

APPENDIX G
PRELIMINARY GEOTECHNICAL ENGINEERING REPORT

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Preliminary Geotechnical Engineering Report

Daggett Solar Power Facility Project
Hidden Springs Road and Power Line Road
Daggett, California

June 8, 2018
Terracon Project No. 60175064

Prepared for:



San Francisco, CA

Prepared by:

Terracon Consultants, Inc.
Tustin, California

terracon.com

Terracon

Environmental



Facilities



Geotechnical



Materials

June 8, 2018



100 California Street, Suite 400
San Francisco, CA 94111

Attn: Erika Brosz, PE, PMP
P: 415-533-5531
E: Erika.Brosz@nrg.com

**Re: Preliminary Geotechnical Engineering Report
Daggett Solar Power Facility Solar Project
Hidden Springs Road and Power Line Road
Daggett, California
Terracon Project No. 60175064**

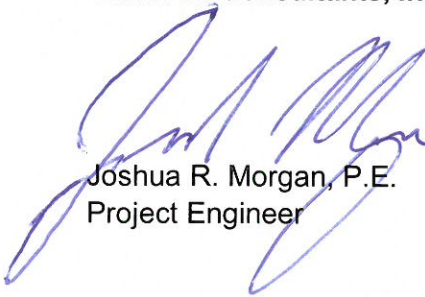
Dear Ms. Brosz:

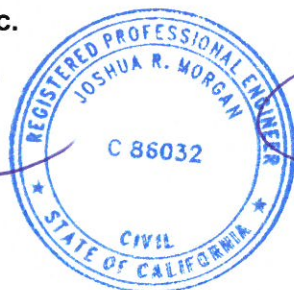
Terracon Consultants, Inc. (Terracon) has completed geotechnical engineering services for the above referenced project. These services were performed in general accordance with our proposal number P60175064, dated May 5, 2017. This report provides a description of project scope and site conditions, the details of our, subsurface exploration and laboratory testing. Additionally, this report provides preliminary geotechnical engineering recommendations concerning earthwork and the design and construction of the proposed structures and site development elements for the project.

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

Sincerely,

Terracon Consultants, Inc.


Joshua R. Morgan, P.E.
Project Engineer





F. Fred Buhamdan, P.E.
Principal

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Geotechnical Engineering Report

Daggett Solar Power Facility Project ■ Daggett, California
June 8, 2018 ■ Terracon Project No. 60175064



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**PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
DAGGETT SOLAR POWER FACILITY PROJECT
HIDDEN SPRINGS ROAD AND POWER LINE ROAD
DAGGETT, CALIFORNIA
Terracon Project No. 60175064
June 8, 2018**

1.0 INTRODUCTION

This report presents the results of our geotechnical engineering services performed for the proposed Daggett Solar Power Facility Project to be located at Hidden Springs Road and Power Line Road in Daggett, California. The “Site Location Plan” (Exhibit A-1) is included in Appendix A of this report. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- earthwork
- driven pile considerations
- groundwater conditions
- pavement/roadway design and construction
- preliminary shallow foundation considerations

Our geotechnical engineering scope of work for this project included the advancement of twenty-two (22) test borings to approximate depths of 16.5 feet bgs.

Logs of the borings along with a Boring Location Plan (Exhibit A-2) are included in Appendix A of this report. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included in Appendix B of this report. Descriptions of the field exploration and laboratory testing are included in their respective appendices.

2.0 PROJECT INFORMATION

2.1 Project Description

ITEM	DESCRIPTION
Site layout	Refer to the “Boring and Test Location Diagram” (Exhibit A-2 in Appendix A).

ITEM	DESCRIPTION
Structures	<p>It is our understanding that the Project will include the following structures:</p> <ul style="list-style-type: none"> ■ Solar photovoltaic (PV) modules mounted on driven steel piles. ■ Electrical equipment within the solar fields including inverters, and other self-contained structures. <p>Furthermore it is our understanding that the project includes a total of one (1) substation. The substation will be connected to an above ground transmission line. Recommendations related to the transmission line and substation foundations are not included in the scope of work of this phase.</p>
Anticipated grading	<p>It is anticipated that the ground mounted solar arrays will generally follow existing site grades without extreme earthwork, grading, or compaction of onsite soils. However, typical clearing and grubbing efforts will be performed prior to construction.</p> <p>Grading operations including subgrade preparation are anticipated for shallow foundations and roads.</p>
Access Roads	<p>Perimeter and interior access roads will consist of compacted native soil or aggregate base roads. Such roads will be utilized by pickup trucks and similar light traffic.</p> <p>Fire truck access roads are anticipated on-site, which will be designed for 80,000 lb vehicles.</p>

2.2 Site Location and Description

ITEM	DESCRIPTION
Location	<p>The proposed project site, located approximately 3 miles east of Daggett, California, is divided into three main portions. It is our understanding that the first portion of the project is approximately 1,800 acres and will have 144MWac capacity. The 2nd and 3rd phases are 182MWac and 300MWac respectively and will be developed on additional 2,000 acres. The project site in all 3 phases cover irregular shaped parcels north of National Trails Highway, west of Lake View Avenue, east of the railroad track, and generally south of Valley Center Road, except for two parcels.</p>
Current ground cover	Soils with agricultural crops and desert vegetation.
Existing topography	Relatively flat.

3.0 SUBSURFACE CONDITIONS

3.1 Site Geology

The site is situated within the Mojave Desert Geomorphic Province in Southern California. Geologic structures within this Province trend mostly northwest, in contrast to the prevailing east-west trend in the neighboring Transverse Ranges Geomorphic Province to the west. The Mojave Desert Province extends into lower California, and is bounded by the Garlock Fault to the north, the San Andreas Fault to the west and Nevada and Arizona borders to the east.^{1, 2} Surficial geologic units in the site consist mainly of Alluvium deposits in the western portion of the site and Dune sands in the eastern portion of the site of Recent Quaternary Age.³

3.2 Typical Subsurface Profile

Specific conditions encountered at the boring locations are indicated on the individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Details for the borings can be found on the boring logs included in Appendix A. Based on the results of the borings, subsurface conditions within the depth of exploration on the project site can be generalized as loose to very dense sand with variable amounts of gravel, silt, and clay. The clayey sand soils encountered on-site were generally weakly to moderately cemented at depths ranging from 5 to 10 feet below ground surface.

Laboratory tests were conducted on selected soil samples and the test results are presented in Appendix B. Atterberg Limit test results indicate the plasticity of on-site soils ranges from non-plastic to medium plasticity. Consolidation/Collapse potential tests for subsurface materials at an approximate depth of 2½ feet bgs exhibit a negligible to slight collapse potential, when saturated under a confining pressure of 2,000 psf. Consolidation/Swell potential tests for clayey sand materials at an approximate depth of 2½ feet bgs exhibits a slight swell potential, when saturated under a confining pressure of 2,000 psf. Direct shear tests were performed on clayey sand and silty clayey sand materials at a depths of 5 and 7½ feet and indicated an ultimate friction angle ranging between 19° and 35° with corresponding cohesion ranging between 30 and 546 psf. A Moisture Density Relationship (Modified Proctor) test indicates near surface sand soils have a maximum dry density of 128.9 pcf and a corresponding optimum water content of 8.0%. California Bearing Ratio (CBR) test results indicated that near surface soils have a CBR value of 37.8.

¹ Harden, D. R., "California Geology, Second Edition," Pearson Prentice Hall, 2004.

² Norris, R. M. and Webb, R. W., "Geology of California, Second Edition," John Wiley & Sons, Inc., 1990.

³ State of California – Division of Mines and Geology, *Geologic Map of California: San Bernardino Sheet*, Thomas H. Rogers, Compiled in 1967.

3.3 Groundwater

Groundwater was not observed in any of the borings at the time of field exploration. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Groundwater conditions can change with varying seasonal and weather conditions, and other factors. Based on a monitoring well located within the Barstow-Daggett Airport, identified by the California Department of Water Resources, recent groundwater levels are approximately 143 to 150 feet bgs⁴.

3.4 Seismic Considerations

3.4.1 Faulting and Estimated Ground Motions

The site is located in Southern California, which is a seismically active area. The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event.

Based on the USGS Design Maps Summary Report, the peak ground acceleration (PGA_M) at the project site is expected to be 0.562g. Based on the USGS Unified Hazard Tool, the project site has a mean magnitude of 6.71 with a mean distance of 8.83 km.

The site is not located within an Alquist-Priolo Earthquake Fault Zone based on our review of the State Fault Hazard Maps.⁵

Based on the results of our borings, it is our opinion that a preliminary Seismic Site Class D should be considered suitable for this site. The 2016 California Building Code (CBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100 foot soil profile determination. Borings extended to a maximum depth of 16½ feet, and this seismic site class definition considers that medium dense soils continue below the maximum depth of the subsurface exploration.

3.4.2 Liquefaction Potential

Liquefaction is a mode of ground failure that results from the generation of high pore water pressures during earthquake ground shaking, causing loss of shear strength. Liquefaction is typically a hazard where loose sandy soils exist below groundwater. San Bernardino County has designated certain areas within the county as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of relatively shallow groundwater. The project site is not mapped within a liquefaction hazard potential area as designated by San Bernardino County. Based on the anticipated depth to groundwater, we conclude that the

⁴ California Department of Water Resources, State Well No. 09N02E20G003S, measurements taken between 2010 and 2017 (www.water.ca.gov/waterdatalibrary)

⁵ California Department of Conservation Division of Mines and Geology (CDMG), "Digital Images of Official Maps of Alquist-Priolo Earthquake Fault Zones of California, Southern Region", CDMG Compact Disc 2000-003, 2000.

potential for liquefaction at the site is considered low. Other geologic hazards related to liquefaction, such as lateral spreading, are therefore also considered low.

3.5 Corrosion Potential

Results of soluble sulfate testing indicate that ASTM Type I/II portland cement is considered suitable for use in all concrete on and below grade. Foundation concrete may be designed for negligible sulfate exposure in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 19.

Laboratory test results indicate that on-site soils have resistivity ranging from 873 to 2,571 ohm-centimeters, chloride content ranging from 85 to 155 ppm, Redox Potential ranging from 685mV to 692 mV, pH values ranging from 7.38 to 8.69, water soluble sulfate contents equal to 0.01%, and negligible concentrations of sulfides. These test results are provided to assist in determining the type and degree of corrosion protection that may be required for the design and construction at the site. Refer to Summary of Laboratory Results contained in Appendix B for the complete results of the various corrosivity testing conducted on the samples obtained from the site.

3.6 Geologic Hazards

- Slope stability – The site is within a gentle slope area, geologic hazards associated with slope instability may be considered low.
- Rock fall hazards - The site is within a gentle slope area, rock fall hazards may be considered low.
- Landslide hazards – The site is within a gentle slope area, landslide hazards may be considered low.
- Surface fault rupture - The site is not located within an Alquist-Priolo Special Study Zone or a fault zone based on the County of San Bernardino.
- Fissures - The site is not within an Alquist-Priolo Special Study Zone nor within a liquefaction zone. Therefore, the expectation of fissures occurring at the site is considered low.
- Liquefaction potential – The site is not mapped within a liquefaction zone by the San Bernardino County. Based on the anticipated depth to groundwater, we conclude that the potential for liquefaction at the site is considered low.
- Collapsible and/or expansive soils – the laboratory test results indicate that the materials at a depth of approximately 2½ feet bgs exhibit a negligible to slight collapse potential when saturated under a confining pressure of 2,000 psf. Onsite soils are not considered expansive except for the clayey sand soils encountered in boring B-21. Such soils have medium plasticity and are expected to have low to medium expansive potential.
- Subsidence -Based on the depth to groundwater and encountered subsurface conditions, the impact of subsidence resulting from groundwater removal may be considered low.

- Ground shaking potential - The site is not located with an Alquist-Priolo Fault Zone. However, with the active faults in the region, the site could be subjected to strong ground shaking that may result from earthquakes on local to distant sources during the life span of the project.
- Seismic Settlement – Based on subsurface conditions, we anticipated seismic induced settlement at the site to be considered low.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

The site appears suitable for the proposed construction based upon geotechnical conditions encountered in the test borings, provided that the findings and recommendations presented in this report are incorporated into project design and construction.

It is our understanding that the PV solar panels will be supported by W section galvanized steel piles or similar.

Geotechnical engineering recommendations for foundation systems and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing (which are presented in Appendices A and B), engineering analyses, and our current understanding of the proposed project.

The information and recommendations included in this report should be considered preliminary. Further exploration and/or pile testing should be performed prior to the design phase of this project. The final geotechnical engineering report will reflect final results, findings, and recommendations, and, as such, will take precedence over any recommendations or information provided in this report.

4.2 Preliminary Earthwork Considerations

It is anticipated that excavations for the proposed construction can be accomplished with conventional earthmoving equipment. Based on onsite observations, slightly cemented materials were encountered in select areas on-site. Excavation penetrating the cemented soils may require the use of specialized heavy-duty equipment such as jack hammer excavators, to facilitate break-up and removal. Consideration should be given to obtaining a unit price for difficult excavation in the contract documents for the project.

At the time of our geotechnical exploration of the site, moisture contents of the surface and near-surface native soils ranged from about 1 to 12 percent. Based on these moisture contents, some moisture conditioning of the soils may be needed during construction and grading/engineered fill placement on the project. On-site soils are generally considered suitable for use as engineered fill

Based upon the subsurface conditions determined from the geotechnical explorations, subgrade soils exposed during construction are anticipated to be relatively workable. We recommend that the earthwork portion of this project be completed during extended periods of dry weather if possible. If earthwork is completed during the wet season, it may be necessary to take extra precautionary measures to protect subgrade soils. Wet season earthwork may require additional mitigative measures beyond that which would be expected during the drier summer and fall months. This could include diversion of surface runoff around exposed soils and draining of ponded water on the site. Once subgrades are established, it may be necessary to protect the exposed subgrade soils from construction traffic.

4.2.1 Preliminary Site and Subsurface Preparation

Strip and remove existing vegetation, debris, and other deleterious materials from proposed development areas. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction.

Stripped materials consisting of vegetation and organic materials should be wasted from the site, or used to revegetate landscaped areas or exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on-site, they should be placed in non-structural areas, and in fill sections not exceeding 5 feet in height.

Due to the low bearing capacity of the near surface soils, shallow spread footing foundations supporting electrical self-contained structures should be supported on engineered fill. The minimum depth of fill and over-excavation should be on the order of 4 feet below existing grades or 2 feet below the bottom of the foundations, whichever is greater.

Care should be taken to prevent wetting or drying of the bearing materials during construction. Wet, dry, or loose/disturbed material in the bottom of the footing excavations should be removed before foundation concrete is placed. Place a lean concrete mud-mat over the bearing soils if the excavations must remain open for an extended period of time.

Subsequent to the surface clearing and grubbing efforts, the exposed subgrade soils which will support engineered fill, slabs, or pavement areas constructed at grade, should be prepared to a minimum depth of 10 inches. Subgrade preparation should generally include scarification, moisture conditioning, and compaction. The moisture content and compaction of subgrade soils should be maintained until construction.

4.2.2 Fill Materials and Placement

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than three inches in size. Pea gravel or other open-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

On-site soils are generally considered suitable for use as engineered fill provided they conform to the fill materials specifications included below.

Imported soils for use as fill material within proposed building and structure areas should conform to low volume change materials as indicated in the following specifications:

<u>Gradation</u>	<u>Percent Finer by Weight (ASTM C 136)</u>
3"	100
No. 4 Sieve	50 - 100
No. 200 Sieve	10 - 40
■ Liquid Limit	30 (max)
■ Plasticity Index	15 (max)
■ Maximum Expansion Index*	20 (max)

*ASTM D4829

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed ten inches loose thickness.

4.2.3 Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Material Type and Location	Per the Modified Maximum Density Test (ASTM D1557)		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction (% over optimum)	
		Minimum	Maximum
On-site native soils and approved imported fill :			
Beneath foundations:	90	0%	+4%
Beneath asphalt pavements:	95	0%	+4%
Beneath aggregate base roadways:	95	0%	+4%
Miscellaneous backfill:	90	0%	+4%
Compacted native soils for roadways:	90	0%	+4%
Utility trench subgrade and backfill (structural and pavement areas)*:	90	0%	+4%
Aggregate base (pavements):	95	0%	+4%

* Minimum compaction of 95% is required in the top 12 inches beneath roadways and structural areas. Compaction requirements may be modified by the electrical engineer based on thermal resistivity.

4.3 Foundations

Self-contained electrical elements within the solar fields can be supported by mat foundations bearing on compacted engineered fill. Design recommendations for foundations for the proposed structures and related structural elements are presented in the following paragraphs.

4.3.1 Preliminary Mat Foundation Design Recommendations

DESCRIPTION	RECOMENDATION
Foundation Type	Mat foundations and/or support slabs with thickened edges
Structures	Equipment pads and slab on grade foundations
Bearing Material	A minimum 2 feet of engineered fill beneath the bottom of the foundations, or 4 feet below existing grades, whichever is greater.
Allowable Bearing Pressure	2,000 psf for mat foundation (Up to 10 feet wide) or support slabs with thickened edges
Minimum Dimensions	24 inches for mat foundations 12 inches for thickened edges
Minimum Embedment Depth Below Finished Grade	12 inches
Total Estimated Settlement	1 inch
Estimated Differential Settlement	½ to ¾ inch.

Since there are several factors that will control the design of mat foundations besides vertical load, Terracon should be consulted when the final foundation depth and width are determined to assist the structural designer in the evaluation of anticipated settlement.

For structural design of mat foundations, a modulus of subgrade reaction (K_{v1}) of 200 pounds per cubic inch (pci) may be used. Other details including treatment of loose foundation soils, superstructure reinforcement and observation of foundation excavations as outlined in the Earthwork section of this report are applicable for the design and construction of a mat foundation at the site.

The subgrade modulus (K_v) for the mat is affected by the size of the mat foundation and would vary according the following equation:

$$K_v = K_{v1} \times (B+1)^2 / (4 \times B^2)$$

Where: K_v is the modulus for the size footing being analyzed
 B is the width of the mat foundation.

4.3.2 Driven Pile Considerations

Subject to successful pile testing, the proposed solar PV panels may be supported on a driven pile foundation system. The design capacity of a single-driven pile is a function of several factors including:

- Size and type of pile;
- Type and capacity of pile installation equipment; and,
- Engineering properties of the subsurface soils.

The most effective means of verifying pile capacities for either tension or lateral loads is through pile load tests, which are proposed to be completed at a later phase.

Based on specific conditions encountered on site, the soils are generally considered drivable for pile installation. However, select areas encountered moderately cemented materials. We anticipate some difficulties with pile drivability in these soils.

4.4 Pavement and Roadway Design and Construction Recommendations

4.4.1 Asphalt Pavement Design Recommendations

Based on correlated engineering characteristics of the on-site soils using a traffic index (TI) of 5 (approximately 7,200 ESALS), and assuming the pavement subgrade will be prepared as recommended within this report, the asphalt concrete (AC) pavement section should consist of a minimum of 3 inches of AC over 4 inches of aggregate base over 10 inches of scarified, moisture conditioned, and compacted soils. As more specific traffic information becomes available, we should be contacted to reevaluate the pavement thickness design recommendations.

This pavement section is considered a minimal section based upon the expected traffic and the subgrade conditions. However, this section is expected to function with periodic maintenance and overlays if good drainage is provided and maintained.

4.4.2 Aggregate Surface Roadway Design Recommendations

Aggregate surface roadway design was conducted in general accordance with the Army Corps of Engineers (Corps), Technical Manual TM-5-822, Design of Aggregate Surface Roads and Airfields (1990).

The design of aggregate surface thickness for operation and maintenance access roads was based on assumed traffic consisting of 200 vehicles per day with 25 percent trucks, less than 10 percent of the total traffic composed of trucks having three or more axles, and no tracked vehicles. Terracon should be contacted if significant changes in assumed traffic loads or characteristics are anticipated. As a minimum, the aggregate surface course on roadways should be a minimum of 5 inches in depth after full compaction.

In addition, it is our understanding that NRG will utilize aggregate surface roads for the fire access roads. Our analysis for these roadways considered a fire truck with standard weight of 80 kips, and respective wheel loads of 20,000 lbs per wheel.

Aggregate surface roadway design was conducted in general accordance with the Bureau of Mines “Design of Surface Mine Haulage Roads – A Manual” (Walker W. Kaufmann and James C. Ault). The design was based on a CBR value of 37.8, which was obtained from our laboratory test results. Aggregate base course thickness of 7 inches is considered suitable for the fire access roads with the assumed loading above.

The aggregate surface course should conform to Class II aggregate base in accordance with the standard specifications per the State of California Department of Transportation, or other approved local governing specifications. The aggregate surfaced roads should be constructed directly above 10 inches of scarified, moisture conditioned, and compacted native soils

The aggregate surface course and underlying subgrade should be compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557. The surface course should be compacted at a moisture content not more than 4 percent above the optimum moisture content defined by ASTM D1557.

Shoulder build-up on both sides of proposed roadways should match the aggregate surface elevation and slope outwards at a minimum grade of 10% for five feet.

4.4.3 Compacted Native Soils Access Road Design Recommendations

Based upon the soils conditions encountered in the test borings, the use of on-site soils for construction of onsite roads is considered acceptable. Without the use of asphalt concrete or other hardened material to surface the roadways, there is an increased potential for erosion and rutting of the roadway to occur.

If high traffic loading is anticipated during wet seasons or when the upper soils are in saturated conditions, the proposed compacted soils road may experience wheel path rutting and depression up to 3 inches deep.

Construction of the un-surfaced roadways should consist of a minimum 10-inches of compacted on-site soils. More specifically, the upper ten inches of subgrade soils beneath existing grade, and any fill required to raise site grades should be moisture conditioned and compacted to a minimum density of 90 percent of ASTM D-1557. The upper 10 inches beneath finish native soils road grade should be compacted to 95-percent of ASTM D-1557.

Positive drainage should be provided during construction and maintained throughout the life of the roadways. Proposed roadway design should maintain the integrity of the road and eliminate ponding. The un-surfaced roads are expected to function with periodic maintenance.

4.4.4 Pavement and Roadway Design and Construction Considerations

Regardless of the design, unsurfaced roadways will display varying levels of wear and deterioration. We recommend implementation of a site inspection program at a frequency of at least once per year to verify the adequacy of the roadways. Preventative measures should be applied as needed for erosion control and regrading. An initial site inspection should be completed approximately three months following construction.

Shoulder build-up on both sides of proposed roadways should match the road surface elevation and slope outwards at a minimum grade of 10% for five feet.

Preventative maintenance should be planned and provided for through an on-going pavement management program in order to enhance future pavement performance. Preventative maintenance activities are intended to slow the rate of pavement deterioration, and to preserve the pavement investment.

Materials and construction of pavements for the project should be in accordance with the requirements and specifications of the State of California Department of Transportation, or other approved local governing specifications.

Base course or surfacing materials should not be placed when the surface is wet. Surface drainage should be provided away from the edge of roadways to reduce lateral moisture transmission into the subgrade.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

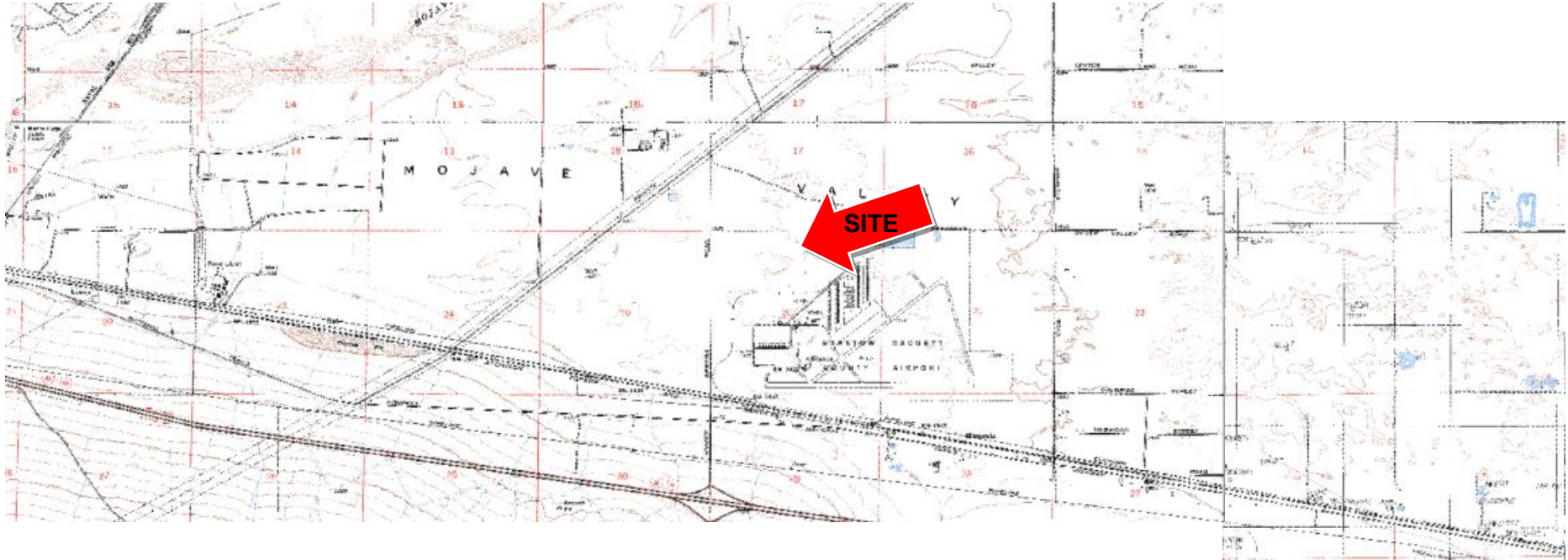
The analyses and recommendations presented in this report are based upon the data obtained from the pile load test program, the borings and test pits performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between pile tests, borings and test pits, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, and bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is

concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A
FIELD EXPLORATION



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY
 QUADRANGLES INCLUDE: YERMO, CA (1/1/1970) and MINNEOLA, CA (1/1/1971).

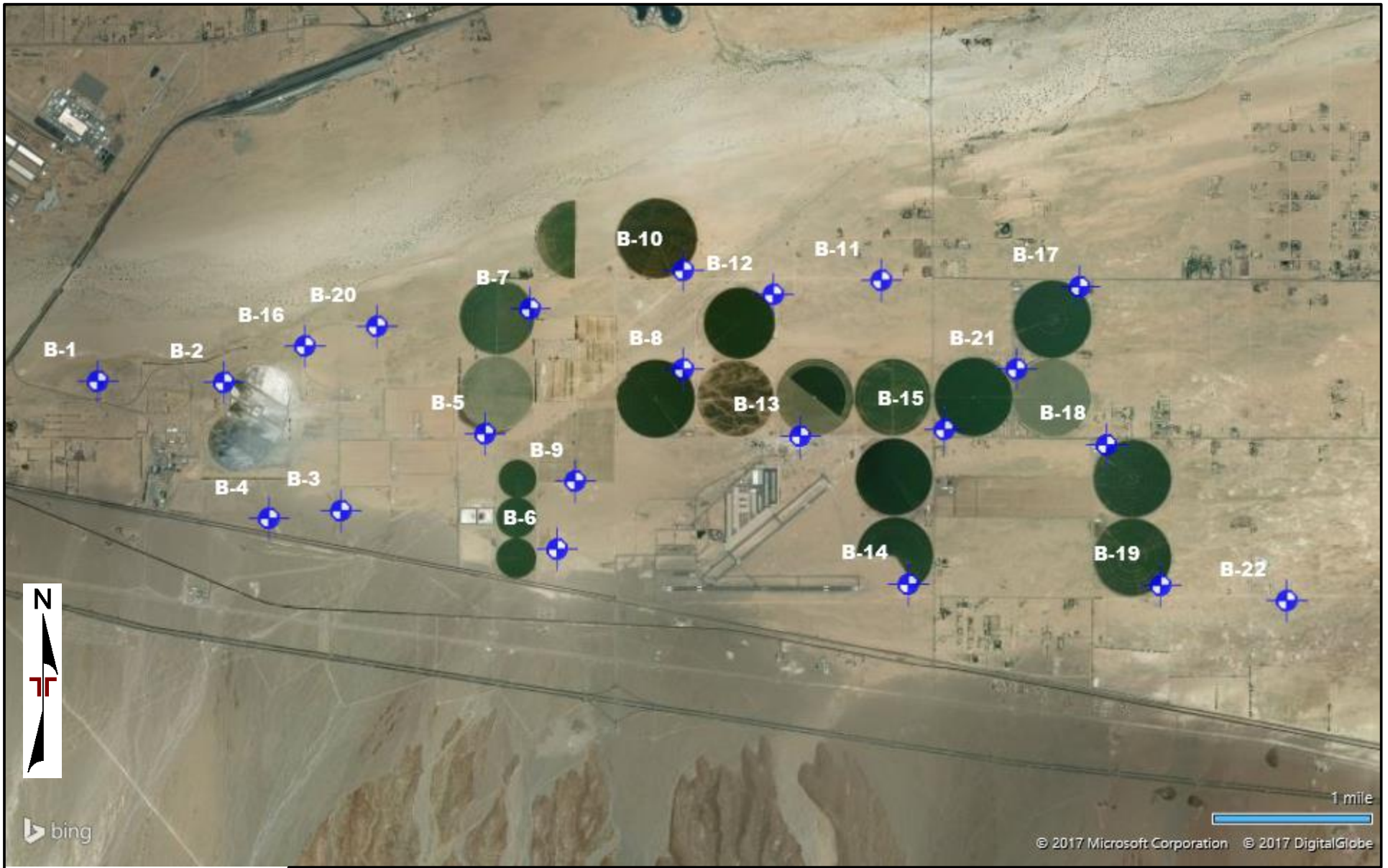
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager: JM	Project No. 60175064
Drawn by: JM	Scale: 1"=4,000'
Checked by: FH	File Name: A-1
Approved by: JM	Date: August 2017

Terracon
 1421 Edinger Ave Ste C
 Tustin, CA 92780-6287

SITE LOCATION
NRG: Daggett Solar Power Facility Project Power Line Road Barstow, CA

Exhibit
A-1



bing

1 mile

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AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager:	JM
Drawn by:	JM
Checked by:	FH
Approved by:	JM

Project No.	60175064
Scale:	AS SHOWN
File Name:	A-2
Date:	August 2017

Terracon
 1421 Edinger Ave Ste C
 Tustin, CA 92780-6287

EXPLORATION PLAN

NRG: Daggett Solar Power Facility Project
 Power Line Road
 Barstow, CA

Exhibit

A-2

Field Exploration Description

A total of twenty-two (22) test borings were drilled at the site on July 10 and 11, 2017. The borings were drilled to an approximate depth of 16½ feet below existing site grades at the approximate locations shown on the attached Boring Location Diagram, Exhibit A-2. The test borings were advanced with a truck-mounted Mobile B-61 drill rig utilizing 6-inch diameter hollow-stem auger.

The borings were located in the field by using the proposed site plan, an aerial photograph of the site, and handheld GPS. The accuracy of boring locations should only be assumed to the level implied by the method used.

Continuous lithologic logs of the borings were recorded by the field engineer during the drilling operations. At selected intervals, samples of the subsurface materials were taken by driving split-spoon or ring-barrel samplers. Bulk samples of subsurface materials were also obtained. Groundwater conditions were evaluated in the borings at the time of site exploration.

Penetration resistance measurements were obtained by driving the split-spoon and ring-barrel samplers into the subsurface materials with a 140-pound automatic hammer falling 30 inches. The penetration resistance value is a useful index in estimating the consistency or relative density of materials encountered.

An automatic hammer was used to advance the split-barrel sampler in the borings performed on this site. A significantly greater efficiency is achieved with the automatic hammer compared to the conventional safety hammer operated with a cathead and rope. This higher efficiency has an appreciable effect on the SPT-N value. The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.

The samples were tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification. Information provided on the boring logs attached to this report includes soil descriptions, consistency evaluations, boring depths, sampling intervals, and groundwater conditions. The borings were backfilled with auger cuttings prior to the drill crew leaving the site.

BORING LOG NO. B-1

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8704° Longitude: -116.861°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
		5.0											
		5											
		10											
		15											
		16.5											
<p>Boring Terminated at 16.5 Feet</p>													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method: Auger	See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Backfilled		
WATER LEVEL OBSERVATIONS Groundwater not encountered	<p>1421 Edinger Ave Ste C Tustin, CA</p>	Boring Started: 07-11-2017 Boring Completed: 07-11-2017 Drill Rig: B-61 Driller: Cal Pac Project No.: 60175064 Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-2

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8703° Longitude: -116.847°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
DEPTH												
	POORLY GRADED SAND (SP) , brown											
		2.5										
	POORLY GRADED SAND WITH SILT (SP-SM) , brown, loose, trace gravel			X	5-7-9			1				
	loose	5		X	3-4-5 N=9						NP	3
	medium dense			X	9-13-13 N=26							
	medium dense	10		X	8-16-24			1				
	medium dense	15		X	8-11-13 N=24							
	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

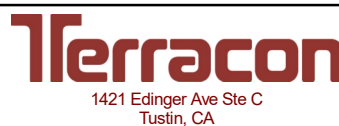
Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
Groundwater not encountered



Boring Started: 07-11-2017

Boring Completed: 07-11-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-3

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8586° Longitude: -116.834°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
2.5	POORLY GRADED SAND (SP) , brown, fine-grained, trace gravel											
5	LEAN CLAY (CL) , brown, stiff very stiff				7-8-10			12	93			
7.5					7-12-19			9	107			
10	POORLY GRADED SAND WITH SILT (SP-SM) , brown, medium dense, trace gravel very dense				6-8-18 N=26							
15					15-26-28 N=54							
16.5					11-21-25 N=46							
Boring Terminated at 16.5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

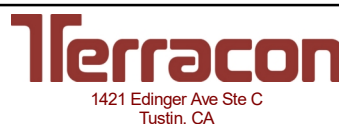
Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
Groundwater not encountered



Boring Started: 07-11-2017

Boring Completed: 07-11-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-4

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8579° Longitude: -116.842°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH	POORLY GRADED SAND (POORLY GRADED SAND), SP, brown, trace gravel											
	medium dense			X	7-18-27 collected in bag							
	dense	5		X	7-14-20 N=34							
		7.5										
7.5	POORLY GRADED SAND WITH SILT (SP-SM), brown, medium dense, trace gravel											
	dense	10		X	8-13-19 N=32			2				
	medium dense	15		X	9-11-5 N=16							
	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-11-2017

Boring Completed: 07-11-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-5

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8656° Longitude: -116.818°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	TEST TYPE					COMPRESSIVE STRENGTH (psf)	STRAIN (%)					
	POORLY GRADED SAND (SP) , brown, trace gravel loose	5.0		X	4-6-9				1		NP	12
	POORLY GRADED SAND WITH SILT (SP-SM) , brown, medium dense medium dense, trace gravel	10.0		X	4-7-7 N=14							
	medium dense	11.5		X	4-8-9 N=17							
	dense	16.5		X	16-16-23				2	115		
Boring Terminated at 16.5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

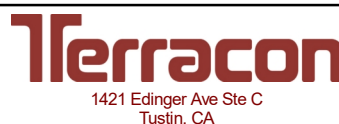
Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS
Groundwater not encountered



Boring Started: 07-10-2017

Boring Completed: 07-10-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-6

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8551° Longitude: -116.81°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	POORLY GRADED SAND (SP) , brown, trace gravel											
	loose	4-7-9	2	103								
	loose	6-7-11	1									
	POORLY GRADED SAND WITH SILT (SP-SM) , medium dense, trace gravel				7-9-14 N=23							
	medium dense	4-12-16 N=28								NP	18	
	SILTY SAND (SM) , brown, very dense	14-27-32 N=59										
	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

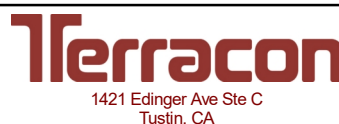
Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-10-2017

Boring Completed: 07-10-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-7

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.877° Longitude: -116.813°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
	POORLY GRADED SAND WITH SILT (SP-SM) , brown, trace gravel											
	medium dense				8-10-13			1				
	medium dense	5			7-9-12			1				
	medium dense				5-6-5 N=11							
	medium dense	10			6-9-10 N=19							
	medium dense	15			6-12-13 N=25							
	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-10-2017

Boring Completed: 07-10-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-8

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8715° Longitude: -116.796°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH												
	POORLY GRADED SAND WITH SILT (SP-SM) , brown, trace gravel											
	loose			◆	9-7-8				1			
	medium dense	5		X	2-4-18 N=22							
	medium dense			◆	5-9-13				1			
	medium dense	10		X	8-10-12 N=22							
	medium dense	15		X	6-12-15 N=27							
	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

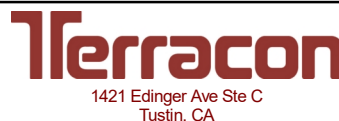
Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-10-2017

Boring Completed: 07-10-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-9

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8613° Longitude: -116.808°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
DEPTH												
10.0	POORLY GRADED SAND WITH SILT (SP-SM) , brown											
	medium dense			X	12-13-13			3	101			
	loose	5		X	5-4-4 N=8							
	medium dense			X	5-9-16			2	108			
10.0	SILTY SAND (SM) , brown, medium dense, trace gravel											
	medium dense	15		X	9-13-17 N=30							
16.5	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-10-2017

Boring Completed: 07-10-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-12

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-10

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8805° Longitude: -116.796°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH												
POORLY GRADED SAND WITH SILT (SP-SM), brown											NP	15
medium dense		5		7-8-13				3				
brown, medium dense				5-7-9 N=16								
medium dense				6-13-22				3	118			
medium dense		10		5-7-6 N=13								
15.0				4-6-10 N=16								
16.5		15										
CLAYEY SAND (SC), gray, medium dense												
Boring Terminated at 16.5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-10-2017

Boring Completed: 07-10-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-13

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-11

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8796° Longitude: -116.774°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
	POORLY GRADED SAND (SP) , brown, trace gravel											
	loose			X	4-6-7							
	medium dense	5		X	4-4-9 N=13							
	CLAYEY SAND (SC) , brown, medium dense	7.5		X	8-13-15 N=28						32-16-16	43
	medium dense	10		X	15-22-25			5	131			
	medium dense	15		X	12-13-15 N=28							
	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-10-2017

Boring Completed: 07-10-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-14

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-12

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8783° Longitude: -116.786°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS		PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI		
DEPTH													
POORLY GRADED SAND WITH SILT (SP-SM), brown													
loose		5		X	3-4-6				1				
loose				X	3-4-4 N=8								
medium dense				X	5-6-6 N=12								
medium dense		10		X	7-10-13								
dense, trace gravel		15		X	11-13-17 N=30								
Boring Terminated at 16.5 Feet													

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-10-2017

Boring Completed: 07-10-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-15

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-13

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8654° Longitude: -116.783°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
DEPTH												
	POORLY GRADED SAND WITH SILT (SP-SM) , trace gravel, brown, trace gravel	2.5										
	CLAYEY SAND (SC) , fine grained, grayish-brown, dense medium dense	5		X	17-27-34			6	119			
	medium dense			X	10-12-22			1	107			
	medium dense			X	10-11-14 N=25							
	POORLY GRADED SAND WITH SILT (SP-SM) , medium grained, brown, medium dense, trace gravel	10.0		X	7-12-13 N=25							
	dense			X	17-22-22 N=44							
	Boring Terminated at 16.5 Feet	16.5										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-10-2017

Boring Completed: 07-10-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-16

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-14

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8519° Longitude: -116.771°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
2.5	POORLY GRADED SAND WITH SILT (SP-SM) , brown, trace gravel										NP	27
5	SILTY SAND (SM) , reddish-brown, medium dense			X	9-13-20			3	101			
5	dense			X	12-20-30			5	110			
10	dense			X	10-16-15 N=31							
10	medium dense			X	10-12-16 N=28							
15	dense			X	11-15-20 N=35							
16.5	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

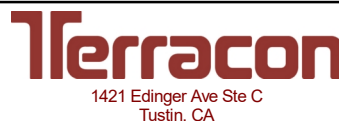
Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-10-2017

Boring Completed: 07-10-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-17

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-15

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.866° Longitude: -116.767°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
DEPTH												
	POORLY GRADED SAND WITH SILT (SP-SM) , fine grained, reddish-brown											
	medium dense			◆	8-9-13			3	102			
	medium dense	5		X	5-6-6 N=12						NP	25
	fine grained, reddish-brown, medium dense, trace gravel			X	5-8-11 N=19							
	fine grained, reddish-brown, medium dense	10		◆	9-14-20							
	medium dense, trace gravel	15		X	10-10-13 N=23							
	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method: Hollow Stem Auger	See Exhibit A-3 for description of field procedures. See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.	Notes:
Abandonment Method: Borings backfilled with soil cuttings upon completion		
WATER LEVEL OBSERVATIONS <i>Groundwater not encountered</i>	1421 Edinger Ave Ste C Tustin, CA	Boring Started: 07-10-2017 Boring Completed: 07-10-2017 Drill Rig: B-61 Driller: Cal Pac Drilling Project No.: 60175064 Exhibit: A-18

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-16

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8736° Longitude: -116.838°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
2.5	POORLY GRADED SAND (SP) , brown											
5	POORLY GRADED SAND WITH GRAVEL (SP) , brown, medium dense			X	6-8-14			1				
10	medium dense			X	5-7-11 N=18							
15	medium dense			X	8-14-17							
16.5	medium dense			X	6-8-9 N=17							
16.5	POORLY GRADED SAND WITH SILT (SP-SM) , brown, medium dense, trace gravel			X	6-10-13 N=23							
	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).
See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-11-2017

Boring Completed: 07-11-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-19

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-17

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.879° Longitude: -116.752°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
	DEPTH											
	2.5	POORLY GRADED SAND (SP) , trace gravel, brown, damp										
	5	POORLY GRADED SAND WITH GRAVEL (SP) , brown, medium dense, damp		X		10-12-14			1			
	10	medium dense		X		10-19-22			1			
	15	medium dense		X		8-8-9 N=17						
		10		X		3-6-7 N=13						
		15		X		9-14-18 N=32						
	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-11-2017

Boring Completed: 07-11-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-20

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-18

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8646° Longitude: -116.749°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH												
	SILTY SAND (SM) , brown, damp											
	medium dense			◆	12-14-20			3	111			
	medium dense	5		X	12-12-10 N=22							
	medium dense			X	7-8-8 N=16							
	medium dense	10		◆	9-10-14			12	102			
	medium dense	15		X	5-8-10 N=18							
	Boring Terminated at 16.5 Feet	16.5										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-11-2017

Boring Completed: 07-11-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-21

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-19

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8518° Longitude: -116.743°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
	<p>POORLY GRADED SAND WITH GRAVEL (SP), brown, damp</p> <p>dense</p> <p>medium dense</p> <p>medium dense</p>	<p>5</p> <p>10</p>		<p>18-30-37</p> <p>20-20-27 N=47</p> <p>10-12-12 N=24</p>				<p>2</p> <p>1</p>				
	<p>CLAYEY SAND (SC), grayish-brown, medium dense, damp</p> <p>very dense</p>	<p>15</p>		<p>8-9-11</p> <p>23-35-28 N=63</p>								
	<p>Boring Terminated at 16.5 Feet</p>											
	<p>Stratification lines are approximate. In-situ, the transition may be gradual.</p>											
	<p>Hammer Type: Automatic SPT Hammer</p>											

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

Advancement Method: Hollow Stem Auger	See Exhibit A-3 for description of field procedures.
Abandonment Method: Borings backfilled with soil cuttings upon completion	See Appendix B for description of laboratory procedures and additional data (if any). See Appendix C for explanation of symbols and abbreviations.
WATER LEVEL OBSERVATIONS Groundwater not encountered	

Notes:

1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-11-2017	Boring Completed: 07-11-2017
Drill Rig: B-61	Driller: Cal Pac Drilling
Project No.: 60175064	Exhibit: A-22

BORING LOG NO. B-20

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8754° Longitude: -116.83°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH												
POORLY GRADED SAND WITH SILT (SP-SM), brown											NP	26
loose		5		X	7-8-9							
medium dense		5		X	7-9-13							
medium dense		10		X	6-7-10 N=17							
medium dense		10		X	7-8-8 N=16							
dense		15		X	17-21-22 N=43							
Boring Terminated at 16.5 Feet												

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

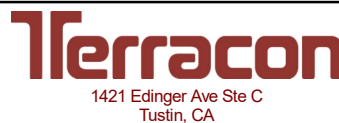
Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



Boring Started: 07-11-2017

Boring Completed: 07-11-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-23

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-21

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8715° Longitude: -116.759°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS	
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)			LL-PL-PI	PERCENT FINES
	POORLY GRADED SAND (SP) , brown											
	medium dense			X	17-21-24			7	126			
	5.0	POORLY GRADED SAND WITH SILT (SP-SM) , medium dense			X	9-9-11 N=20						
	medium dense			X	11-14-20			2				
	10	medium dense			X	5-10-16 N=26						
15.0	SILTY SAND (SM) , fine grained, brown, medium dense				8-12-15 N=27							
16.5	Boring Terminated at 16.5 Feet											

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-11-2017

Boring Completed: 07-11-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-24

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/28/17

BORING LOG NO. B-22

PROJECT: Daggett Solar Power Facility

CLIENT: NRG
San Francisco, CA

SITE: Approximately 10 miles E of Barstow
Daggett, California

GRAPHIC LOG	LOCATION See Exhibit A-2 Latitude: 34.8504° Longitude: -116.729°	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	STRENGTH TEST			WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
						TEST TYPE	COMPRESSIVE STRENGTH (psf)	STRAIN (%)				
DEPTH	POORLY GRADED SAND WITH SILT (SP-SM) , brown											
	brown, medium dense, trace gravel			X	8-25-35			1				
	medium dense	5		X	8-8-8 N=16							
	7.5	SILTY SAND (SM) , brown, medium dense										
	dense	10		X	7-20-38			14	111			
	medium dense	15		X	12-19-22 N=41					23-19-4	38	
	16.5	Boring Terminated at 16.5 Feet			8-17-18 N=35							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:
Hollow Stem Auger

See Exhibit A-3 for description of field procedures.

Notes:

Abandonment Method:
Borings backfilled with soil cuttings upon completion

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

WATER LEVEL OBSERVATIONS

Groundwater not encountered



1421 Edinger Ave Ste C
Tustin, CA

Boring Started: 07-11-2017

Boring Completed: 07-11-2017

Drill Rig: B-61

Driller: Cal Pac Drilling

Project No.: 60175064

Exhibit: A-25

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL BARSTOW2.GPJ TERRACON DATATEMPLATE.GDT 8/28/17

APPENDIX B
LABORATORY TESTING

Laboratory Testing Description

Samples retrieved during the field exploration were taken to the laboratory for further observation by the project geotechnical engineer and were classified in accordance with the Unified Soil Classification System (USCS) described in Appendix C. At that time, the field descriptions were confirmed or modified as necessary and an applicable laboratory testing program was formulated to determine engineering properties of the subsurface materials.

Laboratory tests were conducted on selected soil samples and the test results are presented in this appendix. The laboratory test results were used for the geotechnical engineering analyses, and the development of foundation and earthwork recommendations. Laboratory tests were performed in general accordance with the applicable ASTM, local or other accepted standards.

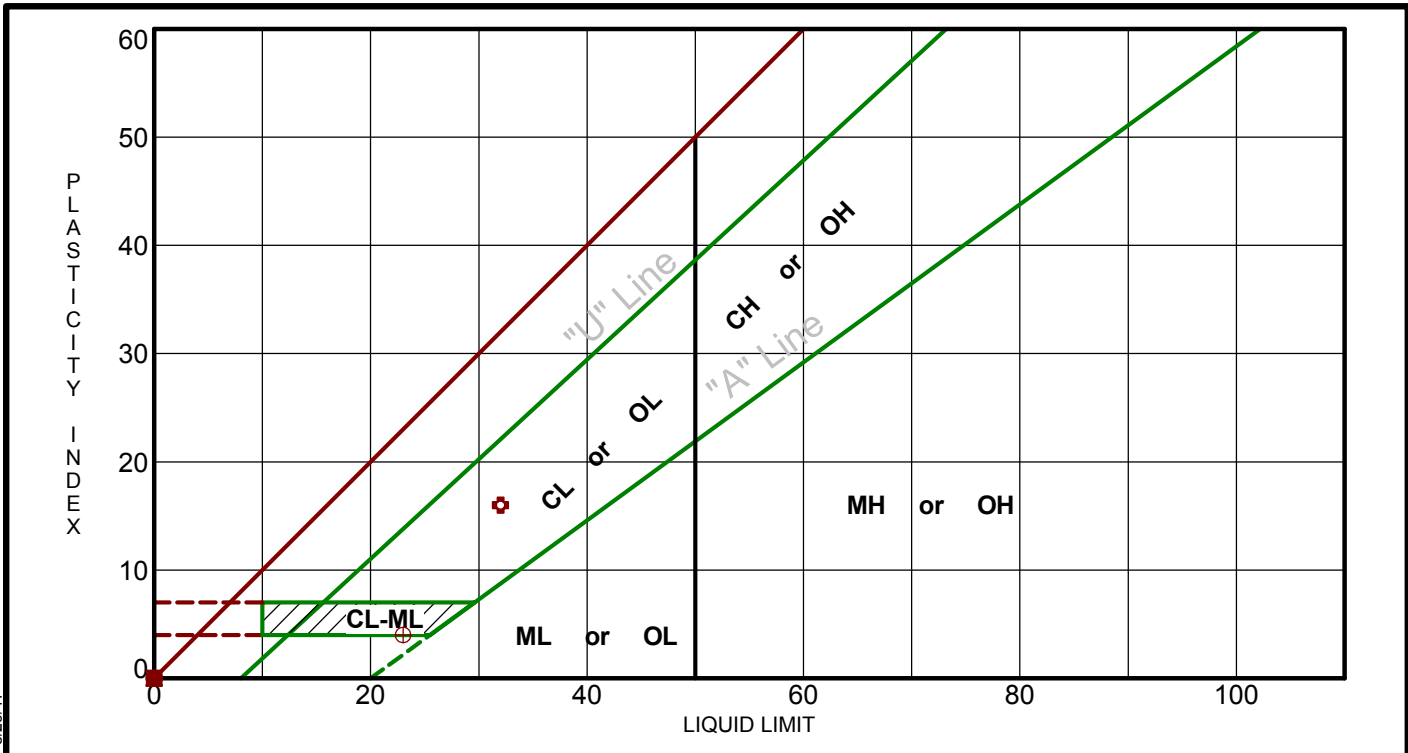
Selected soil samples obtained from the site were tested for the following engineering properties:

- ASTM D7263 Dry Density
- CT422 Chloride Content
- CT643 pH
- ASTM C136 Sieve Analysis
- ASTM D4318 Atterberg Limits
- ASTM D3080 Direct Shear
- ASTM D1883 California Bearing Ratio of Laboratory Compacted Soils
- ASTM D2216 Moisture Content
- CT417 Soluble Sulfates
- CT643 Minimum Resistivity
- ASTM D4546 Collapse/Swell Potential
- ASTM D1557 Moisture-Density Relationship

APPENDIX C
SUPPORTING DOCUMENTS

ATTERBERG LIMITS RESULTS

ASTM D4318



LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT... ATTERBERG LIMITS - BARSTOW2.GPJ_TERRACON_DATA_TEMPLATE.GDT_8/29/17

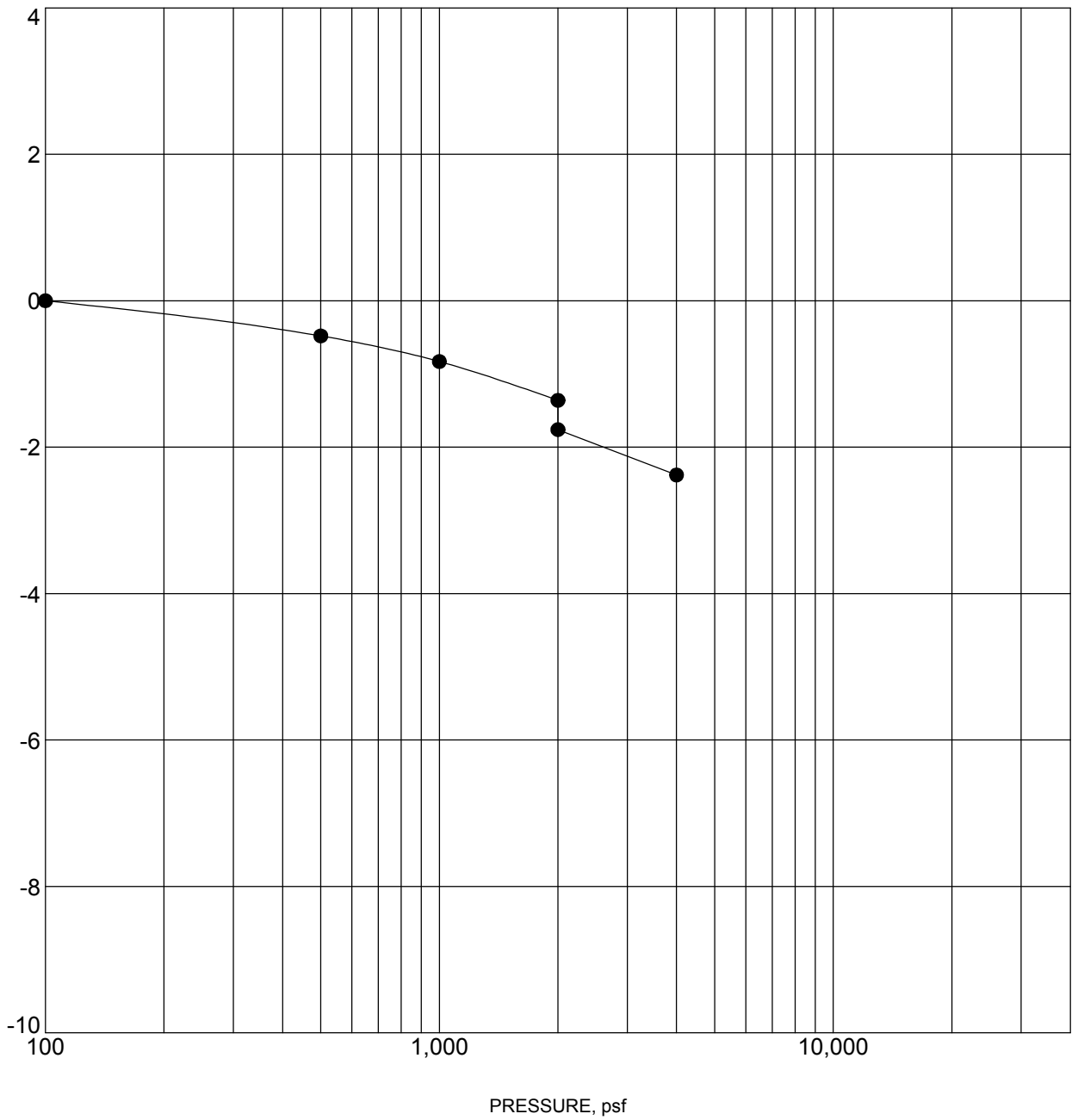
Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
● B-1	0 - 2.5	NP	NP	NP	9	SP-SM	POORLY GRADED SAND WITH SILT
⊠ B-2	5 - 6.5	NP	NP	NP	3	SP	POORLY GRADED SAND
▲ B-5	0 - 2.5	NP	NP	NP	12	SP-SM	POORLY GRADED SAND WITH SILT
★ B-6	10 - 11.5	NP	NP	NP	18	SM	SILTY SAND
⊕ B-10	0 - 2.5	NP	NP	NP	15	SM	SILTY SAND
⊕ B-11	7.5 - 9	32	16	16	43	SC	CLAYEY SAND
○ B-14	0 - 2.5	NP	NP	NP	27	SM	SILTY SAND
△ B-15	5 - 6.5	NP	NP	NP	25	SM	SILTY SAND
⊗ B-20	0 - 2.5	NP	NP	NP	26	SM	SILTY SAND
⊕ B-22	10 - 11.5	23	19	4	38	SC-SM	SILTY CLAYEY SAND

PROJECT: Daggett Solar Power Facility Phase 1 SITE: Approximately 10 miles E of Barstow Daggett, California	 <p>1421 Edinger Ave Ste C Tustin, CA</p>	PROJECT NUMBER: 60175064 CLIENT: NRG San Francisco, CA EXHIBIT: B-2
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SWELL CONSOLIDATION TEST

ASTM D2435

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 65155045-SWELL/CONSOL BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/29/17



Specimen Identification	Classification	γ_d , pcf	WC, %
● B-9 2.5 - 4 ft	POORLY GRADED SAND WITH SILT	101	3

NOTES: Water added at 2,000 psf

PROJECT: Daggett Solar Power Facility Ph 1

SITE: Approximately 10 miles E of
Barstow
Daggett, California

Terracon
1421 Edinger Ave Ste C
Tustin, CA

PROJECT NUMBER: 60175064

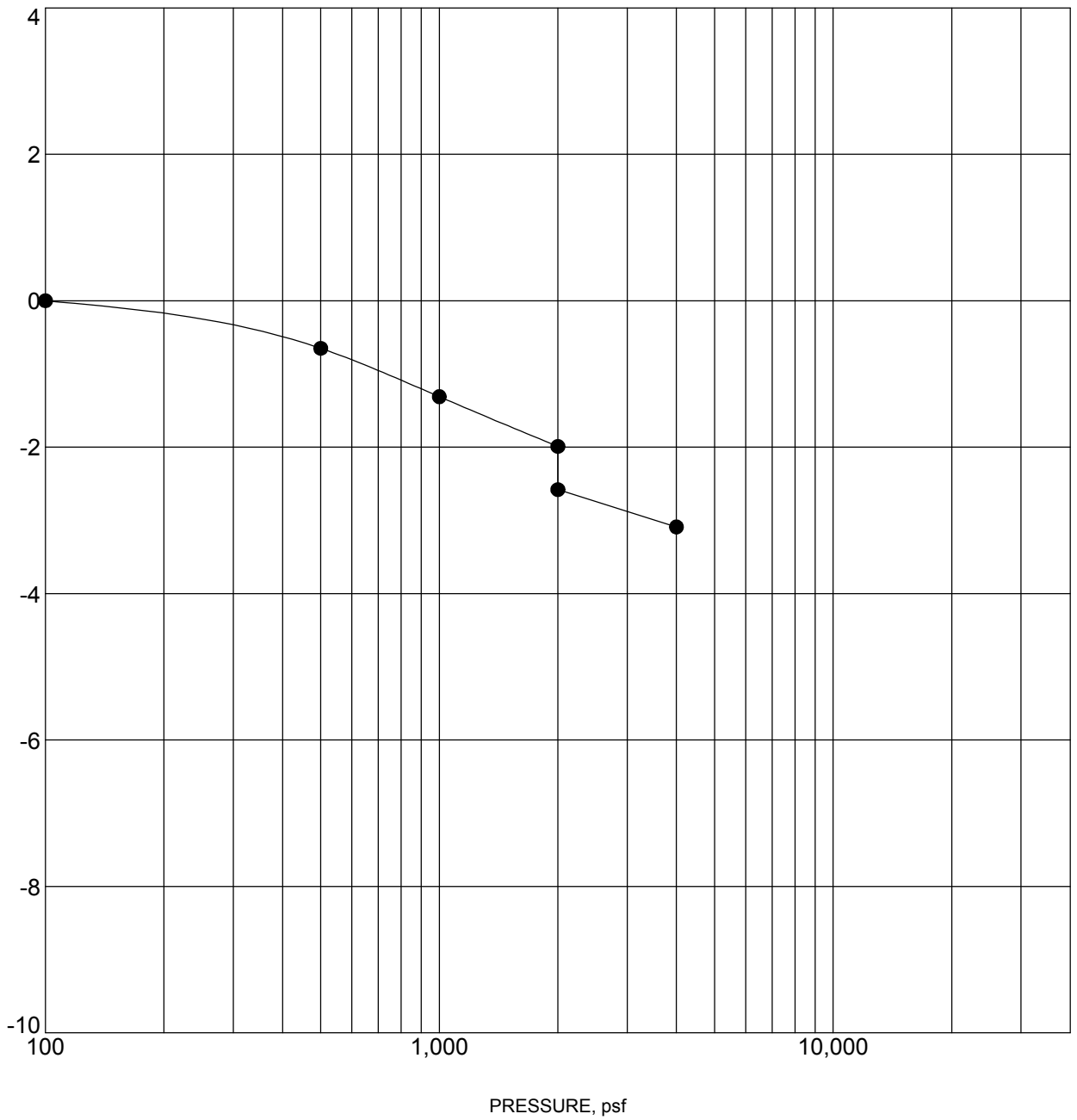
CLIENT: NRG
San Francisco, CA

EXHIBIT: B-3

SWELL CONSOLIDATION TEST

ASTM D2435

AXIAL STRAIN, %



Specimen Identification	Classification	γ_d , pcf	WC, %
● B-14 2.5 - 4 ft	CLAYEY SAND	101	3

NOTES: Water added at 2,000 psf

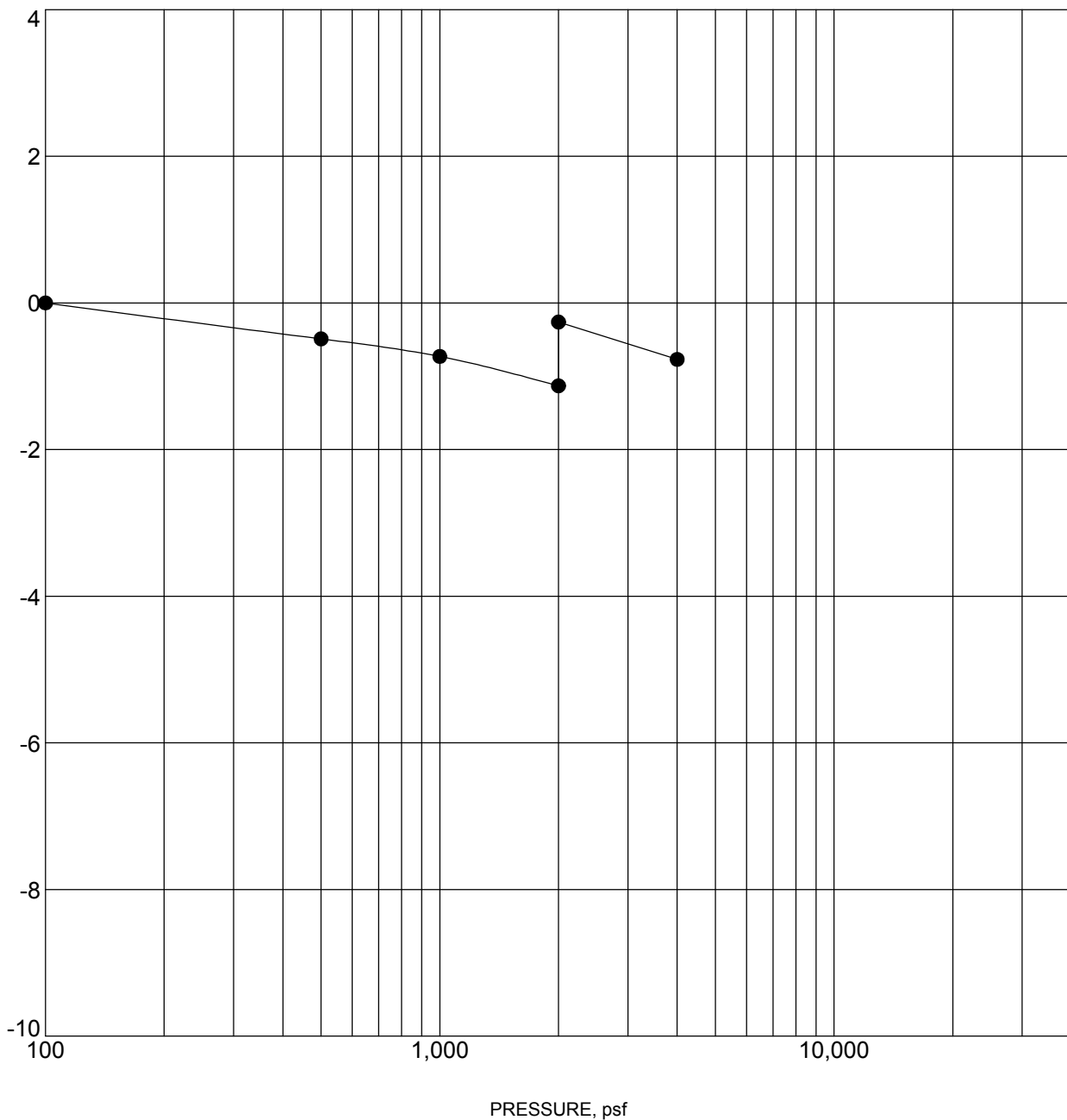
LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 65155045-SWELL/CONSOL BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/29/17

PROJECT: Daggett Solar Power Facility Phase 1	<p style="color: #8B0000; font-weight: bold; margin-top: 5px;">1421 Edinger Ave Ste C Tustin, CA</p>	PROJECT NUMBER: 60175064
SITE: Approximately 10 miles E of Barstow Daggett, California		CLIENT: NRG San Francisco, CA
		EXHIBIT: B-4

SWELL CONSOLIDATION TEST

ASTM D2435

AXIAL STRAIN, %



Specimen Identification	Classification	γ_d , pcf	WC, %
● B-21 2.5 - 4 ft	CLAYEY SAND	126	7

NOTES: Water added at 2,000 psf

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. 65155045-SWELL/CONSOL BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/29/17

PROJECT: Daggett Solar Power Facility Phase 1
SITE: Approximately 10 miles E of Barstow Daggett, California

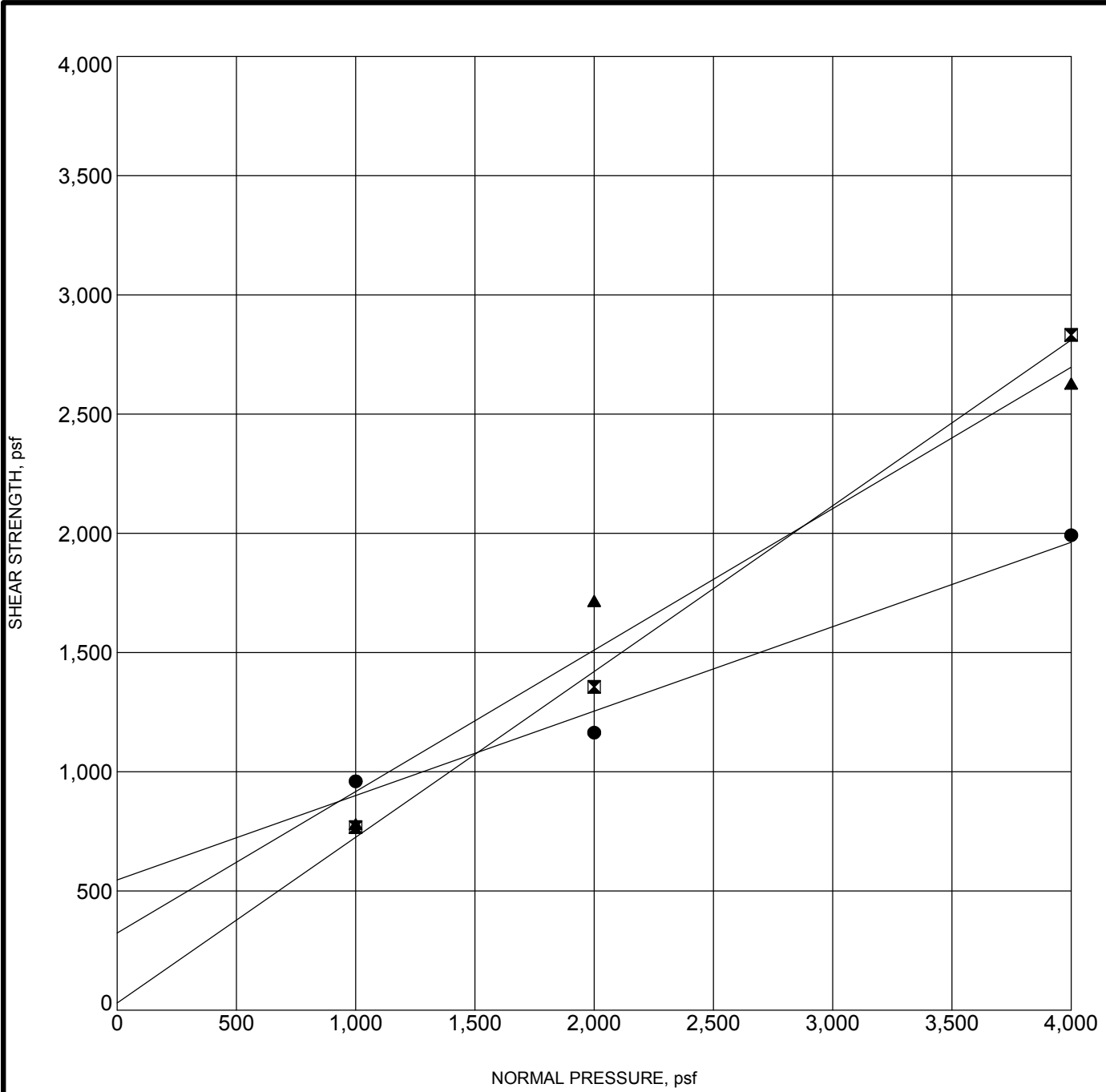


PROJECT NUMBER: 60175064
CLIENT: NRG San Francisco, CA
EXHIBIT: B-5

DIRECT SHEAR TEST

ASTM D3080

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. DIRECT_SHEAR_BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/29/17



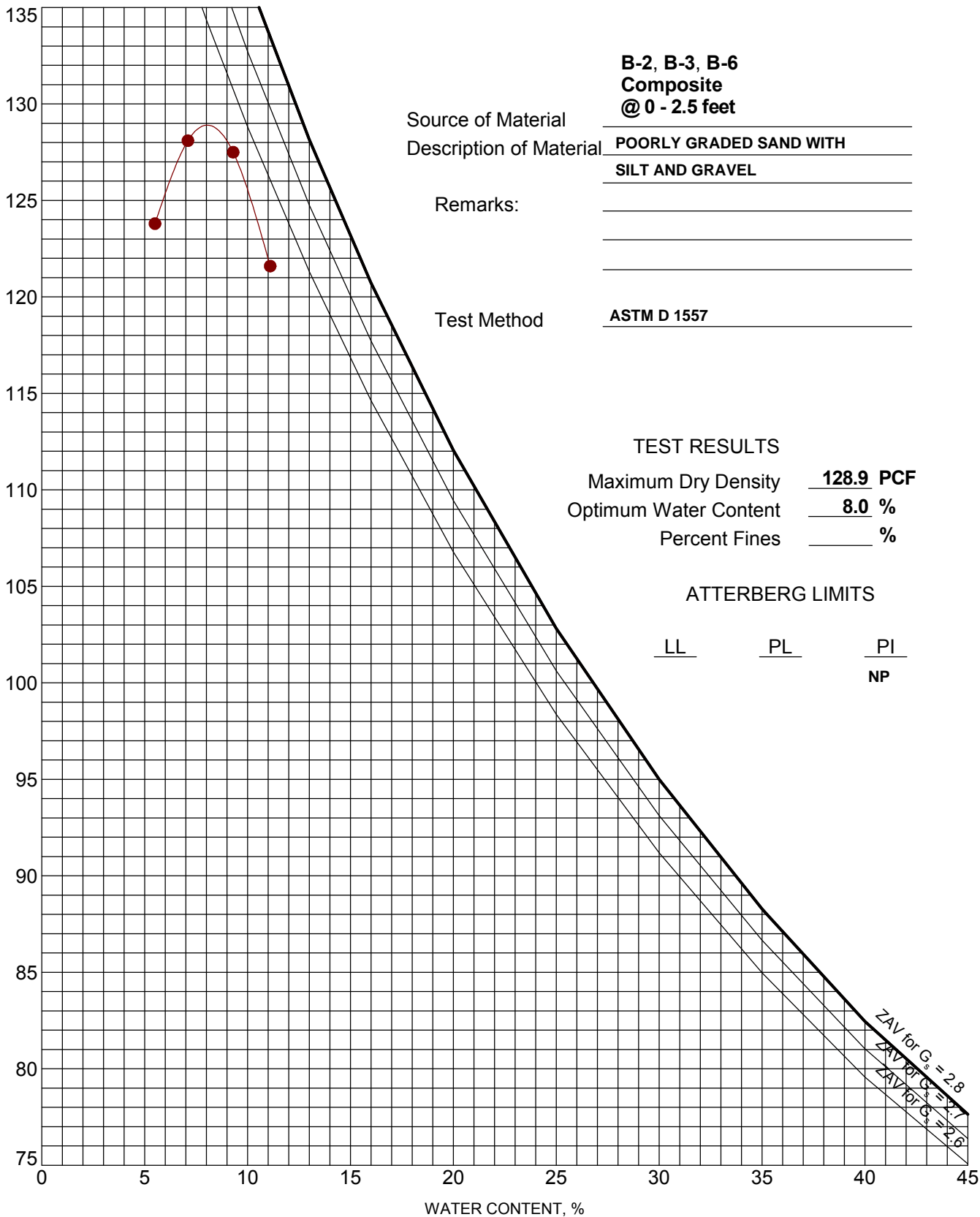
Specimen Identification	Classification	γ_d , pcf	WC, %	c, psf	ϕ°
● B-3 5.0ft	CLAYEY SAND SC	107	9	546	19
◻ B-14 5.0ft	CLAYEY SAND SC	110	5	30	35
▲ B-22 7.5ft	SILTY CLAYEY SAND SC-SM	111	14	324	31

PROJECT: Daggett Solar Facility Phase 1	<p style="margin: 0;">Terracon 1421 Edinger Ave Ste C Tustin, CA</p>	PROJECT NUMBER: 60175064
SITE: Approximately 10 miles E of Barstow Daggett, California		CLIENT: NRG San Francisco, CA
		EXHIBIT: B-6

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTON - V2 BARSTOW2.GPJ TERRACON_DATATEMPLATE.GDT 8/29/17



PROJECT: Daggett Solar Power Facility Phase 1

SITE: Approximately 10 miles E of Barstow
Daggett, California

Terracon
1421 Edinger Ave Ste C
Tustin, CA

PROJECT NUMBER: 60175064

CLIENT: NRG
San Francisco, CA

EXHIBIT: B-7



PROJECT: NRG: Daggett Solar Power FacilityPhase 1
LOCATION: Barstow, CA
MATERIAL: Composite
SAMPLE SOURCE: B-2, B-3 & B-6

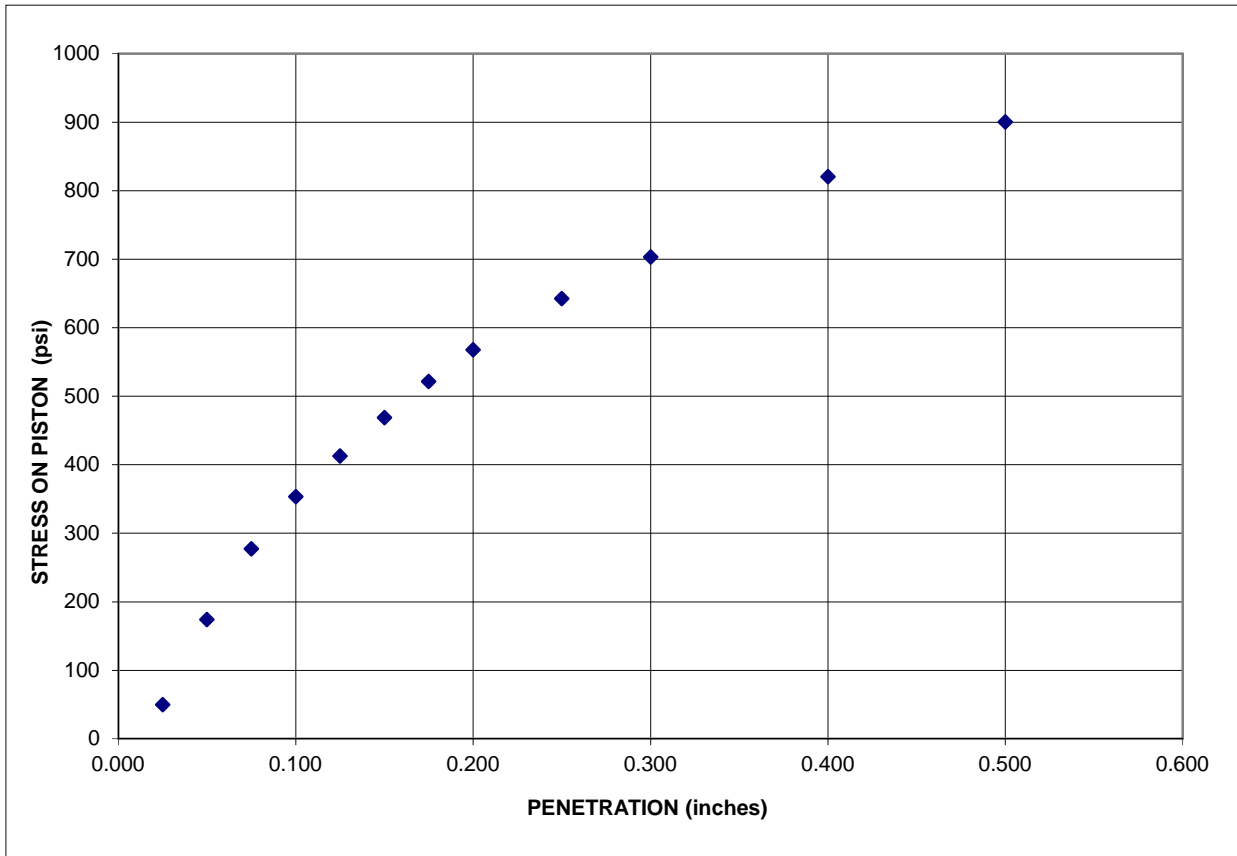
JOB NO: 60175064
WORK ORDER NO:
LAB NO: 9775
DATE SAMPLED: 8/4/17

**CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)**

COMPACTION(%)	95.1	PENETRATION	0.100	0.200
COMPACTION METHOD	D1557 MODIFIED HAMMER	CORRECTION	0.00	0.00
	5 LIFTS @ 35 BLOWS/LIFT	CORRECTED CBR	35.4	37.8
SAMPLE CONDITION	SOAKED			
PERCENT SWELL	0.39%			
% MOISTURE (TOP 1")	10.9%	CBR (SOAKED)	37.8	
SURCHARGE WEIGHT	10 lbs			
% RETAINED 19mm SIEVE	0%			

BEFORE SOAK

DRY DENSITY 122.7 lbs./cu.ft
PERCENT MOISTURE 7.5 %



CHEMICAL LABORATORY TEST REPORT

Project Number: 60175064

Service Date: 07/31/17

Report Date: 08/01/17

Task:

Terracon

750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client**Project**

NRG: Daggett Solar Power Facility Phase I
Barstow, CA

Sample Submitted By: Terracon (60)

Date Received: 7/21/2017

Lab No: 17-0737

Results of Corrosion Analysis

<i>Sample Number</i>			
<i>Sample Location</i>	B-3	B-13	B-19
<i>Sample Depth (ft.)</i>	0	0	0
pH Analysis, AWWA 4500 H	8.69	8.12	7.38
Water Soluble Sulfate (SO ₄), AWWA 4500 E (percent %)	0.01	0.01	0.01
Sulfides, AWWA 4500-S D (mg/kg)	Nil	Nil	Nil
Chlorides, ASTM D 512 (mg/kg)	85	93	155
Red-Ox, AWWA 2580 (mV)	+685	+691	+692
Total Salts, AWWA 2540 (mg/kg)	917	808	1977
Resistivity, ASTM G 57 (ohm-cm)	2183	2571	873

Analyzed By:















Trisha Campo
Chemist

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

APPENDIX C
SUPPORTING DOCUMENTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING	 Auger	 Shelby Tube	 Split Spoon	WATER LEVEL	 Water Initially Encountered	FIELD TESTS
	 Rock Core	 Macro Core	 Modified California Ring Sampler		 Water Level After a Specified Period of Time	
	 Grab Sample	 No Recovery	 Modified Dames & Moore Ring Sampler		 Water Level After a Specified Period of Time	

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS	RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
	Descriptive Term (Density)	Standard Penetration or N-Value Blows/Ft.	Ring Sampler Blows/Ft.	Descriptive Term (Consistency)	Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-Value Blows/Ft.
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

UNIFIED SOIL CLASSIFICATION SYSTEM

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

^A Based on the material passing the 3-inch (75-mm) sieve

^B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

^C Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

^D Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

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

^F If soil contains $\geq 15\%$ sand, add "with sand" to group name.

^G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

^H If fines are organic, add "with organic fines" to group name.

^I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

^J If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

^K If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

^L If soil contains $\geq 30\%$ plus No. 200 predominantly sand, add "sandy" to group name.

^M If soil contains $\geq 30\%$ plus No. 200, predominantly gravel, add "gravelly" to group name.

^N $PI \geq 4$ and plots on or above "A" line.

^O $PI < 4$ or plots below "A" line.

^P PI plots on or above "A" line.

^Q PI plots below "A" line.

