# PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT

**REPORT**

# PRELIMINARY GEOTECHNICAL INVESTIGATION
# CARRIZO ENERGY SOLAR FARM (CESF)
# SAN LUIS OBISPO COUNTY, CALIFORNIA

PREPARED FOR:

**AUSRA, INC.**

URS PROJECT NO. 22239472.01200

**OCTOBER 1, 2007**

R E P O R T

# PRELIMINARY GEOTECHNICAL INVESTIGATION
# CARRIZO ENERGY SOLAR FARM (CESF)

*Prepared for*

Ausra, Inc.
2585 E. Bayshore Drive
Palo Alto, CA 94303

URS Project No. 27666014.00010

October 1, 2007

URS

1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4314
619.294.9400 Fax: 619.293.7920

URS

October 1, 2007

Mr. Rob Morgan
Ausra, Inc.
2585 E. Bayshore Drive
Palo Alto, CA 94303

Subject: Preliminary Geotechnical Investigation
Carrizo Energy Solar Farm (CESF)
San Luis Obispo County, California
URS Project No. 22239472.01200

Dear Mr. Morgan:

URS Corporation Americas (URS) is pleased to submit the following report presenting the results of our preliminary geotechnical investigation for the proposed Carrizo Energy Solar Farm. This investigation was performed in accordance with our proposal dated June 18, 2007 and Work Order No. 8 of our Agreement for Professional Services, dated June 18, 2007.

This report presents our initial conclusions and preliminary recommendations regarding geotechnical issues at the proposed site. The conclusions are based on the results of limited field exploration and laboratory testing. The results of the study indicate that the site should be suitable for the proposed development, provided the geotechnical and geologic considerations discussed in this report are incorporated into the design. Additional geotechnical investigation will be required prior to final design. The results of thermal laboratory testing and field electrical resistivity testing are also included in the report.

We are pleased to be part of this important project, and if you have any questions, please contact us at (619) 294-9400.

Sincerely,

URS CORPORATION

Michael E. Hatch, C.E.G. 1925
Senior Project Geologist

Kelly C. Giesing, G.E. 2749
Project Engineer

REGISTERED PROFESSIONAL ENGINEER
KELLY C. GIESING
No. GE 2749
Exp. 9/30/09
GEOTECHNICAL
STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST
MICHAEL E. HATCH
No. 1925
Exp. 1/30/09
STATE OF CALIFORNIA

URS Corporation
1615 Murray Canyon Road
Suite 1000
San Diego, CA 92108
Tel: 619.294.9400
Fax: 619.293.7920

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# SECTION 1 INTRODUCTION

This report presents the results of URS Corporation Americas' (URS) preliminary geotechnical investigation for the proposed Carrizo Energy Solar Farm (CESF). The site is located within the Carrizo Plain, which is an unincorporated area of San Luis Obispo County near the towns of Simmler and California Valley, California. The location of the site is shown on the Vicinity Map, Figure 1.

URS understands that Ausra, Inc. (Ausra) is considering the site for future development as a solar-powered electrical generation station. The preliminary geotechnical investigation was undertaken to support Ausra CAII, LLC (dba Carrizo Energy) in their Application for Certification (AFC) to the California Energy Commission (CEC) and provide project planning and preliminary engineering design information. The investigation was performed at a preliminary level; additional geotechnical investigation will be required prior to final design.

## 1.1 PROJECT DESCRIPTION

Our understanding of the project is based on discussions with the project team and the Site Boring Location Plan, dated June 13, 2007 provided by Mr. Joe Patch of Patch Services, LLC, the project engineer. We understand the project will consist of approximately one hundred and ninety-five Compact Linear Fresnel reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs) and associated infrastructure producing up to a nominal 177 megawatt (MW) net. The site is adjacent to an existing 230 kiloVolt (kV) transmission line operated by Pacific Gas & Electric (PG&E).

The 640-acres (one square mile) required for the power plant footprint is planned to be located on one section of land (Section 28) adjacent to SR58/Carrisa Highway. The solar arrays will cover the majority of Section 28 and the steam drums will be located across the solar field. Most of the other components, as well as a warehouse and workshops, water tanks, a switchyard and other equipment, will be located within the 'power block' at the north-central side of the Section. A portion of Section 33 immediately to the south will be used as a construction laydown area. Figure 1 depicts the project and surrounding area.

Site grading will be performed to create level pads for the equipment and reflectors (arrays) with cuts and fills across most of the site expected to be approximately 5 feet or less, with larger cuts and fills in isolated areas[1]. Localized grading with minor cuts and fills may be performed in the construction laydown area.

The reflectors will be lightly loaded, with uplift/overturning forces expected to dominate engineering design considerations. The ACCs are expected to be the most highly loaded structures in the power block; approximate foundation loads were provided by Patch Services on July 26, 2007. Vertical loads (dead plus live plus operating loads) are expected to range from 100 to 400 kips, and maximum lateral loads are expected to be approximately 80 to 90 kips.

[1] Planned site grading is based on the "Grading and Drainage Plan" prepared by Patch Services, revision dated September 8, 2007.

## 1.2 SCOPE OF INVESTIGATION

The scope of this investigation was outlined in our proposal dated June 18, 2007 and included reviewing available data, obtaining boring permits from San Luis Obispo County, performing field explorations, laboratory testing and engineering evaluations and analyses, and preparing this report. In addition to the geotechnical exploration performed on Section 28, limited exploration was also performed on Section 27 to the west, which was also being considered as part of the project at the time of the field investigation. No investigation was performed in the proposed construction laydown area.

Our review of available information and the results of the geotechnical investigation were used to develop conclusions and recommendations regarding:

- General subsurface soil and groundwater conditions;
- Site seismicity;
- The potential for seismic and geologic hazards including surface fault rupture, strong ground motions, liquefaction, lateral spreading, seismic settlement, landsliding, expansive soil and subsidence;
- Site coefficients and near-source factors in accordance with the 2001 California Building Code and 2003 International Building Code;
- Presence and effect of near-surface expansive or collapsible soils, if any;
- Appropriate types and depths of foundations for equipment and structures, including preliminary allowable vertical capacity and lateral resistance;
- Estimated settlement for shallow or deep foundations, as appropriate;
- Site grading considerations, including suitability of near-surface soil for use as fill;
- Foundation installation and constructability considerations;
- Parameters for electrical and thermal resistivity; and
- Recommendations for final geotechnical design investigations.

The results of the field explorations and laboratory testing are included in the appendices of this report.

# SECTION 2 GEOTECHNICAL INVESTIGATION

Prior to beginning our field investigation, we reviewed published geologic information for the site and reviewed site-specific geotechnical data provided by PG&E. Subsurface exploration included advancing a combination of borings and cone penetration tests (CPTs) across the site, and performing electrical resisitivity testing at the proposed site of the power block[2]. The borings and CPTs were widely spaced (typically a half mile apart), consistent with the aims of a preliminary geotechnical investigation. Borings and CPTs required obtaining a drilling permit from San Luis Obispo County; they were advanced at the approximate locations requested by Patch Services, however some modifications were made due to topography and access restrictions. A summary of the investigations performed at the site is provided in Table 1. Laboratory testing was performed on selected soil samples to evaluate geotechnical, thermal and electrical resistivity properties.

## 2.1 PREVIOUS INVESTIGATIONS

We understand a prior solar project, called the ARCO Solar Project, was previously considered and constructed on Section 27, immediately east of the site. A geotechnical investigation and well drilling exploration, coordinated by Bechtel Civil & Minerals, Inc. (Bechtel) were performed as part of that project. The boring logs from the geotechnical investigation are not available, however, the results of some geotechnical laboratory testing performed by Harding Lawson Associates in 1984 were provided. The data is of limited usefulness without the boring logs and the locations of the borings, however the laboratory results can be compared with the results of the current investigation. The laboratory data demonstrates that the majority of the soil within about 100 feet of the ground surface is clay (including medium to high plasticity clay) and clayey sand.

An internal Bechtel memorandum dated June 15, 1984 presents a well drilling report prepared by Don's Drilling Company. Several pilot holes were drilled (locations not known) that encountered only low permeability material to depths of about 600 feet. A third hole encountered lenses of sand and gravel between depths of 460 to 610 feet. The results of a pumping test indicated that the aquifer was confined to semiconfined and was able to provide the pumping capacity of 115 gallons per minute needed for the project. The report notes the occurrence of near-surface groundwater to a depth of about 100 feet, but that it is of 'poor quality'.

Available data is presented in Appendix A and the sources are cited in the References Section.

## 2.2 SUBSURFACE EXPLORATIONS

### 2.2.1 Soil Borings

Eight borings, designated Borings SB-01 through SB-08, were advanced between June 20 and 22, 2007 using a truck-mounted hollow stem auger drill rig. The borings were advanced to depths ranging from

[2] At the time of the field investigation, the power block was conceptually located on the west side of Section 27, and therefore several borings and one CPT were concentrated at that location. The electrical resistivity survey was performed at the revised (current) power block location.

30.5 to 95.5 feet below the ground surface (bgs). Soil samples were obtained at 5- to 10-foot depth intervals. The approximate locations of the borings are shown on the Site Plan, Figure 2. Boring locations were recorded using hand-held GPS (global positioning system) equipment; boring elevations were estimated from the topographic survey[3].

Samples were obtained with both Modified California and Standard Penetration Test (SPT) samplers. A geologist from our firm logged the borings, and the soils encountered were classified in general accordance with the Unified Soil Classification System. A Key to Logs of the borings is presented in Appendix B as Figure B-1. Logs of the borings are presented in Figures B-2 through B-9. Additional details of the subsurface investigation are presented in Appendix B.

### 2.2.2 Cone Penetration Testing

Nine CPTs, designated CPT-1 through CPT-9, were advanced to depths ranging from 30 to 86 feet bgs. Practical refusal was reached at some locations prior to achieving the desired depth. The approximate locations of the CPTs are shown in Figure 2. The CPT provided measurements of tip resistance ($Q_c$), sleeve friction ($F_s$) and pore water pressure ($P_w$) at 2-inch intervals during penetration. All CPT soundings were performed in accordance with ASTM D 5778.

Additional details of the CPT soundings are provided in Appendix C. The CPT data are also plotted and tabulated in the appendix.

### 2.2.3 Electrical Resistivity Testing

Electrical resistivity testing was performed to support the design of the electrical grounding system. The testing was conducted using geophysical methods in accordance with ASTM standard G57-06. Three sets of Wenner resistivity arrays were performed using four stainless steel electrodes at twelve different spacings. The maximum length at each array was 450 feet. The approximate locations of the arrays are shown on Figure 2. Additional discussion and the results are provided in Appendix D.

## 2.3 LABORATORY TESTING

### 2.3.1 Geotechnical Laboratory Testing

Soil samples were collected from the borings and returned to our geotechnical laboratory for further classification and testing. The materials encountered in the borings were visually classified and evaluated with respect to strength, swelling potential, compressibility, density, and moisture content. The visual classifications were further evaluated by performing moisture content, dry density, Atterberg Limits, Expansion Index and grain size distribution tests. Limited testing was also performed to evaluate strength, compressibility, compaction characteristics and R-Value (for pavement design). Results of the laboratory tests are shown at the corresponding sample locations on the boring logs in Appendix B. Detailed laboratory test results are presented in Appendix E.

[3] The topographic survey was performed by Vaughan Surveys, Inc., revised August 8, 2007 (preliminary topographic survey, Job #07-052).

### 2.3.2 Thermal Resistivity Testing

Thermal resistivity testing was performed by Geotherm Inc. on three undisturbed soil samples collected from the upper ten feet of the borings. Additional discussion and the results are provided in Appendix F.

### 2.3.3 Corrosivity Testing

Eight soil samples were tested to evaluate corrosion potential and resistivity properties. The results are summarized in Table 2.

# SECTION 3 SITE CONDITIONS

Our knowledge of the site conditions has been developed from a review of the area's geology, historical information, and the field and laboratory programs undertaken for the current investigation.

## 3.1 GEOLOGIC AND SEISMIC SETTING

The primary geologic sources of published information used for this report include the United States Geologic Survey (USGS), the United States Department of Agriculture (USDA), and the County of San Luis Obispo. Much of the geologic information in this region is based on geologic mapping performed by Tom Dibblee. Specific references include: "Regional Geologic Map of San Andreas and Related Faults in Carrizo Plain, Temblor, Caliente, and La Panza Ranges and Vicinity, California: A Digital Database (USGS, 1999); the "Soil Survey of San Luis Obispo County, California, Carrizo Plain Area" (USDA, 2003); and the "Safety Element, San Luis Obispo County General Plan," (San Luis Obispo County Department of Planning and Building, 1999).

### 3.1.1 Physiographic Setting

The site is within the Coast Ranges geomorphic province, which incorporates most of the Central California coast. It is also within the northern portion of the Carrizo Plain physiographic subunit. The Carrizo Plain is a narrow, northeast-southwest trending plain and alluvial valley. The flat lying valley is surrounded by mountains and has internal surface drainage. The Temblor Range separates the plain from the San Joaquin Valley to the northeast, and the Caliente Range and La Panza Mountains bound the plain to the southwest and west, respectively. A regional geologic map is presented as Figure 3, and the associated legend is presented on Figure 4.

The lowest point in the Carrizo Plain is at Soda Lake, an alkali wetland about 10 miles south of the site, where the ground surface is on the order of 1,900 feet Mean Sea Level (MSL). The highest part of the plain is at about Elevation 2,100 feet. The Temblor Range reaches elevations ranging from 3,000 to 4,300 feet MSL, and the Caliente Range is as high as 5,100 feet MSL. The Carrizo Plain is perched, and is about 1,000 feet higher than the Cuyama Valley and about 1,500 feet higher than the nearest portion of the San Joaquin Valley. (Arrowsmith, 1995). The surrounding mountains are steep and rugged with some rolling hills.

The northwestern portion of the Carrizo Plain is dissected by the San Juan drainage, which flows to the Salinas River. (Arrowsmith, 1995).

### 3.1.2 Geologic Setting

The San Andreas fault dominates the geology in the Carrizo Plain. It forms the northeast boundary of the Carrizo Plain, passing through the foothills of the Temblor Range. The San Juan fault, Big Spring fault and Morales fault pass through the hills to the west and southwest of the plain. Faulting has caused deformation and uplift of the hills, which have been subsequently eroded.

The majority of the Temblor and Caliente Ranges are composed of Miocene-age sedimentary rock consisting of sandstone, shale, conglomerate and siltstone. These materials were originally deposited in ocean water or fresh water.

Quaternary (young) alluvium blankets the Carrizo Plain. It is up to several hundred feet thick, and is thickest at Soda Lake. The alluvium consists of interbedded gravel, sand, silt and clay. The recent alluvium is underlain by the Paso Robles Formation, which outcrops in the hills along the northeast side of the plain. The Paso Robles Formation is a Pleistocene-age alluvial deposit and is about 3,000 feet thick near the San Andreas fault. (USDA, 2003). Both the young alluvium and the Paso Robles Formation are derived from material eroded off the surrounding mountains.

### 3.1.3 Seismic Setting

This portion of California is within the broad boundary zone between the North America tectonic plate to the east and the Pacific tectonic plate to the west. The San Andreas fault is the primary element of this boundary, located approximately 5 miles to the east of the site. The compression and shearing in the boundary zone between these two plates have resulted in the broad zone of complex faulting experienced in the area. The major faults further divide the area into four distinct seismotectonic domains. The Carrizo Plain is within the Salinian Domain, characterized by northwest-trending faults and granitic and crystalline metamorphic basement rocks (San Luis Obispo County Department of Planning and Building, 1999).

Seismicity is concentrated along the right-lateral strike-slip faults along the eastern and western margins of the Salinian Domain. The largest reported historic earthquake in the domain was the 1857 Fort Tejon earthquake (M 7.9). This earthquake was reported to have ruptured 345 kilometers (km) of the San Andreas fault in the vicinity of the Carrizo Plain. In the Western San Joaquin Valley Domain, immediately east of the San Andreas, seismicity is caused by thrust and reverse faulting, which creates active folding. The high seismicity of the folding regime was seen in the 1983 Coalinga earthquake (M6.7) (San Luis Obispo County Department of Planning and Building, 1999).

The site is adjacent to the Cholame segment of the San Andreas fault zone. This segment is 62 km in length and has a characteristic slip rate of 34 mm/year. The San Juan fault is subparallel to the San Andreas fault and is located along the western margin of the Carrizo Plain area, approximately 5 miles west of the site. The fault is classified as potentially active by San Luis Obispo County, however, it is considered an active fault source with a maximum moment magnitude of 7.0 by the State of California (San Luis Obispo County Department of Planning and Building, 1999; International Conference of Building Officials, 1998).

While the historical record in the area goes back only about 200 years, several other significant earthquakes have occurred in the recent past. The 1952 Arvin-Tehachapi Earthquake occurred on the White Wolf fault near Bakersfield, with an estimated magnitude of 7.5. The 1934 and 1966 Parkfield earthquakes occurred on the San Andreas fault near the northeast corner of San Luis Obispo County. They had magnitudes of M6.0 and M5.5, respectively (San Luis Obispo County Department of Planning and Building, 1999).

The approximate locations of the faults in the vicinity of the site and epicenters of previous historic earthquakes are shown on Figure 5.

## 3.2 SURFACE CONDITIONS

Ground surface elevations on Section 28 range from approximately elevation 2,060 feet MSL near the northeast corner to about 2,020 feet MSL near the southwest corner, generally gently sloping down to the southwest (Vaughan Surveys, Inc., 2007). In the proposed construction laydown area, ground surface elevations range from about 2,020 to 2,000 feet MSL, sloping toward a minor drainage that traverses the area (USGS, 1966, 1973, and 1982).

The land is primarily covered with agricultural grassland. It has been tilled/disked in the past for agricultural use.

## 3.3 SUBSURFACE CONDITIONS

### 3.3.1 Alluvial Soil

The borings, CPTs and laboratory test results indicate that the alluvial soil within the upper 100 feet of the site is primarily clayey sand, sandy clay and clay, with minor amounts of silty sand, silt, and gravel. The upper two to four feet of soil has been modified by disking or other surficial impacts, and is either very stiff to hard clay and sandy clay or medium dense to dense clayey sand. The borings did not indicate any evidence of a 'hard pan' layer, however many of the CPTs show a spike in tip resistance at a depth of 4 to 6 feet. Below the surficial layer, the soil is typically very stiff to hard clay, sandy clay and silt, or dense to very dense clayey and silty sand. In some locations, the soil strength decreased to stiff or medium dense immediately below the groundwater table.

The results of laboratory testing demonstrate that both the near-surface and deeper clayey soils show moderate expansion potential in some locations. The results from the previous investigation on Section 27 demonstrate that some of the soil has a high expansion potential.

The alluvial deposits are characterized by intervals of clay and clayey sand without obvious lateral continuity. This suggests that these materials were deposited in a low energy alluvial plain environment, with small scale drainages and streams that shifted location often. More information on lateral continuity will be generated during a final exploration where points are closer together. Laboratory hydrometer testing indicates that the fine-grained fraction of the soils consists of both clay and silt-sized particles, although the clay particles appear to control the physical properties in most cases.

Boring SB-02 and CPT-9 were advanced at the same location to confirm that the CPTs are providing soil classifications consistent with the observations and results of the laboratory testing. In general, the two types of explorations correlate well. The data from CPT-9 suggests that much of the soil is silty; laboratory classifications indicate the fine-grained portion is predominantly clayey.

In addition to the primary soil types discussed above, a five-foot thick layer of dense sand with silt was encountered in Boring SB-05 at a depth of 15 feet. In the deep boring, SB-08, a ten-foot thick layer of clayey sand with gravel was observed at a depth of about 90 feet.

### 3.3.2 Groundwater

Groundwater was observed in some borings at the site, and the CPTs also provided an indication of groundwater levels. Across Section 28, groundwater was measured within about 30 feet of the ground surface at the end of drilling program. Groundwater was most shallow at the southwest corner of the site, closest to the drainage, where it was encountered at a depth of 13.5 feet below the ground surface (bgs). On the north and east sides of the Section, the depth to groundwater was between 25 and 30 feet bgs.

The groundwater level often rose in the borings between the time of encountering water and completing the boring. This suggests the groundwater may be partially confined by the clayey soil. We understand the area had higher than average rainfall during the winter of 2006-2007, possibly contributing to the high groundwater pressures.

# SECTION 4 DISCUSSIONS, CONCLUSIONS, AND PRELIMINARY RECOMMENDATIONS

In our opinion, the site is geotechnically suitable for the proposed solar power plant. The soil at the site is generally very stiff and/or very dense and should provide moderate to high strength and low compressibility for the support of structures and equipment on shallow (light to moderate structures and equipment) or deep foundations (heavy equipment). The primary geotechnical considerations for design and construction are expected to include:

1. The presence of near-surface soil with a moderate expansion potential. For improvements supported at or near the ground surface, measures such as overexcavation and replacement with non-expansive fill, soil treatment, or structural measures to resist heave will likely be required.

2. The potential for localized settlement at the southwest corner of the site due to liquefaction during a large earthquake. Additional exploration will be required to further evaluate the extent of the potentially liquefiable zone and expected settlement.

3. Strong seismic ground shaking.

The following sections of this report provide an evaluation of the geotechnical design and construction issues related to the project and present preliminary recommendations for design. The discussions, conclusions, and preliminary recommendations are based on the information provided to us, results of current and previous field explorations, laboratory testing, engineering evaluations and analyses, literature research, empirical correlation, and professional judgment. The recommendations are based on limited subsurface data and loading information, and should be considered preliminary at this time. Additional subsurface investigation should be performed prior to final design.

## 4.1 SEISMIC AND GEOLOGIC HAZARDS

### 4.1.1 Fault Rupture

There are no known mapped faults that project through the site and no geomorphic evidence of active faulting, and therefore the potential for fault rupture through the site is considered low.

### 4.1.2 Strong Ground Motions

Due to the proximity to the San Andreas fault, the project area could be subject to moderate to strong ground shaking in response to a local or more-distant large-magnitude earthquake occurring during the expected life span of the proposed development. Regional planning level estimates of ground motion are presented in the California Geological Survey (CGS) Probabilistic Seismic Hazards Mapping Ground Motion Page (CGS, 2003b). This Probabilistic Seismic Hazards Assessment (PSHA) model estimates that the peak ground acceleration (PGA) for the site area is about 0.56 g (percentage of gravity) for the hazard level associated with a 10 percent probability of exceedence in 50 years. For the 2 percent probability of

exceedance in 50 year hazard level the USGS National Seismic Hazard Maps show a peak ground acceleration of about 0.88g (CGS, 2003b).

### 4.1.3 Seismic Coefficients

Table 3 provides 2001 California Building Code (CBC) Seismic Coefficients. The site is 7.6 km from the San Andreas fault, which is seismic source type A, and 8.2 km from the San Juan fault, a type B fault. The San Andreas fault controls the CBC design. 2003 International Building Code (IBC) seismic design parameters are provided in Table 4.

### 4.1.4 Liquefaction

Liquefaction is a phenomenon where loose, saturated coarse-grained soils (with less than 50% passing the No. 200 sieve) lose their strength and acquire some mobility from strong ground motion induced by earthquakes. The secondary effects of liquefaction include sand boils, settlement, reduced soil shear strength, lateral spreading and global instability due to liquefaction (flow slides) in areas with sloping ground.

The liquefaction hazards map in the San Luis Obispo County General Plan (San Luis Obispo County Department of Planning and Building, 1999) shows the site within an area with a high potential for liquefaction. This designation is due to the presence of variable alluvial soil in the Carrizo Plain. Groundwater levels across most of the site range from about 15 to 30 feet bgs, and liquefaction is not known to occur deeper than about 50 feet bgs; therefore, the zone between the ground surface and 50 feet bgs was evaluated for liquefaction. Within these depths, the soil was observed to be primarily clay and sandy clay, although minor sand layers were present. These sand layers were typically one to two feet thick, generally dense, and not considered susceptible to liquefaction. An exception was in the boring at the southwest corner of Section 28, closest to the drainage, where a potentially liquefiable layer of clayey sand approximately ten feet thick was encountered. The soil has a high silt and clay content and would not typically be considered liquefiable. However, strong ground accelerations could occur due the proximity of the site to the San Andreas fault, and the layer could experience on the order of one to two inches of liquefaction-induced settlement during a major earthquake. The settlement could propagate to the ground surface causing localized ground deformations in the southwest corner of Section 28.

Additional subsurface investigation should be performed as part of a design level geotechnical investigation to further evaluate the potential for liquefaction (settlement and lateral extent) and determine whether mitigation is required. Mitigation measures for liquefaction, if required, could include extending pile foundations below the liquefiable zone or designing the foundations or the structures to accept some differential settlement. More comprehensive mitigation measures could consist of treating the potentially liquefiable layer using compaction grouting, soil mixing, or other methods to increase the density. Such measures could be cost effective if the treatment area is limited in extent.

In general, the potential for liquefaction to occur at the Project site is low with the exception of soil at the southwest corner. Site-specific data indicates that the soil observed below the groundwater table typically either has sufficiently high clay content or is sufficiently dense sandy material to reduce the potential for liquefaction to occur. Where zones of looser, cleaner sand do exist at the site, such as at the southwest

corner, they are likely to be limited in extent; liquefaction-induced settlement is likely to be localized and confined to the southwest corner of the site. Potentially liquefiable material was not found in the subsurface near the power block.

The potential for strength loss in the fine grained soil at the site was evaluated using plasticity and grain size data. The soil tested was found to have a sufficiently high plasticity to resist liquefaction.

Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported down slope or in the direction of a free face by earthquake and gravitational forces. Because of the absence of significant slopes, the site is not considered susceptible to lateral spreading. Further, continuous potentially liquefiable soil layers, along which lateral spreading typically occurs, were not encountered during the geotechnical investigation; therefore, lateral spreading is not considered a significant seismic hazard.

### 4.1.5 Secondary Effects of Seismic Activity

Seismically induced settlement of dry soils (seismic compaction) can occur during strong ground shaking in loose, clean granular deposits above the water table, resulting in ground surface settlement. The soil observed above the groundwater level was typically either sufficiently dense or contains a high clay fraction, and therefore the potential for seismic compaction is low. Where zones of looser sand deposits are present, the resulting settlement at the ground surface is expected be less than ¼ inch.

Tsunamis are seismically induced waves generated by sudden movements of the ocean bottom during submarine earthquakes, landslides, or volcanic activity. Based on the inland location of the site, there is not a potential for damage due to a tsunami.

### 4.1.6 Expansive Soil

The results of laboratory testing demonstrate that both the near surface and deeper clayey soils show moderate expansion potential (i.e., a plasticity index (PI) greater than 22 and a low natural moisture content) in some locations. The results from the previous investigation on Section 27 encountered some soil with a high expansion potential. This condition is common in arid climates with low rainfall and high evaporation. When expansive soil with low moisture content is exposed to moisture (due to rainfall, irrigation, seasonal moisture change or other source) it can swell, and lightly loaded structures supported on expansive soil can be damaged due to uplift caused by swelling. The results of laboratory testing indicate that the soil could swell between two and six percent without confinement; vertical loads of the structures will reduce the swell, however, reflector loads are expected to be light.

### 4.1.7 Collapsible Soil

Collapsible soils are unsaturated materials that undergo a volume change upon saturation. They are typically Aeolian (wind-deposited) sand or silt, or loess, a silt deposit, with high void ratios and low cohesion. The soil observed above the groundwater level during the geotechnical investigation generally has a high clay content with moderate plasticity and is not susceptible to collapse. One zone of sandy silt

about five feet thick was observed at the southwest corner of the Section 28. The material was found to be very stiff and is just above the groundwater level where it has likely been exposed to water during high rainfall events; therefore, the potential for soil collapse to occur at the site is low.

### 4.1.8 Landsliding

The site is on relatively level ground, and therefore the risk of landsliding is very low. The hills to the east and west of the site could experience landslides, however, due to their distance from the site and proposed improvements, the potential for landslides to impact the site is negligible.

## 4.2 SITE PREPARATION CONSIDERATIONS

The upper two to four feet of soil (typically about two feet) has been disturbed due to agricultural activities and natural processes at the site and therefore may not be suitable for support of surface improvements such as foundations, roads, building floor slabs and hardscape. Further, the results of laboratory testing demonstrate that soil with moderate expansion potential is present in the near-surface; this material has the potential to swell.

The preferred method to eliminate the potential for structural damage due to expansive and/or loose surficial soil is to overexcavate the soil below footings and hardscape and replace it with non-expansive fill. Recommended overexcavation depths would be 12 to 18 inches below hardscape and 2 to 3 feet below footings. Due to the large number of shallow foundations expected to be required to support the reflectors, large-scale removal and replacement may not be practical. Alternatively, it may be feasible to recompact the upper 2 to 3 feet of existing soil in combination with some or all of the following measures:

- Modify the expansion properties of the soil with lime or cement treatment;
- Moisture condition the existing soil to above optimum moisture content when recompacting;
- Design the structures to allow some heave;
- Provide sufficient structure weight on the footings to counteract heave forces;
- Connect footings with grade beams to reduce differential movement due to heave;
- Provide expansion joints in concrete slabs; and
- Provide impermeable surfaces and direct water away from foundations and hardscape to reduce changes in moisture content.

As an alternative, the structures could be supported on small-diameter piles that gain support in friction in the soil below the upper zone where volume change can occur. However, due to the large number of foundations that will be required to support the reflectors, the use of piles is not likely to be practical.

Additional field and laboratory testing will be required during the final investigation to further evaluate the extent of the moderately expansive soil and the most appropriate soil preparation methods to mitigate

the potential for foundation damage. Laboratory testing should include swell tests to measure the heave that could occur below loaded foundations.

### 4.2.1 Preliminary Earthwork Recommendations

Prior to commencing site work, existing structures, abandoned utilities and improvements, vegetation and soil containing organic material should be removed and properly disposed off-site. As discussed above, some overexcavation and recompaction, replacement, and/or with possible soil treatment, is likely to be required below foundations and surface improvements. The depth of removal or modification should be further evaluated in design-level studies. All fill and backfill should be compacted to a minimum relative compaction of 90 percent. Moisture content during placement should be 3 to 5 percent in excess of the optimum moisture content for natural soil and near optimum moisture content for imported non-expansive fill. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill or backfill divided by the maximum dry density determined in accordance with ASTM D1557. Fill soil should be placed in loose lifts no thicker than 8 inches.

Imported fill soils for the project should comprise select material meeting the following criteria:

- At least 40 percent material at less than ¼ inch in maximum dimension.
- An expansion index of less than 30 (ASTM D4829) or a PI less than 12.
- No perishable, spongy, deleterious, environmentally sensitive, or otherwise unsuitable material.

Most of the soil that would be excavated for recompaction should meet these requirements with the exception of expansion potential. As discussed above, the project team will evaluate the re-use of potentially expansive soil.

### 4.2.2 Preliminary Trench Backfill Recommendations

Utilities should be supported on sand or gravel bedding material having a sand equivalent (SE) of 30 or greater. Engineered fill may be used as trench backfill over the bedding zone. A maximum particle size of 4 inches is recommended for trench backfill.

Backfill for utility trenches and other excavations is also considered fill, and should be compacted according to the recommendations previously presented. If imported clean sand or gravel is used as backfill, it should be compacted to at least 95 percent relative compaction. Jetting of trench backfill should not be permitted.

### 4.2.3 Infiltration Basins

We understand that small infiltration basins will be used to collect stormwater for permeation into the ground. Due to the clayey nature of the near-surface soil, permeabilities are expected to be low. Based on soil type, permeability is expected to range from $10^{-3}$ cm/s (centimeters per second) for clayey sand to $10^{-7}$ cm/s for clay with very low sand content. Material in the higher permeability range was found at various depths below about three feet deep, although additional geotechnical investigation will be

required to evaluate the lateral extent of the coarser-grained layers. Artificial higher permeability zones may be constructed using gravel to allow for more storage of stormwater and eventual infiltration. Field tests, such as soakaway tests, should be considered for inclusion in the final geotechnical investigation to measure infiltration rates.

## 4.3 FOUNDATION CONSIDERATIONS

The soil at the site consists primarily of stiff to hard clay and medium dense to very dense clayey sand. The moderate expansion potential of the near-surface soil may require overexcavation and replacement with non-expansive fill or treatment and recompaction below shallow foundations as discussed previously. Provided the expansion potential is addressed, the near-surface soil below the upper disturbed zone is suitable for the support of lightly to moderately loaded equipment and structures constructed on shallow spread or strip footings or mat foundations. Heavy equipment with large overturning moments may need to be supported on deep foundations, such as Cast-In-Drilled-Hole (CIDH) or driven piles gaining support in friction. Uplift loads on the reflectors will also need to be resisted.

The following sections discuss the application of conventional shallow continuous and spread footings, mat foundations, deep foundations and tiedown anchors.

### 4.3.1 Shallow Footings

The solar reflectors, other lightly loaded equipment, and small out-buildings can likely be supported on shallow footings constructed on undisturbed alluvium, treated/recompacted existing soil, or imported fill. Shallow foundations may be continuous strip and isolated spread footings. Preliminary recommended allowable bearing pressures for foundations supported on engineered fill or undisturbed alluvium are presented in the following table.

**Preliminary Shallow Foundation Recommendations**

| Material | Vertical Allowable Bearing Pressure (psf) |
|---|---|
| Engineered Fill | 2,500 |
| Undisturbed Alluvium | 4,000 |

The above allowable bearing pressures incorporate a factor of safety against shear failure of at least 3. A one-third increase in the allowable bearing pressure may be used for transient loads such as seismic or wind forces.

The minimum footing width should be at least 24 inches. The minimum footing embedment depth should be at least 24 inches below the lowest adjacent grade. For the lightly-loaded reflectors or small structures supported on thickened-edge slabs, a footing width of 18 inches and depth of 12 inches will likely be acceptable, however this needs to be checked after actual loads are determined. The Structural Engineer should determine the footing embedment, width and reinforcement based on anticipated loads and estimated differential settlements.

Resistance to lateral loads on the shallow foundations may be provided by passive resistance along the outside face of the footing and frictional resistance along the bottom of the footing. The following parameters may be used to design footings poured neat against the soil.

**Preliminary Lateral Loading Recommendations**

| Material | Allowable Passive Pressure (psf/ft) | Frictional Resistance Coefficient | Reduced Frictional Resistance Coefficient[a] |
|---|---|---|---|
| Engineered Fill or Undisturbed Alluvium | 250 | 0.35 | 0.25 |

a. Reduced frictional resistance coefficient should be used when combined with passive resistance.

Ultimate sliding resistance generated through a soil/concrete interface can be computed by multiplying the total dead weight structural loads by the coefficients in the table above. For at-grade structures, the upper 12 inches of soil should be neglected in passive pressure calculations in areas where there will be no hardscape that extends from the outside edge of the footing to a horizontal distance equal to three times the footing depth. The resistance from passive pressure should be neglected where utilities or similar excavations may occur in the future.

The settlement of shallow foundations for a given bearing pressure depends upon the footing size, shape and embedment depth along with the variability and stiffness of the supporting soils. A total settlement of 1/2 inch has been estimated using the allowable vertical bearing pressures provided above for a continuous strip footing that is 24 inches wide. A reflector footing that is 18 inches wide and 12 inches deep with a bearing pressure less than 1,000[4] psf should experience a total settlement less than 1/4 inch. This estimate only considers the settlement that develops from application of dead loads. Further evaluation of total and differential settlement should be performed after structure loads and foundation configurations are determined, following the final geotechnical investigation.

### 4.3.2 Mat Foundations

Mat foundations can be used for heavier structures that would otherwise require the use of large footings, or for structures where differential settlement between footings cannot be accommodated. The high stiffness of a mat foundation can accommodate large structural loads by redistributing the load over a large area (lower contact pressures). Mats may also reduce the effects of underlying expansive soil due to their greater depth (possibly below the zone of seasonal moisture change) and equalizing heave across a structure.

Mat foundations supported on undisturbed alluvium or up to two feet of fill may be designed, on a preliminary basis, for a vertical allowable bearing pressure of 4,000 psf. The lateral design recommendations presented above for footings may also be used for mats.

[4] While higher allowable bearing pressures than 1,000 psf are acceptable, it is estimated that actual bearing pressures below the reflector foundations will be between 50 and 1,000 psf due to the light loads and minimum width recommendations.

Settlement will depend upon the size of the mat and the applied load. For a 10 by 10 foot mat, preliminary settlement estimates are 1/3 inch for a bearing pressure of 1,000 psf and one inch for 4,000 psf. The geotechnical analysis of a mat foundation typically uses a modulus of vertical subgrade reaction (k) developed from evaluations of settlement that considers actual loads, the plan layout of the mat and local variations in subsurface conditions. On a preliminary basis, a k of 50 pounds per cubic inch (pci) may be used for design. Settlement and modulus should be reevaluated as part of the final geotechnical investigation.

### 4.3.3 Deep Foundations

As discussed previously, deep foundations may be required in limited locations within the power block to support the loads of heavy equipment with large overturning moments. Pile foundations could also be used to support the reflectors; piles would provide resistance to uplift loads and heave forces, however they are not expected to be cost-effective. CIDH or driven precast-prestressed concrete piles would gain support in friction in the clays and sands at the site. CIDH piles are typically 18 to 24 inches in diameter, while driven concrete piles may be 14 or 18 inches square. Driven steel H-piles could also be used, although they are likely to be cost prohibitive.

CIDH Piles may be difficult to install, primarily due caving of the soil below the groundwater level; slurry or casing could be used to reduce the potential for caving. However, the use of deep foundations is expected to be very limited, and the mobilization of a pile driving rig will not likely be warranted. Hence, CIDH piles are likely to be the most appropriate pile type.

Preliminary frictional resistance on a pile is estimated to be 1,250 psf (ultimate). Using a factor of safety of 3, and assuming an 18-inch diameter CIDH pile, a 50 foot long pile would be required to support a vertical downward load of 100 kips. Pile groups would be required to support higher loads. The frictional capacity should be further evaluated as part of the final geotechnical investigation, incorporating results of additional laboratory testing, the effects of end bearing, and increased capacity with depth. Settlement of a properly constructed pile should be less than 1/4 inch.

### 4.3.4 Tiedown Anchors

Tiedown anchors can be used to resist vertical uplift forces, such as those expected for the reflectors. For drilled anchors, the ultimate frictional capacity presented above may be used with a factor of safety of 1.5 to estimate the required tiedown length on a preliminary basis. Proprietary pile types, such as helical anchors, may provide a more cost effective method of resisting uplift loads.

## 4.4 RETAINING WALLS

To accommodate the proposed grading, minor slopes and/or small retaining walls will be required. Retaining walls, if used, are expected to be about 3 to 5 feet high, and up to about 10 feet high in limited locations. The preliminary retaining wall design recommendations are for walls with a vertical back, no hydrostatic pressure, no surcharge, and for relatively level ground behind the wall. For a wall that is free to deflect, we recommend using active lateral earth pressures with an equivalent fluid pressure of 35 pounds per cubic foot.

Although the groundwater level is at least 13 feet below grade, infiltrating surface water could build-up behind the walls. We therefore recommend the walls be drained to prevent the build-up of hydrostatic pressures. The clayey on-site soil is not expected to provide good drainage characteristics, and should not be used as wall backfill. The backfill immediately adjacent to retaining walls (minimum horizontal distance of 12 inches measured perpendicular to the wall) should comprise ¾ inch crushed rock or gravel wrapped in filter fabric. Pervious Backfill conforming to Standard Specifications for Public Works Construction or Permeable Material conforming to Caltrans Standard Specifications may be used as an alternative to crushed rock or gravel. Prefabricated drainage composites may be an alternative to free draining crushed rock or gravel and should be attached to the back of the retaining wall. The free-draining material or drainage composite should connect to a perimeter drain at the base of the wall. The base drain should be a minimum four-inch diameter perforated pipe (SDR 35) leading to a suitable protected outlet. The pipe should be surrounded by at least three cubic feet, per foot of pipe, of free draining ¾-inch crushed rock wrapped with filter fabric, such as Mirafi 140N, or approved equivalent.

## 4.5 CORROSION POTENTIAL

Table 2 provides a summary of the pH, resistivity, and water-soluble sulfate and chloride test results performed on samples of the soil within about 6 feet of the ground surface. It has been our experience with local corrosion engineers that resistivity results between 1,000 and 2,000 ohm-cm may be considered moderately corrosive to metallic utility piping and conduits, while results between 500 and 1,000 ohm-cm may be considered corrosive. Laboratory results ranged from 600 to 1,200 ohm-cm, suggesting the soil has a potential for corrosivity. A Corrosion Engineer should be consulted for additional design recommendations.

Table 19A-4 of the 2001 CBC, Requirements for Concrete Exposed to Sulfate Containing Solutions, states that sulfate exposure from concentrations less than 0.10 percent is considered negligible. The results of the tests indicate that the potential for sulfate attack to concrete may be considered low. Further, the soil has a negligible potential for chloride attack.

## 4.6 ADDITIONAL INVESTIGATION

As discussed previously, the current investigation was designed to provide preliminary subsurface information and recommendations. Explorations were widely spaced across the one mile square site; additional geotechnical investigation will be required prior to final design.

The number of exploration points should be developed based on the final site layout, loading conditions and planned foundation types. It is estimated that exploration points about 30 feet deep and spaced on the order of 200 feet should be sufficient in the area of the solar arrays. Closer-spaced explorations about 50 feet deep are likely to be required in the power block area where deep foundations may be used and near the southwest corner of the site to further evaluate liquefaction.

The success of the current field investigation suggests that CPTs are a rapid and cost-effective way of exploring the site. CPTs also provide detailed data that can be used to develop engineering parameters for design. A similar combination of borings and CPTs should provide adequate information for a design-level study.

## 4.7 ADDITIONAL GEOTECHNICAL SERVICES

Development of the project will require further geotechnical services. Based on our experience, geotechnical services for design are anticipated to consist of the following:

- Coordination of the design-level geotechnical investigation;
- Providing design development services, such as evaluation of foundation settlement and modulus of subgrade reaction once structural loads are known and/or reevaluation of foundation design recommendations based on changes to the project;
- Preparing a probabilistic seismic hazard analysis (PSHA) of strong ground motion, and response spectra.

# SECTION 5 UNCERTAINTY AND LIMITATIONS

At the time of preparing this report, only preliminary structural loads and foundation layouts for the project were available. Depending upon the final design, the recommendations presented herein will need to be reviewed and revised, as appropriate.

We have observed only a very small portion of the pertinent subsurface conditions. Subsurface explorations were widely spaced, on the order a half mile apart and primarily around the site boundary, and we have relied on them for the evaluations described in this report. The preliminary recommendations made herein are based on the assumption that soil and geologic conditions do not deviate appreciably from those observed during our investigation. Additional exploration will be required prior to final design to evaluate soil conditions between the widely spaced explorations that were advanced for this preliminary investigation.

Geotechnical engineering and the geologic sciences are characterized by uncertainty. Professional judgments presented herein are based partly on our understanding of the proposed construction, and partly on our general experience. Our engineering work and judgments rendered meet current professional standards; we do not guarantee the performance of the project in any respect.

# SECTION 6 REFERENCES

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**Table 1**
**Summary of Subsurface Explorations**
**Carrizo Energy Solar Farm (CESF)**

| Exploration Number | Exploration Type [a] | Completed Exploration Depth (feet) |
|---|---|---|
| SB-01 | Boring | 31 |
| SB-02 | Boring | 51 |
| SB-03 | Boring | 31 |
| SB-04 | Boring | 31 |
| SB-05 | Boring | 51 |
| SB-06 | Boring | 31 |
| SB-07 | Boring | 30.5 |
| SB-08 | Boring | 95.5 |
| CPT-1 | CPT | 31 |
| CPT-2 | CPT | 31 |
| CPT-3 | CPT | 86 |
| CPT-4 | CPT | 30.5 |
| CPT-5 | CPT | 32 |
| CPT-6 | CPT | 42 |
| CPT-7 | CPT | 64.5 |
| CPT-8 | CPT | 44.5 |
| CPT-9 | CPT | 52.5 |

**Table 2**
**Summary of Soil Corrosivity Test Results**
**Carrizo Energy Solar Farm (CESF)**

| Exploration No. | Depth (ft) | USCS Symbol | pH | Minimum Resistivity (ohm-cm) | Sulfate Content (ppm) | Chloride Content (ppm) |
|---|---|---|---|---|---|---|
| SB-01 | 5.0 | SC | 6.8 | 800 | 9 | 120 |
| SB-02 | 10.0 | SC | 7.1 | 600 | ND | 105 |
| SB-03 | 3.0 and 6.0[b] | SC | 7.3 | 1,200 | 159 | 105 |
| SB-04 | 6.0 | CL | 7.3 | 660 | ND | 105 |
| SB-05 | 3.0 | SC | 7.2 | NT[c] | 54 | 75 |
| SB-06 | 6.0 | CL | 7.3 | 1,100 | 117 | 60 |
| SB-07 | 6.0 | CL | 7.5 | 900 | 84 | 60 |
| SB-08 | 3.0 | SC | 7.6 | 1,100 | 6 | 105 |

Notes:

a. ND – Not detected at laboratory detection limits.
b. Samples from 3.0 and 6.0 were combined for testing.
c. NT – Not tested, due to insufficient sample volume.

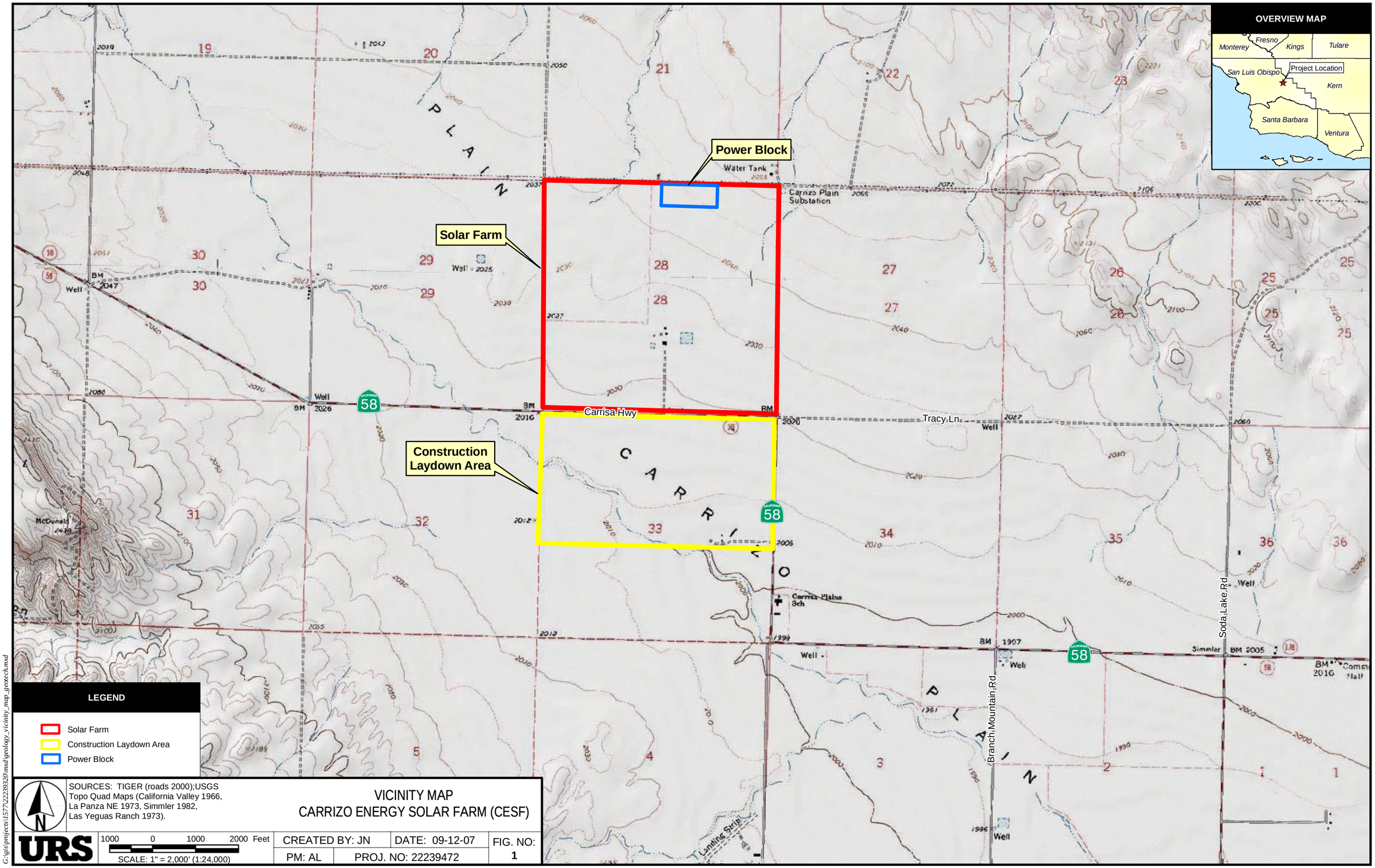
**Table 3**
**2001 California Building Code (CBC) Seismic Coefficients**
**Carrizo Energy Solar Farm (CESF)**

| Parameter | Value | 2001 CBC Reference |
|---|---|---|
| Soil Profile | $S_D$ | Table 16-J |
| Seismic Zone | 4 | Figure 16-2 |
| Zone Factor, Z | 0.4 | Table 16-I |
| Seismic Source Name | San Andreas Fault | Figures I-27 and J-27* |
| Seismic Source Type | A | Table 16-U |
| Distance to Seismic Source | 7.6 km | Figure O-38 |
| Near Source Factor, Na | 1.1 | Table 16-S |
| Near Source Factor, Nv | 1.4 | Table 16-T |
| Seismic Coefficient Ca | 0.48 | Table 16-Q |
| Seismic Coefficient Cv | 0.90 | Table 16-R |

*(International Conference of Building Officials, 1998)

**Table 4**
**2003 International Building Code (IBC) Seismic Coefficients**
**Carrizo Energy Solar Farm (CESF)**

| Parameter | Value | 2003 IBC Reference |
|---|---|---|
| Site Class | D | Table 1615.1.1 |
| Site Coefficient, $F_a$ | 1.0 | Table 1615.1.2(1) |
| Site Coefficient, $F_v$ | 1.5 | Table 1615.1.2(2) |
| Mapped Spectral Accelerations for Short Periods, $S_s$ | 4.5 | Figure 1615(3) |
| Mapped Spectral Accelerations for a 1-Second Period, $S_1$ | 1.8 | Figure 1615(4) |


OVERVIEW MAP
Monterey
Fresno
Kings
Tulare
San Luis Obispo
Project Location
Kern
Santa Barbara
Ventura
Power Block
Solar Farm
Construction Laydown Area
Carrisa Hwy
Tracy Ln
Soda Lake Rd
Branch Mountain Rd
Carrizo Plain Substation
Water Tank
Carrizo Plain Sch
Simmler
Comm Hall
Landing Strip
McDonald
Well
BM
58
LEGEND
Solar Farm
Construction Laydown Area
Power Block
SOURCES: TIGER (roads 2000);USGS Topo Quad Maps (California Valley 1966, La Panza NE 1973, Simmler 1982, Las Yeguas Ranch 1973).
VICINITY MAP
CARRIZO ENERGY SOLAR FARM (CESF)
URS
1000 0 1000 2000 Feet
SCALE: 1" = 2,000' (1:24,000)
CREATED BY: JN
DATE: 09-12-07
PM: AL
PROJ. NO: 22239472
FIG. NO: 1
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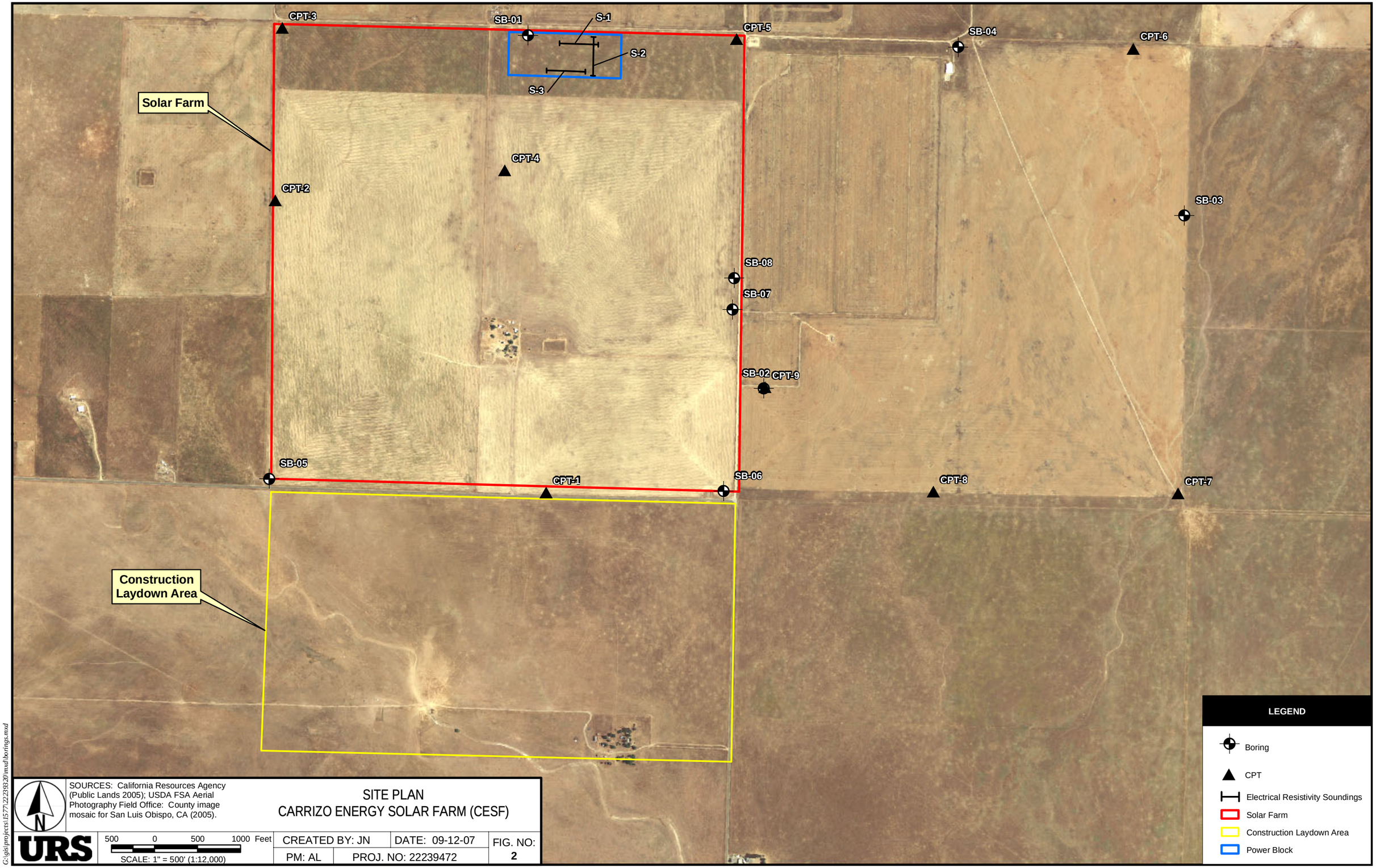


SOURCES: California Resources Agency (Public Lands 2005); USDA FSA Aerial Photography Field Office: County image mosaic for San Luis Obispo, CA (2005).

SITE PLAN
CARRIZO ENERGY SOLAR FARM (CESF)

URS

500 0 500 1000 Feet
SCALE: 1" = 500' (1:12,000)

| | | |
|---|---|---|
| CREATED BY: JN | DATE: 09-12-07 | FIG. NO: 2 |
| PM: AL | PROJ. NO: 22239472 | |

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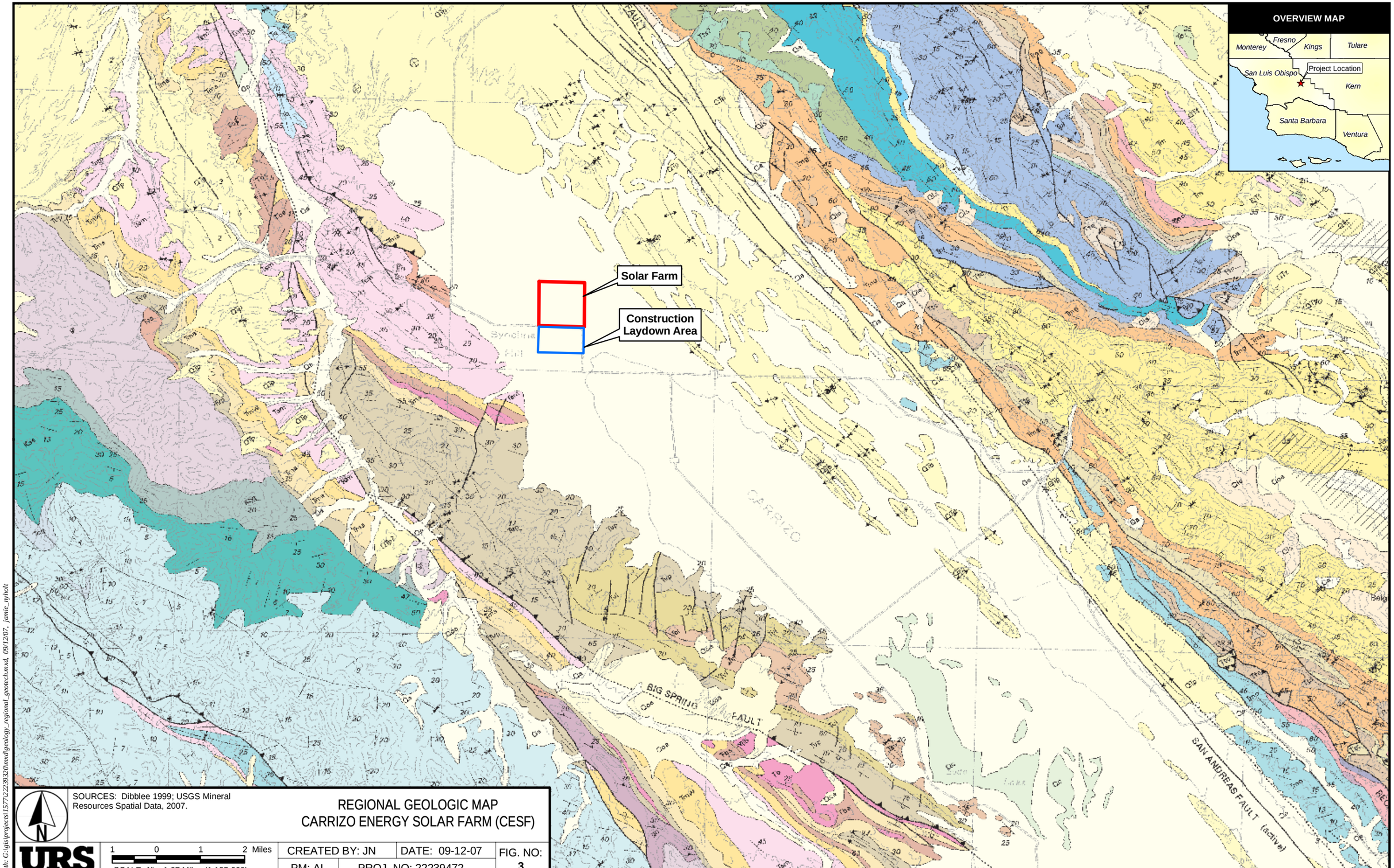



SOURCES: Dibblee 1999; USGS Mineral Resources Spatial Data, 2007.

REGIONAL GEOLOGIC MAP
CARRIZO ENERGY SOLAR FARM (CESF)

URS

1 0 1 2 Miles

SCALE: 1" = 1.97 Miles (1:125,000)

| CREATED BY: JN | DATE: 09-12-07 | FIG. NO: |
|---|---|---|
| PM: AL | PROJ. NO: 22239472 | 3 |

Path: G:\gis\projects\1577\22239320\mxd\geology_regional_geotech.mxd, 09/12/07, jamie_nyholt

# EXPLANATION

**Holocene** — QUATERNARY

Qa, Qc, Qls
Surficial sediments
Qa, alluvium
Qc, playa clay
Qls, landslide rubble

UNCONFORMITY

**Pleistocene**

Qoa
Older alluvium

UNCONFORMITY

VALLEY DEPOSITS

**Pliocene(?) and Pleistocene** — TERTIARY(?) AND QUATERNARY

QTp
Paso Robles Formation

QTt
Tulare Formation

QTu
Unnamed valley sediment

UNCONFORMITY IN MOST AREAS

UPPER TERTIARY SEDIMENTARY SEQUENCE

**Pliocene** — TERTIARY

Tmo
Morales Formation Valley sediments

Tq
Quatal Formation Terrestrial claystone and sandstone

Tu
Unnamed marine sediments Sandstone and siltstone

Tsj
San Joaquin Formation Mostly mudstone

Teb, Te
Etchegoin Formation
Teb, blue sandstone
Te, gray sandstone and siltstone

LOCAL UNCONFORMITIES

MIDDLE TERTIARY SEDIMENTARY SEQUENCE

**Miocene** — TERTIARY

Trr
Reef Ridge Shale

Tbw
Bitterwater Creek Shale
(Mohnian Stage)

Tmb, Tm, Tms, Tmw, Tmu, Tmd, Tmi, Tmg, Tma, Tml
Montery Shale
Tmb, Belridge Diatomite Member (Mohnian Stage)
Tm, McLure Shale Member (mostly Mohnian Stage)
Tms, sandstone lenses
Tmd, Devilwater Shale Member (Luisian Stage)
Tmg, Gould Shale Member (mostly Relizian and Luisian Stages)
Tmi, shale and sandstone unit (Relizian and Luisian Stages)
Tmw, Whiterock Bluff Shale Member (Relizian and Luisian Stages)
Tma, Saltos Shale Member (Saucesian and Relizian Stages)
Tmu, upper part, siliceous shale (Mohnian Stage)
Tml, lower part, argilliceous and siliceous shald (Relizian and Luisian Stages)

Tsm, Tsg, gb, sb
Santa Margarita Formation
Tsm, sandstone
Tsg, conglomerate and breccia
gb, granitic breccia
sb, schist breccia

Tbs
Branch Canyon Sandstone

Tb
Basalt Extrusive and intrusive rocks

Tc
Caliente Formation
Terrestrial. (Hemintordian to Arikareean) Oligocene(?), Miocene, and Pliocene

**Oligocene and Miocene** — TERTIARY

Tvp, Tvs, Ttc, Ttb, Ttm, Ttg, Tts, Ttr, Ttn, Tvl, Tvq, Tvc, Ttu
Vaqueros and Temblor Formations
In areas southwest of San Andreas fault, mapped as Vaqueros Formation.
In areas northeast of San Andreas fault, mapped as Temblor Formation.

Vaqueros Formation
Tvs, sandstone
Tvc, clay shale
Tvp, Painted Rock Sandstone Member (Saucesian Stage)
Tvl, Soda Lake Shale Member (Saucesian and Zemorrian Stages)
Tvq,?Quail Canyon Sandstone Member (Zemorrian Stage)

Temblor Formation
Tts, sandstone
Ttc, clay shale
Ttg, basal conglomerate lens
Ttb, Buttonbed Sandstone Member (Relizian Stage)
Ttm, Media Shale Member (Relizian and Saucesian Stages)
Ttr, Carneros Sandstone Member (Saucesian Stage)
Ttn, upper part of Santos Shale Member (Saucesian Stage)
Ttu,?undivided lower members sandstone and claystone (Zemorrian Stage)

**Oligocene(?)** — TERTIARY

Tsi, Tsc
Simmler Formation
Tsi, mostly sandstone
Tsc, mostly conglomerate

UNCONFORMITY

LOWER TERTIARY MARINE SEDIMENTARY SEQUENCE

**Oligocene** — CENOZOIC

Tw, Tws
Wagonwheel Formation
Tw, clay shale unit (Refugian Stage)
Tws, sandstone unit (Refugian Stage)

**Eocene** — CENOZOIC

Tk, Tkw, Tkg
Kreyenhagen Shale
Tk, undifferentiated shale
Tkw, Welcome Shale Member
Tkg, Gredal Shale Member

Tpr
Point of Rocks Sandstone

Ta
Avenal Sandstone

Tus
Unnamed sandstone

**Paleocene and Eocene** — CENOZOIC

Tl
Lodo Formation

UNCONFORMITY

UPPER CRETACEOUS AND LOWER TERTIARY MARINE SEDIMENTARY SEQUENCE

**Upper Cretaceous, Paleocene, and Eocene** — CRETACEOUS AND TERTIARY — MESOZOIC AND CENOZOIC

Tcg, Tss, Kss, Kcg
Marine clastic sedimentary rocks
Tss, sandstone, clay shale and minor conglomerate. Eocene and Paleocene
Tcg, conglomerate. Paleocene(?)
Kss, sandstone, clay shale, and minor conglomerate. Late Cretaceous
Kcg, conglomerate. Late Cretaceous(?)

UNCONFORMITY

CRETACEOUS AND JURASSIC(?) MARINE SEDIMENTARY SEQUENCE

**Upper Cretaceous** — CRETACEOUS — MESOZOIC

Kcr, Kco, Ks
Mostly marine sedimentary rocks
Ks, sandstone and clay shale, minor conglomerate
Kcr, red conglomerate and mudstone. Terrestrial
Kco, conglomerate

Kp, Kps, Kp, Kpg
Panoche Formation
Kp, clay shale and claystone
Kps, sandstone and clay shale
Kpg, conglomerage

**Lower Cretaceous** — CRETACEOUS — MESOZOIC

Kh
Hex Claystone

**Upper Jurassic(?) and Lower Cretaceous** — JURASSIC(?) AND CRETACEOUS — MESOZOIC

jo
Jolla Formation of Hall and Corbato (1967)
Mostly shale

gf
Gravelly Flat Formation
Mostly shale

EUGEOSYNCLINAL SEDIMENTARY AND IGNEOUS ROCKS — JURASSIC AND (OR) CRETACEOUS — MESOZOIC

sp
Serpentine and serpentinized peridotite

fg, f
Franciscan rocks of Bailey and others (1964)
f, mixed rocks, undifferentiated, pervasively sheared, mainly sandstone (graywacke) and claystone, includes local lenses of chert, limestone, and glaucophane schist
fg, greenstone

CRYSTALLINE PLUTONIC AND METAMORPHIC ROCKS — MESOZOIC OR OLDER

gr
Granitic rocks

hg
Hornblende quartz gabbro

gn
Gneissic rocks

SOURCES: Dibblee 1999.

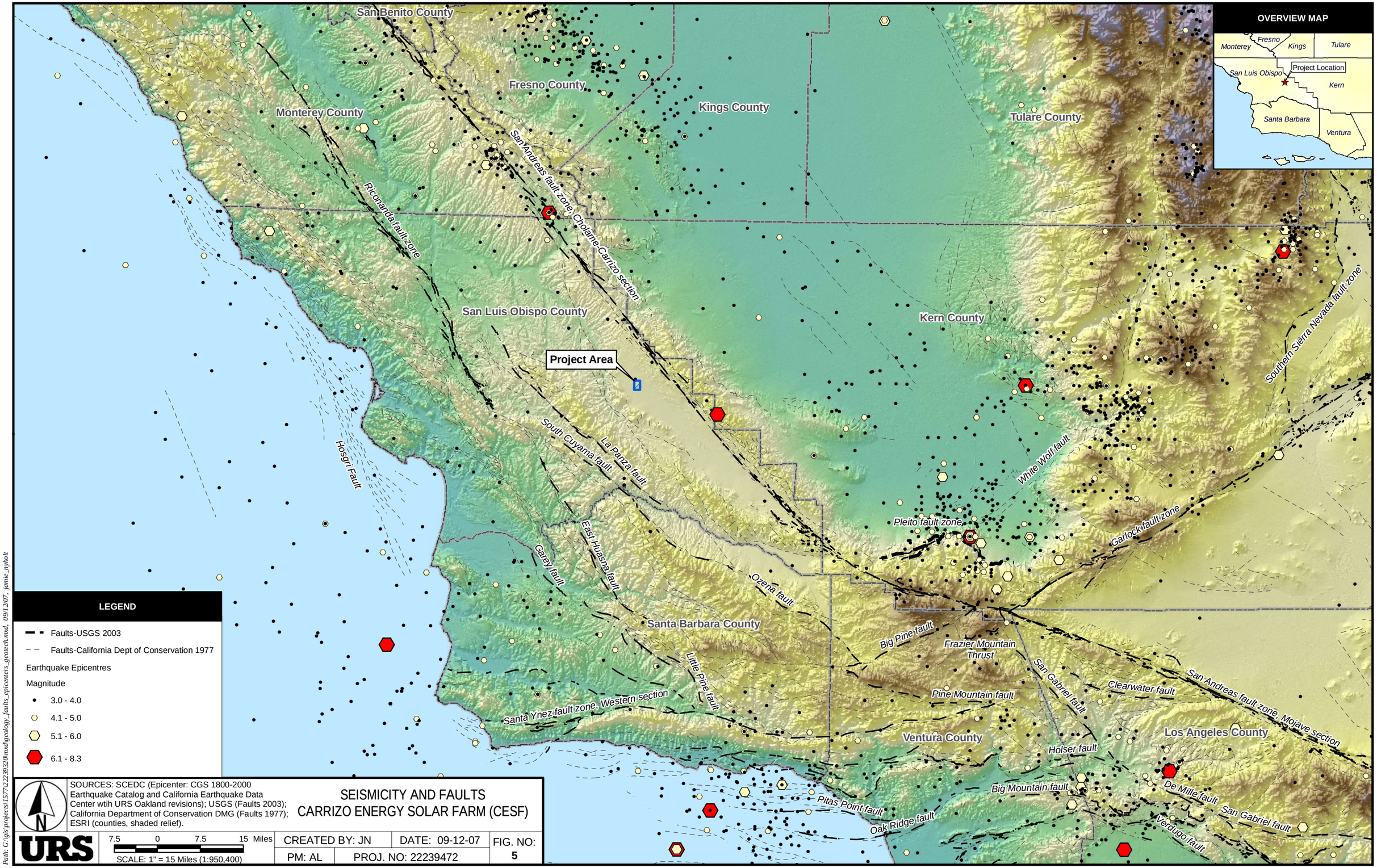
REGIONAL GEOLOGIC MAP LEGEND
CARRIZO ENERGY SOLAR FARM (CESF)

URS

NO SCALE

| CREATED BY: JN | DATE: 09-12-07 | FIG. NO: |
|---|---|---|
| PM: AL | PROJ. NO: 22239472 | 4 |

Path: G:\gis\projects\1577\22239320\mxd\geology_regional_legend_geotech.mxd, 09/12/07, jamie_nyholt




SOURCES: SCEDC (Epicenter: CGS 1800-2000 Earthquake Catalog and California Earthquake Data Center wtih URS Oakland revisions); USGS (Faults 2003); California Department of Conservation DMG (Faults 1977); ESRI (counties, shaded relief).

SEISMICITY AND FAULTS
CARRIZO ENERGY SOLAR FARM (CESF)

| CREATED BY: JN | DATE: 09-12-07 | FIG. NO: |
|---|---|---|
| PM: AL | PROJ. NO: 22239472 | 5 |

Path: G:\gis\projects\1577\22239320\mxd\geology_faults_epicenters_geotech.mxd, 09/12/07, jamie_nyholt

Bechtel Civil & Minerals, Inc.
Engineers—Constructors
Fifty Beale Street
San Francisco, California
*Mail Address:* P.O. Box 3965, San Francisco, CA 94119

March 6, 1984

Mr. Lyle Lewis
Harding Lawson Associates
7655 Redwood Boulevard
Novato, CA 94947

Subject: Test Assignment No. 1 (4 pages)
Job No. 16413-009

Dear Mr. Lewis:

Attached please find a copy of the Test Assignment No. 1 for the samples from the Carissa Plains Project.

Sincerely,

Balakrishna Rao, H-A.

H. A. Balakrishna Rao

cc: H. H. Burke/W. R. Ferris w/attachment
T. McCormick w/attachment
M. F. Salem w/attachment

HABR:jrm
Attachment

12110

A3000179

TEST ASSIGNMENT 1.

# CALCULATION SHEET

LAD 0014 11-70

BECHTEL

12600 E. IMPERIAL HWY. NORWALK, CALIFORNIA 90650

CALCULATION NO. N.A.

P.①

SIGNATURE Balakrishnan Rao N.A. DATE Feb 29, 84 CHECKED _____ DATE _____

PROJECT CARISSA PLAINS JOB NO. 16413

SUBJECT TEST ASSIGNMENT NO. 1 SHEET 1 OF 4 SHEETS

| D.H NO. | Sample No & Type | Depth Range | Recovery or N | MATERIAL TYPE | (150) Vis. Class | 5 Sieve | 10 Sieve + Hydro | 10 Att. Limits | 50 M.C. & Dry | 8 Comp | 30 UU | 9 CU | 10 Consol. | 6 K | 6 Res Col |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ST1 | 1-3.5 | 100 | CL | ✓ | | | | | | | | | | |
| | SS2 | 6-7.5 | N=36 | | | | | | | | | | | | |
| | P3 | 11-13.5 | 96 | CL | ✓ | | ✓ | ✓ | | | | | | ✓ | |
| | P4 | 16-18.5 | 100 | CL | ✓ | | | | ✓ | | ✓ | | ✓ | | |
| | P5 | 21-23.5 | 100 | CL | ✓ | | | | | | | | | | ✓ |
| | P6 | 26-28.5 | 96 | ML | ✓ | | ✓ | ✓ | | | | | | ✓ | |
| | P7 | 33.5-36.3 | 100 | ML | ✓ | | | | ✓ | | ✓ | | ✓ | | |
| | P8 | 36.3-39.1 | 90 | ML | ✓ | | | | | | | | | | |
| | SS9 | 39.1-40.6 | N=45 | SP-GP | ✓ | ✓ | | | | | | | | | |
| | P10 | 42-44.5 | 84 | CL | ✓ | | | | | | | | | | |
| | P11 | 47-49.5 | 100 | ML-CL | ✓ | | | | ✓ | | ✓ | | | | |
| | P12 | 52-54.5 | 100 | ML-CL | ✓ | | ✓ | ✓ | | | | | | | |
| | P13 | 62-64.5 | 100 | CL | ✓ | | | | ✓ | | ✓ | | ✓ | | |
| | P14 | 72-74.5 | 100 | CL | ✓ | | ✓ | ✓ | | | | | | ✓ | |
| | P15 | 82-84.5 | 100 | CL | ✓ | | | | | | | | | | |
| | P16 | 92-94.5 | 56 | CH | ✓ | | | | | | | | | | |

# CALCULATION SHEET

BECHTEL

15400 E. IMPERIAL HWY.
NORWALK, CALIFORNIA 90650

LAO 0016 11-72

CALCULATION NO. N A.

P. 2

SIGNATURE Balakrishna Rao-N.A. DATE Feb 29, 1984 CHECKED – DATE –

PROJECT CARISSA PLAINS JOB NO. 16413

SUBJECT TEST ASSIGNMENT 1. SHEET 2 OF 4 SHEETS

| DH No. | Sample No. & Type | Depth Range | Recovery or N | MATERIAL Type | 150 Vis Class | 5 Sieve | 10 Sieve + Hydro | 10 Att Limits | 50 M.C Dry | 8 Comp | 30 UU | 9 CU | 10 Consol | 6 K | 6 Res Col |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 (Cont). | SS17 | 102-103.5 | N=100 | CH. | ✓ | | | ✓ | ✓ | | ✓ | | | | |
| | P18 | 103.5-106 | 72 | CH | ✓ | ✓ | ✓ | | | | | | | | |
| | P19 | 112-114.5 | 100 | CH (with Nodules) | ✓ | | | | | | | | | | |
| | P20 | 122-124.5 | 60 | SP-GP | ✓ | | | | | | | | | | |
| | P21 | 132-134.5 | 100 | CH | ✓ | | | ✓ | ✓ | | ✓ | | | | |
| | P22 | 142-144.5 | 100 | CH | ✓ | | | | | | | | | | |
| | P23 | 147.5-150 | 100 | CH | ✓ | | | | | | | | | | |

# CALCULATION SHEET

BECHTEL
12400 E. IMPERIAL HWY
NORWALK, CALIFORNIA 90650

CALCULATION NO. NA

SIGNATURE Balakrishna Rao H.A DATE Feb 29, 84 CHECKED _____ DATE _____

PROJECT CARISSA PLAINS JOB NO. 16413

SUBJECT TEST ASSIGNMENT No. 1 SHEET 3 OF 4 SHEETS

| DH No | Sample No & Type | Depth Range | Recovery or N | Material Type | 150 Vis Class | 5 Sieve | 10 Sieve + Hydro | 10 Att Limits | 50 M.C. Rdy | 8 Comp | 30 UU | 9 CU | 10 Consol | 6 K | 6 Res Col |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | ST1 | 3-5.5 | 100 | CL | ✓ | | | ✓ | ✓ | | ✓ | | ✓ | ✓ | |
| | SS2 | 8-9.5 | N=32 | CL | | ✓ | | | | | | | | | |
| | P3 | 13-15.5 | 96 | CL | ✓ | | | | ✓ | | ✓ | | ✓ | | |
| | SS4 | 18-19.5 | N=26 | CL | | | | | | | | | | | |
| | P5 | 23-25.5 | 92 | CL | ✓ | | | | ✓ | | ✓ | | | | |
| | SS6 | 28-29.5 | N=21 | CL | | | | | | | | | | | |
| | P7 | 33-35.5 | 96 | CL | ✓ | | | | ✓ | | ✓ | | | | |
| | SS8 | 38-39.5 | N=29 | ML | | | | | | | | | | | |
| | P9 | 43-45.5 | 88 | ML | ✓ | | | | ✓ | | ✓ | | | | |
| | SS10 | 48-49.5 | N=23 | ML | | | | | | | | | | | |

# CALCULATION SHEET

BECHTEL
12400 E. IMPERIAL HWY.
NORWALK, CALIFORNIA 90650

CALCULATION NO. N A

SIGNATURE B. Calcuishee Roo H.A DATE Feb 29, 84 CHECKED _____ DATE _____

PROJECT CARISSA PLAINS JOB NO. 16413

SUBJECT TEST ASSIGNMENT No. 1 SHEET 4 OF 4 SHEETS

| DH No. | Sample No. & Type | Depth Range | Recovery or N | MATL. Type | (150) Vis | 5 Sieve | 10 Sieve + Hydro | 10 Att Limits | 50 M.C & γdry | 8 Comp | 30 UU | 9 CU | 10 Consol | 6 K | 6 Res Col |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | ST1 | 0-1.5 | 88 | CH | | | ✓ | ✓ | | | | | | | |
| | SS2 | 5-6.5 | N=31 | CL | | | | | | | | | | | |
| | ST3 | 10-12.5 | 76. (Donot use this) | CL | ✓ | | ✓ | ✓ | ✓ | | | | | | |
| | SS4 | 15-16.5 | N=30 | CL | | | | | | | | | | | |
| | P5 | 20-22.5 | 100 | CL | ✓ | | | | ✓ | | ✓ | | ✓ | | |
| | SS6 | 25-26.5 | N=27 | CL | | | | | | | | | | | |
| | P7 | 30-32.5 | 100 | CL | ✓ | | | | ✓ | | ✓ | | | | |
| | SS8 | 35-36.5 | N=25 | CL | | | | | | | | | | | |
| | P9 | 40-42.5 | 100 | CL | ✓ | | | | ✓ | | | | | | |
| | SS10 | 45-46.5 | N=16 | CL | | | | | | | | | | | |
| | P11 | 50-52.5 | 100 | CL | ✓ | | | | ✓ | | | | | | |

**HARDING LAWSON ASSOCIATES**
**OFFICE MEMORANDUM**

To: DR. RAO / BECHTEL Date: 3/23/84

From: Roger File: 30574, 078.01

Subject:

attached are completed data for request #1 — rest by 3/28.

I will mail some data from request #2 on Monday 3/26. - most tx work done on undisturbed samples, compactions completed today. Remold tx work to start next week.

More later -

Regards,
Roger

RECEIVED
MAR 27 1984
H & CE SOILS

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

SHEET 1 OF 2
JOB NO. 3654,075 01
DATE 3/20/84
COMPUTED BY
CHECKED BY

PROJECT BERTHEL
SUBJECT TXUU SUMMARY

| BOR | DEPTH | $\gamma_d$ pcf | w% | $\sigma_3$ psf | $\tau$ psf | ε % |
|---|---|---|---|---|---|---|
| DH1 (P4) | 18.5' | 107.9 | 27.6 | 1920 | 1160 | 3.4 |
| | | | | | 1230 | 6.2 |
| | | | | | 1190 | 9.2 |
| | | | | | 1150 | 12.3 |
| DH1 (P7) | 34.5' | 91.5 | 28.5 | 4500 | 770 | 1.8 |
| | | | | | 1260 | 4.6 |
| | | | | | 1380 | 7.7 |
| | | | | | 1270 | 12.3 |
| DH1 (P11) | 49.5' | 99.7 | 24.7 | 4020 | 1770 | 1.8 |
| | | | | | 2110 | 4.9 |
| | | | | | 2020 | 9.2 |
| | | | | | 1740 | 12.3 |
| DH1 (P13) | 64.5' | 91.3 | 30.7 | 4980 | 2260 | 1.8 |
| | | | | | 2770 | 3.7 |
| | | | | | 3040 | 7.7 |
| DH1 (P17) | 134.5' | 95.5 | 26.1 | 9120 | 1160 | 2.5 |
| | | | | | 1360 | 4.6 |
| | | | | | 1420 | 7.7 |
| | | | | | 1440 | 12.3 |
| DH3 (ST1) | 3.5' | 113.2 | 6.4 | 360 | 2530 | 3.0 |
| | | | | | 2810 | 6.7 |
| | | | | | 2790 | 10.0 |
| | | | | | 2670 | 13.3 |
| DH3 (P3) | 14.5' | 88.2 | 32.4 | 1560 | 1660 | 2.8 |
| | | | | | 1940 | 4.6 |
| | | | | | 1930 | 7.7 |
| | | | | | 1940 | 12.3 |
| DH3 (P5) | 24.5' | 94.5 | 23.8 | 2580 | 1390 | 3.0 |
| | | | | | 2420 | 6.7 |
| | | | | | 2280 | 10.0 |
| | | | | | 2320 | 13.3 |
| DH3 (P7) | 34.5 | 88.1 | 30.1 | 3180 | 1250 | 3.1 |
| | | | | | 1030 | 6.2 |
| | | | | | 890 | 9.2 |
| | | | | | 780 | 12.3 |

PRELIMINARY

**Harding Lawson Associates**
Engineers Geologists
& Geophysicists

SHEET 2 OF 2
JOB NO. 3E24, 078.01
DATE
COMPUTED BY
CHECKED BY

PROJECT GEOTECH
SUBJECT TXUU SUMMARY

| BLOW | DEPTH | $\gamma_d$ pcf | w % | $\sigma_3$ psf | $\sigma_1$ psf | $\varepsilon$ % |
|---|---|---|---|---|---|---|
| DH 3 (P9) | 14.5 | 88.9 | 32.1 | 3760 | 870 | 2.5 |
| | | | | | 960 | 6.2 |
| | | | | | 1000 | 10.8 |
| | | | | | 1030 | 14.5 |
| DH 4 (P5) | 21.5 | 93.8 | 27.3 | 7400 | 2050 | 2.8 |
| | | | | | 2870 | 6.2 |
| | | | | | 3170 | 10.8 |
| | | | | | 3230 | 14.5 |
| DH 4 (P7) | 31.5 | 96.8 | 23.1 | 3000 | 1250 | 1.5 |
| | | | | | 2080 | 4.9 |
| | | | | | 2580 | 9.5 |
| | | | | | 2580 | 12.6 |

PRELIMINARY

# MOISTURE CONTENT – DRY DENSITY

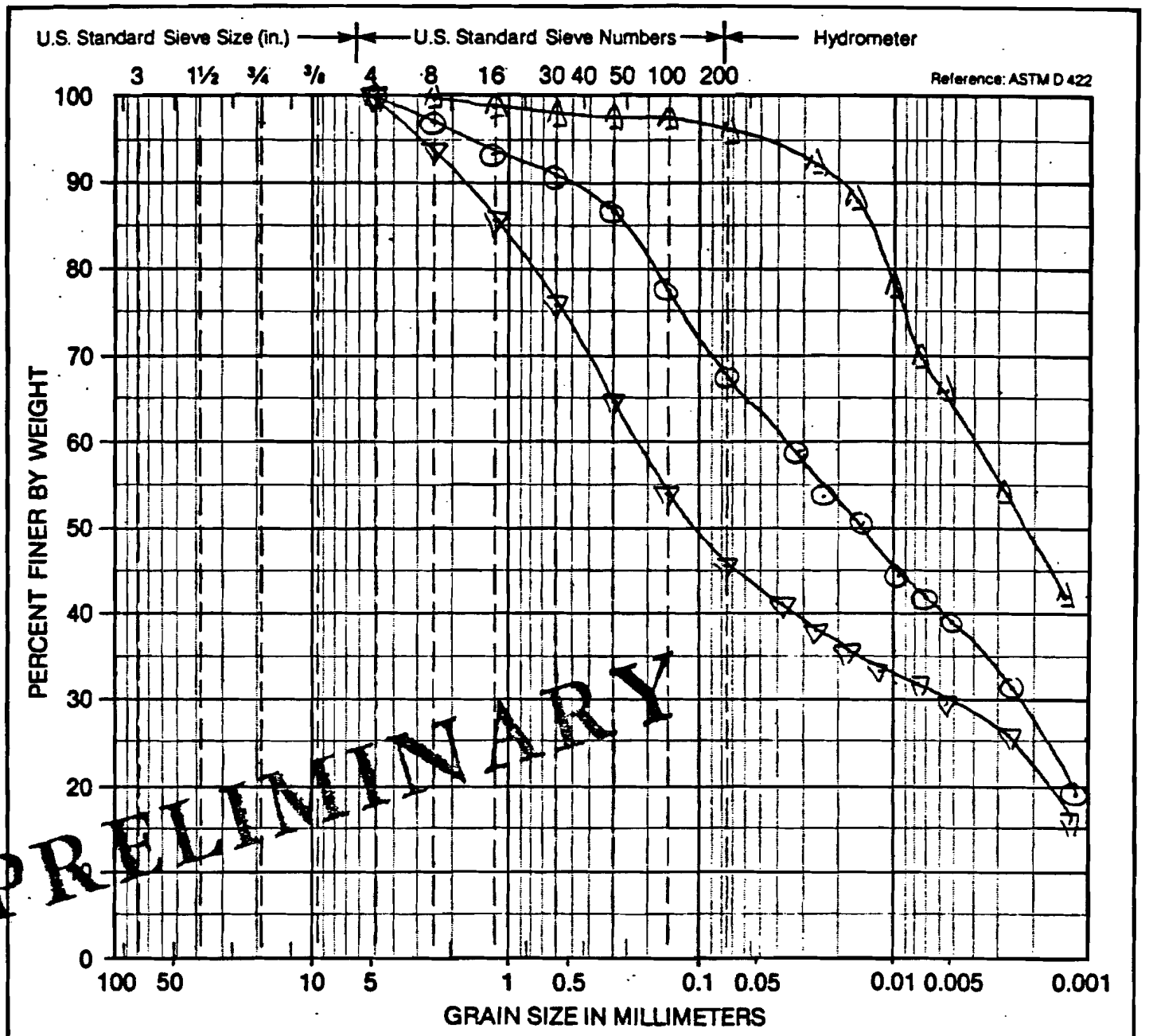
HARDING LAWSON ASSOCIATES

JOB [illegible] NO [illegible] BY [illegible] DATE [illegible]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| BORING | 4 [illegible] | | 4 F11 | | 1 (P7) | | |
| DEPTH | 40.0 - 42.5 | | 50.0 - 52.5 | | 35° | | |
| SOIL | (41.5) Brown Clay w/ silt (CL) w/ some gravel | | Brown Clay w/ silt (CL) | | CL Chunk | | |
| LENGTH (IN.) | 6.5 | | 6.5 | | | | |
| TUBE + WET SOIL | 1812.5 | | 1796.9 | | | | |
| TUBE | 537.0 | | 537.0 | | | | |
| WET SOIL | 1275.5 | | 1259.9 | | | | |
| FACTOR | .091 | | .091 | | | | |
| WET DENSITY (pcf) | 116.2 | | 114.7 | | 115.5 | | |
| CUP# | D-40 | | D-124 | | | | |
| CUP + WET SOIL | 335.3 | | 338.8 | | | | |
| CUP + DRY SOIL | 271.6 | | 271.3 | | | | |
| MOIST. LOSS | 63.7 | | 67.5 | | | | |
| CUP | 41.8 | | 41.3 | | | | |
| DRY SOIL | 229.8 | | 230.0 | | | | |
| MOIST. CONT. (%) | 27.7 | | 29.3 | | 30.0 | | |
| DRY DENSITY (pcf) | 91.3 | | 88.7 | | 88.8 | | |
| BORING | | | | | | | |
| DEPTH | | | | | | | |
| SOIL | | | | | | | |
| LENGTH (in.) | | | | | | | |
| TUBE + WET SOIL | | | | | | | |
| TUBE | | | | | | | |
| WET SOIL | | | | | | | |
| FACTOR | | | | | | | |
| WET DENSITY (pcf) | | | | | | | |
| CUP# | | | | | | | |
| CUP + WET SOIL | | | | | | | |
| CUP + DRY SOIL | | | | | | | |
| MOIST. LOSS | | | | | | | |
| CUP | | | | | | | |
| DRY SOIL | | | | | | | |
| MOIST. CONT. (%) | | | | | | | |
| DRY DENSITY (pcf) | | | | | | | |

PRELIMINARY

Tested by: Computed by: Checked by:




| COBBLES | COARSE | FINE | COARSE | MEDIUM | FINE | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL | | SAND | | | |

| Symbol | Sample Source | Classification |
|---|---|---|
| ○ | DH 1 (P12) 53' | CLAY (CH) |
| △ | DH 1 (P18) 104' | CLAY (CH) |
| ▽ | DH4 (ST 3) 12' | SAND (SC) |

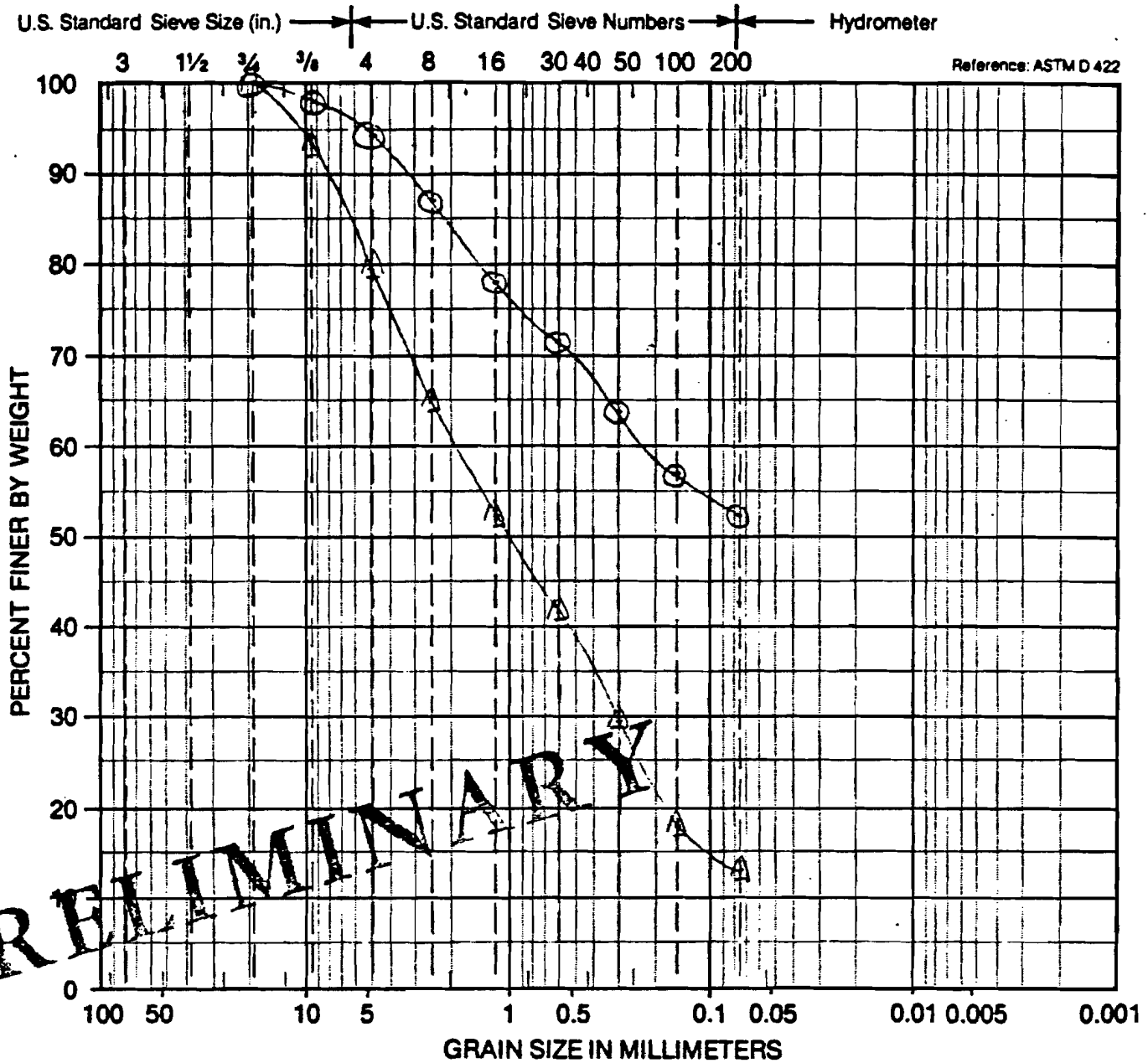
**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Particle Size Analysis**

BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078 | | 3/23/84 | | |




| COBBLES | COARSE | FINE | COARSE | MEDIUM | FINE | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL | | SAND | | | |

| Symbol | Sample Source | Classification |
|---|---|---|
| ⊙ | DH 1 P14 @ 73' | BROWN GRAVELLY SANDY CLAY (CH) |
| △ | DH 1 SS9 @ 40.6' | " CLAYEY GRAVELLY SAND (SC) |

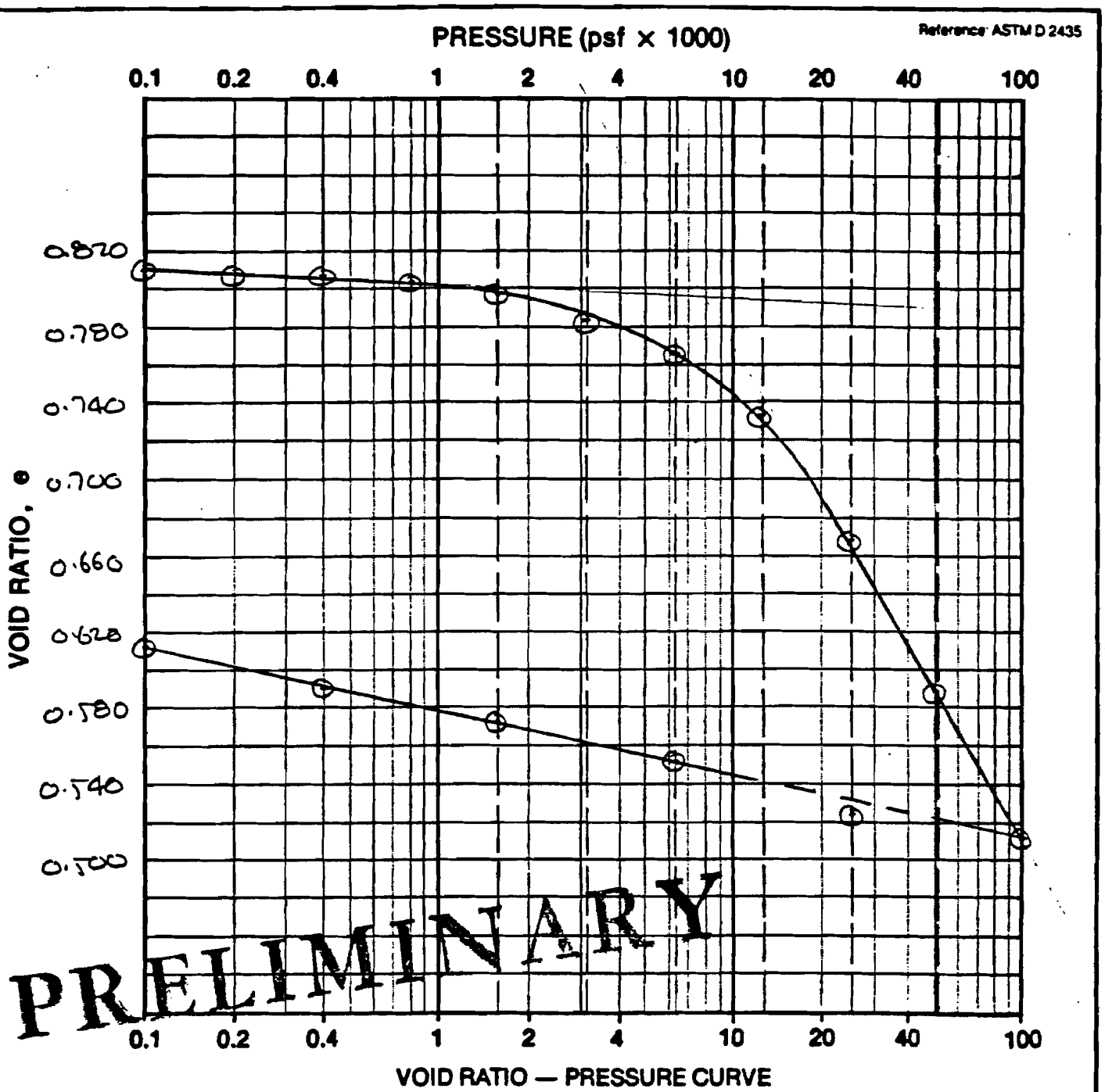
**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Particle Size Analysis**

BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078 | | 3/19/84 | | |




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Type of Specimen UNDISTURBED | | Condition | | Before Test | | After Test | |
| Diameter (in.) 2.43 | Height (in.) 0.80 | Water Content | $w_o$ | 26.2 % | | $w_f$ | 22.5 % |
| Overburden Press., $P_o$ | psf | Void Ratio | $e_o$ | 0.81 | | $e_f$ | 0.612 |
| Preconsol. Press., $P_c$ | psf | Saturation | $S_o$ | 88 % | | $S_f$ | 100 % |
| Compression Index, $C_c$ | | Dry Density | $\gamma_d$ | 93.8 pcf | | $\gamma_d$ | 105.4 pcf |
| LL | PL | PI | | | | Gs | 2.72 |
| Classification | | | Source DH4 (P5) 22.8' | | | | |

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Consolidation Test Report**

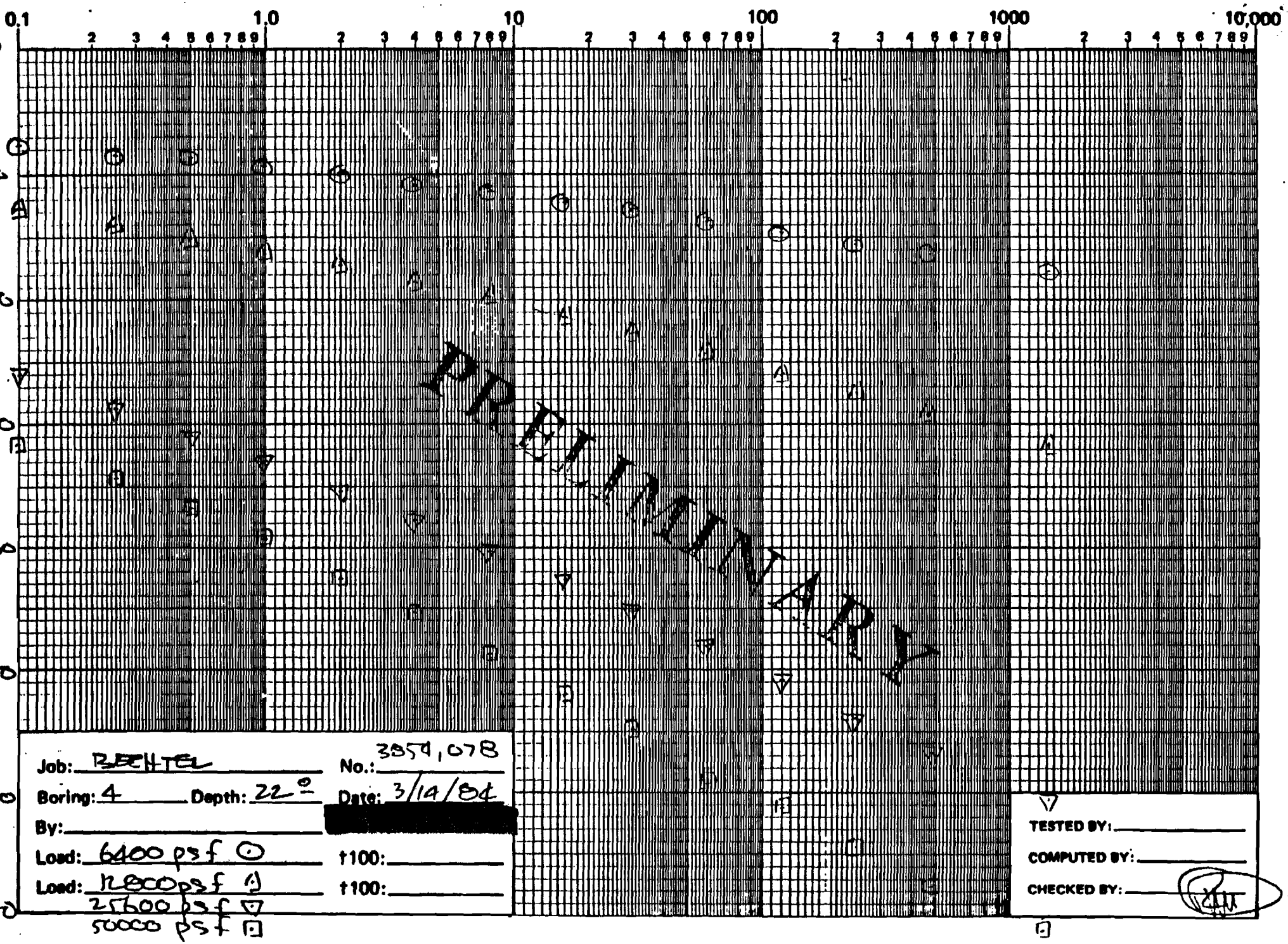
BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854.078 | | 3/21/84 | | |

# CONSOLIDATION TIME - DEFORMATION

HARDING LAWSON ASSOCIATES




Job: BECHTEL

No.: 3354,078

Boring: 4

Depth: 22'

Date: 3/14/84

[redacted]

By:

Load: 6400 psf ○

t100:

Load: 12800 psf △

t100:

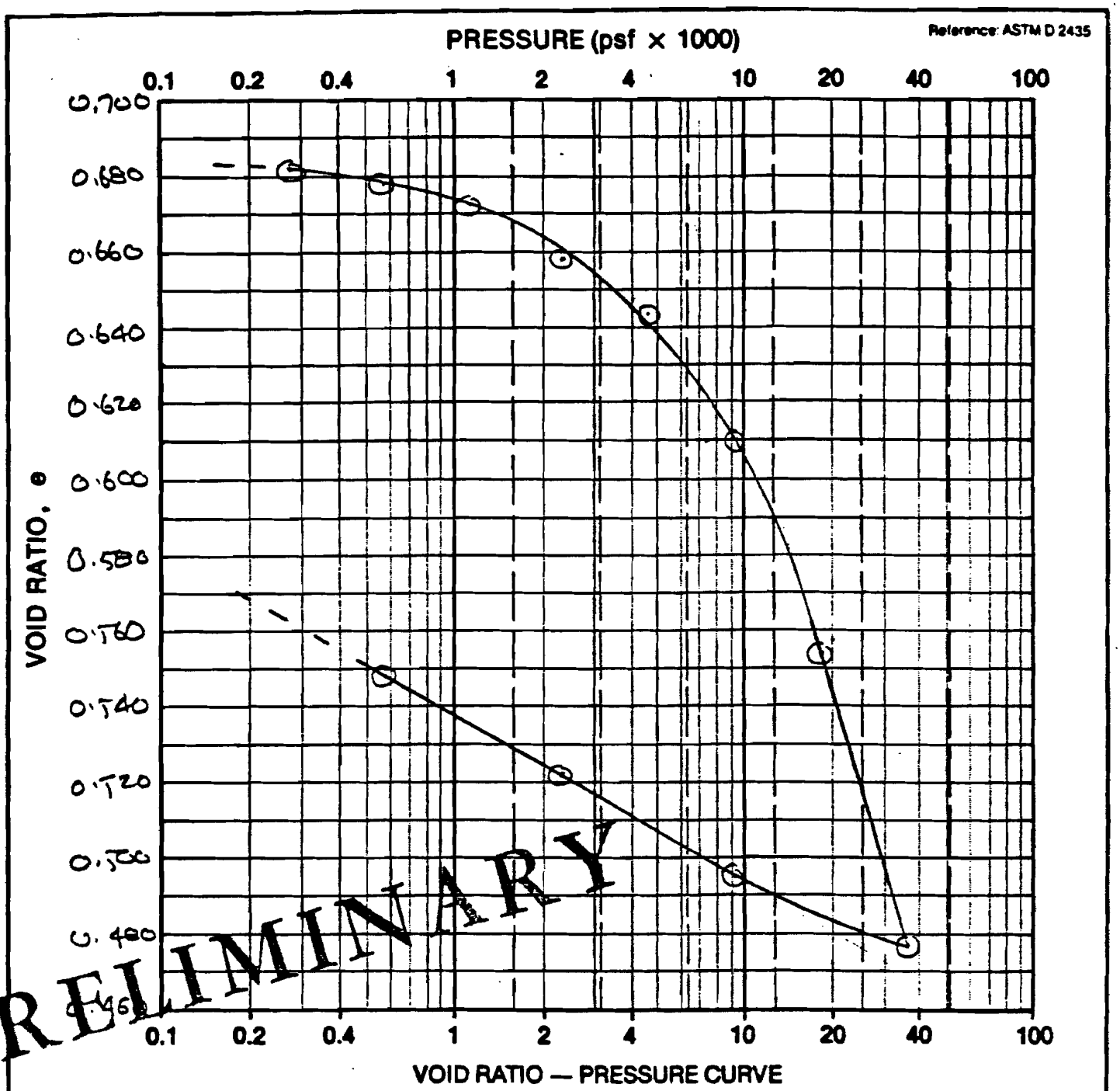
25600 psf ▽

50000 psf □

TESTED BY:

COMPUTED BY:

CHECKED BY:




| Type of Specimen UNDISTURBED | | Condition | | Before Test | | After Test |
|---|---|---|---|---|---|---|
| Diameter (in.) 2.87 | Height (in.) 0.80 | Water Content | $w_o$ | 25.4 % | $w_f$ | 21.4 % |
| Overburden Press., $P_o$ psf | | Void Ratio | $e_o$ | 0.687 | $e_f$ | 0.564 |
| Preconsol. Press., $P_c$ psf | | Saturation | $S_o$ | 98 % | $S_f$ | 100 % |
| Compression Index, $C_c$ | | Dry Density | $\gamma_d$ | 97.7 pcf | $\gamma_d$ | 105.4 pcf |
| LL | PL | PI | | Gs 2.64 | | |
| Classification | | Source DH1 (P4) @ 18.5' | | | | |

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Consolidation Test Report**

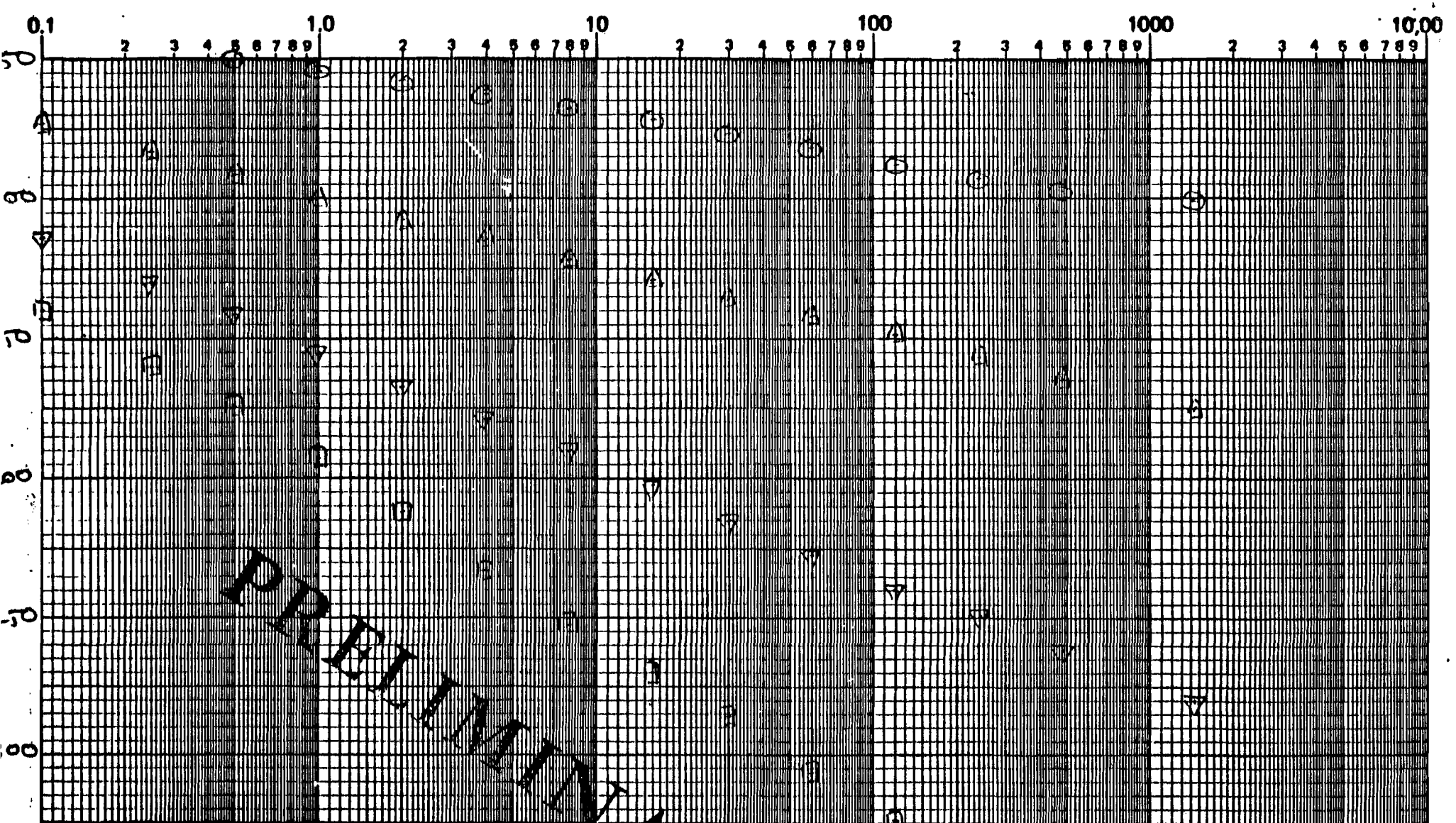
BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078 | | 3/21/84 | | |

# CONSOLIDATION TIME - DEFORMATION

HARDING LAWSON ASSOCIATE.




Job: BEHTEL

No.: 3854,078

Boring: 1 Depth: 18 ft

Date: 2/ /84

By:

Unit No.: 8

Load: 4590 psf ○

t100:

Load: 9180 psf △

t100:

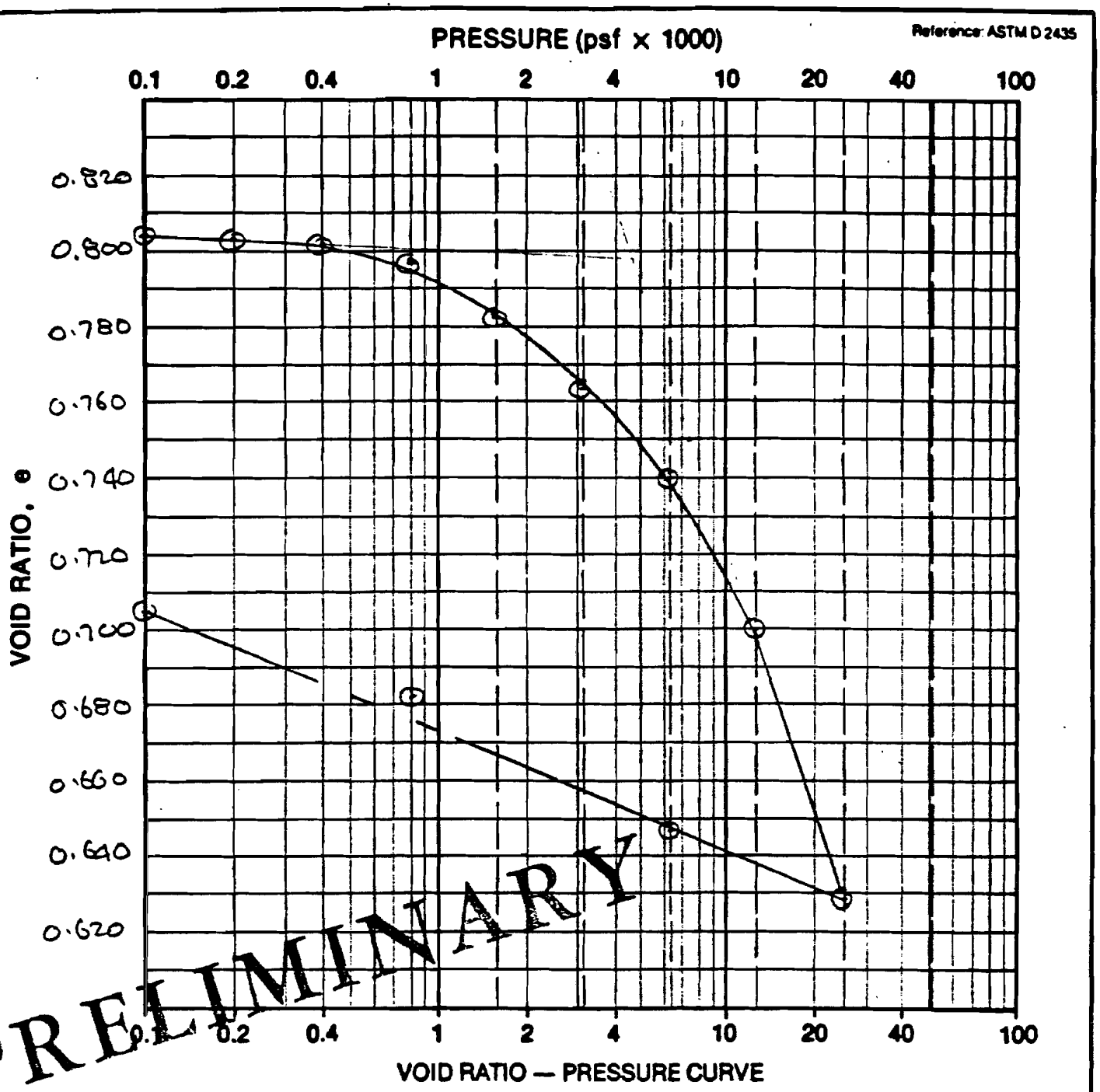
18350 psf ▽

37840 psf □

TESTED BY:

COMPUTED BY:

CHECKED BY:




| Type of Specimen UNDISTURBED | | Condition | | Before Test | | After Test |
|---|---|---|---|---|---|---|
| Diameter (in.) 2.43 | Height (in.) 0.80 | Water Content | $w_o$ | 28.5 % | $w_f$ | 26.4 % |
| Overburden Press., $P_o$ psf | | Void Ratio | $e_o$ | 0.806 | $e_f$ | 0.705 |
| Preconsol. Press., $P_c$ psf | | Saturation | $S_o$ | 94 % | $S_f$ | 100 % |
| Compression Index, $C_c$ | | Dry Density | $\gamma_d$ | 92.3 pcf | $\gamma_d$ | 92.8 pcf |
| LL | PL | PI | | | Gs | 2.67 |
| Classification | | Source DH 3 (P3) 15 ft | | | | |

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Consolidation Test Report**

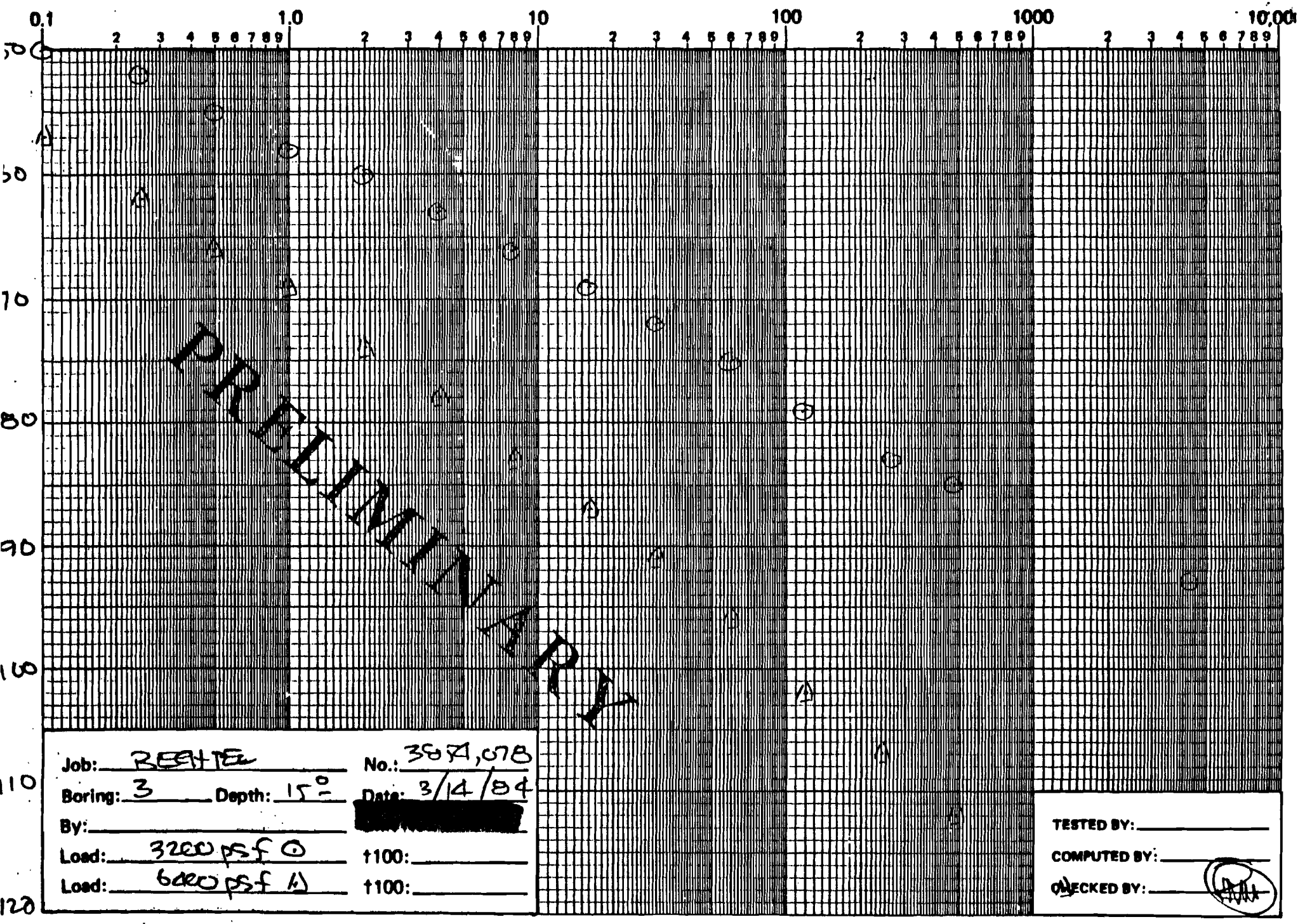
BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 38,74,078 | | 3/21/84 | | |

# CONSOLIDATION TIME - DEFORMATION

HARDING LAWSON ASSOCIATES




Job: BERTEL No.: 3874,078

Boring: 3 Depth: 15'

By: Date: 3/14/84 [redacted]

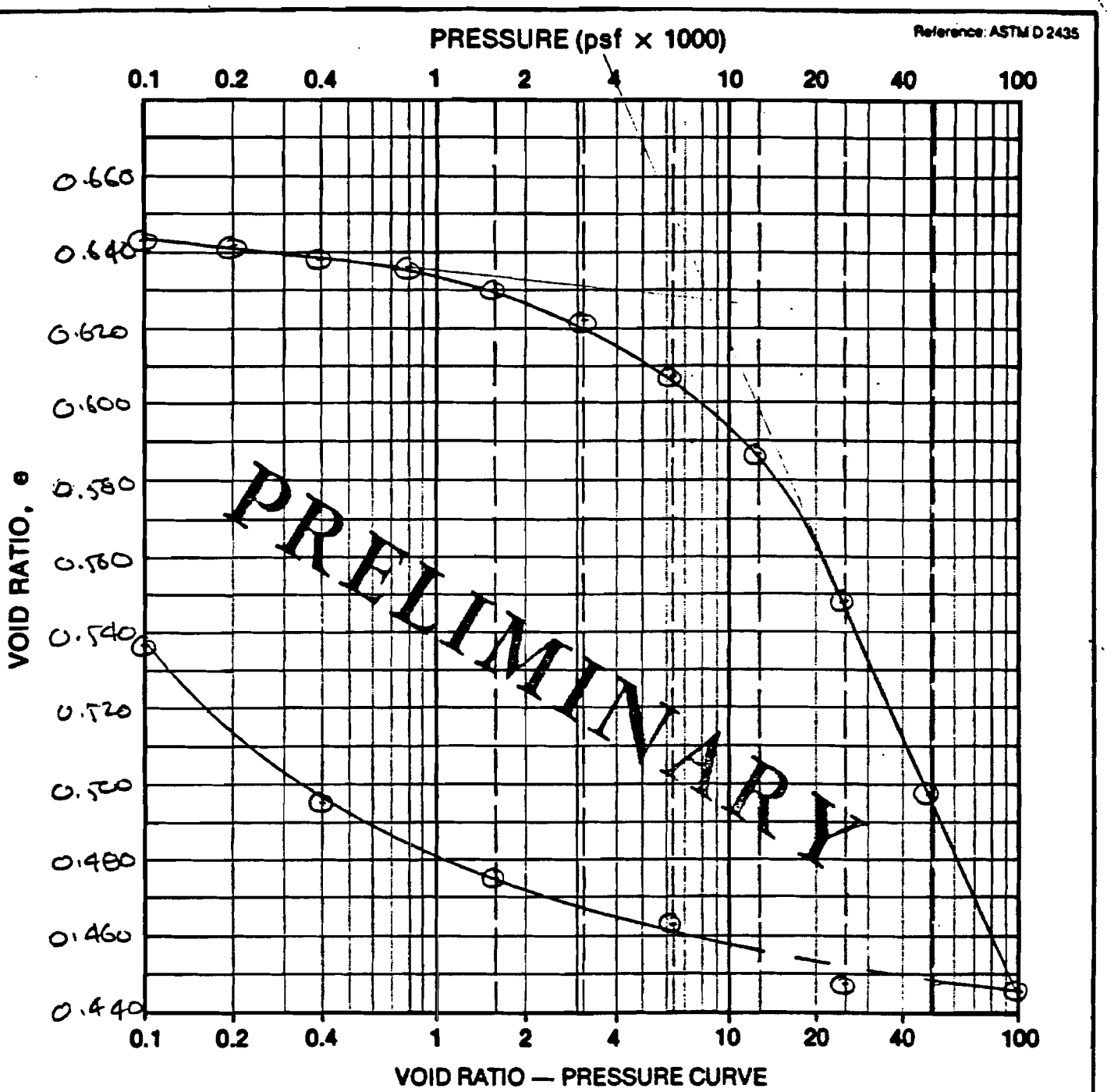
Load: 3200 psf ⊙ t100:

Load: 6400 psf △ t100:

TESTED BY:

COMPUTED BY:

CHECKED BY:




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Type of Specimen UNDISTURBED | | Condition | | Before Test | | After Test | |
| Diameter (in.) 2.43 | Height (in.) 0.80 | Water Content | $w_o$ | 21.3 % | $w_f$ | 20.5 % | |
| Overburden Press., $P_o$ | psf | Void Ratio | $e_o$ | 0.643 | $e_f$ | 0.537 | |
| Preconsol. Press., $P_c$ | psf | Saturation | $S_o$ | 87 % | $S_f$ | 100 % | |
| Compression Index, $C_c$ | | Dry Density | $\gamma_d$ | 100.3 pcf | $\gamma_d$ | 107.3 pcf | |
| LL | PL | PI | | Gs 2.64 | | | |
| Classification | | Source DH 3 (ST1) 5.2' | | | | | |

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Consolidation Test Report**

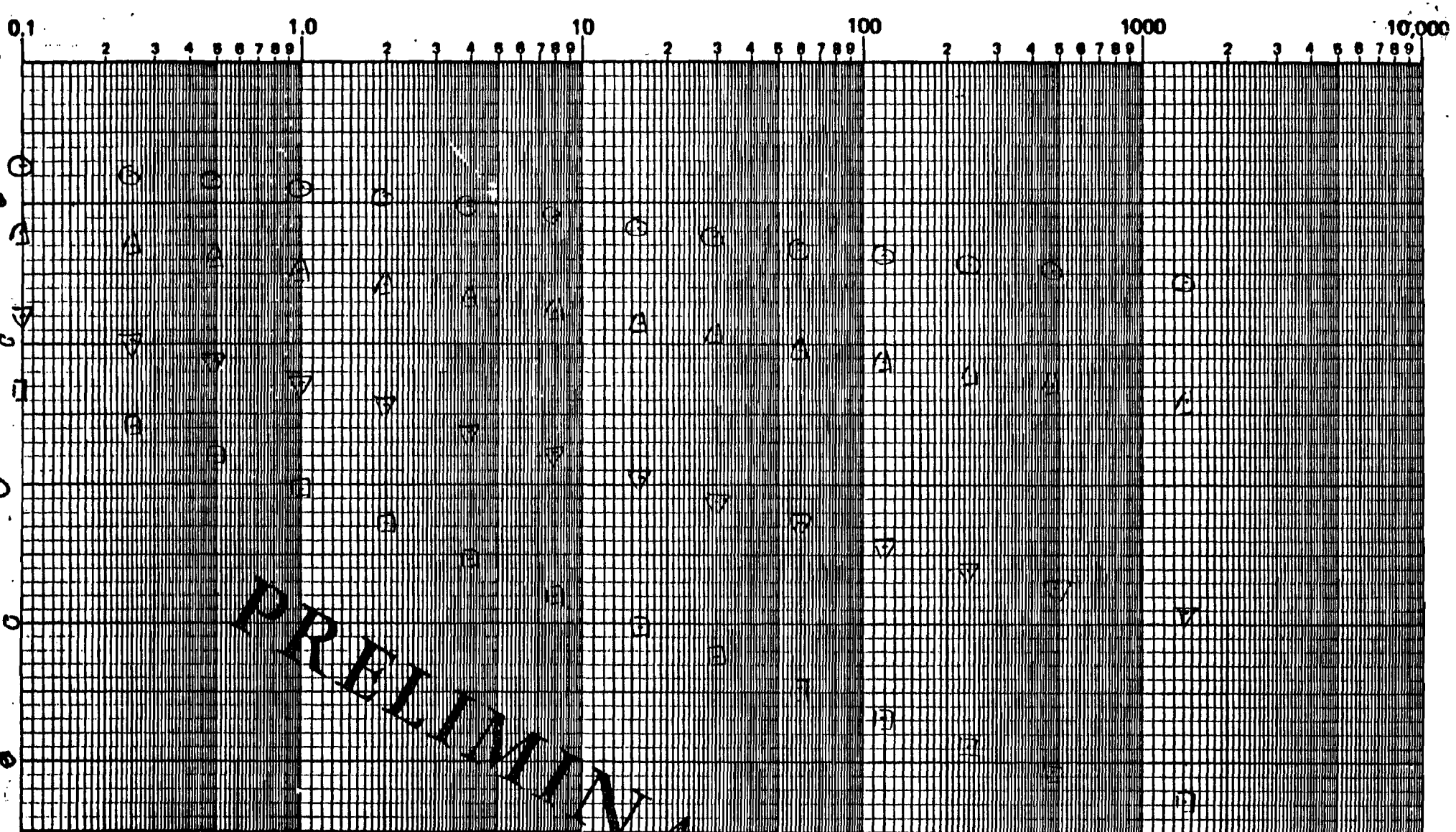
BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078 | | 3/21/84 | | |

# CONSOLIDATION TIME - DEFORMATION

HARDING LAWSON ASSOCIATES




Job: BECHTEL No.: 3854,078

Boring: 3 Depth: 5' Date: 3/14/84

By: [redacted] 10

Load: 6400 psf ○ t100:

Load: 12800 psf △ t100:

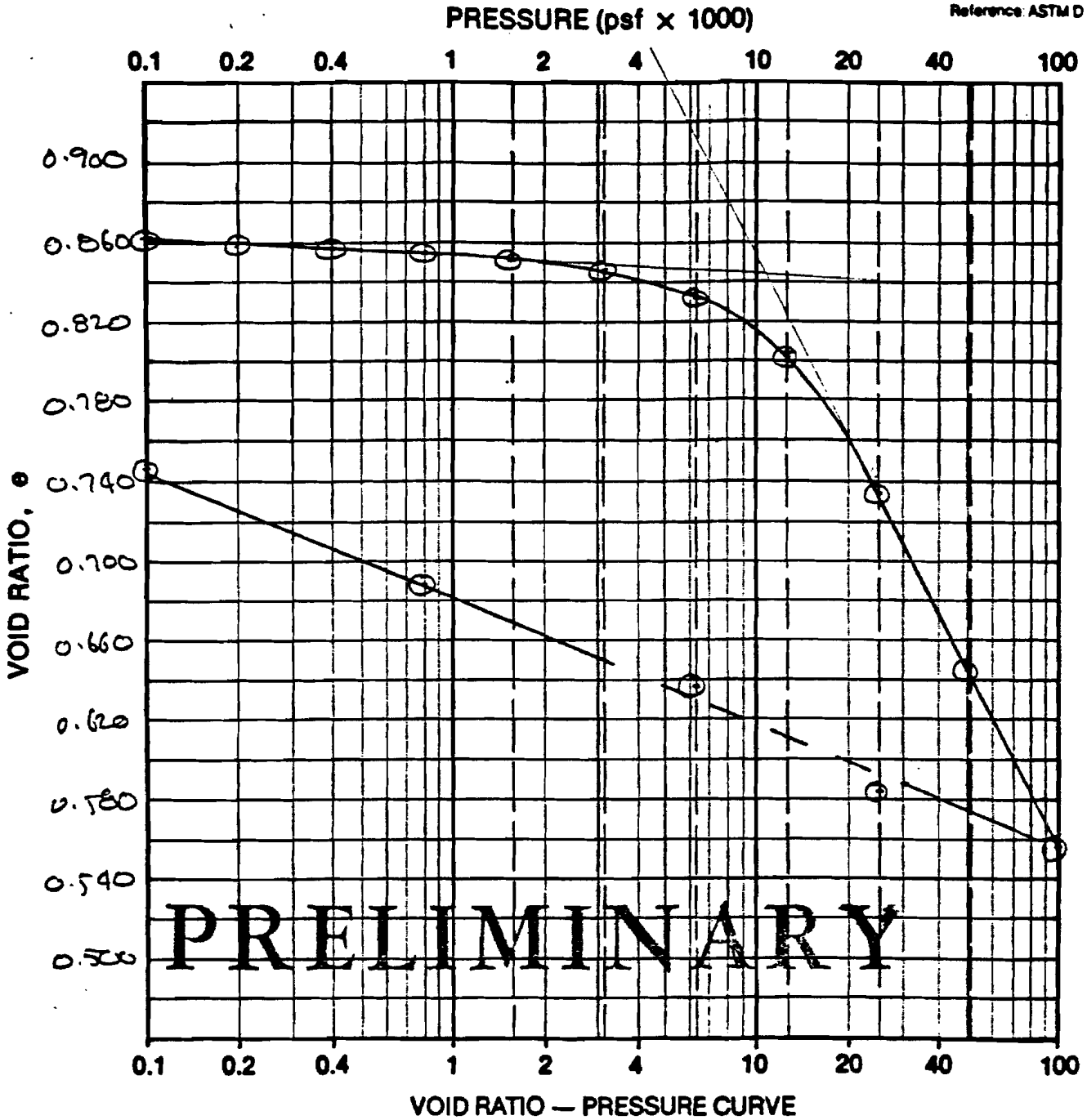
25600 psf ▽

50000 psf □

TESTED BY:

COMPUTED BY:

CHECKED BY:




| Type of Specimen UNDISTURBED | | Condition | | Before Test | | After Test | |
|---|---|---|---|---|---|---|---|
| Diameter (in.) 2.43 | Height (in.) 0.80 | Water Content | $w_o$ | 30.0 % | $w_f$ | 27.7 % | |
| Overburden Press., $P_o$ | psf | Void Ratio | $e_o$ | 0.863 | $e_f$ | 0.745 | |
| Preconsol. Press., $P_c$ | psf | Saturation | $S_o$ | 94 % | $S_f$ | 100 % | |
| Compression Index, $C_c$ | | Dry Density | $\gamma_d$ | 90.2 pcf | $\gamma_d$ | 96.2 pcf | |
| LL | PL | PI | | | Gs | 2.69 | |
| Classification | | | Source | DH 1 (P13) 64' | | | |

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Consolidation Test Report**

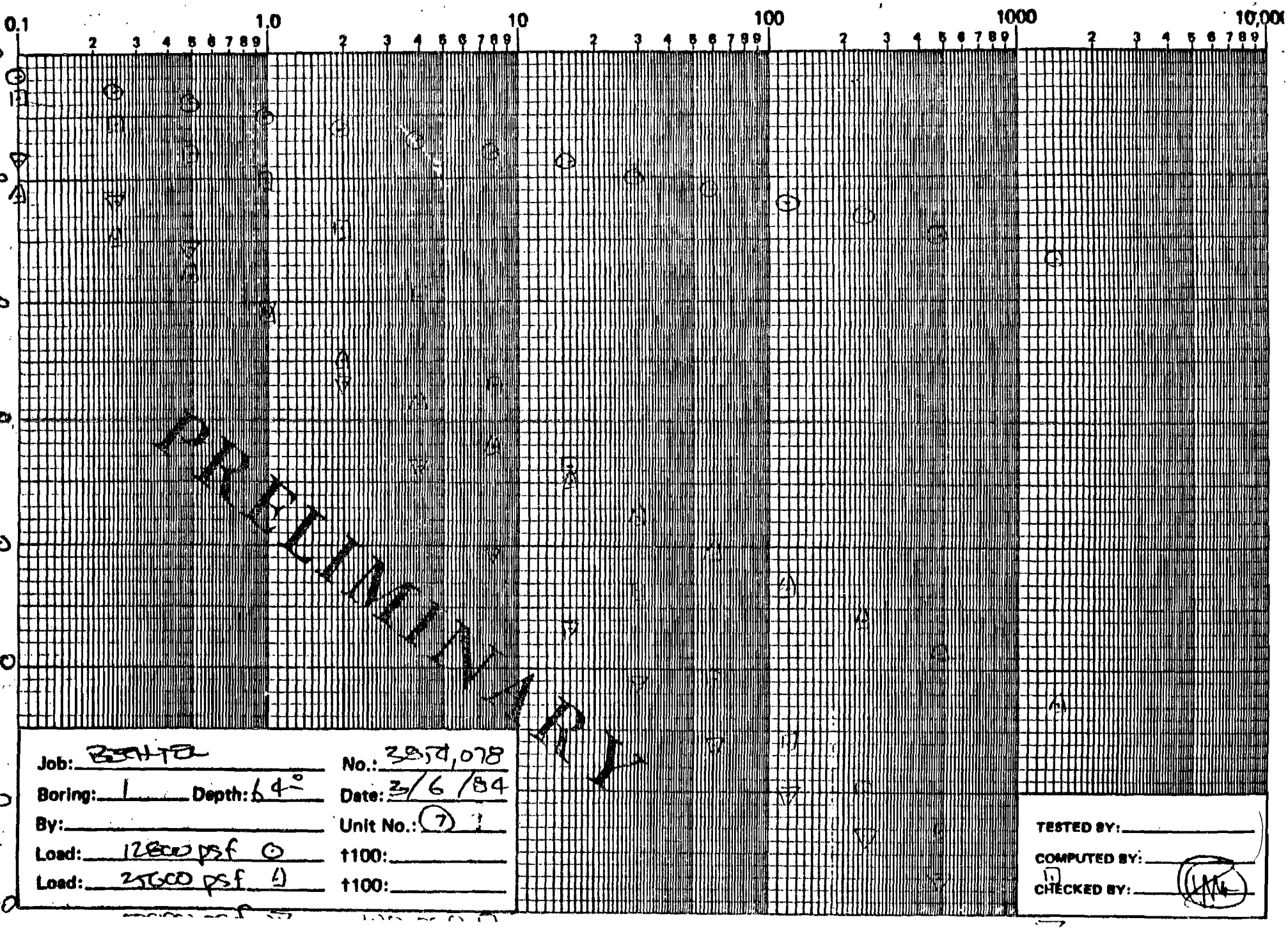
BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078 | | 3/21/84 | | |

# CONSOLIDATION TIME - DEFORMATION

HARDING LAWSON ASSOCIATES




Job: BSHTD

No.: 3854,078

Boring: 1 Depth: 64'

Date: 3/6/84

By:

Unit No.: (7) 1

Load: 12800 psf ①

t100:

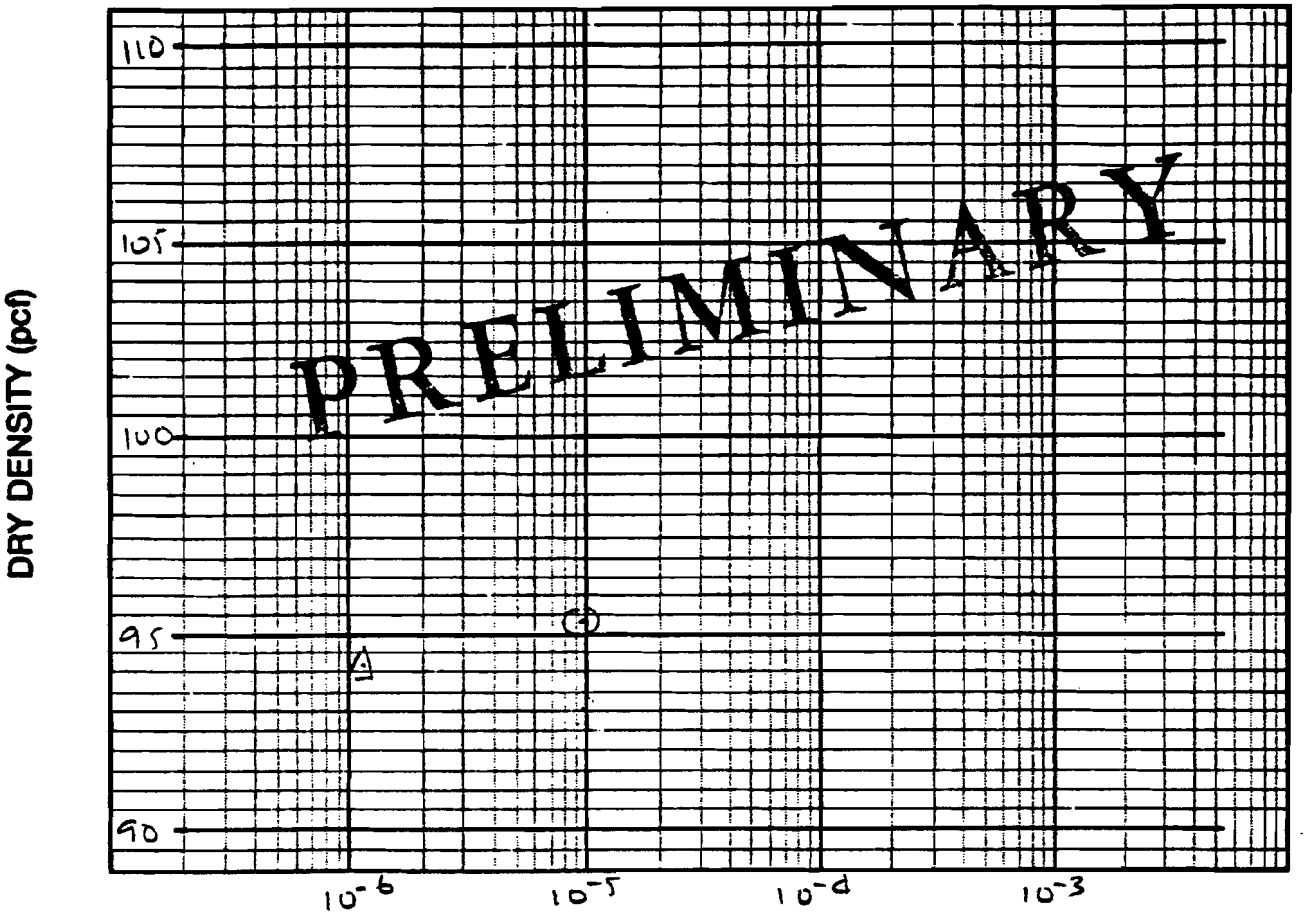
Load: 25600 psf ④

t100:

TESTED BY:

COMPUTED BY:

CHECKED BY:




| PHYSICAL CONDITIONS | | TEST NO A ⊙ | TEST NO B △ | TEST NO C |
|---|---|---|---|---|
| INITIAL | Diameter (in) | 2.43 | 2.43 | |
| | Height (in) | 0.80 | 1.55 | |
| | Water Content (%) | 28.8 | 25.2 | |
| | Dry Density (pcf) | 93.0 | 94.5 | |
| | Void Ratio | – | – | |
| | Saturation (%) | – | – | |
| FINAL | Consolidation Pressure (psf) | 580 | 580 | |
| | Water Content (%) | 28.7 | 26.8 | |
| | Dry Density (pcf) | 95.3 | 94.1 | |
| | Void Ratio | – | – | |
| | Saturation (%) | 100 | 100 | |
| Permeability At 20°C (cm/sec) | | $9.5 \times 10^{-6}$ | $1.1 \times 10^{-6}$ | |
| Sample Source: | | 1 (P6) 28°' | 1 (P14) 74°' | |
| Classification: ⊙ BROWN GRAVELLY SANDY CLAY (CH) △ | | | | |

TEST TYPE: FALLING HEAD

SATURATION METHOD: BACKPRESSURE

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

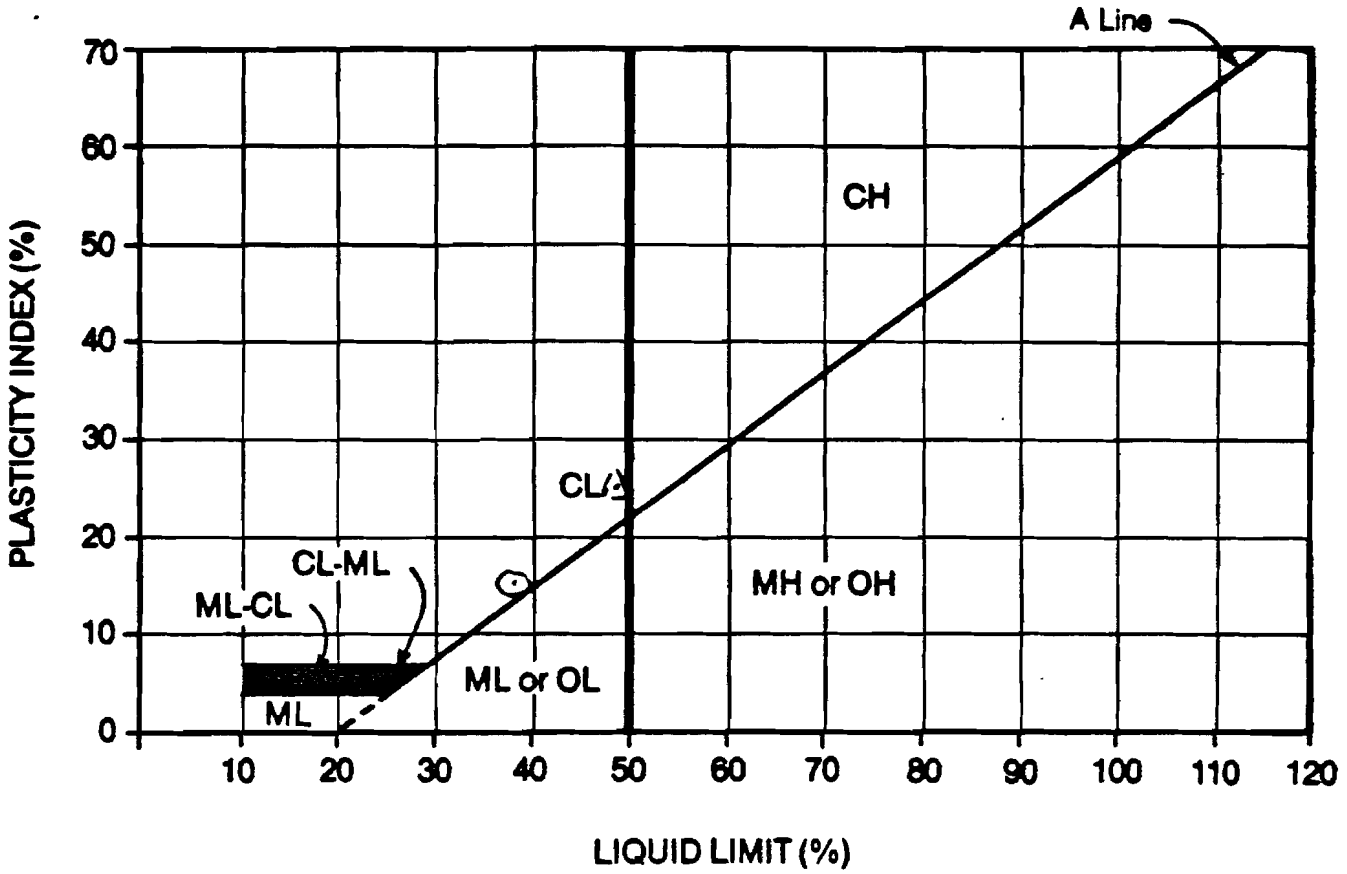
**Permeability Test Report**

BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078 | DRM | 3/12/84 | | |

Reference: ASTM D 423, 424




# PRELIMINARY

| Symbol | Source | Classification | Natural M.C. (%) | Liquid Limit (%) | Plasticity Index (%) | % Passing #200 Sieve |
|---|---|---|---|---|---|---|
| ⊙ | DH 1 (PZ1) 13.4' | BROWN CLAY (CL) | | 38 | 15 | |
| △ | DH 4 (ST3) 12.0' | BROWN CLAYEY SAND (SC) | | 49 | 25 | 45.9 |

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

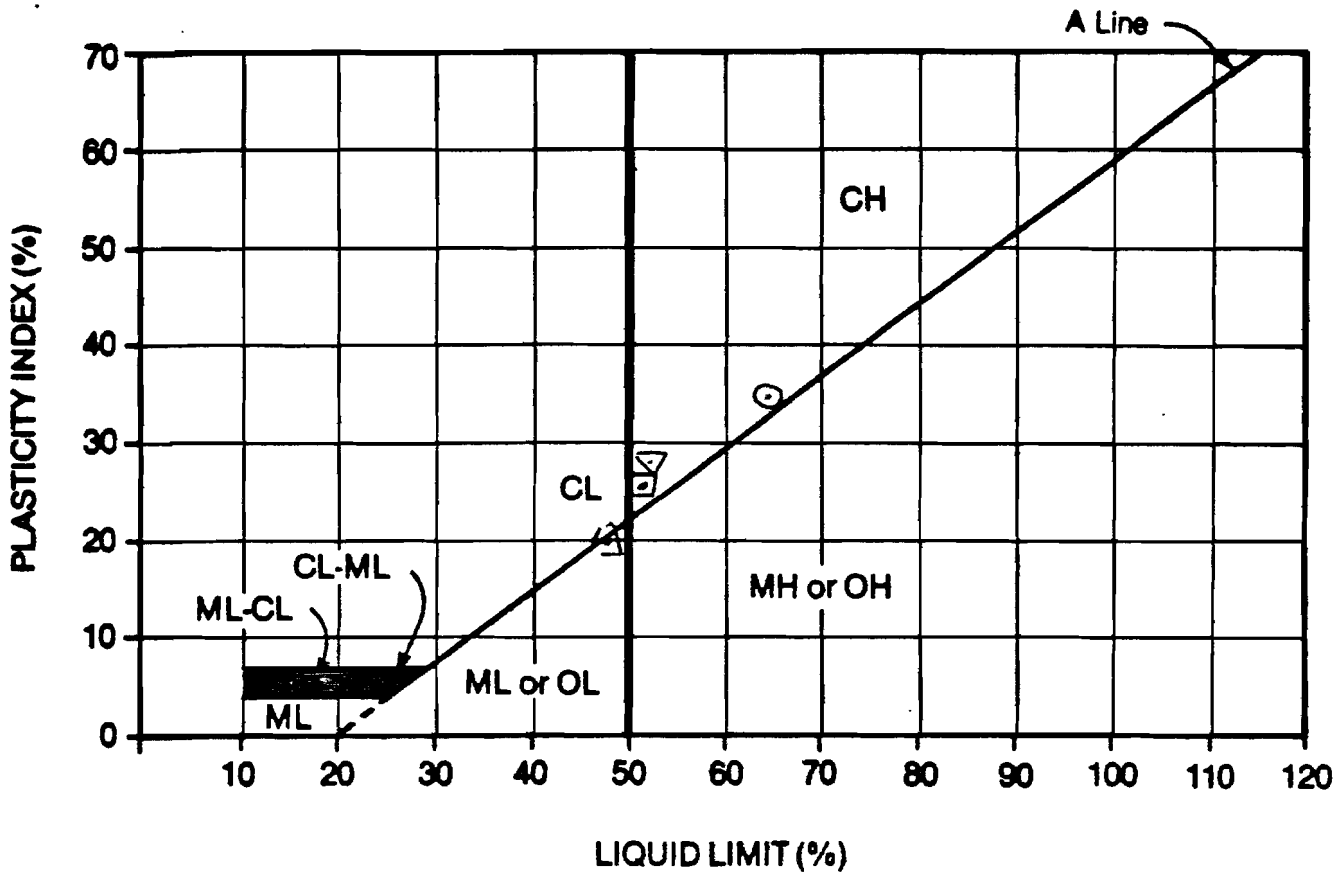
**Plasticity Chart**

BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 38 24,028.01 | | 3/23/84 | | |

Reference: ASTM D 423, 424




# PRELIMINARY

| Symbol | Source | Classification | Natural M.C. (%) | Liquid Limit (%) | Plasticity Index (%) | % Passing #200 Sieve |
|---|---|---|---|---|---|---|
| ⊙ | DH1 (P3) 13.0' | BROWN GRAVELLY SANDY CLAY (CH) | | 64 | 35 | |
| △ | DH1 (P6) 28.0' | BROWN GRAVELLY SANDY SILTY CLAY (CL) | | 48 | 20 | |
| ▽ | DH1 (P12) 53.0' | BROWN GRAVELLY SANDY CLAY (CH) | | 52 | 28 | 67.7 |
| ⊡ | DH1 (P14) 74.0' | BROWN GRAVELLY CLAYEY SAND (SC) | | 51 | 25 | 36.4 |

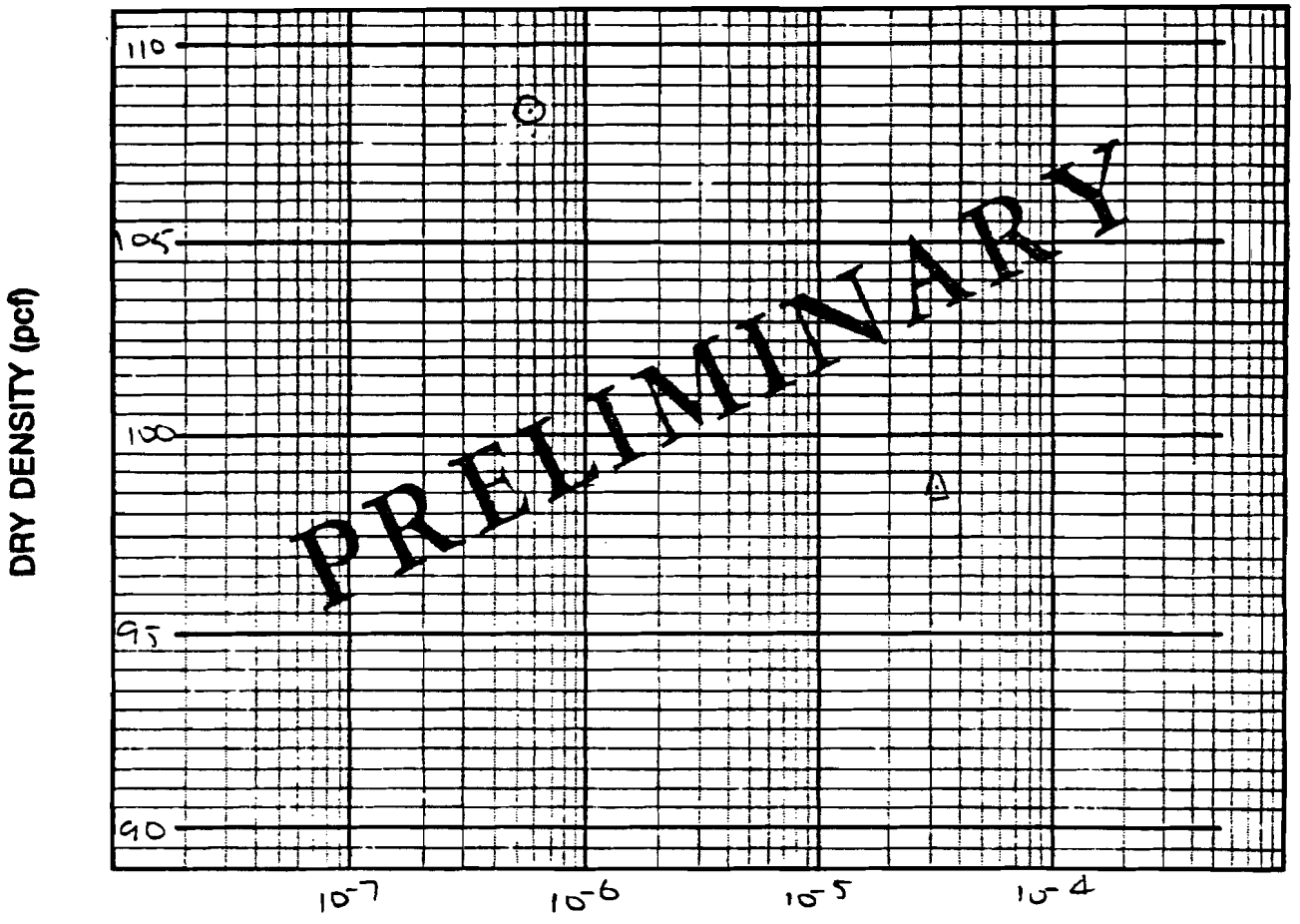
**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Plasticity Chart**

BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078.01 | | 5/23/84 | | |




| PHYSICAL CONDITIONS | | TEST NO A ⊙ | TEST NO B △ | TEST NO C |
|---|---|---|---|---|
| INITIAL | Diameter (in) | 2.43 | 2.87 | |
| | Height (in) | 1.00 | 2.05 | |
| | Water Content (%) | 20.7 | 24.5 | |
| | Dry Density (pcf) | 107.7 | 96.9 | |
| | Void Ratio | — | — | |
| | Saturation (%) | — | — | |
| FINAL | Consolidation Pressure (psf) | 580 | 580 | |
| | Water Content (%) | 24.4 | 25.2 | |
| | Dry Density (pcf) | 108.4 | 98.7 | |
| | Void Ratio | — | — | |
| | Saturation (%) | 100 | 100 | |
| Permeability At 20°C (cm/sec) | | $5.7 \times 10^{-7}$ | $3.1 \times 10^{-5}$ | |
| Sample Source: | | 3 (ST1) 5.0' | 1 (P3) 13.3' | |
| Classification: ⊙ - △ BROWN GRAVELLY SANDY CLAY (CH) | | | | |

TEST TYPE: FALLING HEAD

SATURATION METHOD: BACKPRESSURE

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Permeability Test Report**

BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078 | | 3/12/84 | | |

**HARDING LAWSON ASSOCIATES**
**OFFICE MEMORANDUM**

To: DR. RAO / BECHTEL Date: 3/26/84

From: Roger File: 3874,078 01

Subject:

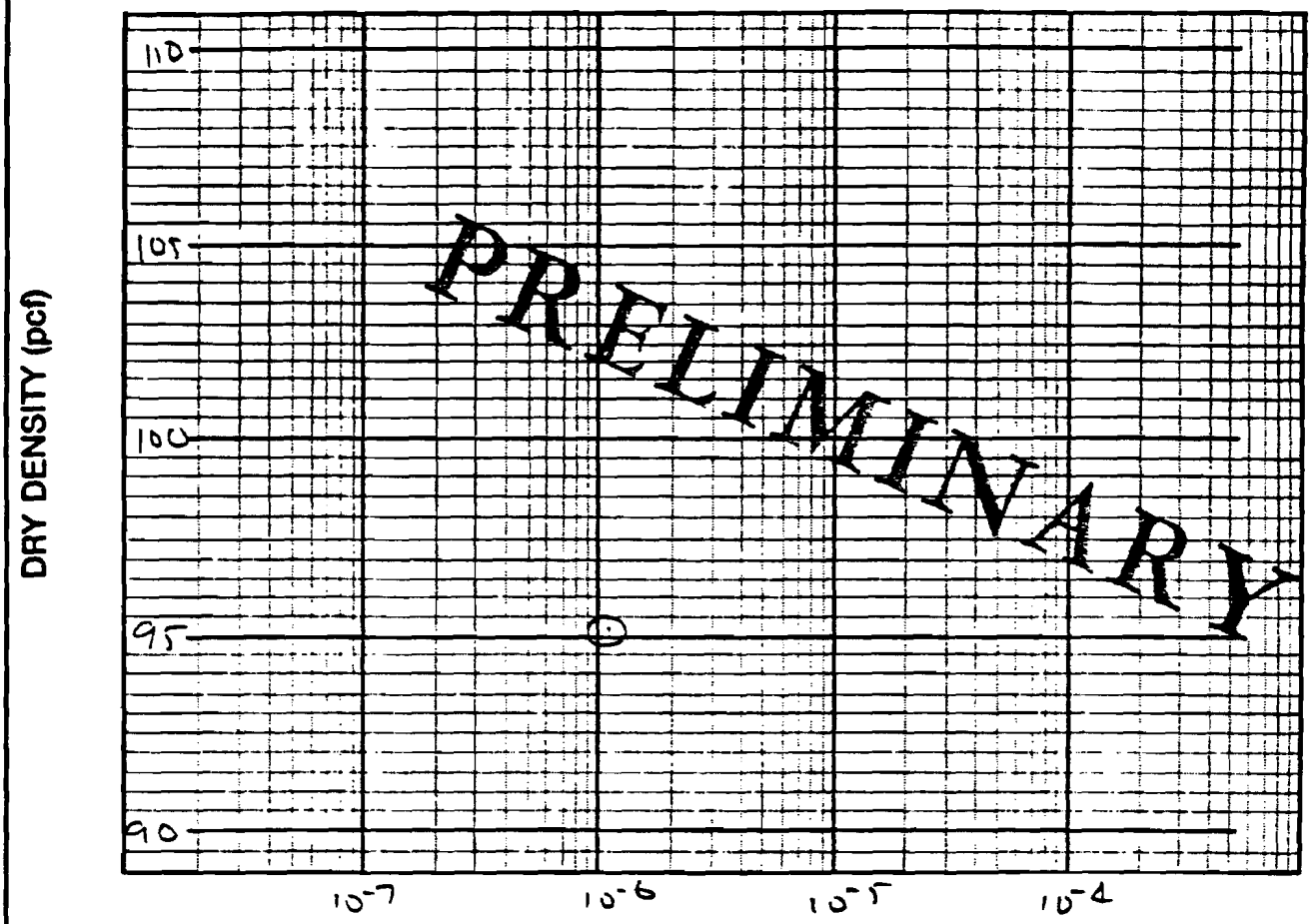
More lab data from request #1 & #2.

more later

Regards,

Roger

RECEIVED
MAR 29 1984
H & CE SOILS




| PHYSICAL CONDITIONS | | TEST NO A ⊙ | B | C |
|---|---|---|---|---|
| INITIAL | Diameter (in) | 2.43 | | |
| | Height (in) | 1.70 | | |
| | Water Content (%) | 22.2 | | |
| | Dry Density (pcf) | 97.1 | | |
| | Void Ratio | – | | |
| | Saturation (%) | – | | |
| FINAL | Consolidation Pressure (psf) | 580 | | |
| | Water Content (%) | 27.2 | | |
| | Dry Density (pcf) | 95.2 | | |
| | Void Ratio | – | | |
| | Saturation (%) | 100 | | |
| Permeability At 20°C (cm/sec) | | $1.1 \times 10^{-6}$ | | |

Sample Source: DH 25 (ST 1) 4.5'

Classification: BROWN CLAY (CL)

TEST TYPE: FALLING HEAD

SATURATION METHOD: BACKPRESSURE

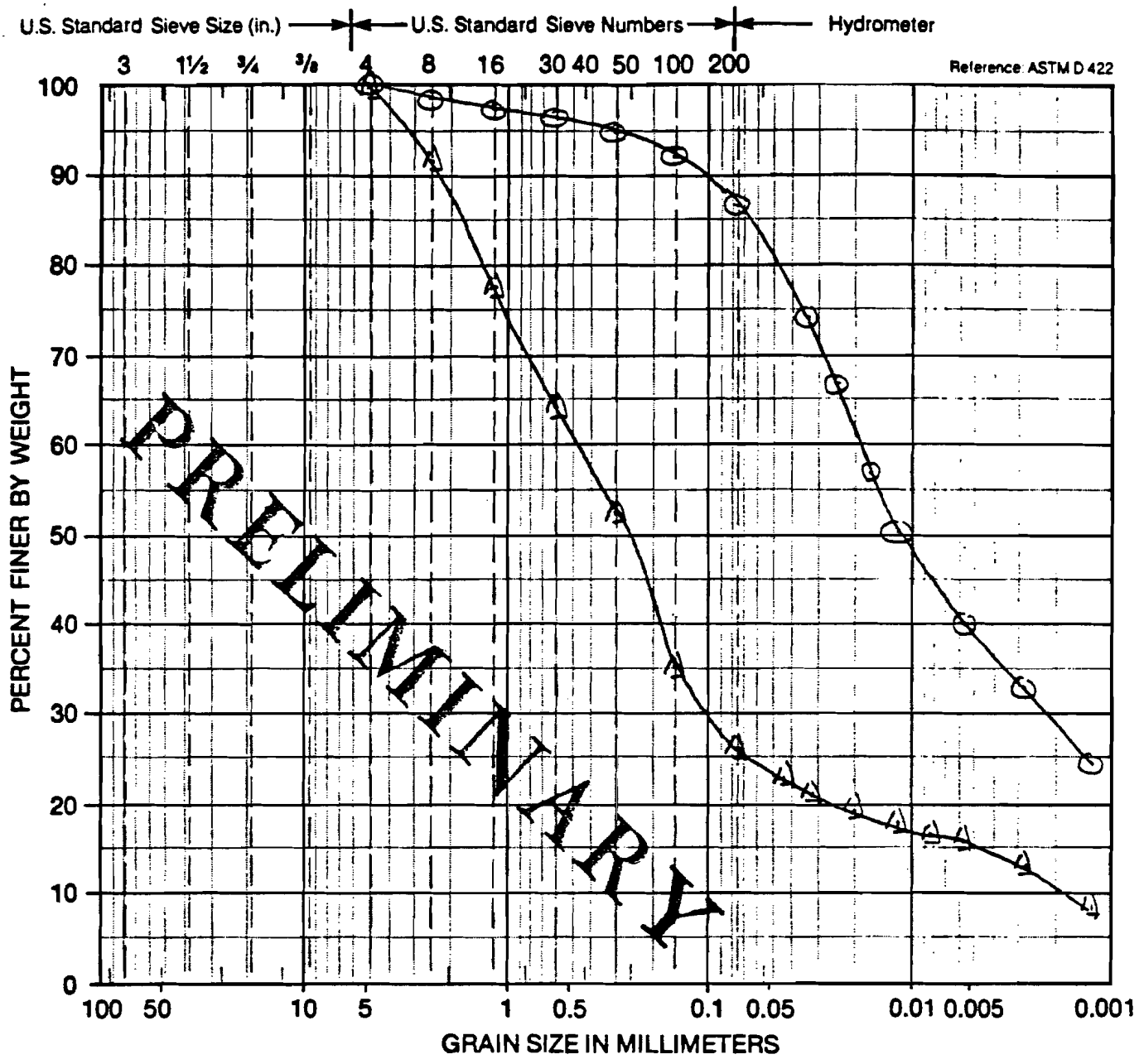
**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Permeability Test Report**

RECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3859,078 | | 3/26/84 | | |




| COBBLES | COARSE | FINE | COARSE | MEDIUM | FINE | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL | | SAND | | | |

| Symbol | Sample Source | Classification |
|---|---|---|
| ○ | DH 1 (P6) 26.0' | |
| △ | DH 1 (P3) 11.0' | |

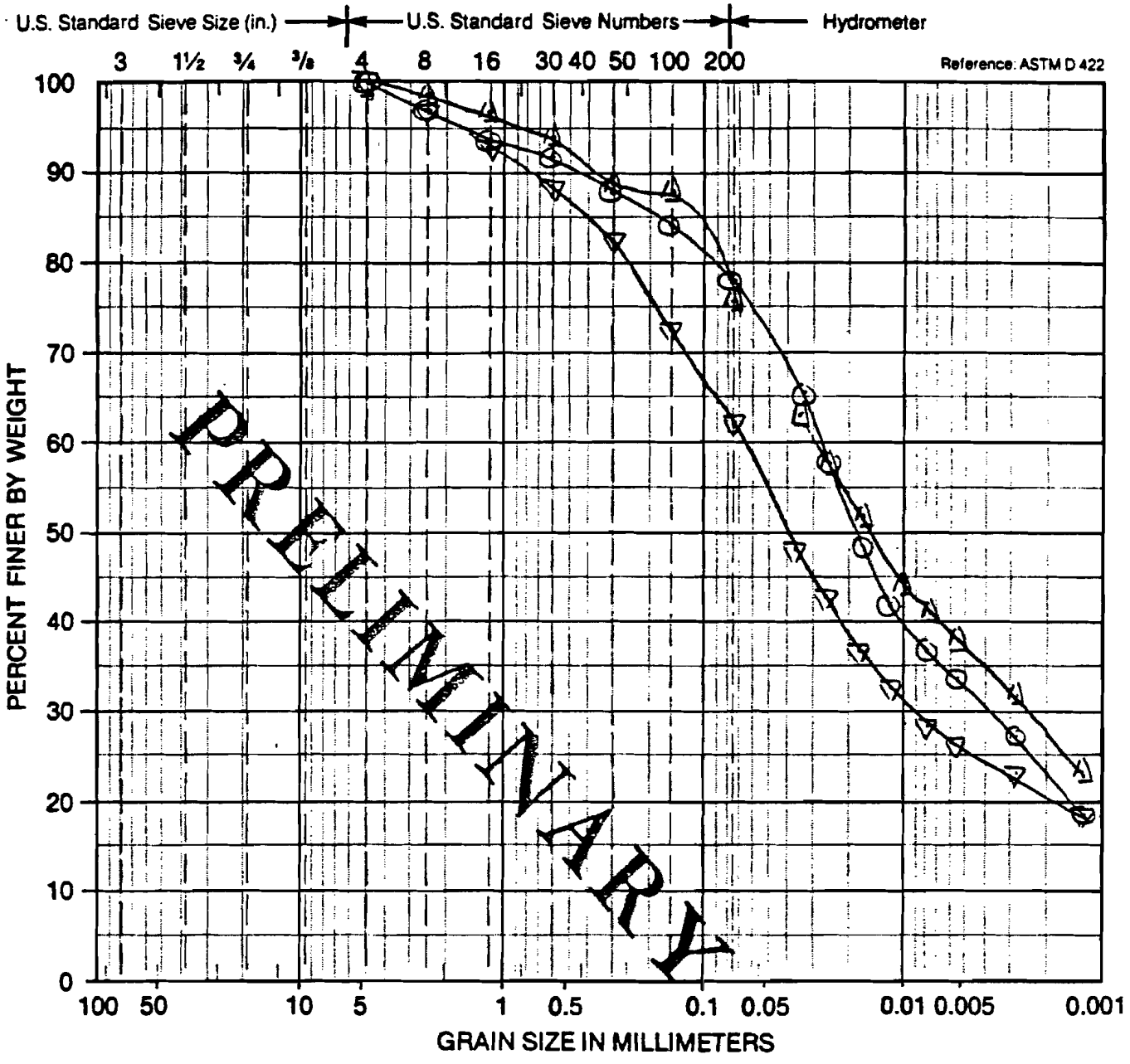
**Harding Lawson Associates**
Engineers, Geologists
& Geophysicists

**Particle Size Analysis**

BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078 | | 3/26/84 | | |




| COBBLES | COARSE | FINE | COARSE | MEDIUM | FINE | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | GRAVEL | | SAND | | | |

| Symbol | Sample Source | Classification |
|---|---|---|
| ○ | BULK #18, 7'-10' | BROWN SANDY CLAY (CL) |
| △ | BULK # 13, 4½'-6½' | " " " |
| ▽ | BULK # 12, 3'-5' | " " " |

**Harding Lawson Associates**
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& Geophysicists

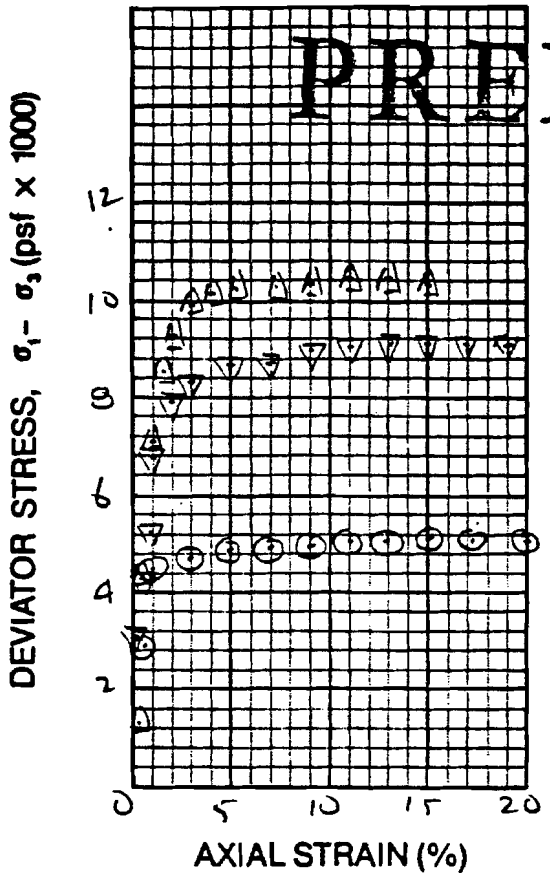
**Particle Size Analysis**

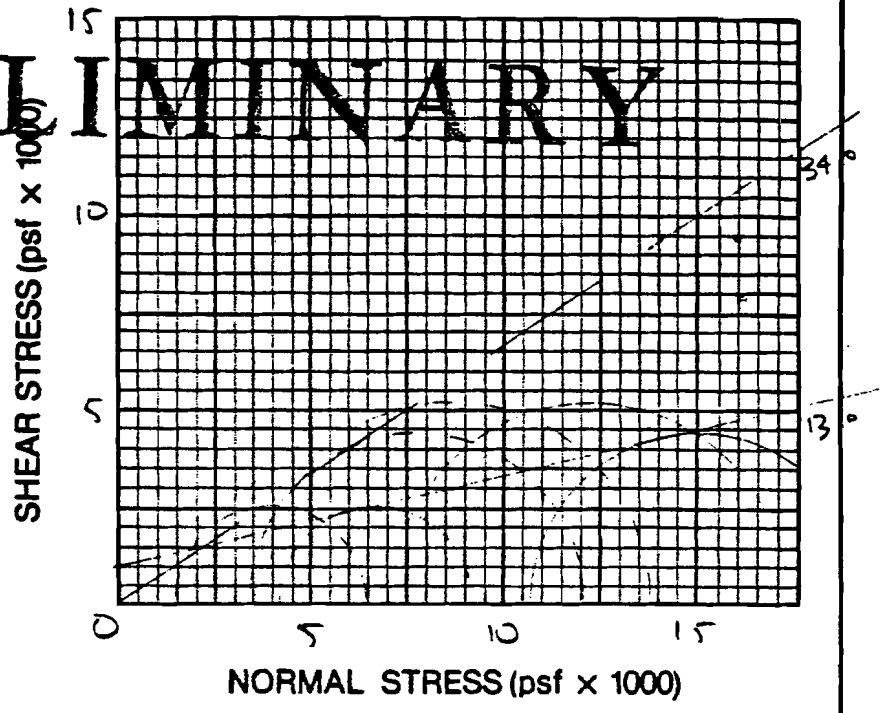
BECHTEL

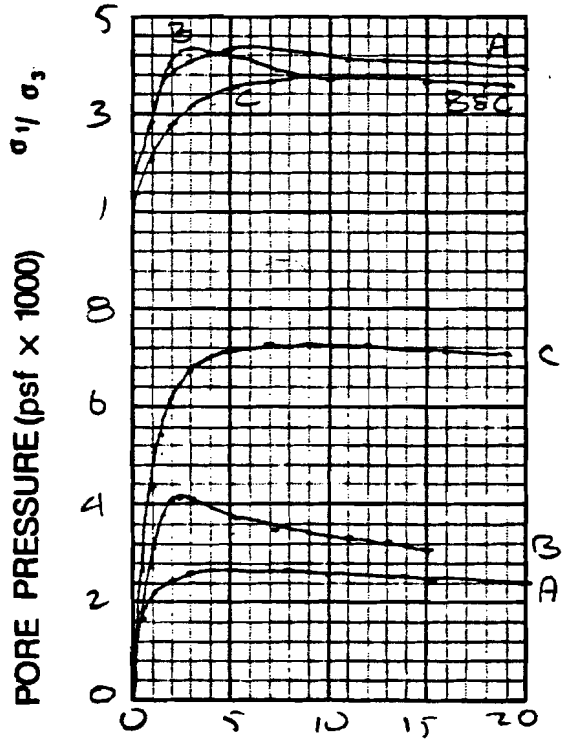
PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078 | | 3/26/84 | | |

PRELIMINARY




TEST TYPE: CONSOLIDATED UNDRAINED Controlled STRAIN

| PHYSICAL CONDITIONS | | TEST NO. A ○ | TEST NO. B △ | TEST NO. C ▽ |
|---|---|---|---|---|
| INITIAL | Diameter (in.) | 2.87 | 2.87 | 2.87 |
| | Height (in.) | 6.50 | 6.50 | 6.50 |
| | Water Content (%) | 25.4 | 27.5 | 31.0 |
| | Void Ratio | 0.733 | 0.784 | 0.818 |
| | Saturation (%) | 92 | 95 | 100 |
| | Dry Density (pcf) | 95.8 | 95.1 | 90.6 |
| BEFORE | Consolidation Pressure (psf) | 4150 | 7030 | 10630 |
| | Backpressure (psf) | 7490 | 4610 | 4610 |
| | Water Content (%) | 24.5 | 25.6 | 26.4 |
| | Void Ratio | 0.651 | 0.698 | 0.696 |
| FINAL | Water Content (%) | 24.5 | 25.6 | 26.4 |
| | Dry Density (pcf) | 100.5 | 99.1 | 97.1 |
| | Void Ratio | 0.651 | 0.698 | 0.696 |
| | Saturation (%) | 100 | 100 | 100 |
| FAILURE | $\sigma_1$ Major Principal Stress (psf) | 9100 | 17370 | 19390 |
| | $\sigma_3$ Minor Principal Stress (psf) | 4150 | 7030 | 10630 |
| | Pore Pressure (psf) | 2640 | 3510 | 7270 |
| | Axial Strain at Failure (%) | 7 | 7 | 7 |
| | Time to Failure (min.) | 175 | 175 | 205 |
| Sample Source: DH 6 (PB) | | 37½' | 38½' | 39½' |
| Classification: | | | | $G_s$ 2.64-2.72 |

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

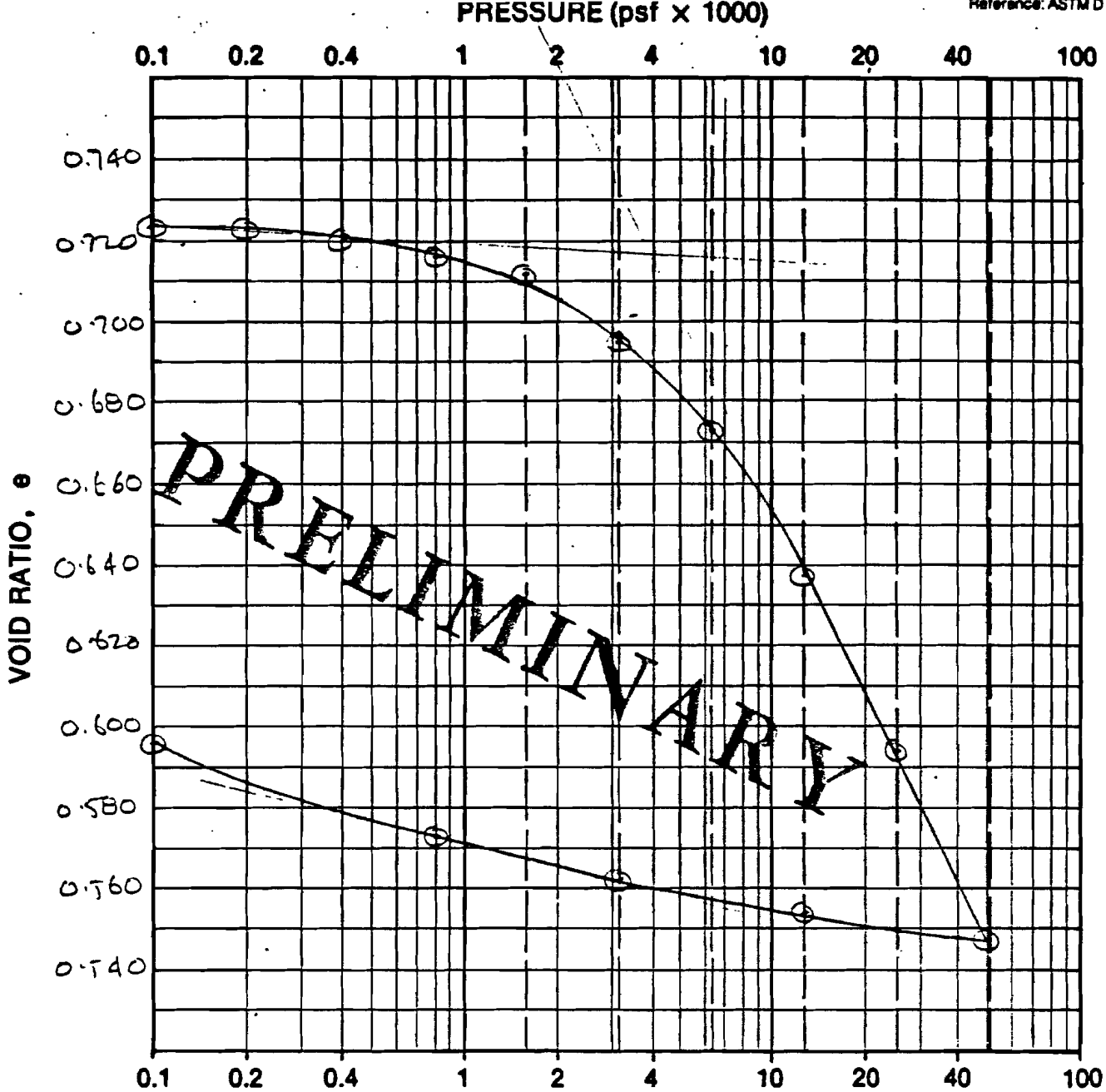
**Triaxial Compression Test**

BECHTEL

PLATE

DRAWN | JOB NUMBER 3814,078 | APPROVED | DATE | REVISED | DATE

Reference: ASTM D 2435




VOID RATIO — PRESSURE CURVE

| | | | | | | |
|---|---|---|---|---|---|---|
| Type of Specimen UNDISTURBED | | Condition | | Before Test | | After Test |
| Diameter (in.) 2.43 | Height (in.) 0.80 | Water Content | $w_o$ | 23.7 % | $w_f$ | 22.7 % |
| Overburden Press., $P_o$ | psf | Void Ratio | $e_o$ | 0.724 | $e_f$ | 0.596 |
| Preconsol. Press., $P_c$ | psf | Saturation | $S_o$ | 86 % | $S_f$ | 100 % |
| Compression Index, $C_c$ | | Dry Density | $\gamma_d$ | 94.9 pcf | $\gamma_d$ | 102.5 pcf |
| LL | PL | PI | | Gs 2.62 | | |
| Classification | | Source DH 7 (P2) @ 9.0' | | | | |

**Harding Lawson Associates**
Engineers, Geologists
& Geophysicists

**Consolidation Test Report**

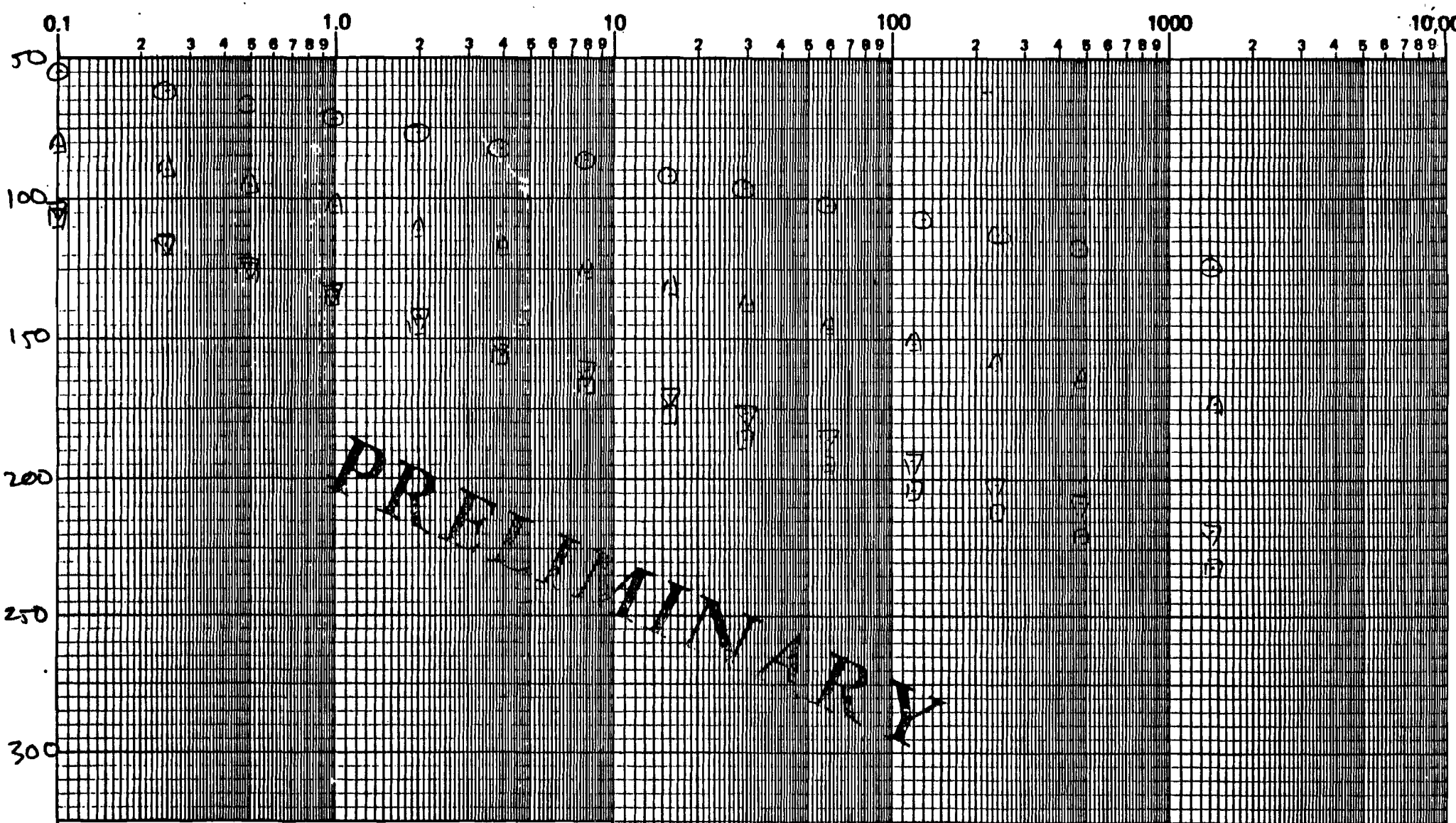
BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 7854,078 | SM | 3/21/84 | | |

# CONSOLIDATION TIME - DEFORMATION

HARDING LAWSON ASSOCIATES




Job: BECHTEL

No.: 38Sd, 078

Boring: TP2 Depth: 9'

Date: 3/22/84

By:

Unit No.: (9)

Load: 6400 psf ○

t100:

Load: 12800 psf △

t100:

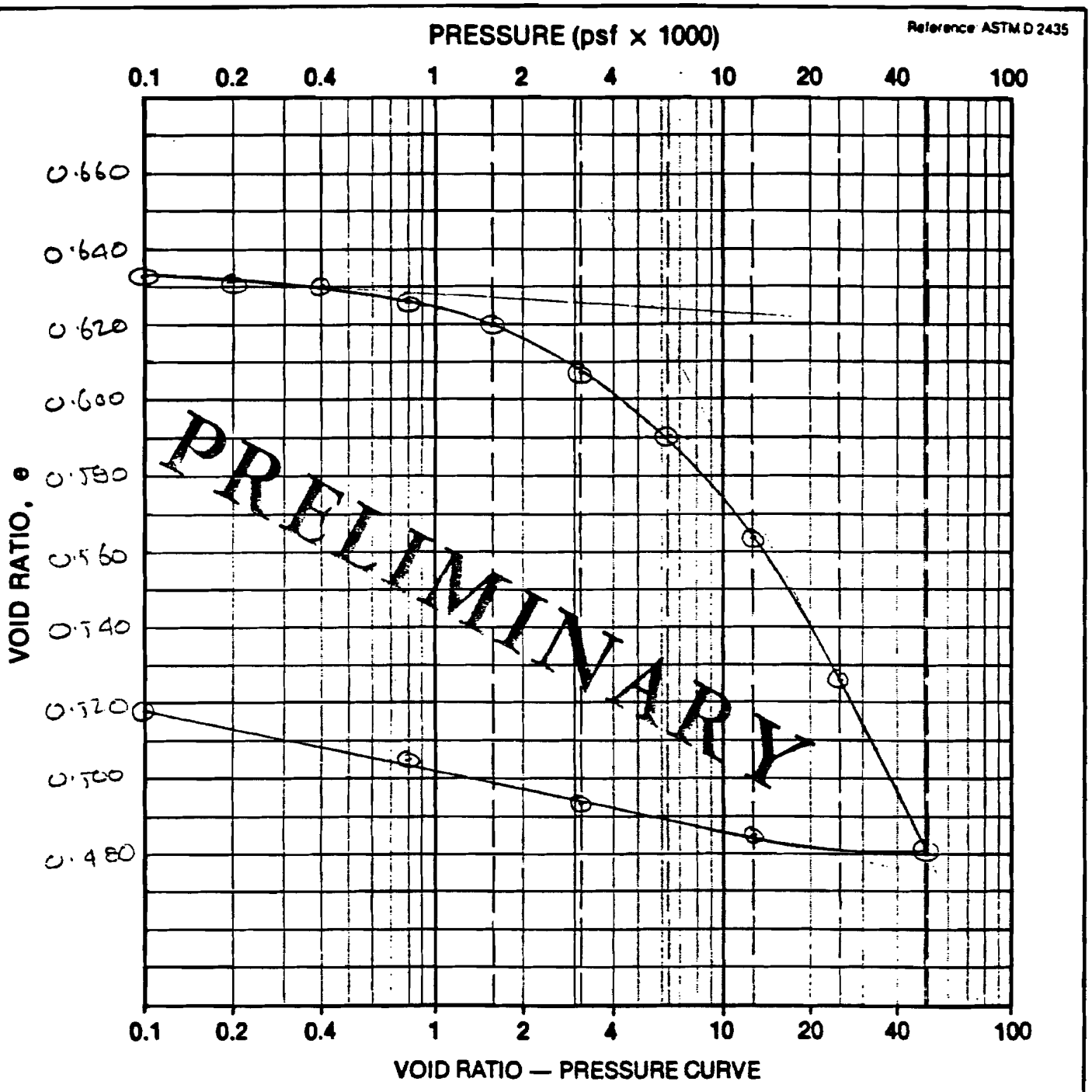
25600 psf ▽

50600 psf □

TESTED BY:

COMPUTED BY:

CHECKED BY:




| | | | | | | |
|---|---|---|---|---|---|---|
| Type of Specimen UNDISTURBED | | Condition | | Before Test | | After Test |
| Diameter (in.) 2.13 | Height (in.) 0.80 | Water Content | $w_o$ | 22.6 % | $w_f$ | 19.7 % |
| Overburden Press., $P_o$ psf | | Void Ratio | $e_o$ | 0.635 | $e_f$ | 0.519 |
| Preconsol. Press., $P_c$ psf | | Saturation | $S_o$ | 94 % | $S_f$ | 100 % |
| Compression Index, $C_c$ | | Dry Density | $\gamma_d$ | 100.4 pcf | $\gamma_d$ | 108.1 pcf |
| LL | PL | PI | | Gs 2.63 | | |
| Classification | | Source DH 6 (P3) @ 14.0' | | | | |

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Consolidation Test Report**

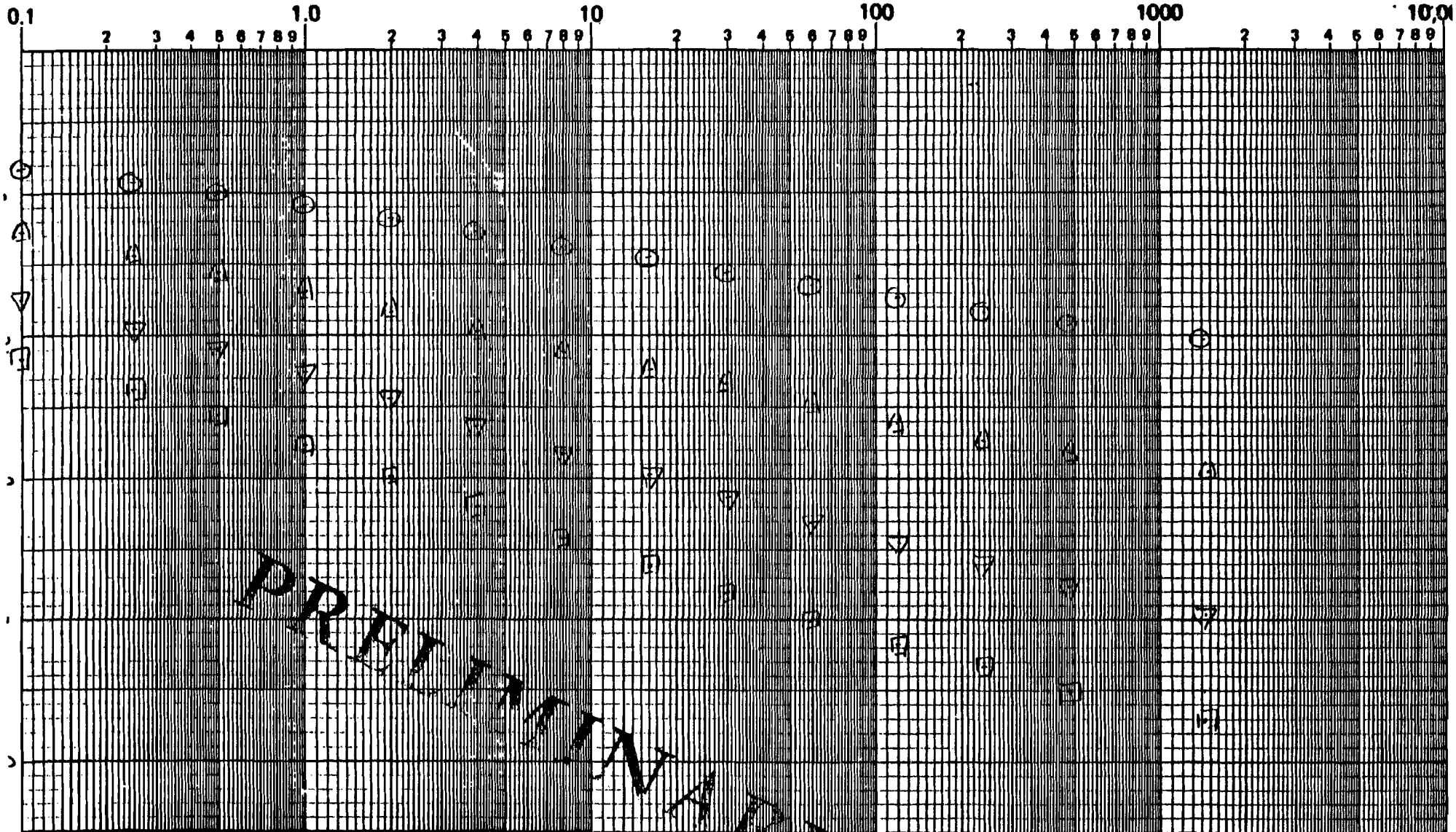
BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 38511.078 | | 3/21/94 | | |

# CONSOLIDATION TIME - DEFORMATION

HARDING LAWSON ASSOCIATES




Job: BECHTEL

No.: 3854,078

Boring: 6 P3 Depth: 14°

Date: 3/22/84

By:

Unit No.: 7

Load: 6400 psf ⊙

t100:

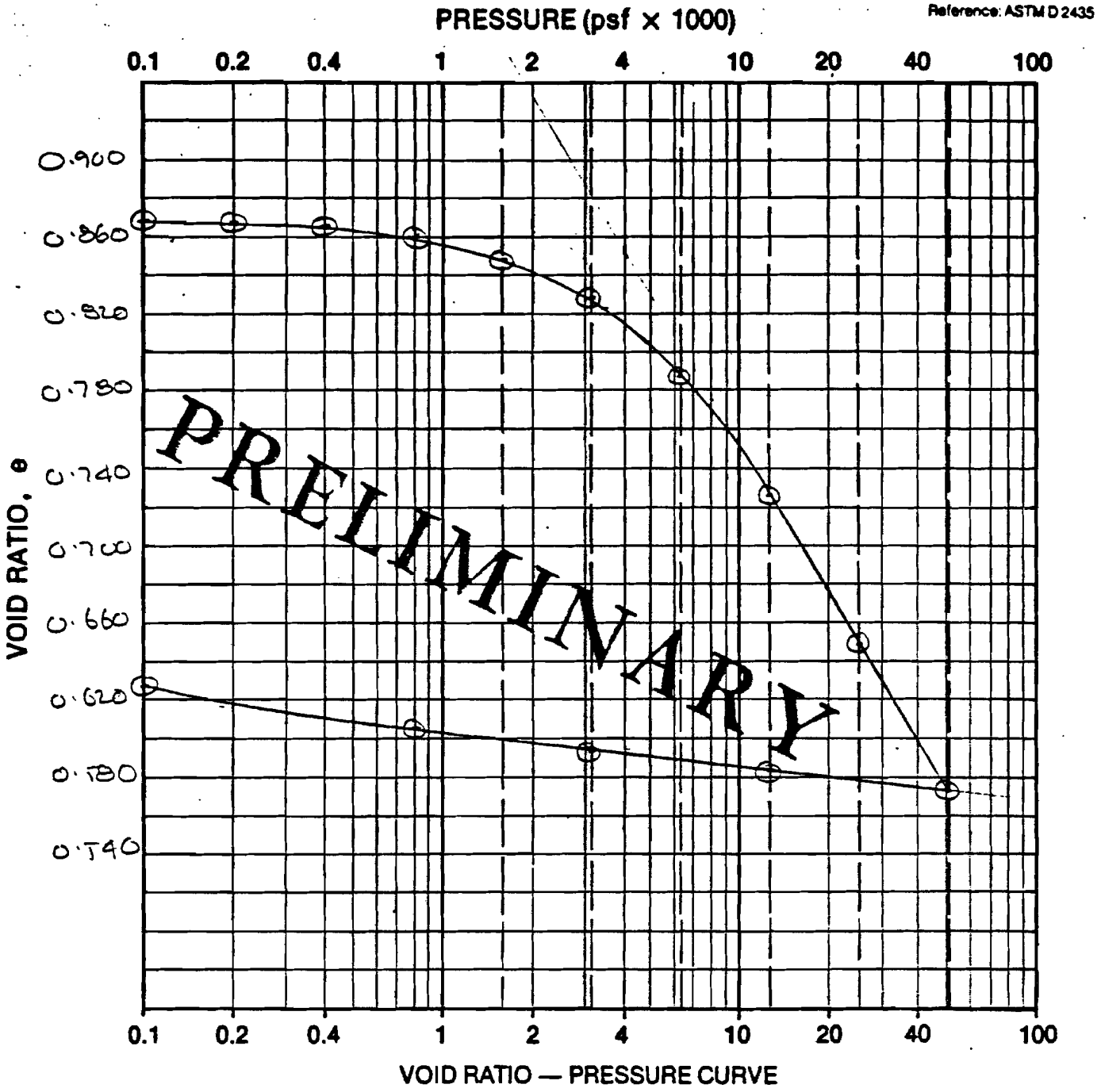
Load: 12800 psf △
25600 psf ▽

t100:

TESTED BY:

COMPUTED BY:

CHECKED BY:




| Type of Specimen UNDISTURBED | | Condition | | Before Test | | After Test |
|---|---|---|---|---|---|---|
| Diameter (in.) 2.43 | Height (in.) 0.80 | Water Content | $w_o$ | 25.9 % | $w_f$ | 23.1 % |
| Overburden Press., $P_o$ | psf | Void Ratio | $e_o$ | 0.871 | $e_f$ | 0.626 |
| Preconsol. Press., $P_c$ | psf | Saturation | $S_o$ | 80 % | $S_f$ | 100 % |
| Compression Index, $C_c$ | | Dry Density | $\gamma_d$ | 89.8 pcf | $\gamma_d$ | 103.3 pcf |
| LL | PL | PI | | | Gs 2.69 | |
| Classification | | Source DH 2 (P4) @ 20' | | | | |

DH 9

**Harding Lawson Associates**
Engineers, Geologists
& Geophysicists

**Consolidation Test Report**

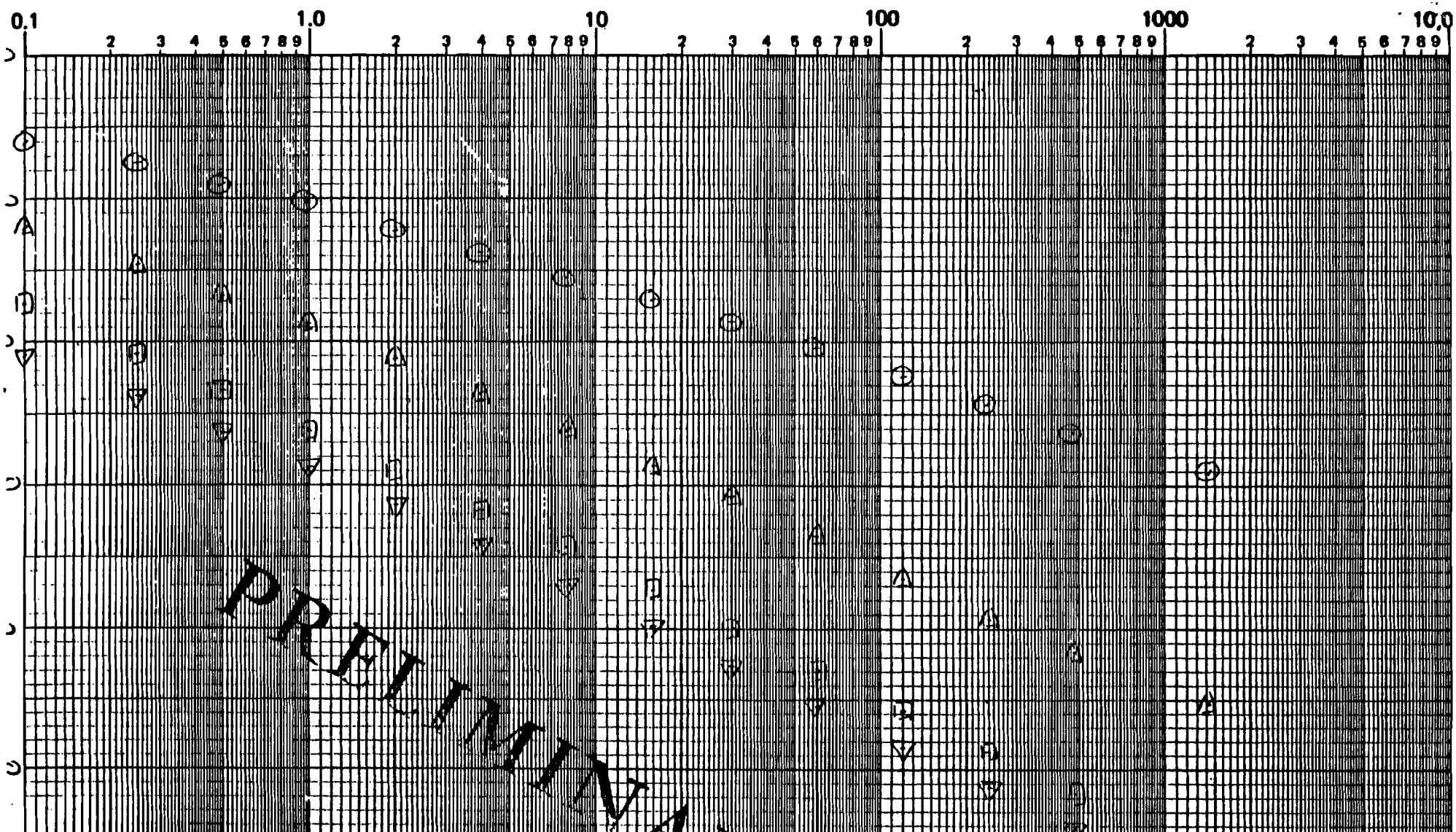
BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078 | | 3/24/84 | | |

# CONSOLIDATION TIME - DEFORMATION

HARDING LAWSON ASSOCIATES




Job: BECHTEL

No.: 38T4,078

Boring: 2 P4 Depth: 20'

Date: 3/22/84

By:

Unit No.: 6

Load: 6000psf ○

t100:

Load: 1800psf △
2600psf ▽

t100:

TESTED BY:

COMPUTED BY:

CHECKED BY:

**HARDING LAWSON ASSOCIATES**
**OFFICE MEMORANDUM**

To: DR. RAO / BECHTEL Date: 3/28/84

From: Roger File: 38T4, 078.01

Subject: Carrissa Plains

Latest completed lab data attached.

More later,

Roger

RECEIVED
APR 2 1984
H & CE SOILS

# SHELBY TUBE LOGGING

PROJECT Bechtel PROJECT NO. 3851,018.01 BY JW DATE 3/22/84 SHEET ___ OF ___ SHE

LENGTH IN INCHES

| TUBE NO. 1 P15<br>DEPTH: 82 TO 84.5 FT. | TUBE NO. 1 P16<br>DEPTH: 92 TO 94.5 FT. | TUBE NO. 1 P19<br>DEPTH: 112 TO 114.5 FT. |
|---|---|---|
| Visual only<br>Brown clay w/ silt (CL-CH) w/ occasional small gravel (0-30")<br>Sample tube fairly homogenous.<br>Recovery = 30" | Visual only<br>Brown clay w/ silt (CL-CH) (0-17")<br>sample tube fairly homogenous.<br>Recovery = 17" | Visual only<br>Brown clay w/ silt (CL-CH) w/ pockets of gypsum throughout (0-30")<br>sample tube fairly homogenous.<br>Recovery = 30" |

0 10 20 30

# SHELBY TUBE LOGGING

PROJECT Bechtel PROJECT NO. 3514 07201 BY [illegible] DATE 3/23/84 SHEET ___ OF ___ SHE

LENGTH IN INCHES

| TUBE NO. 1 P20<br>DEPTH: 122 TO 124.5 FT. | TUBE NO. 1 P22<br>DEPTH: 142 TO 144.5 FT. | TUBE NO. 1 P23<br>DEPTH: 147.5 TO 150.0 FT. |
|---|---|---|
| Visual only<br>Brown Gravelly Clayey Sand (SC) grading in and out of Brown Gravelly Sandy Clay (CL)<br>(0-18")<br>Recovery 18" | Visual only<br>Brown Clay w/ silt (CL-CH) w/ occasional gravel<br>Sample tube homogenous<br>(0-30")<br>Recovery = 30" | Visual only<br>Brown Clay w/ silt (CL-CH)<br>(0-30")<br>sample tube homogenous |

0 10 20 30

# SHELBY TUBE LOGGING

PROJECT Bechtel PROJECT NO. 3854,078.01 BY mv DATE 3/22/84 SHEET ___ OF ___ SHE

LENGTH IN INCHES

| TUBE NO. 1 S+1<br>DEPTH: 1 TO 3.5 FT. | TUBE NO. 1 P8<br>DEPTH: 36.3 TO 39.1 FT. | TUBE NO. 1 P10<br>DEPTH: 42 TO 45.5 FT. |
|---|---|---|
| visual only | visual only | visual only |
| Brown clay w/ silt (CL) w/ occasional gravel 0-20" | Brown clay w/ silt (CL) w/ occasional gravel (0-14") | Brown clay w/ silt (CL-CH) (0-19") |
| | Brown Gravelly Sandy Clay w/silt (CL) (14-30") | |
| Brown clay w/silt (CL) 21-30" | | Brown Gravelly Clay w/ silt (CL-CH) (19-25") |
| | | Recovery = 25" |
| Recovery = 30" | Recovery = 30" | |

# SHELBY TUBE LOGGING

PROJECT Brachtel PROJECT NO. 3854,578.01 BY [illegible] DATE 3/20/84 SHEET ___ OF ___ SHI

LENGTH IN INCHES

| TUBE NO. 4 P9<br>DEPTH: 40 TO 42.5 FT. | TUBE NO. 4 P11<br>DEPTH: 50 TO 52.5 FT. | TUBE NO. ___<br>DEPTH: ___ TO ___ FT. |
|---|---|---|
| 0 | 0 | 0 |
| | Brown Gravelly Sandy Clay w/ silt (CL) ~ 4"<br>Diffuse boundry | |
| 10 | | 10 |
| Brown clay w/silt (CL) w/ some gravel<br>MD<br>sample tube homogenous | MD<br>Brown clay w/silt (CL)<br>4-30" | |
| 20 | | 20 |
| Recovery - 25.0" | Recovery 30" | |
| 30 | | 30 |

# SHELBY TUBE LOGGING

PROJECT Bechtel PROJECT NO 3854,077.0 BY [illegible] DATE 3/20/04 SHEET ___ OF ___ SHE

LENGTH IN INCHES

| TUBE NO. 3 P9<br>DEPTH: 43 TO 45.5 FT. | TUBE NO. 4 P5<br>DEPTH: 20.0 TO ___ FT. | TUBE NO. 4 P7<br>DEPTH: 30.0 TO 32.5 FT. |
|---|---|---|
| 0 | 0 | 0 |
| TXUU Brown Clay w/ silt (CL) | | TRUU Brown Gravelly Sandy Clay w/ silt (CL) |
| 10 | TR/UU Brown Clay w/ silt (CL) | 10 |
| 20 | | 20 |
| Recovery = 26" | Consol Brown clay w/ silt (CL) | |
| 30 | Recovery = 30" | Recovery = 30" 30 |

# SHELBY TUBE LOGGING

PROJECT Bechtel JR #1 PROJECT NO. 3854,074.01 BY mv DATE 3/17/84 SHEET ___ OF ___ SHE

| TUBE NO. 4 St 3<br>DEPTH: 10 TO 12.5 FT. | TUBE NO. 3 P 7<br>DEPTH: 33 TO 33.5 FT. | TUBE NO. 1 P5<br>DEPTH: 21.0 TO ___ FT. |
|---|---|---|

LENGTH IN INCHES: 0, 10, 20, 30

**Tube 4 St 3 (10 – 12.5 ft):**

PI Hydro — Brown Gravelly Fine Sandy Silt w/ clay (ML – CL ?)

sample tube fairly homogenous.

Recovery 23"

**Tube 3 P 7 (33 – 33.5 ft):**

TXUU — Brown silt w/clay (ML)

Recovery = 29"

**Tube 1 P5 (21.0 – ___ ft):**

Res Cat — Brown Gravelly Sandy Clay (CL) Highly Fractured

# SHELBY TUBE LOGGING

PROJECT Bechtel TR #1 PROJECT NO. 3854,078.01 BY [illegible] DATE 3/17/84 SHEET ___ OF ___ SHE

LENGTH IN INCHES

**TUBE NO. 1 P12**
**DEPTH: 52 TO 54.5 FT.**

0

Hydro — Brown Gravelly Sandy Silt w/ clay (ML)

PI — Brown Gravelly Sandy Silt w/ clay (ML)

10

20

Recovery = 30"

30

**TUBE NO. 1 P14**
**DEPTH: 72 TO 74.5 FT.**

0

MA — Brown Sandy Silt w/ clay (ML)

Perm — Brown ~~Gravelly~~ Sandy Silt w/ clay (ML) w/ some gravel

Recovery = 30"

**TUBE NO. 1 P18**
**DEPTH: 103.5 TO 106 FT.**

0

Brown Clay (CL) (possible CH?)
Hydro

– abrupt boundry between (CL and SM/SC)

10

↑ 15" Brown Gravelly Silty/clayey Sand (SM or SC) ↓

20

Recovery 22"

30

# SHELBY TUBE LOGGING

PROJECT Bechtel TR#1 PROJECT NO. 38540/8601 BY WLM DATE _____ SHEET ___ OF ___ SHE

LENGTH IN INCHES

**TUBE NO. 1 P3**
**DEPTH: 11 TO 13.5 FT.**

0
10
20
30

Hydro
PI
Penn

Gravelly Silty Coarse Sand SM-SP

Sandy Silt (ML)

**TUBE NO. 1 P6**
**DEPTH: 26.0 TO 28.5 FT.**

0

Penn
PI
Hydro

Tan & Brn Fine Sandy Clay CL some silt small root or worm holes

**TUBE NO. 3 P3**
**DEPTH: 13.0 TO 15.5 FT.**

0
10
20
30

TX/UU

Brown Sandy silt w/ clay (ML)

Tan & Brn Fine Sandy Clay (CL) some silt

Hydro

# SHELBY TUBE LOGGING

PROJECT Bechtel TR #1 PROJECT NO. 3854,078.01 BY ____ DATE 3/16/84 SHEET ____ OF ____ SHE

LENGTH IN INCHES

| TUBE NO. 1 P21<br>DEPTH: 132 TO 134.5 FT. | TUBE NO. 3 S41<br>DEPTH: 3.0 TO 5.5 FT. | TUBE NO. 3 P5<br>DEPTH: 23 TO 25.5 FT. |
|---|---|---|
| 0 | 0 | 0 |
| | >TX UU Brown Gravelly sandy silt w/ clay (ML) | TX UU Brown silt w/ clay (ML) w/ some small gravel. |
| 10 | >PI Brown Gravelly sandy silt w/ clay (ML) | 10 |
| >PI Brown clay w/ silt (CL) | | |
| 20 | | 20 |
| >TX UU Brown clay w/ silt (CL) | | |
| Recovery = 30.0" | Recovery = 30" | Recovery = 28" |
| 30 | | 30 |

# SHELBY TUBE LOGGING

PROJECT Bechtel TR #1 PROJECT NO. 3854,070.0 BY MV DATE 3/15/84 SHEET ___ OF ___ SHE

LENGTH IN INCHES

| TUBE NO. 1 P4 | TUBE NO. 1 P7 | TUBE NO. 1 P11 |
|---|---|---|
| DEPTH: 16.0 TO 18.5 FT. | DEPTH: 33.5 TO 36.3 FT. | DEPTH: 47.0 TO 48.5 FT. |

0 10 20 30

TX|UU Brown Fine Sandy Clay w/ silt (CL)

TX|UU Brown Clay w/ silt (CL) w/ some sand + gravel

TXUU Brown Fine Sandy Silt (ML) w/ some gravel

# SHELBY TUBE LOGGING

PROJECT Bechtel TR #2 PROJECT NO. 3854,078.01 BY mv DATE 3/16/84 SHEET ___ OF ___ SHE

LENGTH IN INCHES

| TUBE NO. 2 P4 | TUBE NO. 6 P3 | TUBE NO. 7 P2 |
|---|---|---|
| DEPTH: 18 TO 20.5 FT. | DEPTH: 12 TO 14.5 FT. | DEPTH: 7 TO 9.5 FT. |
| 0 | 0 | 0 |
| 10 | 10 | 10 |
| 20 | 20 | 20 |
| >consol | > consol | > consol |
| Brown Gravelly Sandy Silt w/clay (ML) | Brown Gravelly Sandy Silt w/clay (ML) | Brown Gravelly Sandy Silt w/clay (ML) |
| - PI | | |
| Recovery = 25" | Recovery = 25" | Recovery = 24" |
| 30 | 30 | 30 |

# SHELBY TUBE LOGGING

PROJECT Bechtel PROJECT NO. 3854,071.01 BY mv DATE 3/17/84 SHEET ___ OF ___ SHE

LENGTH IN INCHES

| TUBE NO. 6 P8<br>DEPTH: 37 TO 39.5 FT. | TUBE NO. 6 P16<br>DEPTH: 102 TO 104.5 FT. | TUBE NO. 6 P6<br>DEPTH: 22.0 TO 24.5 FT. |
|---|---|---|
| 0 | 0 | 0 |
| TR/CU | PF Brown clay w/silt (CL) w/ pockets of gypsum numerous.<br>TRCU Sample tube homogenous throughout | |
| 10 | Note: entire sample used for testing. None saved. | 10 |
| TRCU | TRCU | |
| 20 | Hydro | 20 |
| Hydro Brown silt w/clay (ML-CL) | Hydro | |
| TRCU | TRCU | TRCU Brn Gravelly Sandy Clay /w silt |
| Recovery = 30" | Recovery = 30" | Recovery = 30" |
| 30 | | 30 |

REMARKS

# SHELBY TUBE LOGGING

PROJECT Bechtel PROJECT NO. 3854,078.01 BY ____ DATE 3/21/84 SHEET ___ OF ___ SHE

| TUBE NO. 25 St. 1 | TUBE NO. ____ | TUBE NO. ____ |
|---|---|---|
| DEPTH: 2.5 TO 5.0 FT. | DEPTH: ___ TO ___ FT. | DEPTH: ___ TO ___ FT. |

LENGTH IN INCHES

0

Brown clay w/silt (CL) w/ some gravel. Sample tube fairly homogenous

10

PI

Perm

Brown clay w/silt (CL) w/ some gravel

20

Recovery = 24"

30

# WORKSHEET-SPECIFIC GRAVITY TESTS

HARDING LAWSON ASSOCIATE

| Job BECHTEL | No. 3854 078 | By | Date 3/23/8 |
|---|---|---|---|

**SPECIFIC GRAVITY OF SOLIDS ($G_s$)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bor. | | 6(P8) | 6(P16) | 6(P16) | 6(P8) | 6(P16) | 6(P8) |
| Depth | | 37.5 | 102.5 | 104.0 | 39.0 | 103.0 | 38.0 |
| Flask No. | | C | G | E | A | F | B |
| Temperature of Water and Soil, T, °C | | 23.0° | 22.0 | 21.5 | 23.0° | 22.0 | 23.0 |
| Pan No. | | D126 | D3 | D16 | D21 | D42 | D106 |
| Wt. in grams: Pan + Dry Soil | | 1100.5 | 1138.3 | 1157.0 | 1041.5 | 1138.9 | 1092.5 |
| Wt. in grams: Pan | | | | | | | |
| Wt. in grams: Dry Soil | $W_s$ | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Wt. in grams: Flask + Water at T, °C | $W_{bw}$ | 675.0 | 662.5 | 663.9 | 663.9 | 654.2 | 667.9 |
| Wt. in grams: $W_s + W_{bw}$ | | 775.0 | 762.5 | 763.9 | 763.9 | 754.2 | 767.9 |
| Wt. in grams: Flask + Water + Immersed Soil | $W_{bws}$ | 737.4 | 728.6 | 730.0 | 726.1 | 719.9 | 731.2 |
| Wt. in grams: Displaced Water, $W_s + W_{bw} - W_{bws}$ | | 37.6 | 33.9 | 33.9 | 37.8 | 34.3 | 36.7 |
| Correction Factor | K | .9993 | .9996 | .9997 | .9993 | .9996 | .9993 |
| $(W_s K) \div (W_s + W_{bw} - W_{bws})$ | $G_s$ | 2.66 | 2.95 | 2.95 | 2.64 | 2.91 | 2.72 |

| APPARENT ($G_a$) AND BULK ($G_m$) SPECIFIC GRAVITY | | | | | Temp. | Corr. Factor |
|---|---|---|---|---|---|---|
| Source | | | | | °C | K |
| Temperature of Water and Soil, T, °C | | | | | 14 | 1.0010 |
| Wt. in grams: Pan + Saturated Surface - Dry Soil | | | | | 15 | 1.0009 |
| Wt. in grams: Tare Weight | | | | | 16 | 1.0007 |
| Wt. in grams: Saturated Surface - Dry Soil | B | | | | 17 | 1.0006 |
| Wt. in grams: (Wire Basket + Soil) in Water | | | | | 18 | 1.0004 |
| Wt. in grams: Wire Basket in Water | | | | | 19 | 1.0002 |
| Wt. in grams: Saturated Soil in Water | C | | | | 20 | 1.0000 |
| Wt. in grams: Tare Weight + Dry Soil | | | | | 21 | 0.9998 |
| Wt. in grams: Tare Weight | | | | | 22 | 0.9996 |
| Wt. in grams: Dry Soil | A | | | | 23 | 0.9993 |
| Correction Factor | K | | | | 24 | 0.9991 |
| (AK) ÷ (A-C) (Apparent) | $G_a$ | | | | 25 | 0.9988 |
| (AK) ÷ (B-C) (Bulk) | $G_m$ | | | | 26 | 0.9986 |
| Remarks: | | | | | 27 | 0.9983 |
| | | | | | 28 | 0.9980 |
| | | | | | 29 | 0.9977 |
| | | | | | 30 | 0.9974 |
| | | | | | 31 | 0.9971 |

Tested by: _____ Computed by: _____ Checked by: _____

# WORKSHEET–SPECIFIC GRAVITY TESTS

HARDING LAWSON ASSOCIATE

| Job Bechtel | No. 3854,078.01 | By mv | Date 3/19/84 |
|---|---|---|---|

| SPECIFIC GRAVITY OF SOLIDS ($G_s$) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bor. | | 2P4 | 7P2 | 6P3 | 6P6 | 6P16 | |
| Depth | | 18-20.5 (20.0) | 7-9.5 (9.0) | 12-14.5 (13.5) | 21° | 102° | |
| Flask No. | | B | C | D | A | B | |
| Temperature of Water and Soil, T, °C | | 24.0 | 24.0 | 24.0 | 23.5 | 23.5 | |
| Pan No. | | | | | D108 | D133 | |
| Wt. in grams: Pan + Dry Soil | | | | | | | |
| Wt. in grams: Pan | | | | | | | |
| Wt. in grams: Dry Soil | $W_s$ | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | |
| Wt. in grams: Flask + Water at T, °C | $W_{bw}$ | 667.9 | 674.8 | 662.0 | 663.9 | 667.9 | |
| $W_s + W_{bw}$ | | 767.9 | 774.8 | 762.0 | 763.9 | 767.9 | |
| Wt. in grams: Flask + Water + Immersed Soil | $W_{bws}$ | 730.7 | 736.7 | 724.0 | 725.3 | 733.9 | |
| Wt. in grams: Displaced Water, $W_s + W_{bw} - W_{bws}$ | | 37.2 | 38.1 | 38.0 | 38.6 | 34.0 | |
| Correction Factor | K | .9991 | — | — | .9992 | .9992 | |
| $(W_s K) \div (W_s + W_{bw} - W_{bws})$ | $G_s$ | 2.69 | 2.62 | 2.63 | 2.59 | 2.94 | |

| APPARENT ($G_a$) AND BULK ($G_m$) SPECIFIC GRAVITY | | | | | Temp. | Corr. Factor |
|---|---|---|---|---|---|---|
| Source | | | | | °C | K |
| Temperature of Water and Soil, T, °C | | | | | 14 | 1.0010 |
| Wt. in grams: Pan + Saturated Surface - Dry Soil | | | | | 15 | 1.0009 |
| Wt. in grams: Tare Weight | | | | | 16 | 1.0007 |
| Wt. in grams: Saturated Surface - Dry Soil | B | | | | 17 | 1.0006 |
| Wt. in grams: (Wire Basket + Soil) in Water | | | | | 18 | 1.0004 |
| Wt. in grams: Wire Basket in Water | | | | | 19 | 1.0002 |
| Wt. in grams: Saturated Soil in Water | C | | | | 20 | 1.0000 |
| Wt. in grams: Tare Weight + Dry Soil | | | | | 21 | 0.9998 |
| Wt. in grams: Tare Weight | | | | | 22 | 0.9996 |
| Wt. in grams: Dry Soil | A | | | | 23 | 0.9993 |
| Correction Factor | K | | | | 24 | 0.9991 |
| (AK) ÷ (A-C) (Apparent) | $G_a$ | | | | 25 | 0.9988 |
| (AK) ÷ (B-C) (Bulk) | $G_m$ | | | | 26 | 0.9986 |
| Remarks: | | | | | 27 | 0.9983 |
| | | | | | 28 | 0.9980 |
| | | | | | 29 | 0.9977 |
| | | | | | 30 | 0.9974 |
| | | | | | 31 | 0.9971 |

Tested by: _____ Computed by: _____ Checked by: [illegible]

# WORKSHEET-SPECIFIC GRAVITY TESTS

HARDING LAWSON ASSOCIATE

| Job Bechtel | No. 3854,078 | By | Date 3/2/84 |
|---|---|---|---|

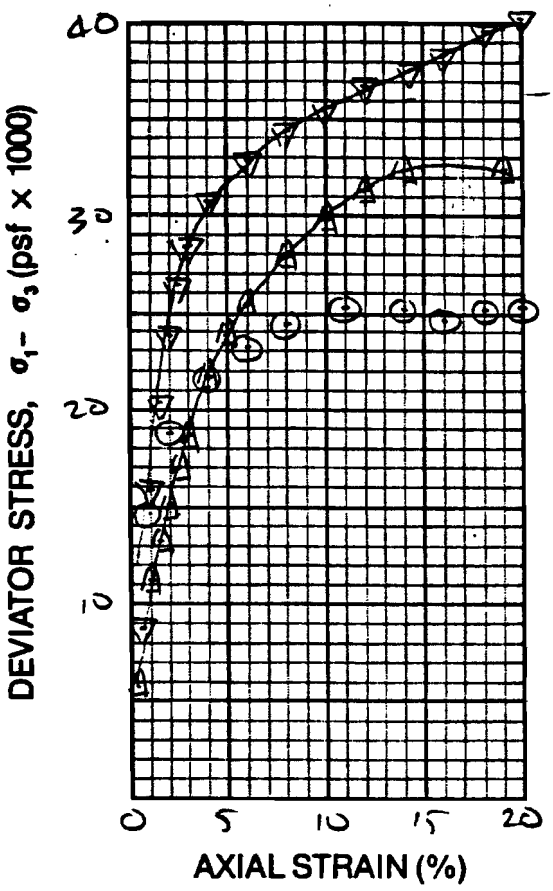
## SPECIFIC GRAVITY OF SOLIDS ($G_s$)

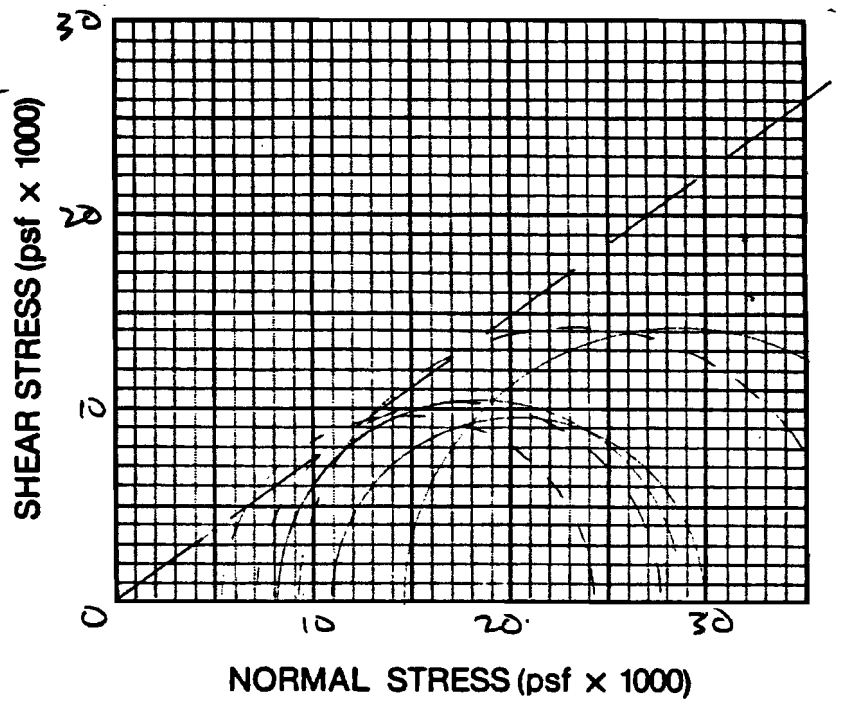
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bor. | | | 1(P13) | 1 (P4) | 3(P3) | 4(P5) | 3(ST1) |
| Depth | | | 62.0 (64.5) | 16.0 (18.5) | 13.0/15.0 | 22.0 | 3.0 (5.0) |
| Flask No. | | | D | A | C | B | G |
| Temperature of Water and Soil, T, °C | | | 23.0 | 23½ | 23½ | 23.0 | — |
| Pan No. | | | D-120 | A28 | D-0 | D-126 | D64 |
| Wt. in grams | Pan + Dry Soil | | | | | | |
| | Pan | | | | | | |
| | Dry Soil | $W_s$ | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| | Flask + Water at T, °C | $W_{bw}$ | 662.1 | 663.9 | 674.9 | 667.9 | 662.4 |
| | $W_s + W_{bw}$ | | 762.1 | 763.9 | 774.9 | 767.9 | 762.4 |
| | Flask + Water + Immersed Soil | $W_{bws}$ | 725.0 | 726.0 | 737.5 | 731.2 | 724.5 |
| | Displaced Water, $W_s + W_{bw} - W_{bws}$ | | 37.1 | 37.9 | 37.4 | 36.7 | 37.9 |
| Correction Factor | | K | .9993 | .9992 | .9992 | .9993 | .9993 |
| $(W_s K) \div (W_s + W_{bw} - W_{bws})$ | | $G_s$ | 2.69 | 2.64 | 2.67 | 2.72 | 2.64 |

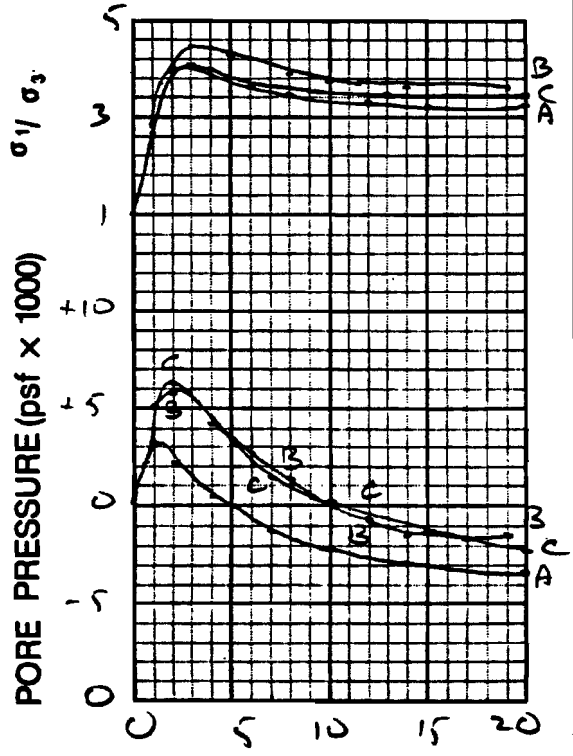
## APPARENT ($G_a$) AND BULK ($G_m$) SPECIFIC GRAVITY

| | | | | | Temp. | Corr. Factor |
|---|---|---|---|---|---|---|
| Source | | | | | °C | K |
| Temperature of Water and Soil, T, °C | | | | | 14 | 1.0010 |
| Wt. in grams | Pan + Saturated Surface - Dry Soil | | | | 15 | 1.0009 |
| | Tare Weight | | | | 16 | 1.0007 |
| | Saturated Surface - Dry Soil | B | | | 17 | 1.0006 |
| | (Wire Basket + Soil) in Water | | | | 18 | 1.0004 |
| | Wire Basket in Water | | | | 19 | 1.0002 |
| | Saturated Soil in Water | C | | | 20 | 1.0000 |
| | Tare Weight + Dry Soil | | | | 21 | 0.9998 |
| | Tare Weight | | | | 22 | 0.9996 |
| | Dry Soil | A | | | 23 | 0.9993 |
| Correction Factor | | K | | | 24 | 0.9991 |
| (AK) ÷ (A-C) (Apparent) | | $G_a$ | | | 25 | 0.9988 |
| (AK) ÷ (B-C) (Bulk) | | $G_m$ | | | 26 | 0.9986 |
| Remarks: | | | | | 27 | 0.9983 |
| | | | | | 28 | 0.9980 |
| | | | | | 29 | 0.9977 |
| | | | | | 30 | 0.9974 |
| | | | | | 31 | 0.9971 |

Tested by: _____ Computed by: _____ Checked by: [illegible]




TEST TYPE: CONSOLIDATED UNDRAINED Controlled STRAIN

| PHYSICAL CONDITIONS | | TEST NO. A ⊙ | TEST NO. B △ | TEST NO. C ▽ |
|---|---|---|---|---|
| INITIAL | Diameter (in.) | 2.87 | 2.87 | 2.87 |
| | Height (in.) | 6.50 | 6.50 | 6.50 |
| | Water Content (%) | 26.4 | 27.9 | 27.0 |
| | Void Ratio | 0.842 | 0.852 | 0.825 |
| | Saturation (%) | 93 | 96 | 95 |
| | Dry Density (pcf) | 100.0 | 99.4 | 99.5 |
| BEFORE | Consolidation Pressure (psf) | 8040 | 10920 | 14520 |
| | Backpressure (psf) | 4320 | 4320 | 3170 |
| | Water Content (%) | 26.4 | 25.9 | 25.5 |
| | Void Ratio | 0.780 | 0.763 | 0.741 |
| FINAL | Water Content (%) | 26.4 | 25.9 | 25.5 |
| | Dry Density (pcf) | 103.4 | 104.4 | 104.3 |
| | Void Ratio | 0.780 | 0.763 | 0.741 |
| | Saturation (%) | 100 | 100 | 100 |
| FAILURE | $\sigma_1$ Major Principal Stress (psf) | 28530 | 29650 | 42720 |
| | $\sigma_3$ Minor Principal Stress (psf) | 8040 | 10920 | 14520 |
| | Pore Pressure (psf) | 1050 | 5470 | 5460 |
| | Axial Strain at Failure (%) | 3 | 3 | 3 |
| | Time to Failure (min.) | 95 | 150 | 120 |
| Sample Source: DH6 (P16) | | 104° | 102.5 | 103° |
| Classification: | | | | $G_s$ 2.91-2.95 |

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Triaxial Compression Test**

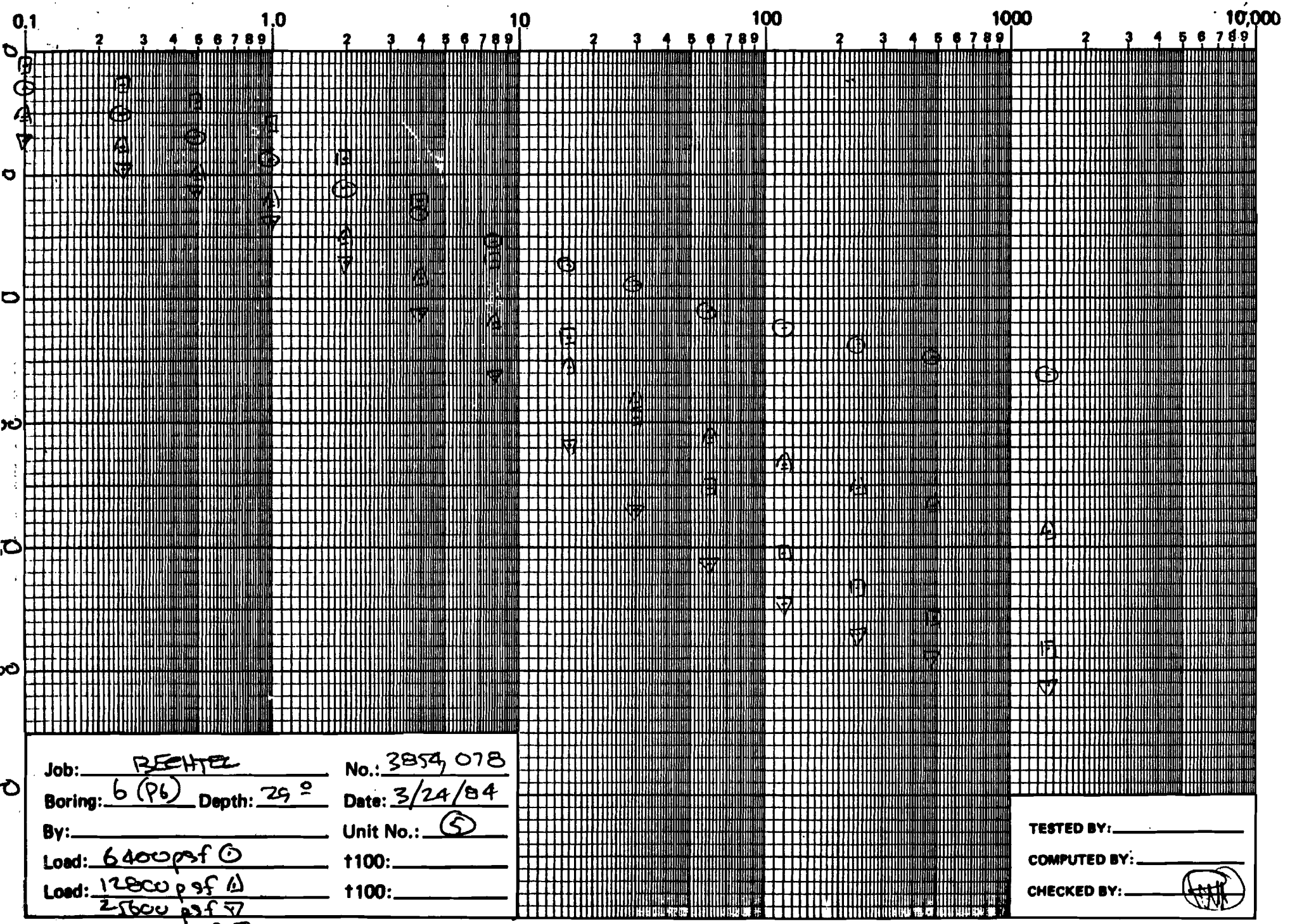
BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854,078 | | 3/26/84 | | |

# CONSOLIDATION TIME - DEFORMATION

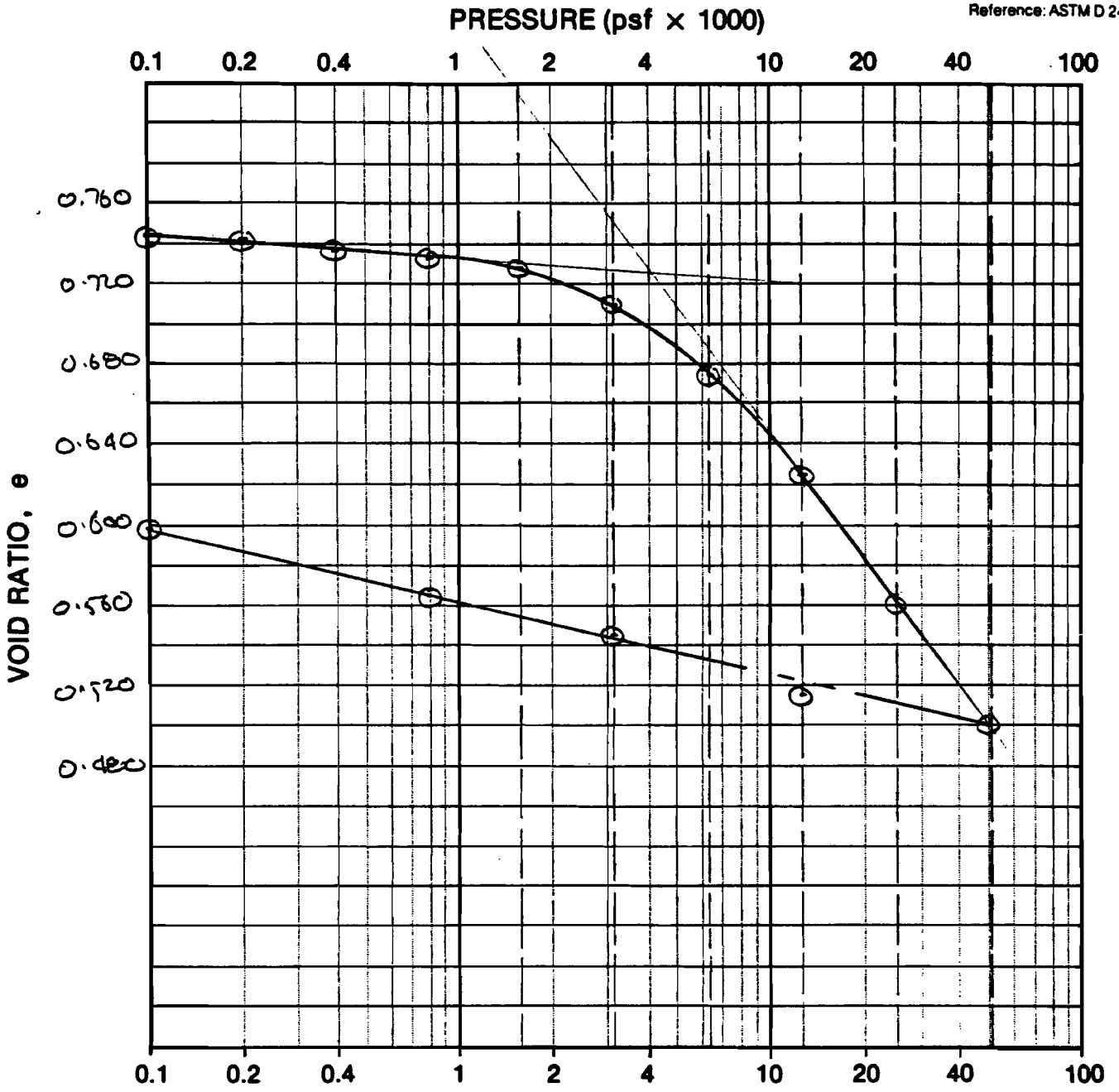
HARDING LAWSON ASSOCIATE.




Job: BECHTEL
No.: 3854,078
Boring: 6 (P6)
Depth: 29 °
Date: 3/24/84
By:
Unit No.: 5
Load: 6400 psf ○
t100:
Load: 12800 psf △
t100:
25600 psf ▽
50000 psf □

TESTED BY:
COMPUTED BY:
CHECKED BY:

Reference: ASTM D 2435




VOID RATIO — PRESSURE CURVE

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Type of Specimen UNDISTURBED | | Condition | | Before Test | | After Test | |
| Diameter (in.) 2.43 | Height (in.) 0.80 | Water Content | $w_o$ | 25.3 % | $w_f$ | 23.1 % | |
| Overburden Press., $P_o$ | psf | Void Ratio | $e_o$ | 0.746 | $e_f$ | 0.598 | |
| Preconsol. Press., $P_c$ | psf | Saturation | $S_o$ | 88 % | $S_f$ | 100 % | |
| Compression Index, $C_c$ | | Dry Density | $\gamma_d$ | 92.6 pcf | $\gamma_d$ | 101.2 pcf | |
| LL | PL | PI | | Gs 2.59 | | | |
| Classification BROWN GRAVELLY SANDY CLAY (CL) | | Source DH6 (P6) 29.5' | | | | | |

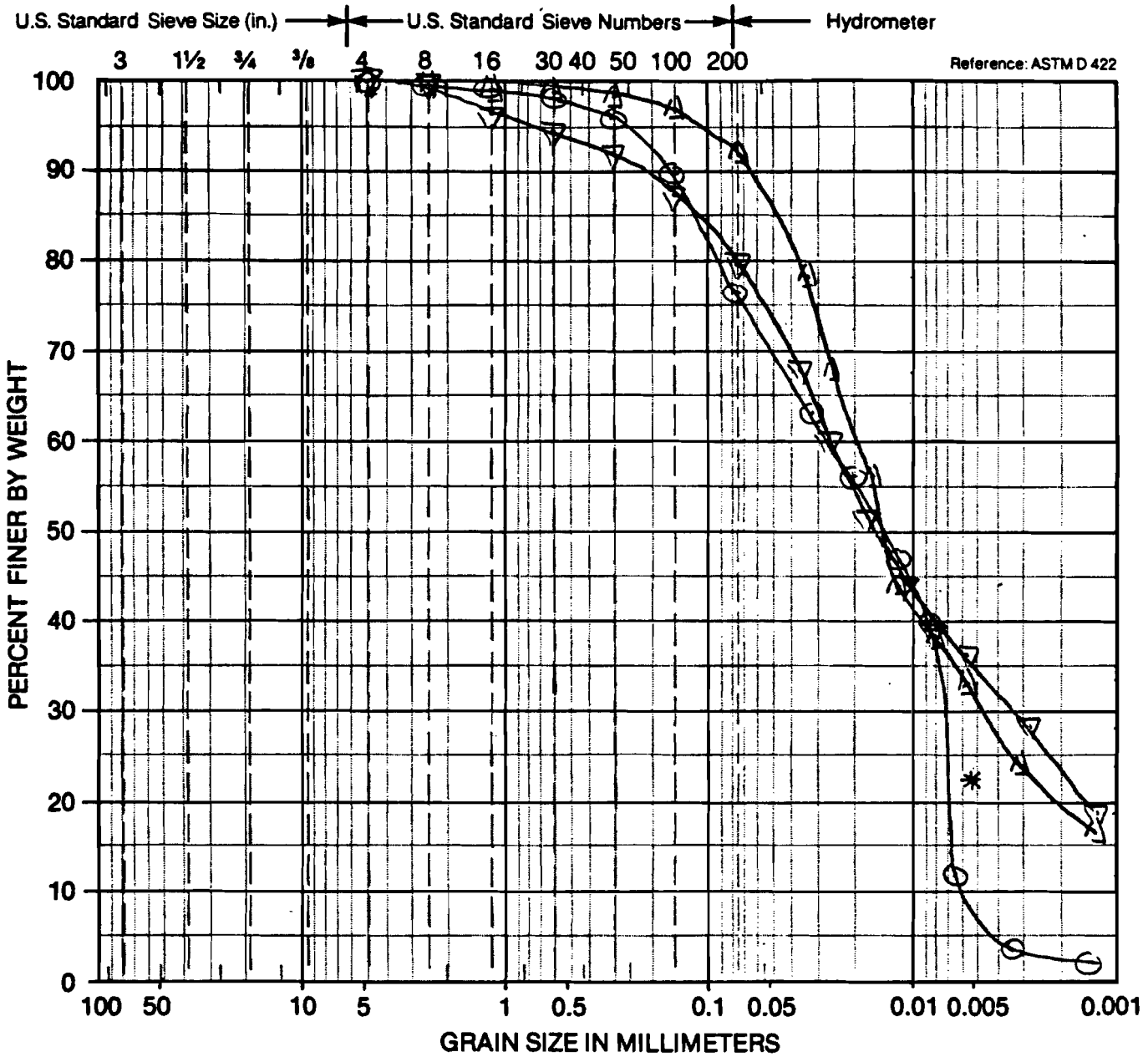
**Harding Lawson Associates**
Engineers, Geologists
& Geophysicists

**Consolidation Test Report**

BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3854, 078 | | 3/27/84 | | |




| COBBLES | GRAVEL: COARSE | GRAVEL: FINE | SAND: COARSE | SAND: MEDIUM | SAND: FINE | SILT OR CLAY |
|---|---|---|---|---|---|---|

| Symbol | Sample Source | Classification |
|---|---|---|
| ⊙ | DH 6 (P16) 104.0' | BROWN SANDY CLAY (CL) W/GYPSUM* |
| ◸ | DH6 (P8) 39.0' | " " " " |
| ▽ | BULK 20 7'-10' | " " " " |

**Harding Lawson Associates**
Engineers, Geologists & Geophysicists

**Particle Size Analysis**

BECHTEL

PLATE

| DRAWN | JOB NUMBER | APPROVED | DATE | REVISED | DATE |
|---|---|---|---|---|---|
| | 3858,078 | | 3/25/84 | | |

# Bechtel Civil & Minerals, Inc.

Interoffice Memorandum

To T. A. McCormick

File No.

Subject Carrisa Plains Test Well
Job 16413

Date June 15, 1984

From C. R. Farrell

Of H&CF/Geology

Copies to M. J. Adair
L. R. West

At 45/31 Ext.

Attached is a summary of the work done to construct and test a production well at the Carrisa Plain Solar Project site.

I contacted Don's Drilling Co. on Friday, June 14, 1984 concerning the sealing of the first well drilled. Mr. D. Redfairn said that he filled the casing to near surface with drill cuttings, mud and the broken up pieces from the concrete pump base. He cut off the well casing about three feet below ground surface, filled the balance of casing with a grout plug, and welded a metal cap on the casing top. He reported this to the county regulatory agency.

CR Farrell

C. R. Farrell

CRF:as
Attachment

12118

PRODUCTION TEST WELL

CARRISA PLAINS SOLAR PROJECT

JUNE 1984

Bechtel National, Inc. requested Bechtel Civil and Minerals, Inc. to investigate the possibility of developing a water supply from ground water for the Solar Energy Plant at Carrisa Plains, California. The water supply requirement is estimated to be about 115 gpm (gallons per minute). A preliminary literature review followed by discussions with local farmers indicated that the ground water resources at the proposed site should be sufficient to meet the water requirements. Near-surface ground water (to a depth of approximately 100 feet) is reported to be poor quality but sands and gravels below that depth yield good quality to wells. A program for well construction and aquifer testing was developed and approved. The drilling contract was awarded to Don's Drilling Co., Bakersfield, Calif. in March, 1984. The contractor mobilized on March 5 and the test/production well was completed on May 5. The following paragraphs describe briefly the drilling, construction, and testing of the test well.

## Exploration

Three 5-1/4-inch diameter exploratory pilot holes were drilled before a sufficiently thick interval of coarse-grained and apparently permeable materials was encountered to justify construction of a well. The first pilot hole, W-1, located about 1000 feet north of the southern section

line and approximately half way between the east and west section lines, was first drilled to a depth of 500 feet. An E-log, which measures the SP (self potential) and apparent electrical resistivity of the materials was run in the hole. A review of the E-log and the drill cuttings indicated that very little sand or gravel was present except in the bottom portion of the hole. It was decided to drill an additional 100 feet (to 600 feet) to determine if additional sand or gravel might be encountered. The hole was drilled to a total depth of 620 feet, and a second E-log was run. The E-log verified the indications of the drill cuttings that little to no permeable material was present at this site. The pilot hole was backfilled and a second exploratory site was selected.

The second pilot hole, W-2, was located about 120 feet south and 120 feet east of the north-west corner of the section. This hole was drilled to 600 feet and E-logged. The hole encountered only clay and silt below about 120 feet. Based on the E-log and the drill cuttings this hole was also backfilled and abandoned.

The third pilot hole, W-3, was located about 120 feet north and 120 feet east of the south-west corner of the section. It was drilled to 620 feet and an E-log was run. The E-log, as well as the drill cuttings, were favorable, indicating lenses of sand and gravel from 460 to 610 feet. Based on these results it was decided to ream the pilot hole and construct the 12-inch diameter test well.

Construction of well

The well is a gravel-packed well, consisting of a 19-inch diameter hole in which a 12-inch diameter casing and screen assembly is installed. A filter gravel was placed below a depth of 190 feet in the annular space between the wall of the drilled hole and the casing/screen assembly. A bentonite seal was installed from 185 to 190 feet. The annulus was backfilled with gravel above that seal to 50 feet below the land surface and a cement-grout surface seal was installed from 50 feet to land surface. A concrete pump base, 6 feet by 6 feet and 1-foot thick was installed at the ground surface.

The well casing and screen assembly consists of 60 feet of galvinized low carbon steel screen and 560 feet carbon steel casing. The screen is a continous wire wrap type, manufactured by U.O.P. Johnson Co. with .020-inch openings. The screen was installed in three sections located at depths of 490-500 feet, 530-555 feet, and 575-600 feet below the land surface.

The well was developed by jetting the screen, and by washing and surging with air. After nine days of cleaning and development by these means it was determined that the well was clean enough for final development with the test pump.

The test pump was installed and final development began on April 10. At 11:20 a.m. April 11, while developing, the pump discharge rate suddenly increased from about 80 gpm to almost 200 gpm and the water



0944-

level in the well rose about 120 feet. In less than 5 minutes the pump locked-up and ceased pumping. The contractor then removed the pump. It was found that the well had filled in to a depth of 460 feet below land surface with sand and gravel. The caved material was washed out to a depth of 585 ft with a 9-7/8-inch bit where an obstruction was encountered, preventing further clearing of the well. It was concluded that the well screen was broken at that depth.

The cause of the break in the screen, based on the events that occurred, was apparently the bridging of gravel filter during installation, leaving a void in the annular space at some point above the break. During development with the pump, the bridge collapsed, and the impact of falling gravel from above caused the screen to break at a depth of 585 feet. Because the casing/screen assembly could not be pulled to repair the screen, the contractor elected to drill a new well. He backfilled and sealed the initial well in accordance with state and county regulations.

The drill rig was moved about 36 feet north of well W-3 and a second 19-inch diameter hole (W-3A) was drilled to a depth of 620 feet. The casing and screen assembly in well W-3A includes 500 feet of 10-inch diameter carbon steel casing, 50 feet of 8-inch diameter galvinized low carbon steel wire wrapped screen, and 67 feet of 8-inch diameter carbon steel casing. The 10-inch casing is joined to the 8-inch casing/screen assembly by a 10x8-inch reducer. The screen has .030-inch openings and was installed in two sections located at depths of 530-550 feet and

570-600 feet below the land surface. A washdown valve seals the bottom of the casing/screen assembly. Gravel filter material was placed in the annular space between drill hole and the well assembly with considerable care to avoid bridging. The filter is from 620 feet to 220 feet below the land surface. A grout plug was installed from 220 feet to 215 feet. The annulus above the plug is filled with gravel to a depth of 50 feet below the land surface. The well was completed by installation of a grout surface seal from 50 feet to ground surface and construction of the pump base.

Development of Well 3A proceeded in a similar manner to that of Well 3. Installation of the test pump and final development was accomplished without difficulty. Removal of fines and sand from the well was realized.

## Well Test and Methods of Analysis

After the completion of development an aquifer pumping test was performed. The pumping test provides an in-situ measurement of the transmissivity of the aquifer, which is important in determining the long term yield of the well. The test was performed in accordance with recognized methods for conducting a constant-discharge type test.

The aquifer pumping test data were analyzed by methods based on the Theis solution of non-steady ground water flow to a well in response to a constant pumping rate. The Theis solution can be written in the following form (Freeze & Cherry, "Groundwater", Prentice Hall, Inc., 1979:

$$s = \frac{Q}{4\pi T} W(u)$$

where: $s$ = drawdown in the well (feet),

$Q$ = discharge from well ($ft^3$/day),

$T$ = transmissivity ($ft^2$/day),

$W(u)$ = well function of u,

$$u = \frac{r^2 S}{4Tt}$$

$r$ = distance from well, feet,

$S$ = storativity, dimensionless, and

$t$ = time, days.

The Jacob approximation of the Theis solution was applied in the analyses. Semilog graphical plotting of the data is used in this method. Both drawdown in response to pumping and recovery of the water level following cessation of pumping provide data with which to analyze aquifer capacity.

Drawdown data obtained during pumping is plotted against the log of time since pumping began. A straight line is developed, the slope of which is related to the transmissivity. The recovery semilog plots are

similar to the time-drawdown solution. Residual drawdown (s') data are plotted against the logarithm of the ratio of time since pumping started (t) and time since pumping stopped (t'). With these data a straight line is also developed, the slope of which is related to the transmissivity.

The test commenced at 9:45 a.m. May 2, 1984 pumping continued for 72 hours. Initially the pumping rate was set at 305 gpm. After 90 minutes, the rate had to be reduced to approximately 265 gpm because of mechanical problems with the diesel engine that operated the pump. The water level in the well was measured during the test with an air line. The pumping rate was measured with an orifice plate on the discharge pipe.

The depth to water below ground surface before commencing the aquifer test (static level) was 40 feet. After 90 minutes of pumping at a rate of 305 gpm the water level in the well was drawn down to a depth of 373 feet (drawdown of 333 feet). Because of mechanical problems with the diesel power source, the pumping rate was decreased at that time, and for the balance of the pumping period (total pumping duration of 4335 minutes, or 3 days) the pumping rate varied from 254 to 268 gpm. WIth the drop in pumping rate, the water level in the well quickly recovered to 340 feet depth, and then began dropping again, slowly, as pumping continued at the lower rate. The water level depth in the well at the end of the pumping period was 368 feet.

## Evaluation of Aquifer Capacity

The analyses of the pumping test data indicate that the transmissivity of the aquifer (the sands and gravels encountered between 460 and 610 feet) is approximately 2800 gallons per day per foot (375 $ft^2/d$) and the estimated well efficiency during the test was 0.60. It is not possible to measure the aquifer storativity accurately with the data collected from the pumping well. However, the occurrence of the sands and gravels within thick clay/silt layers, and the potentiometric level (represented by the water level in the well) above the aquifer indicate it is confined to semiconfined. A storativity of 0.001 can be applied for estimating aquifer capacity. These aquifer characteristics, the measured responses of the test well, and assuming no recharge occurs to replenish the aquifer, provide a conservative basis for estimating the capacity of the aquifer to provide the long-term design water requirement (115 gpm).

Adjusting the well performance to a rate of 115 gpm, and projecting the drawdown interference after 20 years of continuous pumping indicates that it would be less than 200 feet at the well, and less than 50 feet at a distance of 1000 feet from the well. The aquifer is capable of providing the water requirement and the extraction would not interfere with existing users.

Eight borings (designated Borings SB-01 through SB-08) were performed between June 20 and 22, 2007 using a truck-mounted hollow stem auger drill rig. The borings were advanced to depths ranging from 30.5 to 95.5 feet below the ground surface (bgs) by Technicon of Fresno, California. Boring locations established using staking, and after drilling were recorded using hand-held GPS (global positioning system) equipment; boring elevations were estimated from the topographic survey.

During drilling, drive samples were typically collected at 5 to 10-foot intervals using a 2.5-inch diameter, modified California sampler with an interior lining of brass tubes or a 2.0-inch diameter Standard Penetration Test (SPT) sampler. For each sampling interval, the sampler was driven a distance of 18-inches or less into the subsurface using a 140-pound automatic hammer falling about 30-inches. The number of blows required to drive the sampler (blow counts) was recorded in 6-inch increments. The first 6-inch increment of penetration is considered to be a "seating interval" into disturbed soils at the base of the borehole, and the corresponding blow count is not taken into consideration. The total number of blows for the last 12-inches or less of penetration is recorded and is used to describe the relative density and consistency of the soil samples. The blow counts shown on the boring logs have been corrected for hammer and sampler type to represent equivalent SPT N-Values; measured modified California sampler blow counts were multiplied by a factor of 0.7 and SPT blow counts were multiplied by 1.2.

Bulk samples were also collected from the upper ten feet of the boring. Eight of the bulk samples were provided to Patch Services for advanced thermal testing.

Soil samples of the subsurface materials were obtained from the borings and returned to our laboratory for further examination and testing. The upper 25 feet of each boring was backfilled with bentonite chips in accordance with the boring permit obtained from San Luis Obispo County. Below a depth of 25 feet, the borings were backfilled with soil cuttings.

A Key to Boring Logs is presented as Figure B-1. Final logs of the borings are presented on Figures B-2 through B-9. The descriptions on the logs are based on field observation, sample inspection, and laboratory testing.

**Project:** Carrizo Energy Solar Farm (CESF)
**Project Location:** San Luis Obispo County, California
**Project Number:** 22239472.01200

# Key to Logs

Sheet

| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

## COLUMN DESCRIPTIONS

1 **Elevation:** Elevation in feet referenced to mean sea level (MSL) or site datum.

2 **Depth:** Depth in feet below the ground surface.

3 **Sample Type:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

4 **Sample Number:** Sample identification number. Unnumbered sample indicates no sample recovery.

5 **Sampling Resistance:** Number of blows required to advance driven sampler 12 inches beyond first 6-inch interval, or distance noted, using a 140-lb hammer with a 30-inch drop.

6 **Graphic Log:** Graphic depiction of subsurface material encountered; typical symbols are explained below.

7 **Material Description:** Description of material encountered; may include relative density/consistency, moisture, color, particle size; texture, weathering, and strength of formation material.

8 **Water Content:** Water content of soil sample measured in laboratory, expressed as percentage of dry weight of specimen.

9 **Dry Unit Weight:** Dry density of soil sample measured in laboratory, in pounds per cubic foot.

10 **Remarks and Other Tests:** Comments and observations regarding drilling or sampling made by driller or field personnel.

| | |
|---|---|
| **WA** | Three-point wash sieve, %<#200 sieve |
| **SA** | Sieve analysis, %<#200 sieve |
| **LL** | Liquid limit (from Atterberg limits test), % |
| **PI** | Plasticity Index (LL-PL), %; NP=nonplastic |
| **COMP** | Compaction test by modified proctor |
| **CORR** | Corrosivity test |
| **UU** | Unconsolidated-Undrained Triaxial Compression test |
| **R-VALUE** | Resistance value |
| **EI** | Expansion Index |
| **CON** | Consolidation test |

## TYPICAL MATERIAL GRAPHIC SYMBOLS

Silty SAND (SM)

Clayey SAND (SC)

SAND with silt (SP)

SILT (ML)

CLAY (CL)

Clayey GRAVEL (GC)

## TYPICAL SAMPLER GRAPHIC SYMBOLS

2.5-inch-OD Modified California sampler

Standard Penetration sampler

## OTHER GRAPHIC SYMBOLS

First water encountered at time of drilling and sampling (ATD)

Water level measured at specified time after completion of drilling and sampling

Minor change in material properties within a stratum

Inferred or gradational contact between strata

## GENERAL NOTES

1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive; actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.

2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.





Figure B-1

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-01



| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **06-20-07** | Logged By | **F. Gegunde** | Checked By | **K. Giesing** |
| Drilling Method | **Hollow Stem Auger** | Drill Bit Size/Type | **8"** | Total Depth of Borehole | **31 feet** |
| Drill Rig Type | **CME-55** | Drilling Contractor | **Technicon** | Approximate Surface Elevation | **2058.1 feet** |
| Water Level Depth (Feet) | **29.5' bgs** | Sampling Method(s) | **Bulk/ModCal** | Hammer Data | **140 lbs/30" drop** |
| Borehole Backfill | **Bentonite chips (top 25')/soil cuttings** | Location | **See Site Plan** | | |

| Elevation, feet | Depth, feet | SAMPLES Type | Number | Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | SB-01-1 | 22 | | ALLUVIUM<br>Very stiff, dry, grayish brown, sandy CLAY (CL), high sand content, disked upper 2' to 3' | 8 | 95 | SA(56), LL(30), PI(17) |
| 2055 | | | | | | Very dense, moist, grayish brown, clayey fine SAND (SC), high clay content | | | Bulk sample 2.5'-5' R-Value(9) |
| | 5 | | SB-01-5 | 35/ 5.5" | | | 6 | | Bulk sample 4.5'-6' SA(47), COMP, CORR |
| 2050 | | | | | | | | | |
| | 10 | | SB-01-10 | 51 | | Becomes brown | 9 | | WA(43) |
| 2045 | | | | | | | | | |
| | 15 | | SB-01-15 | 57/6" | | Becomes light yellowish brown, calcite stringers | | | |
| 2040 | | | | | | | | | |
| | 20 | | SB-01-20 | 31 | | Becomes dense, brown | 21 | | |
| 2035 | | | | | | | | | |
| | 25 | | SB-01-25 | 33 | | Sand becomes coarser grained | 24 | 99 | |
| 2030 | | | | | | | | | |
| | 30 | | | | | Very stiff, wet, light yellowish brown CLAY (CL) with sand, medium plasticity ▽ | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-01

URS

**Figure B-2**

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-01



| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | SB-01-30 | 16 | | | | | |
| | | | | | | Bottom of boring at 31 feet | | | |
| 2020 | | | | | | | | | |
| | 35 | | | | | | | | |
| 2015 | | | | | | | | | |
| | 40 | | | | | | | | |
| 2010 | | | | | | | | | |
| | 45 | | | | | | | | |
| 2005 | | | | | | | | | |
| | 50 | | | | | | | | |
| 2000 | | | | | | | | | |
| | 55 | | | | | | | | |
| 1995 | | | | | | | | | |
| | 60 | | | | | | | | |
| 1990 | | | | | | | | | |
| | 65 | | | | | | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-01

URS

Figure B-2

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-02



| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **06-20-07** | Logged By | **F. Gegunde** | Checked By | **K. Giesing** |
| Drilling Method | **Hollow Stem Auger** | Drill Bit Size/Type | **8"** | Total Depth of Borehole | **51 feet** |
| Drill Rig Type | **CME-55** | Drilling Contractor | **Technicon** | Approximate Surface Elevation | **2034.0 feet** |
| Water Level Depth (Feet) | **27' bgs** | Sampling Method(s) | **Bulk/ModCal/SPT** | Hammer Data | **140 lbs/30" drop** |
| Borehole Backfill | **Bentonite chips/soil cuttings** | Location | **See Site Plan** | | |

| Elevation, feet | Depth, feet | SAMPLES Type | Number | Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | ALLUVIUM<br>Very stiff, dry, dark grayish brown, sandy CLAY(CH), disked upper 3.5' | | | |
| | | | | | | Becomes moist | | | |
| | | | SB-02-3 | 16 | | | 17 | | LL(53) PI(31), UU(7,300)<br>Bulk sample 2.5'-5'<br>SA(70), COMP |
| 2030 | | | | | | | | | |
| | 5 | | | | | Becomes hard, brown | | | Bulk sample 4.5'-6' |
| | | | SB-02-6 | 32 | | | 13 | | SA(60) |
| | | | | | | Dense, moist, brown, clayey fine SAND (SC), high clay content | | | |
| 2025 | | | | | | | | | |
| | 10 | | SB-02-10 | 49 | | | 21 | 103 | CORR |
| 2020 | | | | | | | | | |
| | 15 | | SB-02-15 | 39 | | | | | |
| 2015 | | | | | | Becomes yellowish brown | | | |
| | 20 | | SB-02-20 | 49 | | | 15 | | WA(33) |
| | | | | | | Stiff, moist, yellowish brown, sandy CLAY (CL) | | | |
| 2010 | | | | | | | | | |
| | 25 | | SB-02-25 | 13 | | | | | |
| 2005 | | | | | | | | | |
| | 30 | | | | | | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-02

**Figure B-3**

URS

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-02



| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | SB-02-30 | 25 | | Becomes very stiff, wet, light yellowish brown, high sand content | 23 | | WA(49) |
| 1995 | | | | | | Becomes pale brown, decreased sand content, some silt | | | |
| | 35 | | SB-02-35 | 16 | | | | | |
| 1990 | | | | | | | | | |
| | 40 | | SB-02-40 | 14 | | Becomes stiff | 25 | | |
| 1985 | | | | | | Becomes very stiff, light yellowish brown | | | |
| | 45 | | SB-02-45 | 22 | | | 23 | 99 | |
| 1980 | | | | | | Becomes brown, increased sand content | | | |
| | 50 | | SB-02-50 | 27 | | | 20 | | |
| | | | | | | Bottom of boring at 51 feet | | | |
| 1975 | | | | | | | | | |
| | 55 | | | | | | | | |
| 1970 | | | | | | | | | |
| | 60 | | | | | | | | |
| 1965 | | | | | | | | | |
| | 65 | | | | | | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-02

URS

Figure B-3

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-03



| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **06-20-07** | Logged By | **F. Gegunde** | Checked By | **K. Giesing** |
| Drilling Method | **Hollow Stem Auger** | Drill Bit Size/Type | **8"** | Total Depth of Borehole | **31 feet** |
| Drill Rig Type | **CME-55** | Drilling Contractor | **Technicon** | Approximate Surface Elevation | **2057.1 feet** |
| Water Level Depth (Feet) | **None encountered** | Sampling Method(s) | **Bulk/ModCal** | Hammer Data | **140 lbs/30" drop** |
| Borehole Backfill | **Bentonite chips/soil cuttings** | Location | **See Site Plan** | | |

| Elevation, feet | Depth, feet | SAMPLES Type | Number | Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | ALLUVIUM<br>Dense, moist, pale brown, clayey fine SAND (SC), high clay content, disked upper 2'-3' | | | |
| 2055 | | | SB-03-3 | 45 | | | 19 | 99 | LL(48), PI(24)<br>Bulk sample 2.5'-5'<br>SA(40), COMP, CORR |
| | 5 | | | | | Becomes yellowish brown, zones of sandy clay | | | Bulk sample 4.5'-6'<br>WA(54), EI(14) |
| | | | SB-03-6 | 22 | | | 15 | 107 | LL(30), PI(15) |
| 2050 | | | | | | | | | |
| | | | | | | Hard, moist, brownish yellow, sandy CLAY (CL) | | | |
| | 10 | | SB-03-10 | 35 | | | 18 | 110 | SA(65) |
| 2045 | | | | | | | | | |
| | 15 | | SB-03-15 | 38 | | Becomes brown | | | WA(64) |
| 2040 | | | | | | | | | |
| | 20 | | SB-03-20 | 61 | | | 17 | | |
| 2035 | | | | | | | | | |
| | | | | | | Dense, moist, light yellowish brown, silty fine SAND (SM), high silt and clay content | | | |
| | 25 | | SB-03-25 | 43 | | | | | |
| 2030 | | | | | | | | | |
| | | | | | | Very stiff, moist, brown, CLAY with sand (CL) | | | |
| | 30 | | | | | | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-03

URS

**Figure B-4**

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-03



| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | SB-03-30 | 28 | | | 24 | | WA(81) |
| 2020 | | | | | | Bottom of boring at 31 feet | | | |
| | 35 | | | | | | | | |
| 2015 | | | | | | | | | |
| | 40 | | | | | | | | |
| 2010 | | | | | | | | | |
| | 45 | | | | | | | | |
| 2005 | | | | | | | | | |
| | 50 | | | | | | | | |
| 2000 | | | | | | | | | |
| | 55 | | | | | | | | |
| 1995 | | | | | | | | | |
| | 60 | | | | | | | | |
| 1990 | | | | | | | | | |
| | 65 | | | | | | | | |



URS

Figure B-4

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-04



| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **06-20-07** | Logged By | **F. Gegunde** | Checked By | **K. Giesing** |
| Drilling Method | **Hollow Stem Auger** | Drill Bit Size/Type | **8"** | Total Depth of Borehole | **31 feet** |
| Drill Rig Type | **CME-55** | Drilling Contractor | **Technicon** | Approximate Surface Elevation | **2072.2 feet** |
| Water Level Depth (Feet) | **None encountered** | Sampling Method(s) | **Bulk/ModCal/SPT** | Hammer Data | **140 lbs/30" drop** |
| Borehole Backfill | **Bentonite chips/soil cuttings** | Location | **See Site Plan** | | |

| Elevation, feet | Depth, feet | SAMPLES Type | Number | Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | ALLUVIUM<br>Medium dense, dry, grayish brown, clayey fine SAND (SC) | | | |
| 2070 | | | SB-04-3 | 28 | | | 10 | | WA(26)<br>Bulk sample 2.5'-5' |
| | 5 | | SB-04-6 | 56/8" | | Hard, moist, brown, sandy CLAY (CL), high sand content | 22 | | CORR |
| 2065 | | | | | | | | | |
| | | | | | | Becomes yellowish brown | | | Bulk sample 8.5'-10' |
| | 10 | | SB-04-10 | 35/4" | | | 18 | | |
| 2060 | | | | | | | | | |
| | | | | | | Becomes pale brown | | | |
| | 15 | | SB-04-15 | 48 | | | 19 | 103 | SA(55) |
| 2055 | | | | | | | | | |
| | | | | | | Becomes brown | | | |
| | 20 | | SB-04-20 | 35/6" | | | | | |
| 2050 | | | | | | | | | |
| | 25 | | SB-04-25 | 43 | | Very dense, moist, light yellowish brown, clayey fine SAND (SC), high clay content | | | |
| 2045 | | | | | | | | | |
| | 30 | | | | | Hard, moist, light yellowish brown, sandy fine CLAY (CL) | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-04

URS

**Figure B-5**

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-04



| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | SB-04-30 | 34 | | | 21 | | |
| 2035 | | | | | | Bottom of boring at 31 feet | | | |
| | 35 | | | | | | | | |
| 2030 | | | | | | | | | |
| | 40 | | | | | | | | |
| 2025 | | | | | | | | | |
| | 45 | | | | | | | | |
| 2020 | | | | | | | | | |
| | 50 | | | | | | | | |
| 2015 | | | | | | | | | |
| | 55 | | | | | | | | |
| 2010 | | | | | | | | | |
| | 60 | | | | | | | | |
| 2005 | | | | | | | | | |
| | 65 | | | | | | | | |

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-05



| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **06-21-07** | Logged By | **F. Gegunde** | Checked By | **K. Giesing** |
| Drilling Method | **Hollow Stem Auger** | Drill Bit Size/Type | **8"** | Total Depth of Borehole | **51 feet** |
| Drill Rig Type | **CME-55** | Drilling Contractor | **Technicon** | Approximate Surface Elevation | **2018.7 feet** |
| Water Level Depth (Feet) | **13.5' bgs** | Sampling Method(s) | **Bulk/ModCal/SPT** | Hammer Data | **140 lbs/30" drop** |
| Borehole Backfill | **Bentonite chips/soil cuttings** | Location | **See Site Plan** | | |

| Elevation, feet | Depth, feet | SAMPLES Type | Number | Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | ALLUVIUM<br>Dense, dry, brown, clayey fine SAND (SC), disked upper 2'-3', high clay content | | | |
| | | | SB-05-3 | 49 | | | | | Bulk sample 2.5'-5' CORR |
| 2015 | | | | | | | | | |
| | 5 | | SB-05-6 | 18 | | Medium dense, moist, brown, silty fine SAND (SM) | 17<br>19<br>22 | 94 | WA(15)<br>WA(21) |
| 2010 | | | | | | | | | Bulk sample 8.5'-10.5' |
| | 10 | | SB-05-10 | 18 | | Very stiff, moist, light yellowish brown, sandy SILT (ML) | 19 | 110 | |
| 2005 | | | | | | | | | |
| | 15 | | SB-05-15 | 41 | | Dense, wet, fine to medium SAND with silt (SP-SM) | 17 | 112 | |
| 2000 | | | | | | | | | |
| | 20 | | SB-05-20 | 23 | | Very stiff, wet, pale brown, sandy CLAY (CL) | | | |
| 1995 | | | | | | Becomes yellowish brown, some silt | | | |
| | 25 | | SB-05-25 | 22 | | | 25 | | WA(68) |
| 1990 | | | | | | | | | |
| | 30 | | | | | | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-05

URS

**Figure B-6**

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-05



| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | SB-05-30 | 17 | | Medium dense, wet, yellowish brown, clayey fine SAND (SC), high clay and silt content | 19 | | WA(43) |
| | | | | | | | 16 | 116 | UU(5,600) |
| 1980 | | | | | | | | | |
| | 35 | | SB-05-35 | 18 | | | | | SA(35) |
| 1975 | | | | | | | | | |
| | | | | | | Very stiff, moist, yellowish brown, sandy CLAY (CL) | | | |
| | 40 | | SB-05-40 | 18 | | | | | |
| 1970 | | | | | | | | | |
| | 45 | | SB-05-45 | 27 | | | 23 | | |
| 1965 | | | | | | | | | |
| | | | | | | Very dense, moist, yellowish brown, clayey fine to medium SAND (SC) | | | |
| | 50 | | SB-05-50 | 52 | | | 19 | | |
| | | | | | | Bottom of boring at 51 feet | | | |
| 1960 | | | | | | | | | |
| | 55 | | | | | | | | |
| 1955 | | | | | | | | | |
| | 60 | | | | | | | | |
| 1950 | | | | | | | | | |
| | 65 | | | | | | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-05

URS

**Figure B-6**

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-06



| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **06-21-07** | Logged By | **F. Gegunde** | Checked By | **K. Giesing** |
| Drilling Method | **Hollow Stem Auger** | Drill Bit Size/Type | **8"** | Total Depth of Borehole | **31 feet** |
| Drill Rig Type | **CME-55** | Drilling Contractor | **Technicon** | Approximate Surface Elevation | **2024.0 feet** |
| Water Level Depth (Feet) | **24' bgs** | Sampling Method(s) | **Bulk/ModCal/SPT** | Hammer Data | **140 lbs/30" drop** |
| Borehole Backfill | **Bentonite chips/soil cuttings** | Location | **See Site Plan** | | |

| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | ALLUVIUM<br>Hard, dry, grayish brown, sandy CLAY (CL), some silt, disked upper 2'-3', medium plasticity | | | |
| | | | SB-06-3 | 56 | | | 11 | 107 | Bulk sample 2.5'-5'<br>WA(69), EI(61) |
| 2020 | | | | | | Lower plasticity | | | |
| | 5 | | SB-06-6 | 53/ 10" | | | 21 | 100 | CORR |
| 2015 | | | | | | | | | Bulk sample 8.5'-10.5' |
| | 10 | | SB-06-10 | 41 | | | | | |
| 2010 | | | | | | | | | |
| | 15 | | SB-06-15 | 43 | | | | | |
| 2005 | | | | | | Dense, moist, dark brown, clayey fine SAND (SC) | | | |
| | 20 | | SB-06-20 | 40 | | | | | |
| 2000 | | | | | | Very stiff, moist, yellowish brown, sandy CLAY (CL) | | | |
| | 25 | | SB-06-25 | 18 | | | 25 | 98 | |
| 1995 | | | | | | Becomes stiff, wet | | | |
| | 30 | | | | | | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-06

URS

**Figure B-7**

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-06



| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | SB-06-30 | 14 | | | | | |
| | | | | | | Bottom of boring at 31 feet | | | |
| 1985 | 35 | | | | | | | | |
| 1980 | 40 | | | | | | | | |
| 1975 | 45 | | | | | | | | |
| 1970 | 50 | | | | | | | | |
| 1965 | 55 | | | | | | | | |
| 1960 | 60 | | | | | | | | |
| 1955 | 65 | | | | | | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-06

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Figure B-7

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-07



| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **06-21-07** | Logged By | **F. Gegunde** | Checked By | **K. Giesing** |
| Drilling Method | **Hollow Stem Auger** | Drill Bit Size/Type | **8"** | Total Depth of Borehole | **31 feet** |
| Drill Rig Type | **CME-55** | Drilling Contractor | **Technicon** | Approximate Surface Elevation | **2037.0 feet** |
| Water Level Depth (Feet) | **None encountered** | Sampling Method(s) | **Bulk/ModCal** | Hammer Data | **140 lbs/30" drop** |
| Borehole Backfill | **Bentonite chips/soil cuttings** | Location | **See Site Plan** | | |

| Elevation, feet | Depth, feet | SAMPLES Type | Number | Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | ALLUVIUM<br>Very stiff, dry, dark yellowish brown, sandy CLAY (CL), disked upper 2'-3', high silt content | | | |
| 2035 | | | SB-07-3 | 18 | | | 9 | 100 | SA(68)<br>Bulk sample 2.5'-5'<br>R-VALUE (12) |
| | 5 | | SB-07-6 | 35/5" | | Becomes hard, decreased silt content | 15 | | CORR |
| 2030 | | | | | | | | | Bulk sample 8'-10.5' |
| | 10 | | SB-07-10 | 36 | | | 19 | 104 | WA(61) |
| 2025 | | | | | | High silt content | | | |
| | 15 | | SB-07-15 | 42 | | | | | SA(71) |
| 2020 | | | | | | | | | |
| | 20 | | SB-07-20 | 34 | | | 19 | 106 | |
| 2015 | | | | | | Decreased silt content | | | |
| | 25 | | SB-07-25 | 33 | | | 25 | | |
| 2010 | | | | | | | | | |
| | 30 | | | | | Very dense, moist, dark yellowish brown, clayey fine SAND (SC) | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-07

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**Figure B-8**

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-07



| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | SB-07-30 | 38 | | | | | |
| | | | | | | Bottom of boring at 31 feet | | | |
| 2000 | | | | | | | | | |
| | 35 | | | | | | | | |
| 1995 | | | | | | | | | |
| | 40 | | | | | | | | |
| 1990 | | | | | | | | | |
| | 45 | | | | | | | | |
| 1985 | | | | | | | | | |
| | 50 | | | | | | | | |
| 1980 | | | | | | | | | |
| | 55 | | | | | | | | |
| 1975 | | | | | | | | | |
| | 60 | | | | | | | | |
| 1970 | | | | | | | | | |
| | 65 | | | | | | | | |



URS

Figure B-8

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-08



| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **06-21-07 through 6-22-07** | Logged By | **F. Gegunde** | Checked By | **K. Giesing** |
| Drilling Method | **Hollow Stem Auger** | Drill Bit Size/Type | **8"** | Total Depth of Borehole | **96 feet** |
| Drill Rig Type | **CME-55** | Drilling Contractor | **Technicon** | Approximate Surface Elevation | **2038.0 feet** |
| Water Level Depth (Feet) | **29' bgs** | Sampling Method(s) | **Bulk/ModCal** | Hammer Data | **140 lbs/30" drop** |
| Borehole Backfill | **Bentonite chips/soil cuttings** | Location | **See Site Plan** | | |

| Elevation, feet | Depth, feet | SAMPLES Type | Number | Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | ALLUVIUM<br>Medium dense, dry, dark yellowish brown, clayey SAND (SC), medium plasticity, disked upper 2' | | | |
| 2035 | | | SB-08-3 | 19 | | | 15 | 111 | LL(49), PI(29), CORR<br>Bulk sample 2.5'-5' |
| | 5 | | SB-08-6 | 53 | | Very dense, moist, brown clayey SAND with gravel (SC) | 19 | 96 | SA(32) |
| 2030 | | | | | | | | | |
| | | | | | | Hard, moist, brown, CLAY with sand (CL), high silt content | | | Bulk sample 8.5'-10.5' |
| | 10 | | SB-08-10 | 46 | | | | | WA(84), LL(43), PI(24) |
| 2025 | | | | | | | | | |
| | | | | | | Becomes yellowish brown | | | |
| | 15 | | SB-08-15 | 50 | | | 21 | | |
| 2020 | | | | | | | | | |
| | | | | | | Very dense, moist, yellowish brown, clayey fine to medium SAND (SC) | | | |
| | 20 | | SB-08-20 | 53 | | | 20 | 102 | WA(36) |
| 2015 | | | | | | | | | |
| | | | | | | Becomes dense, high silt content | | | |
| | 25 | | SB-08-25 | 38 | | | | | |
| 2010 | | | | | | | | | |
| | 30 | | | | | | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-08

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**Figure B-9**

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-08



| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 30 | | SB-08-30 | 27 | | Becomes medium dense, high clay and silt content, trace gravel | 25 | | SA(43) |
| 2000 | | | | | | | | | |
| | | | | | | Becomes light yellowish brown | | | |
| | 35 | | SB-08-35 | 23 | | | 25 | 98 | UU(3,000) |
| | | | | | | | 22 | 98 | WA(46), CON |
| 1995 | | | | | | Very stiff, wet, light yellowish brown sandy CLAY (CL) | | | |
| | 40 | | SB-08-40 | 24 | | | 23 | | |
| 1990 | | | | | | | | | |
| | | | | | | Becomes hard | | | |
| | 45 | | SB-08-45 | 36 | | | 19 | 104 | WA(54) |
| 1985 | | | | | | | | | |
| | | | | | | Becomes very stiff | | | |
| | 50 | | SB-08-50 | 23 | | | | | |
| 1980 | | | | | | | | | |
| | 55 | | SB-08-55 | 16 | | | 28 | 94 | UU(1,400) |
| 1975 | | | | | | | | | |
| | 60 | | | | | | | | |
| 1970 | | | | | | | | | |
| | 65 | | | | | | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-08

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Figure B-9

**Project: Carrizo Energy Solar Farm (CESF)**
**Project Location: San Luis Obispo County, California**
**Project Number: 22239472.01200**

# Log of Boring SB-08



| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Blows per foot | Graphic Log | MATERIAL DESCRIPTION | Water Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|
| | 65 | | SB-08-65 | 15 | | Sandy CLAY (CL) (Continued) | 22 | | |
| 1965 | | | | | | | | | |
| | 70 | | | | | | | | |
| 1960 | | | | | | | | | |
| | 75 | | SB-08-75 | 19 | | | 25 | | |
| 1955 | | | | | | | | | |
| | 80 | | | | | | | | |
| 1950 | | | | | | | | | |
| | | | | | | Dense, moist, light yellowish brown, clayey SAND with gravel (SC) | | | |
| | 85 | | SB-08-85 | 32 | | | 28 | | SA(42) |
| 1945 | | | | | | | | | |
| | 90 | | | | | | | | |
| 1940 | | | | | | | | | |
| | | | | | | Very stiff, moist, yellowish brown, lean CLAY with sand (CL) | | | |
| | 95 | | SB-08-95 | 26 | | | 21 | 107 | |
| | | | | | | Bottom of boring at 96 feet | | | |
| 1935 | | | | | | | | | |
| | 100 | | | | | | | | |

Report: GEO_10_SNA; File: 22239472.GPJ; 10/1/2007 SB-08

URS

**Figure B-9**

Nine Cone Penetration Test (CPT) soundings with pore pressure measurements, designated CPT-1 through CPT-9, were conducted by Brittsan CPT of Wilton, California. Figure 1 shows the approximate locations of the CPTs. The CPTs were advanced to depths ranging from about 30 to 86 feet below the existing ground surface. Table 1 summarizes their locations and sounding depths.

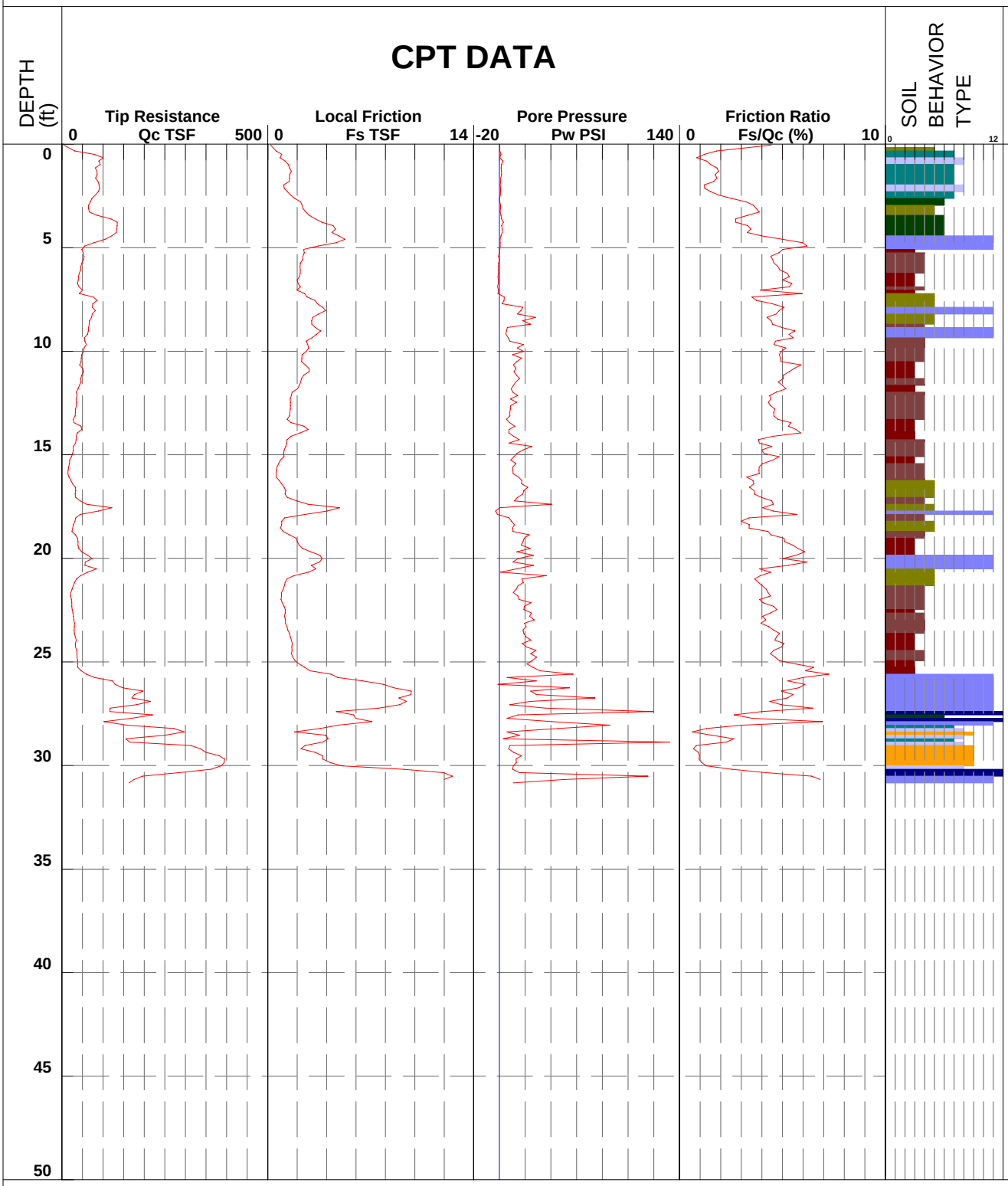
The soundings were conducted using a 10-ton capacity cone with a tip area of 10 $cm^2$. The cone takes measurements of cone bearing, sleeve friction, and dynamic pore water pressure at 2-inch intervals during penetration to provide a nearly continuous geologic log. The CPT soundings were performed in accordance with ASTM standards (D 5778).

Measurements of resistance encountered during sounding can be used to evaluate the variation of material types, engineering properties, and liquefaction potential of soils. Soil behavior type (SBT) and stratigraphic interpretation is based on relationships between cone bearing, sleeve friction, and pore water pressure. The friction ratio is a calculated parameter (defined as sleeve friction divided by cone bearing) and is used to infer soil behavior type. This appendix provides the results of the CPT soundings graphically and in tabular form, along with stratigraphic and parameter interpretations processed by Brittsan CPT. The plots show tip resistance ($Q_c$), sleeve friction ($F_s$), recorded dynamic pore pressure ($P_w$) friction ratio ($F_s/Q_c$) and interpreted soil behavior type.

# Carrizo Solar Power Project

| | | | | | |
|---|---|---|---|---|---|
| Operator | Doug | Cone ID | DSG0369 | Location | Carrizo Solar Power Project |
| Job Number | 297 | Date | 6/21/2007 2:31:51 PM | Sounding Number | CPT 1 |

## CPT DATA



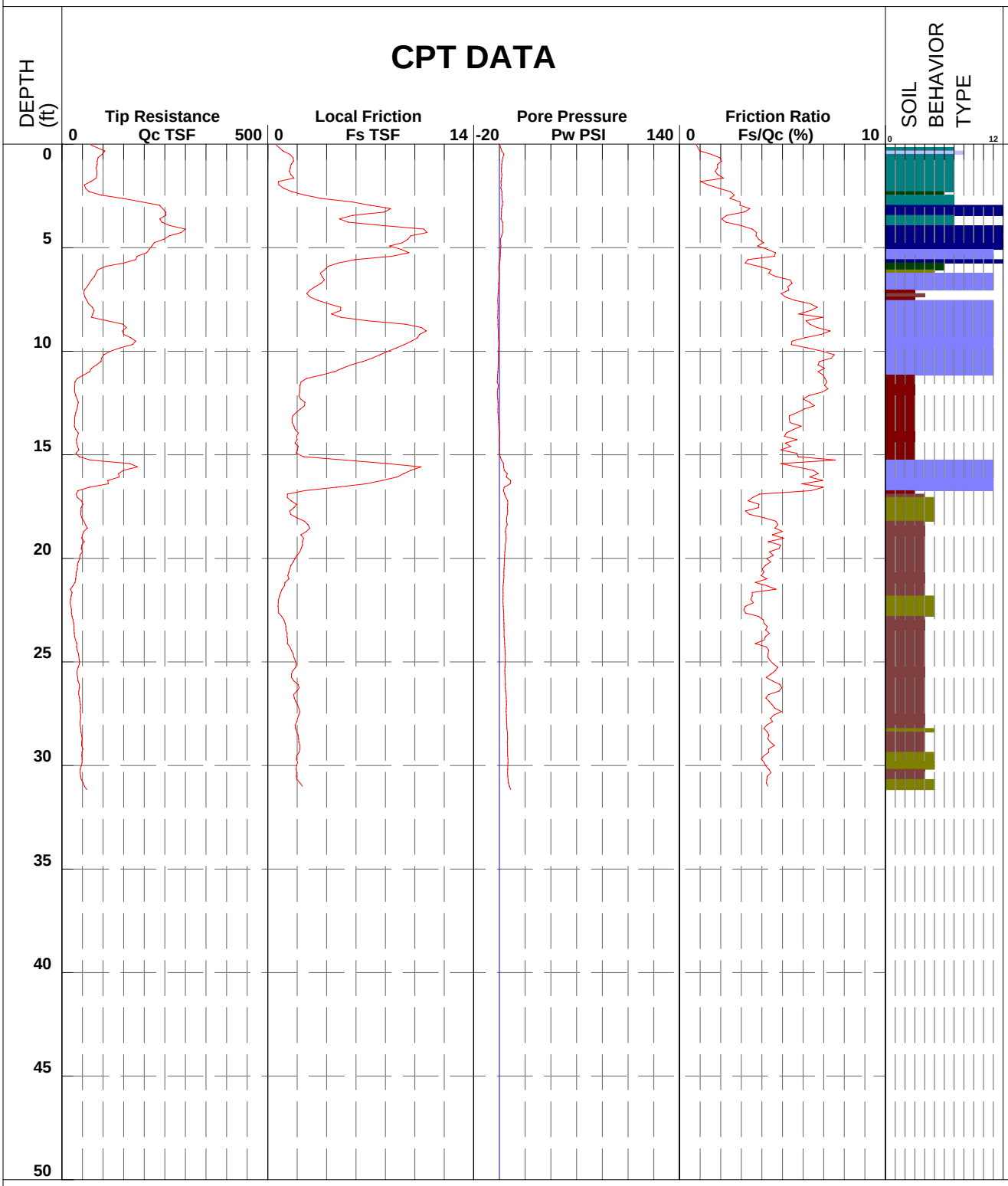

REMARKS

| | | | |
|---|---|---|---|
| 1 - sensitive fine grained | 4 - silty clay to clay | 7 - silty sand to sandy silt | 10 - gravelly sand to sand |
| 2 - organic material | 5 - clayey silt to silty clay | 8 - sand to silty sand | 11 - very stiff fine grained (*) |
| 3 - clay | 6 - sandy silt to clayey silt | 9 - sand | 12 - sand to clayey sand (*) |

# Carrizo Solar Power Project

| | | | | | |
|---|---|---|---|---|---|
| Operator | Doug | Cone ID | DSG0369 | Location | Carrizo Solar Power Project |
| Job Number | 297 | Date | 6/21/2007 3:21:35 PM | Sounding Number | CPT 2 |

## CPT DATA



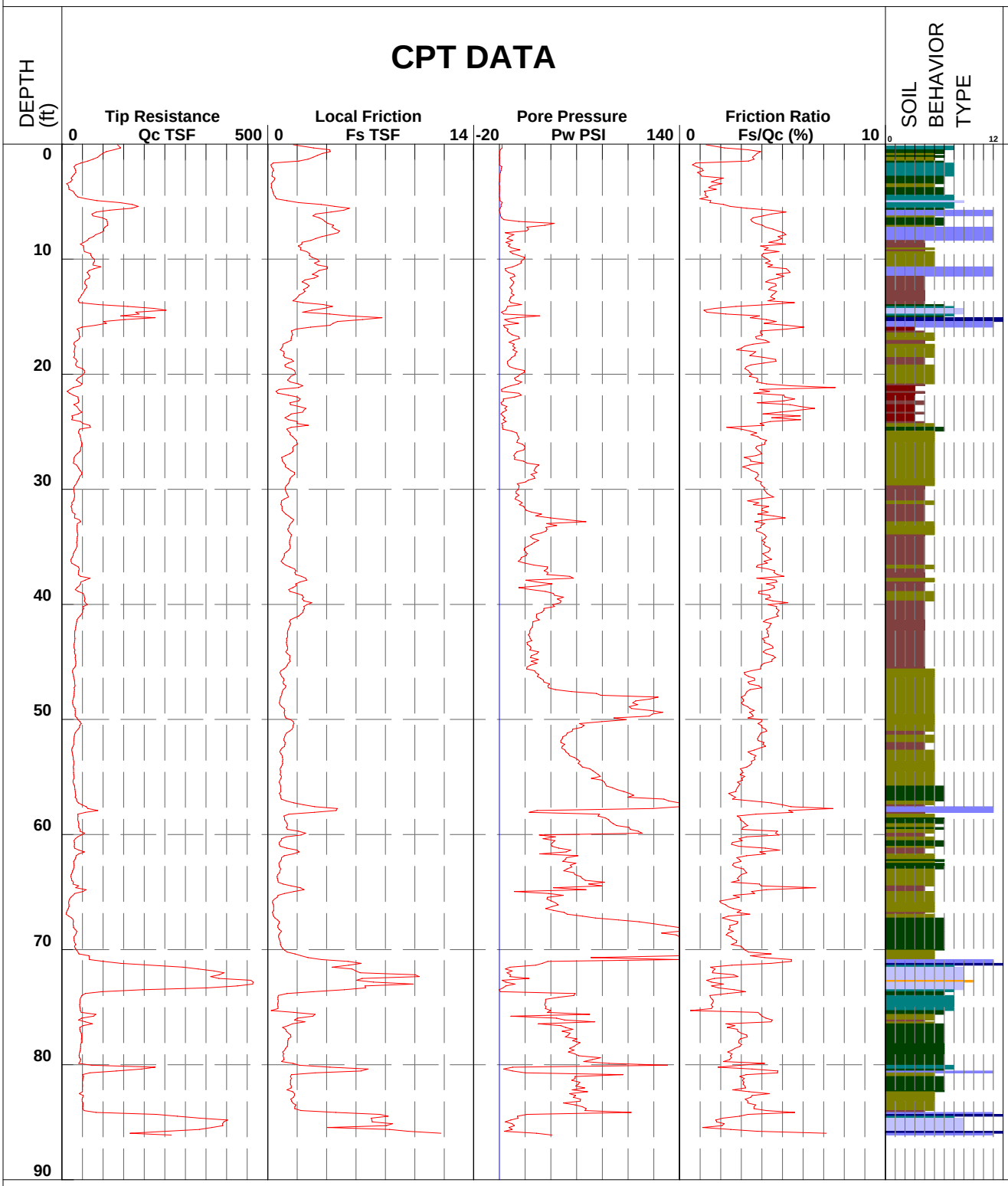

REMARKS

1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

# Carrizo Solar Power Project

| | | | | | |
|---|---|---|---|---|---|
| Operator | Doug | Cone ID | DSG0369 | Location | Carrizo Solar Power Project |
| Job Number | 297 | Date | 6/21/2007 3:58:05 PM | Sounding Number | CPT 3 |

## CPT DATA

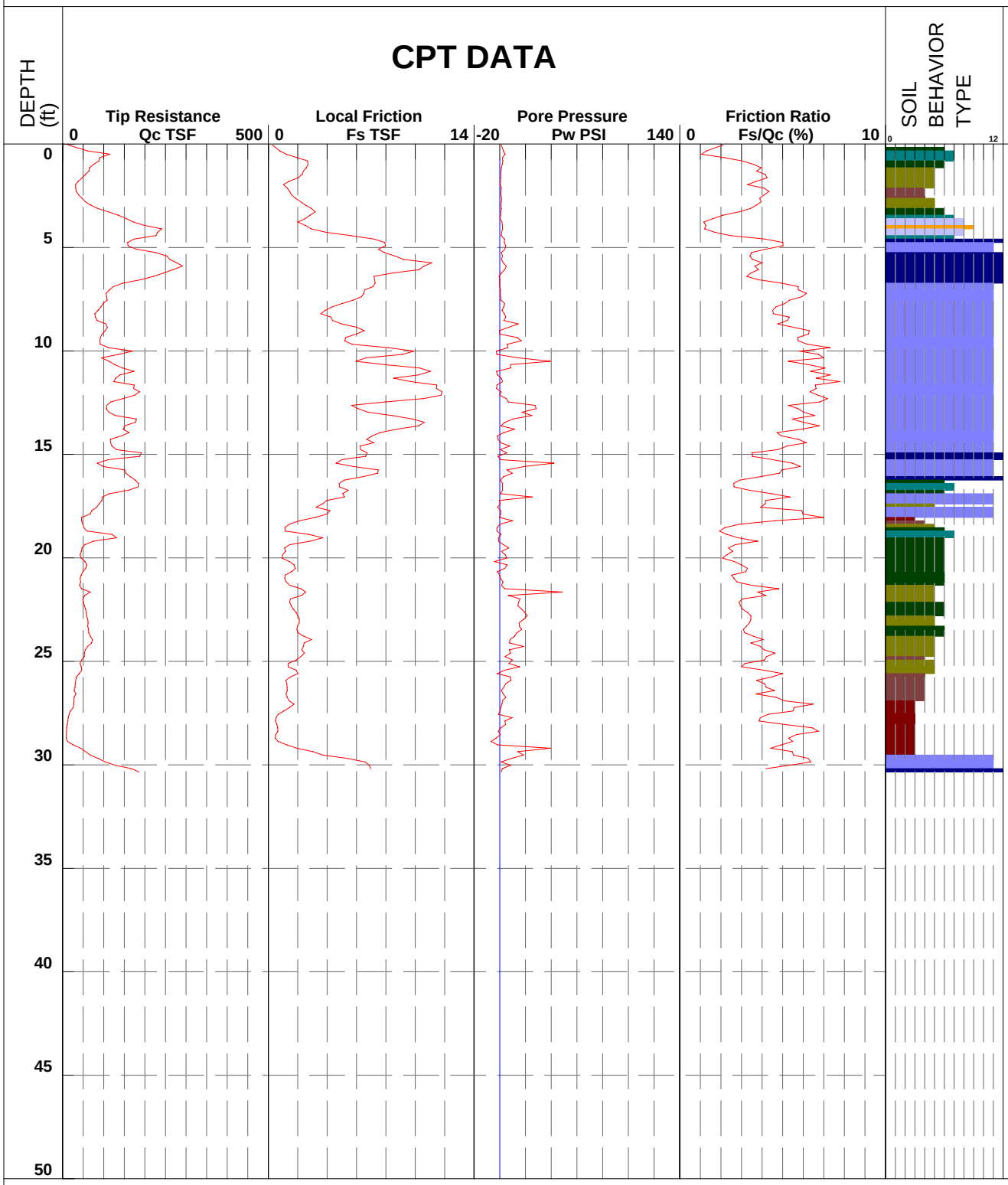



REMARKS

1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

# Carrizo Solar Power Project

| | | | | | |
|---|---|---|---|---|---|
| Operator | Doug | Cone ID | DSG0369 | Location | Carrizo Solar Power Project |
| Job Number | 297 | Date | 6/21/2007 5:12:57 PM | Sounding Number | CPT 4 |



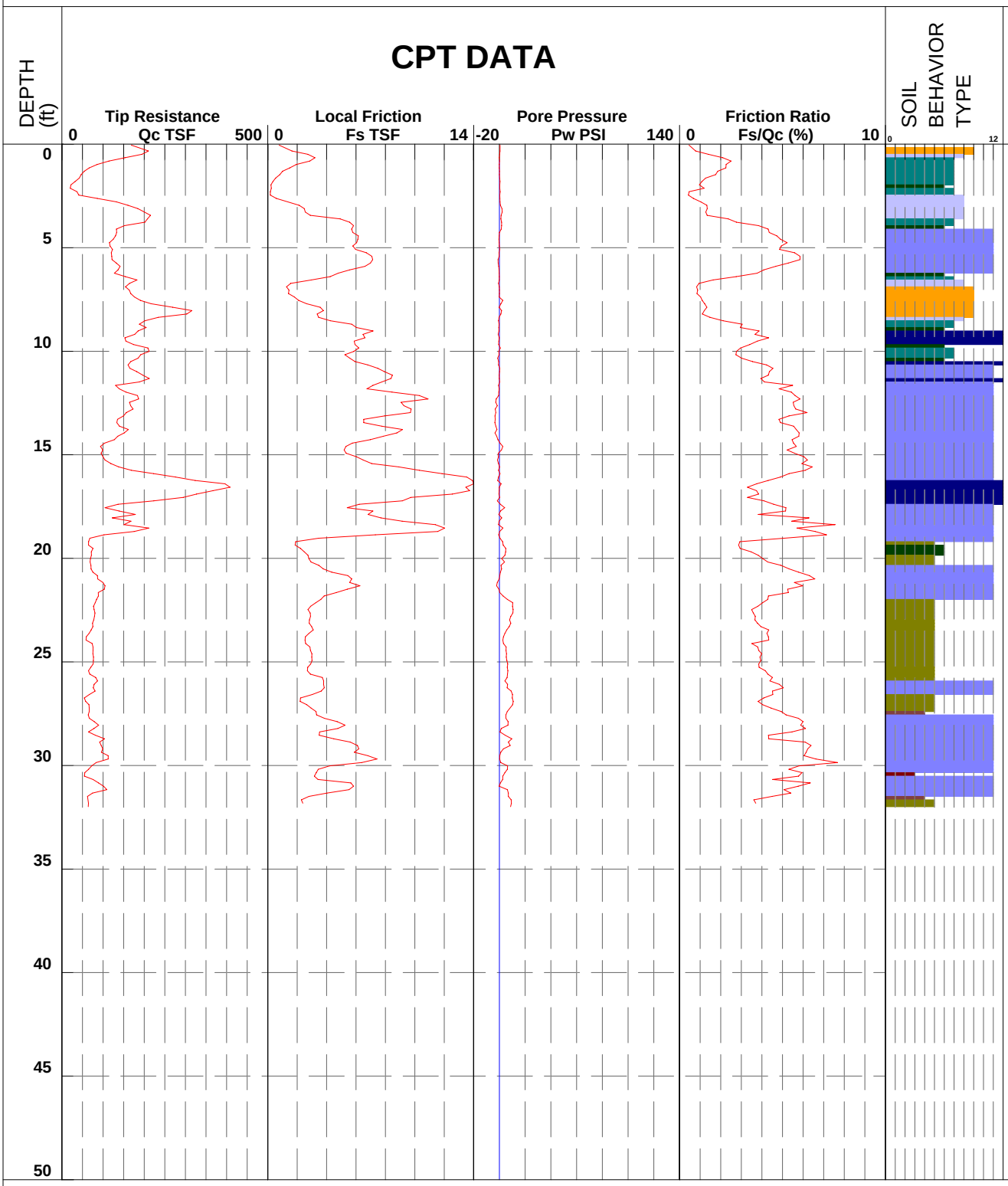

REMARKS

1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

# Carrizo Solar Power Project

| | | | | | |
|---|---|---|---|---|---|
| Operator | Doug | Cone ID | DSG0369 | Location | Carrizo Solar Power Project |
| Job Number | 297 | Date | 6/21/2007 5:52:54 PM | Sounding Number | CPT 5 |

## CPT DATA



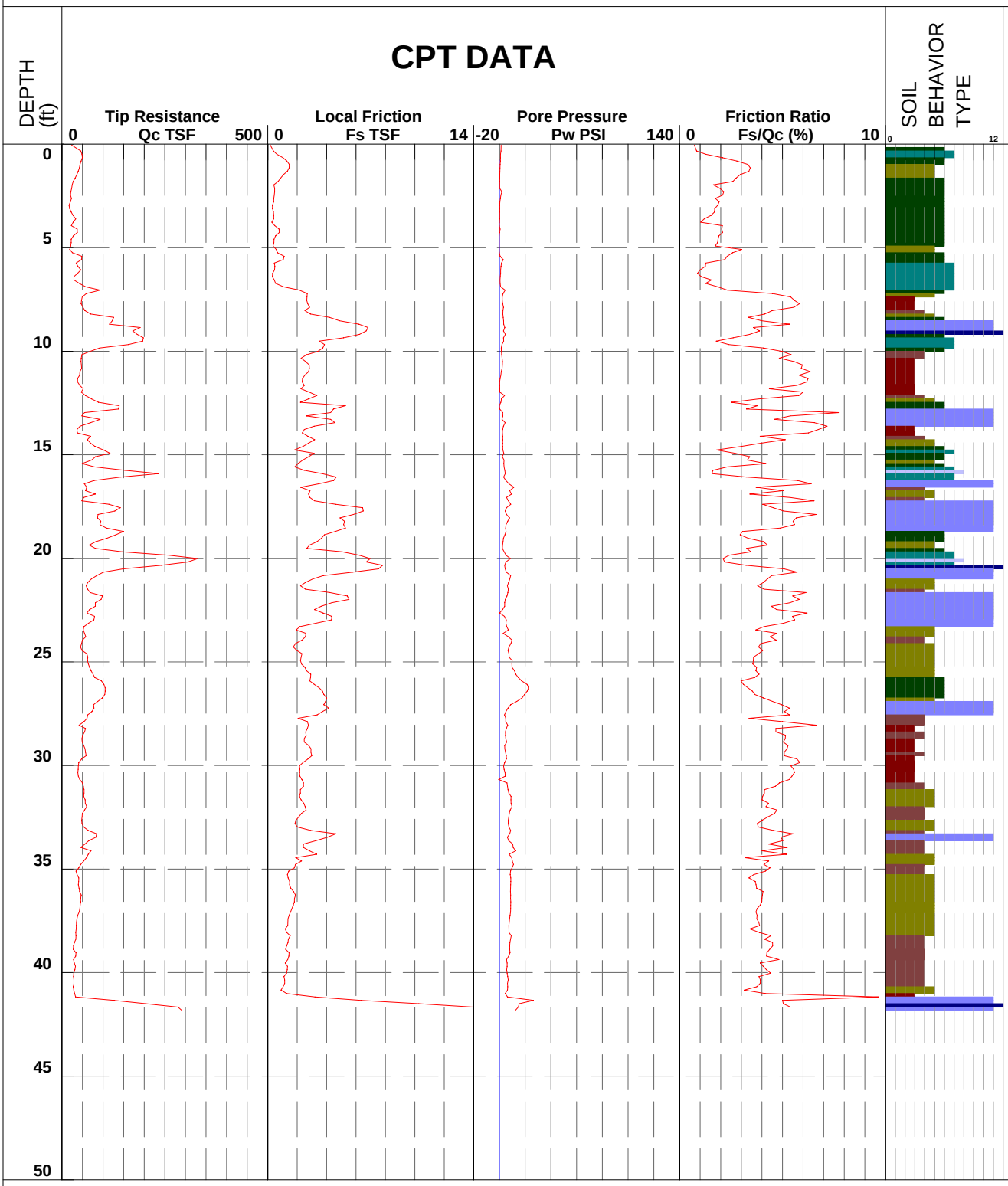

REMARKS

1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

# Carrizo Solar Power Project

| | | | | | |
|---|---|---|---|---|---|
| Operator | Doug | Cone ID | DSG0369 | Location | Carrizo Solar Power Project |
| Job Number | 297 | Date | 6/21/2007 6:39:57 PM | Sounding Number | CPT 6 |

## CPT DATA



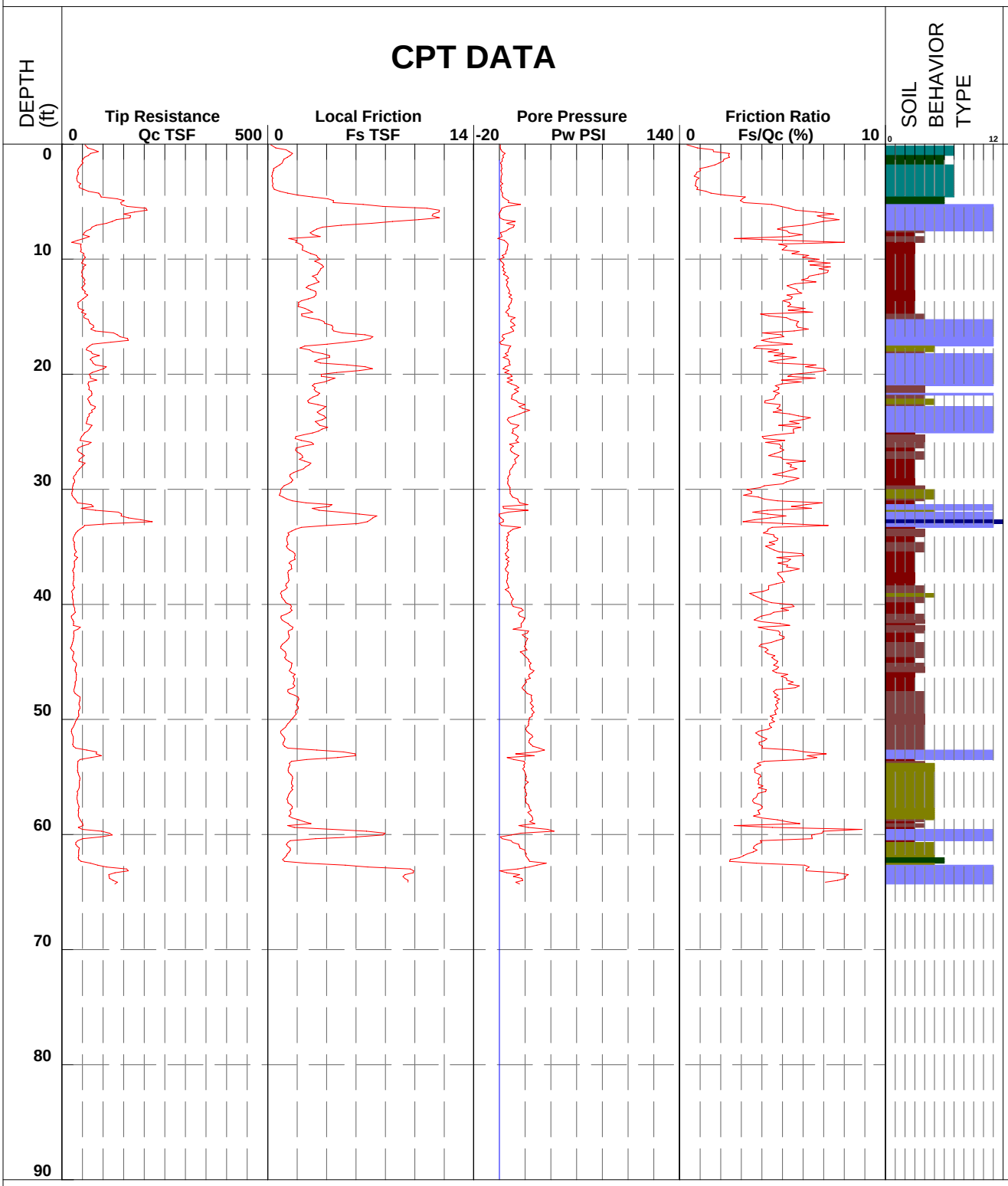

REMARKS

| | | | |
|---|---|---|---|
| 1 - sensitive fine grained | 4 - silty clay to clay | 7 - silty sand to sandy silt | 10 - gravelly sand to sand |
| 2 - organic material | 5 - clayey silt to silty clay | 8 - sand to silty sand | 11 - very stiff fine grained (*) |
| 3 - clay | 6 - sandy silt to clayey silt | 9 - sand | 12 - sand to clayey sand (*) |

# Carrizo Solar Power Project

| | | | | | |
|---|---|---|---|---|---|
| Operator | Doug | Cone ID | DSG0369 | Location | Carrizo Solar Power Project |
| Job Number | 297 | Date | 6/22/2007 8:06:02 AM | Sounding Number | CPT 7 |

## CPT DATA



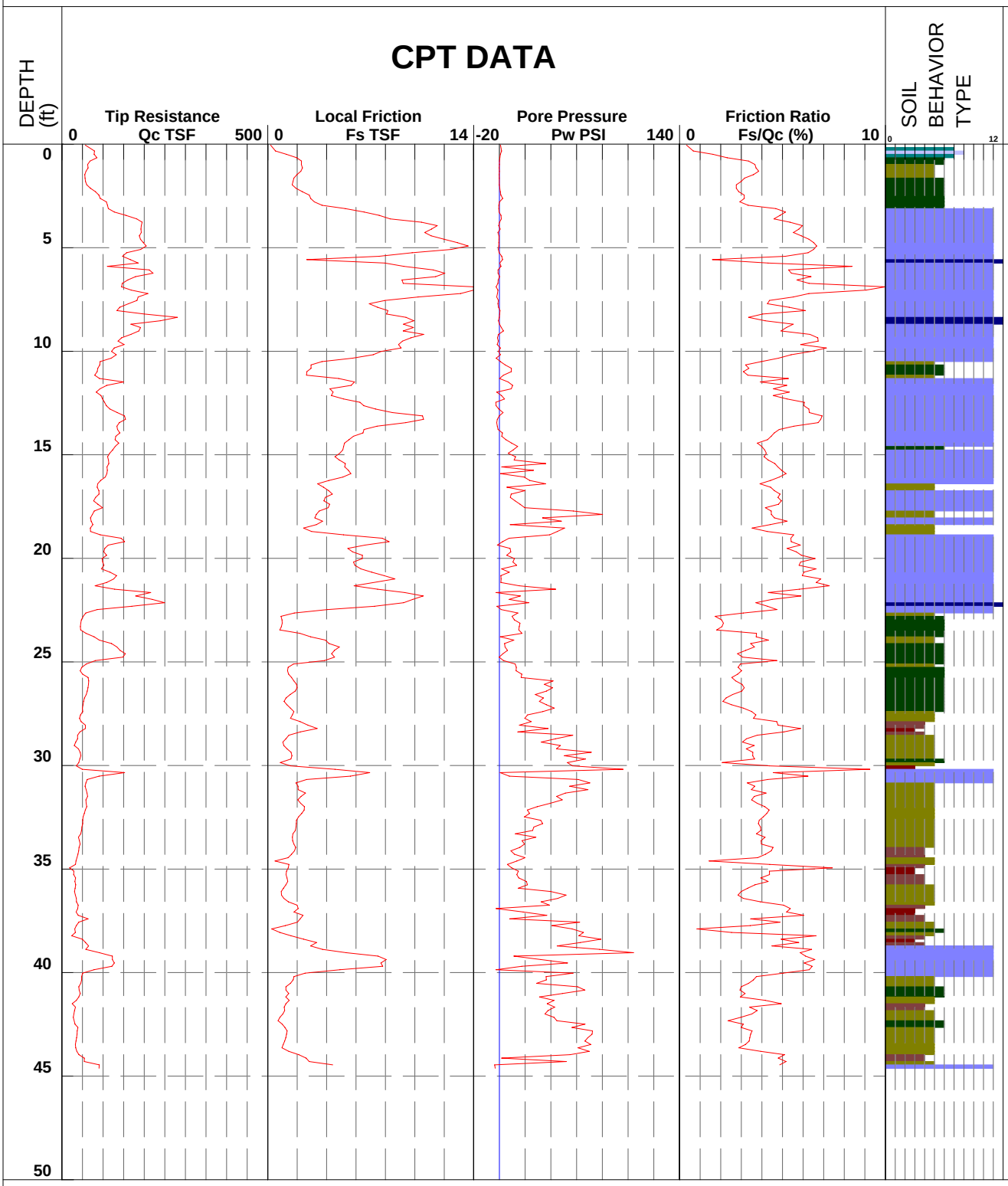

REMARKS

1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

# Carrizo Solar Power Project

| | | | | | |
|---|---|---|---|---|---|
| Operator | Doug | Cone ID | DSG0369 | Location | Carrizo Solar Power Project |
| Job Number | 297 | Date | 6/22/2007 9:31:52 AM | Sounding Number | CPT 8 |

## CPT DATA



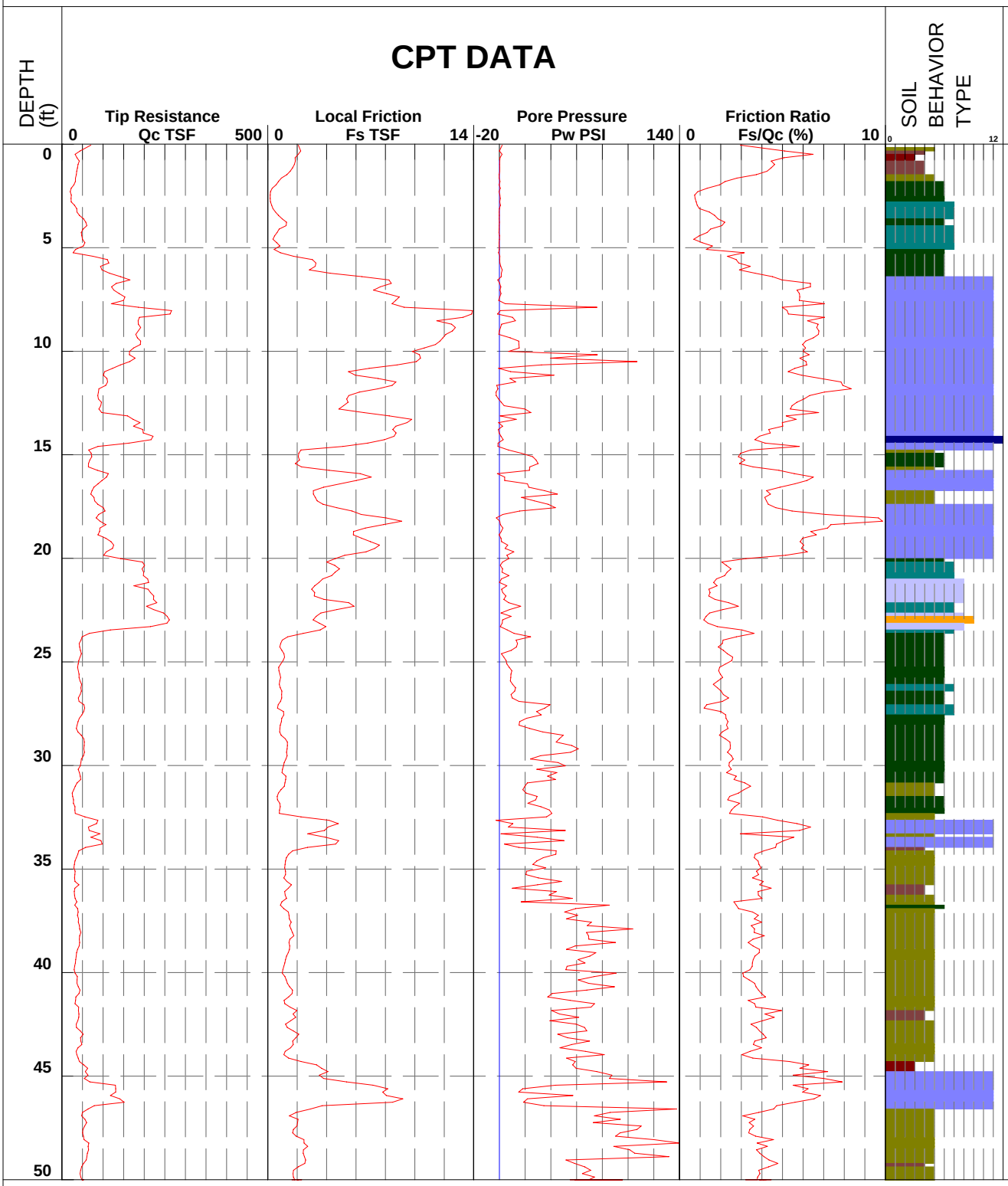

REMARKS

1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

# Carrizo Solar Power Project

| | | | | | |
|---|---|---|---|---|---|
| Operator | Doug | Cone ID | DSG0369 | Location | Carrizo Solar Power Project |
| Job Number | 297 | Date | 6/22/2007 10:25:26 AM | Sounding Number | CPT 9 |

## CPT DATA




REMARKS

- 1 - sensitive fine grained
- 2 - organic material
- 3 - clay
- 4 - silty clay to clay
- 5 - clayey silt to silty clay
- 6 - sandy silt to clayey silt
- 7 - silty sand to sandy silt
- 8 - sand to silty sand
- 9 - sand
- 10 - gravelly sand to sand
- 11 - very stiff fine grained (*)
- 12 - sand to clayey sand (*)

# CPT Data
# Ausra Carrizo Solar Project

Data File:CPT 1 6/21/2007
Operator:Doug Location:PG&E Solar
Cone ID:DSG0369 Job Number:297
Customer: PG&E Solar Project Units:

| Depth (ft) | Qc TSF | Fs TSF | Pw PSI | Fs/Qc (%) | Zone | Soil Behavior Type UBC-1983 | SPT N* 60% Hammer |
|---|---|---|---|---|---|---|---|
| 0.16 | 4.57 | 0.2037 | 0.293 | 4.456 | 5 | clayey silt to silty clay | 6 |
| 0.33 | 31.43 | 0.5648 | 0.421 | 1.797 | 7 | silty sand to sandy silt | 12 |
| 0.49 | 78.11 | 0.9485 | 1.303 | 1.214 | 7 | silty sand to sandy silt | 22 |
| 0.66 | 100.45 | 0.8365 | 0.323 | 0.833 | 8 | sand to silty sand | 21 |
| 0.82 | 89.62 | 1.1728 | 2.749 | 1.309 | 8 | sand to silty sand | 23 |
| 0.98 | 93.03 | 1.3970 | 1.680 | 1.502 | 7 | silty sand to sandy silt | 28 |
| 1.15 | 81.34 | 1.4754 | 1.310 | 1.814 | 7 | silty sand to sandy silt | 28 |
| 1.31 | 85.00 | 1.6106 | 1.586 | 1.895 | 7 | silty sand to sandy silt | 27 |
| 1.48 | 85.72 | 1.4836 | 1.695 | 1.731 | 7 | silty sand to sandy silt | 27 |
| 1.64 | 81.89 | 1.4872 | 1.042 | 1.816 | 7 | silty sand to sandy silt | 27 |
| 1.80 | 87.74 | 1.4574 | 0.926 | 1.661 | 7 | silty sand to sandy silt | 28 |
| 1.97 | 90.05 | 1.0846 | 0.554 | 1.204 | 8 | sand to silty sand | 21 |
| 2.13 | 91.60 | 1.1201 | 0.985 | 1.223 | 8 | sand to silty sand | 22 |
| 2.30 | 88.32 | 1.3363 | 0.892 | 1.513 | 7 | silty sand to sandy silt | 28 |
| 2.46 | 81.30 | 1.5566 | 0.616 | 1.915 | 7 | silty sand to sandy silt | 26 |
| 2.62 | 73.02 | 1.8384 | 0.143 | 2.518 | 6 | sandy silt to clayey silt | 29 |
| 2.79 | 69.04 | 2.2348 | 0.264 | 3.237 | 6 | sandy silt to clayey silt | 26 |
| 2.95 | 64.86 | 2.3335 | 0.929 | 3.597 | 5 | clayey silt to silty clay | 32 |
| 3.12 | 64.39 | 2.4002 | 0.778 | 3.728 | 5 | clayey silt to silty clay | 31 |
| 3.28 | 66.91 | 2.5928 | 0.534 | 3.875 | 5 | clayey silt to silty clay | 35 |
| 3.44 | 85.63 | 2.8291 | 1.239 | 3.304 | 6 | sandy silt to clayey silt | 35 |
| 3.61 | 119.00 | 3.2340 | 1.764 | 2.718 | 6 | sandy silt to clayey silt | 43 |
| 3.77 | 134.50 | 3.6750 | 3.116 | 2.732 | 6 | sandy silt to clayey silt | 49 |
| 3.94 | 134.08 | 4.4379 | 1.768 | 3.310 | 6 | sandy silt to clayey silt | 51 |
| 4.10 | 133.25 | 4.6135 | 2.313 | 3.462 | 6 | sandy silt to clayey silt | 51 |
| 4.27 | 132.18 | 4.3549 | 2.106 | 3.295 | 6 | sandy silt to clayey silt | 49 |
| 4.43 | 121.33 | 4.8270 | 1.165 | 3.979 | 11 | very stiff fine grained (*) | 114 |
| 4.59 | 105.12 | 5.2477 | 0.461 | 4.992 | 11 | very stiff fine grained (*) | 97 |
| 4.76 | 78.05 | 4.6566 | 0.576 | 5.966 | 11 | very stiff fine grained (*) | 76 |
| 4.92 | 55.29 | 3.4244 | 0.576 | 6.194 | 11 | very stiff fine grained ( *) | 58 |
| 5.09 | 48.57 | 2.4351 | 0.406 | 5.013 | 3 | clay | 50 |
| 5.25 | 51.48 | 2.4844 | 0.020 | 4.826 | 4 | silty clay to clay | 33 |
| 5.41 | 53.94 | 2.3903 | -0.766 | 4.431 | 4 | silty clay to clay | 34 |
| 5.58 | 52.57 | 2.3781 | 0.131 | 4.523 | 4 | silty clay to clay | 33 |
| 5.74 | 48.39 | 2.2179 | -0.621 | 4.584 | 4 | silty clay to clay | 31 |
| 5.91 | 46.03 | 2.1955 | -0.700 | 4.769 | 4 | silty clay to clay | 30 |
| 6.07 | 45.38 | 2.2078 | -0.766 | 4.865 | 4 | silty clay to clay | 28 |
| 6.23 | 42.27 | 2.2087 | -0.820 | 5.226 | 3 | clay | 41 |
| 6.40 | 40.25 | 2.1431 | -1.177 | 5.325 | 3 | clay | 39 |
| 6.56 | 39.98 | 1.9980 | -0.788 | 4.998 | 3 | clay | 38 |
| 6.73 | 37.62 | 2.0527 | -0.847 | 5.456 | 3 | clay | 38 |
| 6.89 | 41.59 | 2.2173 | -1.468 | 5.331 | 4 | silty clay to clay | 28 |
| 7.05 | 50.37 | 1.9713 | -0.717 | 3.914 | 3 | clay | 43 |
| 7.22 | 42.09 | 2.5069 | -1.113 | 5.956 | 5 | clayey silt to silty clay | 27 |
| 7.38 | 76.07 | 2.6733 | 3.830 | 3.514 | 5 | clayey silt to silty clay | 33 |
| 7.55 | 85.85 | 3.2067 | 3.663 | 3.735 | 5 | clayey silt to silty clay | 38 |
| 7.71 | 74.97 | 3.3779 | 2.027 | 4.506 | 5 | clayey silt to silty clay | 37 |
| 7.87 | 73.61 | 3.7398 | 18.244 | 5.081 | 11 | very stiff fine grained (*) | 73 |
| 8.04 | 81.05 | 3.9248 | 16.601 | 4.842 | 11 | very stiff fine grained (*) | 73 |
| 8.20 | 73.78 | 3.4604 | 14.020 | 4.690 | 5 | clayey silt to silty clay | 36 |
| 8.37 | 72.00 | 3.0584 | 28.111 | 4.248 | 5 | clayey silt to silty clay | 34 |
| 8.53 | 67.00 | 2.9842 | 18.278 | 4.454 | 5 | clayey silt to silty clay | 33 |
| 8.69 | 66.18 | 2.9918 | 24.044 | 4.521 | 4 | silty clay to clay | 42 |
| 8.86 | 64.97 | 3.2324 | 6.222 | 4.976 | 11 | very stiff fine grained (*) | 62 |
| 9.02 | 64.15 | 3.5930 | 5.419 | 5.601 | 11 | very stiff fine grained (*) | 61 |
| 9.19 | 62.26 | 3.3084 | 5.096 | 5.314 | 11 | very stiff fine grained (*) | 58 |
| 9.35 | 54.46 | 3.0061 | 7.002 | 5.520 | 4 | silty clay to clay | 37 |
| 9.51 | 56.01 | 2.6109 | 8.017 | 4.661 | 4 | silty clay to clay | 36 |
| 9.68 | 59.26 | 2.7162 | 18.655 | 4.584 | 4 | silty clay to clay | 36 |
| 9.84 | 53.93 | 2.7839 | 13.835 | 5.162 | 4 | silty clay to clay | 35 |
| 10.01 | 52.78 | 2.6096 | 18.857 | 4.944 | 4 | silty clay to clay | 33 |
| 10.17 | 48.16 | 2.3346 | 10.207 | 4.848 | 4 | silty clay to clay | 32 |
| 10.33 | 47.11 | 2.3130 | 17.298 | 4.910 | 4 | silty clay to clay | 30 |
| 10.50 | 46.57 | 2.2969 | 13.458 | 4.932 | 3 | clay | 44 |
| 10.66 | 43.17 | 2.5480 | 10.874 | 5.902 | 3 | clay | 45 |
| 10.83 | 50.24 | 2.7998 | 12.889 | 5.573 | 3 | clay | 47 |
| 10.99 | 52.73 | 2.8094 | 11.374 | 5.328 | 3 | clay | 49 |
| 11.15 | 48.54 | 2.4452 | 13.315 | 5.037 | 3 | clay | 47 |
| 11.32 | 45.57 | 2.2990 | 15.655 | 5.046 | 4 | silty clay to clay | 30 |
| 11.48 | 46.52 | 2.2283 | 12.815 | 4.790 | 4 | silty clay to clay | 29 |
| 11.65 | 42.73 | 2.1365 | 10.975 | 5.000 | 3 | clay | 41 |
| 11.81 | 39.13 | 2.0232 | 9.116 | 5.170 | 3 | clay | 38 |
| 11.98 | 35.21 | 1.6573 | 10.397 | 4.707 | 4 | silty clay to clay | 24 |
| 12.14 | 36.52 | 1.5984 | 14.207 | 4.377 | 4 | silty clay to clay | 23 |
| 12.30 | 34.40 | 1.5262 | 8.567 | 4.436 | 4 | silty clay to clay | 23 |
| 12.47 | 35.75 | 1.5430 | 13.365 | 4.316 | 4 | silty clay to clay | 22 |
| 12.63 | 34.84 | 1.5388 | 8.672 | 4.417 | 4 | silty clay to clay | 22 |
| 12.80 | 33.17 | 1.5341 | 8.453 | 4.624 | 4 | silty clay to clay | 22 |
| 12.96 | 32.76 | 1.4977 | 8.126 | 4.571 | 4 | silty clay to clay | 21 |
| 13.12 | 32.33 | 1.4821 | 8.143 | 4.584 | 4 | silty clay to clay | 20 |
| 13.29 | 27.58 | 1.3177 | 5.574 | 4.777 | 3 | clay | 29 |
| 13.45 | 29.36 | 1.5863 | 7.850 | 5.403 | 3 | clay | 33 |
| 13.62 | 46.43 | 2.4584 | 11.953 | 5.295 | 3 | clay | 40 |
| 13.78 | 48.63 | 2.7532 | 7.576 | 5.661 | 3 | clay | 42 |
| 13.94 | 37.45 | 2.2038 | 7.291 | 5.885 | 3 | clay | 39 |
| 14.11 | 34.74 | 1.5810 | 11.012 | 4.551 | 3 | clay | 34 |
| 14.27 | 34.41 | 1.3157 | 15.379 | 3.824 | 4 | silty clay to clay | 22 |
| 14.44 | 32.90 | 1.2747 | 7.273 | 3.874 | 4 | silty clay to clay | 20 |
| 14.60 | 27.28 | 1.2231 | 25.212 | 4.484 | 4 | silty clay to clay | 19 |
| 14.76 | 28.01 | 1.1169 | 18.377 | 3.987 | 4 | silty clay to clay | 18 |
| 14.93 | 26.29 | 1.0773 | 13.729 | 4.098 | 4 | silty clay to clay | 17 |
| 15.09 | 22.97 | 1.1102 | 11.293 | 4.834 | 3 | clay | 22 |
| 15.26 | 18.97 | 0.8626 | 8.845 | 4.547 | 3 | clay | 19 |
| 15.42 | 18.35 | 0.7404 | 12.825 | 4.034 | 4 | silty clay to clay | 12 |
| 15.58 | 16.30 | 0.6310 | 10.490 | 3.870 | 4 | silty clay to clay | 11 |
| 15.75 | 15.08 | 0.5815 | 10.468 | 3.857 | 4 | silty clay to clay | 10 |
| 15.91 | 14.57 | 0.5640 | 10.663 | 3.871 | 4 | silty clay to clay | 10 |
| 16.08 | 17.45 | 0.5686 | 14.828 | 3.258 | 4 | silty clay to clay | 12 |
| 16.24 | 22.08 | 0.7871 | 17.389 | 3.565 | 5 | clayey silt to silty clay | 11 |
| 16.40 | 25.87 | 0.9347 | 17.241 | 3.613 | 5 | clayey silt to silty clay | 13 |
| 16.57 | 32.67 | 1.1097 | 22.025 | 3.396 | 5 | clayey silt to silty clay | 15 |
| 16.73 | 33.74 | 1.2236 | 18.946 | 3.627 | 5 | clayey silt to silty clay | 16 |
| 16.90 | 32.25 | 1.1724 | 18.163 | 3.635 | 5 | clayey silt to silty clay | 16 |
| 17.06 | 33.57 | 1.3368 | 14.052 | 3.982 | 4 | silty clay to clay | 23 |
| 17.22 | 43.96 | 1.9663 | 11.483 | 4.473 | 4 | silty clay to clay | 30 |
| 17.39 | 60.22 | 2.7461 | 40.705 | 4.560 | 5 | clayey silt to silty clay | 36 |
| 17.55 | 121.42 | 4.8887 | 0.202 | 4.026 | 5 | clayey silt to silty clay | 43 |
| 17.72 | 88.78 | 4.0361 | -2.921 | 4.546 | 11 | very stiff fine grained (*) | 81 |
| 17.88 | 44.28 | 2.5213 | -1.470 | 5.694 | 4 | silty clay to clay | 36 |
| 18.04 | 33.77 | 1.1383 | 7.571 | 3.371 | 4 | silty clay to clay | 23 |
| 18.21 | 31.85 | 0.9509 | 9.438 | 2.985 | 5 | clayey silt to silty clay | 15 |
| 18.37 | 27.96 | 0.9473 | 11.603 | 3.388 | 5 | clayey silt to silty clay | 14 |
| 18.54 | 25.96 | 0.8750 | 10.318 | 3.371 | 5 | clayey silt to silty clay | 13 |
| 18.70 | 24.31 | 1.0449 | 10.542 | 4.297 | 4 | silty clay to clay | 18 |
| 18.86 | 33.09 | 1.4695 | 23.182 | 4.441 | 4 | silty clay to clay | 20 |
| 19.03 | 37.99 | 1.9275 | 19.222 | 5.074 | 3 | clay | 36 |
| 19.19 | 39.29 | 2.0053 | 18.370 | 5.103 | 3 | clay | 37 |
| 19.36 | 38.82 | 2.1342 | 17.010 | 5.498 | 3 | clay | 38 |
| 19.52 | 41.19 | 2.3658 | 23.906 | 5.744 | 3 | clay | 41 |
| 19.69 | 48.06 | 2.9279 | 13.453 | 6.092 | 3 | clay | 49 |
| 19.85 | 62.64 | 3.5461 | 26.606 | 5.661 | 11 | very stiff fine grained (*) | 59 |
| 20.01 | 73.45 | 3.6868 | 14.463 | 5.020 | 11 | very stiff fine grained (*) | 62 |
| 20.18 | 56.81 | 3.5234 | 10.515 | 6.202 | 11 | very stiff fine grained (*) | 60 |
| 20.34 | 56.10 | 2.9665 | 26.559 | 5.288 | 11 | very stiff fine grained (*) | 63 |
| 20.51 | 84.32 | 3.2731 | 13.259 | 3.882 | 5 | clayey silt to silty clay | 32 |
| 20.67 | 62.42 | 2.7675 | 0.887 | 4.434 | 5 | clayey silt to silty clay | 31 |
| 20.83 | 45.42 | 1.7837 | 36.483 | 3.927 | 5 | clayey silt to silty clay | 23 |
| 21.00 | 35.61 | 1.2972 | 17.473 | 3.643 | 5 | clayey silt to silty clay | 18 |
| 21.16 | 30.75 | 1.1790 | 18.544 | 3.834 | 5 | clayey silt to silty clay | 15 |
| 21.33 | 27.88 | 1.1222 | 14.436 | 4.025 | 4 | silty clay to clay | 18 |
| 21.49 | 24.87 | 1.0460 | 12.978 | 4.207 | 4 | silty clay to clay | 16 |
| 21.65 | 21.67 | 0.9307 | 10.756 | 4.294 | 4 | silty clay to clay | 15 |
| 21.82 | 21.09 | 0.9316 | 14.296 | 4.418 | 4 | silty clay to clay | 14 |
| 21.98 | 23.06 | 0.8979 | 15.158 | 3.894 | 4 | silty clay to clay | 15 |
| 22.15 | 24.14 | 0.9778 | 24.505 | 4.051 | 4 | silty clay to clay | 15 |
| 22.31 | 24.14 | 1.1016 | 19.264 | 4.563 | 4 | silty clay to clay | 16 |
| 22.47 | 25.11 | 1.1878 | 19.059 | 4.730 | 3 | clay | 25 |
| 22.64 | 26.78 | 1.1812 | 24.860 | 4.411 | 4 | silty clay to clay | 17 |
| 22.80 | 28.01 | 1.1302 | 23.379 | 4.035 | 4 | silty clay to clay | 18 |
| 22.97 | 28.77 | 1.2062 | 27.044 | 4.192 | 4 | silty clay to clay | 19 |
| 23.13 | 30.51 | 1.2048 | 19.544 | 3.948 | 4 | silty clay to clay | 19 |
| 23.29 | 30.20 | 1.3075 | 20.761 | 4.329 | 4 | silty clay to clay | 19 |
| 23.46 | 29.81 | 1.3571 | 18.365 | 4.552 | 4 | silty clay to clay | 19 |
| 23.62 | 30.32 | 1.4723 | 18.998 | 4.857 | 3 | clay | 30 |
| 23.79 | 32.56 | 1.5342 | 20.584 | 4.712 | 3 | clay | 31 |
| 23.95 | 34.90 | 1.6140 | 24.626 | 4.624 | 3 | clay | 32 |
| 24.11 | 32.83 | 1.6659 | 17.675 | 5.074 | 3 | clay | 32 |
| 24.28 | 32.99 | 1.6335 | 21.081 | 4.951 | 3 | clay | 33 |
| 24.44 | 35.99 | 1.6463 | 28.515 | 4.574 | 4 | silty clay to clay | 23 |
| 24.61 | 36.43 | 1.6078 | 24.276 | 4.413 | 4 | silty clay to clay | 23 |
| 24.77 | 36.79 | 1.7089 | 29.012 | 4.644 | 4 | silty clay to clay | 24 |
| 24.93 | 38.17 | 1.8498 | 25.318 | 4.846 | 3 | clay | 36 |
| 25.10 | 37.77 | 2.1360 | 21.392 | 5.656 | 3 | clay | 37 |
| 25.26 | 38.60 | 2.5165 | 26.126 | 6.519 | 3 | clay | 40 |
| 25.43 | 46.82 | 2.8615 | 31.404 | 6.112 | 3 | clay | 47 |
| 25.59 | 59.19 | 4.2955 | 57.301 | 7.257 | 11 | very stiff fine grained (*) | 60 |
| 25.75 | 79.39 | 4.7598 | 6.020 | 5.996 | 11 | very stiff fine grained (*) | 84 |
| 25.92 | 122.85 | 6.4652 | 28.677 | 5.263 | 11 | very stiff fine grained (*) | 106 |
| 26.08 | 129.20 | 7.8660 | -1.123 | 6.088 | 11 | very stiff fine grained (*) | 128 |
| 26.25 | 147.65 | 8.5642 | 54.564 | 5.800 | 11 | very stiff fine grained (*) | 152 |
| 26.41 | 197.16 | 9.7542 | 24.254 | 4.947 | 11 | very stiff fine grained (*) | 167 |
| 26.57 | 176.44 | 9.7258 | 28.613 | 5.512 | 11 | very stiff fine grained (*) | 174 |
| 26.74 | 169.98 | 8.9155 | 74.367 | 5.245 | 11 | very stiff fine grained (*) | 180 |
| 26.90 | 215.46 | 9.4409 | 24.131 | 4.382 | 11 | very stiff fine grained (*) | 181 |
| 27.07 | 181.18 | 8.9647 | 8.103 | 4.948 | 11 | very stiff fine grained (*) | 164 |
| 27.23 | 116.71 | 7.5518 | 35.857 | 6.471 | 11 | very stiff fine grained (*) | 133 |
| 27.40 | 116.57 | 4.6604 | 119.483 | 3.998 | 12 | sand to clayey sand (*) | 73 |
| 27.56 | 220.19 | 5.8390 | 14.618 | 2.652 | 6 | sandy silt to clayey silt | 65 |
| 27.72 | 168.97 | 5.9709 | 5.889 | 3.534 | 12 | sand to clayey sand (*) | 79 |
| 27.89 | 101.97 | 7.0921 | 40.682 | 6.955 | 11 | very stiff fine grained (*) | 137 |
| 28.05 | 157.77 | 4.7869 | 86.133 | 3.034 | 7 | silty sand to sandy silt | 57 |
| 28.22 | 271.51 | 3.5632 | 45.860 | 1.312 | 8 | sand to silty sand | 58 |
| 28.38 | 297.69 | 1.8152 | 5.865 | 0.610 | 9 | sand | 52 |
| 28.54 | 251.04 | 3.9336 | 15.653 | 1.567 | 8 | sand to silty sand | 56 |
| 28.71 | 155.30 | 4.0984 | 2.946 | 2.639 | 7 | silty sand to sandy silt | 61 |
| 28.87 | 164.48 | 3.7335 | 132.338 | 2.270 | 8 | sand to silty sand | 51 |
| 29.04 | 313.50 | 2.5367 | 8.067 | 0.809 | 9 | sand | 52 |
| 29.20 | 336.93 | 2.2571 | 7.236 | 0.670 | 9 | sand | 64 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 29.36 | 349.49 | 3.2086 | 10.894 | 0.918 | 9 | sand | 68 |
| 29.53 | 381.73 | 3.7190 | 17.256 | 0.974 | 9 | sand | 72 |
| 29.69 | 395.45 | 3.7264 | 12.946 | 0.942 | 9 | sand | 75 |
| 29.86 | 394.20 | 4.2474 | 13.155 | 1.077 | 9 | sand | 75 |
| 30.02 | 386.89 | 5.0338 | 10.687 | 1.301 | 8 | sand to silty sand | 91 |
| 30.18 | 361.64 | 9.2519 | 10.310 | 2.558 | 12 | sand to clayey sand (*) | 165 |
| 30.35 | 285.15 | 11.9135 | 15.653 | 4.178 | 12 | sand to clayey sand (*) | 135 |
| 30.51 | 195.65 | 12.5596 | 115.473 | 6.419 | 11 | very stiff fine grained (*) | 171 |
| 30.68 | 175.65 | 11.9943 | 50.714 | 6.828 | 11 | very stiff fine grained (*) | 162 |
| 30.84 | 162.62 | -32768 | 10.756 | -32768 | 0 | <out of range> | 0 |

Data File:CPT 2 6/21/2007 3:21:35 PM
Operator:Doug Location:PG&E Solar
Cone ID:DSG0369 Job Number:297
Customer: PG&E Solar Proje ct Units:

| Depth (ft) | Qc TSF | Fs TSF | Pw PSI | Fs/Qc (%) | Zone | Soil Behavior Type UBC-1983 | SPT N* 60% Hammer |
|---|---|---|---|---|---|---|---|
| 0.16 | 71.07 | 0.5859 | 0.379 | 0.824 | 7 | silty sand to sandy silt | 19 |
| 0.33 | 104.49 | 1.0323 | 1.820 | 0.988 | 8 | sand to silty sand | 22 |
| 0.49 | 97.37 | 1.4984 | 3.490 | 1.539 | 7 | silty sand to sandy silt | 31 |
| 0.66 | 87.72 | 1.7189 | 2.719 | 1.960 | 7 | silty sand to sandy silt | 29 |
| 0.82 | 85.79 | 1.7471 | 2.103 | 2.037 | 7 | silty sand to sandy silt | 28 |
| 0.98 | 85.83 | 1.5826 | 1.855 | 1.844 | 7 | silty sand to sandy silt | 27 |
| 1.15 | 83.43 | 1.5380 | 1.712 | 1.844 | 7 | silty sand to sandy silt | 27 |
| 1.31 | 84.80 | 1.4645 | 1.480 | 1.727 | 7 | silty sand to sandy silt | 27 |
| 1.48 | 85.04 | 1.5768 | 1.882 | 1.854 | 7 | silty sand to sandy silt | 27 |
| 1.64 | 83.31 | 1.7866 | 1.628 | 2.144 | 7 | silty sand to sandy silt | 25 |
| 1.80 | 70.40 | 0.7200 | 1.283 | 1.023 | 7 | silty sand to sandy silt | 22 |
| 1.97 | 54.31 | 0.7476 | 1.419 | 1.377 | 7 | silty sand to sandy silt | 19 |
| 2.13 | 57.30 | 1.0850 | 1.128 | 1.894 | 7 | silty sand to sandy silt | 19 |
| 2.30 | 66.38 | 1.6417 | 1.995 | 2.473 | 6 | sandy silt to clayey silt | 28 |
| 2.46 | 95.41 | 2.5361 | 1.872 | 2.658 | 7 | silty sand to sandy silt | 33 |
| 2.62 | 148.14 | 3.6238 | 2.042 | 2.446 | 7 | silty sand to sandy silt | 47 |
| 2.79 | 193.57 | 5.7007 | 2.458 | 2.945 | 7 | silty sand to sandy silt | 62 |
| 2.95 | 237.72 | 6.9852 | 2.419 | 2.938 | 12 | sand to clayey sand (*) | 108 |
| 3.12 | 244.46 | 8.3538 | 1.638 | 3.417 | 12 | sand to clayey sand (*) | 117 |
| 3.28 | 252.32 | 7.9466 | 1.584 | 3.149 | 12 | sand to clayey sand (*) | 119 |
| 3.44 | 252.02 | 5.7703 | 1.505 | 2.290 | 7 | silty sand to sandy silt | 79 |
| 3.61 | 237.80 | 4.8725 | 1.276 | 2.049 | 7 | silty sand to sandy silt | 78 |
| 3.77 | 242.77 | 5.4627 | 2.495 | 2.250 | 7 | silty sand to sandy silt | 79 |
| 3.94 | 262.74 | 7.8890 | 2.520 | 3.003 | 12 | sand to clayey sand (*) | 129 |
| 4.10 | 300.19 | 10.6085 | 2.507 | 3.534 | 12 | sand to clayey sand (*) | 136 |
| 4.27 | 290.03 | 10.8357 | 2.537 | 3.736 | 12 | sand to clayey sand (*) | 136 |
| 4.43 | 261.43 | 9.7142 | 1.773 | 3.716 | 12 | sand to clayey sand (*) | 128 |
| 4.59 | 247.57 | 9.5183 | 0.825 | 3.845 | 12 | sand to clayey sand (*) | 117 |
| 4.76 | 224.50 | 9.1610 | 0.929 | 4.081 | 12 | sand to clayey sand (*) | 110 |
| 4.92 | 218.57 | 8.2817 | 1.121 | 3.789 | 12 | sand to clayey sand (*) | 105 |
| 5.09 | 212.32 | 9.0830 | 0.837 | 4.278 | 11 | very stiff fine grained (*) | 203 |
| 5.25 | 205.87 | 9.5919 | 0.828 | 4.659 | 11 | very stiff fine grained (*) | 192 |
| 5.41 | 182.67 | 8.4208 | 0.665 | 4.610 | 11 | very stiff fine grained (*) | 181 |
| 5.58 | 179.46 | 5.9537 | 0.505 | 3.318 | 12 | sand to clayey sand (*) | 82 |
| 5.74 | 150.02 | 4.7878 | 0.034 | 3.191 | 6 | sandy silt to clayey silt | 56 |
| 5.91 | 106.91 | 4.0997 | -0.493 | 3.835 | 6 | sandy silt to clayey silt | 44 |
| 6.07 | 86.72 | 3.8534 | -0.458 | 4.443 | 5 | clayey silt to silty clay | 44 |
| 6.23 | 82.74 | 3.5770 | -0.167 | 4.323 | 11 | very stiff fine grained (*) | 79 |
| 6.40 | 78.88 | 3.6983 | -0.172 | 4.688 | 11 | very stiff fine grained (*) | 74 |
| 6.56 | 71.71 | 3.8568 | -0.355 | 5.378 | 11 | very stiff fine grained (*) | 69 |
| 6.73 | 66.20 | 3.6185 | -0.621 | 5.466 | 11 | very stiff fine grained (*) | 64 |
| 6.89 | 61.11 | 3.2100 | -0.596 | 5.252 | 11 | very stif f fine grained (*) | 58 |
| 7.05 | 54.05 | 2.8698 | -0.709 | 5.309 | 3 | clay | 54 |
| 7.22 | 53.59 | 2.6444 | -1.069 | 4.935 | 4 | silty clay to clay | 35 |
| 7.38 | 56.05 | 2.8774 | -1.111 | 5.134 | 3 | clay | 54 |
| 7.55 | 60.77 | 3.4159 | -1.283 | 5.621 | 11 | very stiff fine grained (*) | 58 |
| 7.71 | 64.68 | 4.1049 | -1.217 | 6.346 | 11 | very stiff fine grained (*) | 64 |
| 7.87 | 74.09 | 4.9575 | -1.069 | 6.691 | 11 | very stiff fine grained (*) | 69 |
| 8.04 | 78.04 | 4.9569 | -1.116 | 6.352 | 11 | very stiff fine grained (*) | 72 |
| 8.20 | 74.96 | 4.3341 | -1.158 | 5.782 | 11 | very stiff fine grained (*) | 72 |
| 8.37 | 71.70 | 4.9872 | -1.387 | 6.956 | 11 | very stiff fine grained (*) | 82 |
| 8.53 | 110.26 | 6.7701 | -1.044 | 6.140 | 11 | very stiff fine grained (*) | 105 |
| 8.69 | 147.96 | 9.3606 | -1.099 | 6.327 | 11 | very stiff fine grained (*) | 132 |
| 8.86 | 156.60 | 10.4459 | -1.039 | 6.670 | 11 | very stiff fine grained (*) | 144 |
| 9.02 | 147.26 | 10.7687 | -0.882 | 7.313 | 11 | very stiff fine grained (*) | 145 |
| 9.19 | 150.30 | 10.3360 | -0.884 | 6.877 | 11 | very stiff fine grained (*) | 148 |
| 9.35 | 167.39 | 10.1732 | -0.860 | 6.077 | 11 | very stiff fine grained (*) | 158 |
| 9.51 | 178.96 | 9.7754 | -0.564 | 5.462 | 11 | very stiff fine grained (*) | 165 |
| 9.68 | 171.17 | 9.2883 | -0.453 | 5.426 | 11 | very stiff fine grained (*) | 157 |
| 9.84 | 140.31 | 8.7344 | -0.729 | 6.225 | 11 | very stiff fine grained (*) | 137 |
| 10.01 | 116.98 | 8.1556 | -0.823 | 6.972 | 11 | very stiff fine grained (*) | 115 |
| 10.17 | 101.61 | 7.6293 | -0.847 | 7.508 | 11 | very stiff fine grained (*) | 100 |
| 10.33 | 96.34 | 7.0952 | -0.800 | 7.364 | 11 | very stiff fine grained (*) | 93 |
| 10.50 | 95.05 | 6.4495 | -0.897 | 6.785 | 11 | very stiff fine grained (*) | 88 |
| 10.66 | 83.78 | 5.6364 | -0.966 | 6.727 | 11 | very stiff fine grained (*) | 80 |
| 10.83 | 71.89 | 5.0603 | -1.064 | 7.039 | 11 | very stiff fine grained (*) | 71 |
| 10.99 | 67.58 | 4.5446 | -1.204 | 6.725 | 11 | very stiff fine grained (*) | 61 |
| 11.15 | 51.73 | 3.6118 | -1.416 | 6.982 | 3 | clay | 50 |
| 11.32 | 37.18 | 2.6262 | -1.448 | 7.063 | 3 | clay | 38 |
| 11.48 | 31.63 | 2.2660 | -1.754 | 7.165 | 3 | clay | 32 |
| 11.65 | 31.17 | 2.1938 | -0.808 | 7.038 | 3 | clay | 30 |
| 11.81 | 30.41 | 2.1916 | -1.278 | 7.208 | 3 | clay | 30 |
| 11.98 | 31.35 | 2.1704 | -1.594 | 6.924 | 3 | clay | 30 |
| 12.14 | 33.65 | 2.1152 | -1.539 | 6.286 | 3 | clay | 33 |
| 12.30 | 37.08 | 2.2217 | -1.239 | 5.992 | 3 | clay | 35 |
| 12.47 | 39.93 | 2.5237 | -1.020 | 6.320 | 3 | clay | 37 |
| 12.63 | 38.20 | 2.5023 | -1.015 | 6.550 | 3 | clay | 37 |
| 12.80 | 36.48 | 2.2119 | -1.131 | 6.063 | 3 | clay | 35 |
| 12.96 | 33.72 | 1.9257 | -1.106 | 5.711 | 3 | clay | 33 |
| 13.12 | 31.86 | 1.6980 | -0.980 | 5.329 | 3 | clay | 31 |
| 13.29 | 31.02 | 1.6529 | -0.759 | 5.329 | 3 | clay | 30 |
| 13.45 | 31.03 | 1.6649 | -0.581 | 5.365 | 3 | clay | 29 |
| 13.62 | 30.17 | 1.7825 | -0.365 | 5.908 | 3 | clay | 30 |
| 13.78 | 33.60 | 1.8581 | -0.217 | 5.531 | 3 | clay | 33 |
| 13.94 | 39.98 | 2.0741 | 0.254 | 5.188 | 3 | clay | 36 |
| 14.11 | 38.55 | 1.9618 | 0.074 | 5.089 | 3 | clay | 36 |
| 14.27 | 35.09 | 2.0012 | -0.165 | 5.703 | 3 | clay | 35 |
| 14.44 | 36.02 | 1.8477 | -0.039 | 5.130 | 3 | clay | 35 |
| 14.60 | 38.19 | 2.0591 | -0.032 | 5.392 | 3 | clay | 37 |
| 14.76 | 40.87 | 2.0097 | 0.025 | 4.917 | 3 | clay | 36 |
| 14.93 | 34.07 | 1.9376 | -0.047 | 5.687 | 3 | clay | 37 |
| 15.09 | 42.19 | 2.4306 | 0.564 | 5.761 | 3 | clay | 46 |
| 15.26 | 68.89 | 5.2098 | 1.579 | 7.563 | 11 | very stiff fine grained (*) | 88 |
| 15.42 | 164.76 | 8.1243 | 3.101 | 4.931 | 11 | very stiff fine grained (*) | 133 |
| 15.58 | 183.69 | 10.4208 | 3.347 | 5.673 | 11 | very stiff fine grained (*) | 159 |
| 15.75 | 149.82 | 9.7374 | 3.707 | 6.499 | 11 | very stiff fine grained (*) | 150 |
| 15.91 | 137.29 | 9.2480 | 6.106 | 6.736 | 11 | very stiff fine grained (*) | 136 |
| 16.08 | 139.10 | 8.7874 | 5.374 | 6.317 | 11 | very stiff fine grained (*) | 124 |
| 16.24 | 111.61 | 7.7663 | 8.734 | 6.958 | 11 | very stiff fine grained (*) | 116 |
| 16.40 | 112.79 | 6.6894 | 8.426 | 5.931 | 11 | very stiff fine grained (*) | 93 |
| 16.57 | 66.91 | 4.6697 | 3.702 | 6.979 | 11 | very stiff fine grained (*) | 70 |
| 16.73 | 39.20 | 2.5015 | 3.131 | 6.381 | 3 | clay | 45 |
| 16.90 | 34.48 | 1.3378 | 4.160 | 3.880 | 4 | silty clay to clay | 24 |
| 17.06 | 37.40 | 1.3275 | 5.042 | 3.549 | 5 | clayey silt to silty clay | 19 |
| 17.22 | 47.52 | 1.5852 | 6.525 | 3.336 | 5 | clayey silt to silty clay | 22 |
| 17.39 | 50.72 | 1.9562 | 6.389 | 3.857 | 5 | clayey silt to silty clay | 23 |
| 17.55 | 46.59 | 1.7844 | 6.202 | 3.830 | 5 | clayey silt to silty clay | 23 |
| 17.72 | 46.47 | 1.4896 | 6.416 | 3.205 | 5 | clayey silt to silty clay | 22 |
| 17.88 | 46.00 | 1.5695 | 6.099 | 3.412 | 5 | clayey silt to silty clay | 23 |
| 18.04 | 48.37 | 1.9980 | 5.621 | 4.131 | 5 | clayey silt to silty clay | 24 |
| 18.21 | 53.45 | 2.4964 | 5.554 | 4.670 | 4 | silty clay to clay | 34 |
| 18.37 | 57.09 | 2.7286 | 6.148 | 4.779 | 4 | silty clay to clay | 37 |
| 18.54 | 61.80 | 2.8638 | 5.094 | 4.634 | 4 | silty clay to clay | 37 |
| 18.70 | 52.72 | 2.6335 | 4.719 | 4.995 | 4 | silty clay to clay | 35 |
| 18.86 | 49.91 | 2.2478 | 5.059 | 4.504 | 4 | silty clay to clay | 32 |
| 19.03 | 48.13 | 2.4360 | 5.239 | 5.061 | 4 | silty clay to clay | 33 |
| 19.19 | 54.62 | 2.3545 | 5.116 | 4.311 | 4 | silty clay to clay | 32 |
| 19.36 | 48.36 | 2.3714 | 4.463 | 4.904 | 4 | silty clay to clay | 32 |
| 19.52 | 46.97 | 2.2728 | 4.534 | 4.839 | 4 | silty clay to clay | 31 |
| 19.69 | 50.00 | 2.1815 | 4.236 | 4.363 | 4 | silty clay to clay | 30 |
| 19.85 | 43.77 | 1.9961 | 4.148 | 4.560 | 4 | silty clay to clay | 29 |
| 20.01 | 43.43 | 1.8432 | 3.995 | 4.244 | 4 | silty clay to clay | 27 |
| 20.18 | 39.36 | 1.7390 | 3.820 | 4.419 | 4 | silty clay to clay | 26 |
| 20.34 | 37.76 | 1.5755 | 3.761 | 4.172 | 4 | silty clay to clay | 24 |
| 20.51 | 37.38 | 1.5016 | 3.640 | 4.017 | 4 | silty clay to clay | 23 |
| 20.67 | 34.86 | 1.4284 | 3.436 | 4.097 | 4 | silty clay to clay | 23 |
| 20.83 | 34.27 | 1.3582 | 3.456 | 3.963 | 4 | silty clay to clay | 22 |
| 21.00 | 33.82 | 1.4351 | 3.384 | 4.243 | 4 | silty clay to clay | 21 |
| 21.16 | 31.84 | 1.1694 | 3.175 | 3.673 | 4 | silty clay to clay | 20 |
| 21.33 | 26.77 | 1.1363 | 2.820 | 4.244 | 4 | silty clay to clay | 17 |
| 21.49 | 20.58 | 0.9637 | 2.766 | 4.682 | 4 | silty clay to clay | 15 |
| 21.65 | 24.92 | 0.8802 | 2.889 | 3.532 | 4 | silty clay to clay | 15 |
| 21.82 | 22.59 | 0.7982 | 2.818 | 3.534 | 5 | clayey silt to silty clay | 11 |
| 21.98 | 21.07 | 0.7285 | 2.759 | 3.458 | 5 | clayey silt to silty clay | 10 |
| 22.15 | 20.02 | 0.7187 | 2.771 | 3.590 | 5 | clayey silt to silty clay | 10 |
| 22.31 | 21.86 | 0.6986 | 2.919 | 3.196 | 5 | clayey silt to silty clay | 10 |
| 22.47 | 23.21 | 0.7254 | 3.158 | 3.125 | 5 | clayey silt to silty clay | 11 |
| 22.64 | 23.31 | 0.7460 | 3.333 | 3.201 | 5 | clayey silt to silty clay | 11 |
| 22.80 | 24.64 | 0.9420 | 3.421 | 3.823 | 4 | silty clay to clay | 16 |
| 22.97 | 26.99 | 1.0969 | 3.451 | 4.064 | 4 | silty clay to clay | 17 |
| 23.13 | 28.60 | 1.1731 | 3.515 | 4.101 | 4 | silty clay to clay | 18 |
| 23.29 | 28.96 | 1.2335 | 3.512 | 4.260 | 4 | silty clay to clay | 19 |
| 23.46 | 29.41 | 1.2294 | 3.562 | 4.180 | 4 | silty clay to clay | 19 |
| 23.62 | 30.04 | 1.3103 | 3.557 | 4.361 | 4 | silty clay to clay | 19 |
| 23.79 | 31.36 | 1.3065 | 3.677 | 4.166 | 4 | silty clay to clay | 20 |
| 23.95 | 33.06 | 1.3573 | 3.936 | 4.106 | 4 | silty clay to clay | 21 |
| 24.11 | 36.25 | 1.3336 | 4.113 | 3.679 | 4 | silty clay to clay | 22 |
| 24.28 | 35.73 | 1.5080 | 4.207 | 4.221 | 4 | silty clay to clay | 23 |
| 24.44 | 37.09 | 1.6076 | 4.347 | 4.335 | 4 | silty clay to clay | 24 |
| 24.61 | 40.19 | 1.7254 | 4.554 | 4.293 | 4 | silty clay to clay | 25 |
| 24.77 | 41.49 | 1.7792 | 4.596 | 4.288 | 4 | silty clay to clay | 26 |
| 24.93 | 42.42 | 1.8661 | 4.581 | 4.399 | 4 | silty clay to clay | 27 |
| 25.10 | 42.33 | 1.9324 | 4.537 | 4.565 | 4 | silty clay to clay | 27 |
| 25.26 | 39.76 | 1.8974 | 4.288 | 4.773 | 4 | silty clay to clay | 25 |
| 25.43 | 36.67 | 1.7037 | 4.207 | 4.647 | 4 | silty clay to clay | 24 |
| 25.59 | 36.35 | 1.6106 | 4.281 | 4.431 | 4 | silty clay to clay | 24 |
| 25.75 | 38.33 | 1.6094 | 4.463 | 4.199 | 4 | silty clay to clay | 24 |
| 25.92 | 39.28 | 1.7724 | 4.591 | 4.513 | 4 | silty clay to clay | 26 |
| 26.08 | 42.24 | 2.0580 | 4.660 | 4.872 | 4 | silty clay to clay | 27 |
| 26.25 | 42.89 | 2.1291 | 4.603 | 4.964 | 4 | silty clay to clay | 27 |
| 26.41 | 41.06 | 1.9847 | 4.830 | 4.833 | 4 | silty clay to clay | 27 |
| 26.57 | 40.62 | 1.7574 | 5.121 | 4.327 | 4 | silty clay to clay | 27 |
| 26.74 | 42.93 | 1.8002 | 5.286 | 4.194 | 4 | silty clay to clay | 27 |
| 26.90 | 43.49 | 1.8928 | 5.411 | 4.352 | 4 | silty clay to clay | 28 |
| 27.07 | 44.99 | 2.0217 | 5.488 | 4.494 | 4 | silty clay to clay | 29 |
| 27.23 | 45.36 | 2.1014 | 5.305 | 4.632 | 4 | silty clay to clay | 29 |
| 27.40 | 44.46 | 2.1977 | 5.217 | 4.944 | 4 | silty clay to clay | 29 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 27.56 | 45.76 | 2.1007 | 5.401 | 4.591 | 4 | silty clay to clay | 29 |
| 27.72 | 45.68 | 2.0175 | 5.532 | 4.416 | 4 | silty clay to clay | 29 |
| 27.89 | 44.11 | 1.9884 | 5.589 | 4.508 | 4 | silty clay to clay | 29 |
| 28.05 | 44.11 | 1.8634 | 5.690 | 4.224 | 4 | silty clay to clay | 29 |
| 28.22 | 46.17 | 1.8897 | 5.820 | 4.093 | 5 | clayey silt to silty clay | 22 |
| 28.38 | 46.26 | 1.9702 | 6.160 | 4.259 | 4 | silty clay to clay | 30 |
| 28.54 | 47.67 | 2.0703 | 6.239 | 4.343 | 4 | silty clay to clay | 30 |
| 28.71 | 49.03 | 2.0979 | 6.313 | 4.279 | 4 | silty clay to clay | 31 |
| 28.87 | 47.81 | 2.1080 | 6.135 | 4.409 | 4 | silty clay to clay | 31 |
| 29.04 | 47.61 | 2.1934 | 6.236 | 4.607 | 4 | silty clay to clay | 31 |
| 29.20 | 50.74 | 2.1935 | 6.330 | 4.323 | 4 | silty clay to clay | 31 |
| 29.36 | 48.95 | 2.1228 | 6.268 | 4.337 | 5 | clayey silt to silty clay | 24 |
| 29.53 | 48.03 | 1.9712 | 6.367 | 4.104 | 5 | clayey silt to silty clay | 23 |
| 29.69 | 49.16 | 1.9535 | 6.695 | 3.973 | 5 | clayey silt to silty clay | 23 |
| 29.86 | 49.15 | 2.0197 | 6.633 | 4.109 | 5 | clayey silt to silty clay | 23 |
| 30.02 | 46.78 | 1.9572 | 6.539 | 4.184 | 5 | clayey silt to silty clay | 22 |
| 30.18 | 44.47 | 1.9319 | 6.478 | 4.345 | 4 | silty clay to clay | 29 |
| 30.35 | 44.51 | 1.9769 | 6.303 | 4.442 | 4 | silty clay to clay | 29 |
| 30.51 | 45.66 | 1.9477 | 6.498 | 4.266 | 4 | silty clay to clay | 29 |
| 30.68 | 46.77 | 1.9822 | 6.727 | 4.238 | 5 | clayey silt to silty clay | 23 |
| 30.84 | 51.80 | 2.1841 | 7.089 | 4.217 | 5 | clayey silt to silty clay | 27 |
| 31.00 | 54.90 | 2.3547 | 7.670 | 4.289 | 5 | clayey silt to silty clay | 28 |
| 31.17 | 60.16 | -32768 | 8.803 | -32768 | 0 | <out of range> | 0 |

Data File:CPT 3 6/21/2007 3:58:05 PM
Operator:Doug Location:PG&E Solar
Cone ID:DSG0369 Job Number:297
Customer: PG&E Solar Project Units:

| Depth (ft) | Qc TSF | Fs TSF | Pw PSI | Fs/Qc (%) | Zone | Soil Behavior Type UBC-1983 | SPT N* 60% Hammer |
|---|---|---|---|---|---|---|---|
| 0.16 | 135.13 | 1.7276 | 1.988 | 1.278 | 7 | silty sand to sandy silt | 30 |
| 0.33 | 142.58 | 3.1120 | 2.094 | 2.183 | 7 | silty sand to sandy silt | 43 |
| 0.49 | 126.51 | 4.1983 | 0.768 | 3.318 | 6 | sandy silt to clayey silt | 48 |
| 0.66 | 108.06 | 4.2505 | 0.271 | 3.933 | 6 | sandy silt to clayey silt | 43 |
| 0.82 | 98.89 | 3.7168 | 0.246 | 3.759 | 5 | clayey silt to silty clay | 48 |
| 0.98 | 92.00 | 3.3670 | -0.074 | 3.660 | 6 | sandy silt to clayey silt | 35 |
| 1.15 | 87.15 | 3.0857 | 0.300 | 3.541 | 5 | clayey silt to silty clay | 41 |
| 1.31 | 75.54 | 2.7333 | 0.106 | 3.618 | 5 | clayey silt to silty clay | 36 |
| 1.48 | 63.08 | 2.1139 | 0.047 | 3.351 | 6 | sandy silt to clayey silt | 24 |
| 1.64 | 46.41 | 0.3646 | 0.187 | 0.786 | 7 | silty sand to sandy silt | 15 |
| 1.80 | 34.08 | 0.2137 | -0.059 | 0.627 | 7 | silty sand to sandy silt | 12 |
| 1.97 | 29.52 | 0.2491 | 1.877 | 0.844 | 7 | silty sand to sandy silt | 10 |
| 2.13 | 31.82 | 0.3465 | 1.456 | 1.089 | 7 | silty sand to sandy silt | 10 |
| 2.30 | 33.60 | 0.3861 | 1.167 | 1.149 | 7 | silty sand to sandy silt | 11 |
| 2.46 | 34.02 | 0.2978 | 0.697 | 0.875 | 7 | silty sand to sandy silt | 10 |
| 2.62 | 30.09 | 0.3047 | 0.365 | 1.013 | 7 | silty sand to sandy silt | 10 |
| 2.79 | 26.46 | 0.2826 | 0.315 | 1.068 | 6 | sandy silt to clayey silt | 10 |
| 2.95 | 22.65 | 0.4832 | 0.278 | 2.134 | 6 | sandy silt to clayey silt | 9 |
| 3.12 | 25.13 | 0.4540 | 0.158 | 1.807 | 6 | sandy silt to clayey silt | 9 |
| 3.28 | 21.12 | 0.3260 | 0.069 | 1.543 | 6 | sandy silt to clayey silt | 7 |
| 3.44 | 11.60 | 0.2366 | -0.278 | 2.039 | 5 | clayey silt to silty clay | 8 |
| 3.61 | 16.02 | 0.2535 | 0.071 | 1.583 | 5 | clayey silt to silty clay | 7 |
| 3.77 | 16.98 | 0.2391 | 0.148 | 1.408 | 6 | sandy silt to clayey silt | 6 |
| 3.94 | 17.29 | 0.3078 | 0.052 | 1.780 | 6 | sandy silt to clayey silt | 8 |
| 4.10 | 27.56 | 0.3317 | 0.138 | 1.203 | 6 | sandy silt to clayey silt | 10 |
| 4.27 | 30.20 | 0.3853 | 0.027 | 1.276 | 6 | sandy silt to clayey silt | 12 |
| 4.43 | 33.70 | 0.4193 | 0.015 | 1.244 | 7 | silty sand to sandy silt | 11 |
| 4.59 | 38.61 | 0.5301 | 0.007 | 1.373 | 7 | silty sand to sandy silt | 14 |
| 4.76 | 58.56 | 0.5778 | 0.392 | 0.987 | 7 | silty sand to sandy silt | 19 |
| 4.92 | 85.36 | 1.2936 | 0.399 | 1.515 | 8 | sand to silty sand | 23 |
| 5.09 | 140.99 | 2.0875 | 2.335 | 1.481 | 7 | silty sand to sandy silt | 42 |
| 5.25 | 170.72 | 3.6259 | 1.296 | 2.124 | 7 | silty sand to sandy silt | 53 |
| 5.41 | 185.34 | 4.5547 | 1.318 | 2.458 | 7 | silty sand to sandy silt | 56 |
| 5.58 | 170.01 | 5.5505 | 0.576 | 3.265 | 6 | sandy silt to clayey silt | 60 |
| 5.74 | 115.94 | 5.1685 | -0.200 | 4.458 | 11 | very stiff fine grained (*) | 118 |
| 5.91 | 83.22 | 4.2998 | 0.276 | 5.167 | 11 | very stiff fine grained (*) | 87 |
| 6.07 | 73.03 | 3.2628 | 0.675 | 4.468 | 11 | very stiff fine grained (*) | 74 |
| 6.23 | 75.52 | 3.0707 | 0.867 | 4.066 | 5 | clayey silt to silty clay | 39 |
| 6.40 | 98.19 | 3.5034 | 1.833 | 3.568 | 6 | sandy silt to clayey silt | 36 |
| 6.56 | 108.34 | 3.7477 | 3.438 | 3.459 | 6 | sandy silt to clayey silt | 40 |
| 6.73 | 110.07 | 3.8791 | 15.128 | 3.524 | 6 | sandy silt to clayey silt | 42 |
| 6.89 | 110.49 | 4.0770 | 42.813 | 3.690 | 6 | sandy silt to clayey silt | 43 |
| 7.05 | 111.07 | 4.4718 | 35.453 | 4.026 | 5 | clayey silt to silty clay | 52 |
| 7.22 | 104.37 | 4.3527 | 21.372 | 4.170 | 11 | very stiff fine grained (*) | 101 |
| 7.38 | 101.33 | 4.5917 | 22.586 | 4.532 | 11 | very stiff fine grained (*) | 99 |
| 7.55 | 102.14 | 4.8730 | 21.305 | 4.771 | 11 | very stiff fine grained (*) | 95 |
| 7.71 | 94.36 | 4.7695 | 4.495 | 5.054 | 11 | very stiff fine grained (*) | 89 |
| 7.87 | 81.95 | 4.2330 | 11.251 | 5.165 | 11 | very stiff fine grained (*) | 81 |
| 8.04 | 76.92 | 3.6818 | 7.919 | 4.786 | 11 | very stiff fine grained (*) | 72 |
| 8.20 | 65.53 | 3.2596 | 6.000 | 4.974 | 11 | very stiff fine grained (*) | 65 |
| 8.37 | 62.02 | 2.9416 | 10.362 | 4.743 | 4 | silty clay to clay | 39 |
| 8.53 | 53.60 | 2.3253 | 4.990 | 4.338 | 4 | silty clay to clay | 34 |
| 8.69 | 44.91 | 2.3133 | 8.335 | 5.151 | 4 | silty clay to clay | 32 |
| 8.86 | 52.66 | 2.0728 | 6.897 | 3.936 | 4 | silty clay to clay | 32 |
| 9.02 | 52.48 | 2.2570 | 9.168 | 4.301 | 5 | clayey silt to silty clay | 25 |
| 9.19 | 53.68 | 2.2121 | 15.759 | 4.121 | 4 | silty clay to clay | 34 |
| 9.35 | 54.89 | 2.6482 | 8.044 | 4.825 | 5 | clayey silt to silty clay | 29 |
| 9.51 | 69.78 | 2.8386 | 10.397 | 4.068 | 5 | clayey silt to silty clay | 31 |
| 9.68 | 70.88 | 2.8241 | 15.081 | 3.984 | 5 | clayey silt to silty clay | 34 |
| 9.84 | 73.27 | 3.0122 | 19.453 | 4.111 | 5 | clayey silt to silty clay | 36 |
| 10.01 | 78.76 | 3.3639 | 19.015 | 4.271 | 5 | clayey silt to silty clay | 37 |
| 10.17 | 79.47 | 3.4968 | 16.771 | 4.400 | 5 | clayey silt to silty clay | 38 |
| 10.33 | 76.37 | 3.1830 | 16.956 | 4.168 | 5 | clayey silt to silty clay | 37 |
| 10.50 | 75.39 | 3.3950 | 13.899 | 4.504 | 5 | clayey silt to silty clay | 39 |
| 10.66 | 94.96 | 4.0701 | 10.278 | 4.286 | 11 | very stiff fine grained (*) | 79 |
| 10.83 | 78.31 | 4.0556 | 4.480 | 5.179 | 11 | very stiff fine grained (*) | 76 |
| 10.99 | 65.88 | 3.4838 | 4.808 | 5.288 | 11 | very stiff fine grained (*) | 66 |
| 11.15 | 61.17 | 3.2864 | 7.071 | 5.372 | 11 | very stiff fine grained (*) | 61 |
| 11.32 | 64.55 | 3.0355 | 11.303 | 4.703 | 11 | very stiff fine grained (*) | 62 |
| 11.48 | 68.12 | 3.4477 | 12.076 | 5.061 | 4 | silty clay to clay | 42 |
| 11.65 | 66.03 | 3.1546 | 8.389 | 4.777 | 4 | silty clay to clay | 41 |
| 11.81 | 57.54 | 2.5159 | 9.557 | 4.372 | 4 | silty clay to clay | 38 |
| 11.98 | 55.91 | 2.3414 | 11.111 | 4.188 | 4 | silty clay to clay | 36 |
| 12.14 | 56.15 | 2.6197 | 10.613 | 4.665 | 4 | silty clay to clay | 37 |
| 12.30 | 59.91 | 2.8155 | 9.559 | 4.700 | 4 | silty clay to clay | 38 |
| 12.47 | 60.19 | 2.6807 | 8.007 | 4.454 | 4 | silty clay to clay | 38 |
| 12.63 | 56.17 | 2.4249 | 9.557 | 4.317 | 4 | silty clay to clay | 36 |
| 12.80 | 53.74 | 2.5334 | 9.810 | 4.714 | 4 | silty clay to clay | 34 |
| 12.96 | 51.59 | 2.3839 | 9.106 | 4.621 | 4 | silty clay to clay | 33 |
| 13.12 | 47.43 | 2.1349 | 11.384 | 4.501 | 4 | silty clay to clay | 31 |
| 13.29 | 45.91 | 2.0322 | 8.776 | 4.426 | 4 | silty clay to clay | 29 |
| 13.45 | 41.35 | 1.9123 | 8.251 | 4.624 | 4 | silty clay to clay | 27 |
| 13.62 | 39.68 | 1.7046 | 7.650 | 4.296 | 4 | silty clay to clay | 26 |
| 13.78 | 42.99 | 2.3973 | 8.847 | 5.576 | 4 | silty clay to clay | 37 |
| 13.94 | 88.62 | 3.7847 | 17.246 | 4.271 | 6 | sandy silt to clayey silt | 37 |
| 14.11 | 160.25 | 4.3929 | 6.362 | 2.741 | 7 | silty sand to sandy silt | 50 |
| 14.27 | 223.22 | 3.8324 | 5.611 | 1.717 | 8 | sand to silty sand | 51 |
| 14.44 | 253.08 | 3.0034 | 4.882 | 1.187 | 8 | sand to silty sand | 52 |
| 14.60 | 178.97 | 2.3690 | 1.502 | 1.324 | 8 | sand to silty sand | 49 |
| 14.76 | 187.35 | 4.2173 | 3.337 | 2.251 | 7 | silty sand to sandy silt | 54 |
| 14.93 | 142.82 | 5.5442 | 31.350 | 3.882 | 6 | sandy silt to clayey silt | 71 |
| 15.09 | 226.54 | 7.7626 | 13.645 | 3.427 | 12 | sand to clayey sand (*) | 83 |
| 15.26 | 152.92 | 6.4411 | 4.084 | 4.212 | 12 | sand to clayey sand (*) | 77 |
| 15.42 | 100.85 | 4.7322 | 7.177 | 4.692 | 11 | very stiff fine grained (*) | 116 |
| 15.58 | 107.97 | 4.4347 | 14.751 | 4.107 | 11 | very stiff fine grained (*) | 93 |
| 15.75 | 81.08 | 4.2269 | 3.113 | 5.213 | 11 | very stiff fine grained (*) | 76 |
| 15.91 | 48.33 | 2.9201 | 4.017 | 6.042 | 3 | clay | 53 |
| 16.08 | 36.79 | 1.9161 | 6.675 | 5.207 | 3 | clay | 40 |
| 16.24 | 40.87 | 1.6097 | 5.931 | 3.938 | 4 | silty clay to clay | 26 |
| 16.40 | 41.96 | 1.6494 | 7.618 | 3.931 | 5 | clayey silt to silty clay | 20 |
| 16.57 | 41.87 | 1.6841 | 9.759 | 4.022 | 5 | clayey silt to silty clay | 20 |
| 16.73 | 43.43 | 1.6043 | 15.020 | 3.694 | 5 | clayey silt to silty clay | 21 |
| 16.90 | 42.60 | 1.5878 | 15.456 | 3.727 | 5 | clayey silt to silty clay | 20 |
| 17.06 | 37.80 | 1.5849 | 10.867 | 4.193 | 4 | silty clay to clay | 24 |
| 17.22 | 30.17 | 1.3142 | 7.562 | 4.355 | 4 | silty clay to clay | 21 |
| 17.39 | 28.70 | 1.0223 | 11.576 | 3.562 | 5 | clayey silt to silty clay | 15 |
| 17.55 | 32.41 | 1.0296 | 10.340 | 3.176 | 5 | clayey silt to silty clay | 15 |
| 17.72 | 31.60 | 0.9519 | 12.315 | 3.012 | 5 | clayey silt to silty clay | 15 |
| 17.88 | 30.52 | 0.8445 | 10.384 | 2.767 | 5 | clayey silt to silty clay | 15 |
| 18.04 | 29.72 | 1.0989 | 13.756 | 3.697 | 5 | clayey silt to silty clay | 15 |
| 18.21 | 31.19 | 1.1157 | 12.185 | 3.577 | 5 | clayey silt to silty clay | 15 |
| 18.37 | 31.05 | 1.0590 | 12.071 | 3.410 | 5 | clayey silt to silty clay | 15 |
| 18.54 | 28.41 | 1.1642 | 9.549 | 4.098 | 4 | silty clay to clay | 20 |
| 18.70 | 34.49 | 1.6040 | 8.372 | 4.651 | 4 | silty clay to clay | 21 |
| 18.86 | 37.28 | 1.7479 | 6.352 | 4.688 | 4 | silty clay to clay | 23 |
| 19.03 | 34.32 | 1.4031 | 6.165 | 4.088 | 4 | silty clay to clay | 22 |
| 19.19 | 33.65 | 1.1646 | 6.702 | 3.461 | 5 | clayey silt to silty clay | 17 |
| 19.36 | 36.42 | 1.1795 | 7.921 | 3.238 | 5 | clayey silt to silty clay | 19 |
| 19.52 | 50.31 | 1.5947 | 12.559 | 3.170 | 5 | clayey silt to silty clay | 23 |
| 19.69 | 54.66 | 1.8224 | 19.414 | 3.334 | 5 | clayey silt to silty clay | 26 |
| 19.85 | 54.96 | 1.8754 | 19.101 | 3.412 | 5 | clayey silt to silty clay | 26 |
| 20.01 | 52.37 | 1.8521 | 16.163 | 3.536 | 5 | clayey silt to silty clay | 25 |
| 20.18 | 46.10 | 1.5627 | 14.377 | 3.390 | 5 | clayey silt to silty clay | 22 |
| 20.34 | 38.93 | 1.4689 | 11.648 | 3.773 | 5 | clayey silt to silty clay | 19 |
| 20.51 | 35.22 | 1.3415 | 12.599 | 3.809 | 5 | clayey silt to silty clay | 18 |
| 20.67 | 40.92 | 1.5236 | 17.333 | 3.723 | 5 | clayey silt to silty clay | 20 |
| 20.83 | 49.16 | 2.0766 | 14.621 | 4.224 | 4 | silty clay to clay | 29 |
| 21.00 | 44.29 | 2.3741 | 8.899 | 5.360 | 3 | clay | 39 |
| 21.16 | 27.66 | 2.0913 | 4.485 | 7.560 | 3 | clay | 29 |
| 21.33 | 19.79 | 0.7677 | 1.559 | 3.878 | 3 | clay | 19 |
| 21.49 | 12.76 | 0.5564 | 1.791 | 4.360 | 4 | silty clay to clay | 11 |
| 21.65 | 18.83 | 0.6780 | 15.153 | 3.600 | 3 | clay | 19 |
| 21.82 | 27.44 | 1.3903 | 16.897 | 5.066 | 3 | clay | 28 |
| 21.98 | 39.28 | 2.0055 | 11.877 | 5.105 | 3 | clay | 34 |
| 22.15 | 39.44 | 2.2058 | 3.000 | 5.594 | 3 | clay | 38 |
| 22.31 | 41.33 | 2.0971 | 3.091 | 5.074 | 4 | silty clay to clay | 26 |
| 22.47 | 39.62 | 1.4976 | 1.219 | 3.780 | 4 | silty clay to clay | 23 |
| 22.64 | 28.72 | 1.5402 | 1.943 | 5.362 | 3 | clay | 33 |
| 22.80 | 36.46 | 2.1410 | 5.877 | 5.872 | 3 | clay | 33 |
| 22.97 | 39.47 | 2.5911 | 4.212 | 6.565 | 3 | clay | 38 |
| 23.13 | 42.43 | 2.4426 | 5.660 | 5.757 | 3 | clay | 42 |
| 23.29 | 48.57 | 2.3812 | 2.884 | 4.903 | 4 | silty clay to clay | 28 |
| 23.46 | 39.34 | 1.5918 | 1.150 | 4.046 | 3 | clay | 36 |
| 23.62 | 24.18 | 1.4180 | 2.695 | 5.863 | 3 | clay | 29 |
| 23.79 | 26.17 | 1.1695 | 4.254 | 4.468 | 3 | clay | 24 |
| 23.95 | 23.71 | 1.3948 | 2.909 | 5.884 | 3 | clay | 30 |
| 24.11 | 45.40 | 2.0007 | 5.264 | 4.407 | 4 | silty clay to clay | 26 |
| 24.28 | 51.08 | 1.9960 | 1.791 | 3.908 | 5 | clayey silt to silty clay | 26 |
| 24.44 | 67.45 | 2.7587 | 2.473 | 4.090 | 5 | clayey silt to silty clay | 30 |
| 24.61 | 69.37 | 1.5911 | 2.360 | 2.294 | 6 | sandy silt to clay ey silt | 23 |
| 24.77 | 43.14 | 1.2947 | 2.670 | 3.001 | 6 | sandy silt to clayey silt | 20 |
| 24.93 | 41.15 | 1.4061 | 9.525 | 3.417 | 5 | clayey silt to silty clay | 20 |
| 25.10 | 40.51 | 1.5177 | 13.530 | 3.746 | 5 | clayey silt to silty clay | 20 |
| 25.26 | 44.23 | 1.5296 | 13.882 | 3.458 | 5 | clayey silt to silty clay | 21 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25.43 | 44.34 | 1.6873 | 14.714 | 3.805 | 5 | clayey silt to silty clay | 22 |
| 25.59 | 46.09 | 1.8126 | 15.320 | 3.933 | 5 | clayey silt to silty clay | 22 |
| 25.75 | 46.38 | 1.9581 | 13.966 | 4.222 | 5 | clayey silt to silty clay | 23 |
| 25.92 | 47.92 | 1.9836 | 13.564 | 4.139 | 5 | clayey silt to silty clay | 23 |
| 26.08 | 48.41 | 2.0071 | 17.769 | 4.146 | 5 | clayey silt to silty clay | 23 |
| 26.25 | 47.36 | 1.7778 | 19.576 | 3.754 | 5 | clayey silt to silty clay | 23 |
| 26.41 | 45.72 | 1.6909 | 19.820 | 3.699 | 5 | clayey silt to silty clay | 22 |
| 26.57 | 45.31 | 1.7198 | 18.870 | 3.796 | 5 | clayey silt to silty clay | 22 |
| 26.74 | 43.20 | 1.6936 | 13.650 | 3.920 | 5 | clayey silt to silty clay | 20 |
| 26.90 | 37.54 | 1.4970 | 12.155 | 3.988 | 5 | clayey silt to silty clay | 18 |
| 27.07 | 32.70 | 1.2160 | 11.232 | 3.719 | 5 | clayey silt to silty clay | 16 |
| 27.23 | 29.89 | 0.9398 | 12.074 | 3.145 | 5 | clayey silt to silty clay | 15 |
| 27.40 | 28.74 | 0.9894 | 11.510 | 3.442 | 5 | clayey silt to silty clay | 14 |
| 27.56 | 28.92 | 0.9989 | 18.665 | 3.454 | 5 | clayey silt to silty clay | 14 |
| 27.72 | 27.31 | 1.1075 | 21.438 | 4.055 | 5 | clayey silt to silty clay | 15 |
| 27.89 | 35.40 | 1.2066 | 30.889 | 3.408 | 5 | clayey silt to silty clay | 16 |
| 28.05 | 38.96 | 1.1917 | 28.559 | 3.059 | 5 | clayey silt to silty clay | 19 |
| 28.22 | 41.32 | 1.3867 | 27.645 | 3.356 | 5 | clayey silt to silty clay | 20 |
| 28.38 | 44.64 | 1.5606 | 26.796 | 3.496 | 5 | clayey silt to silty clay | 22 |
| 28.54 | 48.28 | 1.8098 | 29.145 | 3.748 | 5 | clayey silt to silty clay | 23 |
| 28.71 | 47.55 | 1.8186 | 24.406 | 3.825 | 5 | clayey silt to silty clay | 22 |
| 28.87 | 43.36 | 1.6497 | 26.820 | 3.805 | 5 | clay ey silt to silty clay | 21 |
| 29.04 | 41.60 | 1.5267 | 27.549 | 3.670 | 5 | clayey silt to silty clay | 20 |
| 29.20 | 39.68 | 1.4777 | 22.446 | 3.724 | 5 | clayey silt to silty clay | 19 |
| 29.36 | 36.66 | 1.4581 | 20.222 | 3.977 | 5 | clayey silt to silty clay | 18 |
| 29.53 | 35.09 | 1.3816 | 13.796 | 3.937 | 5 | clayey silt to silty clay | 17 |
| 29.69 | 31.26 | 1.2536 | 15.345 | 4.010 | 4 | silty clay to clay | 20 |
| 29.86 | 28.59 | 1.1786 | 15.140 | 4.122 | 4 | silty clay to clay | 19 |
| 30.02 | 29.02 | 1.1894 | 14.567 | 4.098 | 4 | silty clay to clay | 19 |
| 30.18 | 29.35 | 1.2264 | 12.820 | 4.178 | 4 | silty clay to clay | 19 |
| 30.35 | 30.32 | 1.2879 | 12.998 | 4.248 | 4 | silty clay to clay | 19 |
| 30.51 | 30.90 | 1.3576 | 15.333 | 4.394 | 4 | silty clay to clay | 20 |
| 30.68 | 30.76 | 1.4073 | 12.904 | 4.575 | 4 | silty clay to clay | 20 |
| 30.84 | 29.61 | 1.1272 | 12.136 | 3.807 | 4 | silty clay to clay | 19 |
| 31.00 | 28.20 | 0.9316 | 15.214 | 3.304 | 5 | clayey silt to silty clay | 13 |
| 31.17 | 23.89 | 0.9170 | 17.801 | 3.838 | 5 | clayey silt to silty clay | 12 |
| 31.33 | 25.07 | 0.8984 | 15.470 | 3.583 | 4 | silty clay to clay | 15 |
| 31.50 | 22.40 | 0.9694 | 18.968 | 4.328 | 4 | silty clay to clay | 15 |
| 31.66 | 24.00 | 0.9649 | 19.850 | 4.020 | 4 | silty clay to clay | 15 |
| 31.82 | 24.39 | 0.9730 | 20.773 | 3.989 | 4 | silty clay to clay | 16 |
| 31.99 | 25.34 | 1.0903 | 24.909 | 4.303 | 4 | silty clay to clay | 18 |
| 32.15 | 32.15 | 1.2222 | 32.697 | 3.802 | 4 | silty clay to clay | 19 |
| 32.32 | 31.06 | 1.4174 | 28.076 | 4.563 | 4 | silty clay to clay | 20 |
| 32.48 | 30.79 | 1.5788 | 39.532 | 5.127 | 4 | silty clay to clay | 22 |
| 32.64 | 42.11 | 1.7687 | 52.468 | 4.200 | 4 | silty clay to clay | 26 |
| 32.81 | 45.80 | 1.6704 | 67.222 | 3.647 | 5 | clayey silt to silty clay | 20 |
| 32.97 | 37.61 | 1.5564 | 36.628 | 4.138 | 5 | clayey silt to silty clay | 20 |
| 33.14 | 36.94 | 1.4639 | 44.446 | 3.963 | 5 | clayey silt to silty clay | 18 |
| 33.30 | 36.94 | 1.4581 | 36.207 | 3.948 | 5 | clayey silt to silty clay | 18 |
| 33.46 | 36.65 | 1.3645 | 37.042 | 3.723 | 5 | clayey silt to silty clay | 18 |
| 33.63 | 37.16 | 1.3882 | 36.276 | 3.736 | 5 | clayey silt to silty clay | 18 |
| 33.79 | 37.76 | 1.5083 | 32.517 | 3.994 | 5 | clayey silt to silty clay | 18 |
| 33.96 | 39.00 | 1.6115 | 26.190 | 4.132 | 4 | silty clay to clay | 25 |
| 34.12 | 37.49 | 1.5792 | 23.951 | 4.213 | 4 | silty clay to clay | 24 |
| 34.28 | 36.95 | 1.5336 | 26.104 | 4.150 | 4 | silty clay to clay | 24 |
| 34.45 | 37.19 | 1.4904 | 30.507 | 4.007 | 4 | silty clay to clay | 24 |
| 34.61 | 35.60 | 1.4746 | 27.177 | 4.142 | 4 | silty clay to clay | 23 |
| 34.78 | 36.34 | 1.4822 | 25.062 | 4.079 | 4 | silty clay to clay | 23 |
| 34.94 | 36.59 | 1.5334 | 22.305 | 4.191 | 4 | silty clay to clay | 23 |
| 35.10 | 34.88 | 1.5306 | 19.579 | 4.389 | 4 | silty clay to clay | 22 |
| 35.27 | 32.62 | 1.4323 | 19.187 | 4.391 | 4 | silty clay to clay | 21 |
| 35.43 | 29.66 | 1.2812 | 20.278 | 4.319 | 4 | silty clay to clay | 19 |
| 35.60 | 27.89 | 1.1247 | 21.606 | 4.033 | 4 | silty clay to clay | 18 |
| 35.76 | 27.23 | 1.1343 | 20.852 | 4.166 | 4 | silty clay to clay | 17 |
| 35.93 | 25.12 | 1.0802 | 16.953 | 4.300 | 4 | silty clay to clay | 16 |
| 36.09 | 22.42 | 1.0023 | 16.603 | 4.470 | 4 | silty clay to clay | 15 |
| 36.25 | 22.15 | 0.9082 | 14.611 | 4.100 | 4 | silty clay to clay | 15 |
| 36.42 | 23.90 | 1.0199 | 19.855 | 4.267 | 4 | silty clay to clay | 17 |
| 36.58 | 31.77 | 1.2060 | 26.801 | 3.796 | 5 | clayey silt to silty clay | 15 |
| 36.75 | 40.05 | 1.4924 | 37.404 | 3.726 | 5 | clayey silt to silty clay | 18 |
| 36.91 | 42.23 | 1.8108 | 37.035 | 4.288 | 4 | silty clay to clay | 27 |
| 37.07 | 41.28 | 1.9063 | 34.833 | 4.618 | 4 | silty clay to clay | 27 |
| 37.24 | 40.16 | 1.8424 | 37.857 | 4.588 | 4 | silty clay to clay | 26 |
| 37.40 | 40.04 | 1.9014 | 36.850 | 4.749 | 4 | silty clay to clay | 27 |
| 37.57 | 45.10 | 2.2903 | 54.655 | 5.079 | 4 | silty clay to clay | 33 |
| 37.73 | 68.62 | 2.5739 | 57.535 | 3.751 | 5 | clayey silt to silty clay | 27 |
| 37.89 | 56.54 | 2.6541 | 20.535 | 4.694 | 5 | clayey silt to silty clay | 28 |
| 38.06 | 46.21 | 2.1875 | 28.971 | 4.733 | 4 | silty clay to clay | 32 |
| 38.22 | 45.14 | 1.9051 | 40.862 | 4.221 | 4 | silty clay to clay | 29 |
| 38.39 | 42.10 | 1.9307 | 31.096 | 4.586 | 4 | silty clay to clay | 27 |
| 38.55 | 36.95 | 1.7044 | 15.084 | 4.612 | 4 | silty clay to clay | 24 |
| 38.71 | 32.42 | 1.4212 | 24.616 | 4.384 | 4 | silty clay to clay | 23 |
| 38.88 | 39.11 | 1.5096 | 35.709 | 3.860 | 5 | clayey silt to silty clay | 20 |
| 39.04 | 51.57 | 1.9781 | 41.788 | 3.836 | 5 | clayey silt to silty clay | 23 |
| 39.21 | 53.71 | 2.3383 | 42.796 | 4.354 | 5 | clayey silt to silty clay | 26 |
| 39.37 | 54.80 | 2.4202 | 49.929 | 4.416 | 5 | clayey silt to silty clay | 27 |
| 39.53 | 56.21 | 2.3445 | 45.101 | 4.171 | 5 | clayey silt to silty clay | 27 |
| 39.70 | 54.44 | 2.4601 | 47.791 | 4.519 | 4 | silty clay to clay | 36 |
| 39.86 | 56.98 | 2.9939 | 47.392 | 5.255 | 4 | silty clay to clay | 37 |
| 40.03 | 61.73 | 2.6580 | 41.168 | 4.306 | 4 | silty clay to clay | 37 |
| 40.19 | 52.16 | 2.4583 | 42.894 | 4.713 | 4 | silty clay to clay | 36 |
| 40.35 | 52.99 | 2.4925 | 34.640 | 4.704 | 4 | silty clay to clay | 33 |
| 40.52 | 49.96 | 2.4109 | 34.601 | 4.825 | 4 | silty clay to clay | 33 |
| 40.68 | 50.38 | 2.4036 | 33.025 | 4.771 | 4 | silty clay to clay | 32 |
| 40.85 | 47.87 | 2.2500 | 28.936 | 4.700 | 4 | silty clay to clay | 30 |
| 41.01 | 43.78 | 2.1001 | 28.746 | 4.797 | 4 | silty clay to clay | 28 |
| 41.17 | 39.98 | 1.8022 | 28.727 | 4.508 | 4 | silty clay to clay | 26 |
| 41.34 | 36.58 | 1.5367 | 31.022 | 4.201 | 4 | silty clay to clay | 24 |
| 41.50 | 36.02 | 1.4627 | 26.104 | 4.060 | 4 | silty clay to clay | 23 |
| 41.67 | 35.07 | 1.5604 | 25.904 | 4.450 | 4 | silty clay to clay | 23 |
| 41.83 | 34.33 | 1.5064 | 25.805 | 4.388 | 4 | silty clay to clay | 22 |
| 41.99 | 33.50 | 1.4593 | 25.485 | 4.357 | 4 | silty clay to clay | 22 |
| 42.16 | 33.21 | 1.3991 | 24.224 | 4.213 | 4 | silty clay to clay | 21 |
| 42.32 | 31.53 | 1.3508 | 23.591 | 4.285 | 4 | silty clay to clay | 21 |
| 42.49 | 31.24 | 1.3299 | 23.714 | 4.257 | 4 | silty clay to clay | 20 |
| 42.65 | 30.92 | 1.3407 | 22.350 | 4.337 | 4 | silty clay to clay | 20 |
| 42.81 | 31.22 | 1.3469 | 23.685 | 4.314 | 4 | silty clay to clay | 20 |
| 42.98 | 31.82 | 1.2784 | 23.870 | 4.017 | 4 | silty clay to clay | 20 |
| 43.14 | 31.24 | 1.2897 | 25.121 | 4.128 | 4 | silty clay to clay | 20 |
| 43.31 | 30.80 | 1.2665 | 21.453 | 4.112 | 4 | silty clay to clay | 20 |
| 43.47 | 29.49 | 1.2840 | 21.771 | 4.353 | 4 | silty clay to clay | 19 |
| 43.64 | 29.44 | 1.3295 | 23.842 | 4.517 | 4 | silty clay to clay | 19 |
| 43.80 | 29.74 | 1.3514 | 24.490 | 4.544 | 4 | silty clay to clay | 20 |
| 43.96 | 31.68 | 1.3241 | 23.655 | 4.179 | 4 | silty clay to clay | 20 |
| 44.13 | 30.14 | 1.2231 | 30.436 | 4.058 | 4 | silty clay to clay | 20 |
| 44.29 | 31.55 | 1.3300 | 29.143 | 4.216 | 4 | silty clay to clay | 20 |
| 44.46 | 33.21 | 1.5049 | 24.805 | 4.532 | 4 | silty clay to clay | 21 |
| 44.62 | 32.30 | 1.5027 | 24.185 | 4.652 | 4 | silty clay to clay | 21 |
| 44.78 | 32.70 | 1.4698 | 30.163 | 4.494 | 4 | silty clay to clay | 21 |
| 44.95 | 33.87 | 1.5205 | 24.695 | 4.489 | 4 | silty clay to clay | 22 |
| 45.11 | 33.87 | 1.3921 | 29.219 | 4.110 | 4 | silty clay to clay | 22 |
| 45.28 | 33.47 | 1.3280 | 24.094 | 3.967 | 4 | silty clay to clay | 21 |
| 45.44 | 31.67 | 1.2470 | 21.544 | 3.938 | 4 | silty clay to clay | 20 |
| 45.60 | 27.83 | 1.0991 | 21.094 | 3.949 | 5 | clayey silt to silty clay | 14 |
| 45.77 | 25.64 | 0.8912 | 27.318 | 3.476 | 5 | clayey silt to silty clay | 13 |
| 45.93 | 26.32 | 0.8279 | 28.269 | 3.146 | 5 | clayey silt to silty clay | 13 |
| 46.10 | 27.79 | 0.8803 | 30.584 | 3.167 | 5 | clayey silt to silty clay | 13 |
| 46.26 | 28.28 | 0.9447 | 29.456 | 3.341 | 5 | clayey silt to silty clay | 14 |
| 46.42 | 29.34 | 1.0649 | 31.971 | 3.629 | 5 | clayey silt to silty clay | 14 |
| 46.59 | 30.23 | 1.1060 | 34.113 | 3.659 | 5 | clayey silt to silty clay | 15 |
| 46.75 | 31.03 | 1.0313 | 34.503 | 3.324 | 5 | clayey silt to silty clay | 15 |
| 46.92 | 31.25 | 1.0613 | 39.015 | 3.396 | 5 | clayey silt to silty clay | 15 |
| 47.08 | 31.89 | 1.2290 | 37.584 | 3.854 | 5 | clayey silt to silty clay | 15 |
| 47.24 | 29.87 | 1.1893 | 38.165 | 3.982 | 5 | clayey silt to silty clay | 15 |
| 47.41 | 30.58 | 1.0464 | 43.517 | 3.422 | 5 | clayey silt to silty clay | 15 |
| 47.57 | 29.93 | 0.9804 | 55.884 | 3.276 | 5 | clayey silt to silty clay | 15 |
| 47.74 | 29.74 | 0.9573 | 75.266 | 3.219 | 5 | clayey silt to silty clay | 15 |
| 47.90 | 29.65 | 0.9409 | 78.747 | 3.173 | 5 | clayey silt to silty clay | 15 |
| 48.06 | 28.51 | 0.8560 | 123.303 | 3.002 | 5 | clayey silt to silty clay | 14 |
| 48.23 | 27.19 | 0.8376 | 116.801 | 3.080 | 5 | clayey silt to silty clay | 14 |
| 48.39 | 26.17 | 0.8138 | 105.875 | 3.109 | 5 | clayey silt to silty clay | 13 |
| 48.56 | 26.00 | 0.7818 | 103.680 | 3.007 | 5 | clayey silt to silty clay | 13 |
| 48.72 | 26.81 | 0.8268 | 107.308 | 3.084 | 5 | clayey silt to silty clay | 14 |
| 48.88 | 28.47 | 0.9415 | 100.806 | 3.307 | 5 | clayey silt to silty clay | 15 |
| 49.05 | 32.30 | 1.1028 | 102.582 | 3.414 | 5 | clayey silt to silty clay | 16 |
| 49.21 | 31.94 | 1.1601 | 117.478 | 3.633 | 5 | clayey silt to silty clay | 16 |
| 49.38 | 32.83 | 1.1157 | 126.954 | 3.399 | 5 | clayey silt to silty clay | 16 |
| 49.54 | 32.17 | 1.1321 | 118.720 | 3.519 | 5 | clayey silt to silty clay | 16 |
| 49.70 | 32.61 | 1.1674 | 116.449 | 3.580 | 5 | clayey silt to silty clay | 17 |
| 49.87 | 36.62 | 1.2195 | 89.000 | 3.330 | 5 | clayey silt to silty clay | 18 |
| 50.03 | 39.25 | 1.5709 | 98.232 | 4.002 | 5 | clayey silt to silty clay | 20 |
| 50.20 | 43.53 | 1.7331 | 79.712 | 3.982 | 5 | clayey silt to silty clay | 21 |
| 50.36 | 46.93 | 1.7857 | 62.281 | 3.805 | 5 | clayey silt to silty clay | 22 |
| 50.52 | 43.09 | 1.7137 | 65.756 | 3.977 | 5 | clayey silt to silty clay | 22 |
| 50.69 | 42.94 | 1.7147 | 63.835 | 3.994 | 5 | clayey silt to silty clay | 20 |
| 50.85 | 39.31 | 1.6439 | 57.084 | 4.182 | 5 | clayey silt to silty clay | 19 |
| 51.02 | 34.85 | 1.4750 | 56.547 | 4.233 | 4 | silty clay to clay | 23 |
| 51.18 | 32.29 | 1.2732 | 52.705 | 3.944 | 4 | silty clay to clay | 21 |
| 51.35 | 30.57 | 1.1903 | 52.084 | 3.893 | 5 | clayey silt to silty clay | 15 |
| 51.51 | 30.08 | 1.1535 | 49.281 | 3.834 | 5 | clayey silt to silty clay | 15 |
| 51.67 | 29.07 | 1.0998 | 48.904 | 3.784 | 5 | clayey silt to silty clay | 14 |
| 51.84 | 28.72 | 1.0975 | 47.719 | 3.821 | 5 | clayey silt to silty clay | 14 |
| 52.00 | 28.82 | 1.1804 | 47.685 | 4.096 | 4 | silty clay to clay | 19 |
| 52.17 | 28.89 | 1.1699 | 50.705 | 4.050 | 4 | silty clay to clay | 19 |
| 52.33 | 27.27 | 1.1386 | 48.916 | 4.175 | 4 | silty clay to clay | 18 |
| 52.49 | 24.83 | 0.9647 | 48.301 | 3.885 | 4 | silty clay to clay | 17 |
| 52.66 | 24.00 | 0.8711 | 50.998 | 3.629 | 5 | clayey silt to silty clay | 12 |
| 52.82 | 24.70 | 0.8209 | 51.596 | 3.323 | 5 | clayey silt to silty clay | 12 |
| 52.99 | 25.81 | 0.8948 | 53.759 | 3.467 | 5 | clayey silt to silty clay | 13 |
| 53.15 | 26.65 | 0.9885 | 54.461 | 3.709 | 5 | clayey silt to silty clay | 13 |
| 53.31 | 27.55 | 0.9996 | 58.256 | 3.628 | 5 | clayey silt to silty clay | 13 |
| 53.48 | 27.88 | 1.0216 | 60.796 | 3.665 | 5 | clayey silt to silty clay | 14 |
| 53.64 | 28.73 | 1.0020 | 62.429 | 3.488 | 5 | clayey silt to silty clay | 14 |
| 53.81 | 28.94 | 1.0163 | 61.301 | 3.512 | 5 | clayey silt to silty clay | 14 |
| 53.97 | 28.45 | 0.9728 | 63.205 | 3.420 | 5 | clayey silt to silty clay | 14 |
| 54.13 | 27.79 | 0.9081 | 64.384 | 3.267 | 5 | clayey silt to silty clay | 14 |
| 54.30 | 28.21 | 0.8327 | 70.254 | 2.952 | 5 | clayey silt to silty clay | 14 |
| 54.46 | 28.22 | 0.8547 | 72.584 | 3.029 | 5 | clayey silt to silty clay | 14 |
| 54.63 | 28.31 | 0.8739 | 74.719 | 3.087 | 5 | clayey silt to silty clay | 14 |
| 54.79 | 28.53 | 0.8396 | 76.788 | 2.943 | 5 | clayey silt to silty clay | 14 |
| 54.95 | 29.54 | 0.9336 | 78.485 | 3.160 | 5 | clayey silt to silty clay | 15 |
| 55.12 | 29.62 | 0.8964 | 71.412 | 3.027 | 5 | clayey silt to silty clay | 14 |
| 55.28 | 26.98 | 0.8259 | 79.722 | 3.062 | 5 | clayey silt to silty clay | 14 |
| 55.45 | 27.09 | 0.7619 | 81.584 | 2.812 | 5 | clayey silt to silty clay | 14 |
| 55.61 | 28.41 | 0.8337 | 82.387 | 2.935 | 5 | clayey silt to silty clay | 14 |
| 55.77 | 30.58 | 0.8759 | 83.202 | 2.864 | 6 | sandy silt to clayey silt | 12 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 55.94 | 31.24 | 0.8761 | 88.042 | 2.804 | 6 | sandy silt to clayey silt | 12 |
| 56.10 | 31.77 | 0.8758 | 91.471 | 2.757 | 6 | sandy silt to clayey silt | 13 |
| 56.27 | 32.51 | 0.8879 | 96.623 | 2.731 | 6 | sandy silt to clayey silt | 13 |
| 56.43 | 32.81 | 0.7818 | 101.037 | 2.383 | 6 | sandy silt to clayey silt | 13 |
| 56.59 | 34.04 | 0.8628 | 104.385 | 2.535 | 6 | sandy silt to clayey silt | 13 |
| 56.76 | 32.11 | 0.8717 | 99.653 | 2.715 | 6 | sandy silt to clayey silt | 14 |
| 56.92 | 35.71 | 0.9198 | 127.877 | 2.576 | 6 | sandy silt to clayey silt | 14 |
| 57.09 | 35.89 | 1.2588 | 131.488 | 3.508 | 5 | clayey silt to silty clay | 19 |
| 57.25 | 39.98 | 1.7845 | 209.070 | 4.463 | 5 | clayey silt to silty clay | 21 |
| 57.41 | 48.62 | 2.4213 | 167.323 | 4.980 | 4 | silty clay to clay | 33 |
| 57.58 | 58.87 | 3.1864 | 164.821 | 5.412 | 11 | very stiff fine grained (*) | 57 |
| 57.74 | 63.47 | 4.7297 | 119.316 | 7.452 | 11 | very stiff fine grained (*) | 68 |
| 57.91 | 87.65 | 4.6489 | 29.212 | 5.304 | 11 | very stiff fine grained (*) | 67 |
| 58.07 | 57.55 | 3.1646 | 23.064 | 5.499 | 4 | silty clay to clay | 40 |
| 58.23 | 38.70 | 1.4332 | 77.675 | 3.704 | 5 | clayey silt to silty clay | 22 |
| 58.40 | 39.16 | 1.0946 | 76.648 | 2.795 | 5 | clayey silt to silty clay | 19 |
| 58.56 | 38.70 | 1.1406 | 82.357 | 2.948 | 6 | sandy silt to clayey silt | 15 |
| 58.73 | 38.80 | 1.1436 | 84.956 | 2.947 | 6 | sandy silt to clayey silt | 15 |
| 58.89 | 40.01 | 1.2406 | 86.192 | 3.101 | 6 | sandy silt to clayey silt | 16 |
| 59.06 | 41.32 | 1.3143 | 88.355 | 3.181 | 5 | clayey silt to silty clay | 20 |
| 59.22 | 40.71 | 1.3467 | 90.993 | 3.308 | 5 | clayey silt to silty clay | 20 |
| 59.38 | 40.94 | 1.2604 | 100.801 | 3.079 | 6 | sandy silt to clayey silt | 17 |
| 59.55 | 44.08 | 1.3342 | 101.648 | 3.027 | 5 | clayey silt to silty clay | 21 |
| 59.71 | 43.96 | 2.0904 | 107.894 | 4.755 | 5 | clayey silt to silty clay | 24 |
| 59.88 | 55.37 | 2.5763 | 110.971 | 4.653 | 4 | silty clay to clay | 32 |
| 60.04 | 46.83 | 2.2627 | 30.919 | 4.832 | 4 | silty clay to clay | 30 |
| 60.20 | 38.38 | 1.2416 | 43.517 | 3.235 | 5 | clayey silt to silty clay | 19 |
| 60.37 | 32.84 | 0.9501 | 33.892 | 2.893 | 5 | clayey silt to silty clay | 16 |
| 60.53 | 29.48 | 0.8962 | 43.081 | 3.040 | 6 | sandy silt to clayey silt | 12 |
| 60.70 | 30.21 | 0.7742 | 41.394 | 2.562 | 6 | sandy silt to clayey silt | 12 |
| 60.86 | 30.58 | 0.7723 | 40.108 | 2.526 | 6 | sandy silt to clayey silt | 12 |
| 61.02 | 30.00 | 0.8616 | 41.010 | 2.872 | 5 | clayey silt to silty clay | 15 |
| 61.19 | 30.76 | 1.2818 | 46.138 | 4.167 | 4 | silty clay to clay | 22 |
| 61.35 | 40.85 | 1.9853 | 55.409 | 4.860 | 4 | silty clay to clay | 27 |
| 61.52 | 54.79 | 2.1353 | 51.916 | 3.897 | 4 | silty clay to clay | 30 |
| 61.68 | 41.13 | 1.7225 | 31.340 | 4.188 | 5 | clayey silt to silty clay | 21 |
| 61.84 | 34.38 | 1.1178 | 60.934 | 3.251 | 5 | clayey silt to silty clay | 18 |
| 62.01 | 33.53 | 0.9320 | 51.980 | 2.780 | 5 | clayey silt to silty clay | 16 |
| 62.17 | 31.73 | 0.9231 | 51.205 | 2.909 | 6 | sandy silt to clayey silt | 12 |
| 62.34 | 28.40 | 0.8490 | 49.173 | 2.989 | 5 | clayey silt to silty clay | 15 |
| 62.50 | 28.65 | 0.7558 | 59.485 | 2.638 | 6 | sandy silt to clayey silt | 11 |
| 62.66 | 29.80 | 0.7655 | 55.042 | 2.569 | 6 | sandy silt to clayey silt | 12 |
| 62.83 | 29.59 | 0.8020 | 56.283 | 2.710 | 6 | sandy silt to clayey silt | 12 |
| 62.99 | 28.37 | 0.8811 | 52.429 | 3.106 | 5 | clayey silt to silty clay | 14 |
| 63.16 | 25.97 | 0.8248 | 49.988 | 3.175 | 5 | clayey silt to silty clay | 13 |
| 63.32 | 24.50 | 0.7992 | 57.907 | 3.262 | 5 | clayey silt to silty clay | 12 |
| 63.48 | 22.49 | 0.6725 | 58.613 | 2.990 | 5 | clayey silt to silty clay | 11 |
| 63.65 | 21.84 | 0.6315 | 63.185 | 2.892 | 5 | clayey silt to silty clay | 11 |
| 63.81 | 23.28 | 0.6538 | 64.367 | 2.809 | 5 | clayey silt to silty clay | 11 |
| 63.98 | 24.08 | 0.6957 | 66.746 | 2.890 | 5 | clayey silt to silty clay | 13 |
| 64.14 | 28.04 | 0.7083 | 81.806 | 2.526 | 5 | clayey silt to silty clay | 13 |
| 64.30 | 26.86 | 1.0423 | 69.446 | 3.880 | 5 | clayey silt to silty clay | 16 |
| 64.47 | 40.32 | 1.5935 | 79.660 | 3.952 | 4 | silty clay to clay | 22 |
| 64.63 | 33.37 | 2.2060 | 41.973 | 6.611 | 4 | silty clay to clay | 29 |
| 64.80 | 58.57 | 2.4643 | 67.301 | 4.207 | 4 | silty clay to clay | 31 |
| 64.96 | 51.17 | 1.7859 | 11.517 | 3.490 | 5 | clayey silt to silty clay | 23 |
| 65.12 | 31.36 | 1.1411 | 38.345 | 3.639 | 5 | clayey silt to silty clay | 18 |
| 65.29 | 26.95 | 0.7026 | 49.680 | 2.607 | 5 | clayey silt to silty clay | 13 |
| 65.45 | 21.89 | 0.6358 | 37.488 | 2.904 | 5 | clayey silt to silty clay | 11 |
| 65.62 | 18.43 | 0.4547 | 36.975 | 2.467 | 5 | clayey silt to silty clay | 9 |
| 65.78 | 16.74 | 0.3252 | 40.554 | 1.942 | 5 | clayey silt to silty clay | 8 |
| 65.94 | 16.25 | 0.3265 | 43.813 | 2.010 | 5 | clayey silt to silty clay | 8 |
| 66.11 | 17.33 | 0.3892 | 45.611 | 2.246 | 5 | clayey silt to silty clay | 8 |
| 66.27 | 17.15 | 0.4044 | 40.443 | 2.357 | 5 | clayey silt to silty clay | 8 |
| 66.44 | 15.40 | 0.4007 | 35.958 | 2.603 | 5 | clayey silt to silty clay | 8 |
| 66.60 | 13.16 | 0.3932 | 41.884 | 2.988 | 5 | clayey silt to silty clay | 7 |
| 66.77 | 11.16 | 0.3114 | 50.148 | 2.791 | 4 | silty clay to clay | 8 |
| 66.93 | 10.20 | 0.3477 | 52.705 | 3.411 | 5 | clayey silt to silty clay | 6 |
| 67.09 | 16.57 | 0.3919 | 64.660 | 2.365 | 5 | clayey silt to silty clay | 9 |
| 67.26 | 23.76 | 0.4936 | 74.513 | 2.077 | 6 | sandy silt to clayey silt | 9 |
| 67.42 | 27.51 | 0.6696 | 92.520 | 2.434 | 6 | sandy silt to clayey silt | 11 |
| 67.59 | 27.97 | 0.7921 | 108.722 | 2.832 | 6 | sandy silt to clayey silt | 11 |
| 67.75 | 27.11 | 0.7555 | 119.941 | 2.786 | 6 | sandy silt to clayey silt | 11 |
| 67.91 | 28.05 | 0.6836 | 129.269 | 2.437 | 6 | sandy silt to clayey silt | 11 |
| 68.08 | 28.27 | 0.6947 | 142.927 | 2.457 | 6 | sandy silt to clayey silt | 12 |
| 68.24 | 32.32 | 0.7694 | 151.569 | 2.381 | 6 | sandy silt to clayey silt | 13 |
| 68.41 | 36.18 | 0.9444 | 148.702 | 2.610 | 6 | sandy silt to clayey silt | 14 |
| 68.57 | 35.21 | 0.8298 | 126.050 | 2.357 | 6 | sandy silt to clayey silt | 14 |
| 68.73 | 33.10 | 0.7488 | 137.498 | 2.262 | 6 | sandy silt to clayey silt | 13 |
| 68.90 | 29.12 | 0.7281 | 158.747 | 2.500 | 6 | sandy silt to clayey silt | 13 |
| 69.06 | 29.53 | 0.7634 | 163.198 | 2.585 | 6 | sandy silt to clayey silt | 12 |
| 69.23 | 29.85 | 0.8297 | 165.207 | 2.779 | 6 | sandy silt to clayey silt | 12 |
| 69.39 | 30.96 | 0.8532 | 167.764 | 2.756 | 6 | sandy silt to clayey silt | 13 |
| 69.55 | 33.92 | 0.8544 | 154.978 | 2.519 | 6 | sandy silt to clayey silt | 13 |
| 69.72 | 30.53 | 0.9136 | 182.274 | 2.992 | 6 | sandy silt to clayey silt | 13 |
| 69.88 | 32.53 | 1.0017 | 182.387 | 3.079 | 6 | sandy silt to clayey silt | 14 |
| 70.05 | 35.73 | 1.1395 | 184.269 | 3.189 | 5 | clayey silt to silty clay | 18 |
| 70.21 | 39.04 | 1.3096 | 170.311 | 3.355 | 5 | clayey silt to silty clay | 20 |
| 70.37 | 41.51 | 1.8441 | 178.237 | 4.442 | 5 | clayey silt to silty clay | 25 |
| 70.54 | 66.02 | 2.2726 | 195.161 | 3.442 | 5 | clayey silt to silty clay | 29 |
| 70.70 | 66.18 | 2.7324 | 71.074 | 4.129 | 5 | clayey silt to silty clay | 33 |
| 70.87 | 67.06 | 3.6495 | 139.077 | 5.442 | 11 | very stiff fine grained (*) | 76 |
| 71.03 | 100.75 | 5.4679 | 37.589 | 5.427 | 11 | very stiff fine grained (*) | 100 |
| 71.19 | 143.17 | 6.3552 | 33.318 | 4.439 | 12 | sand to clayey sand (*) | 74 |
| 71.36 | 216.35 | 5.5030 | 28.288 | 2.544 | 7 | silty sand to sandy silt | 70 |
| 71.52 | 293.91 | 4.3853 | 8.224 | 1.492 | 8 | sand to silty sand | 67 |
| 71.69 | 331.13 | 5.7348 | 4.672 | 1.732 | 8 | sand to silty sand | 79 |
| 71.85 | 370.04 | 5.9904 | 9.946 | 1.619 | 8 | sand to silty sand | 87 |
| 72.01 | 393.43 | 6.2813 | 5.842 | 1.597 | 8 | sand to silty sand | 91 |
| 72.18 | 382.20 | 10.0199 | 8.670 | 2.622 | 8 | sand to silty sand | 91 |
| 72.34 | 361.25 | 10.2899 | 8.175 | 2.848 | 8 | sand to silty sand | 90 |
| 72.51 | 381.12 | 6.4143 | 23.044 | 1.683 | 8 | sand to silty sand | 96 |
| 72.67 | 458.82 | 6.0381 | 1.993 | 1.316 | 9 | sand | 83 |
| 72.83 | 464.45 | 7.1879 | 4.926 | 1.548 | 8 | sand to silty sand | 111 |
| 73.00 | 463.18 | 9.9010 | 12.067 | 2.138 | 8 | sand to silty sand | 108 |
| 73.16 | 426.60 | 6.6209 | 4.901 | 1.552 | 8 | sand to silty sand | 99 |
| 73.33 | 353.23 | 6.6624 | 2.840 | 1.886 | 8 | sand to silty sand | 78 |
| 73.49 | 196.06 | 5.2056 | -0.310 | 2.655 | 7 | silty sand to sandy silt | 69 |
| 73.65 | 97.12 | 3.1064 | 0.736 | 3.198 | 6 | sandy silt to clayey silt | 45 |
| 73.82 | 56.79 | 1.3196 | 58.801 | 2.324 | 6 | sandy silt to clayey silt | 26 |
| 73.98 | 48.26 | 0.7137 | 57.860 | 1.479 | 7 | silty sand to sandy silt | 16 |
| 74.15 | 46.27 | 0.6926 | 45.852 | 1.497 | 7 | silty sand to sandy silt | 15 |
| 74.31 | 43.81 | 0.6960 | 35.838 | 1.589 | 7 | silty sand to sandy silt | 14 |
| 74.48 | 43.67 | 0.7187 | 35.867 | 1.646 | 7 | silty sand to sandy silt | 14 |
| 74.64 | 43.56 | 0.6970 | 35.695 | 1.600 | 7 | silty sand to sandy silt | 14 |
| 74.80 | 43.18 | 0.6648 | 35.254 | 1.540 | 7 | silty sand to sandy silt | 14 |
| 74.97 | 43.46 | 0.6982 | 36.180 | 1.607 | 7 | silty sand to sandy silt | 14 |
| 75.13 | 44.41 | 0.6879 | 35.682 | 1.549 | 7 | silty sand to sandy silt | 14 |
| 75.30 | 44.95 | 0.2387 | 39.953 | 0.531 | 6 | sandy silt to clayey silt | 18 |
| 75.46 | 46.79 | 1.7817 | 37.259 | 3.808 | 6 | sandy silt to clayey silt | 22 |
| 75.62 | 82.37 | 3.2179 | 70.148 | 3.907 | 5 | clayey silt to silty clay | 33 |
| 75.79 | 76.43 | 3.0629 | 8.845 | 4.007 | 5 | clayey silt to silty clay | 33 |
| 75.95 | 48.19 | 2.0220 | 44.397 | 4.196 | 5 | clayey silt to silty clay | 27 |
| 76.12 | 40.39 | 1.8199 | 50.591 | 4.506 | 4 | silty clay to clay | 31 |
| 76.28 | 56.84 | 2.5258 | 74.042 | 4.444 | 5 | clayey silt to silty clay | 28 |
| 76.44 | 74.10 | 1.6740 | 30.131 | 2.259 | 6 | sandy silt to clayey silt | 24 |
| 76.61 | 51.39 | 1.3823 | 47.700 | 2.690 | 6 | sandy silt to clayey silt | 22 |
| 76.77 | 43.38 | 1.0044 | 51.456 | 2.315 | 6 | sandy silt to clayey silt | 18 |
| 76.94 | 43.39 | 1.2184 | 57.153 | 2.808 | 6 | sandy silt to clayey silt | 17 |
| 77.10 | 44.73 | 1.2657 | 48.759 | 2.830 | 6 | sandy silt to clayey silt | 18 |
| 77.26 | 46.91 | 1.3979 | 54.875 | 2.980 | 6 | sandy silt to clayey silt | 18 |
| 77.43 | 47.70 | 1.5561 | 53.517 | 3.262 | 6 | sandy silt to clayey silt | 18 |
| 77.59 | 47.75 | 1.5734 | 51.214 | 3.295 | 6 | sandy silt to clayey silt | 19 |
| 77.76 | 47.45 | 1.3995 | 60.190 | 2.949 | 6 | sandy silt to clayey silt | 19 |
| 77.92 | 47.42 | 1.3653 | 56.882 | 2.879 | 6 | sandy silt to clayey silt | 18 |
| 78.08 | 47.27 | 1.3586 | 62.719 | 2.874 | 6 | sandy silt to clayey silt | 18 |
| 78.25 | 45.28 | 1.3636 | 60.000 | 3.012 | 6 | sandy silt to clayey silt | 18 |
| 78.41 | 45.32 | 1.3266 | 57.847 | 2.927 | 6 | sandy silt to clayey silt | 18 |
| 78.58 | 45.09 | 1.2117 | 54.409 | 2.687 | 6 | sandy silt to clayey silt | 18 |
| 78.74 | 44.91 | 1.1452 | 57.966 | 2.550 | 6 | sandy silt to clayey silt | 17 |
| 78.90 | 43.43 | 1.0172 | 53.673 | 2.342 | 6 | sandy silt to clayey silt | 17 |
| 79.07 | 42.09 | 1.0749 | 58.717 | 2.554 | 6 | sandy silt to clayey silt | 17 |
| 79.23 | 41.75 | 1.0316 | 61.658 | 2.471 | 6 | sandy silt to clayey silt | 17 |
| 79.40 | 43.02 | 1.0812 | 78.559 | 2.513 | 6 | sandy silt to clayey silt | 17 |
| 79.56 | 45.77 | 1.1131 | 72.059 | 2.432 | 6 | sandy silt to clayey silt | 17 |
| 79.72 | 43.84 | 0.9334 | 65.456 | 2.129 | 6 | sandy silt to clayey silt | 17 |
| 79.89 | 41.28 | 1.7059 | 85.136 | 4.133 | 6 | sandy silt to clayey silt | 21 |
| 80.05 | 72.56 | 2.1434 | 130.621 | 2.954 | 7 | silty sand to sandy silt | 37 |
| 80.22 | 226.32 | 4.2312 | 10.264 | 1.870 | 7 | silty sand to sandy silt | 53 |
| 80.38 | 193.46 | 6.8150 | 3.328 | 3.523 | 6 | sandy silt to clayey silt | 71 |
| 80.54 | 132.49 | 6.3375 | 10.172 | 4.784 | 11 | very stiff fine grained (*) | 126 |
| 80.71 | 67.85 | 3.2285 | 20.111 | 4.758 | 5 | clayey silt to silty clay | 40 |
| 80.87 | 49.58 | 1.6021 | 96.114 | 3.231 | 5 | clayey silt to silty clay | 28 |
| 81.04 | 52.59 | 1.5391 | 58.808 | 2.927 | 6 | sandy silt to clayey silt | 20 |
| 81.20 | 51.00 | 1.6063 | 58.744 | 3.149 | 6 | sandy silt to clayey silt | 20 |
| 81.36 | 50.65 | 1.5442 | 56.239 | 3.049 | 6 | sandy silt to clayey silt | 20 |
| 81.53 | 49.61 | 1.5508 | 62.488 | 3.126 | 6 | sandy silt to clayey silt | 19 |
| 81.69 | 49.73 | 1.5344 | 61.379 | 3.085 | 6 | sandy silt to clayey silt | 19 |
| 81.86 | 50.29 | 1.5943 | 59.335 | 3.170 | 6 | sandy silt to clayey silt | 19 |
| 82.02 | 49.61 | 1.5929 | 66.254 | 3.211 | 6 | sandy silt to clayey silt | 19 |
| 82.19 | 50.22 | 1.3009 | 56.623 | 2.591 | 6 | sandy silt to clayey silt | 19 |
| 82.35 | 50.02 | 1.6868 | 68.461 | 3.372 | 5 | clayey silt to silty clay | 23 |
| 82.51 | 41.86 | 1.8246 | 54.360 | 4.359 | 5 | clayey silt to silty clay | 23 |
| 82.68 | 51.72 | 1.8215 | 59.180 | 3.522 | 5 | clayey silt to silty clay | 23 |
| 82.84 | 50.55 | 1.7451 | 57.552 | 3.452 | 5 | clayey silt to silty clay | 25 |
| 83.01 | 49.06 | 1.5644 | 63.040 | 3.189 | 5 | clayey silt to silty clay | 24 |
| 83.17 | 49.07 | 1.6266 | 62.830 | 3.315 | 5 | clayey silt to silty clay | 24 |
| 83.33 | 51.52 | 1.7035 | 49.732 | 3.307 | 5 | clayey silt to silty clay | 25 |
| 83.50 | 51.69 | 1.9118 | 58.990 | 3.699 | 5 | clayey silt to silty clay | 25 |
| 83.66 | 50.89 | 1.8369 | 64.636 | 3.609 | 5 | clayey silt to silty clay | 25 |
| 83.83 | 50.69 | 1.8301 | 67.365 | 3.610 | 5 | clayey silt to silty clay | 25 |
| 83.99 | 53.53 | 2.2558 | 66.389 | 4.214 | 4 | silty clay to clay | 40 |
| 84.15 | 82.56 | 4.6196 | 102.486 | 5.596 | 11 | very stiff fine grained (*) | 117 |
| 84.32 | 229.16 | 7.6064 | 21.515 | 3.319 | 12 | sand to clayey sand (*) | 95 |
| 84.48 | 280.22 | 8.1784 | 13.953 | 2.919 | 7 | silty sand to sandy silt | 90 |
| 84.65 | 335.63 | 7.0190 | 14.411 | 2.091 | 8 | sand to silty sand | 81 |
| 84.81 | 402.30 | 7.0866 | 8.850 | 1.762 | 8 | sand to silty sand | 90 |
| 84.97 | 393.03 | 7.0950 | 4.569 | 1.805 | 8 | sand to silty sand | 95 |
| 85.14 | 390.25 | 8.4833 | 9.847 | 2.174 | 8 | sand to silty sand | 94 |
| 85.30 | 390.83 | 8.0502 | 11.658 | 2.060 | 8 | sand to silty sand | 91 |
| 85.47 | 364.29 | 4.0619 | 7.387 | 1.115 | 8 | sand to silty sand | 87 |
| 85.63 | 333.87 | 8.2891 | 9.919 | 2.483 | 8 | sand to silty sand | 76 |
| 85.79 | 252.23 | 9.5492 | 3.813 | 3.786 | 12 | sand to clayey sand (*) | 109 |
| 85.96 | 165.31 | 11.7813 | 28.914 | 7.127 | 11 | very stiff fine grained (*) | 207 |
| 86.12 | 266.03 | -32768 | 40.990 | -32768 | 0 | <out of range> | 0 |

# CPT Data
# Ausra Carrizo Solar Project

Data File:CPT 4 6/21/2007 5:12:57 PM
Operator:Doug Location:PG&E Solar
Cone ID:DSG0369 Job Number:297
Customer: PG&E Solar Project Units:

| Depth (ft) | Qc TSF | Fs TSF | Pw PSI | Fs/Qc (%) | Zone | Soil Behavior Type UBC-1983 | SPT N* 60% Hammer |
|---|---|---|---|---|---|---|---|
| 0.16 | 13.36 | 0.2811 | 1.200 | 2.105 | 6 | sandy silt to clayey silt | 9 |
| 0.33 | 60.17 | 0.7807 | 2.781 | 1.298 | 7 | silty sand to sandy silt | 20 |
| 0.49 | 114.79 | 1.2181 | 4.167 | 1.061 | 7 | silty sand to sandy silt | 28 |
| 0.66 | 90.88 | 1.9563 | 1.968 | 2.153 | 7 | silty sand to sandy silt | 31 |
| 0.82 | 88.38 | 2.6677 | 2.357 | 3.018 | 6 | sandy silt to clayey silt | 33 |
| 0.98 | 75.45 | 2.7006 | 1.924 | 3.579 | 6 | sandy silt to clayey silt | 29 |
| 1.15 | 65.21 | 2.5827 | 1.305 | 3.961 | 5 | clayey silt to silty clay | 33 |
| 1.31 | 63.87 | 2.3833 | 0.850 | 3.731 | 5 | clayey silt to silty clay | 29 |
| 1.48 | 55.30 | 2.3006 | 0.741 | 4.160 | 5 | clayey silt to silty clay | 27 |
| 1.64 | 47.29 | 2.0038 | 0.645 | 4.237 | 5 | clayey silt to silty clay | 22 |
| 1.80 | 37.69 | 1.3944 | 0.475 | 3.700 | 5 | clayey silt to silty clay | 19 |
| 1.97 | 31.17 | 1.0281 | 0.478 | 3.298 | 5 | clayey silt to silty clay | 16 |
| 2.13 | 31.64 | 1.2932 | 1.108 | 4.087 | 4 | silty clay to clay | 21 |
| 2.30 | 33.55 | 1.4541 | 0.860 | 4.335 | 4 | silty clay to clay | 22 |
| 2.46 | 38.86 | 1.5901 | 0.865 | 4.092 | 4 | silty clay to clay | 26 |
| 2.62 | 47.43 | 1.8456 | 1.456 | 3.891 | 5 | clayey silt to silty clay | 23 |
| 2.79 | 55.42 | 2.1944 | 1.187 | 3.960 | 5 | clayey silt to silty clay | 27 |
| 2.95 | 68.13 | 2.5372 | 0.909 | 3.724 | 5 | clayey silt to silty clay | 33 |
| 3.12 | 85.09 | 2.9239 | 1.214 | 3.436 | 6 | sandy silt to clayey silt | 34 |
| 3.28 | 110.81 | 3.1956 | 0.759 | 2.884 | 6 | sandy silt to clayey silt | 42 |
| 3.44 | 135.25 | 2.8432 | 0.613 | 2.102 | 7 | silty sand to sandy silt | 43 |
| 3.61 | 155.63 | 2.5014 | 0.325 | 1.607 | 8 | sand to silty sand | 37 |
| 3.77 | 172.24 | 2.0045 | 1.771 | 1.164 | 8 | sand to silty sand | 42 |
| 3.94 | 199.45 | 2.5308 | 2.017 | 1.269 | 9 | sand | 39 |
| 4.10 | 241.07 | 2.9132 | 2.150 | 1.208 | 8 | sand to silty sand | 54 |
| 4.27 | 230.56 | 3.9360 | 1.433 | 1.707 | 8 | sand to silty sand | 56 |
| 4.43 | 227.14 | 5.6093 | 1.138 | 2.470 | 7 | silty sand to sandy silt | 67 |
| 4.59 | 173.66 | 7.1967 | 3.633 | 4.144 | 12 | sand to clayey sand (*) | 89 |
| 4.76 | 158.04 | 7.9188 | 3.470 | 5.011 | 11 | very stiff fine grained (*) | 157 |
| 4.92 | 158.93 | 7.9806 | 4.554 | 5.021 | 11 | very stiff fine grained (*) | 158 |
| 5.09 | 179.18 | 7.4789 | 3.993 | 4.174 | 11 | very stiff fine grained (*) | 180 |
| 5.25 | 225.95 | 7.8838 | 1.244 | 3.489 | 12 | sand to clayey sand (*) | 105 |
| 5.41 | 253.13 | 8.6254 | 2.042 | 3.407 | 12 | sand to clayey sand (*) | 118 |
| 5.58 | 260.53 | 9.1884 | 1.342 | 3.527 | 12 | sand to clayey sand (*) | 126 |
| 5.74 | 277.23 | 11.1154 | 2.670 | 4.009 | 12 | sand to clayey sand (*) | 132 |
| 5.91 | 291.35 | 10.5928 | 5.096 | 3.636 | 12 | sand to clayey sand (*) | 133 |
| 6.07 | 267.74 | 10.2545 | 3.877 | 3.830 | 12 | sand to clayey sand (*) | 128 |
| 6.23 | 245.71 | 8.4849 | 1.192 | 3.453 | 12 | sand to clayey sand (*) | 117 |
| 6.40 | 220.63 | 7.1778 | -0.544 | 3.253 | 12 | sand to clayey sand (*) | 105 |
| 6.56 | 189.64 | 7.2275 | -0.037 | 3.811 | 12 | sand to clayey sand (*) | 89 |
| 6.73 | 146.84 | 7.2634 | -0.195 | 4.946 | 11 | very stiff fine grained (*) | 147 |
| 6.89 | 123.79 | 7.1256 | -0.022 | 5.756 | 11 | very stiff fine grained (*) | 123 |
| 7.05 | 113.66 | 6.5456 | 0.571 | 5.759 | 11 | very stiff fine grained (*) | 109 |
| 7.22 | 105.54 | 6.4988 | 0.475 | 6.158 | 11 | very stiff fine grained (*) | 104 |
| 7.38 | 106.88 | 6.3412 | 0.527 | 5.933 | 11 | very stiff fine grained (*) | 102 |
| 7.55 | 108.44 | 5.7809 | 0.901 | 5.331 | 11 | very stiff fine grained (*) | 100 |
| 7.71 | 98.56 | 5.0308 | 3.904 | 5.104 | 11 | very stiff fine grained (*) | 96 |
| 7.87 | 92.86 | 4.3287 | 3.034 | 4.662 | 11 | very stiff fine grained (*) | 89 |
| 8.04 | 86.03 | 3.8773 | 1.771 | 4.507 | 11 | very stiff fine grained (*) | 82 |
| 8.20 | 78.29 | 3.5650 | 3.488 | 4.554 | 11 | very stiff fine grained (*) | 78 |
| 8.37 | 79.82 | 4.2512 | 4.695 | 5.326 | 11 | very stiff fine grained (*) | 77 |
| 8.53 | 83.76 | 4.3723 | 3.131 | 5.220 | 11 | very stiff fine grained (*) | 86 |
| 8.69 | 104.88 | 4.9896 | 14.367 | 4.758 | 11 | very stiff fine grained (*) | 95 |
| 8.86 | 108.93 | 6.0036 | 6.975 | 5.511 | 11 | very stiff fine grained (*) | 101 |
| 9.02 | 103.47 | 6.5185 | -0.362 | 6.300 | 11 | very stiff fine grained (*) | 98 |
| 9.19 | 95.70 | 5.9841 | 0.005 | 6.253 | 11 | very stiff fine grained (*) | 93 |
| 9.35 | 91.89 | 5.2633 | 13.402 | 5.728 | 11 | very stiff fine grained (*) | 89 |
| 9.51 | 90.42 | 5.2047 | 16.719 | 5.756 | 11 | very stiff fine grained (*) | 88 |
| 9.68 | 91.74 | 5.6820 | 5.803 | 6.193 | 11 | very stiff fine grained (*) | 94 |
| 9.84 | 111.85 | 8.1727 | 6.244 | 7.307 | 11 | very stiff fine grained (*) | 119 |
| 10.01 | 170.27 | 9.9175 | -2.805 | 5.825 | 11 | very stiff fine grained (*) | 133 |
| 10.17 | 135.33 | 9.1271 | -2.308 | 6.744 | 11 | very stiff fine grained (*) | 128 |
| 10.33 | 94.84 | 6.6360 | 14.621 | 6.997 | 11 | very stiff fine grained (*) | 110 |
| 10.50 | 113.00 | 5.9592 | 39.315 | 5.274 | 11 | very stiff fine grained (*) | 107 |
| 10.66 | 126.51 | 7.9004 | 8.473 | 6.245 | 11 | very stiff fine grained (*) | 123 |
| 10.83 | 145.97 | 10.3039 | 8.443 | 7.059 | 11 | very stiff fine grained (*) | 142 |
| 10.99 | 173.44 | 11.0283 | -2.517 | 6.359 | 11 | very stiff fine grained (*) | 147 |
| 11.15 | 139.68 | 10.2265 | -1.820 | 7.321 | 11 | very stiff fine grained (*) | 141 |
| 11.32 | 128.67 | 8.5334 | 1.042 | 6.632 | 11 | very stiff fine grained (*) | 125 |
| 11.48 | 124.82 | 9.7026 | 2.138 | 7.773 | 11 | very stiff fine grained (*) | 136 |
| 11.65 | 174.18 | 11.4687 | -2.227 | 6.584 | 11 | very stiff fine grained (*) | 150 |
| 11.81 | 172.59 | 11.4308 | -2.426 | 6.623 | 11 | very stiff fine grained (*) | 170 |
| 11.98 | 186.79 | 11.8108 | 1.022 | 6.323 | 11 | very stiff fine grained (*) | 170 |
| 12.14 | 174.83 | 11.7583 | 0.020 | 6.725 | 11 | very stiff fine grained (*) | 162 |
| 12.30 | 146.59 | 10.5325 | 5.007 | 7.185 | 11 | very stiff fine grained (*) | 140 |
| 12.47 | 116.71 | 7.9363 | 6.658 | 6.800 | 11 | very stiff fine grained (*) | 118 |
| 12.63 | 107.34 | 5.6607 | 27.446 | 5.273 | 11 | very stiff fine grained (*) | 106 |
| 12.80 | 106.26 | 6.1080 | 28.244 | 5.748 | 11 | very stiff fine grained (*) | 104 |
| 12.96 | 112.49 | 6.7851 | 17.261 | 6.032 | 11 | very stiff fine grained (*) | 111 |
| 13.12 | 128.21 | 8.4142 | 24.958 | 6.563 | 11 | very stiff fine grained (*) | 134 |
| 13.29 | 179.36 | 9.8072 | 10.266 | 5.468 | 11 | very stiff fine grained (*) | 155 |
| 13.45 | 177.06 | 10.6192 | 4.002 | 5.998 | 11 | very stiff fine grained (*) | 162 |
| 13.62 | 150.77 | 10.2319 | 0.852 | 6.786 | 11 | very stiff fine grained (*) | 152 |
| 13.78 | 147.44 | 8.7541 | 11.687 | 5.937 | 11 | very stiff fine grained (*) | 147 |
| 13.94 | 161.17 | 7.6203 | 3.202 | 4.728 | 11 | very stiff fine grained (*) | 144 |
| 14.11 | 142.99 | 7.0558 | -1.828 | 4.934 | 11 | very stiff fine grained (*) | 134 |
| 14.27 | 116.18 | 6.6847 | -1.399 | 5.754 | 11 | very stiff fine grained (*) | 120 |
| 14.44 | 116.45 | 7.1741 | 0.638 | 6.161 | 11 | very stiff fine grained (*) | 112 |
| 14.60 | 119.59 | 6.2400 | 7.830 | 5.218 | 11 | very stiff fine grained (*) | 117 |
| 14.76 | 131.02 | 6.2676 | 0.278 | 4.784 | 11 | very stiff fine grained (*) | 141 |
| 14.93 | 191.52 | 6.7340 | 5.554 | 3.516 | 12 | sand to clayey sand (*) | 81 |
| 15.09 | 187.32 | 6.6170 | -1.421 | 3.532 | 12 | sand to clayey sand (*) | 78 |
| 15.26 | 110.89 | 5.0047 | 0.493 | 4.513 | 11 | very stiff fine grained (*) | 122 |
| 15.42 | 84.05 | 4.6008 | 42.202 | 5.474 | 11 | very stiff fine grained (*) | 94 |
| 15.58 | 98.65 | 5.7846 | 19.071 | 5.864 | 11 | very stiff fine grained (*) | 107 |
| 15.75 | 150.75 | 7.4860 | 5.618 | 4.966 | 11 | very stiff fine grained (*) | 129 |
| 15.91 | 153.66 | 7.4291 | 9.697 | 4.835 | 11 | very stiff fine grained (*) | 150 |
| 16.08 | 164.47 | 6.4374 | 2.943 | 3.914 | 12 | sand to clayey sand (*) | 79 |
| 16.24 | 176.90 | 5.1677 | 0.387 | 2.921 | 6 | sandy silt to clayey silt | 67 |
| 16.40 | 184.32 | 4.8234 | 2.177 | 2.617 | 7 | silty sand to sandy silt | 58 |
| 16.57 | 183.50 | 4.8356 | 1.975 | 2.635 | 7 | silty sand to sandy silt | 56 |
| 16.73 | 160.17 | 5.4363 | 2.217 | 3.394 | 6 | sandy silt to clayey silt | 58 |
| 16.90 | 113.54 | 5.0529 | 0.414 | 4.450 | 11 | very stiff fine grained (*) | 118 |
| 17.06 | 96.65 | 5.1821 | 25.355 | 5.362 | 11 | very stiff fine grained (*) | 98 |
| 17.22 | 95.49 | 3.9830 | -0.498 | 4.171 | 11 | very stiff fine grained (*) | 90 |
| 17.39 | 88.65 | 3.6859 | 0.466 | 4.158 | 5 | clayey silt to silty clay | 43 |
| 17.55 | 82.91 | 3.2516 | -1.781 | 3.922 | 11 | very stiff fine grained (*) | 77 |
| 17.72 | 70.66 | 4.1925 | 0.613 | 5.933 | 11 | very stiff fine grained (*) | 70 |
| 17.88 | 67.00 | 4.0076 | 0.648 | 5.982 | 11 | very stiff fine grained (*) | 59 |
| 18.04 | 45.78 | 3.1954 | -0.187 | 6.980 | 3 | clay | 51 |
| 18.21 | 46.08 | 2.1262 | 10.002 | 4.614 | 4 | silty clay to clay | 30 |
| 18.37 | 49.09 | 1.4312 | 0.128 | 2.915 | 5 | clayey silt to silty clay | 23 |
| 18.54 | 51.45 | 1.1275 | -2.214 | 2.192 | 6 | sandy silt to clayey silt | 20 |
| 18.70 | 59.01 | 1.1397 | -2.251 | 1.931 | 7 | silty sand to sandy silt | 24 |
| 18.86 | 119.83 | 2.7350 | 0.926 | 2.282 | 7 | silty sand to sandy silt | 33 |
| 19.03 | 131.12 | 3.7154 | -0.978 | 2.834 | 6 | sandy silt to clayey silt | 42 |
| 19.19 | 74.99 | 2.8376 | -0.963 | 3.784 | 6 | sandy silt to clayey silt | 33 |
| 19.36 | 54.13 | 1.4596 | 2.800 | 2.697 | 6 | sandy silt to clayey silt | 22 |
| 19.52 | 46.97 | 1.1128 | 6.988 | 2.369 | 6 | sandy silt to clayey silt | 19 |
| 19.69 | 45.37 | 1.1655 | 1.337 | 2.569 | 6 | sandy silt to clayey silt | 17 |
| 19.85 | 42.73 | 0.9730 | 4.266 | 2.277 | 6 | sandy silt to clayey silt | 17 |
| 20.01 | 45.08 | 0.9332 | 5.372 | 2.070 | 6 | sandy silt to clayey silt | 18 |
| 20.18 | 54.22 | 1.4361 | -4.212 | 2.648 | 6 | sandy silt to clayey silt | 20 |
| 20.34 | 58.42 | 1.7511 | 5.724 | 2.997 | 6 | sandy silt to clayey silt | 22 |
| 20.51 | 55.95 | 1.8435 | 3.793 | 3.295 | 6 | sandy silt to clayey silt | 21 |
| 20.67 | 49.23 | 1.5778 | -1.929 | 3.205 | 6 | sandy silt to clayey silt | 19 |
| 20.83 | 45.16 | 1.1385 | -0.094 | 2.521 | 6 | sandy silt to clayey silt | 17 |
| 21.00 | 42.31 | 1.1174 | 0.493 | 2.641 | 6 | sandy silt to clayey silt | 17 |
| 21.16 | 43.77 | 1.2201 | 2.549 | 2.788 | 6 | sandy silt to clayey silt | 16 |
| 21.33 | 41.52 | 1.4500 | 1.352 | 3.493 | 5 | clayey silt to silty clay | 21 |
| 21.49 | 46.17 | 2.2241 | 3.884 | 4.817 | 5 | clayey silt to silty clay | 25 |
| 21.65 | 67.19 | 2.5437 | 48.613 | 3.786 | 5 | clayey silt to silty clay | 27 |
| 21.82 | 53.88 | 2.2551 | 6.668 | 4.185 | 5 | clayey silt to silty clay | 27 |
| 21.98 | 49.07 | 1.4988 | 15.739 | 3.054 | 5 | clayey silt to silty clay | 25 |
| 22.15 | 50.36 | 1.4461 | 14.695 | 2.872 | 6 | sandy silt to clayey silt | 20 |
| 22.31 | 52.96 | 1.5634 | 13.936 | 2.952 | 6 | sandy silt to clayey silt | 20 |
| 22.47 | 55.86 | 1.6975 | 16.956 | 3.039 | 6 | sandy silt to clayey silt | 21 |
| 22.64 | 57.47 | 1.8924 | 19.530 | 3.293 | 6 | sandy silt to clayey silt | 22 |
| 22.80 | 58.23 | 2.0129 | 21.337 | 3.457 | 5 | clayey silt to silty clay | 28 |
| 22.97 | 61.10 | 2.1084 | 18.569 | 3.451 | 5 | clayey silt to silty clay | 29 |
| 23.13 | 61.80 | 2.0954 | 15.025 | 3.391 | 5 | clayey silt to silty clay | 29 |
| 23.29 | 61.10 | 1.9833 | 15.229 | 3.246 | 6 | sandy silt to clayey silt | 24 |
| 23.46 | 62.93 | 1.9460 | 16.902 | 3.092 | 6 | sandy silt to clayey silt | 24 |
| 23.62 | 63.61 | 2.0112 | 13.288 | 3.162 | 6 | sandy silt to clayey silt | 25 |
| 23.79 | 67.58 | 2.4191 | 11.512 | 3.579 | 5 | clayey silt to silty clay | 33 |
| 23.95 | 72.61 | 2.9466 | 8.049 | 4.058 | 5 | clayey silt to silty clay | 34 |
| 24.11 | 70.56 | 2.4369 | 7.517 | 3.454 | 5 | clayey silt to silty clay | 33 |
| 24.28 | 60.84 | 2.3827 | 18.606 | 3.916 | 5 | clayey silt to silty clay | 30 |
| 24.44 | 55.32 | 2.2688 | 7.394 | 4.102 | 5 | clayey silt to silty clay | 27 |
| 24.61 | 53.14 | 2.4593 | 8.318 | 4.628 | 5 | clayey silt to silty clay | 26 |
| 24.77 | 52.59 | 2.2156 | 4.054 | 4.213 | 4 | silty clay to clay | 32 |
| 24.93 | 46.24 | 1.9006 | 9.884 | 4.110 | 5 | clayey silt to silty clay | 23 |
| 25.10 | 42.08 | 1.3408 | 7.062 | 3.187 | 5 | clayey silt to silty clay | 21 |
| 25.26 | 45.06 | 1.3477 | 15.352 | 2.991 | 5 | clayey silt to silty clay | 21 |
| 25.43 | 46.29 | 1.8865 | 3.865 | 4.076 | 5 | clayey silt to silty clay | 21 |
| 25.59 | 40.53 | 2.0268 | -1.953 | 5.000 | 4 | silty clay to clay | 26 |
| 25.75 | 33.59 | 1.5009 | 8.256 | 4.468 | 4 | silty clay to clay | 23 |
| 25.92 | 32.00 | 1.1931 | 8.727 | 3.729 | 4 | silty clay to clay | 21 |
| 26.08 | 30.47 | 1.2556 | 4.581 | 4.120 | 4 | silty clay to clay | 20 |
| 26.25 | 30.30 | 1.2720 | 3.155 | 4.198 | 4 | silty clay to clay | 19 |
| 26.41 | 28.01 | 1.2901 | 1.276 | 4.605 | 4 | silty clay to clay | 19 |
| 26.57 | 32.47 | 1.2035 | 2.685 | 3.707 | 4 | silty clay to clay | 19 |
| 26.74 | 27.55 | 1.2907 | 4.707 | 4.686 | 4 | silty clay to clay | 19 |
| 26.90 | 27.71 | 1.4074 | 2.027 | 5.078 | 3 | clay | 26 |
| 27.07 | 27.00 | 1.7523 | 1.702 | 6.489 | 3 | clay | 26 |
| 27.23 | 25.90 | 1.4364 | 0.830 | 5.546 | 3 | clay | 23 |
| 27.40 | 19.13 | 1.0550 | 0.204 | 5.513 | 3 | clay | 19 |
| 27.56 | 15.63 | 0.6728 | -1.017 | 4.305 | 3 | clay | 15 |
| 27.72 | 13.53 | 0.5287 | 9.606 | 3.907 | 3 | clay | 13 |
| 27.89 | 12.50 | 0.4810 | 3.978 | 3.849 | 3 | clay | 12 |
| 28.05 | 11.34 | 0.5824 | 4.443 | 5.134 | 3 | clay | 11 |
| 28.22 | 9.95 | 0.6415 | 0.892 | 6.445 | 3 | clay | 10 |
| 28.38 | 9.73 | 0.6556 | -1.074 | 6.736 | 3 | clay | 9 |
| 28.54 | 8.82 | 0.4997 | 0.463 | 5.664 | 3 | clay | 9 |
| 28.71 | 8.98 | 0.4743 | -2.820 | 5.282 | 3 | clay | 9 |
| 28.87 | 12.08 | 0.6624 | -6.788 | 5.485 | 3 | clay | 15 |
| 29.04 | 25.74 | 1.2683 | -1.655 | 4.926 | 3 | clay | 26 |
| 29.20 | 44.05 | 1.9442 | 39.606 | 4.414 | 3 | clay | 40 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 29.36 | 55.47 | 3.0296 | 14.007 | 5.462 | 3 | clay | 54 |
| 29.53 | 67.21 | 3.7139 | 18.522 | 5.526 | 11 | very stiff fine grained (*) | 67 |
| 29.69 | 85.98 | 5.3615 | 9.365 | 6.236 | 11 | very stiff fine grained (*) | 82 |
| 29.86 | 103.48 | 6.5923 | 0.936 | 6.370 | 11 | very stiff fine grained (*) | 101 |
| 30.02 | 127.91 | 6.8525 | 8.567 | 5.357 | 11 | very stiff fine grained (*) | 153 |
| 30.18 | 166.81 | 6.9744 | 1.929 | 4.181 | 12 | sand to clayey sand (*) | 84 |
| 30.35 | 186.01 | -32768 | 1.266 | -32768 | 0 | <out of range> | 0 |

Data File:CPT 5 6/21/2007 5:52:54 PM
Operator:Doug Location:PG&E Solar
Cone ID:DSG0369 Job Number:297
Customer: PG&E Solar Project Units:

| Depth (ft) | Qc TSF | Pw PSI | Fs/Qc (%) | Zone | Soil Behavior Type UBC-1983 | | SPT N* 60% Hammer |
|---|---|---|---|---|---|---|---|
| 0.16 | 168.36 | 0.473 | 0.455 | 0.000 | 9 | sand | 24 |
| 0.33 | 210.16 | 0.495 | 0.780 | 0.000 | 9 | sand | 37 |
| 0.49 | 194.56 | 0.133 | 1.398 | 0.000 | 8 | sand to silty sand | 44 |
| 0.66 | 152.98 | -0.113 | 2.097 | 0.000 | 7 | silty sand to sandy silt | 49 |
| 0.82 | 114.42 | 0.059 | 2.498 | 0.000 | 7 | silty sand to sandy silt | 38 |
| 0.98 | 85.69 | -0.064 | 2.262 | 0.000 | 7 | silty sand to sandy silt | 28 |
| 1.15 | 66.26 | -0.108 | 2.249 | 0.000 | 7 | silty sand to sandy silt | 22 |
| 1.31 | 54.25 | 0.067 | 1.856 | 0.000 | 7 | silty sand to sandy silt | 18 |
| 1.48 | 46.55 | 0.025 | 1.750 | 0.000 | 7 | silty sand to sandy silt | 15 |
| 1.64 | 42.11 | 0.177 | 1.266 | 0.000 | 7 | silty sand to sandy silt | 13 |
| 1.80 | 31.93 | 0.446 | 1.079 | 0.000 | 7 | silty sand to sandy silt | 10 |
| 1.97 | 22.10 | 0.335 | 0.964 | 0.000 | 6 | sandy silt to clayey silt | 9 |
| 2.13 | 20.12 | 0.222 | 1.192 | 0.000 | 7 | silty sand to sandy silt | 8 |
| 2.30 | 36.65 | 0.544 | 0.466 | 0.000 | 7 | silty sand to sandy silt | 10 |
| 2.46 | 40.93 | 0.239 | 0.427 | 0.000 | 8 | sand to silty sand | 13 |
| 2.62 | 85.94 | 0.357 | 0.676 | 0.000 | 8 | sand to silty sand | 21 |
| 2.79 | 132.39 | 0.510 | 1.030 | 0.000 | 8 | sand to silty sand | 30 |
| 2.95 | 160.44 | 0.712 | 1.329 | 0.000 | 8 | sand to silty sand | 38 |
| 3.12 | 184.59 | 2.022 | 1.347 | 0.000 | 8 | sand to silty sand | 43 |
| 3.28 | 200.11 | 2.204 | 1.273 | 0.000 | 8 | sand to silty sand | 48 |
| 3.44 | 215.32 | 1.318 | 1.341 | 0.000 | 8 | sand to silty sand | 50 |
| 3.61 | 207.86 | 1.084 | 2.368 | 0.000 | 7 | silty sand to sandy silt | 66 |
| 3.77 | 201.45 | 1.717 | 2.764 | 0.000 | 7 | silty sand to sandy silt | 60 |
| 3.94 | 151.90 | 1.714 | 3.840 | 0.000 | 6 | sandy silt to clayey silt | 62 |
| 4.10 | 132.51 | 1.463 | 4.303 | 0.000 | 11 | very stiff fine grained (*) | 133 |
| 4.27 | 132.83 | -0.012 | 4.354 | 0.000 | 11 | very stiff fine grained (*) | 126 |
| 4.43 | 130.46 | -0.121 | 4.723 | 0.000 | 11 | very stiff fine grained (*) | 124 |
| 4.59 | 124.87 | -0.401 | 4.906 | 0.000 | 11 | very stiff fine grained (*) | 118 |
| 4.76 | 115.60 | -0.158 | 5.226 | 0.000 | 11 | very stiff fine grained (*) | 114 |
| 4.92 | 117.13 | -0.057 | 4.941 | 0.000 | 11 | very stiff fine grained (*) | 114 |
| 5.09 | 122.99 | 0.138 | 4.854 | 0.000 | 11 | very stiff fine grained (*) | 115 |
| 5.25 | 120.08 | -0.350 | 5.582 | 0.000 | 11 | very stiff fine grained (*) | 116 |
| 5.41 | 121.10 | -0.175 | 5.846 | 0.000 | 11 | very stiff fine grained (*) | 116 |
| 5.58 | 121.86 | -1.027 | 5.853 | 0.000 | 11 | very stiff fine grained (*) | 120 |
| 5.74 | 132.10 | -0.953 | 5.282 | 0.000 | 11 | very stiff fine grained (*) | 126 |
| 5.91 | 141.45 | -0.532 | 4.667 | 0.000 | 11 | very stiff fine grained (*) | 131 |
| 6.07 | 136.08 | -0.291 | 4.089 | 0.000 | 11 | very stiff fine grained (*) | 129 |
| 6.23 | 127.12 | -0.234 | 3.765 | 0.000 | 6 | sandy silt to clayey silt | 53 |
| 6.40 | 154.34 | -0.091 | 2.750 | 0.000 | 7 | silty sand to sandy silt | 49 |
| 6.56 | 182.28 | -0.103 | 1.626 | 0.000 | 8 | sand to silty sand | 40 |
| 6.73 | 164.16 | -0.628 | 0.946 | 0.000 | 8 | sand to silty sand | 40 |
| 6.89 | 154.41 | -0.071 | 0.828 | 0.000 | 9 | sand | 31 |
| 7.05 | 163.71 | 0.037 | 0.884 | 0.000 | 9 | sand | 31 |
| 7.22 | 167.19 | -0.027 | 0.841 | 0.000 | 9 | sand | 32 |
| 7.38 | 176.20 | -0.121 | 1.024 | 0.000 | 9 | sand | 34 |
| 7.55 | 190.67 | 2.695 | 1.100 | 0.000 | 9 | sand | 37 |
| 7.71 | 216.52 | 1.096 | 1.220 | 0.000 | 9 | sand | 43 |
| 7.87 | 269.46 | -0.135 | 1.324 | 0.000 | 9 | sand | 51 |
| 8.04 | 315.61 | 1.682 | 1.200 | 0.000 | 9 | sand | 57 |
| 8.20 | 303.24 | 1.131 | 1.106 | 0.000 | 9 | sand | 54 |
| 8.37 | 234.19 | -0.315 | 1.476 | 0.000 | 8 | sand to silty sand | 59 |
| 8.53 | 201.50 | -0.719 | 2.113 | 0.000 | 7 | silty sand to sandy silt | 66 |
| 8.69 | 187.93 | -0.347 | 3.038 | 0.000 | 7 | silty sand to sandy silt | 63 |
| 8.86 | 204.55 | -0.458 | 2.945 | 0.000 | 6 | sandy silt to clayey silt | 74 |
| 9.02 | 185.14 | -0.387 | 3.865 | 0.000 | 12 | sand to clayey sand (*) | 90 |
| 9.19 | 176.86 | -0.978 | 3.661 | 0.000 | 12 | sand to clayey sand (*) | 82 |
| 9.35 | 152.92 | -0.113 | 4.324 | 0.000 | 12 | sand to clayey sand (*) | 77 |
| 9.51 | 155.36 | -0.480 | 3.782 | 0.000 | 12 | sand to clayey sand (*) | 77 |
| 9.68 | 174.03 | -0.517 | 3.410 | 0.000 | 6 | sandy silt to clayey silt | 69 |
| 9.84 | 208.88 | 0.606 | 2.961 | 0.000 | 7 | silty sand to sandy silt | 63 |
| 10.01 | 211.77 | -0.448 | 2.762 | 0.000 | 7 | silty sand to sandy silt | 65 |
| 10.17 | 191.42 | -0.337 | 2.738 | 0.000 | 7 | silty sand to sandy silt | 63 |
| 10.33 | 185.10 | -1.337 | 3.012 | 0.000 | 6 | sandy silt to clayey silt | 69 |
| 10.50 | 167.12 | -0.539 | 3.549 | 0.000 | 12 | sand to clayey sand (*) | 82 |
| 10.66 | 160.82 | -0.727 | 4.228 | 0.000 | 11 | very stiff fine grained (*) | 157 |
| 10.83 | 165.13 | 0.234 | 4.534 | 0.000 | 11 | very stiff fine grained (*) | 162 |
| 10.99 | 181.69 | 0.064 | 4.363 | 0.000 | 11 | very stiff fine grained (*) | 173 |
| 11.15 | 196.56 | -0.158 | 4.309 | 0.000 | 11 | very stiff fine grained (*) | 188 |
| 11.32 | 212.01 | -0.108 | 3.950 | 0.000 | 12 | sand to clayey sand (*) | 95 |
| 11.48 | 188.03 | 0.138 | 4.126 | 0.000 | 11 | very stiff fine grained (*) | 169 |
| 11.65 | 130.09 | -0.663 | 5.498 | 0.000 | 11 | very stiff fine grained (*) | 146 |
| 11.81 | 139.51 | -0.160 | 4.831 | 0.000 | 11 | very stiff fine grained (*) | 136 |
| 11.98 | 155.65 | -0.495 | 5.429 | 0.000 | 11 | very stiff fine grained (*) | 153 |
| 12.14 | 183.62 | -0.581 | 5.614 | 0.000 | 11 | very stiff fine grained (*) | 168 |
| 12.30 | 186.37 | -2.436 | 5.851 | 0.000 | 11 | very stiff fine grained (*) | 170 |
| 12.47 | 164.27 | -2.837 | 5.517 | 0.000 | 11 | very stiff fine grained (*) | 165 |
| 12.63 | 166.84 | -1.660 | 5.549 | 0.000 | 11 | very stiff fine grained (*) | 161 |
| 12.80 | 172.75 | -3.278 | 5.645 | 0.000 | 11 | very stiff fine grained (*) | 158 |
| 12.96 | 156.50 | -2.768 | 6.198 | 0.000 | 11 | very stiff fine grained (*) | 153 |
| 13.12 | 149.55 | -3.438 | 5.315 | 0.000 | 11 | very stiff fine grained (*) | 141 |
| 13.29 | 135.23 | -3.222 | 4.826 | 0.000 | 11 | very stiff fine grained (*) | 133 |
| 13.45 | 133.16 | -3.532 | 4.905 | 0.000 | 11 | very stiff fine grained (*) | 130 |
| 13.62 | 139.80 | -2.805 | 5.543 | 0.000 | 11 | very stiff fine grained (*) | 139 |
| 13.78 | 161.80 | -1.909 | 5.665 | 0.000 | 11 | very stiff fine grained (*) | 144 |
| 13.94 | 150.96 | -3.436 | 5.809 | 0.000 | 11 | very stiff fine grained (*) | 143 |
| 14.11 | 135.69 | -2.047 | 5.792 | 0.000 | 11 | very stiff fine grained (*) | 132 |
| 14.27 | 127.43 | -1.187 | 5.466 | 0.000 | 11 | very stiff fine grained (*) | 117 |
| 14.44 | 103.90 | 0.456 | 5.533 | 0.000 | 11 | very stiff fine grained (*) | 104 |
| 14.60 | 93.69 | 2.603 | 5.672 | 0.000 | 11 | very stiff fine grained (*) | 95 |
| 14.76 | 99.55 | 1.594 | 5.221 | 0.000 | 11 | very stiff fine grained (*) | 92 |
| 14.93 | 95.33 | -0.872 | 5.592 | 0.000 | 11 | very stiff fine grained (*) | 94 |
| 15.09 | 99.72 | -0.663 | 6.041 | 0.000 | 11 | very stiff fine grained (*) | 96 |
| 15.26 | 104.66 | -1.478 | 6.205 | 0.000 | 11 | very stiff fine grained (*) | 103 |
| 15.42 | 119.14 | -0.660 | 5.936 | 0.000 | 11 | very stiff fine grained (*) | 115 |
| 15.58 | 138.14 | 0.091 | 6.443 | 0.000 | 11 | very stiff fine grained (*) | 136 |
| 15.75 | 169.11 | -0.714 | 6.103 | 0.000 | 11 | very stiff fine grained (*) | 169 |
| 15.91 | 222.91 | 0.468 | 5.315 | 0.000 | 11 | very stiff fine grained (*) | 213 |
| 16.08 | 276.21 | -0.727 | 4.899 | 0.000 | 11 | very stiff fine grained (*) | 263 |
| 16.24 | 323.54 | -1.377 | 4.301 | 0.000 | 12 | sand to clayey sand (*) | 159 |
| 16.40 | 396.16 | 1.323 | 3.747 | 0.000 | 12 | sand to clayey sand (*) | 180 |
| 16.57 | 408.14 | -0.076 | 3.299 | 0.000 | 12 | sand to clayey sand (*) | 187 |
| 16.73 | 366.73 | -0.145 | 3.742 | 0.000 | 12 | sand to clayey sand (*) | 176 |
| 16.90 | 326.68 | -0.411 | 3.841 | 0.000 | 12 | sand to clayey sand (*) | 158 |
| 17.06 | 294.55 | 0.170 | 3.301 | 0.000 | 12 | sand to clayey sand (*) | 135 |
| 17.22 | 223.09 | -1.667 | 4.103 | 0.000 | 12 | sand to clayey sand (*) | 104 |
| 17.39 | 136.07 | 0.756 | 4.570 | 0.000 | 11 | very stiff fine grained (*) | 148 |
| 17.55 | 104.63 | 4.086 | 5.164 | 0.000 | 11 | very stiff fine grained (*) | 121 |
| 17.72 | 138.83 | 0.865 | 5.148 | 0.000 | 11 | very stiff fine grained (*) | 135 |
| 17.88 | 178.48 | -0.515 | 3.819 | 0.000 | 11 | very stiff fine grained (*) | 140 |
| 18.04 | 122.35 | 1.852 | 6.283 | 0.000 | 11 | very stiff fine grained (*) | 150 |
| 18.21 | 167.83 | -0.281 | 5.445 | 0.000 | 11 | very stiff fine grained (*) | 141 |
| 18.37 | 150.77 | -0.599 | 7.554 | 0.000 | 11 | very stiff fine grained (*) | 169 |
| 18.54 | 210.97 | 2.776 | 5.702 | 0.000 | 11 | very stiff fine grained (*) | 171 |
| 18.70 | 175.51 | 0.172 | 6.585 | 0.000 | 11 | very stiff fine grained (*) | 156 |
| 18.86 | 102.53 | -0.537 | 7.138 | 0.000 | 11 | very stiff fine grained (*) | 110 |
| 19.03 | 68.08 | 0.490 | 5.065 | 0.000 | 11 | very stiff fine grained (*) | 75 |
| 19.19 | 65.02 | 2.429 | 2.927 | 0.000 | 5 | clayey silt to silty clay | 32 |
| 19.36 | 64.57 | 2.953 | 2.869 | 0.000 | 6 | sandy silt to clayey silt | 26 |
| 19.52 | 75.54 | 4.909 | 2.940 | 0.000 | 6 | sandy silt to clayey silt | 27 |
| 19.69 | 71.54 | 4.874 | 3.479 | 0.000 | 6 | sandy silt to clayey silt | 28 |
| 19.85 | 71.56 | 4.298 | 3.820 | 0.000 | 5 | clayey silt to silty clay | 34 |
| 20.01 | 69.07 | 1.842 | 4.045 | 0.000 | 5 | clayey silt to silty clay | 33 |
| 20.18 | 68.48 | 3.973 | 4.285 | 0.000 | 5 | clayey silt to silty clay | 33 |
| 20.34 | 70.48 | 1.286 | 4.919 | 0.000 | 11 | very stiff fine grained (*) | 67 |
| 20.51 | 70.87 | 1.759 | 5.323 | 0.000 | 11 | very stiff fine grained (*) | 69 |
| 20.67 | 75.10 | 0.719 | 5.785 | 0.000 | 11 | very stiff fine grained (*) | 74 |
| 20.83 | 86.36 | 0.291 | 6.309 | 0.000 | 11 | very stiff fine grained (*) | 79 |
| 21.00 | 86.84 | -0.135 | 6.570 | 0.000 | 11 | very stiff fine grained (*) | 87 |
| 21.16 | 99.74 | -1.672 | 5.574 | 0.000 | 11 | very stiff fine grained (*) | 93 |
| 21.33 | 104.63 | -2.246 | 5.984 | 0.000 | 11 | very stiff fine grained (*) | 98 |
| 21.49 | 102.89 | -0.397 | 5.248 | 0.000 | 11 | very stiff fine grained (*) | 94 |
| 21.65 | 88.40 | 0.325 | 5.282 | 0.000 | 11 | very stiff fine grained (*) | 89 |
| 21.82 | 88.87 | 2.828 | 4.313 | 0.000 | 11 | very stiff fine grained (*) | 83 |
| 21.98 | 84.16 | 6.170 | 4.286 | 0.000 | 5 | clayey silt to silty clay | 41 |
| 22.15 | 80.85 | 10.416 | 4.033 | 0.000 | 5 | clayey silt to silty clay | 39 |
| 22.31 | 76.61 | 10.138 | 3.806 | 0.000 | 5 | clayey silt to silty clay | 38 |
| 22.47 | 78.12 | 10.611 | 3.498 | 0.000 | 5 | clayey silt to silty clay | 38 |
| 22.64 | 80.47 | 10.507 | 3.581 | 0.000 | 5 | clayey silt to silty clay | 38 |
| 22.80 | 79.15 | 8.813 | 3.673 | 0.000 | 5 | clayey silt to silty clay | 38 |
| 22.97 | 77.31 | 7.874 | 3.661 | 0.000 | 5 | clayey silt to silty clay | 37 |
| 23.13 | 74.45 | 8.852 | 3.786 | 0.000 | 5 | clayey silt to silty clay | 36 |
| 23.29 | 75.31 | 7.584 | 3.953 | 0.000 | 5 | clayey silt to silty clay | 35 |
| 23.46 | 71.23 | 5.707 | 4.338 | 0.000 | 5 | clayey silt to silty clay | 34 |
| 23.62 | 66.07 | 4.298 | 4.239 | 0.000 | 5 | clayey silt to silty clay | 31 |
| 23.79 | 59.28 | 3.131 | 4.316 | 0.000 | 5 | clayey silt to silty clay | 29 |
| 23.95 | 58.47 | 2.672 | 4.331 | 0.000 | 5 | clayey silt to silty clay | 31 |
| 24.11 | 73.34 | 3.158 | 3.510 | 0.000 | 5 | clayey silt to silty clay | 33 |
| 24.28 | 75.58 | 5.256 | 3.794 | 0.000 | 5 | clayey silt to silty clay | 36 |
| 24.44 | 75.53 | 5.150 | 3.846 | 0.000 | 5 | clayey silt to silty clay | 36 |
| 24.61 | 75.21 | 5.495 | 3.990 | 0.000 | 5 | clayey silt to silty clay | 36 |
| 24.77 | 76.74 | 5.350 | 3.903 | 0.000 | 5 | clayey silt to silty clay | 36 |
| 24.93 | 76.34 | 5.781 | 3.941 | 0.000 | 5 | clayey silt to silty clay | 37 |
| 25.10 | 75.80 | 6.394 | 3.846 | 0.000 | 5 | clayey silt to silty clay | 36 |
| 25.26 | 70.19 | 6.089 | 3.865 | 0.000 | 5 | clayey silt to silty clay | 34 |
| 25.43 | 64.42 | 6.554 | 4.169 | 0.000 | 5 | clayey silt to silty clay | 32 |
| 25.59 | 67.71 | 6.298 | 4.289 | 0.000 | 5 | clayey silt to silty clay | 34 |
| 25.75 | 82.16 | 5.938 | 4.513 | 0.000 | 5 | clayey silt to silty clay | 38 |
| 25.92 | 86.59 | 4.278 | 4.385 | 0.000 | 11 | very stiff fine grained (*) | 79 |
| 26.08 | 78.29 | 6.330 | 4.847 | 0.000 | 11 | very stiff fine grained (*) | 77 |
| 26.25 | 76.11 | 5.919 | 5.041 | 0.000 | 11 | very stiff fine grained (*) | 75 |
| 26.41 | 80.51 | 9.145 | 4.510 | 0.000 | 11 | very stiff fine grained (*) | 71 |
| 26.57 | 66.72 | 10.197 | 4.530 | 0.000 | 5 | clayey silt to silty clay | 32 |
| 26.74 | 54.36 | 10.012 | 4.085 | 0.000 | 5 | clayey silt to silty clay | 29 |
| 26.90 | 57.70 | 10.791 | 3.814 | 0.000 | 5 | clayey silt to silty clay | 28 |
| 27.07 | 65.77 | 10.229 | 4.033 | 0.000 | 5 | clayey silt to silty clay | 30 |
| 27.23 | 66.27 | 8.158 | 4.451 | 0.000 | 5 | clayey silt to silty clay | 32 |
| 27.40 | 66.42 | 6.113 | 4.942 | 0.000 | 4 | silty clay to clay | 42 |
| 27.56 | 64.00 | 5.111 | 5.175 | 0.000 | 11 | very stiff fine grained (*) | 63 |
| 27.72 | 66.63 | 5.012 | 5.776 | 0.000 | 11 | very stiff fine grained (*) | 67 |
| 27.89 | 78.68 | 6.727 | 5.996 | 0.000 | 11 | very stiff fine grained (*) | 75 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 28.05 | 89.40 | 6.697 | 5.879 | 0.000 | 11 | very stiff fine grained (*) | 79 |
| 28.22 | 77.80 | 1.443 | 6.119 | 0.000 | 11 | very stiff fine grained (*) | 74 |
| 28.38 | 64.50 | 0.453 | 5.455 | 0.000 | 11 | very stiff fine grained (*) | 71 |
| 28.54 | 81.03 | 4.480 | 4.314 | 0.000 | 11 | very stiff fine grained (*) | 79 |
| 28.71 | 103.32 | 9.599 | 4.336 | 0.000 | 11 | very stiff fine grained (*) | 88 |
| 28.87 | 91.85 | 6.901 | 6.099 | 0.000 | 11 | very stiff fine grained (*) | 93 |
| 29.04 | 95.37 | 8.402 | 6.390 | 0.000 | 11 | very stiff fine grained (*) | 92 |
| 29.20 | 99.40 | 3.202 | 6.224 | 0.000 | 11 | very stiff fine grained (*) | 93 |
| 29.36 | 95.61 | 1.054 | 6.152 | 0.000 | 11 | very stiff fine grained (*) | 98 |
| 29.53 | 112.57 | 0.293 | 6.049 | 0.000 | 11 | very stiff fine grained (*) | 102 |
| 29.69 | 112.26 | 0.140 | 6.616 | 0.000 | 11 | very stiff fine grained (*) | 98 |
| 29.86 | 83.26 | 1.032 | 7.671 | 0.000 | 11 | very stiff fine grained (*) | 86 |
| 30.02 | 72.51 | 6.360 | 5.802 | 0.000 | 11 | very stiff fine grained (*) | 70 |
| 30.18 | 64.62 | 6.177 | 5.308 | 0.000 | 11 | very stiff fine grained (*) | 62 |
| 30.35 | 55.44 | 4.315 | 5.948 | 0.000 | 3 | clay | 56 |
| 30.51 | 54.81 | 2.702 | 5.780 | 0.000 | 11 | very stiff fine grained (*) | 59 |
| 30.68 | 75.77 | 2.552 | 4.512 | 0.000 | 11 | very stiff fine grained (*) | 70 |
| 30.84 | 89.03 | 0.771 | 6.347 | 0.000 | 11 | very stiff fine grained (*) | 85 |
| 31.00 | 101.22 | -0.126 | 5.761 | 0.000 | 11 | very stiff fine grained (*) | 96 |
| 31.17 | 109.01 | 6.192 | 5.071 | 0.000 | 11 | very stiff fine grained (*) | 91 |
| 31.33 | 74.35 | 6.938 | 5.407 | 0.000 | 11 | very stiff fine grained (*) | 78 |
| 31.50 | 62.30 | 6.985 | 4.494 | 0.000 | 4 | silty clay to clay | 43 |
| 31.66 | 63.43 | 9.099 | 3.607 | 0.000 | 5 | clayey silt to silty clay | 31 |
| 31.82 | 64.49 | 9.259 | 3.698 | 0.000 | 5 | clayey silt to silty clay | 31 |
| 31.99 | 64.09 | 8.668 | -32768 | 0.000 | 0 | <out of range> | 0 |

Data File:CPT 6 6/21/2007 6:39:57 PM
Operator:Doug Location:PG&E Solar
Cone ID:DSG0369 Job Number:297
Customer: PG&E Solar Project Units:

| Depth (ft) | Qc TSF | Fs/Qc (%) | Pw PSI | Zone | Soil Behavior Type UBC-1983 | | SPT N* 60% Hammer |
|---|---|---|---|---|---|---|---|
| 0.16 | 23.73 | 0.721 | 1.352 | 0.000 | 6 | sandy silt to clayey silt | 9 |
| 0.33 | 45.80 | 0.828 | 1.190 | 0.000 | 7 | silty sand to sandy silt | 13 |
| 0.49 | 48.80 | 1.278 | 0.906 | 0.000 | 7 | silty sand to sandy silt | 15 |
| 0.66 | 49.61 | 2.091 | 0.882 | 0.000 | 6 | sandy silt to clayey silt | 19 |
| 0.82 | 46.57 | 2.781 | 0.704 | 0.000 | 6 | sandy silt to clayey silt | 18 |
| 0.98 | 44.15 | 3.320 | 0.586 | 0.000 | 5 | clayey silt to silty clay | 21 |
| 1.15 | 42.31 | 3.432 | 0.443 | 0.000 | 5 | clayey silt to silty clay | 20 |
| 1.31 | 39.57 | 3.367 | 0.360 | 0.000 | 5 | clayey silt to silty clay | 19 |
| 1.48 | 36.33 | 2.946 | 0.273 | 0.000 | 5 | clayey silt to silty clay | 17 |
| 1.64 | 31.95 | 2.742 | 0.229 | 0.000 | 6 | sandy silt to clayey silt | 12 |
| 1.80 | 27.16 | 2.588 | 0.170 | 0.000 | 6 | sandy silt to clayey silt | 11 |
| 1.97 | 25.16 | 1.635 | 0.150 | 0.000 | 6 | sandy silt to clayey silt | 10 |
| 2.13 | 23.84 | 1.951 | 0.175 | 0.000 | 6 | sandy silt to clayey silt | 9 |
| 2.30 | 21.75 | 2.150 | 1.936 | 0.000 | 6 | sandy silt to clayey silt | 8 |
| 2.46 | 20.81 | 2.089 | 1.071 | 0.000 | 6 | sandy silt to clayey silt | 8 |
| 2.62 | 23.39 | 1.745 | 0.714 | 0.000 | 6 | sandy silt to clayey silt | 8 |
| 2.79 | 20.49 | 1.919 | 0.372 | 0.000 | 6 | sandy silt to clayey silt | 8 |
| 2.95 | 17.25 | 1.851 | 0.182 | 0.000 | 6 | sandy silt to clayey silt | 7 |
| 3.12 | 19.13 | 1.708 | 0.214 | 0.000 | 6 | sandy silt to clayey silt | 8 |
| 3.28 | 22.61 | 1.698 | 0.148 | 0.000 | 6 | sandy silt to clayey silt | 9 |
| 3.44 | 26.98 | 1.527 | 0.180 | 0.000 | 6 | sandy silt to clayey silt | 11 |
| 3.61 | 33.77 | 1.197 | 0.180 | 0.000 | 6 | sandy silt to clayey silt | 11 |
| 3.77 | 27.35 | 1.020 | -0.030 | 0.000 | 6 | sandy silt to clayey silt | 11 |
| 3.94 | 22.77 | 2.079 | -0.099 | 0.000 | 6 | sandy silt to clayey silt | 11 |
| 4.10 | 37.29 | 2.051 | 0.552 | 0.000 | 6 | sandy silt to clayey silt | 12 |
| 4.27 | 37.49 | 2.094 | 0.069 | 0.000 | 6 | sandy silt to clayey silt | 13 |
| 4.43 | 28.13 | 1.911 | -0.175 | 0.000 | 6 | sandy silt to clayey silt | 11 |
| 4.59 | 22.60 | 1.868 | -0.244 | 0.000 | 6 | sandy silt to clayey silt | 9 |
| 4.76 | 22.58 | 1.845 | -0.268 | 0.000 | 6 | sandy silt to clayey silt | 8 |
| 4.92 | 21.00 | 1.724 | -0.259 | 0.000 | 5 | clayey silt to silty clay | 10 |
| 5.09 | 18.99 | 3.025 | -0.276 | 0.000 | 5 | clayey silt to silty clay | 10 |
| 5.25 | 25.60 | 2.575 | -0.084 | 0.000 | 6 | sandy silt to clayey silt | 12 |
| 5.41 | 48.30 | 2.308 | 0.594 | 0.000 | 6 | sandy silt to clayey silt | 16 |
| 5.58 | 47.74 | 2.198 | 2.951 | 0.000 | 6 | sandy silt to clayey silt | 17 |
| 5.74 | 34.37 | 1.272 | 1.552 | 0.000 | 7 | silty sand to sandy silt | 13 |
| 5.91 | 39.00 | 1.251 | 1.165 | 0.000 | 7 | silty sand to sandy silt | 13 |
| 6.07 | 46.10 | 0.999 | 0.985 | 0.000 | 7 | silty sand to sandy silt | 13 |
| 6.23 | 38.32 | 0.873 | 0.961 | 0.000 | 7 | silty sand to sandy silt | 12 |
| 6.40 | 29.19 | 1.049 | 0.623 | 0.000 | 7 | silty sand to sandy silt | 10 |
| 6.56 | 28.90 | 1.546 | 0.485 | 0.000 | 7 | silty sand to sandy silt | 11 |
| 6.73 | 42.13 | 1.271 | 0.569 | 0.000 | 7 | silty sand to sandy silt | 14 |
| 6.89 | 57.81 | 1.848 | 0.973 | 0.000 | 7 | silty sand to sandy silt | 21 |
| 7.05 | 92.77 | 2.320 | 4.426 | 0.000 | 6 | sandy silt to clayey silt | 27 |
| 7.22 | 59.18 | 4.525 | 2.884 | 0.000 | 5 | clayey silt to silty clay | 32 |
| 7.38 | 49.39 | 5.397 | 2.222 | 0.000 | 3 | clay | 50 |
| 7.55 | 47.58 | 5.582 | 2.259 | 0.000 | 3 | clay | 46 |
| 7.71 | 46.65 | 5.821 | 2.574 | 0.000 | 3 | clay | 46 |
| 7.87 | 51.15 | 5.552 | 3.145 | 0.000 | 3 | clay | 49 |
| 8.04 | 56.06 | 4.500 | 2.810 | 0.000 | 4 | silty clay to clay | 38 |
| 8.20 | 70.05 | 4.137 | 2.640 | 0.000 | 5 | clayey silt to silty clay | 40 |
| 8.37 | 125.61 | 3.340 | 2.929 | 0.000 | 6 | sandy silt to clayey silt | 41 |
| 8.53 | 122.27 | 3.996 | 3.236 | 0.000 | 11 | very stiff fine grained (*) | 116 |
| 8.69 | 115.70 | 5.357 | 3.342 | 0.000 | 11 | very stiff fine grained (*) | 137 |
| 8.86 | 190.19 | 3.581 | 4.177 | 0.000 | 11 | very stiff fine grained (*) | 153 |
| 9.02 | 171.99 | 3.886 | 3.143 | 0.000 | 12 | sand to clayey sand (*) | 87 |
| 9.19 | 183.10 | 3.404 | 4.675 | 0.000 | 6 | sandy silt to clayey silt | 71 |
| 9.35 | 197.79 | 2.600 | 3.121 | 0.000 | 7 | silty sand to sandy silt | 61 |
| 9.51 | 196.21 | 1.783 | 3.296 | 0.000 | 7 | silty sand to sandy silt | 59 |
| 9.68 | 161.34 | 2.389 | 1.968 | 0.000 | 7 | silty sand to sandy silt | 48 |
| 9.84 | 91.89 | 4.077 | 1.446 | 0.000 | 6 | sandy silt to clayey silt | 41 |
| 10.01 | 68.09 | 4.990 | 1.537 | 0.000 | 4 | silty clay to clay | 44 |
| 10.17 | 48.68 | 5.421 | 1.788 | 0.000 | 4 | silty clay to clay | 35 |
| 10.33 | 46.76 | 4.837 | 2.086 | 0.000 | 3 | clay | 45 |
| 10.50 | 46.30 | 5.564 | 2.372 | 0.000 | 3 | clay | 45 |
| 10.66 | 47.29 | 5.964 | 2.303 | 0.000 | 3 | clay | 45 |
| 10.83 | 47.83 | 5.913 | 2.064 | 0.000 | 3 | clay | 44 |
| 10.99 | 43.76 | 6.344 | 1.431 | 0.000 | 3 | clay | 43 |
| 11.15 | 43.22 | 5.811 | 1.071 | 0.000 | 3 | clay | 40 |
| 11.32 | 37.90 | 6.243 | 0.542 | 0.000 | 3 | clay | 38 |
| 11.48 | 37.86 | 6.170 | 0.177 | 0.000 | 3 | clay | 38 |
| 11.65 | 43.43 | 5.703 | 0.160 | 0.000 | 3 | clay | 42 |
| 11.81 | 51.85 | 4.354 | 0.234 | 0.000 | 3 | clay | 45 |
| 11.98 | 46.98 | 5.998 | 0.293 | 0.000 | 3 | clay | 50 |
| 12.14 | 57.64 | 5.793 | 3.951 | 0.000 | 4 | silty clay to clay | 38 |
| 12.30 | 72.35 | 3.808 | 1.569 | 0.000 | 5 | clayey silt to silty clay | 35 |
| 12.47 | 88.64 | 2.502 | 1.140 | 0.000 | 6 | sandy silt to clayey silt | 38 |
| 12.63 | 139.31 | 3.792 | -0.118 | 0.000 | 6 | sandy silt to clayey silt | 47 |
| 12.80 | 137.40 | 3.251 | 0.276 | 0.000 | 11 | very stiff fine grained (*) | 106 |
| 12.96 | 55.17 | 7.752 | 2.517 | 0.000 | 11 | very stiff fine grained (*) | 77 |
| 13.12 | 48.43 | 5.381 | 2.732 | 0.000 | 11 | very stiff fine grained (*) | 63 |
| 13.29 | 92.65 | 4.608 | 1.985 | 0.000 | 11 | very stiff fine grained (*) | 67 |
| 13.45 | 69.86 | 6.540 | 4.461 | 0.000 | 11 | very stiff fine grained (*) | 66 |
| 13.62 | 43.92 | 7.170 | 3.163 | 0.000 | 3 | clay | 48 |
| 13.78 | 36.76 | 6.735 | 2.495 | 0.000 | 3 | clay | 38 |
| 13.94 | 37.48 | 6.255 | 2.303 | 0.000 | 3 | clay | 46 |
| 14.11 | 69.62 | 3.907 | 2.525 | 0.000 | 4 | silty clay to clay | 36 |
| 14.27 | 62.12 | 5.136 | 2.520 | 0.000 | 5 | clayey silt to silty clay | 32 |
| 14.44 | 69.73 | 3.985 | 2.448 | 0.000 | 5 | clayey silt to silty clay | 34 |
| 14.60 | 80.32 | 2.990 | 2.470 | 0.000 | 6 | sandy silt to clayey silt | 32 |
| 14.76 | 100.89 | 1.795 | 2.692 | 0.000 | 7 | silty sand to sandy silt | 32 |
| 14.93 | 116.73 | 2.697 | 3.441 | 0.000 | 6 | sandy silt to clayey silt | 38 |
| 15.09 | 81.53 | 3.415 | 2.108 | 0.000 | 6 | sandy silt to clayey silt | 35 |
| 15.26 | 72.32 | 3.295 | 3.549 | 0.000 | 5 | clayey silt to silty clay | 32 |
| 15.42 | 49.04 | 4.198 | 3.441 | 0.000 | 6 | sandy silt to clayey silt | 26 |
| 15.58 | 79.00 | 2.321 | 3.579 | 0.000 | 7 | silty sand to sandy silt | 30 |
| 15.75 | 153.04 | 1.617 | 4.212 | 0.000 | 8 | sand to silty sand | 37 |
| 15.91 | 235.44 | 1.572 | 4.631 | 0.000 | 7 | silty sand to sandy silt | 57 |
| 16.08 | 143.18 | 3.244 | 3.256 | 0.000 | 7 | silty sand to sandy silt | 49 |
| 16.24 | 78.40 | 5.726 | 5.034 | 0.000 | 11 | very stiff fine grained (*) | 88 |
| 16.40 | 54.34 | 6.392 | 7.478 | 0.000 | 11 | very stiff fine grained (*) | 62 |
| 16.57 | 60.21 | 3.715 | 11.207 | 0.000 | 4 | silty clay to clay | 37 |
| 16.73 | 57.21 | 5.023 | 7.990 | 0.000 | 5 | clayey silt to silty clay | 32 |
| 16.90 | 81.19 | 3.412 | 9.256 | 0.000 | 5 | clayey silt to silty clay | 31 |
| 17.06 | 53.33 | 5.361 | 5.544 | 0.000 | 4 | silty clay to clay | 39 |
| 17.22 | 48.61 | 6.538 | 6.924 | 0.000 | 11 | very stiff fine grained (*) | 69 |
| 17.39 | 114.40 | 4.031 | 8.877 | 0.000 | 11 | very stiff fine grained (*) | 97 |
| 17.55 | 141.77 | 4.550 | 5.576 | 0.000 | 11 | very stiff fine grained (*) | 123 |
| 17.72 | 128.50 | 5.054 | 4.512 | 0.000 | 11 | very stiff fine grained (*) | 114 |
| 17.88 | 87.92 | 6.624 | 5.451 | 0.000 | 11 | very stiff fine grained (*) | 97 |
| 18.04 | 86.54 | 5.671 | 7.906 | 0.000 | 11 | very stiff fine grained (*) | 86 |
| 18.21 | 94.60 | 5.510 | 6.480 | 0.000 | 11 | very stiff fine grained (*) | 87 |
| 18.37 | 92.38 | 5.587 | 5.135 | 0.000 | 11 | very stiff fine grained (*) | 94 |
| 18.54 | 107.77 | 4.901 | 4.823 | 0.000 | 11 | very stiff fine grained (*) | 112 |
| 18.70 | 149.77 | 3.060 | 5.160 | 0.000 | 6 | sandy silt to clayey silt | 50 |
| 18.86 | 130.89 | 2.939 | 4.249 | 0.000 | 6 | sandy silt to clayey silt | 50 |
| 19.03 | 109.49 | 3.327 | 3.086 | 0.000 | 6 | sandy silt to clayey silt | 41 |
| 19.19 | 82.24 | 4.074 | 2.842 | 0.000 | 5 | clayey silt to silty clay | 41 |
| 19.36 | 66.40 | 4.274 | 2.424 | 0.000 | 5 | clayey silt to silty clay | 37 |
| 19.52 | 81.32 | 3.253 | 2.337 | 0.000 | 6 | sandy silt to clayey silt | 38 |
| 19.69 | 146.49 | 3.462 | 3.702 | 0.000 | 7 | silty sand to sandy silt | 52 |
| 19.85 | 260.48 | 2.395 | 5.168 | 0.000 | 7 | silty sand to sandy silt | 78 |
| 20.01 | 329.51 | 2.113 | 8.603 | 0.000 | 8 | sand to silty sand | 71 |
| 20.18 | 305.72 | 2.193 | 5.086 | 0.000 | 7 | silty sand to sandy silt | 93 |
| 20.34 | 240.99 | 3.235 | 4.067 | 0.000 | 12 | sand to clayey sand (*) | 111 |
| 20.51 | 148.51 | 5.074 | 4.411 | 0.000 | 11 | very stiff fine grained (*) | 157 |
| 20.67 | 100.90 | 5.715 | 5.406 | 0.000 | 11 | very stiff fine grained (*) | 107 |
| 20.83 | 84.49 | 4.474 | 8.741 | 0.000 | 11 | very stiff fine grained (*) | 82 |
| 21.00 | 71.79 | 4.264 | 8.067 | 0.000 | 5 | clayey silt to silty clay | 35 |
| 21.16 | 62.76 | 4.073 | 7.113 | 0.000 | 5 | clayey silt to silty clay | 31 |
| 21.33 | 58.69 | 3.789 | 6.190 | 0.000 | 5 | clayey silt to silty clay | 29 |
| 21.49 | 62.62 | 4.104 | 6.985 | 0.000 | 4 | silty clay to clay | 40 |
| 21.65 | 68.75 | 6.135 | 6.564 | 0.000 | 11 | very stiff fine grained (*) | 73 |
| 21.82 | 98.51 | 5.492 | 5.911 | 0.000 | 11 | very stiff fine grained (*) | 84 |
| 21.98 | 95.21 | 5.807 | 4.584 | 0.000 | 11 | very stiff fine grained (*) | 88 |
| 22.15 | 81.39 | 5.361 | 4.121 | 0.000 | 11 | very stiff fine grained (*) | 82 |
| 22.31 | 81.41 | 4.458 | 4.057 | 0.000 | 11 | very stiff fine grained (*) | 73 |
| 22.47 | 67.19 | 4.715 | 2.443 | 0.000 | 11 | very stiff fine grained (*) | 67 |
| 22.64 | 60.67 | 6.196 | 0.170 | 0.000 | 11 | very stiff fine grained (*) | 66 |
| 22.80 | 79.32 | 5.484 | 3.916 | 0.000 | 11 | very stiff fine grained (*) | 69 |
| 22.97 | 77.59 | 5.591 | 5.313 | 0.000 | 11 | very stiff fine grained (*) | 71 |
| 23.13 | 64.92 | 5.058 | 4.985 | 0.000 | 11 | very stiff fine grained (*) | 63 |
| 23.29 | 53.58 | 4.101 | 5.695 | 0.000 | 5 | clayey silt to silty clay | 27 |
| 23.46 | 51.90 | 3.702 | 6.911 | 0.000 | 5 | clayey silt to silty clay | 26 |
| 23.62 | 55.07 | 4.716 | 2.916 | 0.000 | 5 | clayey silt to silty clay | 26 |
| 23.79 | 58.05 | 4.402 | 6.956 | 0.000 | 4 | silty clay to clay | 35 |
| 23.95 | 49.50 | 4.702 | 9.825 | 0.000 | 4 | silty clay to clay | 33 |
| 24.11 | 47.81 | 3.947 | 9.002 | 0.000 | 5 | clayey silt to silty clay | 23 |
| 24.28 | 45.07 | 3.834 | 7.436 | 0.000 | 5 | clayey silt to silty clay | 23 |
| 24.44 | 48.80 | 4.044 | 6.687 | 0.000 | 5 | clayey silt to silty clay | 25 |
| 24.61 | 60.62 | 3.840 | 7.416 | 0.000 | 5 | clayey silt to silty clay | 28 |
| 24.77 | 62.96 | 3.598 | 7.502 | 0.000 | 5 | clayey silt to silty clay | 30 |
| 24.93 | 62.12 | 3.581 | 9.953 | 0.000 | 5 | clayey silt to silty clay | 30 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25.10 | 64.31 | 3.564 | 9.682 | 0.000 | 5 | clayey silt to silty clay | 31 |
| 25.26 | 67.23 | 3.747 | 9.869 | 0.000 | 5 | clayey silt to silty clay | 32 |
| 25.43 | 70.98 | 3.709 | 11.734 | 0.000 | 5 | clayey silt to silty clay | 34 |
| 25.59 | 75.55 | 3.866 | 12.722 | 0.000 | 5 | clayey silt to silty clay | 36 |
| 25.75 | 79.91 | 3.642 | 14.670 | 0.000 | 6 | sandy silt to clayey silt | 32 |
| 25.92 | 95.90 | 2.980 | 17.271 | 0.000 | 6 | sandy silt to clayey silt | 36 |
| 26.08 | 101.86 | 3.099 | 21.498 | 0.000 | 6 | sandy silt to clayey silt | 39 |
| 26.25 | 105.21 | 3.320 | 22.640 | 0.000 | 6 | sandy silt to clayey silt | 40 |
| 26.41 | 105.15 | 3.535 | 21.589 | 0.000 | 6 | sandy silt to clayey silt | 40 |
| 26.57 | 104.10 | 3.662 | 19.517 | 0.000 | 6 | sandy silt to clayey silt | 39 |
| 26.74 | 98.09 | 4.074 | 17.596 | 0.000 | 5 | clayey silt to silty clay | 46 |
| 26.90 | 87.06 | 4.512 | 13.478 | 0.000 | 11 | very stiff fine grained (*) | 84 |
| 27.07 | 76.77 | 4.954 | 8.727 | 0.000 | 11 | very stiff fine grained (*) | 77 |
| 27.23 | 77.83 | 5.336 | 6.628 | 0.000 | 11 | very stiff fine grained (*) | 73 |
| 27.40 | 72.95 | 5.095 | 4.983 | 0.000 | 11 | very stiff fine grained (*) | 68 |
| 27.56 | 62.87 | 5.334 | 3.963 | 0.000 | 4 | silty clay to clay | 42 |
| 27.72 | 60.93 | 3.373 | 4.931 | 0.000 | 4 | silty clay to clay | 38 |
| 27.89 | 53.78 | 4.996 | 4.948 | 0.000 | 4 | silty clay to clay | 33 |
| 28.05 | 41.68 | 6.637 | 6.525 | 0.000 | 3 | clay | 49 |
| 28.22 | 57.45 | 4.677 | 5.345 | 0.000 | 3 | clay | 49 |
| 28.38 | 55.01 | 4.678 | 4.695 | 0.000 | 4 | silty clay to clay | 35 |
| 28.54 | 50.56 | 5.147 | 4.727 | 0.000 | 4 | silty clay to clay | 33 |
| 28.71 | 48.26 | 5.127 | 4.894 | 0.000 | 3 | clay | 47 |
| 28.87 | 49.24 | 5.037 | 5.712 | 0.000 | 3 | clay | 48 |
| 29.04 | 52.85 | 5.269 | 4.067 | 0.000 | 3 | clay | 51 |
| 29.20 | 56.27 | 5.219 | 4.214 | 0.000 | 3 | clay | 53 |
| 29.36 | 57.65 | 5.086 | 4.729 | 0.000 | 4 | silty clay to clay | 37 |
| 29.53 | 58.82 | 5.083 | 5.333 | 0.000 | 3 | clay | 53 |
| 29.69 | 47.85 | 5.707 | 5.377 | 0.000 | 3 | clay | 47 |
| 29.86 | 40.90 | 5.843 | 4.067 | 0.000 | 3 | clay | 41 |
| 30.02 | 39.86 | 5.407 | 3.232 | 0.000 | 3 | clay | 38 |
| 30.18 | 39.37 | 5.541 | 3.670 | 0.000 | 3 | clay | 38 |
| 30.35 | 38.71 | 5.575 | 4.337 | 0.000 | 3 | clay | 38 |
| 30.51 | 40.02 | 5.454 | 4.608 | 0.000 | 3 | clay | 39 |
| 30.68 | 43.45 | 5.332 | -0.571 | 0.000 | 3 | clay | 43 |
| 30.84 | 50.05 | 4.849 | 5.911 | 0.000 | 4 | silty clay to clay | 31 |
| 31.00 | 52.00 | 4.658 | 6.291 | 0.000 | 4 | silty clay to clay | 33 |
| 31.17 | 53.82 | 4.121 | 6.668 | 0.000 | 5 | clayey silt to silty clay | 26 |
| 31.33 | 53.83 | 4.117 | 7.325 | 0.000 | 5 | clayey silt to silty clay | 26 |
| 31.50 | 53.13 | 4.036 | 9.054 | 0.000 | 5 | clayey silt to silty clay | 26 |
| 31.66 | 56.43 | 4.006 | 9.005 | 0.000 | 5 | clayey silt to silty clay | 27 |
| 31.82 | 56.77 | 4.320 | 9.057 | 0.000 | 5 | clayey silt to silty clay | 28 |
| 31.99 | 60.59 | 4.196 | 9.803 | 0.000 | 4 | silty clay to clay | 37 |
| 32.15 | 54.98 | 4.733 | 8.313 | 0.000 | 4 | silty clay to clay | 35 |
| 32.32 | 49.66 | 4.612 | 7.648 | 0.000 | 4 | silty clay to clay | 33 |
| 32.48 | 49.16 | 4.295 | 7.318 | 0.000 | 4 | silty clay to clay | 31 |
| 32.64 | 47.77 | 4.004 | 6.835 | 0.000 | 5 | clayey silt to silty clay | 23 |
| 32.81 | 48.91 | 3.776 | 6.798 | 0.000 | 5 | clayey silt to silty clay | 24 |
| 32.97 | 52.70 | 3.829 | 7.495 | 0.000 | 5 | clayey silt to silty clay | 26 |
| 33.14 | 64.00 | 4.564 | 8.714 | 0.000 | 4 | silty clay to clay | 43 |
| 33.30 | 83.99 | 5.512 | 8.020 | 0.000 | 11 | very stiff fine grained (*) | 74 |
| 33.46 | 82.68 | 4.919 | 6.158 | 0.000 | 11 | very stiff fine grained (*) | 74 |
| 33.63 | 65.54 | 5.013 | 7.219 | 0.000 | 4 | silty clay to clay | 44 |
| 33.79 | 56.06 | 4.325 | 10.392 | 0.000 | 4 | silty clay to clay | 36 |
| 33.96 | 46.17 | 5.232 | 10.668 | 0.000 | 4 | silty clay to clay | 37 |
| 34.12 | 70.73 | 4.010 | 12.668 | 0.000 | 4 | silty clay to clay | 39 |
| 34.28 | 63.87 | 5.216 | 7.569 | 0.000 | 5 | clayey silt to silty clay | 31 |
| 34.45 | 59.80 | 3.181 | 9.633 | 0.000 | 5 | clayey silt to silty clay | 28 |
| 34.61 | 52.95 | 4.336 | 9.970 | 0.000 | 5 | clayey silt to silty clay | 25 |
| 34.78 | 45.94 | 4.091 | 10.948 | 0.000 | 4 | silty clay to clay | 30 |
| 34.94 | 41.12 | 4.395 | 9.732 | 0.000 | 4 | silty clay to clay | 26 |
| 35.10 | 34.17 | 4.167 | 8.613 | 0.000 | 4 | silty clay to clay | 24 |
| 35.27 | 37.04 | 3.604 | 8.335 | 0.000 | 5 | clayey silt to silty clay | 18 |
| 35.43 | 41.01 | 3.366 | 8.808 | 0.000 | 5 | clayey silt to silty clay | 19 |
| 35.60 | 40.72 | 3.674 | 8.872 | 0.000 | 5 | clayey silt to silty clay | 19 |
| 35.76 | 40.01 | 3.715 | 8.751 | 0.000 | 5 | clayey silt to silty clay | 20 |
| 35.93 | 41.78 | 3.744 | 8.628 | 0.000 | 5 | clayey silt to silty clay | 20 |
| 36.09 | 43.25 | 4.051 | 8.611 | 0.000 | 5 | clayey silt to silty clay | 21 |
| 36.25 | 46.91 | 4.024 | 8.754 | 0.000 | 5 | clayey silt to silty clay | 22 |
| 36.42 | 45.53 | 4.000 | 8.663 | 0.000 | 5 | clayey silt to silty clay | 22 |
| 36.58 | 45.31 | 3.987 | 8.808 | 0.000 | 5 | clayey silt to silty clay | 22 |
| 36.75 | 44.32 | 3.916 | 8.739 | 0.000 | 5 | clayey silt to silty clay | 21 |
| 36.91 | 43.57 | 3.764 | 8.766 | 0.000 | 5 | clayey silt to silty clay | 21 |
| 37.07 | 41.84 | 3.708 | 8.665 | 0.000 | 5 | clayey silt to silty clay | 20 |
| 37.24 | 38.52 | 3.771 | 8.273 | 0.000 | 5 | clayey silt to silty clay | 19 |
| 37.40 | 36.64 | 3.752 | 7.894 | 0.000 | 5 | clayey silt to silty clay | 18 |
| 37.57 | 35.57 | 3.845 | 7.603 | 0.000 | 5 | clayey silt to silty clay | 17 |
| 37.73 | 35.02 | 3.882 | 7.293 | 0.000 | 5 | clayey silt to silty clay | 17 |
| 37.89 | 34.71 | 3.405 | 7.431 | 0.000 | 5 | clayey silt to silty clay | 17 |
| 38.06 | 33.39 | 3.876 | 7.475 | 0.000 | 5 | clayey silt to silty clay | 16 |
| 38.22 | 34.22 | 4.439 | 9.202 | 0.000 | 4 | silty clay to clay | 22 |
| 38.39 | 33.90 | 4.127 | 8.638 | 0.000 | 4 | silty clay to clay | 21 |
| 38.55 | 30.36 | 4.521 | 8.165 | 0.000 | 4 | silty clay to clay | 20 |
| 38.71 | 28.29 | 4.523 | 8.017 | 0.000 | 4 | silty clay to clay | 18 |
| 38.88 | 27.78 | 4.376 | 8.010 | 0.000 | 4 | silty clay to clay | 19 |
| 39.04 | 34.30 | 4.240 | 8.251 | 0.000 | 4 | silty clay to clay | 20 |
| 39.21 | 33.85 | 4.224 | 7.241 | 0.000 | 4 | silty clay to clay | 21 |
| 39.37 | 28.23 | 4.827 | 5.586 | 0.000 | 4 | silty clay to clay | 20 |
| 39.53 | 30.12 | 3.920 | 5.921 | 0.000 | 4 | silty clay to clay | 19 |
| 39.70 | 32.93 | 4.061 | 5.993 | 0.000 | 4 | silty clay to clay | 20 |
| 39.86 | 31.46 | 4.221 | 5.668 | 0.000 | 4 | silty clay to clay | 20 |
| 40.03 | 28.76 | 4.425 | 6.062 | 0.000 | 4 | silty clay to clay | 19 |
| 40.19 | 28.38 | 3.861 | 6.532 | 0.000 | 4 | silty clay to clay | 18 |
| 40.35 | 29.32 | 3.926 | 6.808 | 0.000 | 4 | silty clay to clay | 19 |
| 40.52 | 29.27 | 3.917 | 6.268 | 0.000 | 4 | silty clay to clay | 18 |
| 40.68 | 27.78 | 3.750 | 6.542 | 0.000 | 5 | clayey silt to silty clay | 14 |
| 40.85 | 28.83 | 3.142 | 6.244 | 0.000 | 5 | clayey silt to silty clay | 14 |
| 41.01 | 30.88 | 4.156 | 4.411 | 0.000 | 3 | clay | 30 |
| 41.17 | 33.15 | 9.683 | 6.291 | 0.000 | 11 | very stiff fine grained (*) | 61 |
| 41.34 | 126.86 | 5.000 | 26.443 | 0.000 | 11 | very stiff fine grained (*) | 116 |
| 41.50 | 203.87 | 5.038 | 15.367 | 0.000 | 12 | sand to clayey sand (*) | 124 |
| 41.67 | 281.88 | 5.385 | 14.722 | 0.000 | 11 | very stiff fine grained (*) | 275 |
| 41.83 | 291.77 | -32768 | 12.281 | 0.000 | 0 | <out of range> | 0 |

Data File:CPT 7 6/22/2007 8:06:02 AM
Operator:Doug Location:PG&E Solar
Cone ID:DSG0369 Job Number:297
Customer: PG&E Solar Project Units:

| Depth (ft) | Qc TSF | Fs TSF | Pw PSI | Fs/Qc (%) | Zone | Soil Behavior Type UBC-1983 | SPT N* 60% Hammer |
|---|---|---|---|---|---|---|---|
| 0.16 | 56.00 | 0.1986 | 0.798 | 0.355 | 7 | silty sand to sandy silt | 13 |
| 0.33 | 62.75 | 0.5434 | 0.660 | 0.866 | 7 | silty sand to sandy silt | 21 |
| 0.49 | 77.31 | 1.2533 | 1.278 | 1.621 | 7 | silty sand to sandy silt | 24 |
| 0.66 | 88.18 | 1.4512 | 2.244 | 1.646 | 7 | silty sand to sandy silt | 25 |
| 0.82 | 69.73 | 1.6830 | 4.406 | 2.414 | 7 | silty sand to sandy silt | 24 |
| 0.98 | 64.39 | 1.5324 | 2.616 | 2.380 | 6 | sandy silt to clayey silt | 24 |
| 1.15 | 55.23 | 1.3363 | 3.106 | 2.420 | 6 | sandy silt to clayey silt | 22 |
| 1.31 | 51.01 | 1.0992 | 1.968 | 2.155 | 6 | sandy silt to clayey silt | 20 |
| 1.48 | 48.84 | 1.0349 | 2.340 | 2.119 | 6 | sandy silt to clayey silt | 19 |
| 1.64 | 51.13 | 0.9818 | 0.761 | 1.920 | 6 | sandy silt to clayey silt | 19 |
| 1.80 | 46.60 | 0.8047 | 1.670 | 1.727 | 7 | silty sand to sandy silt | 15 |
| 1.97 | 43.38 | 0.6004 | 1.586 | 1.384 | 7 | silty sand to sandy silt | 14 |
| 2.13 | 39.83 | 0.3922 | 1.946 | 0.984 | 7 | silty sand to sandy silt | 13 |
| 2.30 | 37.90 | 0.3866 | 1.180 | 1.020 | 7 | silty sand to sandy silt | 12 |
| 2.46 | 39.41 | 0.3293 | 1.640 | 0.836 | 7 | silty sand to sandy silt | 12 |
| 2.62 | 39.75 | 0.3187 | 2.219 | 0.802 | 7 | silty sand to sandy silt | 12 |
| 2.79 | 37.17 | 0.2644 | 1.406 | 0.712 | 7 | silty sand to sandy silt | 12 |
| 2.95 | 35.85 | 0.3420 | 1.387 | 0.954 | 7 | silty sand to sandy silt | 12 |
| 3.12 | 36.43 | 0.3014 | 1.170 | 0.827 | 7 | silty sand to sandy silt | 12 |
| 3.28 | 38.16 | 0.3049 | 1.047 | 0.799 | 7 | silty sand to sandy silt | 13 |
| 3.44 | 45.94 | 0.3594 | 2.500 | 0.782 | 7 | silty sand to sandy silt | 13 |
| 3.61 | 41.76 | 0.3189 | 0.736 | 0.764 | 7 | silty sand to sandy silt | 14 |
| 3.77 | 42.05 | 0.3693 | 1.727 | 0.878 | 7 | silty sand to sandy silt | 15 |
| 3.94 | 52.48 | 0.4412 | 1.101 | 0.841 | 7 | silty sand to sandy silt | 17 |
| 4.10 | 64.50 | 0.8293 | 1.480 | 1.286 | 7 | silty sand to sandy silt | 22 |
| 4.27 | 89.46 | 1.3626 | 2.480 | 1.523 | 7 | silty sand to sandy silt | 26 |
| 4.43 | 93.29 | 2.0499 | 2.145 | 2.197 | 7 | silty sand to sandy silt | 30 |
| 4.59 | 95.18 | 3.0403 | 2.712 | 3.194 | 6 | sandy silt to clayey silt | 41 |
| 4.76 | 134.24 | 4.0872 | 4.429 | 3.045 | 6 | sandy silt to clayey silt | 49 |
| 4.92 | 151.02 | 4.4667 | 7.138 | 2.958 | 6 | sandy silt to clayey silt | 55 |
| 5.09 | 142.58 | 4.4546 | 7.039 | 3.124 | 6 | sandy silt to clayey silt | 56 |
| 5.25 | 144.63 | 6.4778 | 16.473 | 4.479 | 11 | very stiff fine grained (*) | 142 |
| 5.41 | 158.31 | 7.8145 | 5.734 | 4.936 | 11 | very stiff fine grained (*) | 162 |
| 5.58 | 204.02 | 10.8289 | 1.943 | 5.308 | 11 | very stiff fine grained (*) | 182 |
| 5.74 | 206.96 | 11.6707 | 1.254 | 5.639 | 11 | very stiff fine grained (*) | 187 |
| 5.91 | 175.97 | 11.6400 | 0.567 | 6.615 | 11 | very stiff fine grained (*) | 170 |
| 6.07 | 149.93 | 11.2300 | -0.411 | 7.490 | 11 | very stiff fine grained (*) | 157 |
| 6.23 | 167.00 | 11.1710 | 0.175 | 6.689 | 11 | very stiff fine grained (*) | 154 |
| 6.40 | 165.31 | 11.6745 | 0.374 | 7.062 | 11 | very stiff fine grained (*) | 148 |
| 6.56 | 132.36 | 10.2709 | 3.005 | 7.760 | 11 | very stiff fine grained (*) | 134 |
| 6.73 | 122.12 | 8.4942 | 12.283 | 6.955 | 11 | very stiff fine grained (*) | 116 |
| 6.89 | 108.41 | 7.0622 | 5.658 | 6.514 | 11 | very stiff fine grained (*) | 100 |
| 7.05 | 83.38 | 4.9872 | 11.719 | 5.981 | 11 | very stiff fine grained (*) | 85 |
| 7.22 | 73.15 | 3.7217 | 10.791 | 5.088 | 11 | very stiff fine grained (*) | 72 |
| 7.38 | 69.87 | 3.3248 | 7.251 | 4.759 | 11 | very stiff fine grained (*) | 65 |
| 7.55 | 59.25 | 3.0960 | 5.249 | 5.226 | 4 | silty clay to clay | 39 |
| 7.71 | 54.27 | 2.8814 | 0.768 | 5.309 | 3 | clay | 53 |
| 7.87 | 51.71 | 3.0791 | 1.542 | 5.955 | 3 | clay | 55 |
| 8.04 | 66.90 | 3.5656 | 2.057 | 5.330 | 4 | silty clay to clay | 37 |
| 8.20 | 53.55 | 1.4215 | -1.232 | 2.655 | 4 | silty clay to clay | 34 |
| 8.37 | 38.17 | 1.9673 | 3.727 | 5.154 | 4 | silty clay to clay | 25 |
| 8.53 | 23.72 | 1.9004 | 5.500 | 8.013 | 3 | clay | 35 |
| 8.69 | 46.53 | 2.2409 | 6.766 | 4.816 | 3 | clay | 37 |
| 8.86 | 45.73 | 2.3833 | 6.505 | 5.211 | 3 | clay | 44 |
| 9.02 | 46.47 | 2.3764 | 6.131 | 5.114 | 3 | clay | 44 |
| 9.19 | 46.89 | 2.3358 | 5.934 | 4.981 | 3 | clay | 44 |
| 9.35 | 45.03 | 2.6185 | 4.899 | 5.815 | 3 | clay | 47 |
| 9.51 | 53.58 | 2.9235 | 5.148 | 5.457 | 3 | clay | 48 |
| 9.68 | 52.83 | 3.3157 | 2.180 | 6.276 | 3 | clay | 52 |
| 9.84 | 56.71 | 3.3897 | 3.544 | 5.977 | 3 | clay | 52 |
| 10.01 | 52.50 | 3.5619 | 0.369 | 6.785 | 3 | clay | 51 |
| 10.17 | 50.95 | 3.1858 | 1.222 | 6.253 | 3 | clay | 48 |
| 10.33 | 47.63 | 3.4844 | 2.818 | 7.315 | 3 | clay | 50 |
| 10.50 | 58.03 | 3.6782 | 3.581 | 6.338 | 3 | clay | 50 |
| 10.66 | 51.87 | 3.8009 | 2.330 | 7.329 | 3 | clay | 52 |
| 10.83 | 53.40 | 3.6146 | 3.596 | 6.769 | 3 | clay | 49 |
| 10.99 | 49.15 | 3.5519 | 2.837 | 7.227 | 3 | clay | 48 |
| 11.15 | 47.86 | 3.4430 | 4.768 | 7.194 | 3 | clay | 47 |
| 11.32 | 50.08 | 3.3835 | 3.278 | 6.756 | 3 | clay | 47 |
| 11.48 | 48.30 | 3.0379 | 5.894 | 6.290 | 3 | clay | 48 |
| 11.65 | 52.65 | 3.2847 | 7.108 | 6.239 | 3 | clay | 50 |
| 11.81 | 55.90 | 3.3116 | 5.128 | 5.924 | 3 | clay | 52 |
| 11.98 | 52.74 | 3.4945 | 6.559 | 6.626 | 3 | clay | 53 |
| 12.14 | 56.36 | 3.1582 | 5.911 | 5.604 | 3 | clay | 52 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12.30 | 52.90 | 2.7657 | 5.672 | 5.228 | 3 | clay | 50 |
| 12.47 | 48.28 | 2.6106 | 6.557 | 5.407 | 3 | clay | 49 |
| 12.63 | 50.95 | 2.9093 | 7.347 | 5.710 | 3 | clay | 50 |
| 12.80 | 56.63 | 3.2499 | 8.099 | 5.739 | 3 | clay | 52 |
| 12.96 | 55.42 | 3.2903 | 7.106 | 5.937 | 3 | clay | 56 |
| 13.12 | 62.71 | 3.2713 | 9.367 | 5.217 | 3 | clay | 56 |
| 13.29 | 57.36 | 3.1404 | 7.382 | 5.475 | 3 | clay | 55 |
| 13.45 | 50.98 | 2.7633 | 9.830 | 5.421 | 3 | clay | 49 |
| 13.62 | 45.53 | 2.2826 | 9.256 | 5.013 | 3 | clay | 43 |
| 13.78 | 38.99 | 2.0801 | 9.027 | 5.335 | 3 | clay | 40 |
| 13.94 | 39.11 | 2.1083 | 7.941 | 5.391 | 3 | clay | 38 |
| 14.11 | 39.16 | 2.0586 | 7.025 | 5.256 | 3 | clay | 38 |
| 14.27 | 41.60 | 2.5372 | 7.970 | 6.099 | 3 | clay | 43 |
| 14.44 | 52.72 | 2.7819 | 6.236 | 5.277 | 3 | clay | 45 |
| 14.60 | 47.28 | 3.0570 | 4.830 | 6.465 | 3 | clay | 51 |
| 14.76 | 58.37 | 2.2966 | 7.039 | 3.934 | 4 | silty clay to clay | 34 |
| 14.93 | 53.31 | 2.3137 | 6.773 | 4.340 | 4 | silty clay to clay | 35 |
| 15.09 | 53.59 | 2.7849 | 12.325 | 5.197 | 4 | silty clay to clay | 37 |
| 15.26 | 64.33 | 3.4629 | 9.118 | 5.383 | 11 | very stiff fine grained (*) | 59 |
| 15.42 | 65.97 | 3.8168 | 8.623 | 5.786 | 11 | very stiff fine grained (*) | 63 |
| 15.58 | 67.89 | 3.8671 | 10.704 | 5.696 | 11 | very stiff fine grained (*) | 67 |
| 15.75 | 76.51 | 4.3439 | 12.187 | 5.678 | 11 | very stiff fine grained (*) | 71 |
| 15.91 | 77.28 | 4.4335 | 8.744 | 5.737 | 11 | very stiff fine grained (*) | 72 |
| 16.08 | 70.01 | 4.3807 | 10.298 | 6.257 | 11 | very stiff fine grained (*) | 73 |
| 16.24 | 80.55 | 4.4871 | 11.108 | 5.570 | 11 | very stiff fine grained (*) | 88 |
| 16.40 | 125.52 | 5.0607 | 7.714 | 4.032 | 11 | very stiff fine grained (*) | 109 |
| 16.57 | 134.48 | 6.6201 | 2.828 | 4.923 | 11 | very stiff fine grained (*) | 128 |
| 16.73 | 141.36 | 7.1498 | 2.017 | 5.058 | 11 | very stiff fine grained (*) | 139 |
| 16.90 | 159.45 | 6.9620 | 3.833 | 4.366 | 11 | very stiff fine grained (*) | 147 |
| 17.06 | 161.23 | 6.4107 | 2.500 | 3.976 | 11 | very stiff fine grained (*) | 140 |
| 17.22 | 118.87 | 5.3077 | 0.224 | 4.465 | 11 | very stiff fine grained (*) | 113 |
| 17.39 | 73.67 | 4.0325 | 1.180 | 5.474 | 11 | very stiff fine grained (*) | 83 |
| 17.55 | 67.03 | 2.5129 | 8.892 | 3.749 | 5 | clayey silt to silty clay | 32 |
| 17.72 | 61.01 | 2.1965 | 7.685 | 3.600 | 5 | clayey silt to silty clay | 30 |
| 17.88 | 59.13 | 2.8382 | 7.010 | 4.800 | 5 | clayey silt to silty clay | 31 |
| 18.04 | 71.46 | 3.0729 | 6.823 | 4.300 | 4 | silty clay to clay | 43 |
| 18.21 | 73.39 | 3.7321 | 4.571 | 5.086 | 11 | very stiff fine grained (*) | 75 |
| 18.37 | 90.97 | 4.1888 | 6.564 | 4.605 | 11 | very stiff fine grained (*) | 76 |
| 18.54 | 74.11 | 4.2111 | 2.941 | 5.682 | 11 | very stiff fine grained (*) | 75 |
| 18.70 | 68.58 | 3.4835 | 6.879 | 5.080 | 11 | very stiff fine grained (*) | 69 |
| 18.86 | 73.57 | 3.1828 | 7.764 | 4.326 | 11 | very stiff fine grained (*) | 69 |
| 19.03 | 75.22 | 3.5906 | 7.616 | 4.773 | 11 | very stiff fine grained (*) | 74 |
| 19.19 | 81.21 | 5.3799 | 8.394 | 6.625 | 11 | very stiff fine grained (*) | 85 |
| 19.36 | 108.26 | 6.6220 | 4.700 | 6.117 | 11 | very stiff fine grained (*) | 93 |
| 19.52 | 101.38 | 7.1171 | 2.842 | 7.020 | 11 | very stiff fine grained (*) | 95 |
| 19.69 | 88.07 | 6.2504 | 7.360 | 7.097 | 11 | very stiff fine grained (*) | 84 |
| 19.85 | 73.36 | 4.6873 | 4.209 | 6.390 | 11 | very stiff fine grained (*) | 73 |
| 20.01 | 66.03 | 3.6340 | 8.328 | 5.503 | 11 | very stiff fine grained (*) | 67 |
| 20.18 | 69.19 | 3.6413 | 9.929 | 5.263 | 11 | very stiff fine grained (*) | 65 |
| 20.34 | 69.50 | 4.5787 | 6.126 | 6.588 | 11 | very stiff fine grained (*) | 71 |
| 20.51 | 84.57 | 4.1971 | 10.042 | 4.963 | 11 | very stiff fine grained (*) | 70 |
| 20.67 | 65.29 | 3.8570 | 6.030 | 5.907 | 11 | very stiff fine grained (*) | 68 |
| 20.83 | 63.61 | 3.1605 | 9.118 | 4.968 | 11 | very stiff fine grained (*) | 62 |
| 21.00 | 65.31 | 3.0341 | 13.017 | 4.646 | 4 | silty clay to clay | 42 |
| 21.16 | 66.80 | 3.2229 | 15.089 | 4.825 | 4 | silty clay to clay | 42 |
| 21.33 | 65.50 | 3.1524 | 11.847 | 4.813 | 4 | silty clay to clay | 44 |
| 21.49 | 71.57 | 3.2638 | 14.732 | 4.560 | 4 | silty clay to clay | 45 |
| 21.65 | 72.81 | 3.5237 | 11.946 | 4.839 | 11 | very stiff fine grained (*) | 69 |
| 21.82 | 72.60 | 3.3937 | 9.670 | 4.674 | 4 | silty clay to clay | 45 |
| 21.98 | 66.32 | 3.0732 | 9.675 | 4.634 | 4 | silty clay to clay | 43 |
| 22.15 | 62.50 | 2.8645 | 9.264 | 4.583 | 5 | clayey silt to silty clay | 31 |
| 22.31 | 65.36 | 2.7138 | 13.352 | 4.152 | 5 | clayey silt to silty clay | 31 |
| 22.47 | 67.44 | 2.7851 | 14.653 | 4.130 | 5 | clayey silt to silty clay | 32 |
| 22.64 | 69.87 | 3.4106 | 19.995 | 4.881 | 4 | silty clay to clay | 47 |
| 22.80 | 81.18 | 3.9405 | 15.350 | 4.854 | 11 | very stiff fine grained (*) | 74 |
| 22.97 | 79.99 | 3.7832 | 18.069 | 4.730 | 11 | very stiff fine grained (*) | 75 |
| 23.13 | 72.00 | 3.5666 | 23.532 | 4.954 | 11 | very stiff fine grained (*) | 72 |
| 23.29 | 73.70 | 3.3535 | 19.224 | 4.550 | 11 | very stiff fine grained (*) | 68 |
| 23.46 | 65.71 | 3.5115 | 15.623 | 5.344 | 11 | very stiff fine grained (*) | 66 |
| 23.62 | 66.27 | 3.8271 | 11.623 | 5.775 | 11 | very stiff fine grained (*) | 62 |
| 23.79 | 62.20 | 3.9537 | 7.182 | 6.357 | 11 | very stiff fine grained (*) | 61 |
| 23.95 | 61.96 | 3.7084 | 6.103 | 5.985 | 11 | very stiff fine grained (*) | 59 |
| 24.11 | 60.42 | 3.2268 | 7.288 | 5.341 | 11 | very stiff fine grained (*) | 58 |
| 24.28 | 58.65 | 3.4034 | 8.736 | 5.802 | 11 | very stiff fine grained (*) | 62 |
| 24.44 | 73.27 | 3.5291 | 14.990 | 4.816 | 11 | very stiff fine grained (*) | 64 |
| 24.61 | 69.19 | 4.0796 | 13.530 | 5.896 | 11 | very stiff fine grained (*) | 67 |
| 24.77 | 66.67 | 3.6776 | 10.251 | 5.516 | 11 | very stiff fine grained (*) | 63 |
| 24.93 | 62.49 | 3.4569 | 10.798 | 5.532 | 11 | very stiff fine grained (*) | 59 |
| 25.10 | 54.78 | 3.0453 | 9.764 | 5.560 | 3 | clay | 54 |
| 25.26 | 52.02 | 2.4360 | 12.596 | 4.683 | 4 | silty clay to clay | 33 |
| 25.43 | 47.67 | 1.9126 | 14.594 | 4.012 | 4 | silty clay to clay | 31 |
| 25.59 | 45.45 | 1.8616 | 14.049 | 4.096 | 4 | silty clay to clay | 29 |
| 25.75 | 44.45 | 2.2741 | 12.712 | 5.116 | 4 | silty clay to clay | 34 |
| 25.92 | 71.08 | 2.9745 | 14.904 | 4.185 | 4 | silty clay to clay | 38 |
| 26.08 | 64.23 | 3.1158 | 7.867 | 4.851 | 4 | silty clay to clay | 39 |
| 26.25 | 48.78 | 2.4104 | 10.956 | 4.941 | 4 | silty clay to clay | 33 |
| 26.41 | 39.94 | 1.9479 | 9.032 | 4.878 | 3 | clay | 40 |
| 26.57 | 37.34 | 1.8907 | 8.485 | 5.064 | 3 | clay | 38 |
| 26.74 | 40.30 | 1.9706 | 9.507 | 4.890 | 4 | silty clay to clay | 27 |
| 26.90 | 47.75 | 2.2050 | 11.828 | 4.618 | 4 | silty clay to clay | 30 |
| 27.07 | 54.36 | 2.3497 | 15.015 | 4.322 | 4 | silty clay to clay | 32 |
| 27.23 | 48.29 | 2.3781 | 13.672 | 4.925 | 4 | silty clay to clay | 31 |
| 27.40 | 42.68 | 2.1461 | 11.919 | 5.028 | 3 | clay | 42 |
| 27.56 | 40.98 | 2.5045 | 12.251 | 6.112 | 3 | clay | 45 |
| 27.72 | 56.39 | 2.9314 | 12.938 | 5.199 | 3 | clay | 48 |
| 27.89 | 51.56 | 2.8030 | 10.746 | 5.436 | 3 | clay | 50 |
| 28.05 | 47.65 | 2.5626 | 10.301 | 5.378 | 3 | clay | 45 |
| 28.22 | 42.90 | 2.4438 | 9.081 | 5.697 | 3 | clay | 41 |
| 28.38 | 39.02 | 2.0778 | 8.042 | 5.325 | 3 | clay | 37 |
| 28.54 | 35.07 | 1.7582 | 7.916 | 5.014 | 3 | clay | 35 |
| 28.71 | 33.77 | 1.5290 | 8.232 | 4.528 | 3 | clay | 31 |
| 28.87 | 28.85 | 1.4956 | 6.879 | 5.184 | 3 | clay | 29 |
| 29.04 | 27.50 | 1.5947 | 6.399 | 5.799 | 3 | clay | 28 |
| 29.20 | 30.73 | 1.7000 | 6.860 | 5.532 | 3 | clay | 29 |
| 29.36 | 31.08 | 1.6093 | 6.389 | 5.179 | 3 | clay | 29 |
| 29.53 | 28.08 | 1.4078 | 6.399 | 5.013 | 3 | clay | 28 |
| 29.69 | 26.82 | 1.1039 | 7.480 | 4.116 | 4 | silty clay to clay | 17 |
| 29.86 | 25.44 | 0.9958 | 8.239 | 3.914 | 4 | silty clay to clay | 17 |
| 30.02 | 26.66 | 0.8731 | 8.204 | 3.275 | 5 | clay ey silt to silty clay | 12 |
| 30.18 | 25.08 | 0.8785 | 8.352 | 3.503 | 5 | clayey silt to silty clay | 12 |
| 30.35 | 24.07 | 0.8408 | 8.246 | 3.494 | 5 | clayey silt to silty clay | 12 |
| 30.51 | 24.83 | 0.7734 | 9.256 | 3.114 | 5 | clayey silt to silty clay | 12 |
| 30.68 | 27.27 | 1.0429 | 10.148 | 3.824 | 5 | clayey silt to silty clay | 13 |
| 30.84 | 31.69 | 1.3010 | 14.325 | 4.105 | 4 | silty clay to clay | 20 |
| 31.00 | 35.21 | 1.6759 | 14.702 | 4.760 | 3 | clay | 33 |
| 31.17 | 37.39 | 2.5903 | 15.857 | 6.928 | 3 | clay | 46 |
| 31.33 | 71.10 | 4.3675 | 22.047 | 6.143 | 11 | very stiff fine grained (*) | 59 |
| 31.50 | 76.37 | 4.1524 | 2.773 | 5.437 | 11 | very stiff fine grained (*) | 62 |
| 31.66 | 47.24 | 3.0231 | 3.236 | 6.400 | 11 | very stiff fine grained (*) | 66 |
| 31.82 | 81.73 | 3.4787 | 22.266 | 4.256 | 5 | clayey silt to silty clay | 43 |
| 31.99 | 137.25 | 4.8862 | 6.860 | 3.560 | 11 | very stiff fine grained (*) | 116 |
| 32.15 | 145.37 | 6.2248 | -0.190 | 4.282 | 11 | very stiff fine grained (*) | 136 |
| 32.32 | 143.51 | 7.4143 | -0.057 | 5.166 | 11 | very stiff fine grained (*) | 144 |
| 32.48 | 161.79 | 7.1357 | 1.076 | 4.410 | 11 | very stiff fine grained (*) | 159 |
| 32.64 | 191.33 | 6.9798 | 3.015 | 3.648 | 12 | sand to clayey sand (*) | 91 |
| 32.81 | 219.72 | 6.7796 | 3.039 | 3.086 | 12 | sand to clayey sand (*) | 85 |
| 32.97 | 120.75 | 6.1462 | -0.037 | 5.090 | 11 | very stiff fine grained (*) | 126 |
| 33.14 | 55.33 | 3.9952 | 1.761 | 7.220 | 11 | very stiff fine grained (*) | 73 |
| 33.30 | 50.91 | 2.2891 | 16.394 | 4.496 | 3 | clay | 48 |
| 33.46 | 44.26 | 1.9025 | 10.633 | 4.299 | 4 | silty clay to clay | 28 |
| 33.63 | 38.20 | 1.6318 | 8.670 | 4.272 | 4 | silty clay to clay | 25 |
| 33.79 | 33.88 | 1.3764 | 6.525 | 4.063 | 4 | silty clay to clay | 22 |
| 33.96 | 31.45 | 1.4407 | 7.567 | 4.581 | 4 | silty clay to clay | 20 |
| 34.12 | 28.92 | 1.3283 | 5.756 | 4.592 | 3 | clay | 28 |
| 34.28 | 27.19 | 1.3000 | 6.175 | 4.782 | 3 | clay | 27 |
| 34.45 | 27.33 | 1.2946 | 5.360 | 4.738 | 3 | clay | 27 |
| 34.61 | 30.73 | 1.3388 | 6.801 | 4.357 | 4 | silty clay to clay | 19 |
| 34.78 | 29.77 | 1.3759 | 6.067 | 4.621 | 4 | silty clay to clay | 19 |
| 34.94 | 30.16 | 1.2634 | 6.406 | 4.189 | 4 | silty clay to clay | 19 |
| 35.10 | 30.38 | 1.3308 | 5.761 | 4.380 | 4 | silty clay to clay | 20 |
| 35.27 | 32.31 | 1.4810 | 7.116 | 4.583 | 4 | silty clay to clay | 21 |
| 35.43 | 35.51 | 1.7169 | 5.867 | 4.835 | 3 | clay | 32 |
| 35.60 | 30.98 | 1.8390 | 4.704 | 5.936 | 3 | clay | 31 |
| 35.76 | 30.70 | 1.8525 | 5.246 | 6.034 | 3 | clay | 32 |
| 35.93 | 38.30 | 1.8087 | 7.261 | 4.722 | 3 | clay | 33 |
| 36.09 | 34.56 | 1.8642 | 5.192 | 5.394 | 3 | clay | 33 |
| 36.25 | 29.92 | 1.5694 | 7.502 | 5.246 | 3 | clay | 30 |
| 36.42 | 30.25 | 1.4472 | 6.069 | 4.784 | 3 | clay | 29 |
| 36.58 | 30.55 | 1.6034 | 6.655 | 5.248 | 3 | clay | 29 |
| 36.75 | 30.66 | 1.5960 | 5.727 | 5.206 | 3 | clay | 29 |
| 36.91 | 27.99 | 1.6300 | 4.589 | 5.824 | 3 | clay | 27 |
| 37.07 | 26.20 | 1.4160 | 5.145 | 5.405 | 3 | clay | 27 |
| 37.24 | 28.63 | 1.3636 | 7.027 | 4.763 | 3 | clay | 27 |
| 37.40 | 28.96 | 1.3875 | 6.475 | 4.791 | 3 | clay | 28 |
| 37.57 | 28.43 | 1.3906 | 6.168 | 4.892 | 3 | clay | 27 |
| 37.73 | 28.45 | 1.4171 | 6.480 | 4.982 | 3 | clay | 27 |
| 37.89 | 28.65 | 1.4346 | 5.909 | 5.007 | 3 | clay | 27 |
| 38.06 | 27.30 | 1.3901 | 5.534 | 5.093 | 3 | clay | 26 |
| 38.22 | 26.67 | 1.2498 | 6.271 | 4.686 | 3 | clay | 26 |
| 38.39 | 28.32 | 1.2234 | 6.781 | 4.320 | 4 | silty clay to clay | 18 |
| 38.55 | 30.64 | 1.3286 | 7.310 | 4.337 | 4 | silty clay to clay | 18 |
| 38.71 | 27.56 | 1.1888 | 4.567 | 4.313 | 4 | silty clay to clay | 17 |
| 38.88 | 23.24 | 0.9408 | 6.751 | 4.049 | 4 | silty clay to clay | 16 |
| 39.04 | 25.55 | 0.8696 | 8.212 | 3.403 | 5 | clayey silt to silty clay | 12 |
| 39.21 | 26.24 | 0.9426 | 8.663 | 3.592 | 5 | clayey silt to silty clay | 12 |
| 39.37 | 25.01 | 0.9494 | 9.473 | 3.796 | 4 | silty clay to clay | 17 |
| 39.53 | 26.50 | 1.0511 | 10.761 | 3.966 | 4 | silty clay to clay | 17 |
| 39.70 | 27.89 | 1.1629 | 9.672 | 4.169 | 4 | silty clay to clay | 17 |
| 39.86 | 27.38 | 1.2226 | 9.347 | 4.466 | 3 | clay | 27 |
| 40.03 | 28.09 | 1.5360 | 9.815 | 5.468 | 3 | clay | 27 |
| 40.19 | 29.11 | 1.6200 | 10.776 | 5.565 | 3 | clay | 28 |
| 40.35 | 31.23 | 1.5405 | 17.086 | 4.933 | 3 | clay | 29 |
| 40.52 | 31.10 | 1.6429 | 18.510 | 5.283 | 3 | clay | 31 |
| 40.68 | 32.64 | 1.4916 | 15.345 | 4.570 | 3 | clay | 30 |
| 40.85 | 28.44 | 1.2568 | 14.658 | 4.419 | 4 | silty clay to clay | 18 |
| 41.01 | 22.81 | 0.9064 | 15.773 | 3.974 | 4 | silty clay to clay | 16 |
| 41.17 | 23.37 | 0.8858 | 19.638 | 3.790 | 4 | silty clay to clay | 16 |
| 41.34 | 26.62 | 0.9654 | 19.049 | 3.626 | 4 | silty clay to clay | 17 |
| 41.50 | 28.56 | 1.1396 | 18.288 | 3.989 | 4 | silty clay to clay | 18 |
| 41.67 | 28.25 | 1.3797 | 16.840 | 4.883 | 3 | clay | 27 |
| 41.83 | 28.09 | 1.5034 | 16.801 | 5.353 | 4 | silty clay to clay | 22 |
| 41.99 | 44.96 | 1.7169 | 17.074 | 3.819 | 4 | silty clay to clay | 24 |
| 42.16 | 39.00 | 1.6573 | 10.628 | 4.249 | 4 | silty clay to clay | 24 |
| 42.32 | 28.85 | 1.3894 | 22.586 | 4.817 | 4 | silty clay to clay | 21 |
| 42.49 | 28.43 | 1.3886 | 21.837 | 4.884 | 3 | clay | 28 |
| 42.65 | 29.54 | 1.4302 | 17.769 | 4.842 | 3 | clay | 28 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 42.81 | 28.79 | 1.4631 | 19.571 | 5.082 | 3 | clay | 28 |
| 42.98 | 28.06 | 1.4193 | 21.995 | 5.058 | 3 | clay | 27 |
| 43.14 | 27.42 | 1.2916 | 21.131 | 4.711 | 3 | clay | 26 |
| 43.31 | 25.91 | 1.1542 | 20.416 | 4.454 | 4 | silty clay to clay | 17 |
| 43.47 | 24.74 | 0.9789 | 20.471 | 3.957 | 4 | silty clay to clay | 16 |
| 43.64 | 23.35 | 0.9016 | 19.542 | 3.862 | 4 | silty clay to clay | 15 |
| 43.80 | 20.93 | 0.8774 | 20.138 | 4.192 | 4 | silty clay to clay | 15 |
| 43.96 | 23.84 | 1.0266 | 21.399 | 4.306 | 4 | silty clay to clay | 16 |
| 44.13 | 28.63 | 1.1902 | 16.217 | 4.158 | 4 | silty clay to clay | 17 |
| 44.29 | 28.69 | 1.2314 | 18.266 | 4.291 | 4 | silty clay to clay | 18 |
| 44.46 | 26.82 | 1.2433 | 19.313 | 4.635 | 4 | silty clay to clay | 17 |
| 44.62 | 25.67 | 1.1510 | 21.121 | 4.484 | 3 | clay | 26 |
| 44.78 | 26.86 | 1.2357 | 22.727 | 4.601 | 3 | clay | 27 |
| 44.95 | 29.93 | 1.4268 | 22.943 | 4.768 | 3 | clay | 30 |
| 45.11 | 34.91 | 1.6446 | 24.562 | 4.711 | 4 | silty clay to clay | 22 |
| 45.28 | 35.35 | 1.6159 | 23.443 | 4.571 | 4 | silty clay to clay | 22 |
| 45.44 | 33.41 | 1.6098 | 23.761 | 4.819 | 4 | silty clay to clay | 22 |
| 45.60 | 32.59 | 1.5389 | 23.906 | 4.722 | 4 | silty clay to clay | 21 |
| 45.77 | 32.09 | 1.4482 | 26.862 | 4.512 | 4 | silty clay to clay | 21 |
| 45.93 | 34.22 | 1.6055 | 25.507 | 4.692 | 3 | clay | 33 |
| 46.10 | 35.54 | 1.8678 | 23.190 | 5.255 | 3 | clay | 34 |
| 46.26 | 34.66 | 1.7120 | 22.773 | 4.939 | 3 | clay | 34 |
| 46.42 | 34.42 | 1.7901 | 24.000 | 5.200 | 3 | clay | 33 |
| 46.59 | 34.88 | 1.8167 | 20.246 | 5.209 | 3 | clay | 33 |
| 46.75 | 32.01 | 1.7637 | 21.059 | 5.510 | 3 | clay | 32 |
| 46.92 | 32.58 | 1.7190 | 19.805 | 5.276 | 3 | clay | 31 |
| 47.08 | 31.71 | 1.8410 | 18.685 | 5.807 | 3 | clay | 31 |
| 47.24 | 30.60 | 1.7200 | 17.539 | 5.621 | 3 | clay | 29 |
| 47.41 | 29.29 | 1.3732 | 18.628 | 4.688 | 3 | clay | 29 |
| 47.57 | 29.49 | 1.3462 | 20.490 | 4.564 | 4 | silty clay to clay | 20 |
| 47.74 | 32.06 | 1.4873 | 21.404 | 4.639 | 4 | silty clay to clay | 21 |
| 47.90 | 38.31 | 1.8343 | 25.064 | 4.787 | 4 | silty clay to clay | 25 |
| 48.06 | 44.48 | 2.0549 | 24.697 | 4.620 | 4 | silty clay to clay | 27 |
| 48.23 | 43.56 | 2.1168 | 24.995 | 4.859 | 4 | silty clay to clay | 28 |
| 48.39 | 43.44 | 2.0461 | 25.493 | 4.710 | 4 | silty clay to clay | 28 |
| 48.56 | 41.73 | 2.0000 | 23.860 | 4.792 | 4 | silty clay to clay | 27 |
| 48.72 | 41.62 | 1.9382 | 25.096 | 4.656 | 4 | silty clay to clay | 27 |
| 48.88 | 43.75 | 2.0561 | 26.562 | 4.700 | 4 | silty clay to clay | 28 |
| 49.05 | 43.63 | 2.0813 | 24.769 | 4.771 | 4 | silty clay to clay | 28 |
| 49.21 | 41.28 | 1.9121 | 25.682 | 4.632 | 4 | silty clay to clay | 27 |
| 49.38 | 40.28 | 1.8701 | 27.027 | 4.643 | 4 | silty clay to clay | 26 |
| 49.54 | 41.15 | 1.9318 | 25.402 | 4.695 | 4 | silty clay to clay | 26 |
| 49.70 | 41.01 | 1.8044 | 25.480 | 4.400 | 4 | silty clay to clay | 26 |
| 49.87 | 37.77 | 1.7152 | 23.370 | 4.541 | 4 | silty clay to clay | 25 |
| 50.03 | 35.64 | 1.5920 | 23.126 | 4.468 | 4 | silty clay to clay | 23 |
| 50.20 | 32.70 | 1.5092 | 22.658 | 4.615 | 4 | silty clay to clay | 21 |
| 50.36 | 31.38 | 1.3699 | 22.751 | 4.365 | 4 | silty clay to clay | 20 |
| 50.52 | 29.42 | 1.2851 | 22.571 | 4.368 | 4 | silty clay to clay | 19 |
| 50.69 | 26.91 | 1.2009 | 21.049 | 4.462 | 4 | silty clay to clay | 17 |
| 50.85 | 24.13 | 1.0367 | 20.483 | 4.297 | 4 | silty clay to clay | 16 |
| 51.02 | 22.78 | 0.8753 | 21.320 | 3.843 | 4 | silty clay to clay | 15 |
| 51.18 | 23.91 | 0.8844 | 22.771 | 3.698 | 4 | silty clay to clay | 16 |
| 51.35 | 25.49 | 0.9781 | 25.148 | 3.837 | 4 | silty clay to clay | 17 |
| 51.51 | 27.46 | 1.0976 | 25.951 | 3.997 | 4 | silty clay to clay | 17 |
| 51.67 | 27.52 | 1.1654 | 23.818 | 4.234 | 4 | silty clay to clay | 18 |
| 51.84 | 27.36 | 1.1287 | 23.168 | 4.125 | 4 | silty clay to clay | 18 |
| 52.00 | 27.22 | 1.0526 | 22.953 | 3.866 | 4 | silty clay to clay | 17 |
| 52.17 | 26.34 | 1.0193 | 24.397 | 3.870 | 4 | silty clay to clay | 18 |
| 52.33 | 28.04 | 1.1294 | 26.052 | 4.029 | 4 | silty clay to clay | 19 |
| 52.49 | 33.71 | 1.3454 | 30.980 | 3.991 | 4 | silty clay to clay | 26 |
| 52.66 | 60.39 | 3.3406 | 35.113 | 5.531 | 11 | very stiff fine grained (*) | 57 |
| 52.82 | 84.41 | 5.1410 | 28.778 | 6.091 | 11 | very stiff fine grained (*) | 73 |
| 52.99 | 83.42 | 5.9413 | 12.660 | 7.122 | 11 | very stiff fine grained (*) | 85 |
| 53.15 | 96.31 | 5.9706 | 26.983 | 6.199 | 11 | very stiff fine grained (*) | 80 |
| 53.31 | 71.26 | 4.7554 | 6.005 | 6.673 | 11 | very stiff fine grained (*) | 68 |
| 53.48 | 44.01 | 2.6468 | 11.057 | 6.014 | 3 | clay | 49 |
| 53.64 | 38.93 | 1.6018 | 19.096 | 4.114 | 4 | silty clay to clay | 26 |
| 53.81 | 38.78 | 1.4665 | 20.032 | 3.782 | 5 | clayey silt to silty clay | 19 |
| 53.97 | 38.26 | 1.5088 | 18.958 | 3.944 | 5 | clayey silt to silty clay | 19 |
| 54.13 | 38.19 | 1.4413 | 19.557 | 3.774 | 5 | clayey silt to silty clay | 18 |
| 54.30 | 38.42 | 1.3914 | 18.079 | 3.621 | 5 | clayey silt to silty clay | 18 |
| 54.46 | 37.62 | 1.3791 | 19.411 | 3.666 | 5 | clayey silt to silty clay | 19 |
| 54.63 | 39.15 | 1.4314 | 19.904 | 3.656 | 5 | clayey silt to silty clay | 19 |
| 54.79 | 40.37 | 1.5786 | 20.392 | 3.910 | 5 | clayey silt to silty clay | 20 |
| 54.95 | 42.45 | 1.6768 | 20.938 | 3.950 | 5 | clayey silt to silty clay | 20 |
| 55.12 | 44.09 | 1.6967 | 20.613 | 3.848 | 5 | clayey silt to silty clay | 21 |
| 55.28 | 43.09 | 1.6439 | 20.113 | 3.815 | 5 | clayey silt to silty clay | 21 |
| 55.45 | 42.10 | 1.6201 | 22.483 | 3.848 | 5 | clayey silt to silty clay | 21 |
| 55.61 | 42.40 | 1.6171 | 20.650 | 3.814 | 5 | clayey silt to silty clay | 20 |
| 55.77 | 42.40 | 1.7168 | 19.751 | 4.049 | 5 | clayey silt to silty clay | 20 |
| 55.94 | 41.96 | 1.6099 | 19.209 | 3.837 | 5 | clayey silt to silty clay | 20 |
| 56.10 | 40.09 | 1.6897 | 20.200 | 4.215 | 5 | clayey silt to silty clay | 19 |
| 56.27 | 37.31 | 1.5621 | 20.101 | 4.187 | 5 | clayey silt to silty clay | 19 |
| 56.43 | 38.46 | 1.4630 | 21.293 | 3.804 | 5 | clayey silt to silty clay | 18 |
| 56.59 | 37.40 | 1.4115 | 21.042 | 3.774 | 5 | clayey silt to silty clay | 18 |
| 56.76 | 36.62 | 1.3668 | 19.877 | 3.732 | 5 | clayey silt to silty clay | 18 |
| 56.92 | 36.52 | 1.3078 | 20.633 | 3.581 | 5 | clayey silt to silty clay | 18 |
| 57.09 | 38.31 | 1.3559 | 20.303 | 3.539 | 5 | clayey silt to silty clay | 18 |
| 57.25 | 37.87 | 1.3738 | 20.704 | 3.628 | 5 | clayey silt to silty clay | 19 |
| 57.41 | 40.06 | 1.5680 | 22.520 | 3.914 | 5 | clayey silt to silty clay | 19 |
| 57.58 | 41.60 | 1.6712 | 23.145 | 4.018 | 5 | clayey silt to silty clay | 20 |
| 57.74 | 40.90 | 1.6358 | 23.429 | 4.000 | 5 | clayey silt to silty clay | 20 |
| 57.91 | 39.35 | 1.4995 | 24.778 | 3.811 | 5 | clayey silt to silty clay | 19 |
| 58.07 | 40.64 | 1.5685 | 22.030 | 3.860 | 5 | clayey silt to silty clay | 19 |
| 58.23 | 40.05 | 1.5605 | 23.507 | 3.896 | 5 | clayey silt to silty clay | 19 |
| 58.40 | 39.83 | 1.4327 | 25.012 | 3.597 | 5 | clayey silt to silty clay | 20 |
| 58.56 | 41.81 | 1.6685 | 25.828 | 3.991 | 5 | clayey silt to silty clay | 20 |
| 58.73 | 44.28 | 2.1069 | 26.010 | 4.758 | 4 | silty clay to clay | 29 |
| 58.89 | 47.73 | 2.4950 | 23.660 | 5.227 | 3 | clay | 46 |
| 59.06 | 50.37 | 2.9437 | 27.525 | 5.844 | 4 | silty clay to clay | 32 |
| 59.22 | 51.29 | 1.3638 | 14.970 | 2.659 | 4 | silty clay to clay | 30 |
| 59.38 | 39.92 | 1.7978 | 22.397 | 4.504 | 3 | clay | 45 |
| 59.55 | 49.70 | 4.4040 | 37.581 | 8.861 | 11 | very stiff fine grained (*) | 60 |
| 59.71 | 96.25 | 6.7127 | 42.426 | 6.974 | 11 | very stiff fine grained (*) | 84 |
| 59.88 | 115.33 | 7.9738 | 16.480 | 6.914 | 11 | very stiff fine grained (*) | 107 |
| 60.04 | 122.14 | 7.8362 | 9.207 | 6.416 | 11 | very stiff fine grained (*) | 106 |
| 60.20 | 94.46 | 6.0696 | 0.643 | 6.426 | 11 | very stiff fine grained (*) | 85 |
| 60.37 | 50.50 | 3.2592 | 2.239 | 6.454 | 11 | very stiff fine grained (*) | 59 |
| 60.53 | 38.75 | 1.5212 | 9.160 | 3.926 | 3 | clay | 39 |
| 60.70 | 34.03 | 1.3570 | 10.431 | 3.988 | 5 | clayey silt to silty clay | 17 |
| 60.86 | 33.73 | 1.2672 | 14.968 | 3.757 | 5 | clayey silt to silty clay | 17 |
| 61.02 | 37.16 | 1.3444 | 15.522 | 3.618 | 5 | clayey silt to silty clay | 18 |
| 61.19 | 42.55 | 1.5246 | 15.936 | 3.583 | 5 | clayey silt to silty clay | 19 |
| 61.35 | 41.07 | 1.5440 | 19.884 | 3.759 | 5 | clayey silt to silty clay | 20 |
| 61.52 | 40.74 | 1.4590 | 19.958 | 3.581 | 5 | clayey silt to silty clay | 20 |
| 61.68 | 40.31 | 1.3244 | 20.934 | 3.286 | 5 | clayey silt to silty clay | 20 |
| 61.84 | 41.02 | 1.2725 | 20.434 | 3.102 | 5 | clayey silt to silty clay | 19 |
| 62.01 | 39.67 | 1.1518 | 21.559 | 2.904 | 6 | sandy silt to clayey silt | 16 |
| 62.17 | 41.18 | 1.0102 | 22.719 | 2.453 | 6 | sandy silt to clayey silt | 16 |
| 62.34 | 46.74 | 1.1328 | 23.424 | 2.424 | 6 | sandy silt to clayey silt | 20 |
| 62.50 | 69.59 | 2.6011 | 36.360 | 3.738 | 5 | clayey silt to silty clay | 33 |
| 62.66 | 86.79 | 5.2739 | 29.148 | 6.077 | 11 | very stiff fine grained (*) | 85 |
| 62.83 | 107.99 | 6.7902 | 23.296 | 6.288 | 11 | very stiff fine grained (*) | 113 |
| 62.99 | 157.36 | 9.6949 | 14.249 | 6.161 | 11 | very stiff fine grained (*) | 136 |
| 63.16 | 161.49 | 9.9152 | 0.340 | 6.140 | 11 | very stiff fine grained (*) | 143 |
| 63.32 | 128.97 | 9.8875 | 5.702 | 7.667 | 11 | very stiff fine grained (*) | 129 |
| 63.48 | 113.96 | 9.3429 | 15.825 | 8.198 | 11 | very stiff fine grained (*) | 114 |
| 63.65 | 114.49 | 9.1963 | 10.877 | 8.033 | 11 | very stiff fine grained (*) | 110 |
| 63.81 | 115.72 | 9.3212 | 17.394 | 8.055 | 11 | very stiff fine grained (*) | 113 |
| 63.98 | 124.22 | 9.5401 | 18.185 | 7.680 | 11 | very stiff fine grained (*) | 124 |
| 64.14 | 134.70 | 9.5358 | 12.626 | 7.079 | 11 | very stiff fine grained (*) | 126 |
| 64.30 | 128.41 | -32768 | 15.734 | -32768 | 0 | <out of range> | 0 |

Data File:CPT 8 6/22/2007 9:31:52 AM
Operator:Doug Location:PG&E Solar
Cone ID:DSG0369 Job Number:297
Customer: PG&E Solar Project Units:

| Depth (ft) | Qc TSF | Fs TSF | Pw PSI | Fs/Qc (%) | Zone | Soil Behavior Type UBC-1983 | SPT N* 60% Hammer |
|---|---|---|---|---|---|---|---|
| 0.16 | 56.80 | 0.1923 | 0.892 | 0.339 | 7 | silty sand to sandy silt | 14 |
| 0.33 | 79.01 | 0.5263 | 1.704 | 0.666 | 8 | sand to silty sand | 17 |
| 0.49 | 78.30 | 1.2652 | 0.813 | 1.616 | 7 | silty sand to sandy silt | 26 |
| 0.66 | 85.04 | 1.9667 | 0.406 | 2.313 | 6 | sandy silt to clayey silt | 30 |
| 0.82 | 68.38 | 2.2938 | 0.025 | 3.355 | 6 | sandy silt to clayey silt | 28 |
| 0.98 | 62.44 | 2.2854 | -0.034 | 3.660 | 5 | clayey silt to silty clay | 31 |
| 1.15 | 63.64 | 2.3634 | -0.241 | 3.714 | 5 | clayey silt to silty clay | 29 |
| 1.31 | 58.59 | 2.2530 | 0.025 | 3.845 | 5 | clayey silt to silty clay | 28 |
| 1.48 | 55.45 | 1.9871 | -0.214 | 3.584 | 5 | clayey silt to silty clay | 27 |
| 1.64 | 56.31 | 1.7796 | -0.071 | 3.160 | 6 | sandy silt to clayey silt | 22 |
| 1.80 | 57.43 | 1.7143 | -0.116 | 2.985 | 6 | sandy silt to clayey silt | 22 |
| 1.97 | 60.22 | 1.6590 | -0.111 | 2.755 | 6 | sandy silt to clayey silt | 24 |
| 2.13 | 69.54 | 1.9137 | 0.335 | 2.752 | 6 | sandy silt to clayey silt | 27 |
| 2.30 | 81.56 | 2.3465 | 0.635 | 2.877 | 6 | sandy silt to clayey silt | 31 |
| 2.46 | 89.85 | 2.8232 | 1.145 | 3.142 | 6 | sandy silt to clayey silt | 34 |
| 2.62 | 92.90 | 2.9153 | 2.579 | 3.138 | 6 | sandy silt to clayey silt | 37 |
| 2.79 | 108.21 | 3.1645 | 0.067 | 2.925 | 6 | sandy silt to clayey silt | 40 |
| 2.95 | 110.60 | 3.6858 | -0.456 | 3.333 | 6 | sandy silt to clayey silt | 42 |
| 3.12 | 112.92 | 5.2794 | -0.438 | 4.675 | 11 | very stiff fine grained (*) | 112 |
| 3.28 | 127.26 | 6.5519 | -0.325 | 5.149 | 11 | very stiff fine grained (*) | 126 |
| 3.44 | 155.21 | 7.5731 | 1.182 | 4.879 | 11 | very stiff fine grained (*) | 148 |
| 3.61 | 181.74 | 8.3287 | 1.532 | 4.583 | 11 | very stiff fine grained (*) | 170 |
| 3.77 | 194.83 | 10.4505 | 0.052 | 5.364 | 11 | very stiff fine grained (*) | 182 |
| 3.94 | 192.99 | 11.5286 | -0.542 | 5.974 | 11 | very stiff fine grained (*) | 185 |
| 4.10 | 192.01 | 11.1335 | 0.552 | 5.799 | 11 | very stiff fine grained (*) | 184 |
| 4.27 | 192.88 | 10.6682 | -1.108 | 5.531 | 11 | very stiff fine grained (*) | 183 |
| 4.43 | 187.90 | 11.1038 | -0.392 | 5.909 | 11 | very stiff fine grained (*) | 182 |
| 4.59 | 190.83 | 11.9912 | -0.362 | 6.284 | 11 | very stiff fine grained (*) | 184 |
| 4.76 | 197.93 | 12.8986 | -0.488 | 6.517 | 11 | very stiff fine grained (*) | 189 |
| 4.92 | 204.53 | 13.6225 | -0.458 | 6.660 | 11 | very stiff fine grained (*) | 190 |
| 5.09 | 191.58 | 12.4814 | -0.882 | 6.515 | 11 | very stiff fine grained (*) | 177 |
| 5.25 | 157.28 | 9.8184 | -0.170 | 6.243 | 11 | very stiff fine grained (*) | 158 |
| 5.41 | 147.25 | 7.5608 | 1.865 | 5.135 | 11 | very stiff fine grained (*) | 150 |
| 5.58 | 166.24 | 2.6508 | 2.490 | 1.595 | 12 | sand to clayey sand (*) | 80 |
| 5.74 | 185.41 | 7.9600 | 0.291 | 4.293 | 11 | very stiff fine grained (*) | 147 |
| 5.91 | 110.38 | 9.2523 | 1.187 | 8.382 | 11 | very stiff fine grained (*) | 162 |
| 6.07 | 212.43 | 11.2410 | -1.030 | 5.292 | 11 | very stiff fine grained (*) | 174 |
| 6.23 | 221.51 | 12.0430 | -1.042 | 5.437 | 11 | very stiff fine grained (*) | 196 |
| 6.40 | 178.87 | 11.4149 | 0.091 | 6.382 | 11 | very stiff fine grained (*) | 179 |
| 6.56 | 160.27 | 9.1227 | -0.919 | 5.692 | 11 | very stiff fine grained (*) | 155 |
| 6.73 | 146.49 | 9.2065 | -1.165 | 6.285 | 11 | very stiff fine grained (*) | 144 |
| 6.89 | 144.76 | 14.6039 | -2.549 | 10.088 | 11 | very stiff fine grained (*) | 147 |
| 7.05 | 168.42 | 15.2450 | -1.177 | 9.052 | 11 | very stiff fine grained (*) | 167 |
| 7.22 | 208.88 | 13.1143 | -1.500 | 6.278 | 11 | very stiff fine grained (*) | 179 |
| 7.38 | 185.08 | 10.2238 | -2.030 | 5.524 | 11 | very stiff fine grained (*) | 184 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 7.55 | 182.58 | 7.9797 | -0.798 | 4.371 | 11 very stiff fine grained (*) | 169 |
| 7.71 | 161.80 | 6.9046 | -1.214 | 4.267 | 11 very stiff fine grained (*) | 155 |
| 7.87 | 140.31 | 7.4683 | -0.613 | 5.323 | 11 very stiff fine grained (*) | 139 |
| 8.04 | 133.69 | 8.1746 | 0.446 | 6.115 | 11 very stiff fine grained (*) | 151 |
| 8.20 | 200.42 | 8.0795 | 0.167 | 4.031 | 11 very stiff fine grained (*) | 196 |
| 8.37 | 280.19 | 9.3951 | -0.076 | 3.353 | 12 sand to clayey sand (*) | 115 |
| 8.53 | 238.87 | 9.9285 | -0.788 | 4.156 | 12 sand to clayey sand (*) | 110 |
| 8.69 | 167.31 | 9.2247 | 0.091 | 5.514 | 11 very stiff fine grained (*) | 191 |
| 8.86 | 191.03 | 9.9112 | 1.532 | 5.188 | 11 very stiff fine grained (*) | 174 |
| 9.02 | 186.87 | 9.2090 | 3.165 | 4.928 | 11 very stiff fine grained (*) | 174 |
| 9.19 | 167.29 | 10.5974 | -0.655 | 6.335 | 11 very stiff fine grained (*) | 159 |
| 9.35 | 144.89 | 9.7303 | -1.473 | 6.716 | 11 very stiff fine grained (*) | 143 |
| 9.51 | 136.05 | 9.1592 | -0.882 | 6.732 | 11 very stiff fine grained (*) | 138 |
| 9.68 | 151.03 | 8.8861 | -1.722 | 5.884 | 11 very stiff fine grained (*) | 132 |
| 9.84 | 127.08 | 9.0668 | 0.813 | 7.135 | 11 very stiff fine grained (*) | 127 |
| 10.01 | 120.56 | 7.7110 | -0.599 | 6.396 | 11 very stiff fine grained (*) | 121 |
| 10.17 | 132.12 | 7.1661 | 0.818 | 5.424 | 11 very stiff fine grained (*) | 119 |
| 10.33 | 120.16 | 5.7731 | -2.448 | 4.804 | 11 very stiff fine grained (*) | 110 |
| 10.50 | 92.86 | 3.6839 | 0.736 | 3.967 | 5 clayey silt to silty clay | 49 |
| 10.66 | 92.03 | 2.9425 | 4.429 | 3.197 | 6 sandy silt to clayey silt | 35 |
| 10.83 | 87.31 | 2.9415 | 9.347 | 3.369 | 6 sandy silt to clayey silt | 34 |
| 10.99 | 85.69 | 2.6587 | 9.172 | 3.103 | 6 sandy silt to clayey silt | 32 |
| 11.15 | 79.49 | 2.6321 | 3.155 | 3.311 | 5 clayey silt to silty clay | 41 |
| 11.32 | 91.23 | 4.8240 | 0.064 | 5.288 | 11 very stiff fine grained (*) | 102 |
| 11.48 | 150.04 | 5.8940 | 6.732 | 3.928 | 11 very stiff fine grained (*) | 112 |
| 11.65 | 108.76 | 5.6636 | 10.350 | 5.208 | 11 very stiff fine grained (*) | 112 |
| 11.81 | 92.57 | 4.2209 | 9.168 | 4.560 | 11 very stiff fine grained (*) | 91 |
| 11.98 | 83.23 | 4.4348 | -2.039 | 5.329 | 11 very stiff fine grained (*) | 86 |
| 12.14 | 95.08 | 4.3253 | 1.608 | 4.549 | 11 very stiff fine grained (*) | 88 |
| 12.30 | 98.69 | 5.1564 | 3.943 | 5.225 | 11 very stiff fine grained (*) | 95 |
| 12.47 | 103.50 | 6.2666 | -2.801 | 6.055 | 11 very stiff fine grained (*) | 99 |
| 12.63 | 108.22 | 6.5380 | -2.500 | 6.041 | 11 very stiff fine grained (*) | 105 |
| 12.80 | 116.62 | 7.3251 | -0.480 | 6.281 | 11 very stiff fine grained (*) | 115 |
| 12.96 | 134.43 | 8.4743 | 2.867 | 6.304 | 11 very stiff fine grained (*) | 129 |
| 13.12 | 152.00 | 10.5203 | -0.118 | 6.921 | 11 very stiff fine grained (*) | 141 |
| 13.29 | 154.54 | 10.5914 | -1.660 | 6.853 | 11 very stiff fine grained (*) | 142 |
| 13.45 | 139.55 | 9.3913 | -2.091 | 6.730 | 11 very stiff fine grained (*) | 136 |
| 13.62 | 133.68 | 7.4215 | -1.702 | 5.552 | 11 very stiff fine grained (*) | 130 |
| 13.78 | 135.17 | 6.5385 | -1.002 | 4.837 | 11 very stiff fine grained (*) | 131 |
| 13.94 | 140.69 | 6.4724 | 2.394 | 4.601 | 11 very stiff fine grained (*) | 130 |
| 14.11 | 130.94 | 5.8244 | 1.847 | 4.448 | 11 very stiff fine grained (*) | 128 |
| 14.27 | 129.27 | 5.5220 | 5.108 | 4.272 | 11 very stiff fine grained (*) | 127 |
| 14.44 | 138.06 | 5.2162 | 9.502 | 3.778 | 11 very stiff fine grained (*) | 127 |
| 14.60 | 129.44 | 5.1606 | 14.187 | 3.987 | 6 sandy silt to clayey silt | 50 |
| 14.76 | 123.18 | 5.0945 | 10.663 | 4.136 | 11 very stiff fine grained (*) | 118 |
| 14.93 | 116.09 | 4.8895 | 6.783 | 4.212 | 11 very stiff fine grained (*) | 112 |
| 15.09 | 111.12 | 4.5646 | 12.549 | 4.108 | 11 very stiff fine grained (*) | 109 |
| 15.26 | 113.00 | 4.8652 | 11.414 | 4.305 | 11 very stiff fine grained (*) | 108 |
| 15.42 | 114.09 | 5.2799 | 36.017 | 4.628 | 11 very stiff fine grained (*) | 108 |
| 15.58 | 109.61 | 5.2295 | 1.852 | 4.771 | 11 very stiff fine grained (*) | 107 |
| 15.75 | 110.44 | 5.4790 | 26.527 | 4.961 | 11 very stiff fine grained (*) | 105 |
| 15.91 | 109.22 | 5.6507 | 0.764 | 5.174 | 11 very stiff fine grained (*) | 104 |
| 16.08 | 105.37 | 5.1044 | 19.212 | 4.844 | 11 very stiff fine grained (*) | 99 |
| 16.24 | 93.96 | 4.1485 | 23.648 | 4.415 | 11 very stiff fine grained (*) | 92 |
| 16.40 | 86.88 | 3.3899 | 36.000 | 3.902 | 5 clayey silt to silty clay | 43 |
| 16.57 | 85.78 | 3.7908 | 5.776 | 4.419 | 5 clayey silt to silty clay | 42 |
| 16.73 | 89.88 | 4.1398 | 19.724 | 4.606 | 11 very stiff fine grained (*) | 85 |
| 16.90 | 89.95 | 4.3904 | 9.148 | 4.881 | 11 very stiff fine grained (*) | 84 |
| 17.06 | 81.85 | 3.9123 | 8.525 | 4.780 | 11 very stiff fine grained (*) | 80 |
| 17.22 | 77.05 | 3.8097 | 12.259 | 4.945 | 11 very stiff fine grained (*) | 79 |
| 17.39 | 87.67 | 4.2074 | 16.084 | 4.799 | 11 very stiff fine grained (*) | 84 |
| 17.55 | 98.61 | 4.1105 | 19.704 | 4.169 | 11 very stiff fine grained (*) | 85 |
| 17.72 | 78.73 | 3.5019 | 57.517 | 4.448 | 5 clayey silt to silty clay | 40 |
| 17.88 | 74.06 | 3.3018 | 80.195 | 4.458 | 5 clayey silt to silty clay | 36 |
| 18.04 | 69.44 | 3.1990 | 33.500 | 4.607 | 11 very stiff fine grained (*) | 69 |
| 18.21 | 71.19 | 3.7213 | 48.205 | 5.227 | 11 very stiff fine grained (*) | 69 |
| 18.37 | 75.17 | 3.3059 | 8.318 | 4.398 | 5 clayey silt to silty clay | 35 |
| 18.54 | 69.06 | 2.4308 | 50.604 | 3.520 | 5 clayey silt to silty clay | 34 |
| 18.70 | 69.67 | 2.9700 | 44.904 | 4.263 | 5 clayey silt to silty clay | 37 |
| 18.86 | 92.93 | 5.1471 | 39.121 | 5.539 | 11 very stiff fine grained (*) | 98 |
| 19.03 | 143.94 | 7.7831 | 7.574 | 5.407 | 11 very stiff fine grained (*) | 124 |
| 19.19 | 152.20 | 8.2485 | 2.424 | 5.419 | 11 very stiff fine grained (*) | 131 |
| 19.36 | 112.69 | 6.6142 | -1.672 | 5.869 | 11 very stiff fine grained (*) | 118 |
| 19.52 | 104.23 | 5.4443 | 8.239 | 5.224 | 11 very stiff fine grained (*) | 102 |
| 19.69 | 101.62 | 5.7613 | 8.887 | 5.669 | 11 very stiff fine grained (*) | 100 |
| 19.85 | 108.67 | 6.4313 | 5.680 | 5.918 | 11 very stiff fine grained (*) | 98 |
| 20.01 | 97.62 | 6.4248 | 11.746 | 6.581 | 11 very stiff fine grained (*) | 98 |
| 20.18 | 99.16 | 5.8265 | 10.480 | 5.876 | 11 very stiff fine grained (*) | 96 |
| 20.34 | 102.05 | 5.9214 | 13.421 | 5.803 | 11 very stiff fine grained (*) | 95 |
| 20.51 | 95.62 | 6.3340 | 1.778 | 6.624 | 11 very stiff fine grained (*) | 101 |
| 20.67 | 117.02 | 7.0719 | 7.719 | 6.044 | 11 very stiff fine grained (*) | 110 |
| 20.83 | 132.80 | 7.9120 | 1.138 | 5.958 | 11 very stiff fine grained (*) | 120 |
| 21.00 | 125.97 | 8.6455 | 1.365 | 6.863 | 11 very stiff fine grained (*) | 117 |
| 21.16 | 108.55 | 7.2074 | 1.101 | 6.639 | 11 very stiff fine grained (*) | 101 |
| 21.33 | 80.72 | 5.8680 | 15.318 | 7.269 | 11 very stiff fine grained (*) | 102 |
| 21.49 | 128.29 | 7.4660 | 43.741 | 5.820 | 11 very stiff fine grained (*) | 136 |
| 21.65 | 215.84 | 9.3066 | -2.616 | 4.312 | 11 very stiff fine grained (*) | 167 |
| 21.82 | 178.99 | 10.5592 | 16.273 | 5.899 | 11 very stiff fine grained (*) | 196 |
| 21.98 | 219.44 | 9.8513 | 7.552 | 4.489 | 11 very stiff fine grained (*) | 207 |
| 22.15 | 249.50 | 9.2462 | 22.857 | 3.706 | 12 sand to clayey sand (*) | 102 |
| 22.31 | 169.73 | 7.2589 | -1.877 | 4.277 | 11 very stiff fine grained (*) | 161 |
| 22.47 | 85.80 | 4.0541 | 1.419 | 4.725 | 11 very stiff fine grained (*) | 100 |
| 22.64 | 58.14 | 1.8018 | 14.394 | 3.099 | 5 clayey silt to silty clay | 31 |
| 22.80 | 51.83 | 0.8942 | 9.783 | 1.725 | 6 sandy silt to clayey silt | 20 |
| 22.97 | 47.33 | 0.9668 | 11.552 | 2.043 | 6 sandy silt to clayey silt | 19 |
| 23.13 | 45.99 | 0.9807 | 16.057 | 2.132 | 6 sandy silt to clayey silt | 18 |
| 23.29 | 44.94 | 0.9258 | 15.377 | 2.060 | 6 sandy silt to clayey silt | 17 |
| 23.46 | 45.48 | 0.8178 | 15.020 | 1.798 | 6 sandy silt to clayey silt | 19 |
| 23.62 | 58.46 | 2.1880 | 17.618 | 3.743 | 6 sandy silt to clayey silt | 23 |
| 23.79 | 78.27 | 2.9118 | 0.618 | 3.720 | 5 clayey silt to silty clay | 36 |
| 23.95 | 90.85 | 3.9187 | 11.305 | 4.313 | 5 clayey silt to silty clay | 46 |
| 24.11 | 120.61 | 4.1643 | 3.968 | 3.453 | 6 sandy silt to clayey silt | 44 |
| 24.28 | 133.80 | 4.8652 | 4.401 | 3.636 | 6 sandy silt to clayey silt | 51 |
| 24.44 | 141.31 | 4.5332 | 6.271 | 3.208 | 6 sandy silt to clayey silt | 55 |
| 24.61 | 154.24 | 4.3377 | 2.791 | 2.812 | 6 sandy silt to clayey silt | 57 |
| 24.77 | 148.18 | 4.5428 | -0.180 | 3.066 | 6 sandy silt to clayey silt | 49 |
| 24.93 | 81.57 | 3.8538 | 3.062 | 4.725 | 6 sandy silt to clayey silt | 37 |
| 25.10 | 59.18 | 1.7473 | 12.288 | 2.952 | 5 clayey silt to silty clay | 30 |
| 25.26 | 48.55 | 1.3799 | 13.136 | 2.842 | 6 sandy silt to clayey silt | 20 |
| 25.43 | 44.51 | 1.3392 | 12.956 | 3.008 | 6 sandy silt to clayey silt | 18 |
| 25.59 | 50.31 | 1.4198 | 17.488 | 2.822 | 6 sandy silt to clayey silt | 20 |
| 25.75 | 63.72 | 1.6155 | 16.860 | 2.535 | 6 sandy silt to clayey silt | 23 |
| 25.92 | 65.29 | 1.7783 | 41.778 | 2.724 | 6 sandy silt to clayey silt | 25 |
| 26.08 | 64.53 | 1.9606 | 34.924 | 3.038 | 6 sandy silt to clayey silt | 25 |
| 26.25 | 63.46 | 1.9929 | 41.374 | 3.140 | 6 sandy silt to clayey silt | 24 |
| 26.41 | 61.62 | 1.8647 | 36.591 | 3.026 | 6 sandy silt to clayey silt | 24 |
| 26.57 | 59.26 | 1.5293 | 27.855 | 2.580 | 6 sandy silt to clayey silt | 23 |
| 26.74 | 54.84 | 1.2411 | 34.192 | 2.263 | 6 sandy silt to clayey silt | 21 |
| 26.90 | 52.69 | 1.1111 | 31.049 | 2.109 | 6 sandy silt to clayey silt | 20 |
| 27.07 | 51.56 | 1.2985 | 36.397 | 2.519 | 6 sandy silt to clayey silt | 20 |
| 27.23 | 49.68 | 1.5394 | 42.638 | 3.099 | 6 sandy silt to clayey silt | 20 |
| 27.40 | 50.51 | 1.7711 | 33.840 | 3.507 | 5 clayey silt to silty clay | 23 |
| 27.56 | 45.16 | 1.6761 | 21.877 | 3.711 | 5 clayey silt to silty clay | 22 |
| 27.72 | 42.94 | 1.5421 | 19.719 | 3.591 | 5 clayey silt to silty clay | 22 |
| 27.89 | 46.63 | 2.2009 | 24.643 | 4.720 | 4 silty clay to clay | 31 |
| 28.05 | 57.04 | 2.7307 | 15.527 | 4.787 | 4 silty clay to clay | 34 |
| 28.22 | 57.08 | 3.3552 | 37.850 | 5.878 | 3 clay | 51 |
| 28.38 | 43.62 | 2.2096 | 14.308 | 5.065 | 4 silty clay to clay | 30 |
| 28.54 | 37.93 | 1.4307 | 57.049 | 3.772 | 5 clayey silt to silty clay | 19 |
| 28.71 | 37.97 | 1.2328 | 43.581 | 3.247 | 5 clayey silt to silty clay | 18 |
| 28.87 | 33.68 | 1.0284 | 32.439 | 3.054 | 5 clayey silt to silty clay | 16 |
| 29.04 | 29.98 | 1.0869 | 47.313 | 3.625 | 5 clayey silt to silty clay | 17 |
| 29.20 | 40.27 | 1.3043 | 44.266 | 3.239 | 5 clayey silt to silty clay | 19 |
| 29.36 | 44.46 | 1.5829 | 71.409 | 3.560 | 5 clayey silt to silty clay | 21 |
| 29.53 | 46.07 | 1.6365 | 50.473 | 3.552 | 5 clayey silt to silty clay | 22 |
| 29.69 | 43.29 | 1.5754 | 67.022 | 3.639 | 6 sandy silt to clayey silt | 17 |
| 29.86 | 41.08 | 0.8490 | 52.889 | 2.067 | 5 clayey silt to silty clay | 19 |
| 30.02 | 35.26 | 1.5400 | 56.734 | 4.367 | 3 clay | 41 |
| 30.18 | 49.46 | 4.5714 | 96.109 | 9.244 | 11 very stiff fine grained (*) | 76 |
| 30.35 | 152.19 | 6.9307 | 0.557 | 4.554 | 11 very stiff fine grained (*) | 94 |
| 30.51 | 89.99 | 5.6169 | 7.680 | 6.242 | 11 very stiff fine grained (*) | 97 |
| 30.68 | 61.61 | 2.6416 | 61.251 | 4.288 | 11 very stiff fine grained (*) | 68 |
| 30.84 | 58.25 | 1.9155 | 70.323 | 3.288 | 5 clayey silt to silty clay | 29 |
| 31.00 | 56.21 | 2.0537 | 54.633 | 3.654 | 5 clayey silt to silty clay | 28 |
| 31.17 | 59.07 | 2.0592 | 68.835 | 3.486 | 5 clayey silt to silty clay | 29 |
| 31.33 | 61.07 | 2.5657 | 51.286 | 4.201 | 5 clayey silt to silty clay | 30 |
| 31.50 | 62.38 | 2.2643 | 44.478 | 3.630 | 5 clayey silt to silty clay | 29 |
| 31.66 | 58.32 | 2.0437 | 48.916 | 3.504 | 5 clayey silt to silty clay | 29 |
| 31.82 | 59.05 | 2.2270 | 39.599 | 3.771 | 5 clayey silt to silty clay | 29 |
| 31.99 | 60.20 | 2.4921 | 29.259 | 4.140 | 5 clayey silt to silty clay | 28 |
| 32.15 | 56.83 | 2.4719 | 21.650 | 4.350 | 5 clayey silt to silty clay | 28 |
| 32.32 | 54.50 | 2.3090 | 23.421 | 4.237 | 5 clayey silt to silty clay | 26 |
| 32.48 | 51.41 | 2.0915 | 19.414 | 4.068 | 5 clayey silt to silty clay | 25 |
| 32.64 | 50.51 | 1.9544 | 32.101 | 3.870 | 5 clayey silt to silty clay | 25 |
| 32.81 | 50.62 | 1.9394 | 33.626 | 3.831 | 5 clayey silt to silty clay | 24 |
| 32.97 | 48.68 | 1.9158 | 26.781 | 3.936 | 5 clayey silt to silty clay | 24 |
| 33.14 | 47.50 | 1.8742 | 25.788 | 3.945 | 5 clayey silt to silty clay | 23 |
| 33.30 | 45.79 | 1.7086 | 12.352 | 3.732 | 5 clayey silt to silty clay | 21 |
| 33.46 | 40.28 | 1.6730 | 28.365 | 4.153 | 5 clayey silt to silty clay | 21 |
| 33.63 | 42.66 | 1.6883 | 17.559 | 3.958 | 5 clayey silt to silty clay | 20 |
| 33.79 | 44.45 | 1.7674 | 19.557 | 3.976 | 5 clayey silt to silty clay | 21 |
| 33.96 | 41.73 | 1.8942 | 15.872 | 4.539 | 4 silty clay to clay | 27 |
| 34.12 | 40.63 | 1.8094 | 8.946 | 4.454 | 4 silty clay to clay | 26 |
| 34.28 | 38.82 | 1.6186 | 11.672 | 4.170 | 4 silty clay to clay | 25 |
| 34.45 | 36.47 | 1.3831 | 19.983 | 3.792 | 5 clayey silt to silty clay | 18 |
| 34.61 | 34.13 | 0.4898 | 13.532 | 1.435 | 5 clayey silt to silty clay | 17 |
| 34.78 | 32.93 | 1.4428 | 6.155 | 4.382 | 4 silty clay to clay | 18 |
| 34.94 | 18.73 | 1.3895 | 9.498 | 7.419 | 3 clay | 26 |
| 35.10 | 29.26 | 1.2774 | 14.729 | 4.366 | 3 clay | 25 |
| 35.27 | 28.40 | 1.2404 | 13.490 | 4.368 | 4 silty clay to clay | 19 |
| 35.43 | 33.13 | 1.3088 | 15.022 | 3.951 | 4 silty clay to clay | 20 |
| 35.60 | 31.51 | 1.3570 | 20.948 | 4.307 | 4 silty clay to clay | 21 |
| 35.76 | 33.68 | 1.2351 | 21.850 | 3.667 | 5 clayey silt to silty clay | 16 |
| 35.93 | 32.35 | 1.0696 | 14.717 | 3.306 | 5 clayey silt to silty clay | 16 |
| 36.09 | 30.72 | 0.9190 | 39.946 | 2.992 | 5 clayey silt to silty clay | 16 |
| 36.25 | 32.85 | 0.9314 | 51.825 | 2.835 | 5 clayey silt to silty clay | 16 |
| 36.42 | 35.17 | 1.0886 | 45.402 | 3.095 | 5 clayey silt to silty clay | 17 |
| 36.58 | 35.57 | 1.3979 | 32.488 | 3.930 | 5 clayey silt to silty clay | 18 |
| 36.75 | 39.50 | 1.9945 | 38.867 | 5.050 | 4 silty clay to clay | 24 |
| 36.91 | 38.34 | 2.0641 | -2.599 | 5.383 | 3 clay | 36 |
| 37.07 | 34.36 | 1.7840 | 18.586 | 5.192 | 3 clay | 36 |
| 37.24 | 39.80 | 2.3979 | 36.806 | 6.026 | 4 silty clay to clay | 30 |
| 37.40 | 63.78 | 2.2028 | 7.823 | 3.454 | 4 silty clay to clay | 31 |
| 37.57 | 41.20 | 2.0116 | 62.375 | 4.883 | 5 clayey silt to silty clay | 23 |
| 37.73 | 35.11 | 1.2044 | 40.852 | 3.430 | 5 clayey silt to silty clay | 18 |
| 37.89 | 31.23 | 0.2630 | 56.411 | 0.842 | 6 sandy silt to clayey silt | 13 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 38.06 | 32.75 | 0.8263 | 65.298 | 2.523 | 5 | clayey silt to silty clay | 14 |
| 38.22 | 23.87 | 1.5827 | 61.599 | 6.629 | 4 | silty clay to clay | 23 |
| 38.39 | 49.53 | 2.4455 | 78.978 | 4.937 | 3 | clay | 43 |
| 38.55 | 57.22 | 3.3116 | 62.958 | 5.787 | 4 | silty clay to clay | 37 |
| 38.71 | 64.82 | 2.9086 | 44.877 | 4.487 | 11 | very stiff fine grained (*) | 58 |
| 38.88 | 58.05 | 3.7252 | 77.889 | 6.417 | 11 | very stiff fine grained (*) | 69 |
| 39.04 | 90.97 | 5.3320 | 104.234 | 5.861 | 11 | very stiff fine grained (*) | 88 |
| 39.21 | 122.53 | 7.5017 | 11.254 | 6.122 | 11 | very stiff fine grained (*) | 108 |
| 39.37 | 122.47 | 8.0479 | 32.281 | 6.572 | 11 | very stiff fine grained (*) | 119 |
| 39.53 | 127.14 | 7.6925 | 52.931 | 6.050 | 11 | very stiff fine grained (*) | 119 |
| 39.70 | 121.31 | 7.8092 | 17.399 | 6.437 | 11 | very stiff fine grained (*) | 104 |
| 39.86 | 77.97 | 4.9122 | -2.613 | 6.300 | 11 | very stiff fine grained (*) | 80 |
| 40.03 | 50.40 | 2.5347 | 57.214 | 5.030 | 11 | very stiff fine grained (*) | 57 |
| 40.19 | 47.78 | 1.7820 | 36.259 | 3.729 | 5 | clayey silt to silty clay | 24 |
| 40.35 | 47.96 | 1.7202 | 36.500 | 3.586 | 5 | clayey silt to silty clay | 23 |
| 40.52 | 45.97 | 1.5385 | 28.882 | 3.347 | 5 | clayey silt to silty clay | 22 |
| 40.68 | 41.03 | 1.2266 | 60.702 | 2.990 | 6 | sandy silt to clayey silt | 17 |
| 40.85 | 41.82 | 1.2282 | 66.537 | 2.937 | 6 | sandy silt to clayey silt | 17 |
| 41.01 | 44.75 | 1.4244 | 48.978 | 3.183 | 6 | sandy silt to clayey silt | 17 |
| 41.17 | 41.28 | 1.2188 | 31.136 | 2.953 | 5 | clayey silt to silty clay | 20 |
| 41.34 | 34.93 | 1.4558 | 42.429 | 4.168 | 5 | clayey silt to silty clay | 16 |
| 41.50 | 24.93 | 1.2320 | 37.177 | 4.941 | 4 | silty clay to clay | 20 |
| 41.67 | 33.03 | 1.1206 | 42.926 | 3.392 | 4 | silty clay to clay | 19 |
| 41.83 | 30.57 | 1.1530 | 37.808 | 3.771 | 5 | clayey silt to silty clay | 15 |
| 41.99 | 29.34 | 1.0302 | 35.315 | 3.511 | 5 | clayey silt to silty clay | 14 |
| 42.16 | 27.80 | 0.8277 | 42.394 | 2.977 | 5 | clayey silt to silty clay | 14 |
| 42.32 | 29.64 | 0.6988 | 44.705 | 2.358 | 6 | sandy silt to clayey silt | 12 |
| 42.49 | 31.66 | 0.9802 | 66.559 | 3.096 | 6 | sandy silt to clayey silt | 13 |
| 42.65 | 38.95 | 1.1643 | 56.379 | 2.990 | 5 | clayey silt to silty clay | 18 |
| 42.81 | 37.21 | 1.3098 | 72.419 | 3.521 | 5 | clayey silt to silty clay | 18 |
| 42.98 | 36.87 | 1.2735 | 71.990 | 3.454 | 5 | clayey silt to silty clay | 18 |
| 43.14 | 35.80 | 1.2222 | 68.626 | 3.414 | 5 | clayey silt to silty clay | 18 |
| 43.31 | 34.19 | 1.1561 | 66.448 | 3.382 | 5 | clayey silt to silty clay | 17 |
| 43.47 | 32.81 | 1.0482 | 70.998 | 3.194 | 5 | clayey silt to silty clay | 16 |
| 43.64 | 33.42 | 0.9624 | 61.136 | 2.880 | 5 | clayey silt to silty clay | 17 |
| 43.80 | 36.24 | 1.4311 | 69.828 | 3.949 | 5 | clayey silt to silty clay | 18 |
| 43.96 | 41.44 | 2.1135 | 54.943 | 5.100 | 4 | silty clay to clay | 28 |
| 44.13 | 54.32 | 2.6022 | 1.714 | 4.790 | 4 | silty clay to clay | 32 |
| 44.29 | 54.45 | 2.8165 | 51.983 | 5.173 | 5 | clayey silt to silty clay | 38 |
| 44.46 | 90.89 | 4.4197 | -3.707 | 4.863 | 11 | very stiff fine grained (*) | 87 |
| 44.62 | 90.10 | -32768 | -3.281 | -32768 | 0 | <out of range> | 0 |

Data File:CPT 9 6/22/2007 10:25:26 AM
Operator:Doug Location:PG&E Solar
Cone ID:DSG0369 Job Number:297
Customer: PG&E Solar Project Units:

| Depth (ft) | Qc TSF | Fs TSF | Pw PSI | Fs/Qc (%) | Zone | Soil Behavior Type UBC-1983 | SPT N* 60% Hammer |
|---|---|---|---|---|---|---|---|
| 0.16 | 70.52 | 2.0782 | 2.155 | 2.947 | 5 | clayey silt to silty clay | 18 |
| 0.33 | 43.94 | 2.2446 | 0.039 | 5.108 | 4 | silty clay to clay | 31 |
| 0.49 | 32.03 | 2.0780 | 2.074 | 6.488 | 3 | clay | 36 |
| 0.66 | 36.60 | 1.8534 | 0.463 | 5.064 | 3 | clay | 35 |
| 0.82 | 42.21 | 1.8774 | 0.345 | 4.448 | 4 | silty clay to clay | 25 |
| 0.98 | 39.16 | 1.8087 | 0.163 | 4.618 | 4 | silty clay to clay | 25 |
| 1.15 | 37.75 | 1.6773 | 0.244 | 4.443 | 4 | silty clay to clay | 24 |
| 1.31 | 35.94 | 1.5273 | 0.227 | 4.250 | 4 | silty clay to clay | 23 |
| 1.48 | 34.86 | 1.2992 | -0.138 | 3.727 | 5 | clayey silt to silty clay | 17 |
| 1.64 | 33.02 | 0.9216 | -0.138 | 2.791 | 5 | clayey silt to silty clay | 16 |
| 1.80 | 32.65 | 0.7229 | 0.475 | 2.214 | 6 | sandy silt to clayey silt | 12 |
| 1.97 | 29.32 | 0.5701 | -0.244 | 1.944 | 6 | sandy silt to clayey silt | 11 |
| 2.13 | 22.56 | 0.3017 | 0.626 | 1.337 | 6 | sandy silt to clayey silt | 9 |
| 2.30 | 20.03 | 0.1773 | -0.283 | 0.885 | 6 | sandy silt to clayey silt | 8 |
| 2.46 | 22.88 | 0.1682 | 0.362 | 0.735 | 6 | sandy silt to clayey silt | 8 |
| 2.62 | 22.24 | 0.1676 | 0.606 | 0.754 | 6 | sandy silt to clayey silt | 9 |
| 2.79 | 22.69 | 0.1832 | 0.234 | 0.808 | 7 | silty sand to sandy silt | 8 |
| 2.95 | 30.82 | 0.2644 | 0.707 | 0.858 | 7 | silty sand to sandy silt | 10 |
| 3.12 | 36.06 | 0.3469 | -0.015 | 0.962 | 7 | silty sand to sandy silt | 11 |
| 3.28 | 36.46 | 0.5266 | -0.224 | 1.445 | 7 | silty sand to sandy silt | 12 |
| 3.44 | 42.54 | 0.7232 | -0.044 | 1.700 | 7 | silty sand to sandy silt | 14 |
| 3.61 | 52.64 | 0.9856 | -0.209 | 1.872 | 6 | sandy silt to clayey silt | 20 |
| 3.77 | 57.96 | 1.2740 | -0.032 | 2.198 | 6 | sandy silt to clayey silt | 22 |
| 3.94 | 60.88 | 1.2515 | -0.165 | 2.056 | 7 | silty sand to sandy silt | 18 |
| 4.10 | 51.39 | 0.7741 | -0.148 | 1.506 | 7 | silty sand to sandy silt | 17 |
| 4.27 | 47.06 | 0.6308 | -0.377 | 1.341 | 7 | silty sand to sandy silt | 16 |
| 4.43 | 48.30 | 0.4627 | 0.044 | 0.958 | 7 | silty sand to sandy silt | 15 |
| 4.59 | 50.03 | 0.3452 | -0.012 | 0.690 | 7 | silty sand to sandy silt | 16 |
| 4.76 | 55.70 | 0.6144 | -0.340 | 1.103 | 7 | silty sand to sandy silt | 17 |
| 4.92 | 51.97 | 0.8290 | -0.158 | 1.595 | 7 | silty sand to sandy silt | 15 |
| 5.09 | 33.12 | 0.4296 | -0.086 | 1.297 | 6 | sandy silt to clayey silt | 14 |
| 5.25 | 27.13 | 0.8537 | -0.623 | 3.146 | 6 | sandy silt to clayey silt | 17 |
| 5.41 | 75.54 | 1.7584 | 0.419 | 2.328 | 6 | sandy silt to clayey silt | 27 |
| 5.58 | 110.46 | 3.0347 | 0.177 | 2.747 | 6 | sandy silt to clayey silt | 38 |
| 5.74 | 113.90 | 3.2784 | 0.426 | 2.878 | 6 | sandy silt to clayey silt | 41 |
| 5.91 | 93.71 | 3.2244 | 1.042 | 3.441 | 6 | sandy silt to clayey silt | 39 |
| 6.07 | 97.26 | 2.8285 | 2.204 | 2.908 | 6 | sandy silt to clayey silt | 39 |
| 6.23 | 115.51 | 4.2313 | 1.500 | 3.663 | 6 | sandy silt to clayey silt | 45 |
| 6.40 | 142.12 | 6.4099 | 1.468 | 4.510 | 11 | very stiff fine grained (*) | 135 |
| 6.56 | 165.54 | 8.2443 | -1.288 | 4.980 | 11 | very stiff fine grained (*) | 140 |
| 6.73 | 132.31 | 8.4061 | 0.123 | 6.354 | 11 | very stiff fine grained (*) | 133 |
| 6.89 | 120.42 | 7.6500 | 1.121 | 6.353 | 11 | very stiff fine grained (*) | 121 |
| 7.05 | 126.26 | 7.1931 | 0.515 | 5.697 | 11 | very stiff fine grained (*) | 123 |
| 7.22 | 138.77 | 8.0838 | 1.187 | 5.825 | 11 | very stiff fine grained (*) | 133 |
| 7.38 | 153.05 | 8.9381 | 0.214 | 5.840 | 11 | very stiff fine grained (*) | 141 |
| 7.55 | 149.66 | 8.7011 | -0.574 | 5.814 | 11 | very stiff fine grained (*) | 135 |
| 7.71 | 120.11 | 8.4523 | 4.522 | 7.037 | 11 | very stiff fine grained (*) | 146 |
| 7.87 | 185.97 | 9.2770 | 75.803 | 4.989 | 11 | very stiff fine grained (*) | 183 |
| 8.04 | 266.43 | 13.9163 | 0.786 | 5.223 | 11 | very stiff fine grained (*) | 229 |
| 8.20 | 262.55 | 13.8662 | -1.525 | 5.281 | 11 | very stiff fine grained (*) | 229 |
| 8.37 | 188.45 | 13.2710 | 10.182 | 7.042 | 11 | very stiff fine grained (*) | 203 |
| 8.53 | 184.91 | 11.4913 | 12.421 | 6.215 | 11 | very stiff fine grained (*) | 179 |
| 8.69 | 185.76 | 12.5024 | 1.741 | 6.730 | 11 | very stiff fine grained (*) | 179 |
| 8.86 | 191.48 | 12.7583 | 0.842 | 6.663 | 11 | very stiff fine grained (*) | 180 |
| 9.02 | 185.51 | 12.5524 | 0.030 | 6.766 | 11 | very stiff fine grained (*) | 178 |
| 9.19 | 179.57 | 12.1144 | -0.480 | 6.747 | 11 | very stiff fine grained (*) | 175 |
| 9.35 | 183.35 | 11.9120 | 8.399 | 6.497 | 11 | very stiff fine grained (*) | 177 |
| 9.51 | 191.20 | 11.7082 | 15.015 | 6.124 | 11 | very stiff fine grained (*) | 181 |
| 9.68 | 190.59 | 11.3961 | 15.131 | 5.979 | 11 | very stiff fine grained (*) | 178 |
| 9.84 | 174.01 | 10.6402 | 15.370 | 6.115 | 11 | very stiff fine grained (*) | 169 |
| 10.01 | 164.08 | 9.8287 | 7.116 | 5.990 | 11 | very stiff fine grained (*) | 161 |
| 10.17 | 164.03 | 10.3150 | 76.109 | 6.289 | 11 | very stiff fine grained (*) | 162 |
| 10.33 | 177.84 | 10.3825 | 39.739 | 5.838 | 11 | very stiff fine grained (*) | 163 |
| 10.50 | 164.53 | 10.1010 | 106.917 | 6.139 | 11 | very stiff fine grained (*) | 156 |
| 10.66 | 142.47 | 8.7964 | 32.663 | 6.174 | 11 | very stiff fine grained (*) | 138 |
| 10.83 | 123.20 | 6.8964 | -0.712 | 5.598 | 11 | very stiff fine grained (*) | 118 |
| 10.99 | 103.91 | 5.4792 | 8.761 | 5.273 | 11 | very stiff fine grained (*) | 105 |
| 11.15 | 100.58 | 5.9568 | 42.370 | 5.922 | 11 | very stiff fine grained (*) | 100 |
| 11.32 | 109.38 | 7.5054 | 8.140 | 6.862 | 11 | very stiff fine grained (*) | 103 |
| 11.48 | 111.23 | 8.7170 | 12.717 | 7.837 | 11 | very stiff fine grained (*) | 105 |
| 11.65 | 106.66 | 8.4573 | -2.121 | 7.929 | 11 | very stiff fine grained (*) | 98 |
| 11.81 | 89.84 | 7.4944 | -1.187 | 8.342 | 11 | very stiff fine grained (*) | 91 |
| 11.98 | 88.54 | 6.2241 | -2.500 | 7.030 | 11 | very stiff fine grained (*) | 85 |
| 12.14 | 87.18 | 5.5055 | -2.458 | 6.315 | 11 | very stiff fine grained (*) | 84 |
| 12.30 | 88.89 | 5.3715 | -0.727 | 6.043 | 11 | very stiff fine grained (*) | 87 |
| 12.47 | 95.88 | 5.4612 | 1.397 | 5.696 | 11 | very stiff fine grained (*) | 89 |
| 12.63 | 94.19 | 5.1432 | 3.732 | 5.460 | 11 | very stiff fine grained (*) | 89 |
| 12.80 | 89.73 | 4.8304 | 19.852 | 5.383 | 11 | very stiff fine grained (*) | 90 |
| 12.96 | 96.75 | 6.5342 | 24.458 | 6.754 | 11 | very stiff fine grained (*) | 111 |
| 13.12 | 159.44 | 8.2559 | 0.589 | 5.178 | 11 | very stiff fine grained (*) | 137 |
| 13.29 | 172.95 | 9.7885 | 13.069 | 5.660 | 11 | very stiff fine grained (*) | 167 |
| 13.45 | 189.82 | 9.4659 | -0.714 | 4.987 | 11 | very stiff fine grained (*) | 171 |
| 13.62 | 173.79 | 8.7055 | 2.421 | 5.009 | 11 | very stiff fine grained (*) | 179 |
| 13.78 | 196.54 | 8.4991 | -0.889 | 4.324 | 11 | very stiff fine grained (*) | 181 |
| 13.94 | 197.79 | 8.7195 | -0.185 | 4.409 | 11 | very stiff fine grained (*) | 197 |
| 14.11 | 221.43 | 8.5937 | 1.288 | 3.881 | 12 | sand to clayey sand (*) | 101 |
| 14.27 | 216.76 | 7.9322 | 2.911 | 3.659 | 12 | sand to clayey sand (*) | 96 |
| 14.44 | 163.47 | 6.7938 | -1.034 | 4.156 | 11 | very stiff fine grained (*) | 149 |
| 14.60 | 87.91 | 5.1166 | -1.113 | 5.820 | 11 | very stiff fine grained (*) | 101 |
| 14.76 | 65.26 | 2.2552 | 6.993 | 3.456 | 5 | clayey silt to silty clay | 36 |
| 14.93 | 71.12 | 2.1107 | 17.108 | 2.968 | 6 | sandy silt to clayey silt | 27 |
| 15.09 | 72.55 | 2.0739 | 25.874 | 2.859 | 6 | sandy silt to clayey silt | 27 |
| 15.26 | 68.03 | 2.1624 | 28.515 | 3.178 | 6 | sandy silt to clayey silt | 26 |
| 15.42 | 64.37 | 1.8746 | 30.076 | 2.912 | 6 | sandy silt to clayey silt | 25 |
| 15.58 | 64.24 | 2.2937 | 23.613 | 3.570 | 5 | clayey silt to silty clay | 34 |
| 15.75 | 86.40 | 4.1706 | 23.352 | 4.827 | 11 | very stiff fine grained (*) | 84 |
| 15.91 | 112.85 | 6.2854 | -1.697 | 5.570 | 11 | very stiff fine grained (*) | 98 |
| 16.08 | 108.39 | 7.0440 | 4.067 | 6.499 | 11 | very stiff fine grained (*) | 102 |
| 16.24 | 97.23 | 6.0146 | 4.165 | 6.186 | 11 | very stiff fine grained (*) | 94 |
| 16.40 | 87.86 | 4.9205 | 21.803 | 5.600 | 11 | very stiff fine grained (*) | 84 |
| 16.57 | 77.68 | 3.7886 | 22.852 | 4.877 | 11 | very stiff fine grained (*) | 77 |
| 16.73 | 73.26 | 3.0946 | 35.000 | 4.224 | 5 | clayey silt to silty clay | 36 |
| 16.90 | 70.19 | 3.0976 | 45.084 | 4.413 | 5 | clayey silt to silty clay | 36 |
| 17.06 | 77.97 | 3.2275 | 17.153 | 4.139 | 5 | clayey silt to silty clay | 37 |
| 17.22 | 79.46 | 3.3560 | 27.168 | 4.224 | 5 | clayey silt to silty clay | 39 |
| 17.39 | 87.21 | 3.7591 | 37.902 | 4.310 | 11 | very stiff fine grained (*) | 86 |
| 17.55 | 100.47 | 4.6969 | 43.453 | 4.675 | 11 | very stiff fine grained (*) | 94 |
| 17.72 | 104.77 | 5.7287 | 15.761 | 5.468 | 11 | very stiff fine grained (*) | 94 |
| 17.88 | 89.34 | 6.3455 | 2.608 | 7.103 | 11 | very stiff fine grained (*) | 89 |
| 18.04 | 83.22 | 8.0375 | -2.387 | 9.659 | 11 | very stiff fine grained (*) | 85 |
| 18.21 | 92.39 | 9.1065 | 0.266 | 9.856 | 11 | very stiff fine grained (*) | 90 |
| 18.37 | 106.89 | 7.8568 | 0.828 | 7.350 | 11 | very stiff fine grained (*) | 93 |
| 18.54 | 92.24 | 6.6347 | 2.773 | 7.193 | 11 | very stiff fine grained (*) | 93 |
| 18.70 | 91.51 | 5.8317 | 1.411 | 6.373 | 11 | very stiff fine grained (*) | 87 |
| 18.86 | 87.63 | 5.8220 | -0.246 | 6.644 | 11 | very stiff fine grained (*) | 91 |
| 19.03 | 106.75 | 6.3785 | 1.244 | 5.975 | 11 | very stiff fine grained (*) | 100 |
| 19.19 | 119.26 | 6.9860 | 1.751 | 5.858 | 11 | very stiff fine grained (*) | 112 |
| 19.36 | 125.89 | 7.5950 | 6.461 | 6.033 | 11 | very stiff fine grained (*) | 118 |
| 19.52 | 122.86 | 7.2716 | 4.382 | 5.919 | 11 | very stiff fine grained (*) | 114 |
| 19.69 | 107.61 | 6.6779 | 11.200 | 6.206 | 11 | very stiff fine grained (*) | 106 |
| 19.85 | 101.51 | 5.2330 | 5.766 | 5.155 | 11 | very stiff fine grained (*) | 112 |
| 20.01 | 142.39 | 4.5907 | 7.266 | 3.224 | 6 | sandy silt to clayey silt | 56 |
| 20.18 | 195.41 | 3.9993 | 2.480 | 2.047 | 7 | silty sand to sandy silt | 57 |
| 20.34 | 200.77 | 4.5510 | 0.616 | 2.267 | 7 | silty sand to sandy silt | 63 |
| 20.51 | 194.75 | 4.8720 | 2.478 | 2.502 | 7 | silty sand to sandy silt | 63 |
| 20.67 | 198.53 | 4.5816 | 2.005 | 2.308 | 7 | silty sand to sandy silt | 63 |
| 20.83 | 197.88 | 4.3387 | 7.436 | 2.193 | 7 | silty sand to sandy silt | 64 |
| 21.00 | 208.38 | 3.7279 | 1.507 | 1.789 | 8 | sand to silty sand | 49 |
| 21.16 | 210.52 | 3.4772 | 0.069 | 1.652 | 8 | sand to silty sand | 47 |
| 21.33 | 175.06 | 3.1878 | 5.776 | 1.821 | 8 | sand to silty sand | 47 |
| 21.49 | 209.40 | 2.9796 | 1.714 | 1.423 | 8 | sand to silty sand | 48 |
| 21.65 | 215.33 | 3.1934 | 2.512 | 1.483 | 8 | sand to silty sand | 52 |
| 21.82 | 223.13 | 3.1625 | 5.076 | 1.417 | 8 | sand to silty sand | 53 |
| 21.98 | 222.22 | 3.8288 | 3.431 | 1.723 | 8 | sand to silty sand | 54 |
| 22.15 | 230.58 | 5.5070 | 7.222 | 2.388 | 7 | silty sand to sandy silt | 70 |
| 22.31 | 205.34 | 5.8703 | 16.594 | 2.859 | 7 | silty sand to sandy silt | 70 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 22.47 | 222.35 | 4.6903 | 7.850 | 2.109 | 7 | silty sand to sandy silt | 72 |
| 22.64 | 247.10 | 3.6088 | 1.200 | 1.460 | 8 | sand to silty sand | 58 |
| 22.80 | 255.62 | 3.2918 | 9.020 | 1.288 | 9 | sand | 49 |
| 22.97 | 260.97 | 3.0851 | 2.458 | 1.182 | 9 | sand | 49 |
| 23.13 | 254.86 | 3.5082 | 2.187 | 1.377 | 8 | sand to silty sand | 58 |
| 23.29 | 214.91 | 3.9529 | 0.638 | 1.839 | 8 | sand to silty sand | 47 |
| 23.46 | 117.70 | 3.5622 | 6.103 | 3.026 | 7 | silty sand to sandy silt | 43 |
| 23.62 | 66.73 | 2.4177 | 11.347 | 3.623 | 6 | sandy silt to clayey silt | 30 |
| 23.79 | 48.99 | 1.3539 | 24.318 | 2.763 | 6 | sandy silt to clayey silt | 21 |
| 23.95 | 46.32 | 0.9777 | 12.914 | 2.111 | 6 | sandy silt to clayey silt | 18 |
| 24.11 | 41.98 | 0.8719 | 14.069 | 2.077 | 6 | sandy silt to clayey silt | 17 |
| 24.28 | 43.23 | 0.8117 | 13.244 | 1.878 | 6 | sandy silt to clayey silt | 17 |
| 24.44 | 44.91 | 0.9575 | 9.091 | 2.132 | 6 | sandy silt to clayey silt | 17 |
| 24.61 | 47.42 | 1.1006 | 1.527 | 2.321 | 6 | sandy silt to clayey silt | 17 |
| 24.77 | 44.10 | 1.1400 | 3.438 | 2.585 | 6 | sandy silt to clayey silt | 17 |
| 24.93 | 40.89 | 1.0390 | 5.251 | 2.541 | 6 | sandy silt to clayey silt | 16 |
| 25.10 | 39.42 | 0.8799 | 5.798 | 2.232 | 6 | sandy silt to clayey silt | 15 |
| 25.26 | 38.07 | 0.7404 | 7.638 | 1.945 | 6 | sandy silt to clayey silt | 15 |
| 25.43 | 39.82 | 0.7570 | 9.677 | 1.901 | 6 | sandy silt to clayey silt | 15 |
| 25.59 | 41.75 | 0.8273 | 8.963 | 1.982 | 6 | sandy silt to clayey silt | 16 |
| 25.75 | 41.78 | 0.8739 | 8.897 | 2.092 | 6 | sandy silt to clayey silt | 16 |
| 25.92 | 43.91 | 0.8162 | 8.512 | 1.859 | 6 | sandy silt to clayey silt | 17 |
| 26.08 | 47.84 | 0.7829 | 10.278 | 1.637 | 7 | silty sand to sandy silt | 15 |
| 26.25 | 46.06 | 0.8480 | 12.522 | 1.841 | 7 | silty sand to sandy silt | 15 |
| 26.41 | 47.45 | 0.9586 | 11.877 | 2.020 | 6 | sandy silt to clayey silt | 18 |
| 26.57 | 44.50 | 0.9447 | 9.035 | 2.123 | 6 | sandy silt to clayey silt | 17 |
| 26.74 | 39.90 | 0.9509 | 9.983 | 2.383 | 6 | sandy silt to clayey silt | 16 |
| 26.90 | 41.77 | 0.8694 | 15.180 | 2.081 | 6 | sandy silt to clayey silt | 17 |
| 27.07 | 53.60 | 0.7070 | 39.399 | 1.319 | 7 | silty sand to sandy silt | 16 |
| 27.23 | 55.26 | 0.6572 | 35.273 | 1.189 | 7 | silty sand to sandy silt | 17 |
| 27.40 | 53.15 | 1.0640 | 28.995 | 2.002 | 7 | silty sand to sandy silt | 17 |
| 27.56 | 48.46 | 1.0869 | 32.495 | 2.243 | 6 | sandy silt to clayey silt | 19 |
| 27.72 | 42.27 | 0.9540 | 21.064 | 2.257 | 6 | sandy silt to clayey silt | 17 |
| 27.89 | 39.16 | 0.9210 | 15.724 | 2.352 | 6 | sandy silt to clayey silt | 15 |
| 28.05 | 37.01 | 0.8451 | 15.271 | 2.283 | 6 | sandy silt to clayey silt | 14 |
| 28.22 | 35.06 | 0.8266 | 23.599 | 2.358 | 6 | sandy silt to clayey silt | 14 |
| 28.38 | 38.94 | 0.8052 | 33.636 | 2.068 | 6 | sandy silt to clayey silt | 16 |
| 28.54 | 46.91 | 0.9069 | 49.631 | 1.933 | 6 | sandy silt to clayey silt | 18 |
| 28.71 | 53.29 | 1.1879 | 46.594 | 2.229 | 6 | sandy silt to clayey silt | 20 |
| 28.87 | 54.43 | 1.3312 | 44.116 | 2.446 | 6 | sandy silt to clayey silt | 21 |
| 29.04 | 53.98 | 1.3299 | 56.239 | 2.464 | 6 | sandy silt to clayey silt | 21 |
| 29.20 | 53.44 | 1.3122 | 61.313 | 2.455 | 6 | sandy silt to clayey silt | 21 |
| 29.36 | 54.74 | 1.2734 | 55.409 | 2.326 | 6 | sandy silt to clayey silt | 21 |
| 29.53 | 52.42 | 1.3188 | 31.988 | 2.516 | 6 | sandy silt to clayey silt | 20 |
| 29.69 | 47.30 | 1.2346 | 24.094 | 2.610 | 6 | sandy silt to clayey silt | 19 |
| 29.86 | 46.16 | 1.1147 | 45.628 | 2.415 | 6 | sandy silt to clayey silt | 18 |
| 30.02 | 44.54 | 1.0666 | 51.278 | 2.395 | 6 | sandy silt to clayey silt | 17 |
| 30.18 | 39.76 | 1.0009 | 29.044 | 2.518 | 6 | sandy silt to clayey silt | 16 |
| 30.35 | 42.50 | 0.9684 | 44.690 | 2.278 | 6 | sandy silt to clayey silt | 16 |
| 30.51 | 44.65 | 1.2299 | 37.495 | 2.754 | 6 | sandy silt to clayey silt | 17 |
| 30.68 | 45.94 | 1.2152 | 43.540 | 2.645 | 6 | sandy silt to clayey silt | 16 |
| 30.84 | 36.85 | 1.1673 | 21.729 | 3.168 | 5 | clayey silt to silty clay | 19 |
| 31.00 | 32.49 | 1.1216 | 19.796 | 3.452 | 5 | clayey silt to silty clay | 16 |
| 31.17 | 28.68 | 0.8978 | 18.170 | 3.131 | 5 | clayey silt to silty clay | 14 |
| 31.33 | 25.16 | 0.7196 | 20.783 | 2.860 | 5 | clayey silt to silty clay | 13 |
| 31.50 | 26.15 | 0.6373 | 29.372 | 2.437 | 6 | sandy silt to clayey silt | 10 |
| 31.66 | 28.35 | 0.6625 | 28.212 | 2.337 | 6 | sandy silt to clayey silt | 11 |
| 31.82 | 28.01 | 0.8187 | 22.039 | 2.923 | 6 | sandy silt to clayey silt | 11 |
| 31.99 | 31.72 | 0.8501 | 32.173 | 2.680 | 6 | sandy silt to clayey silt | 12 |
| 32.15 | 31.60 | 0.7975 | 38.894 | 2.523 | 6 | sandy silt to clayey silt | 12 |
| 32.32 | 32.53 | 0.7881 | 40.705 | 2.422 | 5 | clayey silt to silty clay | 19 |
| 32.48 | 55.99 | 2.2593 | 36.697 | 4.035 | 5 | clayey silt to silty clay | 28 |
| 32.64 | 87.48 | 4.1701 | -2.732 | 4.767 | 11 | very stiff fine grained (*) | 73 |
| 32.81 | 83.97 | 4.7937 | 10.500 | 5.709 | 11 | very stiff fine grained (*) | 75 |
| 32.97 | 64.26 | 4.0924 | 6.823 | 6.369 | 11 | very stiff fine grained (*) | 69 |
| 33.14 | 66.16 | 3.8550 | 51.163 | 5.826 | 11 | very stiff fine grained (*) | 71 |
| 33.30 | 92.19 | 2.7144 | 1.175 | 2.944 | 5 | clayey silt to silty clay | 37 |
| 33.46 | 70.56 | 3.9205 | 29.256 | 5.557 | 11 | very stiff fine grained (*) | 83 |
| 33.63 | 94.99 | 4.8120 | 50.325 | 5.066 | 11 | very stiff fine grained (*) | 85 |
| 33.79 | 98.07 | 4.6190 | 3.901 | 4.710 | 11 | very stiff fine grained (*) | 80 |
| 33.96 | 57.85 | 2.7000 | 14.983 | 4.667 | 4 | silty clay to clay | 42 |
| 34.12 | 41.20 | 1.6869 | 44.017 | 4.095 | 5 | clayey silt to silty clay | 22 |
| 34.28 | 38.67 | 1.4198 | 43.867 | 3.672 | 5 | clayey silt to silty clay | 19 |
| 34.45 | 34.87 | 1.2643 | 34.131 | 3.626 | 5 | clayey silt to silty clay | 17 |
| 34.61 | 31.68 | 1.2086 | 29.069 | 3.815 | 5 | clayey silt to silty clay | 16 |
| 34.78 | 30.34 | 1.1710 | 25.958 | 3.859 | 5 | clayey silt to silty clay | 15 |
| 34.94 | 29.04 | 1.1498 | 35.971 | 3.959 | 5 | clayey silt to silty clay | 15 |
| 35.10 | 32.27 | 1.2078 | 21.091 | 3.742 | 5 | clayey silt to silty clay | 15 |
| 35.27 | 31.55 | 1.2112 | 20.599 | 3.839 | 5 | clayey silt to silty clay | 15 |
| 35.43 | 30.69 | 1.0877 | 30.313 | 3.544 | 5 | clayey silt to silty clay | 15 |
| 35.60 | 31.80 | 1.2955 | 48.261 | 4.075 | 5 | clayey silt to silty clay | 17 |
| 35.76 | 41.44 | 1.6134 | 29.660 | 3.893 | 4 | silty clay to clay | 23 |
| 35.93 | 31.58 | 1.4046 | 10.000 | 4.448 | 4 | silty clay to clay | 22 |
| 36.09 | 30.03 | 1.1455 | 44.278 | 3.815 | 4 | silty clay to clay | 20 |
| 36.25 | 30.82 | 1.1780 | 38.660 | 3.822 | 5 | clayey silt to silty clay | 15 |
| 36.42 | 31.92 | 1.2797 | 56.673 | 4.009 | 5 | clayey silt to silty clay | 16 |
| 36.58 | 36.21 | 0.9561 | 16.820 | 2.640 | 5 | clayey silt to silty clay | 16 |
| 36.75 | 31.29 | 0.8623 | 85.402 | 2.756 | 6 | sandy silt to clayey silt | 14 |
| 36.91 | 37.90 | 1.0848 | 59.340 | 2.862 | 5 | clayey silt to silty clay | 18 |
| 37.07 | 39.32 | 1.3938 | 50.636 | 3.545 | 5 | clayey silt to silty clay | 19 |
| 37.24 | 37.69 | 1.4414 | 60.680 | 3.824 | 5 | clayey silt to silty clay | 19 |
| 37.40 | 40.34 | 1.4654 | 51.968 | 3.632 | 5 | clayey silt to silty clay | 19 |
| 37.57 | 39.81 | 1.5901 | 71.535 | 3.994 | 5 | clayey silt to silty clay | 20 |
| 37.73 | 42.49 | 1.4802 | 68.219 | 3.484 | 5 | clayey silt to silty clay | 21 |
| 37.89 | 43.25 | 1.5750 | 103.604 | 3.642 | 5 | clayey silt to silty clay | 22 |
| 38.06 | 46.13 | 1.6716 | 67.734 | 3.624 | 5 | clayey silt to silty clay | 22 |
| 38.22 | 43.14 | 1.7769 | 69.234 | 4.118 | 5 | clayey silt to silty clay | 21 |
| 38.39 | 42.07 | 1.4994 | 69.503 | 3.564 | 5 | clayey silt to silty clay | 21 |
| 38.55 | 43.20 | 1.4398 | 90.271 | 3.333 | 5 | clayey silt to silty clay | 21 |
| 38.71 | 41.88 | 1.4941 | 58.993 | 3.568 | 5 | clayey silt to silty clay | 20 |
| 38.88 | 37.98 | 1.4728 | 52.079 | 3.878 | 5 | clayey silt to silty clay | 19 |
| 39.04 | 35.84 | 1.3867 | 74.953 | 3.869 | 5 | clayey silt to silty clay | 18 |
| 39.21 | 34.68 | 1.2701 | 70.320 | 3.663 | 5 | clayey silt to silty clay | 17 |
| 39.37 | 33.80 | 1.2094 | 61.118 | 3.578 | 5 | clayey silt to silty clay | 17 |
| 39.53 | 32.71 | 1.1573 | 66.611 | 3.538 | 5 | clayey silt to silty clay | 16 |
| 39.70 | 30.96 | 1.0934 | 52.559 | 3.531 | 5 | clayey silt to silty clay | 15 |
| 39.86 | 29.81 | 1.0207 | 51.579 | 3.424 | 5 | clayey silt to silty clay | 15 |
| 40.03 | 32.20 | 0.9878 | 90.621 | 3.068 | 5 | clayey silt to silty clay | 16 |
| 40.19 | 37.53 | 1.1694 | 73.646 | 3.116 | 5 | clayey silt to silty clay | 18 |
| 40.35 | 37.06 | 1.2548 | 61.303 | 3.385 | 5 | clayey silt to silty clay | 18 |
| 40.52 | 36.61 | 1.3342 | 69.249 | 3.644 | 5 | clayey silt to silty clay | 19 |
| 40.68 | 40.05 | 1.4890 | 89.461 | 3.718 | 5 | clayey silt to silty clay | 20 |
| 40.85 | 43.84 | 1.6798 | 67.934 | 3.832 | 5 | clayey silt to silty clay | 20 |
| 41.01 | 41.69 | 1.6569 | 41.067 | 3.974 | 5 | clayey silt to silty clay | 19 |
| 41.17 | 33.95 | 1.4180 | 37.532 | 4.177 | 5 | clayey silt to silty clay | 18 |
| 41.34 | 33.12 | 1.1042 | 54.951 | 3.333 | 5 | clayey silt to silty clay | 16 |
| 41.50 | 31.77 | 1.1591 | 73.897 | 3.649 | 5 | clayey silt to silty clay | 17 |
| 41.67 | 40.79 | 1.5106 | 71.269 | 3.703 | 5 | clayey silt to silty clay | 18 |
| 41.83 | 40.08 | 1.9843 | 40.599 | 4.951 | 4 | silty clay to clay | 26 |
| 41.99 | 41.38 | 1.7140 | 46.687 | 4.142 | 4 | silty clay to clay | 27 |
| 42.16 | 41.22 | 1.8973 | 61.764 | 4.603 | 4 | silty clay to clay | 26 |
| 42.32 | 38.58 | 1.5560 | 39.180 | 4.033 | 5 | clayey silt to silty clay | 19 |
| 42.49 | 34.82 | 1.2059 | 59.623 | 3.463 | 5 | clayey silt to silty clay | 18 |
| 42.65 | 35.44 | 1.3237 | 66.197 | 3.735 | 5 | clay ey silt to silty clay | 19 |
| 42.81 | 44.61 | 1.7312 | 67.966 | 3.881 | 5 | clayey silt to silty clay | 21 |
| 42.98 | 51.92 | 2.1057 | 45.335 | 4.056 | 5 | clayey silt to silty clay | 23 |
| 43.14 | 45.23 | 1.9071 | 53.037 | 4.217 | 5 | clayey silt to silty clay | 23 |
| 43.31 | 46.12 | 1.6858 | 70.104 | 3.655 | 5 | clayey silt to silty clay | 23 |
| 43.47 | 48.53 | 1.7369 | 56.239 | 3.579 | 5 | clayey silt to silty clay | 22 |
| 43.64 | 38.88 | 1.5499 | 47.099 | 3.987 | 5 | clayey silt to silty clay | 20 |
| 43.80 | 34.52 | 1.1816 | 66.813 | 3.423 | 5 | clayey silt to silty clay | 18 |
| 43.96 | 36.12 | 1.0934 | 81.503 | 3.027 | 5 | clayey silt to silty clay | 18 |
| 44.13 | 39.72 | 1.4148 | 52.249 | 3.562 | 5 | clayey silt to silty clay | 19 |
| 44.29 | 42.43 | 2.2644 | 59.008 | 5.337 | 3 | clay | 44 |
| 44.46 | 52.86 | 3.3164 | 56.961 | 6.275 | 3 | clay | 51 |
| 44.62 | 62.75 | 3.6623 | 59.606 | 5.836 | 3 | clay | 56 |
| 44.78 | 56.84 | 4.0904 | 75.687 | 7.196 | 11 | very stiff fine grained (*) | 59 |
| 44.95 | 63.61 | 3.5083 | 87.478 | 5.516 | 11 | very stiff fine grained (*) | 57 |
| 45.11 | 54.22 | 3.7937 | 85.547 | 6.997 | 11 | very stiff fine grained (*) | 61 |
| 45.28 | 67.87 | 5.3612 | 130.008 | 7.899 | 11 | very stiff fine grained (*) | 82 |
| 45.44 | 130.07 | 7.1662 | 43.690 | 5.509 | 11 | very stiff fine grained (*) | 106 |
| 45.60 | 130.63 | 8.1585 | 18.104 | 6.245 | 11 | very stiff fine grained (*) | 125 |
| 45.77 | 130.62 | 7.8090 | 14.911 | 5.979 | 11 | very stiff fine grained (*) | 121 |
| 45.93 | 117.70 | 8.0549 | 57.141 | 6.844 | 11 | very stiff fine grained (*) | 124 |
| 46.10 | 140.43 | 9.1809 | 21.813 | 6.538 | 11 | very stiff fine grained (*) | 131 |
| 46.26 | 151.14 | 8.4861 | 18.628 | 5.615 | 11 | very stiff fine grained (*) | 119 |
| 46.42 | 78.69 | 3.7086 | 34.490 | 4.713 | 11 | very stiff fine grained (*) | 95 |
| 46.59 | 63.70 | 2.9120 | 137.592 | 4.571 | 5 | clayey silt to silty clay | 31 |
| 46.75 | 50.10 | 1.9286 | 86.116 | 3.850 | 5 | clayey silt to silty clay | 26 |
| 46.92 | 47.76 | 1.4657 | 73.796 | 3.069 | 5 | clayey silt to silty clay | 25 |
| 47.08 | 56.15 | 2.0528 | 93.981 | 3.656 | 5 | clayey silt to silty clay | 27 |
| 47.24 | 60.06 | 2.0303 | 72.850 | 3.381 | 5 | clayey silt to silty clay | 28 |
| 47.41 | 55.24 | 1.9868 | 110.168 | 3.597 | 5 | clayey silt to silty clay | 27 |
| 47.57 | 50.99 | 1.7399 | 107.015 | 3.412 | 5 | clayey silt to silty clay | 26 |
| 47.74 | 50.46 | 1.6955 | 93.729 | 3.360 | 5 | clayey silt to silty clay | 25 |
| 47.90 | 52.22 | 1.9296 | 90.345 | 3.695 | 5 | clayey silt to silty clay | 26 |
| 48.06 | 53.91 | 2.4592 | 120.000 | 4.561 | 5 | clayey silt to silty clay | 28 |
| 48.23 | 65.42 | 2.4638 | 144.257 | 3.766 | 5 | clayey silt to silty clay | 30 |
| 48.39 | 63.70 | 2.7178 | 88.907 | 4.266 | 5 | clayey silt to silty clay | 32 |
| 48.56 | 64.91 | 2.4234 | 101.160 | 3.733 | 5 | clayey silt to silty clay | 31 |
| 48.72 | 61.92 | 2.4129 | 105.126 | 3.897 | 5 | clayey silt to silty clay | 31 |
| 48.88 | 60.82 | 2.4937 | 131.754 | 4.100 | 5 | clayey silt to silty clay | 30 |
| 49.05 | 59.36 | 2.5779 | 51.675 | 4.343 | 5 | clayey silt to silty clay | 28 |
| 49.21 | 52.64 | 2.5172 | 58.500 | 4.782 | 4 | silty clay to clay | 35 |
| 49.38 | 47.87 | 2.0718 | 66.249 | 4.328 | 5 | clayey silt to silty clay | 24 |
| 49.54 | 45.61 | 1.7525 | 70.968 | 3.842 | 5 | clayey silt to silty clay | 22 |
| 49.70 | 43.97 | 1.7160 | 64.436 | 3.903 | 5 | clayey silt to silty clay | 22 |
| 49.87 | 45.95 | 1.7426 | 73.921 | 3.792 | 5 | clayey silt to silty clay | 23 |
| 50.03 | 48.69 | 1.8356 | 69.616 | 3.770 | 5 | clayey silt to silty clay | 24 |
| 50.20 | 50.33 | 1.8552 | 71.643 | 3.686 | 5 | clayey silt to silty clay | 24 |
| 50.36 | 51.10 | 1.8064 | 78.323 | 3.535 | 5 | clayey silt to silty clay | 25 |
| 50.52 | 51.08 | 1.6387 | 91.921 | 3.208 | 5 | clayey silt to silty clay | 25 |
| 50.69 | 51.44 | 1.8830 | 95.569 | 3.661 | 5 | clayey silt to silty clay | 25 |
| 50.85 | 51.93 | 2.0455 | 82.306 | 3.939 | 5 | clayey silt to silty clay | 25 |
| 51.02 | 50.82 | 1.9636 | 95.747 | 3.864 | 5 | clayey silt to silty clay | 25 |
| 51.18 | 51.53 | 2.0203 | 86.929 | 3.921 | 5 | clayey silt to silty clay | 25 |
| 51.35 | 52.76 | 2.1853 | 70.732 | 4.142 | 5 | clayey silt to silty clay | 25 |
| 51.51 | 51.80 | 2.3049 | 54.887 | 4.449 | 5 | clayey silt to silty clay | 25 |
| 51.67 | 52.16 | 2.0528 | 74.909 | 3.936 | 5 | clayey silt to silty clay | 25 |
| 51.84 | 50.40 | 2.0673 | 71.867 | 4.102 | 5 | clayey silt to silty clay | 25 |
| 52.00 | 51.31 | 2.0855 | 58.544 | 4.064 | 5 | clayey silt to silty clay | 25 |
| 52.17 | 50.41 | 2.0525 | 71.035 | 4.071 | 5 | clayey silt to silty clay | 24 |
| 52.33 | 49.24 | 2.0725 | 82.732 | 4.209 | 5 | clayey silt to silty clay | 24 |
| 52.49 | 49.97 | -32768 | 67.946 | -32768 | 0 | <out of range> | 0 |

Field electrical resistivity testing was performed at the proposed power block location by GEOVision on July 12, 2007. The testing was performed to support the design of the electrical grounding system. A description of the methodology and a summary of the results is presented in this appendix.

July 19, 2007

GEOVision Project Number 7322

Mr. Mike Hatch
URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108
(619) 683-6114

Subject: **Four Electrode Wenner Resistivity Tests**
**Carrizo Solar Power Project, Section 28**

Dear Mr. Hatch:

A geophysical survey was conducted on July 12, 2007 at Section 28 of the Carrizo Solar Power Project near California Valley, California. The purpose of the geophysical survey was to measure soil resistivity in accordance with ASTM standard G57-06. Site conditions consisted of an open dirt field with minor vegetation.

**Table 1: Sounding Locations**

| Sounding | Direction | Northing (US Feet) | Easting (US Feet) |
|---|---|---|---|
| S-1 Center | West to East | 2,331,055 | 5,951,487 |
| S-2 Center | South to North | 2,330,865 | 5,951,655 |
| S-3 Center | West to East | 2,330,691 | 5,951,337 |

Note: US State Plane, NAD83, CA Zone V (0405)

## METHODOLOGY

Resistivity equipment used during this investigation included an Advanced Geosciences Supersting R8/IP earth resistivity meter coupled to 1/4- inch stainless steel electrode stakes with 20 gauge insulated copper wire. A test resistor rated at 19.82 ohms was used to verify the Supersting R8/IP was operating within manufacturer specifications. The Supersting transmitter is rated at 200W and is capable of continuous output current between 1 mA and 1 A with an output voltage of 800 V peak to peak. The operator may

select a maximum output current, which the instrument will automatically reduce as needed depending on soil conditions and ground impedance. The transmitter then maintains a steady current through the measurement cycle, recording input voltage and writing V/I to internal memory.

## FIELD PROCEDURES

Before conducting the geophysical survey the battery level was checked on the resistivity meter and found to be within acceptable limits. Ambient temperature and soil conditions were recorded on the field log. Electrode spacing was pre-determined based on information provided by the client.

A test resistor rated at 19.82 ohms was connected to the positive and negative current and potential leads on the Supersting R8/IP immediately before the first sounding at each of the survey locations. The resistance value across the test resistor and the time of the test measurement was recorded on the field log.

Resistivity measurements (soundings) were made at three locations (S-1, S-2 and S-3) at the selected electrode spacings using a surveyor's measuring tape for spatial control.

Resistivity measurements at twelve electrode spacings were made on each line. For each resistivity measurement, four stainless steel electrodes were placed at equal distances (a-spacing) in a straight line. A current was applied from the outer electrodes, and the potential difference (voltage) was measured across the inner electrodes. The Supersting R8/IP displays the resistance value equal to V/I, which was recorded along with the a-spacing on a field data sheet and later transferred to a spreadsheet. Two or more measurements were recorded at each station for quality control. If there was significant variation between the first and second measurements the control leads, electrode cable and electrode coupling were field checked to ensure proper survey conditions. After each measurement, the electrodes were moved to the next a-spacing and another set of measurements were taken.

## DATA REDUCTION

Three spreadsheets were generated from the collected resistivity data. Electrode spacing (a-spacing) and resistance reading (V/I), were entered for each resistivity measurement. The generalized form of the four-electrode array is shown in Figure 1.

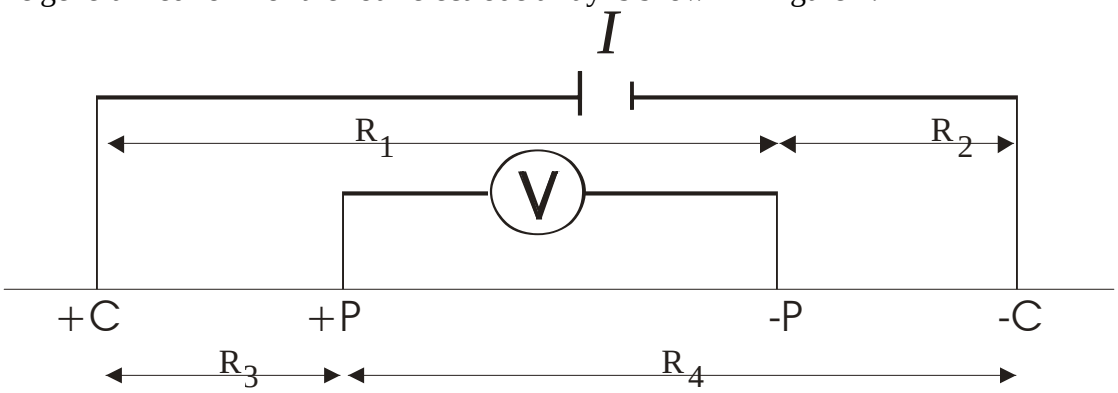



**Figure 1: The generalized form of the four electrode array**

When the material upon which the current is induced is uniform, the resistivity calculated will be constant independent of electrode configuration. However, in a field investigation where subsurface heterogeneities exist, the calculated resistivity values will vary with electrode array. This calculated resistivity is referred to as apparent resistivity ($\rho_a$), and can be calculated using the relationship:

$$\rho_a = \frac{2\pi V}{I\left\{\left(\frac{1}{R_3} - \frac{1}{R_4}\right) - \left(\frac{1}{R_1} - \frac{1}{R_2}\right)\right\}}$$

For the Wenner array, which was used during this investigation, where R1 = R4 ; R3 = R2 and R1 = 2R2 = 2*a*, it can be shown that the formula for calculated apparent resistivity can be reduced to the following form:

$$\rho_a = 2\pi a\left(\frac{V}{I}\right)$$

## RESULTS

Data collected from the three Wenner resistivity arrays are attached as Tables 2, 3 and 4. All calculations were conducted using known geometry and measured resistance (V/I) values which were recorded on the daily field logs. Apparent resistivity (magnitude) values are presented in ohm-ft, ohm-m and ohm-cm. The ASTM Standard G57-06 specifies that apparent resistivity is presented in the ohm-centimeter unit.

All completed data processing forms are retained in project files. All files generated during the processing sequence were archived on CD-ROM.

## SUMMARY

Four-electrode soil resistivity measurements were made at Section 28 of the Carrizo Solar Power Project in accordance with ASTM standard G57-2006. Soil resistivity values were made at twelve locations, using electrode spacings based on previous investigations. Field measurements and calculated values were consistent and repeatable at all locations, as summarized in Tables 2-4.

If you have any questions concerning this investigation, please call us at 951-549-1234.

Sincerely,
**GEO***Vision* Geophysical Services

Submitted by:
William Dalrymple
Project Geophysicist

Reviewed and Approved by:
Antony Martin, P. GP 989
Technical Director

Attachments:

Table 2: Resistivity Sounding S-1
Table 3: Resistivity Sounding S-2
Table 4: Resistivity Sounding S-3
Applied Technical Services, Incorporated Certificate of Calibration
Applied Technical Services, Incorporated Calibration Data Sheet

**TABLE 2 ELECTRICAL RESISTIVITY SOUNDING S-1 - Carrizo Plain Section 28: West - East Sounding**

Job Number 7322 Date 12-Jul-07

19.82 ohm Test Resistor Reading

19.80 ohm at 1530

| A-Spacing [ft.] | Resistance Reading [Ohm] | Geometric Multiplier [2πA](ft) | Calculated Magnitude [Ohm-ft.] | Converted Magnitude [Ohm-m] | Converted Magnitude [Ohm-cm] | Repeat Resistance [Ohm] | Repeat Magnitude [Ohm-ft.] | Repeat Conversion [Ohm-m] | Repeat Conversion [Ohm-cm] |
|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 6.243 | 9.425 | 58.839 | 17.934 | 1793.4 | 6.246 | 58.867 | 17.943 | 1794.3 |
| 2.0 | 4.899 | 12.566 | 61.563 | 18.764 | 1876.4 | 4.894 | 61.500 | 18.745 | 1874.5 |
| 3.0 | 5.451 | 18.850 | 102.749 | 31.318 | 3131.8 | 5.582 | 105.218 | 32.071 | 3207.1 |
| 5.0 | 2.445 | 31.416 | 76.812 | 23.412 | 2341.2 | 2.447 | 76.875 | 23.431 | 2343.1 |
| 7.5 | 1.916 | 47.124 | 90.289 | 27.520 | 2752.0 | 1.915 | 90.242 | 27.506 | 2750.6 |
| 10.0 | 1.476 | 62.832 | 92.740 | 28.267 | 2826.7 | 1.475 | 92.677 | 28.248 | 2824.8 |
| 15.0 | 1.003 | 94.248 | 94.531 | 28.813 | 2881.3 | 1.007 | 94.908 | 28.928 | 2892.8 |
| 30.0 | 0.357 | 188.496 | 67.236 | 20.494 | 2049.4 | 0.359 | 67.595 | 20.603 | 2060.3 |
| 50.0 | 0.194 | 314.159 | 60.947 | 18.577 | 1857.7 | 0.195 | 61.387 | 18.711 | 1871.1 |
| 75.0 | 0.123 | 471.239 | 58.010 | 17.681 | 1768.1 | 0.134 | 62.910 | 19.175 | 1917.5 |
| 100.0 | 0.070 | 628.319 | 43.982 | 13.406 | 1340.6 | 0.073 | 45.911 | 13.994 | 1399.4 |
| 150.0 | 0.032 | 942.478 | 29.763 | 9.072 | 907.2 | 0.033 | 31.309 | 9.543 | 954.3 |

**TABLE 3 ELECTRICAL RESISTIVITY SOUNDING S-2 - Carrizo Plain Section 28: South to North Sounding**

Job Number 7322 Date 12-Jul-07

19.82 ohm Test Resistor Reading

19.80 ohm at 1426

| A-Spacing [ft.] | Resistance Reading [Ohm] | Geometric Multiplier [2πA](ft) | Calculated Magnitude [Ohm-ft.] | Converted Magnitude [Ohm-m] | Converted Magnitude [Ohm-cm] | Repeat Resistance [Ohm] | Repeat Magnitude [Ohm-ft.] | Repeat Conversion [Ohm-m] | Repeat Conversion [Ohm-cm] |
|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 11.250 | 9.425 | 106.029 | 32.318 | 3231.8 | 11.230 | 105.840 | 32.260 | 3226.0 |
| 2.0 | 9.433 | 12.566 | 118.539 | 36.131 | 3613.1 | 9.413 | 118.287 | 36.054 | 3605.4 |
| 3.0 | 5.606 | 18.850 | 105.671 | 32.208 | 3220.8 | 5.602 | 105.595 | 32.185 | 3218.5 |
| 5.0 | 3.188 | 31.416 | 100.154 | 30.527 | 3052.7 | 3.188 | 100.154 | 30.527 | 3052.7 |
| 7.5 | 2.354 | 47.124 | 110.930 | 33.811 | 3381.1 | 2.354 | 110.930 | 33.811 | 3381.1 |
| 10.0 | 1.589 | 62.832 | 99.840 | 30.431 | 3043.1 | 1.590 | 99.903 | 30.450 | 3045.0 |
| 15.0 | 1.002 | 94.248 | 94.436 | 28.784 | 2878.4 | 1.003 | 94.531 | 28.813 | 2881.3 |
| 30.0 | 0.399 | 188.496 | 75.134 | 22.901 | 2290.1 | 0.405 | 76.341 | 23.269 | 2326.9 |
| 50.0 | 0.144 | 314.159 | 45.365 | 13.827 | 1382.7 | 0.144 | 45.302 | 13.808 | 1380.8 |
| 75.0 | 0.089 | 471.239 | 41.785 | 12.736 | 1273.6 | 0.091 | 42.869 | 13.066 | 1306.6 |
| 100.0 | 0.047 | 628.319 | 29.544 | 9.005 | 900.5 | 0.047 | 29.650 | 9.037 | 903.7 |
| 150.0 | 0.027 | 942.478 | 25.626 | 7.811 | 781.1 | 0.028 | 26.116 | 7.960 | 796.0 |

**TABLE 4 ELECTRICAL RESISTIVITY SOUNDING S-3 - Carrizo Plain Section 28: West - East Sounding**

Job Number 7322 Date 12-Jul-07

19.82 ohm Test Resistor Reading

19.81 ohm at 1323

| A-Spacing [ft.] | Resistance Reading [Ohm] | Geometric Multiplier [2πA](ft) | Calculated Magnitude [Ohm-ft.] | Converted Magnitude [Ohm-m] | Converted Magnitude [Ohm-cm] | Repeat Resistance [Ohm] | Repeat Magnitude [Ohm-ft.] | Repeat Conversion [Ohm-m] | Repeat Conversion [Ohm-cm] |
|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 2.774 | 9.425 | 26.144 | 7.969 | 796.9 | 2.769 | 26.097 | 7.954 | 795.4 |
| 2.0 | 3.500 | 12.566 | 43.982 | 13.406 | 1340.6 | 3.501 | 43.995 | 13.410 | 1341.0 |
| 3.0 | 3.930 | 18.850 | 74.079 | 22.579 | 2257.9 | 2.927 | 55.173 | 16.817 | 1681.7 |
| 5.0 | 1.907 | 31.416 | 59.910 | 18.261 | 1826.1 | 1.907 | 59.910 | 18.261 | 1826.1 |
| 7.5 | 1.513 | 47.124 | 71.298 | 21.732 | 2173.2 | 1.510 | 71.157 | 21.689 | 2168.9 |
| 10.0 | 0.958 | 62.832 | 60.199 | 18.349 | 1834.9 | 0.957 | 60.155 | 18.335 | 1833.5 |
| 15.0 | 0.539 | 94.248 | 50.800 | 15.484 | 1548.4 | 0.539 | 50.818 | 15.489 | 1548.9 |
| 30.0 | 0.291 | 188.496 | 54.928 | 16.742 | 1674.2 | 0.292 | 54.984 | 16.759 | 1675.9 |
| 50.0 | 0.140 | 314.159 | 43.825 | 13.358 | 1335.8 | 0.139 | 43.700 | 13.320 | 1332.0 |
| 75.0 | 0.073 | 471.239 | 34.179 | 10.418 | 1041.8 | 0.072 | 34.141 | 10.406 | 1040.6 |
| 100.0 | 0.028 | 628.319 | 17.662 | 5.383 | 538.3 | 0.028 | 17.612 | 5.368 | 536.8 |
| 150.0 | 0.021 | 942.478 | 19.651 | 5.990 | 599.0 | 0.021 | 19.481 | 5.938 | 593.8 |

# CERTIFICATE OF CALIBRATION

## Accredited Calibration

ACCREDITED
CERT. # 1888-03

**Certificate Number:** M505659-1

Manufacturer: **Advanced Geosciences, Inc**
Model No: **Super Sting**
Customer PO No.:

Description: **Auto Resistivity Meter**
Serial No: **SS0609199**
Customer Asset No.: **SS0609199**

**Customer:**
GeoVision
1151 Pomona Road
Suite P
Corona, CA 92882

**Location of Calibration:**
Applied Technical Services, Inc.
1049 Triad Court
Marietta, GA 30062

Calibration Procedure: **ATS-1032 Rev. 2: Calibration of Resistance Bridges / MicroOhm Meters**

Date of Calibration: **March 26, 2007**
Temperature: **70° F**
Condition Received: **In Tolerance**

*Next Calibration Due: **March 26, 2008**
Humidity: **40 %**
Condition Returned: **In Tolerance**

This instrument has been calibrated using primary or secondary standards whose calibration is traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST). Some measurements are traceable to natural physical constants, consensus standards or ratio type measurements.

The reported expanded measurement uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a confidence level of approximately 95%. ATS maintains, wherever possible, at least a 4:1 Test Uncertainty Ratio. Statements of compliance, where applicable, are based on test results falling within specified limits with no reduction by the uncertainty of the measurement, unless otherwise allowed by procedure.

All calibrations are performed in accordance with the ATS Quality Manual QM1, Rev. 7 dated July 7, 2006. Applied Technical Services, Inc.'s Quality System complies with the applicable requirements of ANSI/NCSL Z540-1, ISO 9001-2000, 10CFR 50 Appendix B, 10CFR Part 21 and ISO/IEC 17025. ATS is an ISO/IEC 17025 Accredited Calibration Laboratory through A2LA.

The reported data is valid only at the time of the test and related only to the item calibrated. *Calibration due dates appearing on this Certificate of Calibration and calibration label are determined by the client and do not imply continued conformance to specifications.

This certificate shall not be reproduced except in full, without the permission of Applied Technical Services, Inc.

Notes:

Calibration Equipment Used::

Model: **Guildline 9211A** Desc.: **Master Shunt Box** ID No.: **ATS-02014** Cal Due Date: **4/25/2007**

**Calibrated by:** Jeff L. Cook
Electrical Lab Supervisor



**Applied Technical Services, Inc. 1049 Triad Court, Marietta, GA 30062 (770) 423-1400 www.atslab.com**

APPLIED TECHNICAL SERVICES, INCORPORATED

# Calibration Data Sheet



Customer : Geovision
Purchase Order No:
Item Name: Automatic Resistivity Meter
Asset No: SS0609199
ATS Reference No: M505659-1
Manufacturer: Advanced Geosciences
Model No Super Sting
Proc. No: 1032
Rev: 1
Serial No: SS0609199
Calibration Date: 03-26-07
Calibration Due Date: 3/26/2008
Reason For Service: ■ Initial Calibration ☐ Due For Calibration ☐ Repair and Calibration

Equipment Used: ATS-02014 Due: 04-25-07 Guidlind Resistance Standard
Due:
Due:
Due:
Due:

**Calibrated By:** Jeff L Cook

## Customer Instrument Under Test

| UNCERTAINTY (SEE NOTE) | Function And Range | Applied | TOLERANCE | | AS FOUND READING | AS CALIBRATED READING |
|---|---|---|---|---|---|---|
| 0.001 | Restance m ohms | 999.99 | 989.9901 | 1009.9899 | 998.1 | 998.1 |
| 0.001 | Restance m ohms | 99.99 | 98.9901 | 100.9899 | 99.98 | 99.98 |
| 0.001 | Restance m ohms | 10.00 | 9.9000 | 10.1000 | 10.01 | 10.01 |
| 0.001 | Restance m ohms | 1.00 | 0.9900 | 1.0100 | 1.003 | 1.003 |
| 0.001 | Restance u ohms | 333.33 | 329.9997 | 336.6663 | 332.9 | 332.9 |

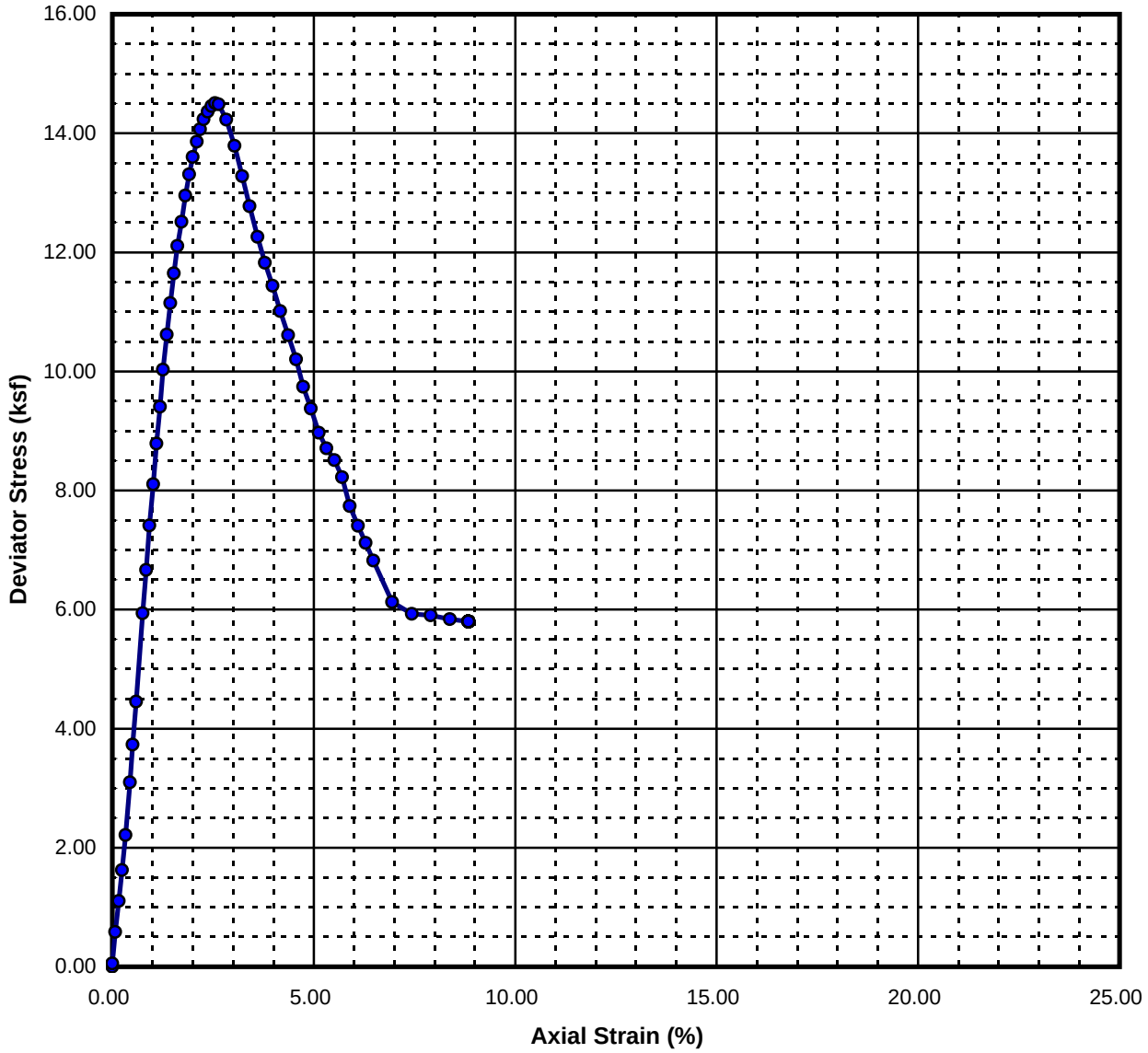
* Indicates out of tolerance readings

Remarks:

ATS-563, 08/06

The materials encountered in the field were visually classified and evaluated with respect to strength, swelling potential, compressibility, dry density, and moisture content. Subsequently, the samples were returned to our geotechnical laboratory for further examination and testing. The materials encountered in the borings were visually classified and evaluated with respect to strength, swelling potential, compressibility, density, and moisture content. The visual classifications were substantiated by performing moisture content, dry density, Atterberg Limits, Expansion Index and grain size distribution tests. Limited testing was also performed to evaluate strength, compressibility, compaction characteristics and R-Value (for pavement design).

Laboratory testing was performed in general accordance with applicable ASTM standards. Results of laboratory testing are shown at the corresponding sample locations on the boring logs. Detailed laboratory test results are presented in this Appendix.



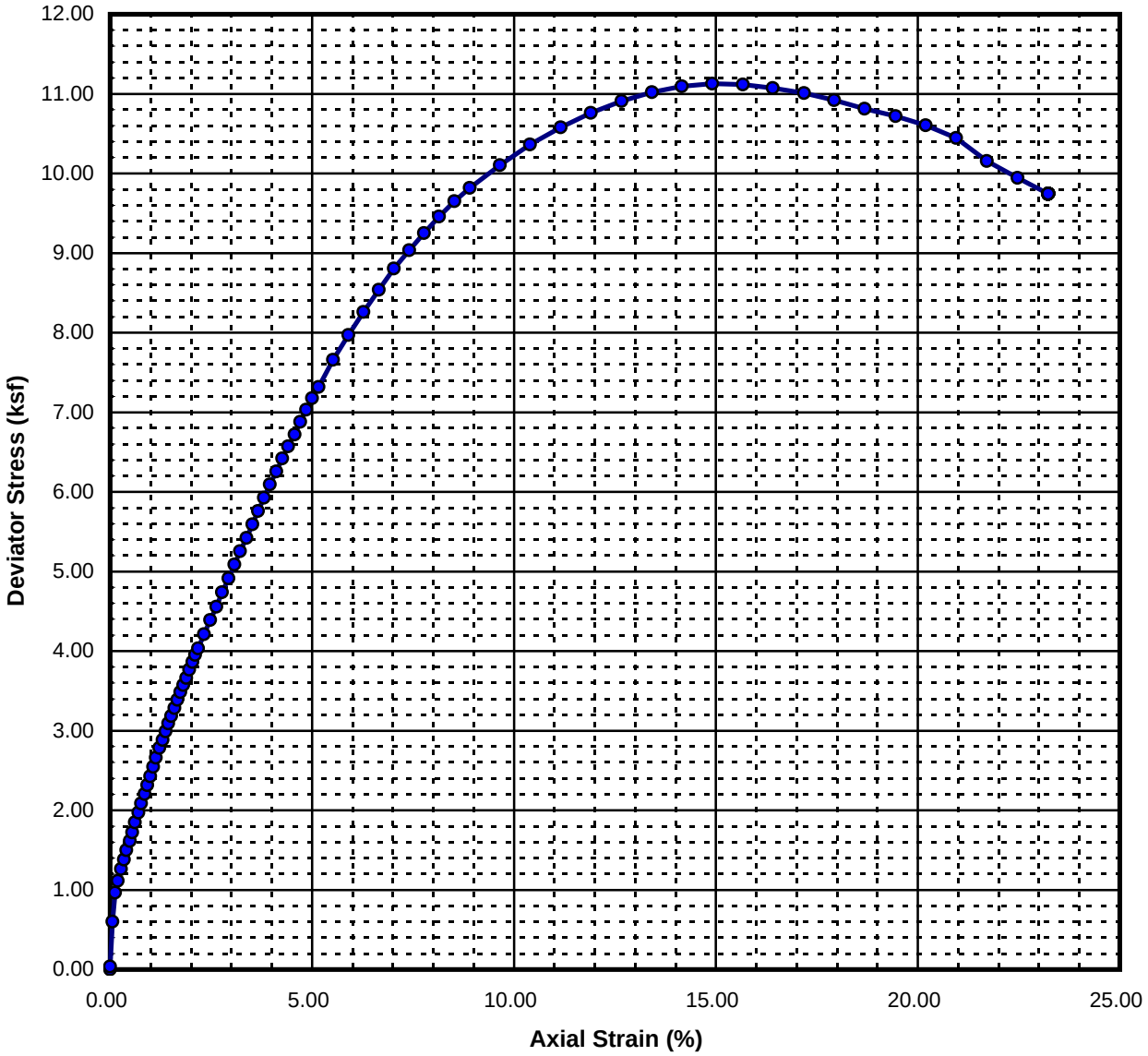

Cell Pressure (ksf) = 0.50

Strain Rate (%/min) = 0.94 Peak Deviator Stress (ksf): 14.51

Axial Strain during confinment (%): 0.19

| Test Number | Water Content (%) | LL (%) | PI (%) | Length (in) | Diameter (in) | Wet Unit Weight (pcf) | Degree of Saturation (%) |
|---|---|---|---|---|---|---|---|
| Initial: | 16.5 | 53 | 31 | 4.796 | 2.402 | 113.6 | 61.3 |

| | | |
|---|---|---|
| **Project Name:** | **Carrizo Energy Solar Farm (CESF)** | **UNCONSOLIDATED - UNDRAINED TRIAXIAL COMPRESSION TEST** |
| **Project Number:** | **22239472** | |
| **Exploration No:** | **SB-02** **Sample No.:** **Depth (ft): 3.0** | |
| **Description and/or Classification:** | **Dark grayish brown sandy Clay (CH)** | **Figure : E-1** |



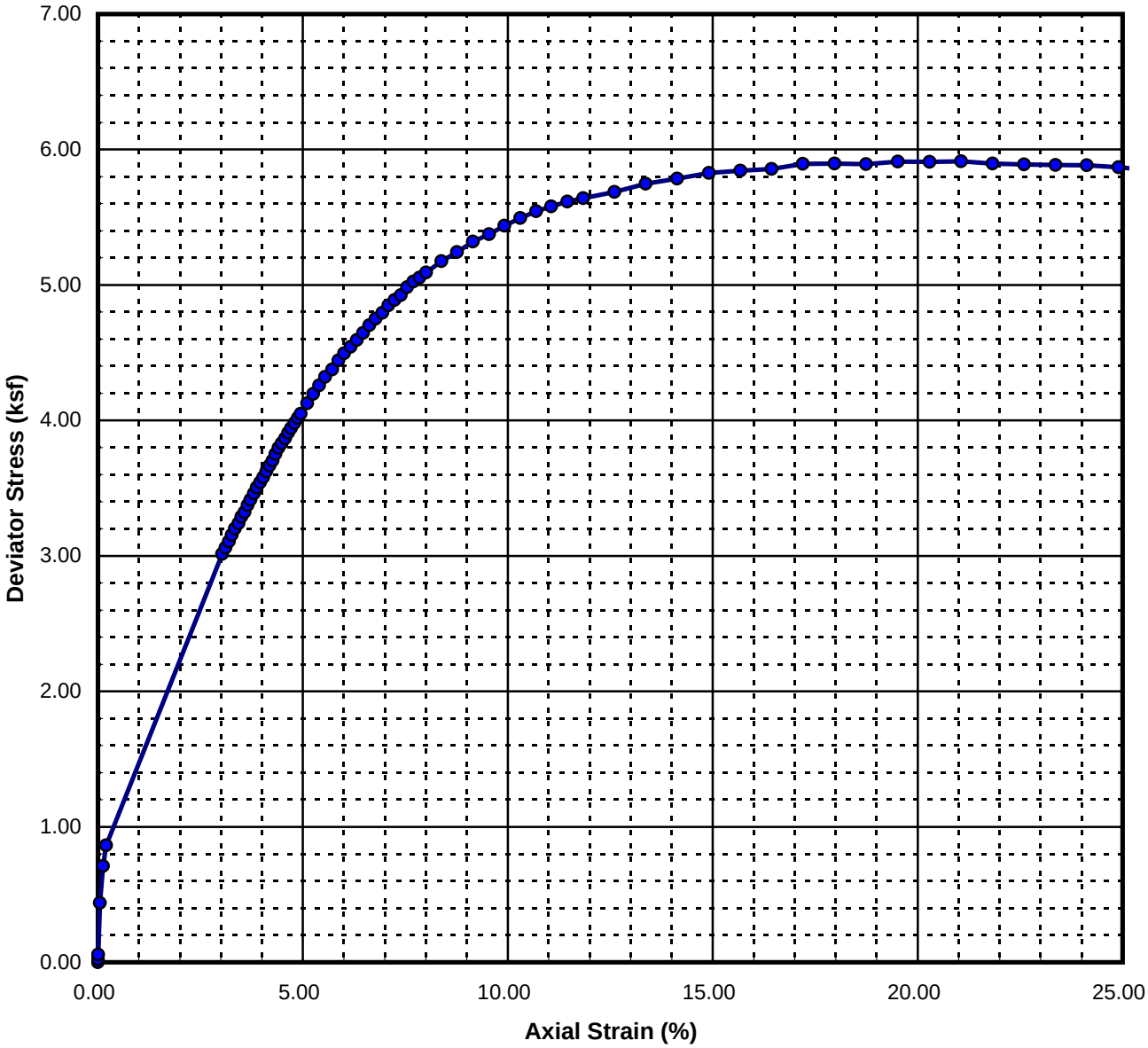

Cell Pressure (ksf) = 3.00

Strain Rate (%/min) = 0.74 Peak Deviator Stress (ksf): 11.13

Axial Strain during confinment (%): 0.46

| Test Number | Water Content (%) | LL (%) | PI (%) | Length (in) | Diameter (in) | Wet Unit Weight (pcf) | Degree of Saturation (%) |
|---|---|---|---|---|---|---|---|
| Initial: | 16.1 | | | 6.033 | 2.418 | 134.9 | 97.0 |

| | | |
|---|---|---|
| **Project Name:** | **Carrizo Energy Solar Farm (CESF)** | **UNCONSOLIDATED - UNDRAINED TRIAXIAL COMPRESSION TEST** |
| **Project Number:** | **22239472** | |
| **Exploration No:** | **SB-05** **Sample No.:** **Depth (ft): 30.0** | |
| **Description and/or Classification:** | **Yellowish brown clayey Sand (SC)** | **Figure : E-2** |



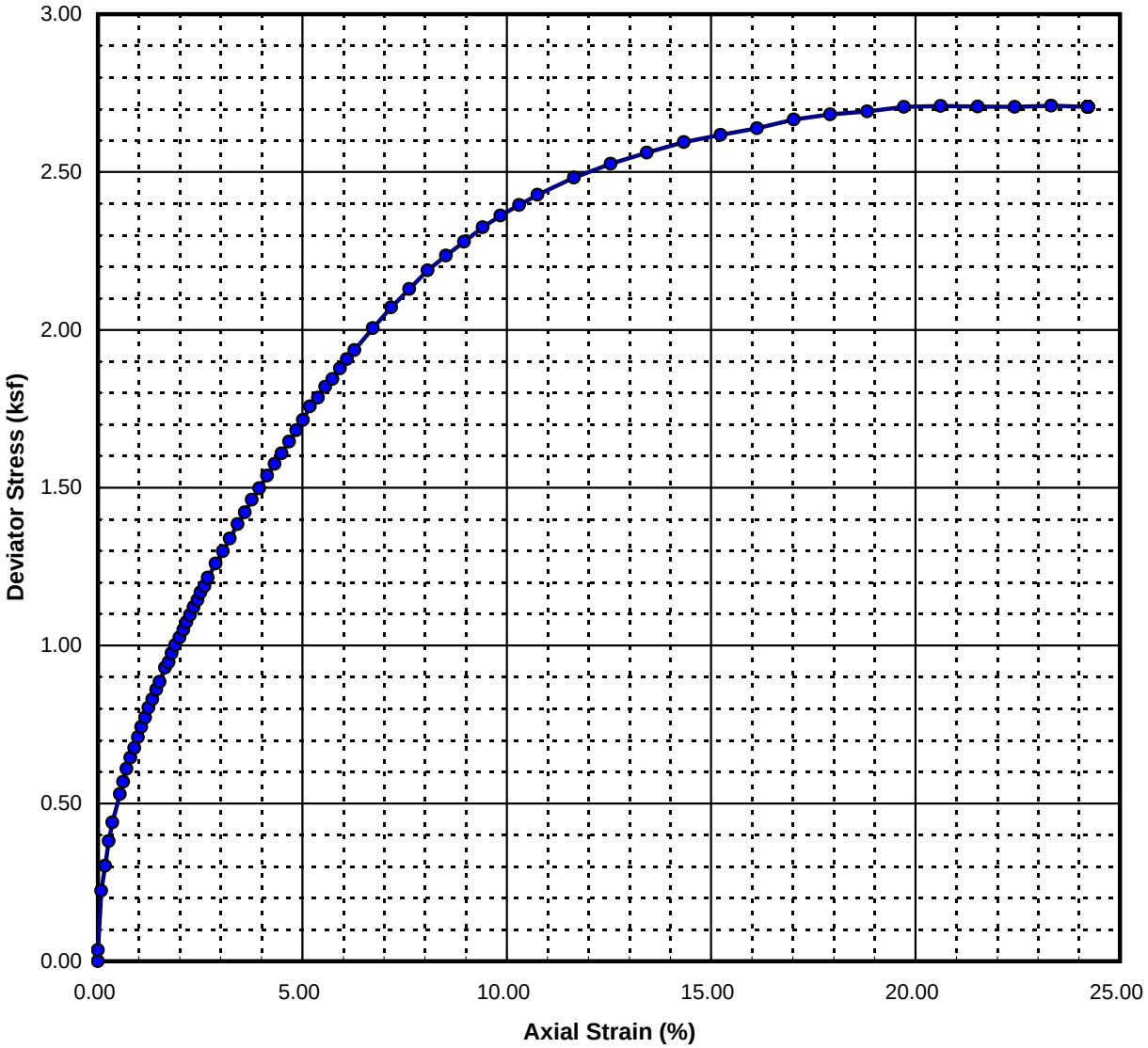

Cell Pressure (ksf) = 3.50

Strain Rate (%/min) = 0.76 Peak Deviator Stress (ksf): 5.91

Axial Strain during confinment (%): 0.93

| Test Number | Water Content (%) | LL (%) | PI (%) | Length (in) | Diameter (in) | Wet Unit Weight (pcf) | Degree of Saturation (%) |
|---|---|---|---|---|---|---|---|
| Initial: | 25.2 | | | 5.942 | 2.423 | 122.1 | 93.8 |

| | | |
|---|---|---|
| **Project Name:** | **Carrizo Energy Solar Farm (CESF)** | **UNCONSOLIDATED - UNDRAINED TRIAXIAL COMPRESSION TEST** |
| **Project Number:** | **22239472** | |
| **Exploration No:** | **SB-08** **Sample No.:** **Depth (ft): 35.0** | |
| **Description and/or Classification:** | **Light yellowish brown clayey Sand (SC)** | **Figure : E-3** |



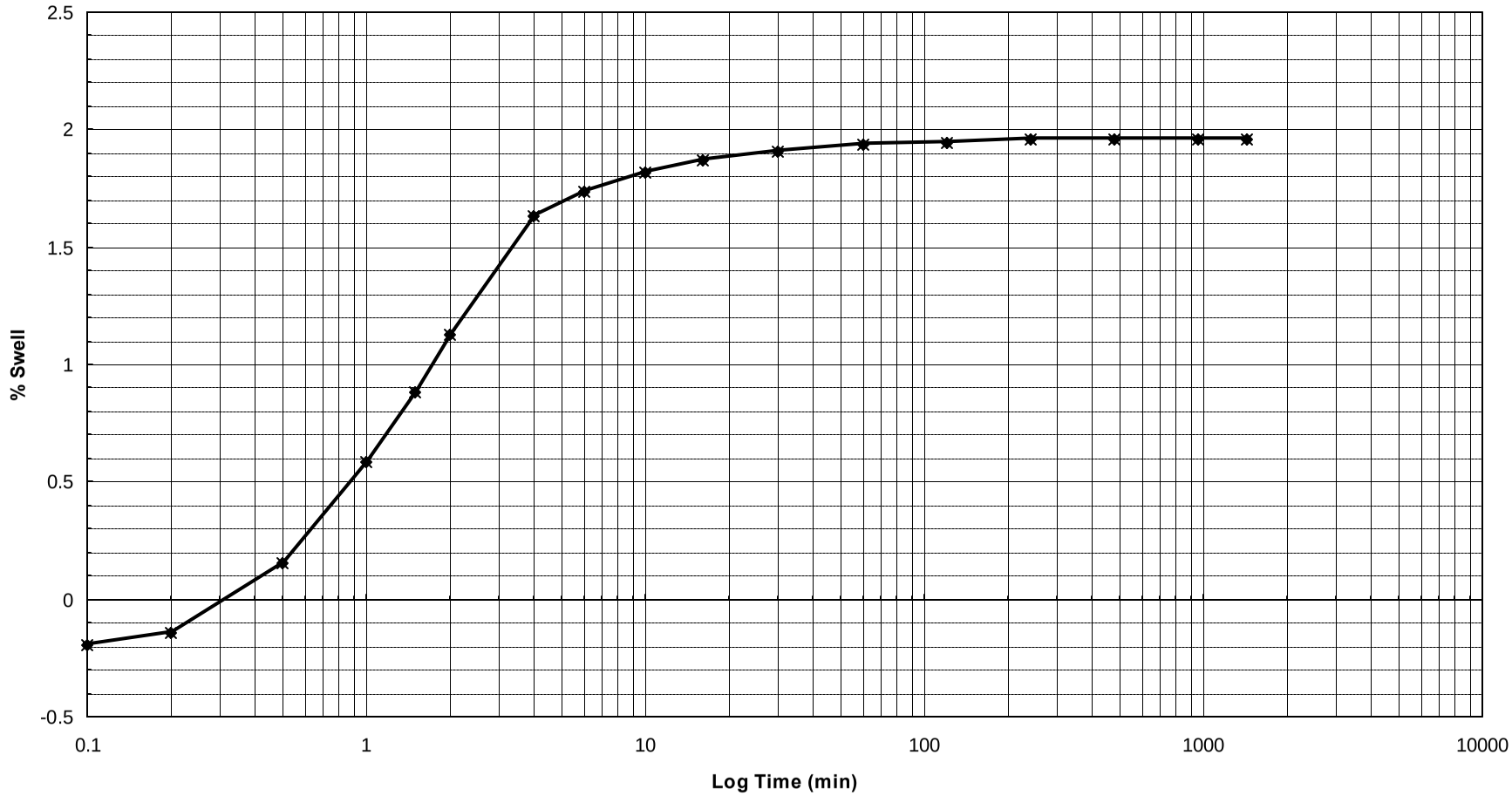

Cell Pressure (ksf) = 5.50

Strain Rate (%/min) = 0.89 Peak Deviator Stress (ksf): 2.71

Axial Strain during confinment (%): 0.32

| Test Number | Water Content (%) | LL (%) | PI (%) | Length (in) | Diameter (in) | Wet Unit Weight (pcf) | Degree of Saturation (%) |
|---|---|---|---|---|---|---|---|
| Initial: | 28.2 | | | 5.055 | 2.425 | 120.2 | 95.8 |

| | | |
|---|---|---|
| **Project Name:** | **Carrizo Energy Solar Farm (CESF)** | **UNCONSOLIDATED - UNDRAINED TRIAXIAL COMPRESSION TEST** |
| **Project Number:** | **22239472** | |
| **Exploration No:** | **SB-08** **Sample No.:** **Depth (ft): 55.0** | |
| **Description and/or Classification:** | **Light yellowish brown sandy Clay (CL)** | **Figure : E-4** |



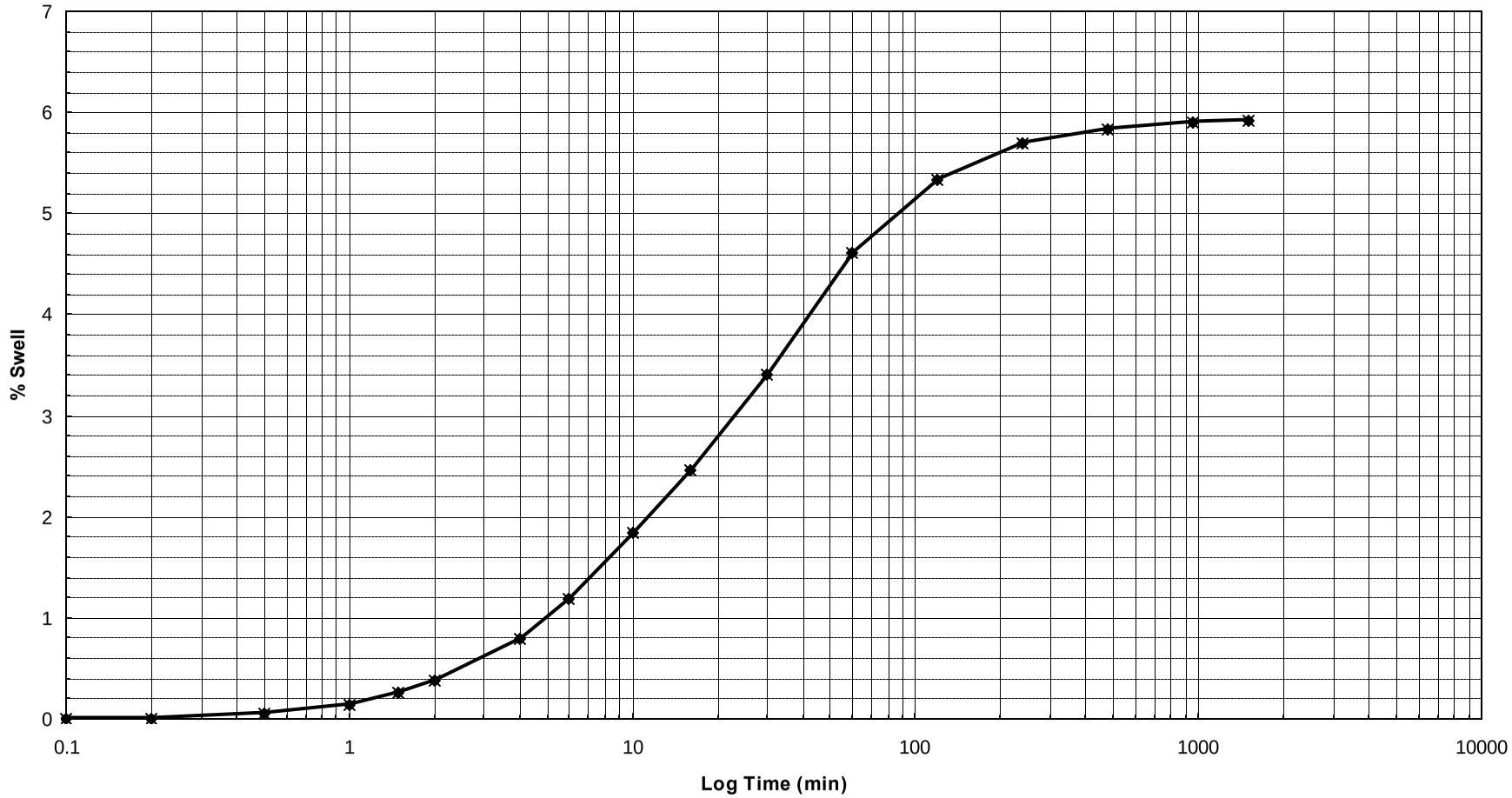

| Expansion Index, EI @ S=50%: | 0 to 20 | 21 to 50 | 51 to 90 | 91 to 130 | > 130 |
|---|---|---|---|---|---|
| Potential Expansion: | Very Low | Low | Medium | High | Very High |

| Exploration No. | Sample No. | Depth (ft) | WC (%) | DUW (pcf) | Saturation (%) | EI S meas. | EI S=50% | Description and/or Classification |
|---|---|---|---|---|---|---|---|---|
| SB-03 | bulk | 4.5 ~6 | 13.6 | 87.7 | 39 | 20 | 14 | Yellowish brown sandy Clay (CL) |

**PROJECT NAME: Carrizo Energy Solar Farm (CESF)**
**PROJECT NUMBER: 22239472**

**EXPANSION INDEX TEST**
**ASTM D 4829**

**FIGURE No. E-5**



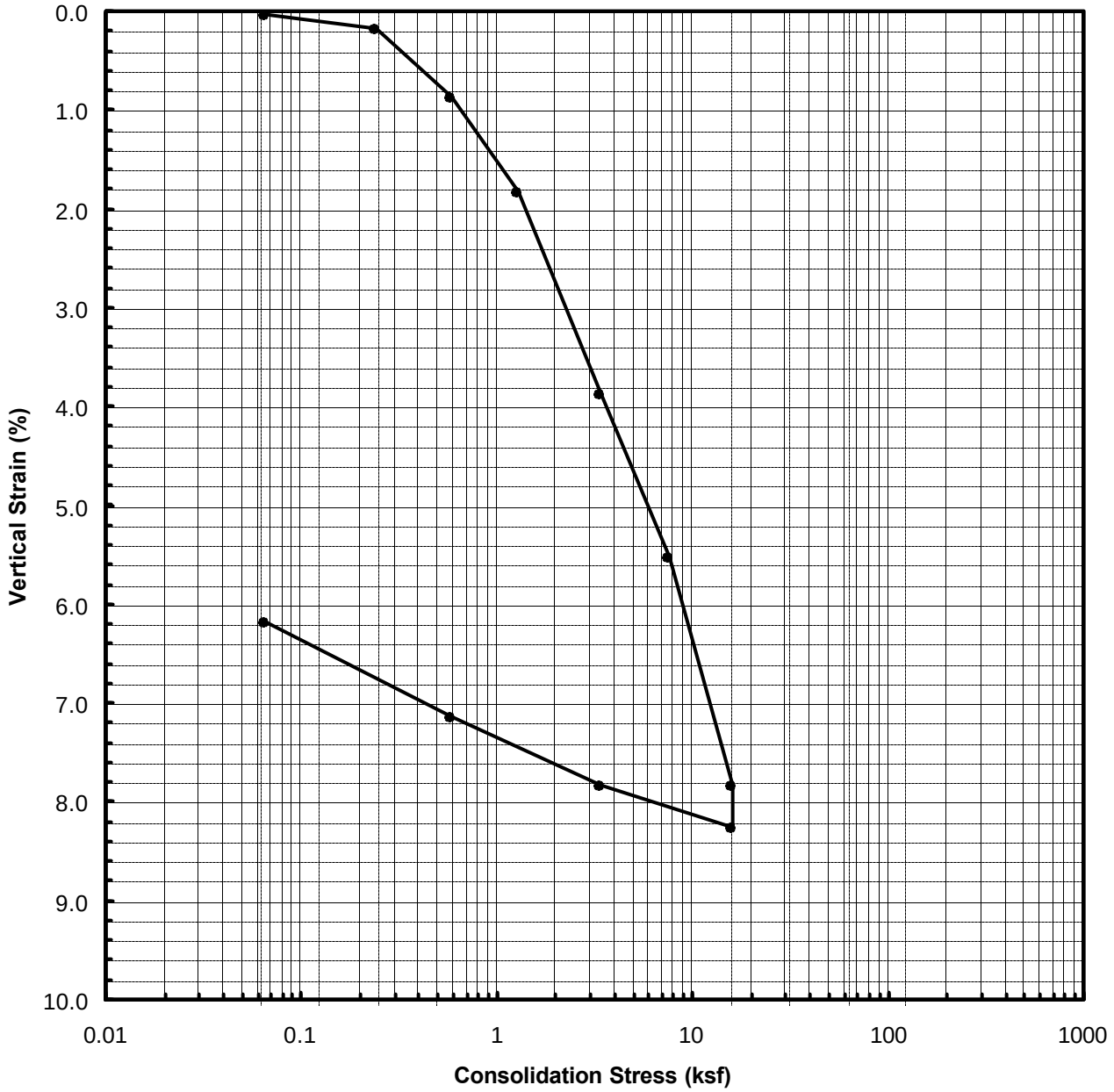

| Expansion Index, EI @ S=50%: | 0 to 20 | 21 to 50 | 51 to 90 | 91 to 130 | > 130 |
|---|---|---|---|---|---|
| Potential Expansion: | Very Low | Low | Medium | High | Very High |

| Exploration No. | Sample No. | Depth (ft) | WC (%) | DUW (pcf) | Saturation (%) | EI S meas. | EI S=50% | Description and/or Classification |
|---|---|---|---|---|---|---|---|---|
| SB-06 | | 3.0 | 13.0 | 103.3 | 52 | 59 | 61 | Grayish brown sandy Clay (CL) |

**PROJECT NAME: Carrizo Energy Solar Farm (CESF)**
**PROJECT NUMBER: 22239472**

**EXPANSION INDEX TEST**
**ASTM D 4829**

**FIGURE No. E-6**



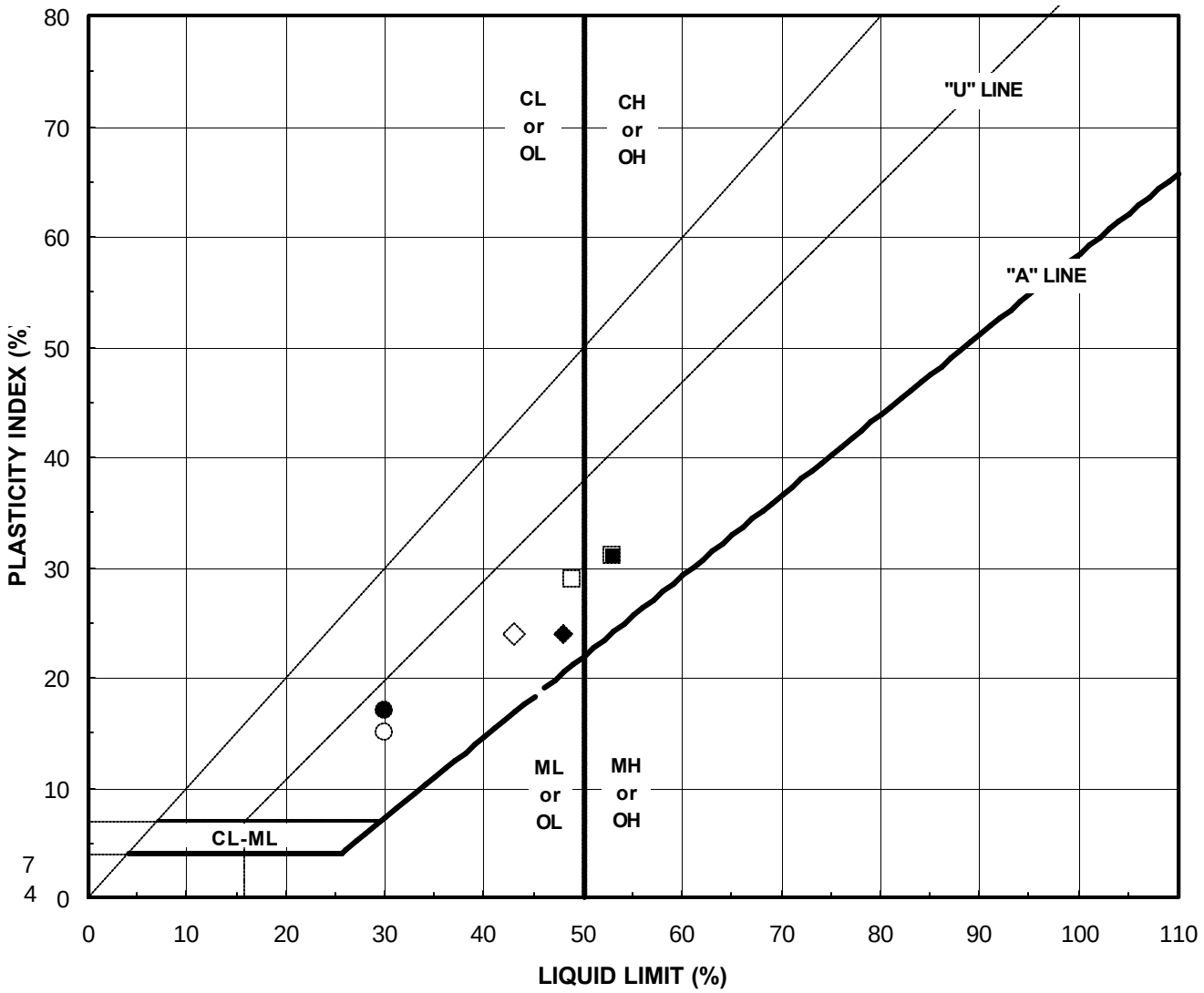

Exploration No.: **SB-08** Sample No.: **A** Depth (ft.): **35**

Description/ Classification: **Light yellowish brown clayey Sand (SC)**

| | Water Content, % | Total Unit Weight, pcf | Dry Unit Weight, pcf | Void Ratio | Saturation % | Height inches | Diameter inches | Specific Gravity | Liquid Limit | Plasticity Index |
|---|---|---|---|---|---|---|---|---|---|---|
| Initial: | 21.5 | 118.9 | 97.9 | 0.75 | 78.8 | 0.706 | 2.412 | 2.75 | | |
| Final: | 23.1 | 125.8 | 102.2 | 0.68 | 93.9 | 0.668 | | assumed | | |

**Project Name: Carrizo Energy Solar Farm (CESF)**
**Project Number: 222239472**

**CONSOLIDATION TEST**
**Figure: E-7**

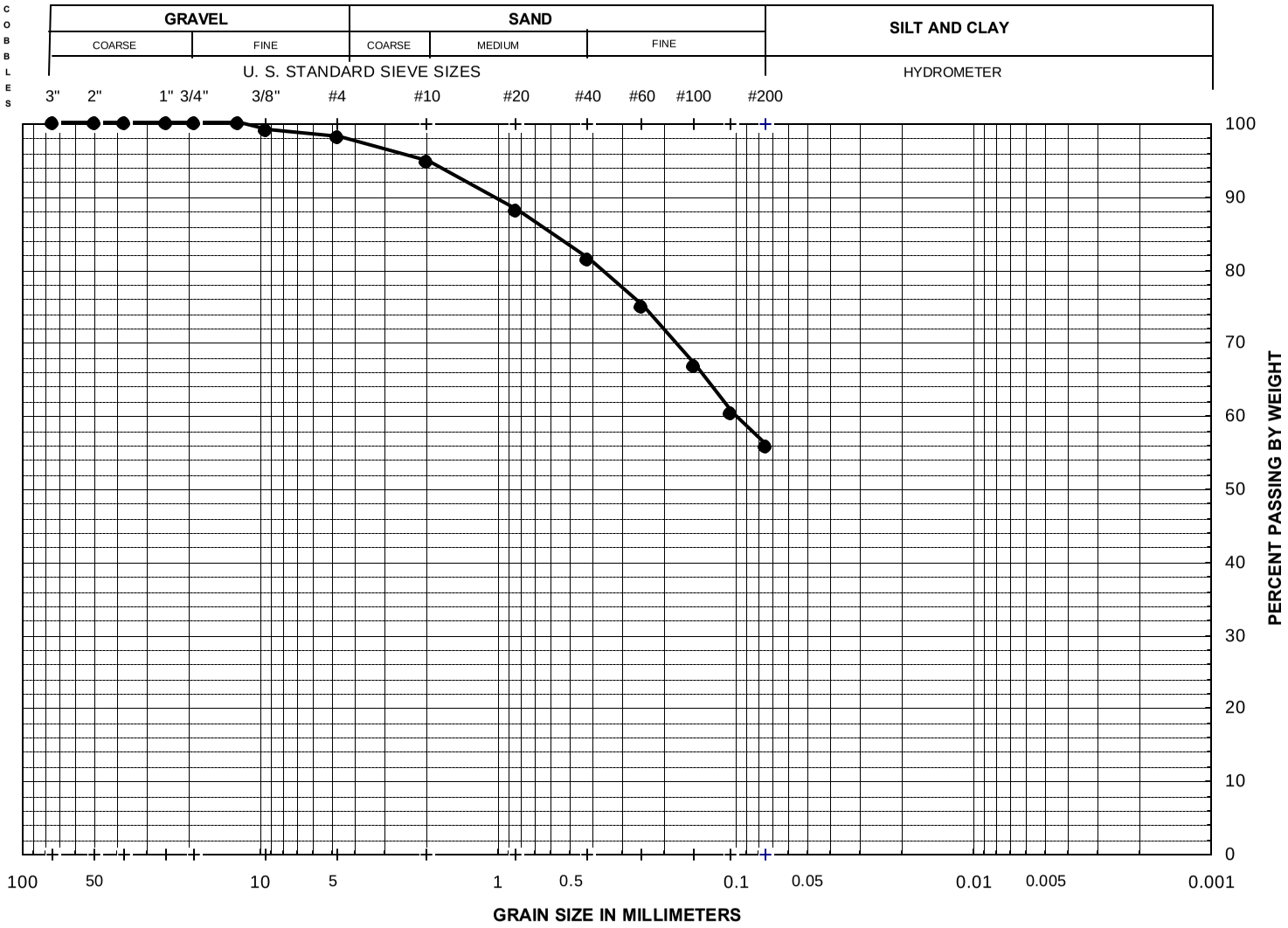



| BORING / SAMPLE | DEPTH (feet) | TEST SYMBOL | WATER CONTENT (%) | LL | PI | DESCRIPTION / CLASSIFICATION |
|---|---|---|---|---|---|---|
| SB-01 | 1.0 | ● | 7.9 | 30 | 17 | Grayish brown sandy Clay (CL) |
| SB-02 | 3.0 | ■ | 16.5 | 53 | 31 | Dark grayish brown sandy Clay (CH) |
| SB-03 | 6.0 | ◆ | 18.9 | 48 | 24 | Yellowish brown clayey Sand (SC) |
| SB-03 | 9.0 | ○ | 14.9 | 30 | 15 | Brownish yellow sandy Clay (CL) |
| SB-08 | 3.0 | □ | 15.4 | 49 | 29 | Dark yellowish brown clayey Sand (SC) |
| SB-08 | 10.0 | ◇ | | 43 | 24 | Brown Clay with sand (CL) |

**Project Name:** **Carrizo Energy Solar Farm (CESF)**
**Project Number:** **22239472**

**PLASTICITY CHART**
**Figure E-8**

## UNIFIED SOIL CLASSIFICATION




| Sieve No. | Dia. mm | % Finer |
|---|---|---|
| 3" | 75.0 | 100.0 |
| 2" | 50.0 | 100.0 |
| 1.5" | 37.5 | 100.0 |
| 1" | 25.0 | 100.0 |
| 3/4" | 19.00 | 100.0 |
| 1/2" | 12.50 | 100.0 |
| 3/8" | 9.50 | 99.1 |
| #4 | 4.75 | 98.1 |
| #10 | 2.00 | 94.6 |
| #20 | 0.850 | 88.1 |
| #40 | 0.425 | 81.4 |
| #60 | 0.250 | 74.9 |
| #100 | 0.150 | 66.7 |
| #140 | 0.106 | 60.2 |
| #200 | 0.075 | 55.7 |
| Hydrometer Analysis | | |

| | |
|---|---|
| % Cobbles | |
| % Gravel | 1.9 |
| % Sand | 42.4 |
| % Fines | 55.7 |
| $D_{60}$ | |
| $D_{30}$ | |
| $D_{10}$ | |
| $C_u$ | |
| $C_c$ | |

| Exploration | Sample No. | Depth (ft) | SYMBOL | Wn (%) | LL | PI | % Clay | Description and Classification |
|---|---|---|---|---|---|---|---|---|
| SB-01 | | 1.0 | ● | 7.9 | 30 | 17 | | **Grayish brown sandy Clay (CL)** |

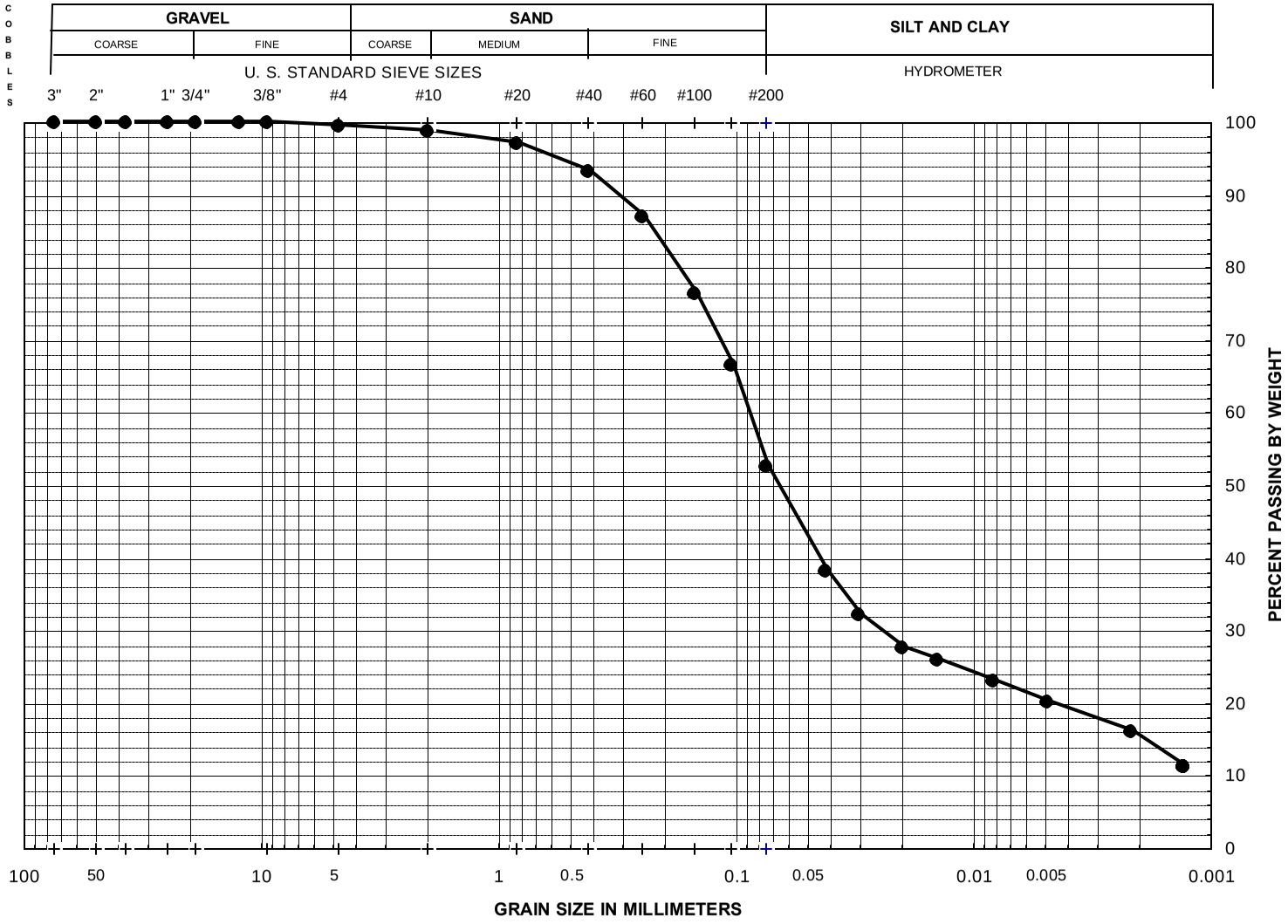
**PROJECT NAME:** **Carrizo Energy Solar Farm (CESF)**

**PROJECT NUMBER:** **22239472**

**PARTICLE-SIZE DISTRIBUTION CURVES**

**Figure: E-9**

## UNIFIED SOIL CLASSIFICATION




| Sieve No. | Dia. mm | % Finer |
|---|---|---|
| 3" | 75.0 | 100.0 |
| 2" | 50.0 | 100.0 |
| 1.5" | 37.5 | 100.0 |
| 1" | 25.0 | 100.0 |
| 3/4" | 19.00 | 100.0 |
| 1/2" | 12.50 | 100.0 |
| 3/8" | 9.50 | 100.0 |
| #4 | 4.75 | 99.4 |
| #10 | 2.00 | 98.9 |
| #20 | 0.850 | 97.1 |
| #40 | 0.425 | 93.2 |
| #60 | 0.250 | 87.1 |
| #100 | 0.150 | 76.4 |
| #140 | 0.106 | 66.6 |
| #200 | 0.075 | 52.7 |
| Hydrometer Analysis | 0.0419 | 38.2 |
| | 0.0307 | 32.3 |
| | 0.0199 | 27.7 |
| | 0.0142 | 25.9 |
| | 0.0083 | 23.0 |
| | 0.0049 | 20.1 |
| | 0.0022 | 16.2 |
| | 0.0013 | 11.3 |
| | 0.0013 | 11.3 |
| | 0.0013 | 11.3 |

| | |
|---|---|
| % Cobbles | |
| % Gravel | 0.6 |
| % Sand | 39.2 |
| % Fines | 60.2 |
| $D_{60}$ | |
| $D_{30}$ | |
| $D_{10}$ | |
| $C_u$ | |
| $C_c$ | |

| Exploration | Sample No. | Depth (ft) | SYMBOL | Wn (%) | LL | PI | % Clay | Description and Classification |
|---|---|---|---|---|---|---|---|---|
| SB-02 | | 6.0 | ● | 12.6 | | | 17 | **Brown sandy Clay (CH)** |

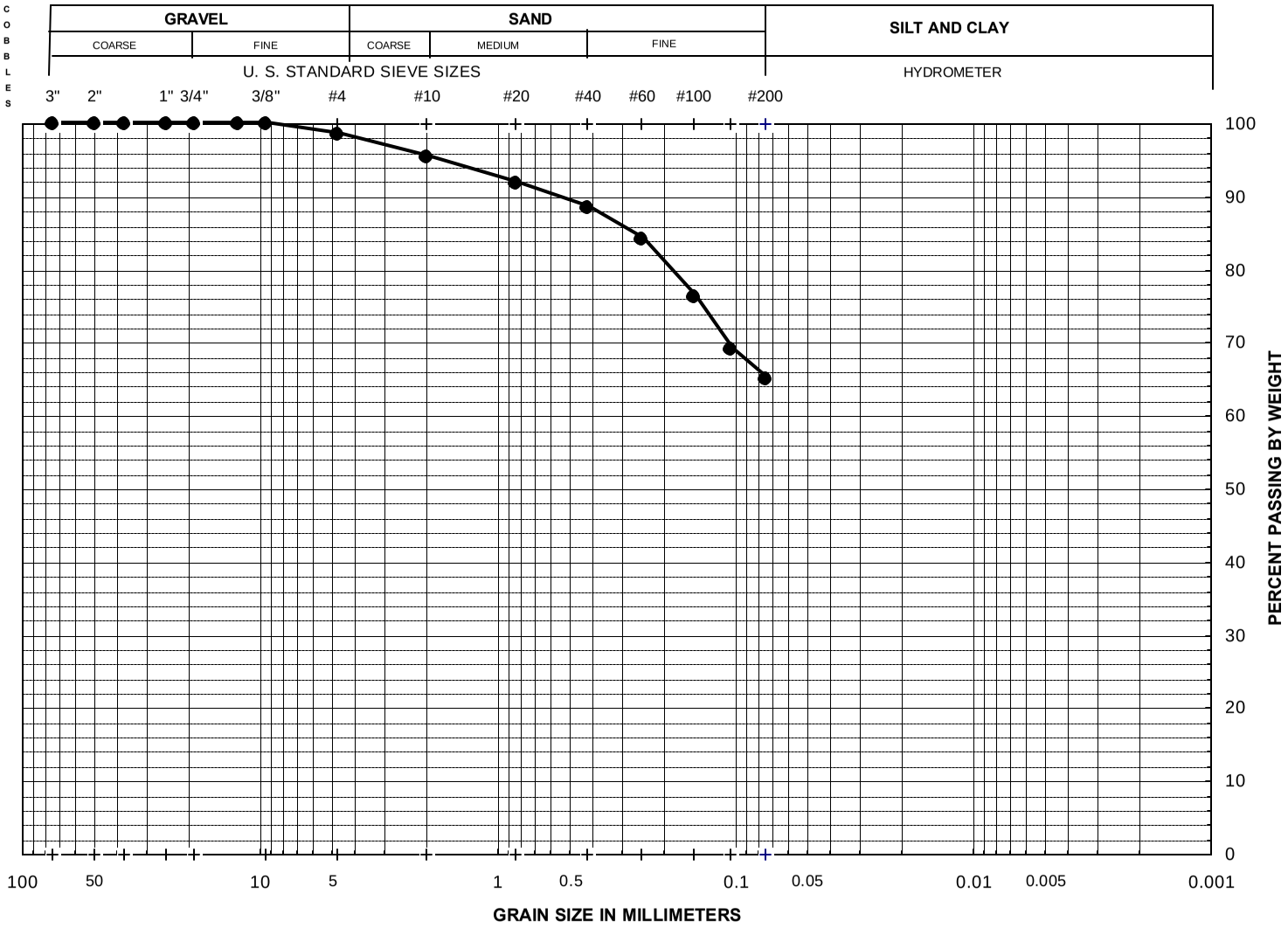
**PROJECT NAME:** **Carrizo Energy Solar Farm (CESF)**

**PROJECT NUMBER:** **22239472**

**PARTICLE-SIZE DISTRIBUTION CURVES**

**Figure:** **E-10**

## UNIFIED SOIL CLASSIFICATION




| Sieve No. | Dia. mm | % Finer |
|---|---|---|
| 3" | 75.0 | 100.0 |
| 2" | 50.0 | 100.0 |
| 1.5" | 37.5 | 100.0 |
| 1" | 25.0 | 100.0 |
| 3/4" | 19.00 | 100.0 |
| 1/2" | 12.50 | 100.0 |
| 3/8" | 9.50 | 100.0 |
| #4 | 4.75 | 98.6 |
| #10 | 2.00 | 95.5 |
| #20 | 0.850 | 91.9 |
| #40 | 0.425 | 88.5 |
| #60 | 0.250 | 84.2 |
| #100 | 0.150 | 76.2 |
| #140 | 0.106 | 69.2 |
| #200 | 0.075 | 65.0 |
| Hydrometer Analysis | | |

| | |
|---|---|
| % Cobbles | |
| % Gravel | 1.4 |
| % Sand | 33.6 |
| % Fines | 65.0 |
| $D_{60}$ | |
| $D_{30}$ | |
| $D_{10}$ | |
| $C_u$ | |
| $C_c$ | |

| Exploration | Sample No. | Depth (ft) | SYMBOL | Wn (%) | LL | PI | % Clay | Description and Classification |
|---|---|---|---|---|---|---|---|---|
| SB-03 | | 10.0 | ● | 17.9 | | | | **Brownish yellow sandy Clay (CL)** |

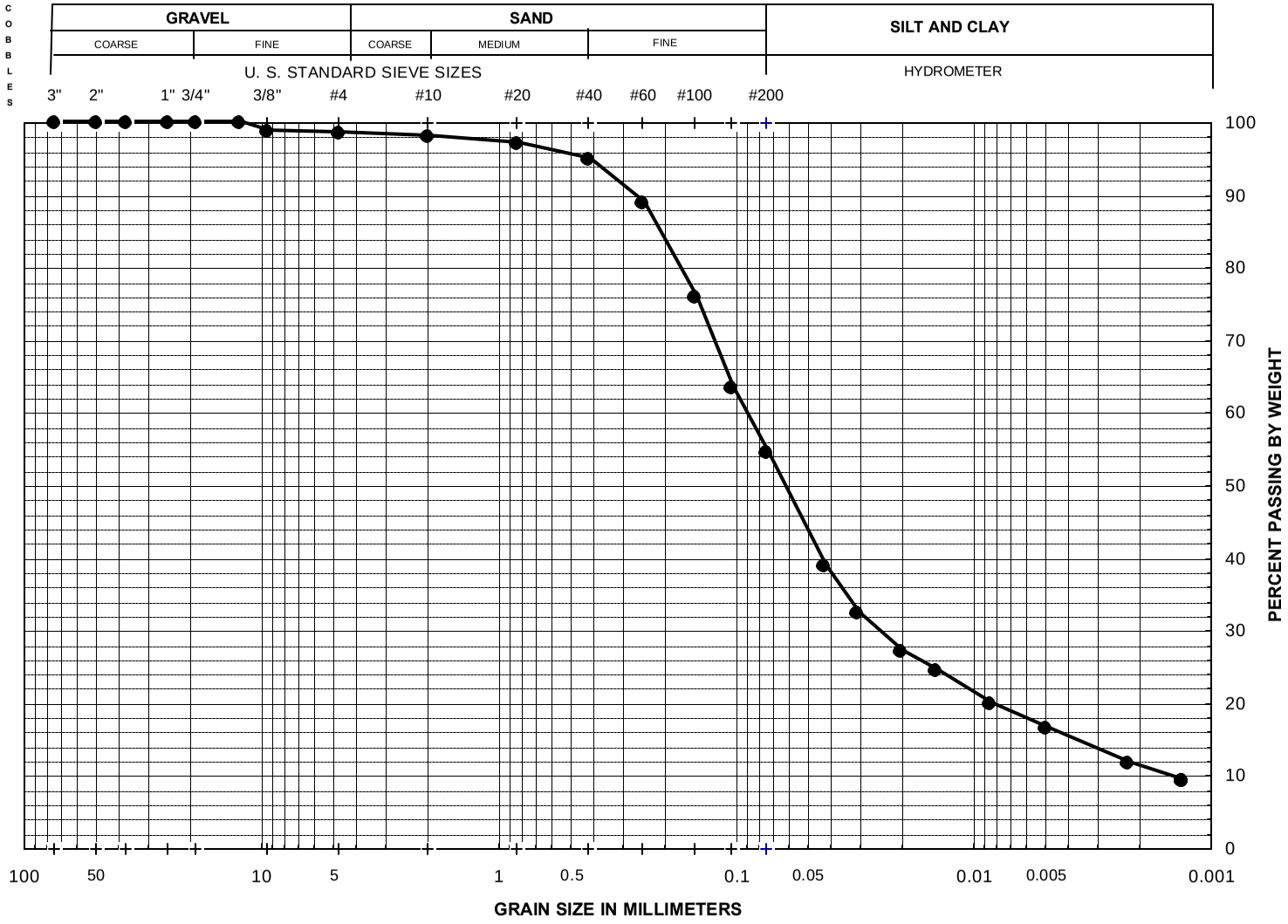
**PROJECT NAME:** **Carrizo Energy Solar Farm (CESF)**

**PROJECT NUMBER:** **22239472**

**PARTICLE-SIZE DISTRIBUTION CURVES**

**Figure: E-11**

## UNIFIED SOIL CLASSIFICATION




| Sieve No. | Dia. mm | % Finer |
|---|---|---|
| 3" | 75.0 | 100.0 |
| 2" | 50.0 | 100.0 |
| 1.5" | 37.5 | 100.0 |
| 1" | 25.0 | 100.0 |
| 3/4" | 19.00 | 100.0 |
| 1/2" | 12.50 | 100.0 |
| 3/8" | 9.50 | 98.8 |
| #4 | 4.75 | 98.6 |
| #10 | 2.00 | 98.1 |
| #20 | 0.850 | 97.2 |
| #40 | 0.425 | 95.0 |
| #60 | 0.250 | 88.9 |
| #100 | 0.150 | 75.9 |
| #140 | 0.106 | 63.5 |
| #200 | 0.075 | 54.6 |
| Hydrometer Analysis | 0.0428 | 39.0 |
| | 0.0313 | 32.5 |
| | 0.0203 | 27.2 |
| | 0.0146 | 24.6 |
| | 0.0086 | 20.0 |
| | 0.0050 | 16.7 |
| | 0.0023 | 11.7 |
| | 0.0013 | 9.4 |
| | 0.0013 | 9.4 |
| | 0.0013 | 9.4 |

| | |
|---|---|
| % Cobbles | |
| % Gravel | 1.4 |
| % Sand | 44.0 |
| % Fines | 54.6 |
| $D_{60}$ | |
| $D_{30}$ | |
| $D_{10}$ | |
| $C_u$ | |
| $C_c$ | |

| Exploration | Sample No. | Depth (ft) | SYMBOL | Wn (%) | LL | PI | % Clay | Description and Classification |
|---|---|---|---|---|---|---|---|---|
| SB-04 | | 15.0 | ● | 18.7 | | | 11 | **Pale brown sandy Clay (CL)** |

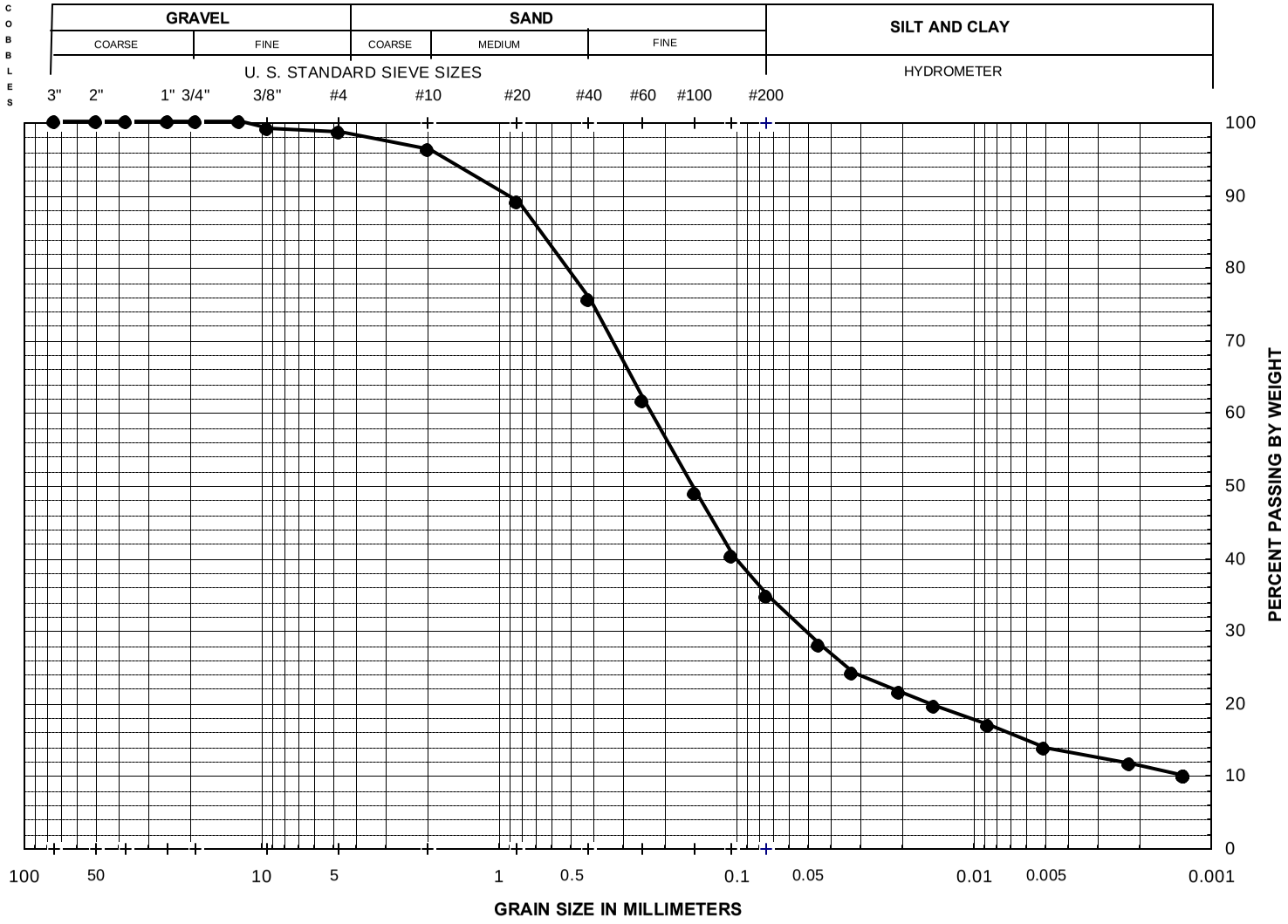
**PROJECT NAME:** **Carrizo Energy Solar Farm (CESF)**

**PROJECT NUMBER:** **22239472**

**PARTICLE-SIZE DISTRIBUTION CURVES**

**Figure:** **E-12**

## UNIFIED SOIL CLASSIFICATION




| Sieve No. | Dia. mm | % Finer |
|---|---|---|
| 3" | 75.0 | 100.0 |
| 2" | 50.0 | 100.0 |
| 1.5" | 37.5 | 100.0 |
| 1" | 25.0 | 100.0 |
| 3/4" | 19.00 | 100.0 |
| 1/2" | 12.50 | 100.0 |
| 3/8" | 9.50 | 99.2 |
| #4 | 4.75 | 98.5 |
| #10 | 2.00 | 96.3 |
| #20 | 0.850 | 89.0 |
| #40 | 0.425 | 75.5 |
| #60 | 0.250 | 61.4 |
| #100 | 0.150 | 48.9 |
| #140 | 0.106 | 40.2 |
| #200 | 0.075 | 34.7 |
| Hydrometer Analysis | 0.0452 | 27.9 |
| | 0.0325 | 24.0 |
| | 0.0208 | 21.4 |
| | 0.0149 | 19.5 |
| | 0.0087 | 16.9 |
| | 0.0051 | 13.7 |
| | 0.0022 | 11.4 |
| | 0.0013 | 9.8 |
| | 0.0013 | 9.8 |
| | 0.0013 | 9.8 |

| | |
|---|---|
| % Cobbles | |
| % Gravel | 1.5 |
| % Sand | 63.9 |
| % Fines | 34.7 |
| $D_{60}$ | |
| $D_{30}$ | |
| $D_{10}$ | |
| $C_u$ | |
| $C_c$ | |

| Exploration | Sample No. | Depth (ft) | SYMBOL | Wn (%) | LL | PI | % Clay | Description and Classification |
|---|---|---|---|---|---|---|---|---|
| SB-05 | | 35.0 | ● | 22.0 | | | 11 | **Yellowish brown clayey Sand (SC)** |

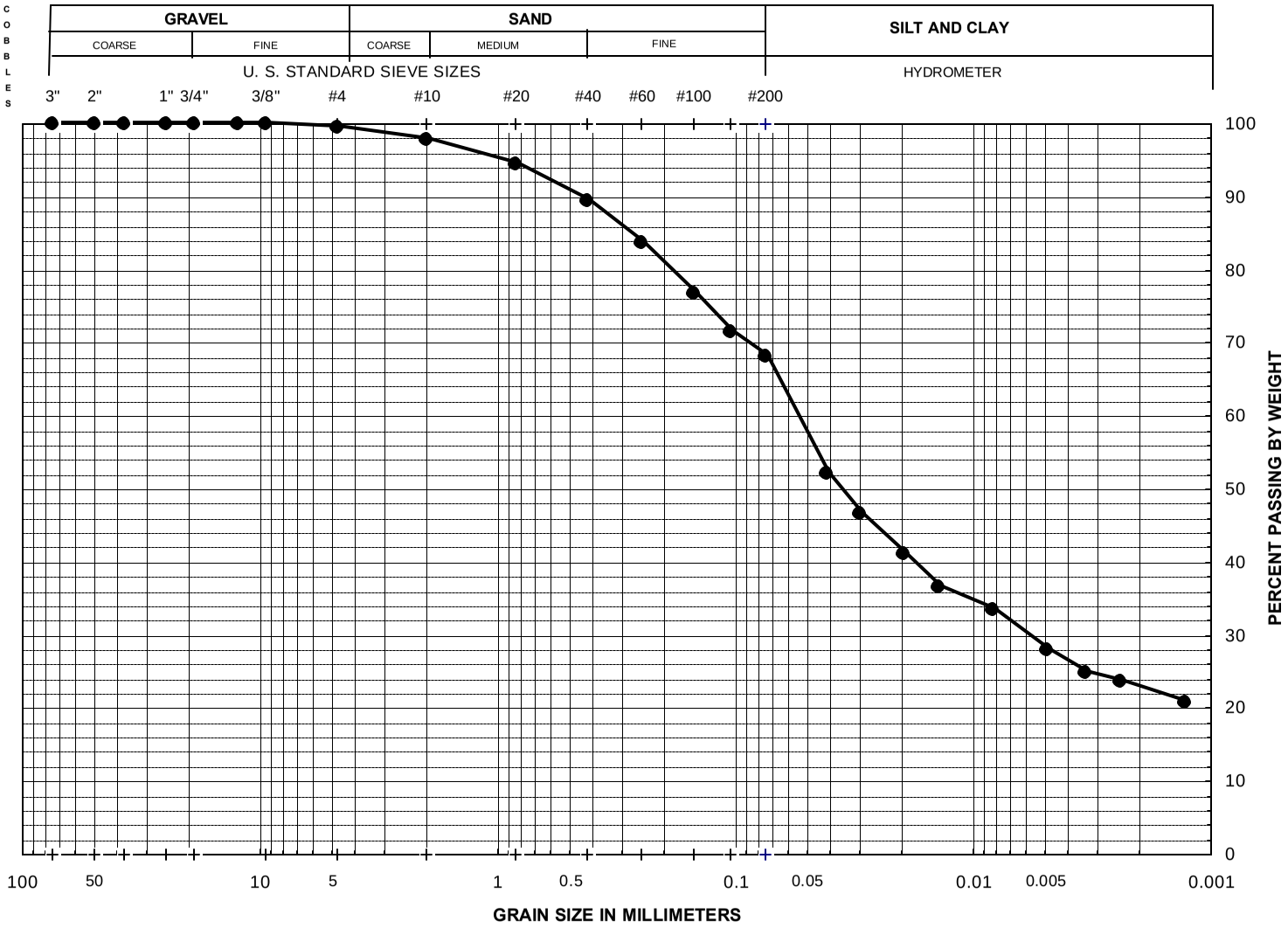
**PROJECT NAME:** **Carrizo Energy Solar Farm (CESF)**

**PROJECT NUMBER:** **22239472**

**PARTICLE-SIZE DISTRIBUTION CURVES**

**Figure:** **E-13**

## UNIFIED SOIL CLASSIFICATION




| Sieve No. | Dia. mm | % Finer |
|---|---|---|
| 3" | 75.0 | 100.0 |
| 2" | 50.0 | 100.0 |
| 1.5" | 37.5 | 100.0 |
| 1" | 25.0 | 100.0 |
| 3/4" | 19.00 | 100.0 |
| 1/2" | 12.50 | 100.0 |
| 3/8" | 9.50 | 100.0 |
| #4 | 4.75 | 99.5 |
| #10 | 2.00 | 97.9 |
| #20 | 0.850 | 94.5 |
| #40 | 0.425 | 89.5 |
| #60 | 0.250 | 83.8 |
| #100 | 0.150 | 76.7 |
| #140 | 0.106 | 71.5 |
| #200 | 0.075 | 68.1 |
| Hydrometer Analysis | 0.0416 | 52.2 |
| | 0.0302 | 46.7 |
| | 0.0196 | 41.2 |
| | 0.0141 | 36.5 |
| | 0.0083 | 33.4 |
| | 0.0049 | 28.1 |
| | 0.0034 | 25.0 |
| | 0.0024 | 23.6 |
| | 0.0013 | 20.8 |

| | |
|---|---|
| % Cobbles | |
| % Gravel | 0.5 |
| % Sand | 31.4 |
| % Fines | 68.1 |
| $D_{60}$ | |
| $D_{30}$ | |
| $D_{10}$ | |
| $C_u$ | |
| $C_c$ | |

| Exploration | Sample No. | Depth (ft) | SYMBOL | Wn (%) | LL | PI | % Clay | Description and Classification |
|---|---|---|---|---|---|---|---|---|
| SB-07 | | 3.0 | ● | 9.3 | | | 23 | **Dark yellowish brown sandy Clay (CL)** |

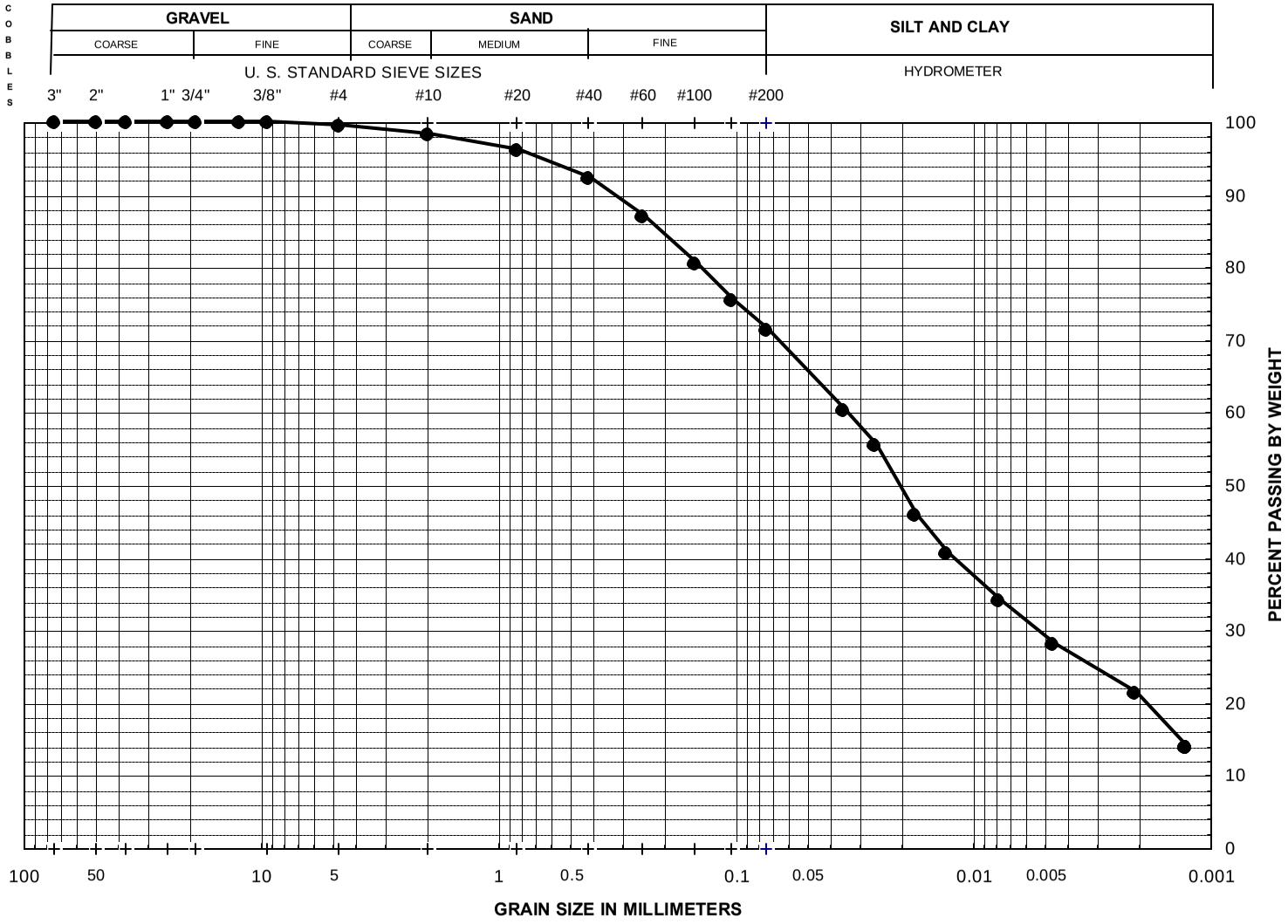
**PROJECT NAME:** **Carrizo Energy Solar Farm (CESF)**

**PROJECT NUMBER:** **22239472**

**PARTICLE-SIZE DISTRIBUTION CURVES**

**Figure: E-14**

## UNIFIED SOIL CLASSIFICATION




| Sieve No. | Dia. mm | % Finer |
|---|---|---|
| 3" | 75.0 | 100.0 |
| 2" | 50.0 | 100.0 |
| 1.5" | 37.5 | 100.0 |
| 1" | 25.0 | 100.0 |
| 3/4" | 19.00 | 100.0 |
| 1/2" | 12.50 | 100.0 |
| 3/8" | 9.50 | 100.0 |
| #4 | 4.75 | 99.5 |
| #10 | 2.00 | 98.3 |
| #20 | 0.850 | 96.1 |
| #40 | 0.425 | 92.3 |
| #60 | 0.250 | 87.1 |
| #100 | 0.150 | 80.6 |
| #140 | 0.106 | 75.4 |
| #200 | 0.075 | 71.4 |
| Hydrometer Analysis | 0.0358 | 60.3 |
| | 0.0263 | 55.5 |
| | 0.0179 | 46.0 |
| | 0.0131 | 40.7 |
| | 0.0079 | 34.1 |
| | 0.0047 | 28.2 |
| | 0.0021 | 21.3 |
| | 0.0013 | 13.9 |
| | 0.0013 | 13.9 |
| | 0.0013 | 13.9 |

| | |
|---|---|
| % Cobbles | |
| % Gravel | 0.5 |
| % Sand | 28.2 |
| % Fines | 71.4 |
| $D_{60}$ | |
| $D_{30}$ | |
| $D_{10}$ | |
| $C_u$ | |
| $C_c$ | |

| Exploration | Sample No. | Depth (ft) | SYMBOL | Wn (%) | LL | PI | % Clay | Description and Classification |
|---|---|---|---|---|---|---|---|---|
| SB-07 | A | 15.0 | ● | 21.5 | | | 20 | **Dark yellowish brown sandy Clay (CL)** |

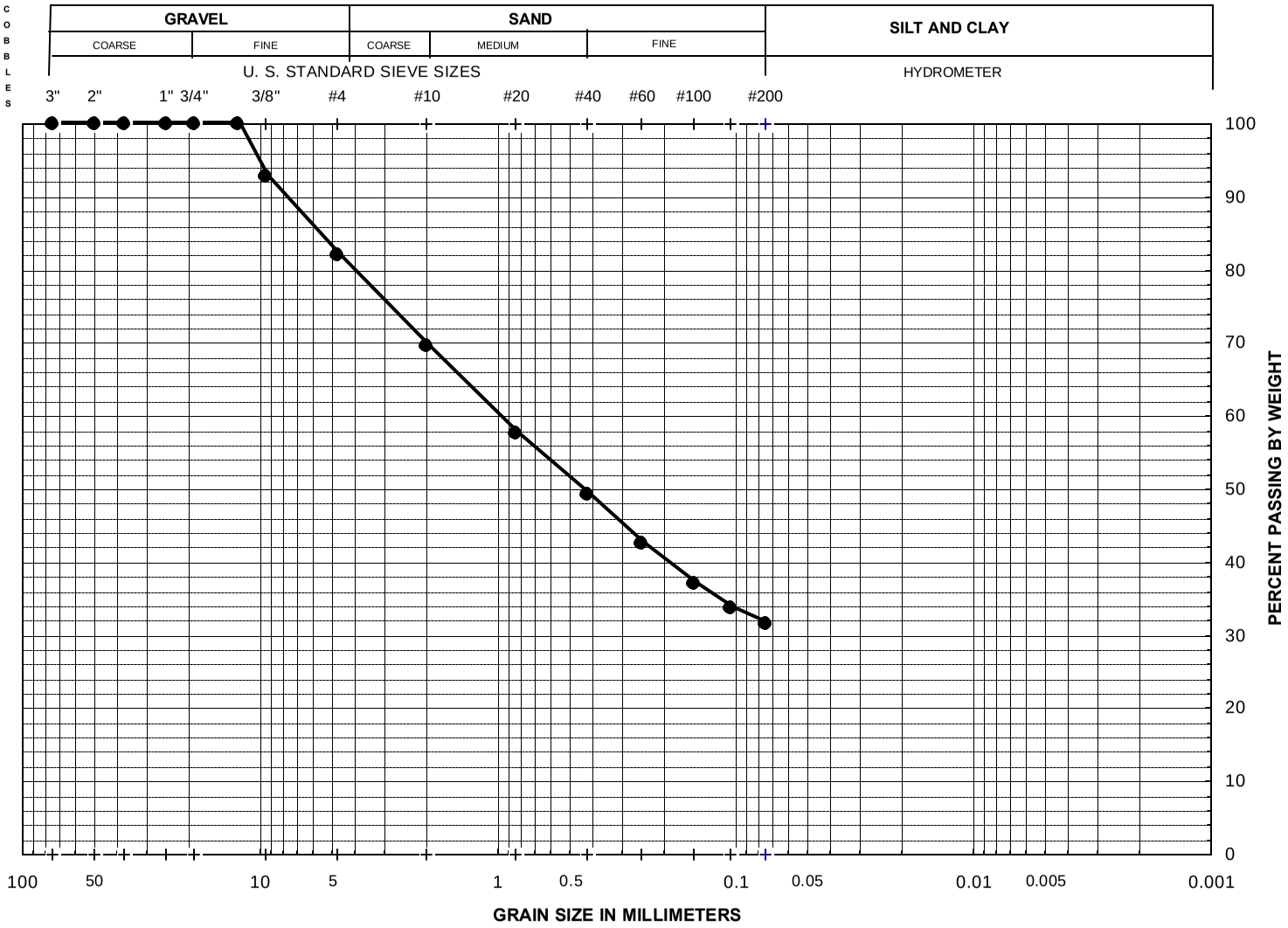
**PROJECT NAME:** **Carrizo Energy Solar Farm (CESF)**

**PROJECT NUMBER:** **22239472**

**PARTICLE-SIZE DISTRIBUTION CURVES**

**Figure: E-15**

## UNIFIED SOIL CLASSIFICATION




| Sieve No. | Dia. mm | % Finer |
|---|---|---|
| 3" | 75.0 | 100.0 |
| 2" | 50.0 | 100.0 |
| 1.5" | 37.5 | 100.0 |
| 1" | 25.0 | 100.0 |
| 3/4" | 19.00 | 100.0 |
| 1/2" | 12.50 | 100.0 |
| 3/8" | 9.50 | 92.8 |
| #4 | 4.75 | 82.0 |
| #10 | 2.00 | 69.5 |
| #20 | 0.850 | 57.7 |
| #40 | 0.425 | 49.2 |
| #60 | 0.250 | 42.6 |
| #100 | 0.150 | 37.1 |
| #140 | 0.106 | 33.8 |
| #200 | 0.075 | 31.6 |
| Hydrometer Analysis | | |

| | |
|---|---|
| % Cobbles | |
| % Gravel | 18.0 |
| % Sand | 50.4 |
| % Fines | 31.6 |
| $D_{60}$ | |
| $D_{30}$ | |
| $D_{10}$ | |
| $C_u$ | |
| $C_c$ | |

| Exploration | Sample No. | Depth (ft) | SYMBOL | Wn (%) | LL | PI | % Clay | Description and Classification |
|---|---|---|---|---|---|---|---|---|
| SB-08 | P | 6.0 | ● | | | | | **Brown clayey Sand with gravel (SC)** |

**PROJECT NAME:** **Carrizo Energy Solar Farm (CESF)**

**PROJECT NUMBER:** **22239472**

**PARTICLE-SIZE DISTRIBUTION CURVES**

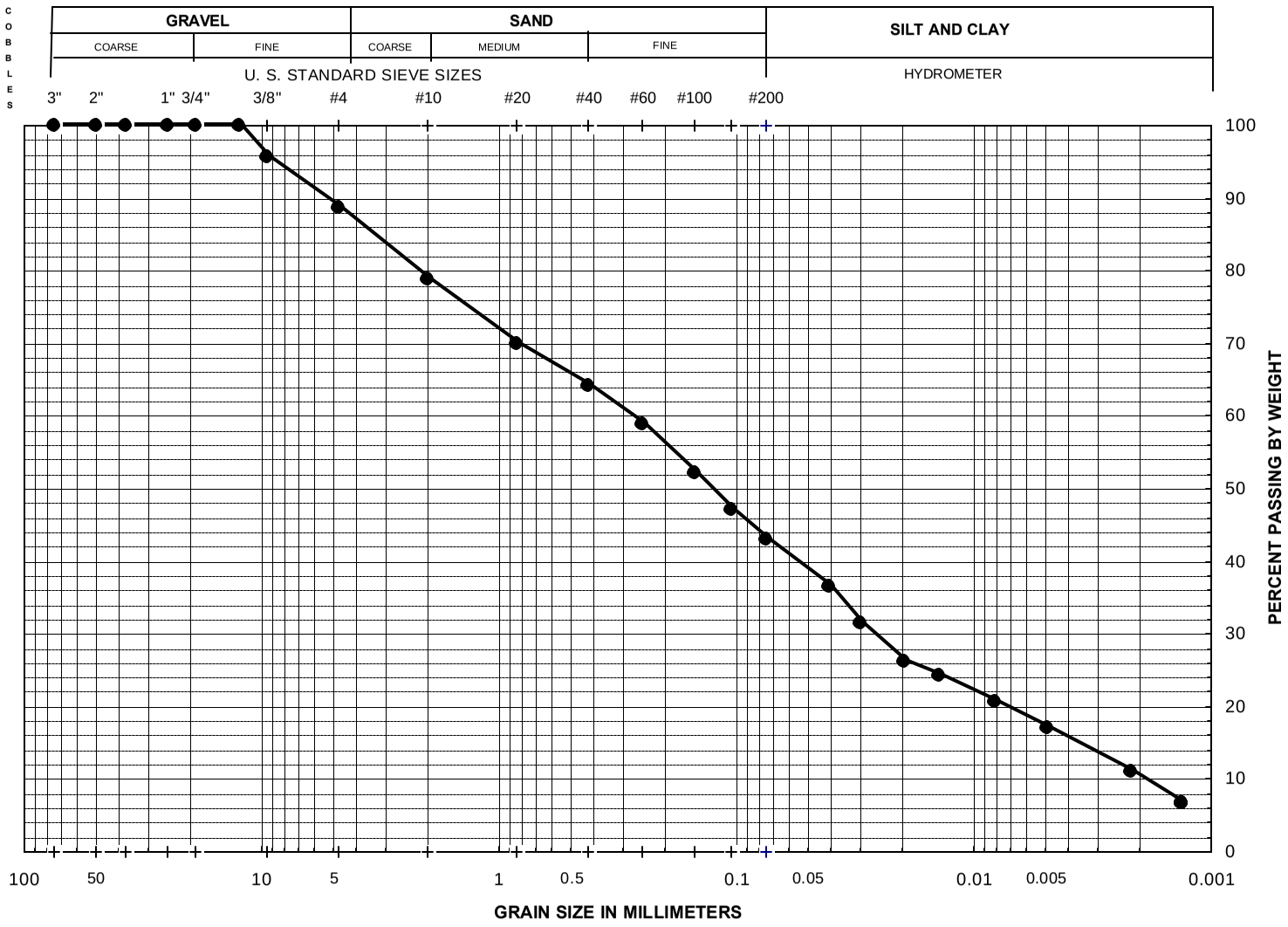
**Figure: E-16**

(SNA) sieve only (04/2000)

Sieve CSPP sb08006

**URS**

## UNIFIED SOIL CLASSIFICATION




| Sieve No. | Dia. mm | % Finer |
|---|---|---|
| 3" | 75.0 | 100.0 |
| 2" | 50.0 | 100.0 |
| 1.5" | 37.5 | 100.0 |
| 1" | 25.0 | 100.0 |
| 3/4" | 19.00 | 100.0 |
| 1/2" | 12.50 | 100.0 |
| 3/8" | 9.50 | 95.7 |
| #4 | 4.75 | 88.7 |
| #10 | 2.00 | 78.9 |
| #20 | 0.850 | 69.8 |
| #40 | 0.425 | 64.2 |
| #60 | 0.250 | 58.9 |
| #100 | 0.150 | 52.2 |
| #140 | 0.106 | 47.0 |
| #200 | 0.075 | 43.0 |
| Hydrometer Analysis | 0.0409 | 36.6 |
| | 0.0300 | 31.4 |
| | 0.0197 | 26.3 |
| | 0.0141 | 24.3 |
| | 0.0082 | 20.7 |
| | 0.0049 | 17.1 |
| | 0.0022 | 11.2 |
| | 0.0013 | 6.8 |
| | 0.0013 | 6.8 |
| | 0.0013 | 6.8 |

| | |
|---|---|
| % Cobbles | |
| % Gravel | 11.3 |
| % Sand | 45.7 |
| % Fines | 43.0 |
| $D_{60}$ | |
| $D_{30}$ | |
| $D_{10}$ | |
| $C_u$ | |
| $C_c$ | |

| Exploration | Sample No. | Depth (ft) | SYMBOL | Wn (%) | LL | PI | % Clay | Description and Classification |
|---|---|---|---|---|---|---|---|---|
| SB-08 | B | 30.0 | ● | 18.5 | | | 10 | **Yellowish brown clayey Sand (SC)** |

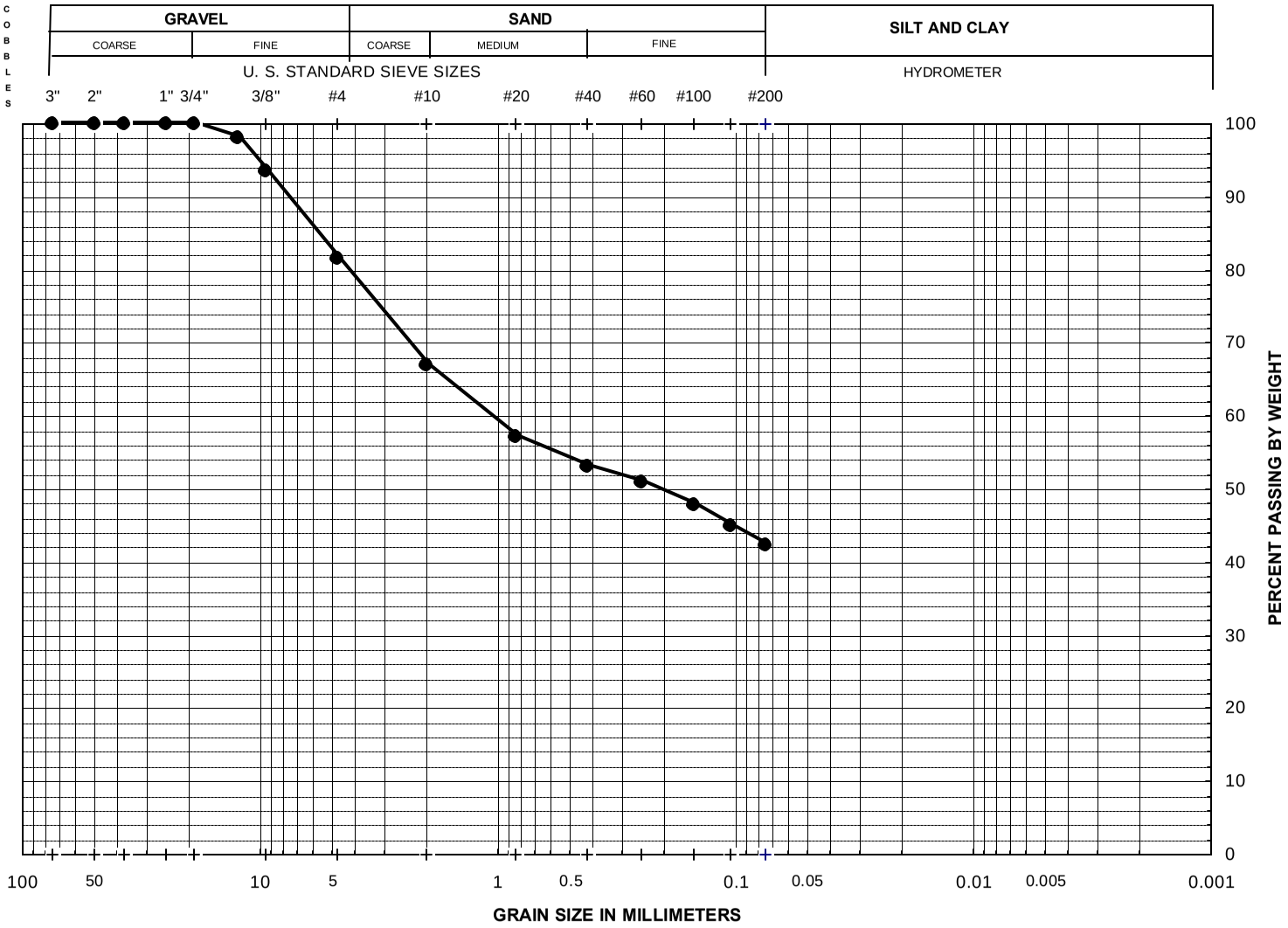
**PROJECT NAME:** **Carrizo Energy Solar Farm (CESF)**

**PROJECT NUMBER:** **22239472**

**PARTICLE-SIZE DISTRIBUTION CURVES**

**Figure:** **E-17**

## UNIFIED SOIL CLASSIFICATION




| Sieve No. | Dia. mm | % Finer |
|---|---|---|
| 3" | 75.0 | 100.0 |
| 2" | 50.0 | 100.0 |
| 1.5" | 37.5 | 100.0 |
| 1" | 25.0 | 100.0 |
| 3/4" | 19.00 | 100.0 |
| 1/2" | 12.50 | 98.0 |
| 3/8" | 9.50 | 93.6 |
| #4 | 4.75 | 81.6 |
| #10 | 2.00 | 67.0 |
| #20 | 0.850 | 57.3 |
| #40 | 0.425 | 53.2 |
| #60 | 0.250 | 50.8 |
| #100 | 0.150 | 47.9 |
| #140 | 0.106 | 45.0 |
| #200 | 0.075 | 42.3 |
| Hydrometer Analysis | | |

| | |
|---|---|
| % Cobbles | |
| % Gravel | 18.4 |
| % Sand | 39.3 |
| % Fines | 42.3 |
| $D_{60}$ | |
| $D_{30}$ | |
| $D_{10}$ | |
| $C_u$ | |
| $C_c$ | |

| Exploration | Sample No. | Depth (ft) | SYMBOL | Wn (%) | LL | PI | % Clay | Description and Classification |
|---|---|---|---|---|---|---|---|---|
| SB-08 | B | 85.0 | ● | | | | | **Light yellowish brown clayey Sand with gravel (SC)** |

**PROJECT NAME:** **Carrizo Energy Solar Farm (CESF)**

**PROJECT NUMBER:** **22239472**

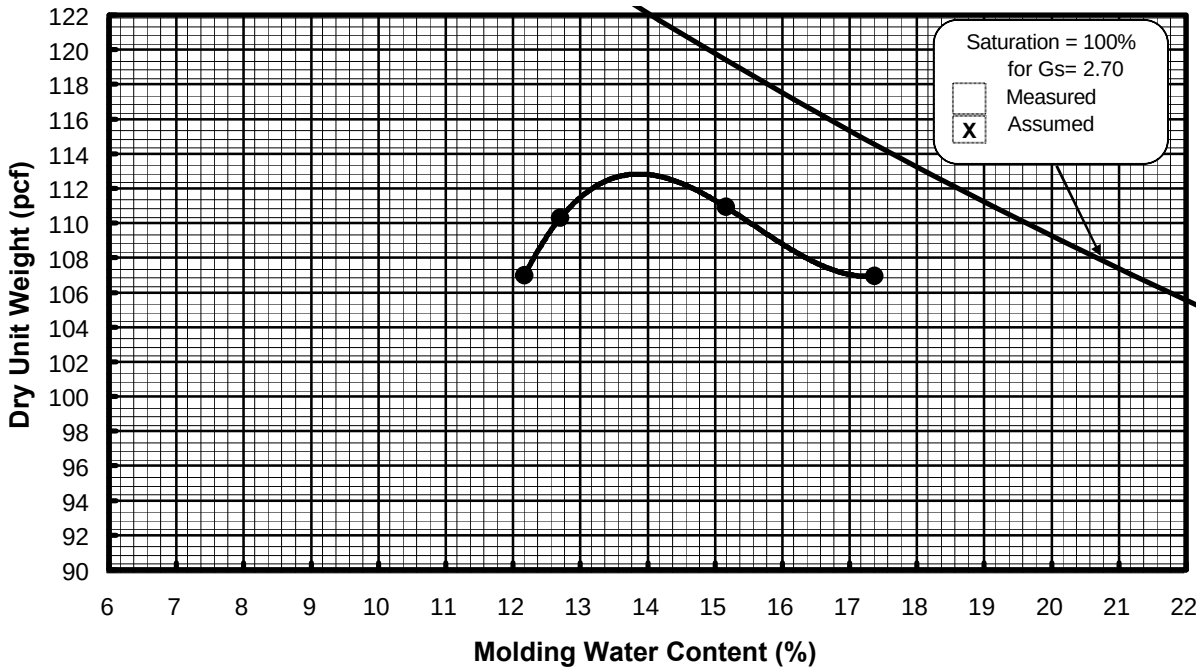
**PARTICLE-SIZE DISTRIBUTION CURVES**

**Figure: E-18**

## COMPACTION CURVE

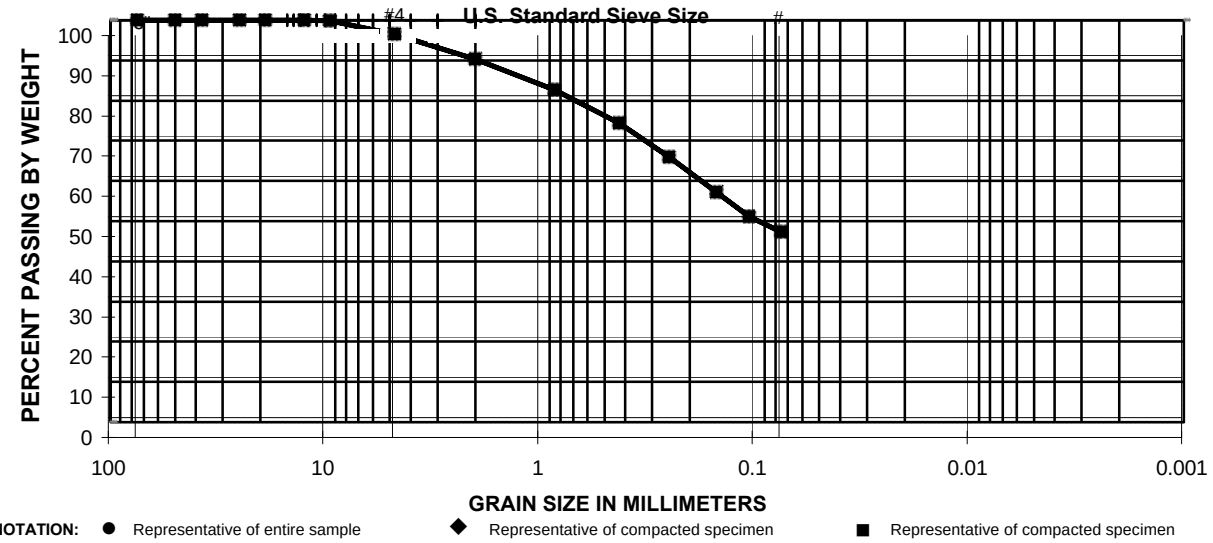
Test Method: ● ASTM D 1557 ■ ASTM D 698 ◆ CA-DWR: S-10 ❍ Other Effort

Compaction Procedure: **B** Specimen Preparation Method: **Moist**




## PARTICLE-SIZE DISTRIBUTION CURVE

| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | COARSE | FINE | COARSE | MEDIUM | FINE | |




**NOTATION:** ● Representative of entire sample ◆ Representative of compacted specimen ■ Representative of compacted specimen and entire sample

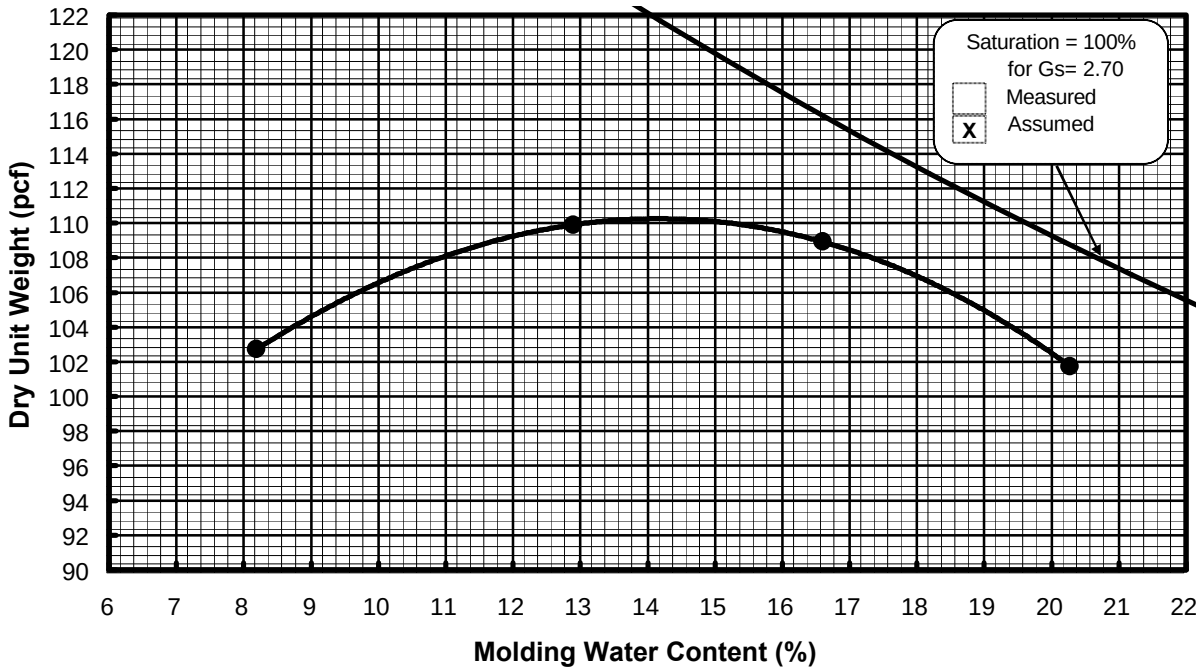
| Exploration No. | Sample No. | Depth (ft) | OPT. WC (%) | MAX. DUW (pcf) | LL | PI | Description and/or Classification |
|---|---|---|---|---|---|---|---|
| SB-01 | Bulk | 4.5 | 14.0 | 113.0 | | | Grayish brown clayey Sand (SC) |

| | | |
|---|---|---|
| **PROJECT NAME: Carrizo Energy Solar Farm (CESF)**<br>**PROJECT NUMBER: 22239472** | **COMPACTION AND INDEX PROPERTY DATA** | **Figure E-19** |

## COMPACTION CURVE

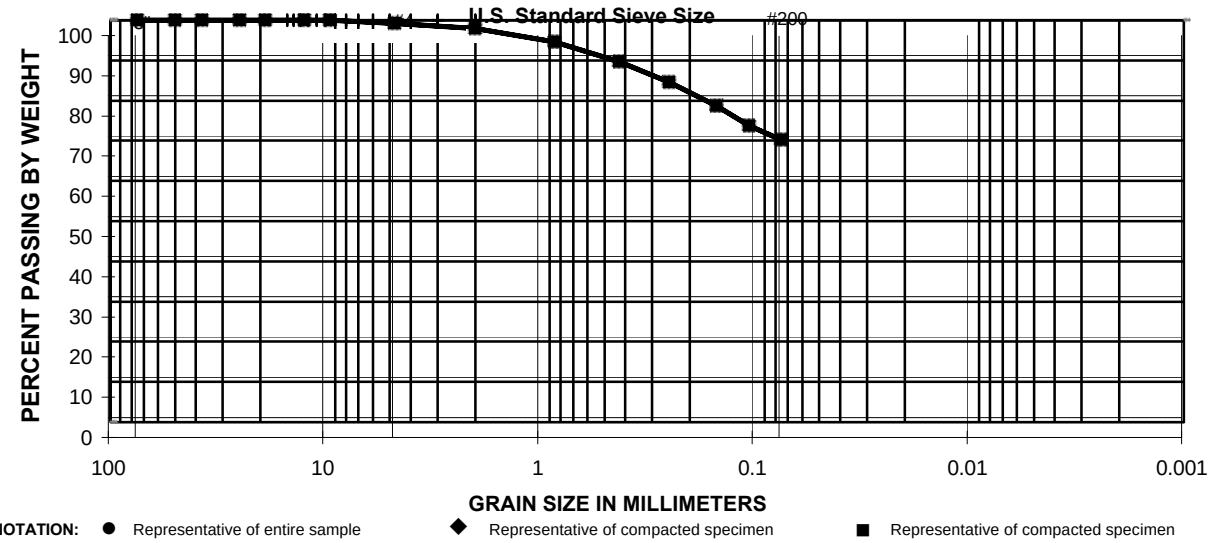
Test Method: ● ASTM D 1557 ■ ASTM D 698 ◆ CA-DWR: S-10 ❍ Other Effort

Compaction Procedure: **B** Specimen Preparation Method: **Moist**




## PARTICLE-SIZE DISTRIBUTION CURVE

| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | COARSE | FINE | COARSE | MEDIUM | FINE | |




**NOTATION:** ● Representative of entire sample ◆ Representative of compacted specimen ■ Representative of compacted specimen and entire sample

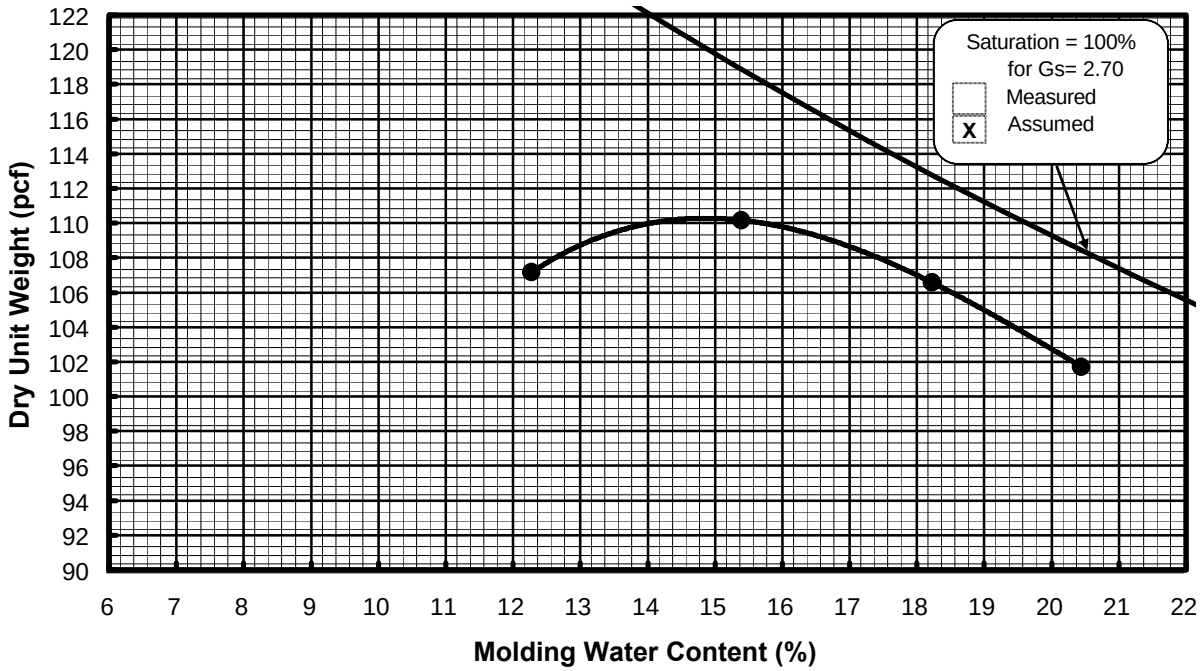
| Exploration No. | Sample No. | Depth (ft) | OPT. WC (%) | MAX. DUW (pcf) | LL | PI | Description and/or Classification |
|---|---|---|---|---|---|---|---|
| SB-02 | Bulk | 2.5 | 14.0 | 110.0 | 53 | 31 | Dark grayish brown sandy Clay (CL) |

| | | |
|---|---|---|
| **PROJECT NAME: Carrizo Energy Solar Farm (CESF)**<br>**PROJECT NUMBER: 22239472** | **COMPACTION AND INDEX PROPERTY DATA** | **Figure E-20** |

## COMPACTION CURVE

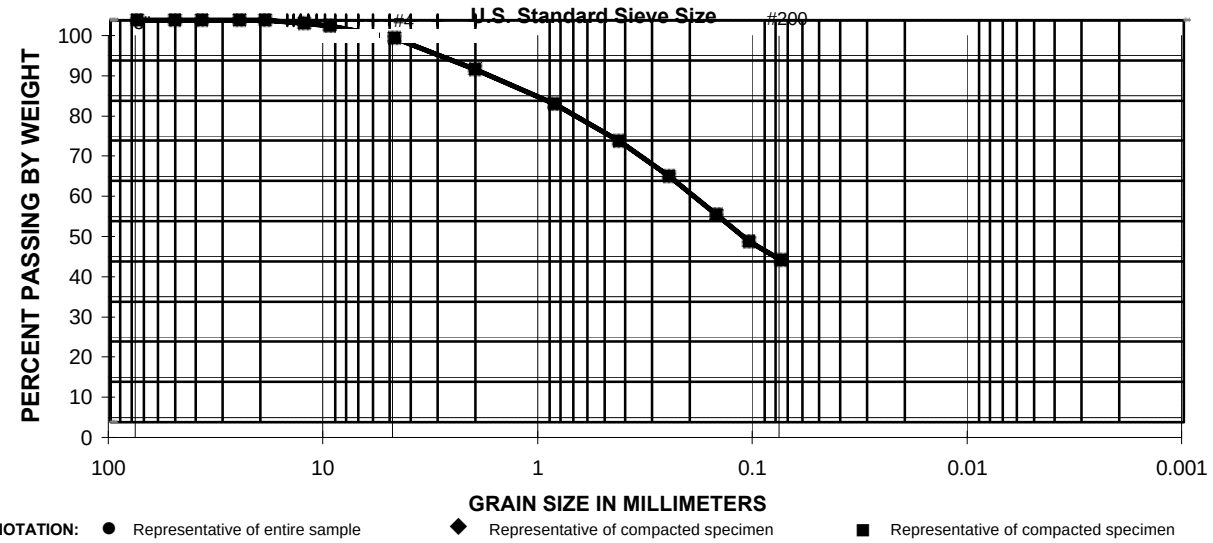
Test Method: ● ASTM D 1557 ■ ASTM D 698 ◆ CA-DWR: S-10 ❍ Other Effort

Compaction Procedure: **B** Specimen Preparation Method: **Moist**




## PARTICLE-SIZE DISTRIBUTION CURVE

| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | COARSE | FINE | COARSE | MEDIUM | FINE | |




**NOTATION:** ● Representative of entire sample ◆ Representative of compacted specimen ■ Representative of compacted specimen and entire sample

| Exploration No. | Sample No. | Depth (ft) | OPT. WC (%) | MAX. DUW (pcf) | LL | PI | Description and/or Classification |
|---|---|---|---|---|---|---|---|
| SB-03 | Bulk | 2.5 | 15.0 | 110.0 | 48 | 24 | Pale brown clayey Sand (SC) |

**PROJECT NAME: Carrizo Energy Solar Farm (CESF)**
**PROJECT NUMBER: 22239472**

**COMPACTION AND INDEX PROPERTY DATA**

**Figure E-21**

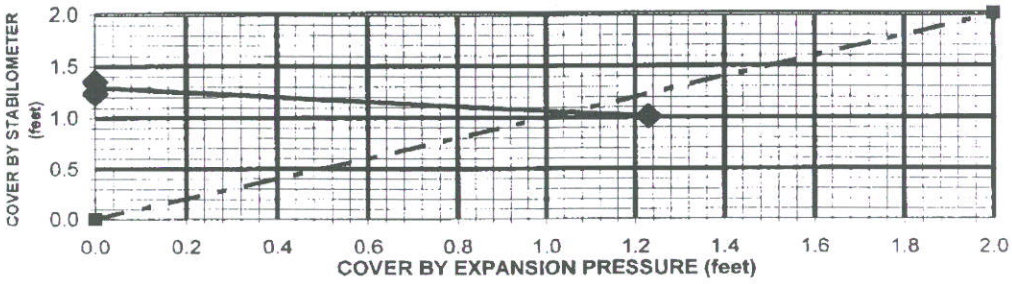
DAVIS EARTH & MATERIALS INC

# R-VALUE TEST REPORT

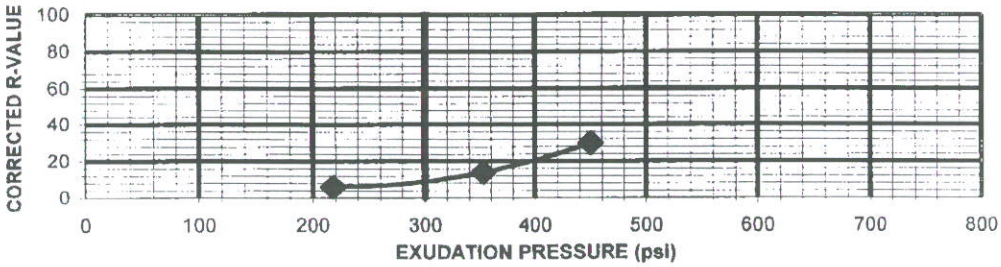
| | | | |
|---|---|---|---|
| DEM PROJECT NO. | 13-01.01 | DATE RECEIVED | 7/18/2007 |
| CLIENT | G Force | LAB NUMBER | 673 |
| CLIENT REFERENCE | GF12277, G Force Lab No. 5391 | REPORT DATE | 7/25/2007 |
| CLIENT'S PROJECT OR WORK ORDER NUMBER | PO # 2187 Carrizo Solar Power Project | | |
| SAMPLE LOCATION | SB-01 @ 2.5' to 5' | | |
| SAMPLE DESCRIPTION | Dark Brown Sandy, Silty Clay (CL) | | |
| SAMPLED BY | Client | | |

| LABORATORY TEST DATA | 1 | 2 | 3 |
|---|---|---|---|
| Compactor Pressure (psi) | 150 | 80 | 60 |
| Moisture at Compaction (%) | 15.9 | 17.3 | 19.5 |
| Compacted Dry Density (pcf) | 112.6 | 110.7 | 107.7 |
| Cover Thickness by Expansion Pressure (feet) | 1.23 | 0.00 | 0.00 |
| Cover Thickness by Stabilometer (feet) | 1.01 | 1.24 | 1.35 |
| Exudation Pressure (psi) | 450 | 353 | 218 |
| R-Value (corrected) | 30 | 14 | 6 |

## EXPANSION PRESSURE




## EXUDATION PRESSURE




| | |
|---|---|
| ASSUMED TRAFFIC INDEX | 4.5 |
| R-VALUE BY EXUDATION | 9 |
| R-VALUE BY EXPANSION | 26 |
| **R-VALUE AT EQUILIBRIUM** | **9** |

ENGINEER: CHAD M. DAVIS, RCE

DAVIS EARTH & MATERIALS, INC.
4320 VIEWRIDGE AVENUE, SUITE D SAN DIEGO, CA 92123 858-292-7575 FAX 858-292-7570

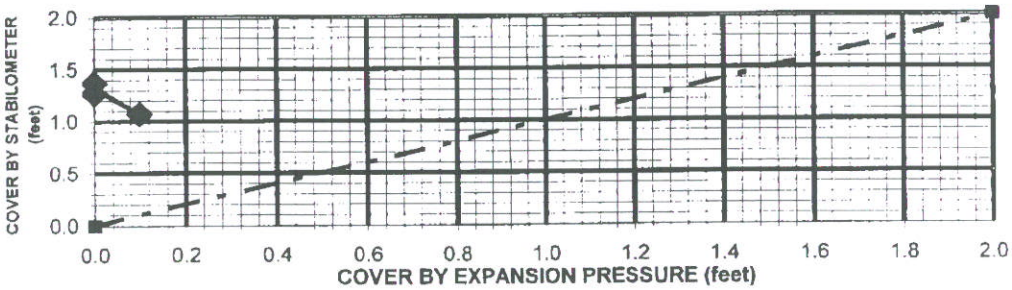
DAVIS EARTH & MATERIALS INC

# R-VALUE TEST REPORT

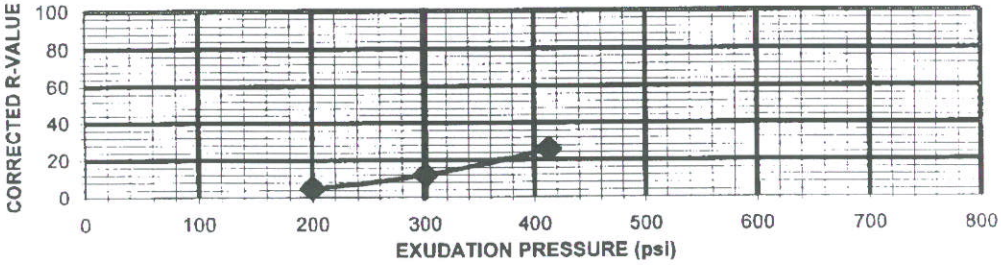
| | | | |
|---|---|---|---|
| DEM PROJECT NO. | 13-01.01 | DATE RECEIVED | 7/18/2007 |
| CLIENT | G Force | LAB NUMBER | 674 |
| CLIENT REFERENCE | GF12277, G Force Lab No. 5392 | REPORT DATE | 7/25/2007 |
| CLIENT'S PROJECT OR WORK ORDER NUMBER | PO # 2187 Carrizo Solar Power Project | | |
| SAMPLE LOCATION | SB-07 @ 2.5' to 5' | | |
| SAMPLE DESCRIPTION | Dark Brown Sandy, Silty Clay (CL) | | |
| SAMPLED BY | Client | | |

| LABORATORY TEST DATA | 1 | 2 | 3 |
|---|---|---|---|
| Compactor Pressure (psi) | 80 | 60 | 50 |
| Moisture at Compaction (%) | 17.5 | 19.4 | 21.2 |
| Compacted Dry Density (pcf) | 110.7 | 106.9 | 105.3 |
| Cover Thickness by Expansion Pressure (feet) | 0.10 | 0.00 | 0.00 |
| Cover Thickness by Stabilometer (feet) | 1.07 | 1.27 | 1.37 |
| Exudation Pressure (psi) | 413 | 301 | 200 |
| R-Value (corrected) | 26 | 12 | 5 |

## EXPANSION PRESSURE




## EXUDATION PRESSURE




| | |
|---|---|
| ASSUMED TRAFFIC INDEX | 4.5 |
| R-VALUE BY EXUDATION | 12 |
| R-VALUE BY EXPANSION | - |
| **R-VALUE AT EQUILIBRIUM** | **12** |

ENGINEER: CHAD M. DAVIS, RCE

DAVIS EARTH & MATERIALS, INC.
4320 VIEWRIDGE AVENUE, SUITE D SAN DIEGO, CA 92123 858-292-7575 FAX 858-292-7570

# GEOTHERM INC.

email: geotherm@geotherm.net

P.O. Box: 742
Aurora, Ontario
CANADA
L4G 4J9
Tel: 905-727-6448
Fax: 905-727-4325


**July 6, 2007**

**URS Corporation**
1615 Murray Canyon Road
Suite 1000
San Diego, CA
92108
**Attn: Kelly Giesing, P.E., G.E.**

**Re: Thermal Analysis of Native Soil Sample**
**Carrizo Solar Power Project**

The following is the test report of thermal dryout characterization conducted on the three (3) native soil samples from the referenced project sent to our laboratory. These were undisturbed tube samples taken in brass liners of California sampler.

## MEASUREMENT OF THERMAL RESISTIVITY

In order not to exceed safe operating temperatures at the design ampacity, the heat generated by the cable(s) must be dissipated through the soil. The thermal resistivity or rho [ºC-m/W] is a measure of the resistance to heat flow through a unit area of soil, and is measured by the 'transient thermal probe' technique. Basically, a slender cylindrical probe, containing a heater and temperature sensor, is inserted into the soil to be tested. Constant power is applied to the heater and the probe temperature/time data is monitored. The thermal resistivity can be calculated from this curve. As long as certain theoretical assumptions and test procedures are met, the technique is equally applicable to small probes (100mm long by 3mm diameter) in laboratory soil samples and large probes (2m long by 25mm diameter) installed in-situ.

The TPA-7000 (EPRI EL-2128), manufactured by *Geotherm Inc*., is a system that fully automates the thermal probe test. It is computer controlled and provides programmable power to the thermal probes, reads temperature sensors and heater current and voltage, and computes in real time the thermal resistivity. The unit consists of a programmable 10 amp, 60-volt power supply, a 10-channel data acquisition system, a notebook computer, and a printer. A nominal 110-volt power source is required. The entire test procedure is software controlled in a totally interactive manner, and various built-in error-reducing features ensure that the test complies with the theoretical assumptions. A statistical analysis of data indicates whether an acceptable test has been accomplished. Test data (time, temperature, power, etc.) is printed, plotted and stored on diskette for future analysis and reference to the results.

## FACTORS AFFECTING THERMAL RESISTIVITY

Heat flows through a soil mainly by conduction along mineral particles, and secondarily by conduction and convection through the moisture or air that occupies the pore space between solid particles (Figure 1). Thermal resistivity depends on soil composition and texture, water content, density, and various other factors to a lesser degree. This complex interrelationship does not lend itself to a simple formula; rather a thermal probe test must be carried out on any given soil in an undisturbed condition. Laboratory tests on undisturbed soil samples should only be performed when correlated to field test results. Note that once a cable is installed, the soil moisture is the only parameter that changes significantly with time.

**Soil Composition:** Soil is a composite material consisting of solid mineral grains, typically only making point-to-point contact, and pore space filled with water and air. The thermal resistivity of a given soil mass is a function of the intrinsic resistivities of its components. These may range from 0.12 °C-m/W for quartz mineral, to 0.40 °C-m/W for limestone, to 1.65 °C-m/W for water, to about 5.0 °C-m/W for organics (Figure 1). Even certain highly compacted soils can have up to 30% voids between solid particles; that in a dry state are filled with very high resistivity air (~45 °C-m/W).

**Texture:** This refers to soil grain size, shape, and particle size gradation. Since most of the heat is conducted through the solid particles and their contacts, the resistivity is minimized for soils that maximize these contacts. In engineering applications, a soil is often qualitatively categorized by a visual description using accepted adjectives to indicate the fractional amount of each component (i.e. gravel, sand, silt, clay, etc.).

**Water Content:** For any given soil the major influence on the thermal resistivity is the moisture content. In a dry state the pore spaces are filled with air (~45 °C-m/W). As water (~1.65 °C-m/W) replaces air, the soil resistivity is substantially lowered (as much as 3 to 7 times) as the good heat conduction paths are expanded (‘thermal bridges’). This is illustrated by the 'thermal dryout curve' (thermal resistivity vs. soil moisture content) (**Figure 1**). A soil that is better able to retain its moisture, as well as being able to efficiently re-wet when dried, will have better thermal performance characteristics. The soil water content is expressed as a percentage of the weight of water to the dry weight of soil solids, as determined by oven drying at 105 °C.

**Dry Density:** Soil densification (or compaction) increases mineral grain contacts and displaces air (i.e. lowers porosity), therefore reducing the soil resistivity, most notably at low moisture contents. Well-graded soils are potentially more dense because smaller grains can efficiently fill the spaces between the larger particles. Dry density is expressed as the ratio of the dry weight of the soil solids to the total volume. The total volume is taken as the initial volume of the undisturbed moist soil in a sample tube.

**Other Factors*:*** Soil particle soundness (porosity), mineral type (limestone, granite, basalt, etc.) and organic content also affect the thermal resistivity to some degree. Porosity and organic content of higher than 4% can increase the dry thermal resistivity by 15-20%.

**Test Procedure and Equipment:**
The tests included the measurement of moisture content, density and thermal dryout characterization (thermal resistivity as a function of moisture content). A laboratory type thermal probe was installed central and vertical in each sample. A series of measurements were made in stages, with moisture content ranging from the natural (as received) to totally dry condition. The testing was conducted in accordance with the IEEE Standard, using our thermal property analyzer. The thermal dryout curves are presented in **Figure 2.**

## Test Results

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

**SB-04 @ 3'**
Light brown clayey silty Sand some gravel
The as received moisture content was 11% and the dry density was 104 pcf.
Thermal resistivity at as received moisture content = **89 *ºC-cm/W***
Thermal resistivity at 0% moisture content (totally dry) = **210 *ºC-cm/W***

**SB-05 @ 3'**
Light brown clayey Sand some gravel
The as received moisture content was 15% and the dry density was 108 pcf.
Thermal resistivity at as received moisture content = **67 *ºC-cm/W***
Thermal resistivity at 0% moisture content (totally dry) = **155 *ºC-cm/W***

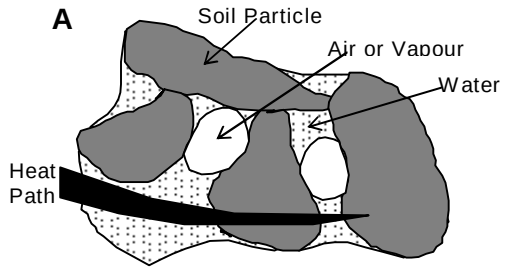
**SB-08 @ 10'**
Brown sandy Silt
The as received moisture content was 20% and the dry density was 107 pcf.
Thermal resistivity at as received moisture content = **68 *ºC-cm/W***
Thermal resistivity at 0% moisture content (totally dry) = **150 *ºC-cm/W***

Please contact us if you or your client(s) have any questions, wish to discuss any part of this report or if we can be of further assistance.

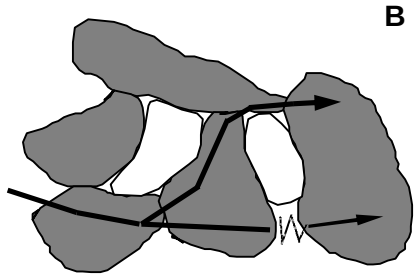
Yours truly
***Geotherm Inc.***

Deepak Parmar
President

| SOIL COMPONENTS | |
|---|---|
| **Description** | **Thermal Resistivity Dry ($^{o}$C-cm/W)** |
| **Soil Grains** | |
| Quartz | 12 |
| Granite | 30 |
| Limestone | 40 |
| Sandstone | 50 |
| Shale (sound) | 60 |
| Shale (highly friable) | 200 |
| Mica | 170 |
| **Others** | |
| Ice | 45 |
| Water | 165 |
| Organics | ~500 |
| Oil (petroleum) | ~800 |
| Air | ~4500 |




Wet Soil: High water content provides an easy path for heat conduction ("thermal bridges"); therefore the soil thermal




Damp Soil: As soil dries, discontinuities develop in the heat conduction path due to low water content, therefore thermal resistivity

**THERMAL RESISTIVITY CURVES**

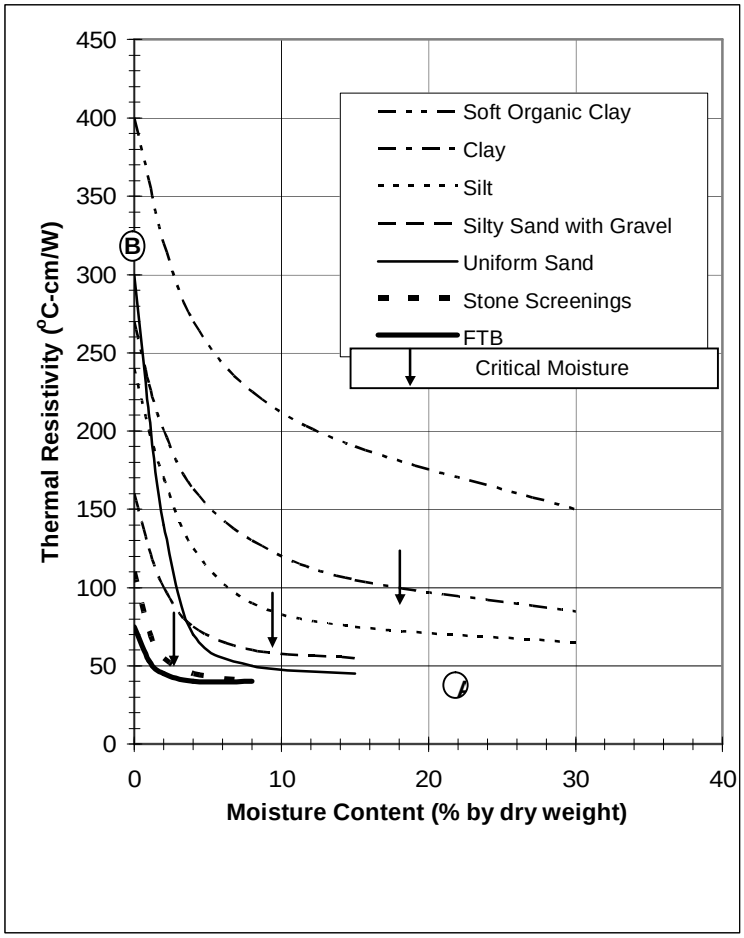
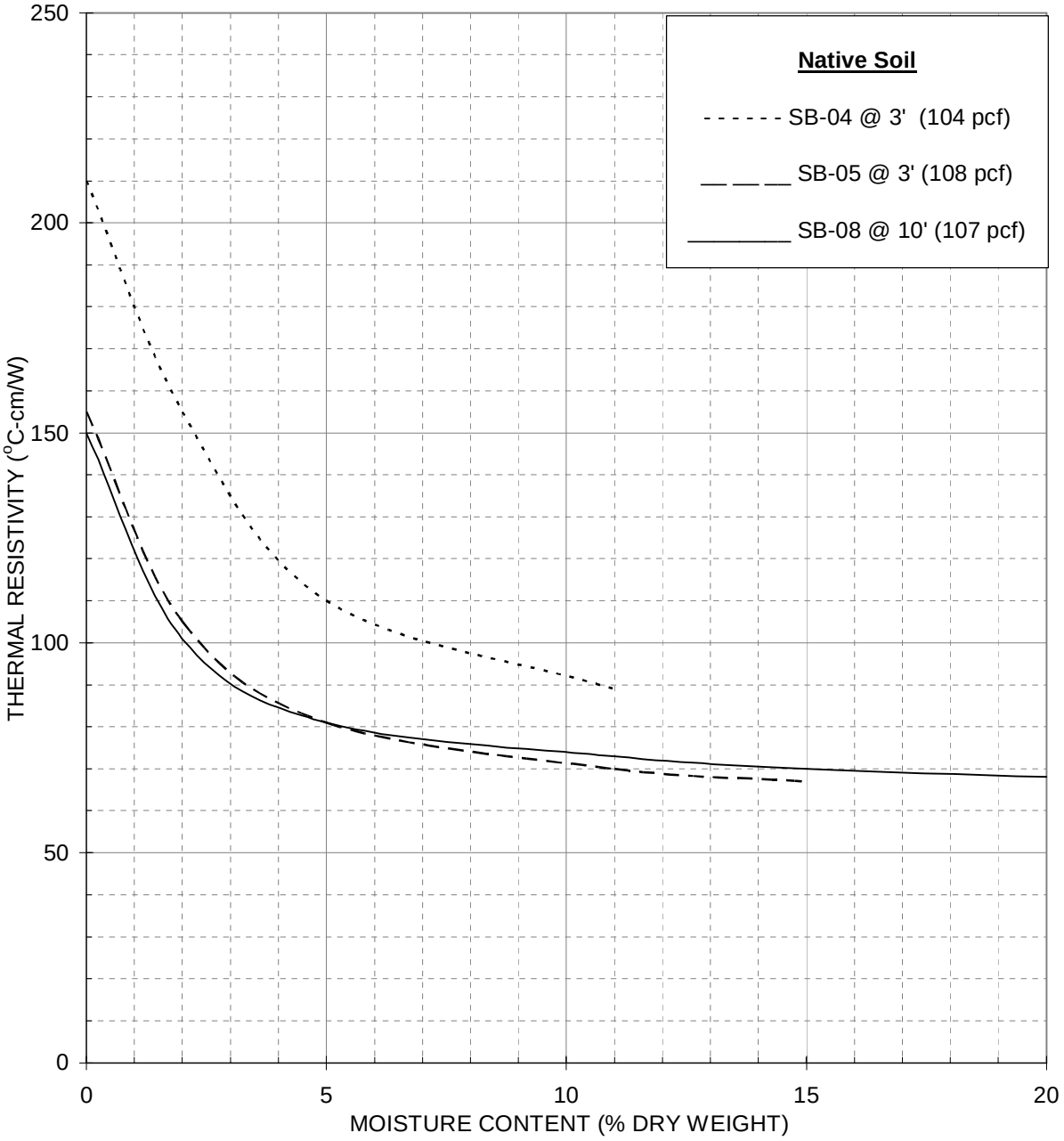



**Figure 1**

# THERMAL DRYOUT CURVES




**URS Corporation**

**Thermal Analysis of Native Soil Samples**

**Carrizo Solar Power Project**

**July 2007**

**Figure 2**