APPENDIX D
GEOTECHNICAL INVESTIGATION

MOORE TWINING ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED GROUND MOUNTED SOLAR ARRAY
COUNTY OF LOS ANGELES HIGH DESERT EXPANSION
45100 60TH STREET WEST
LANCASTER, CALIFORNIA

Project Number: E468R6.01

For:

SunPower Corporation
1414 Harbour Way South, Suite 1901
Richmond, CA 94804

July 9, 2021 (Revised September 17, 2021)

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MOORE TWINING ASSOCIATES, INC.

July 9, 2021 (Revised September 17, 2021) E468R6.01

Mr. Tim Christman
SunPower Corporation
1414 Harbour Way South, Suite 1901
Richmond, CA 94804

Subject: Geotechnical Engineering Investigation
Proposed Ground Mounted Solar Array
County of Los Angeles High Desert Expansion
45100 60th Street West
Lancaster, California

Dear Mr. Christman:

We are pleased to submit this geotechnical engineering investigation report conducted for the proposed ground mounted solar array planned at the County of Los Angeles High Desert Expansion site at 45100 60th Street West in Lancaster, California. The contents of this report include the purpose of the investigation, scope of services, background information, investigative procedures, our findings, conclusions, and recommendations.

We recommend that those portions of the plans and specifications that pertain to earthwork and foundations be reviewed by Moore Twining Associates, Inc. (Moore Twining) to determine if they are consistent with our recommendations. This service is not a part of this current contractual agreement; however, the client should provide these documents for our review prior to their issuance for construction bidding purposes.

We appreciate the opportunity to be of service to Sunpower Corporation. If you have any questions regarding this report, or if we can be of further assistance, please contact us at your convenience.

Sincerely,
MOORE TWINING ASSOCIATES, INC.

DRAFT

Read L. Andersen, RGE
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EXECUTIVE SUMMARY

This report presents the results of a geotechnical engineering investigation for a proposed solar array at the County of Los Angeles High Desert Expansion site at 45100 60th Street West in Lancaster, California.

The subject site consists of an area of vacant land between the existing Mira Loma Detention Center, Los Angeles County Challenger Memorial Camps and the California State Prison, Los Angeles County. An existing ground mounted solar power system is located between the existing Mira Loma Detention Center and Los Angeles County Challenger Memorial Camps. Six (6) new solar arrays were originally planned on the north, west, southwest, and south sides of the existing ground mount solar system; however, a revised site plan sent to our firm on February 17, 2021 indicated that other areas located further southwest and also southeast of the existing ground mount system are also being considered for new solar arrays. The area of the proposed solar arrays being considered for the site are shown on Drawing No. 2 in Appendix A. The size of the entire site, was estimated to be about 89 +/- acres.

The ground surface was generally covered with dried grasses and low lying brush at the time of our investigation. However, some areas included gravel roads, roads covered with asphalt grindings, and some unpaved roads traversing portions of the site. In addition, some stockpiles of asphalt, concrete, mulch, tree trimmings, debris and soils were noted within the site. A group of trash bins were noted adjacent to several stockpiles of soil and debris on the west side of the existing solar array. One soil stockpile of fill was about 160 to 225 feet wide and about 930 feet long and had a maximum height of about 4 to 5 feet. Scattered debris was also noted across the site and included pipes, wood, concrete, brick, asphalt, plastic, a shopping cart, a trailer, and glass bottles.

In general, the subsurface soils encountered in the soil borings drilled for this investigation consisted of lean clays, lean clays with sand and sandy lean clays; while some of the borings encountered discontinuous, interbedded layers of clayey sands, silty sands, sandy silts or silts with sand, fat clays, with interbeds of poorly graded sands, and well graded sands with silt extending to the maximum depth explored, about 16½ feet BSG.

Fill soils were encountered in several of the borings to depths ranging from about 1½ feet BSG to 3½ feet BSG. Borings B-13/B-13A encountered fills extending to about 2 to 2½ feet BSG feet BSG and also to a depth of about 2½ feet BSG in backhoe pit BP-12 (refer to Appendix G for backhoe pit locations and logs) which was excavated about 44 feet west of boring B-13. In addition, borings B-21/B-21A and several of the backhoe pits excavated around B-21/B-21A encountered fills as extending to depths of as much as about 13¾ feet BSG. The fill soils contained a significant amount of debris in borings B-21/B-21A, backhoe pit BP-15 (adjacent to B-21) and backhoe pit BP-12 (excavated about 44 feet west of boring B-13).

It should also be noted that soil samples with varying degrees of cementation were noted in several of the borings at depths ranging from about 2 to 5 feet BSG. Due to the cemented nature of the soils encountered in some of the borings with high standard penetration test resistance N-values, driving small diameter solar post/piles should anticipate increased resistance in some areas. Predrilling may be necessary to install the solar posts.

Historically, the site area where the on-site solar array exists and the surrounding vacant land where the solar array expansion is planned was formerly an airfield (War Eagle Field). The airfield was deactivated on October 1, 1945, and the land was later bought by Los Angeles County. The airfield was converted to a detention facility, and it continues to be used for that purpose. Due to the previous site uses, during installation of the proposed solar array, there is potential to encounter buried obstructions/remnants of the former development. This was evident in eight (8) of the twelve (12) backhoe pits excavated around B-13/B-13A which encountered a 1-inch to 1½-inch thick buried asphalt layer about 8 to 12 inches below the ground surface (refer to Appendix G).

EXECUTIVE SUMMARY (Continued)

As part of the site preparation, undocumented fills extending deeper than 2 feet BSG should be removed and the excavations backfilled with engineered fill. Fill soils extending deeper than 2 feet BSG were encountered around borings B-21/B-21 and the backhoe pits excavated around these borings, as well as backhoe pit BP-12 (refer to the boring logs in Appendix B and the supplemental report in Appendix G for depth of fill encountered). In addition, one soil stockpile of fill was about 160 to 225 feet wide and about 930 feet long and had a maximum height of about 4 to 5 feet in the added scope of work area located in the southeast portion of the site. These fills will be required to be removed. In addition, any unsuitable debris encountered in the fill stockpile should be removed from the site and not mixed with soils to be reused as engineered fill. If improvements are planned in the areas where debris fills were encountered, the debris fill materials encountered in backhoe pits BP-12 and BP-15 (refer to supplemental report in Appendix G) and Borings B-21/21A should be removed and replaced with on-site soils that are free of debris or replaced with a clean import fill meeting the recommendations of Section 8.4. Debris fills may be encountered in other areas of the site that were not explored. If additional debris fills/unsuitable materials are encountered during grading or construction, these materials should also be removed.

Some stockpiles of asphalt, concrete, mulch, tree trimmings, debris and soils were noted within the site. A group of trash bins were noted adjacent to several stockpiles of soil and debris on the west side of the existing solar array. Thus, substantial clearing/removal of debris will be required.

An expansion index (EI) test indicated the near surface soils have a very low to medium expansion potential. Thus, expansive soils are considered to have an impact to the site. As a result, this report recommends that the proposed equipment pads be supported on a minimum of 18 inches of aggregate base over moisture conditioned and compacted subgrade soils prepared as recommended in this report.

At the time of the field investigation (April 12 through 16, 2021), groundwater was not encountered in test borings drilled to the maximum depth of about 16½ feet BSG.

Based on the Flood Insurance Rate Maps distributed by the Federal Emergency Management Agency (Community Panel number 06037C0405F), the northern and southwestern portions of the site are located in Zone X (areas determined to be outside the 0.2 percent annual chance flood plain). However, the southern and southeastern portions of the site are located in Zone X with a dotted pattern (areas of 0.2 percent annual chance flood; areas of 1 percent annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1 percent annual chance flood).

This executive summary should not be used for design or construction and should be reviewed in conjunction with the attached report.

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GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED GROUND MOUNTED SOLAR ARRAY
COUNTY OF LOS ANGELES HIGH DESERT EXPANSION
45100 60TH STREET WEST
LANCASTER, CALIFORNIA

Project Number: E468R6.01

1.0 INTRODUCTION

We are pleased to submit this geotechnical engineering investigation report conducted for the proposed ground mounted solar array planned at the County of Los Angeles High Desert Expansion site at 45100 60th Street West in Lancaster, California. Moore Twining Associates, Inc. (Moore Twining) was authorized to conduct this investigation by Sunpower Corporation.

The contents of this report include the purpose of the investigation and the scope of services provided. The existing site features and anticipated construction are discussed. In addition, a description of the investigative procedures used and the subsequent findings obtained are presented. Finally, the report provides general conclusions and related recommendations. The report appendices contain the drawings (Appendix A); the logs of borings (Appendix B); the results of laboratory tests (Appendix C), the results of the field resistivity testing (Appendix D), Flood Insurance Rate Map Community Panel number 06037C0405F (Appendix E), a Photographic Log (Appendix F), and a Supplemental Backhoe Pit Investigation report (Appendix G).

The Geotechnical Engineering Division of Moore Twining, headquartered in Fresno, California, performed the investigation.

2.0 PURPOSE AND SCOPE OF INVESTIGATION

2.1 Purpose: The purpose of this investigation was to conduct a field exploration and laboratory testing program, evaluate the data collected during the field and laboratory portions of the investigation, and provide the following in accordance with the requirements included in the Scope of Work for Geotechnical Services, identified by Item Number 501850 Rev N:

2.1.1 A description of general subsurface soil conditions encountered;

2.1.2 Foundation design parameters including soil bearing capacity, estimated settlement, and lateral resistance;

2.1.3 A description of the general drainage capacity of the near surface soils;

2.1.4 A description of the geologic setting and a description of potential geologic hazards in accordance with the Sunpower Scope of Work based on literature review: fault surface rupture, liquefaction potential, seismically induced settlement, lateral spreading, other seismic related hazards, slope stability, erosion, flooding, frost heave, and expansive or collapsible soils. The geologic hazards discussed in this report were only intended to satisfy the Sunpower Scope of Work for Geotechnical Services, identified by Item Number 501850 Rev N;

2.1.5 Site preparation and engineered fill recommendations for shallow foundations and equipment pads for the solar power project;

2.1.6 Presentation of seismic coefficients in accordance with the 2019 CBC;

2.1.7 Preliminary evaluation of soil corrosivity and sulfate attack potential;

2.1.8 Recommendations for earth or gravel maintenance roads;

2.1.9 Presentation of laboratory thermal resistivity test results; and

2.1.10 Final test boring logs and laboratory test results.

This report is provided specifically for the proposed improvements described in the Anticipated Construction section of this report. The purpose of our investigation was to provide geotechnical engineering parameters for use in design of foundations, slabs-on-grade and preparation of related construction documents. This investigation did not include in-place density tests, an environmental investigation, corrosion engineering, or an environmental audit.

2.2 Scope: Our proposal, dated August 31, 2020, outlined the scope of our services. The actions undertaken during the investigation are summarized as follows:

2.2.1 The Scope of Work requested by Sunpower, identified by Item Number 501850 Rev N, was reviewed.

2.2.2 The Array Layout plan provided by Sunpower, last revision with added scope areas sent to our firm on February 17, 2021, was reviewed. This plan is referred to, hereinafter, as the Site Plan.

2.2.3 The following previous geotechnical reports were reviewed:

Geotechnical Engineering and Engineering Geologic Evaluation Report, Solar Energy Project, 45100 60th Street West, Lancaster, California," dated February 21, 2011, prepared by Twining Laboratories

Supplemental Geotechnical Investigation, Proposed Solar Power Facilities, High Desert Complex Solar Farm, County of Los Angeles, 45100 N. 60th Street, Lancaster, California," dated October 13, 2011, prepared by Geotechnical Professionals, Inc. (GPI)

A "Response to County Comments on Geotechnical Report, Proposed High Desert Complex Solar Farm, County of Los Angeles, 45100 N. 60th Street, Lancaster, California," dated October 13, 2011, prepared by GPI, was reviewed.

Geotechnical Engineering Investigation, Proposed Buildings and Renovations for Health Care Facility Improvement Program, California Department of Corrections and Rehabilitation, California State Prison, 44750 60th Street West, Lancaster, Los Angeles County, California," dated October 23, 2013, prepared by Moore Twining Associates, Inc.

Geotechnical Engineering and Geologic Hazards Investigation, Proposed Medication Distribution Room Additions to Housing Unit D3 and D4, Health Care Facility Improvement Program, California Department of Corrections and Rehabilitation, California State Prison Los Angeles County, 44750 60th

Street West, Lancaster, Los Angeles County, California," dated July 31, 2019, prepared by Moore Twining Associates, Inc.

2.2.4 A report entitled, "Phase I Environmental Site Assessment-Draft, 5300 W Avenue I, Lancaster, California 93536," prepared by WSP, dated April 30, 2021, provided by Mr. Tim Christman (Sunpower), was reviewed.

2.2.5 Several historical topographic maps were reviewed for the subject site and are discussed in the Site History and Previous Studies section of this report. In addition, Mr. Tim Christman (Sunpower) provided a "High Desert Topographic Survey" for our review, prepared by Vara 3D Geospatial Solutions, dated May 2021.

2.2.6 The Seismic Hazard Zone Report for the Lancaster West 7.5-Minute Quadrangle, Los Angeles County, California, dated 2005, prepared by the California Geological Survey, was reviewed. In addition, the Earthquake Zones of Required Investigation, Lancaster West Quadrangle, dated February 11, 2025, was also reviewed for mapped liquefaction hazard zones.

2.2.7 Boring permit No. SR0242712 was obtained from the Los Angeles County Department of Environmental Health, Drinking Water Program.

2.2.8 A site reconnaissance and subsurface exploration were conducted.

2.2.9 Laboratory tests were conducted to determine selected physical and engineering properties of the subsurface materials encountered.

2.2.10 Mr. Tim Christman (Sunpower Corporation) was consulted during the investigation.

2.2.11 The data obtained from the investigation were evaluated to develop an understanding of the subsurface soil conditions and the engineering properties of the subsurface materials encountered.

2.2.12 This report was prepared.

3.0 BACKGROUND INFORMATION

The site description, si history and previous studies and the anticipated construction are summarized in the following subsections.

3.1 Site Description: The subject site consists of an area of vacant land between the existing Mira Loma Detention Center, Los Angeles County Challenger Memorial Camps and the California State Prison, Los Angeles County. An existing ground mounted solar power system is located between the existing Mira Loma Detention Center and Los Angeles County Challenger Memorial Camps. Six (6) new solar arrays were originally planned on the north, west, southwest, and south sides of the existing ground mount solar system; however, a revised site plan sent to our firm on February 17, 2021 indicated that other areas located further southwest and also southeast of the existing ground mount system are also being considered for new solar arrays. The general site location is identified on Drawing No. 1 in Appendix A. The area of the proposed solar arrays being considered for the site are shown on Drawing No. 2 in Appendix A. The size of the entire site, was estimated to be about 89 +/- acres.

The general site area is bounded to the north by West Avenue I, to the west by the existing Mira Loma Detention Center and 60th Street West beyond, to the south by the California State Prison, Los Angeles County and West Avenue J beyond, and to the east by the Los Angeles County Challenger Memorial Youth Camps and 50th Street West beyond.

The ground surface was generally covered with dried grasses and low lying brush at the time of our investigation. However, some areas included gravel roads, roads covered with asphalt grindings, and some unpaved roads traversing portions of the site. In addition, some stockpiles of asphalt, concrete, mulch, tree trimmings, debris and soils were noted within the site. A group of trash bins were noted adjacent to several stockpiles of soil and debris on the west side of the existing solar array. One soil stockpile of fill was about 160 to 225 feet wide and about 930 feet long and had a maximum height of about 4 to 5 feet. Borings B-25 and B-28 were drilled on top of this stockpile and encountered about 3 to 3½ feet of fill. Scattered debris was also noted across the site and included pipes, wood, concrete, brick, asphalt, plastic, a shopping cart, a trailer, and glass bottles.

Small concrete pads were noted south of the youth center from a previous site use.

A water well was located in a fenced area just outside the northeast corner of the California State Prison, just west of boring B-32, and also in the easternmost portion of the site, just southeast of boring B-25. Remnants of a concrete slab were noted just outside the southwest corner of the Los Angeles County Challenger Memorial Youth Camps and just north of boring B-21.

A drainage swale, about 3 to 4 feet in depth, was noted on the south side of the existing solar array, and portions of this drainage were filled with tree trimmings. Another drainage swale, about 3 to 4 feet in depth, was also noted on the north side of the existing solar array. Underground storm drain pipes appeared to exist to connect the existing drainage swales on site.

A sign indicating, "Leach Field, Pipe Termination," was noted in the southwest portion of the site, between borings B-34 and B-35. Thus, it is possible that a septic system with a leach field exists somewhere in the triangular-shaped area in the southwestern portion of the site.

Several of the features described in this Site Description section are shown on Drawing No. 3 in Appendix A. In addition, a photo appendix depicting some of the existing site conditions is included in Appendix F of this report.

Wood power poles were noted trending in an east to west orientation from the just outside the northeast corner of the California State Prison to the eastern side of the site, near borings B-25, B-28, B-29, and B-32. In addition, wood power poles were located in a north to south orientation (trending between B-22/B-23 and B-28/B-29) from the south side of the Los Angeles County Challenger Memorial Youth Camps to the aforementioned power poles that trend in an east to west orientation.

Underground utility lines such as water, electric, and telecommunications were noted in various portions of the site.

Sunpower provided a "High Desert Topographic Survey", prepared by Vara 3D Geospatial Solutions, dated May 2021. This topographic survey indicates the site ranges in elevation from about 2,340 feet above mean sea level (AMSL) in the eastern portion of the site, just south of the Los Angeles County Challenger Memorial Camps, to about 2,348 feet AMSL in the southwest portion of the site, just north of the California State Prison, Los Angeles County.

It should also be noted that an off-site ponding basin, about 24 feet deep, exists on the east side of the rectangular-shaped added scope area as shown on Drawing No. 2 in Appendix A. Based on our review of the High Desert Topographic Survey, prepared by Vara 3D Geospatial Solutions, dated May 2021, the side slope of the basin appears to have a height of at least about 24 feet and an inclination of about 3 Horizontal to 1 Vertical (3H:1V).

3.2 Site History: The following historical information is based on our review of readily available on-line aerial imagery from between December 1985 and July 2017, and based on our discussions with Mr. Oscar Rodriguez (on-site contact during our field exploration). Based on discussions with Mr. Rodriguez, the vacant land areas where the solar arrays are planned was previously known as War Eagle Field and was used as a training facility during World War II for the Royal Air Force and Canadian Air Force as part of the U.S. Army Air Force West Coast facility. Mr. Rodriguez said the facility was built in 1941 and de-activated in 1945 to 1946. Online research regarding War Eagle Field indicated: "War Eagle Field is a former airfield located in the Mojave Desert, about 5-mile west of Lancaster, California. Polaris Flight Academy, which opened on the field's ground on July 15, 1941, trained cadets for the Royal Air Force and the Royal Canadian Air Force. The airfield had two hard-surface bituminious runways, one of 3,100 feet aligned NE/SW and the other of 2,950 feet aligned E/W. After the Japanese attack of Pearl Harbor, the flight school began training cadets for the United States Army Air Forces on July 28, 1942, being operated by the Polaris Flight Academy as a contract basic flying school (phase 1). In 1944, the flight school changed its name to Mira Loma Flight Activity. The airfield inactivated on October 1, 1945, and was declared surplus in 1946. Responsibility for it was given to the War Assets Administration. The land was bought by Los Angeles County. The airfield was converted to a detention facility, and it continues to be used for that purpose."

Historical Topographic Maps

Historical USGS Topographic maps for the area of the subject site were reviewed for historical development at the site. USGS Topographic Maps for Lake Elizabeth, California, dated 1915 and 1917, both show no development on the site. USGS Topographic Maps for Del Sur, California, dated 1931 and 1936, both show no development on the site but the northern portion of the site is not shown on the topographic map. These 1931 and 1936 topographic maps of the site also show a pond feature; however, it appears the pond feature is in the area east of the site. USGS Topographic Maps for Los Angeles, California, dated 1949, 1955, and 1959 are much broader maps and both show a symbol on the site that is identified as being symbol for "swamp, marsh," and a number (2348) indicates a spot elevation at the site.

USGS Topographic Maps for Lancaster, California, dated 1958, and for Lancaster West, California, dated 1958, both show several of the buildings as existing at the southeast corner of Avenue I and 60th Street West, and a sewage disposal area (outside of the project site to the northeast) is shown on the south side of Avenue I and north of the current day Los Angeles County Challenger Memorial Camps. Some roadways are also shown traversing the site, and a drainage is shown along the western side of the site, trending south along the east side of 60th Street West and then turning east into the area of the current day California State Prison, Los Angeles County.

Historical Aerial Photographs

Based on our review of historical aerial photographs from the Phase I Environmental Site Assessment-Draft, 5300 W Avenue I, Lancaster, California 93536, prepared by WSP, dated April 30, 2021, the 1928 and 1940 historical aerial photographs show the site as vacant land. The 1948 historical aerial photograph shows existing buildings at the southeast corner of West Avenue I and

60th Street West, a sewage disposal area on the south side of West Avenue I, and airplane runways within the War Eagle Field area of the site. The 1953 historical aerial photograph of the site also shows the runways but they are faded. The 1968 historical aerial photograph of the site shows remnants of the old runways; however, graded unpaved roads and drainages appear to have been constructed in the area of the former runways. In addition, more buildings were constructed at the southeast corner of West Avenue I and 60th Street West.

The 1974 historical aerial photograph of the site shows an added parking lot area around one of the new buildings that appeared in the 1968 aerial photograph. The Los Angeles County Challenger Memorial Camps appears as existing in the 1989 historical aerial photograph, and more buildings were added to the development at the southeast corner of West Avenue I and 60th Street West, expanding further to the southeast. The California State Prison, Los Angeles County is shown as existing in the 2002 historical aerial photograph of the site. The 2005 and 2009 historical aerial photographs are similar to the 2002 historical aerial photograph of the site. The existing ground mounted solar array, between the Mira Loma Detention Center and Los Angeles County Challenger Memorial Camps, is shown as existing in the 2012 historical aerial photograph of the site. In addition, drainages appear to have been constructed on the north and south sides of the existing ground mounted solar array. The 2016 historical aerial image of the site is similar to the 2012 image, except asphalt grindings appear to have been placed on some of unpaved roadways on the west and southwest sides of the existing ground mounted solar array.

Recent On-Line Aerial Imagery

Between the April 2015 and October 2016 aerial images of the site, a long and wide soil stockpile was placed in the southeastern portion of the site, between the Los Angeles County Challenger Memorial Camps and the California State Prison, Los Angeles County. This stockpile was observed during our field exploration and is described in the Site Description section of this report. Based on our observations of more recent aerial images of the site and observations during our field exploration, it appears that the site has also been used in recent years for dumping of soil and debris in various areas.

3.3 Previous Studies: A report entitled, "Geotechnical Engineering and Engineering Geologic Evaluation Report, Solar Energy Project, 45100 60th Street West, Lancaster, California," dated February 21, 2011, prepared by Twining Laboratories was reviewed. This report was prepared for the (now existing) solar field project that exists between the Mira Loma Detention Center and the LA County Challenger Memorial Youth Camps. Fourteen (14) borings were drilled to depths ranging from 21 to 51½ feet BSG. The report described fill soils extending to a depth of about 1 foot below site grades (BSG) in five (5) of the borings as consisting of silt soils. The native alluvium below the fill was described as medium dense to very dense, poorly graded sand with varying amounts of clay and silt and medium stiff to hard, silt and lean clay with varying amounts of sand. Groundwater was not encountered in the borings drilled for the solar array. The report cited historic high groundwater being great than 100 feet BSG from the Seismic Hazard Zone Report for the Lancaster West Quadrangle, prepared by the California Geological Survey. The report also noted that Caltrans encountered groundwater at levels of less than 40 feet BSG in nearby areas during the 1960s and 1970s; however, the report noted that recent data shows that water levels have dropped significantly since that time. In regards to liquefaction, the report indicated, "...there are not any zones of potentially liquefiable soil during intense shaking, due to the lack of groundwater present within the upper 50 feet of the site. Furthermore, the relatively high blow counts also negate the potential for liquefaction to occur, were groundwater to be present at the site." Seismic settlement of up to 0.1 inches was estimated in the report. Recommendations were provided for support of the solar field on shallow foundations on the native alluvium materials following clearing and grubbing of the site.

A report entitled, "Supplemental Geotechnical Investigation, Proposed Solar Power Facilities, High Desert Complex Solar Farm, County of Los Angeles, 45100 N. 60th Street, Lancaster, California," dated October 13, 2011, prepared by Geotechnical Professionals, Inc. (GPI), was reviewed. The supplemental investigation included six (6) borings to depths of 15 to 20 feet in the existing solar farm project area. Silty clay fill soils were noted in some of the explorations in the upper foot of the soil profile. The natural soils were described as low-density sandy silts in the upper 3 feet, underlain by stiff to hard sandy silts and medium dense clayey sands extending to depths of 7 to 10 feet. At depths of 7 to 10 feet, the report noted a layer of loose to medium dense sands, gravelly sands, clayey sands and silty sands, and the thickness of this layer ranged from about 3 to 7 feet. A layer of soft to firm clay was noted at a depth of 15 feet near the termination depth of the borings. The natural soils were noted to have moderate strength and moderate compressibility characteristics. Groundwater was not encountered. The report recommended compaction of the upper 1 foot of the existing soil profile and compaction of 1 foot below the bottom of the proposed equipment slasb or other minor structures. The report provided alternative foundation design parameters for support of the solar field on drilled or driven piers. An allowable bearing pressure of 2,000 pounds per square foot was recommended for design of shallow footings for supporting minor structures with a minimum footing depth of 12 inches.

Moore Twining Associates, Inc. previously prepared geotechnical reports for improvements at the adjacent California State Prison, Los Angeles County, located directly south of the subject site. A report entitled, "Geotechnical Engineering Investigation, Proposed Buildings and Renovations for Health Care Facility Improvement Program, California Department of Corrections and Rehabilitation, California State Prison, 44750 60th Street West, Lancaster, Los Angeles County, California," dated October 23, 2013, prepared by Moore Twining Associates, Inc., was reviewed. The investigation included seven (7) borings drilled within or near the footprint of the proposed new building or expansion areas, and proposed parking lot areas, to depths ranging from about 3½ to 51½ feet BSG. The near surface soils encountered generally consisted of lean clays with sand or sandy lean clays extending to depths of about 8½ feet BSG or greater that were underlain by interbedded layers of silty sands, clayey sands, poorly graded sands, poorly graded sands with silt and lean clays with sand and sandy lean clays extending to the maximum depth explored, about 51½ feet BSG. The near surface sandy lean clays were noted to have moderate compressibility characteristics, low to medium expansion potential, moderate shear strength characteristics, and good pavement support characteristics when compacted as engineered fill. Groundwater was not encountered to the maximum depth explored, about 51½ feet BSG. In regards to groundwater, the report noted the following: "Groundwater was not reported by Carlton during their test pit explorations at the site in April 2013 to the maximum depth explored, about 13 feet BSG. In addition, groundwater was not reported by Fugro during their boring explorations at the site in December 2009 to the maximum depth explored, about 56½ feet BSG." Due to the depth of groundwater, the report indicated liquefaction was not a concern."

Moore Twining Associates, Inc. also previously prepared a report for a project at the California State Prison, Los Angeles County located directly south of the subject site, entitled, "Geotechnical Engineering and Geologic Hazards Investigation, Proposed Medication Distribution Room Additions to Housing Unit D3 and D4, Health Care Facility Improvement Program, California Department of Corrections and Rehabilitation, California State Prison Los Angeles County, 44750 60th Street West, Lancaster, Los Angeles County, California," dated July 31, 2019. The investigation included drilling two test borings at the site to depths of about 51½ and 16½ feet BSG. The borings encountered silty sand sands in both borings extending to depths of about 2 feet BSG, underlain by interbedded layers of clayey sands, sandy lean clay, silty sands, sandy silts, and poorly graded sands extending to the maximum depth explored, about 51½ feet BSG. Groundwater was encountered in one of the borings at a depth of about 51 feet BSG. The clay and clayey sand soils tested had high plasticity

characteristics (plasticity index of 22), very low expansion characteristics (expansion index values of 12 and 27), and poor support characteristics for pavements. Site preparation recommendations were included in the report for the proposed building additions.

No previous reports of geotechnical engineering investigations conducted for this site were provided for review during this investigation. If available, these reports should be provided for review and consideration for this project.

3.4 Anticipated Construction: The project is planned to include a ground mounted solar power system including at least six (6) solar array areas combining for about 8 MW (AC) as shown on Drawing No. 2 in Appendix A. Additional arrays may be added in the southwest and southeastn portions of the site. In addition, various access roads, equipment pads, fencing, and below ground utilities are anticipated. The proposed improvements are depicted on the site plan identified as Drawing No. 2 in Appendix A.

It is anticipated that the proposed solar array improvements will be supported on small diameter, driven steel piles or cast-in-drilled-hole pile foundations. Based on our review of the information provided in the Scope of Work prepared by Sunpower Corporation, the vertical and lateral loads on the piles are anticipated to range from approximately 2.3 to 2.8 kips and 1.2 to 2.0 kips at 7 to 8 feet above grade, respectively. Based on the information provided, the allowable differential settlement for the proposed foundations is indicated to be 2 inches over a distance of 25 feet.

At the time this report was prepared, it was our understanding significant grading is not anticipated for the project. However, some of the existing drainage swales may be filled in or modified as part of the project.

4.0 INVESTIGATIVE PROCEDURES

The field exploration and laboratory testing program conducted for this investigation are summarized in the following subsections. The field exploration, number of test borings, sampling, laboratory testing and field resistivity surveys were performed in general accordance with the Scope of Work for Geotechnical Survey Services prepared by Sunpower Corporation identified by Item Number 501850 Rev N.

4.1 Field Exploration: The field exploration included a site reconnaissance, drilling test borings, standard penetration testing, sampling of the underlying soils and field resistivity surveys. At the time of this investigation between April 12 and April 16, 2021, the weather was mostly sunny and windy with a high temperature of about 82 degrees Fahrenheit. Prior to conducting the field exploration, boring permit No. SR0242712 was obtained from the Los Angeles County Department of Environmental Health, Drinking Water Program.

4.1.1 Site Reconnaissance: The site reconnaissance consisted of walking areas of the site and noting visible surface features. The site reconnaissance was conducted by a Moore Twining engineer between April 12 and 16, 2021. The features noted are described in the Background Information section of this report.

4.1.2 Drilling Test Borings: During the geotechnical field exploration between April 12 and 16, 2021, thirty-seven (37) test borings (B-1 through B-35 and B-13A and B-21A) were drilled in the area of the proposed solar array to depths of about 16½ feet below site grade (BSG). Borings B-13A and B-21A were drilled adjacent to borings B-13 and B-21 to depths of about 11½ and 16½ feet BSG, respectively, for additional information regarding the fill soils encountered in borings B-13 and B-21. The number, location, and minimum depths of the test borings were

intended to confirm with the Sunpower SOW. The test borings were drilled using a CME-75 drill rig equipped with 6-⅝ inch outside diameter hollow-stem augers. The borings were drilled under the direction of a Moore Twining engineer.

The approximate test boring locations are shown on Drawing No. 2 in Appendix A. The soils encountered in the test borings were logged during drilling by a representative of Moore Twining. The field soil classification was in accordance with the Unified Soil Classification System and consisted of particle size, color, and other distinguishing features. Soil samples were collected and returned to our laboratory for classification and soil mechanics testing. The presence and elevation of free water, if any, in the test borings were noted and recorded during the drilling.

Test boring locations were determined by using Global Position System (GPS) coordinates. Elevations of the borings were not surveyed as a part of the investigation. The test borings were backfilled with neat cement per the requirements of the Los Angeles County boring permit and the soil cuttings from the borings were spread near each of the borings.

4.1.3 Soil Sampling: Standard penetration tests were conducted, and both disturbed and relatively undisturbed samples were obtained.

The standard penetration resistance, N-value, is defined as the number of blows required to drive a standard split barrel sampler into the soil. The standard split barrel sampler has a 2 inch O.D. and a 1-⅜ inch inside diameter (I.D.). The sampler is driven by a 140 pound weight free falling 30 inches. The sampler is lowered to the bottom of the bore hole and set by driving it an initial 6 inches. It is then driven an additional 12 inches and the number of blows required to advance the sampler the additional 12 inches is recorded as the N-value.

Relatively undisturbed samples for laboratory tests were obtained by driving a California modified split barrel sampler. The soil samples were retained in stainless steel rings, 2.5 inches O.D. and 1 inch in height. The lower 6 inch portion of the samples were placed in close-fitting, plastic, air-tight containers which, in turn, were placed in cushioned boxes for transport to the laboratory.

The soil samples obtained were taken to Moore Twining's laboratory for classification and testing.

4.1.4 Field Resistivity Surveys: In-situ electrical resistivity measurements were conducted at two test locations by Southwest Geophysics, Inc. on April 5, 2021. It should be noted that the southwest corner (triangular-shaped added scope area) was not surveyed due to the presence of electric and water utilities as electric lines can greatly affect the reliability of the data. Due to this condition, additional field resistivity data was obtained within the northeast of the southwestern portion of the site. The results of the tests are presented in Appendix D of this report.

4.2 Laboratory Testing: The laboratory testing was programmed to determine selected physical and engineering properties of various samples that were obtained from the investigation. The tests were conducted on disturbed and relatively undisturbed samples considered representative of the subsurface material encountered.

The results of laboratory tests are summarized in Appendix C. These data, along with the field observations, were used to prepare the final test boring logs in Appendix B.

5.0 FINDINGS AND RESULTS

The findings and results of the field exploration and laboratory testing are summarized in the following subsections.

5.1 General Geologic Conditions: Based on the Geologic Map of the Lancaster Quadrangle, Los Angeles County, California, dated 1960, prepared by the T.W. Dibblee Jr., the surficial deposits at the site are identified as recent (Quaternary-age) alluvium which is described as unconsolidated, undissected fill (gravel, sand and silt) of Antelope Valley. Based on our review of the Seismic Hazard Zone Report for the Lancaster West 7.5-Minute Quadrangle, Los Angeles County, California," dated 2005, prepared by the California Geological Survey, Plate 1.1 maps the site as being covered by late Pleistocene and Holocene age playa deposits.

5.2 Soil Profile: The soil profile descriptions below are divided into different areas of the site. Refer to Drawing No. 2 in Appendix A for the boring locations described below.

North of Existing Solar Array: The subsurface soils encountered in borings B-1 through B-7, drilled on the north side of the existing solar array, generally consisted of sandy lean clay soils extending to the maximum depth explored, about 13 feet BSG, and included some occasional interbedded layers of silty sands, sandy silts, fat clays and poorly graded sands. However, one of these borings (boring B-5) encountered near surface silty sands, extending from the ground surface to a depth of 10 feet, which was underlain by sandy lean clays and fat clays extending to the maximum depth explored, about 13 feet BSG. Two of these borings (borings B-4 and B-6) encountered sandy lean clay fill soils with asphalt debris extending to depths of about 1½ to 2 feet BSG, respectively.

West, Southwest and South of Existing Solar Array: The subsurface soils encountered in borings B-8 through B-20, drilled on the west, southwest and south sides of the existing solar array, generally consisted of lean clays, lean clays with sand and sandy lean clays extending to the maximum depths explored, about 13 to 15 feet BSG (with the exception that B-13A was only drilled to a depth of 11 ½ feet BSG to verify the fill depth encountered in boring B-13). These borings included some interbedded layers of sandy silts, well graded sands with silt, poorly graded sands, silty sands, and clayey sands. Boring B-9 encountered near surface granular soils (silty sands and well graded sands with silt) extending to a depth of 10 feet BSG and were underlain by lean clays extending to the maximum depth explored, about 13 feet BSG. Boring B-20 encountered near surface silt with sand soils extending to a depth of 3½ feet BSG which were underlain by lean clays extending to the maximum depth explored, about 13 feet BSG. Fill soils were encountered in borings B-10, B-13 and B-13A. Boring B-10 encountered lean clay fill soils with asphalt debris extending to a depth of about 2 feet BSG. Borings B-13 and B-13A encountered sandy lean clay fill soils with asphalt debris extending to depths of about 2 to 2½ feet BSG. The fill depths in borings B-13 and B-13A were originally logged to be deeper, but were revised to depths of 2 to 2½ feet BSG based on the findings from the supplemental backhoe pit investigation (refer to Appendix G).

Rectangular-Shaped Area Located Southeast of Existing Solar Array: The subsurface soils encountered in borings B-21 through B-32, drilled in the rectangular-shaped area located southeast of the existing solar array, generally consisted of lean clays, sandy, silty clays and sandy lean clays extending to the maximum depths explored, about 13 to 16½ feet BSG. These borings included some interbedded layers of clayey sands, silty sands, sandy silts, and poorly graded sands with silt. Borings B-21, B-21A, B-22, B-25, B-28 and B-32 all encountered fill soils. Boring B-21 and B-21A (drilled adjacent to B-21 to verify fill soil depth) encountered debris fill material with grout debris and concrete fragments, tire fragments, metal debris. In addition, a seam of silty sand over fabric was noted at the bottom of the fill soils encountered in boring B-21A at a depth of 13¾ feet BSG

(fill/native soil contact). The fill materials encountered in borings B-21 and B-21A were underlain by native sandy lean clay soils extending to the maximum depths explored, about 14½ and 16½ feet BSG, respectively. Refer to the report in Appendix G which includes additional information regarding the debris fill in this area. Fill soils encountered in boring B-22 consisted of sandy lean clays with trace asphalt and grout debris extending to a depth of about 2 feet BSG. Fill soils encountered in borings B-25 and B-28 consisted of silty sands extending to a depth of 3½ feet BSG. Boring B-32 encountered sandy lean clay fill soils with concrete debris as extending to a depth of about 1½ feet BSG.

Triangular-Shaped Area Located Southwest of Existing Solar Array: The subsurface soils encountered in borings B-33, B-34 and B-35, drilled in the triangular-shaped area located southwest of the existing solar array, generally consisted of lean clays, lean clays with sand and fat clays extending to the maximum depth explored, about 13 feet BSG. An interbedded silty sand layer was encountered in one of these borings. Near surface sandy silt soils were encountered in boring B-33 as extending to a depth of about 5 feet which were underlain by lean clays with sand extending to the maximum depth explored, about 13 feet BSG. No fill soils were encountered in borings B-33, B-34 or B-35. However, during the field electrical resistivity surveys, water lines and electric lines were noted in the triangular-shaped area located southwest of the existing solar array. Thus, trench backfill soils for existing underground utilities are anticipated to be present in this area.

It should also be noted that soil samples with varying degrees of cementation were noted in several of the borings at depths generally ranging from about 2 to 5 feet BSG.

5.3 Soil Engineering Properties: The engineering properties of the subsurface soils and encountered during this investigation are summarized below.

Lean Clay and Sandy Lean Clay Fill Soils: The lean clay and sandy lean clay fill soils encountered were described as medium stiff to very stiff, based on Standard Penetration Resistance, N-values, ranging from 4 to 24 blows per foot. The moisture content of a fill sample tested was about 11 percent. One (1) relatively undisturbed sample revealed a dry density of 93.9 pounds per cubic foot.

Silty Sand Fill Soils: The silty sand fill soils encountered were described as loose to medium dense, based on Standard Penetration Resistance, N-values, ranging from 9 to 13 blows per foot.

Native Lean Clays, Sandy Lean Clays, Lean Clays with Sand and Sandy, Silty Clays: The native lean clays, sandy lean clays, lean clays with sand and sandy, silty clays encountered were described as soft to hard, based on Standard Penetration Resistance, N-values, ranging from 3 to greater than 50 blows per foot. The moisture content of the samples tested ranged from about 8 to 30 percent. Below a depth of 10 feet BSG, some of the soft lean clays and sandy lean clays had very high moisture contents (32, 56, and 28 percent) where encountered in borings B-1, B-6 and B-22, respectively. Fourteen (14) relatively undisturbed samples revealed dry densities of 104.9, 107.3, 96.0, 90.7, 94.3, 78.9 (sample disturbed), 94.8, 88.5, 81.8, 115.4, 109.5, 90.6, 88.5 and 106.4 pounds per cubic foot. Five (5) Atterberg Limits tests indicated liquid limits of 47, 37, 42, 26 and 44 with corresponding plasticity indices of 25, 17, 24, 6, and 28, respectively. Direct shear tests conducted on two samples from boring B-3 at 3½ to 5 feet BSG and from boring B-35 from depths of 3½ to 5 feet BSG indicated internal angles of friction of 33 and 37 degrees with corresponding cohesion values of 460 and 260 pounds per square foot, respectively. A consolidation test collected from depths of about 3 to 4½ from boring B-26 indicated about 6.7 percent consolidation under a load of 16 kips per square foot. Upon inundation, the sample exhibited about 0.8 percent swell when wetted under a load of 0.5 kips per square foot. Another consolidation test collected from depths of about

3½ to 5 from boring B-35 indicated about 8.3 percent consolidation under a load of 16 kips per square foot. Upon inundation, the sample exhibited about 0.1 percent collapse when wetted under a load of 0.5 kips per square foot.

Native Fat Clays: The native fat clays that were encountered below a depth of about 10 feet BSG in some of the borings were soft to medium stiff, as determined by a standard penetration resistance, N-value, ranging from 2 to 6 blows per foot. The fat clays had very high moisture contents of about 47, 60 and 51 percent where encountered in borings B-2, B-5 and B-35. Three Atterberg Limits tests conducted on samples collected below a depth of 10 feet BSG indicated liquid limits of 62, 94 and 82 with corresponding plasticity indices of 44, 65 and 60, respectively.

Native Silty Sands: The native silty sands encountered were described as loose to very dense, as determined by a standard penetration resistance, N-value, ranging from 9 to 39 blows per foot, and SPT equivalent N-values (estimated by driving a California Modified split barrel sampler) of greater than 50 blows per foot. The moisture content of one sample tested was about 3 percent. One (1) relatively undisturbed sample revealed a dry density of 127.7 pounds per cubic foot.

Native Clayey Sands: The native clayey sands encountered were described as loose to very dense, as determined by standard penetration resistance, N-values, ranging from 8 to 40 blows per foot, and SPT equivalent N-values (estimated by driving a California Modified split barrel sampler) of up to greater than 50 blows per foot. The moisture content of the samples tested were about 8 to 12 percent; however, one sample had a moisture content of 32 percent. Three (3) relatively undisturbed samples revealed dry densities of 101.7, 100.4 and 78.4 pounds per cubic foot. A direct shear test conducted on a sample collected from depths of about 2 to 3½ feet BSG from boring B-22 indicated an internal angle of friction of 44 degrees with 500 pounds per square foot of cohesion.

Native Sandy Silts and Silts with Sand: The native sandy silts and silts with sand encountered were described as medium stiff to hard, as determined by standard penetration resistance, N-values, ranging from 5 to 23 blows per foot, and SPT equivalent N-values (estimated by driving a California Modified split barrel sampler) ranging from 14 to 34 blows per foot. The moisture content of the samples tested ranged from about 17 to 24 percent. Three (3) relatively undisturbed samples revealed dry densities of 78.9 (sample disturbed), 81.7 and 78.2 (sample disturbed) pounds per cubic foot. Two (2) Atterberg Limits tests conducted on sandy silt samples with clay indicated liquid limit of 47 and 38 and corresponding plasticity indices of 19 and 12, respectively. A consolidation test collected from depths of about 2 to 3½ from boring B-33 indicated about 9 percent consolidation under a load of 8 kips per square foot. Upon inundation, the sample exhibited about 0.6 percent swell when wetted under a load of 0.5 kips per square foot.

Poorly Graded Sands, Poorly Graded Sands with Silt and Well Graded Sands with Silt: The poorly graded sands, poorly graded sands with silt and well graded sands with silt encountered were described as medium dense, as determined by a standard penetration resistance, N-values, ranging from 14 to 28 blows per foot.

Expansion Index Test: An expansion index test conducted on a bulk sample of silty sand with clay collected from depths of 0 to 5 feet BSG from boring B-5 indicated an expansion index value of 9. An expansion index test conducted on a bulk sample of sandy lean clay collected from depths of 0 to 5 feet BSG from boring B-16 indicated an expansion index value of 34. An expansion index test conducted on a bulk sample of sandy lean clay collected from depths of 0 to 5 feet BSG from boring B-23 indicated an expansion index value of 68. An expansion index test conducted on a bulk sample of sandy silt sample with clay collected from depths of 0 to 3½ feet BSG from boring B-33 indicated an expansion index value of 26.

Maximum Density-Optimum Moisture Determination: A maximum density-optimum moisture determination was conducted on a sandy lean clay sample collected at depths of 0 to 3 feet BSG from boring B-4 that indicated a maximum dry density of 102.8 pounds per cubic foot at an optimum moisture content of 18.9 percent.

R-value Tests: The results of R-value tests conducted on lean clay samples indicated R-values of 22 and 24. The result of R-value tests conducted on sandy lean clay samples indicated R-values of 23, 36 and 37. The result of R-value tests conducted on a silty with sand and sandy silt samples indicated R-values of 43 and 68, respectively. The result of an R-value test conducted on a silty sand sample indicated a R-value of 66.

Chemical Analysis: Chemical tests were performed on soil samples collected within the upper 3½ feet to evaluate the corrosion potential. The results of the chemical testing are summarized in Table No. 1 below. The laboratory test sheets are included in Appendix C.

Table No. 1 - Laboratory Corrosion Potential Test Results

Location	Depth (Feet)	pH	Minimum Resistivity (ohm-cm)	Sulfate (Percent by Weight)	Chloride (Percent by Weight)
B-7	0-3	7.9	620	0.29	< 0.00060
B-9	0-3.5	9.1	1,900	0.06	< 0.00060
B-10	0-5	9.2	2,100	0.029	< 0.00060
B-11	0-3.5	9.0	3,300	0.0017	< 0.00060
B-12	0-3	7.7	2,000	0.53	< 0.00060
B-13	0-3.5	7.7	1,700	0.54	< 0.00060
B-14	0-3.5	8.3	2,700	0.0078	0.0013
B-15	0-5	9.3	2,900	0.0022	0.0011
B-16	0-5	9.0	3,400	0.0044	0.0071
B-19	0-5	8.3	2,500	0.02	0.0039
B-24	0-3.5	8.8	440	0.24	0.051
B-26	0-3	9.7	2,300	0.0041	0.0049
B-28	0-3.5	7.9	5,900	0.0011	< 0.00060
B-29	0-3	8.3	2,000	0.031	0.0039
B-32	0-3	8.0	2,000	0.025	0.0043
B-34	0-5	9.0	2,300	0.014	0.00061

ND- Not Detected, Reporting limit of 0.00060 Percent by Weight

Thermal Resistivity Testing: Thermal resistivity tests (ASTM D5334) were conducted on near surface samples collected from six (6) locations. The samples were remolded to a dry density of about 85 percent of the maximum dry density determined in accordance with the Standard Proctor (ASTM D698) at the saturated moisture content, 0 percent moisture, and four (4) intermediate moisture contents in accordance with the Sunpower requirements (Scope of Work for Geotechnical Services). The results of the thermal resistivity tests are provided in Table No. 2 below and in Appendix C.

Table No. 2 - Results of Thermal Resistivity Testing

Location	Depth, Feet BSG	Moisture Content, %	Thermal Resistivity, °C-cm/W
B-2	2-4	0.0	363.6
		5.0	180.2
		11.1	110.9
		17.2	85.2
		23.3	83.6
		30.6	77.9
B-6	2-4	0.0	210.5
		4.9	121.7
		13.0	101.5
		21.1	84.4
		29.1	86.1
		50.9	88.4
B-18	2-4	0.0	436.7
		4.2	270.3
		11.4	174.8
		22.2	111.6
		31.2	100.9
		42.9	95.5

Table No. 2 - Results of Thermal Resistivity Testing (Continued)

Location	Depth, Feet BSG	Moisture Content, %	Thermal Resistivity, °C-cm/W
B-22	2-4	0.0	319.5
		6.8	187.6
		15.3	101.6
		22.0	101.5
		28.8	88.4
		38.3	95.2
B-27	2-4	0.0	250.0
		5.2	147.5
		10.2	127.6
		16.9	113.8
		25.2	84.7
		37.2	92.1
B-31	2-4	0.0	400.0
		5.3	323.6
		12.0	168.9
		24.3	113.6
		35.7	86.1
		47.6	94.5

5.4 Groundwater Conditions: At the time of the field investigation (April 12 through 16, 2021), groundwater was not encountered in the test borings drilled to the maximum depth of about 16½ feet BSG. Groundwater was not encountered in the borings drilled in 2011 for the solar array (now existing) by Twining Laboratories. Groundwater was encountered in one of the borings at a depth of about 51 feet BSG during Moore Twining's 2019 geotechnical investigation for at the at the adjacent California State Prison, Los Angeles County, south of the site. The referenced Phase I ESA report, prepared by WSP, dated April 30, 2021, indicated, "Well completion reports from the subject property indicate the depth of first water at approximately 140 to 190 ft bgs," and noted the source as Well Completion Report Map Application (WCR1989-016849, WCR1988-015173).

Historical groundwater data reviewed from the Department of Water Resources, Water Data Library was reviewed. A well located at the southwest corner of Avenue I and 60th Street West indicates that historical groundwater in site vicinity has ranged from about 126 feet to 147 feet BSG from 1958 to 1962. Another well located at the southwest corner of Avenue I and 60th Street West indicates that the groundwater depth in the site vicinity has ranged from about 83 feet to 170 feet BSG from 1958 to 1962, and another measurement made in 2010 from this well indicated a groundwater measurement of about 148 feet BSG. Another well located at the southeast corner of Avenue I and 60th Street West indicates that groundwater in the site vicinity has ranged from about 98 feet BSG to 102 feet BSG from 1978 to 1985. Based on our review of Plate 1.2 of the Seismic Hazard Zone Report for the Lancaster West 7.5-Minute Quadrangle, Los Angeles County, California," dated 2005, prepared by the California Geological Survey, the historic high groundwater in the vicinity of the site is shown to be greater than 100 feet BSG. Moore Twining drilled a boring to 51½ feet BSG at the Lancaster State Prison bordering the south side of the subject site in July 2019, and groundwater was encountered in this boring at a depth of 51 feet BSG.

It should be recognized, however, that groundwater is dependent upon seasonal precipitation, irrigation, land use, and climatic conditions as well as other factors. In addition, groundwater measurements obtained in the drilled borings do not represent a stabilized water surface elevation. Therefore, observations at the time of the field investigation may vary from those encountered both during the construction phase and the design life of the project. Actual groundwater levels during construction could be higher or lower than indicated in this report. The evaluation of such factors was beyond the scope of this investigation and report.

6.0 GEOLOGIC, FLOOD AND LIQUEFACTION HAZARDS PER SUNPOWER SOW

Geologic, flood and liquefaction hazards are summarized in the following subsections.

6.1 Geologic and Flood Hazards: The project site is not located in an Alquist-Priolo Earthquake Fault Zone or a known local earthquake fault rupture hazard zone. The locations of active faults were evaluated using the Fault Activity Map of California, 2010 (http://maps.conservation.ca.gov/cgs/fam/app/). The map indicates that the nearest active fault with surface rupture is the San Andreas Fault Zone, which is located about 6 miles southwest of the site. Considering the distance to the nearest known active fault, the potential for surface fault rupture at the site due to a known active fault is considered low.

The majority of the site is relatively flat, with the exception of the stockpiles of soil, debris and tree trimmings. There is a ponding basin that is located just outside the project boundary, east of the southeastern portion of the site. The rectangular bounded area in the southeastern portion of the site appears to be at least 15 feet from the existing ponding basin. Due to the flat relief of the site, landslide hazards are not anticipated to be a factor for the project. New foundations should be setback a sufficient distance from the sideslopes of the existing basin in accordance with code requirements.

The soil survey maps, prepared by the United States Department of Agriculture, Natural Resources Conservation Service, indicate "k" factors for erosion can range from 0.02 to 0.69, and soils with higher values indicate the soil is more susceptible to sheet and rill erosion by water. The soil survey maps indicate the site has a "k" factor ranging from 0.28 for the Tray sandy loam to 0.37 for the Pond loam, Pond silty clay loam and Tray loam which are all noted as mapped unit names across the site. The United States Department of Agriculture, indicates in "Revised Universal Soil Loss Equation Version 2 (RUSLE2) Handbook," dated March 2001, the following: "*Medium textured soils, such as the silt loam soils, have moderate K values, about 0.25 to 0.45, because they are moderately susceptible to detachment and they produce moderate runoff. Soils having a high silt content are especially susceptible to erosion and have high K values.*" With the on-site soils having erosion "k" factors of 0.28 and 0.37, these values are considered moderate for the onsite soils beings susceptible to erosion. In addition, it should also be noted that erosion due to winds can occur commonly in the site area.

Expansion index (EI) tests indicated the near surface soils have a very low to medium expansion potential. Thus, expansive soils are considered to have an impact to the site. Recommendations are provided in this report for placement of aggregate base below equipment slabs to reduce the potential for expansive soil movement.

Based on the Flood Insurance Rate Maps distributed by the Federal Emergency Management Agency (Community Panel number 06037C0405F), the northern and southwestern portions of the site are located in Zone X (areas determined to be outside the 0.2 percent annual chance flood plain). However, the southern and southeastern portions of the site are located in Zone X with a dotted pattern (areas of 0.2 percent annual chance flood; areas of 1 percent annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1 percent annual chance flood).

The website for the California Department of Water Resources, Division of Safety of Dams, was reviewed for dam inundation areas. The site is located outside the inundation zone for catastrophic failure of any dams in the vicinity of the site. The nearest lake is Rosamond Lake which is located about 11 miles northeast of the site. Maps showing the areas of potential flooding around this lake indicate an uncertain flow direction. However, given that the subject site is about 60 feet higher in elevation than Rosamond Lake, the chance of flooding of the subject site from high levels of water from the Rosamond Lake is considered low.

6.2 <u>Liquefaction Hazard:</u> A liquefaction hazard zone is mapped as trending in a northeast-southwest orientation within the existing solar farm and within a part of the site (Earthquake Zones of Required Investigation, Lancaster West Quadrangle, dated February 11, 2005, prepared by the California Geological Survey). Section 5.4 of this report summarizes historical groundwater data from water wells and groundwater depth information from prior geotechnical investigations. Based on our review of Plate 1.2 of the Seismic Hazard Zone Report for the Lancaster West 7.5-Minute Quadrangle, Los Angeles County, California," dated 2005, prepared by the California Geological Survey, the historic high groundwater in the vicinity of the site is shown to be greater than 100 feet BSG. Based on the generally clayey nature of the soils encountered in the borings, the lack of settlement sensitive structures planned for the project, our review of historical groundwater data, and our review of the liquefaction analysis conducted for the solar field project (now existing) and for the Lancaster State Prison bordering the south side of the subject site (refer to Section 3.3 of this report), the potential for liquefaction to impact the project is considered to be low.

7.0 CONCLUSIONS

Based on the data collected during the field and laboratory investigation, our geotechnical experience in the vicinity of the project site, and our understanding of the anticipated construction, the following conclusions are presented.

7.1 The site is considered suitable for the proposed construction with regard to support of the proposed foundations, provided the recommendations contained in this report are followed. When the recommendations included in this report are implemented, the proposed grading and solar array will be safe from the potential hazards of landsliding, settlement or slippage. In addition, the proposed grading and solar array construction will not affect the geologic stability of adjacent property. It should be noted that the recommended design consultation and observation of clearing, and earthwork activities by Moore Twining are integral to this conclusion.

7.2 In general, the subsurface soils encountered in the soil borings drilled for this investigation consisted of lean clays, lean clays with sand and sandy lean clays; while some of the borings encountered discontinuous, interbedded layers of clayey sands, silty sands, sandy silts or silts with sand, fat clays, poorly graded sands, and well graded sands with silt extending to the maximum depth explored, about 16½ feet BSG.

Borings B-4 and B-6 encountered sandy lean clay fill soils with asphalt debris extending to depths of about 1½ to 2 feet BSG. Lean clay fill soils with asphalt debris were encountered in borings B-10 to a depth of about 2 feet BSG. Sandy lean clay fill soils with asphalt debris were encountered in borings B-13 and B-13A as extending to depths of about 2 to 2½ feet BSG. Backhoe pit BP-12, excavated about 44 feet west of B-13, encountered about 2½ feet of fill with abundant debris concentrated in the upper 12 inches of fill (refer to Appendix G). Boring B-21 and B-21A (drilled adjacent to B-21 to verify fill soil depth) encountered sandy lean clay, lean clay and clayey sand fill soils with grout debris/concrete fragments, tire fragments, and metal debris. In addition, a seam of silty sand over a filter fabric was noted at the bottom of the fill soils encountered in boring B-21A at a depth of 13¾ feet BSG (fill/native soil contact). Backhoe pit BP-15, excavated about 15 feet west of boring B-21, encountered abundant debris in the fill soils extending to a depth of nearly 14 feet BSG (refer to Appendix G). Fill soils were also encountered in severl of the other backhoe pits excavated around B-21/B-21A (refer to Appendix G). Fill soils encountered in boring B-22 consisted of sandy lean clays with trace asphalt and grout debris extending to a depth of about 2 feet BSG. Fill soils encountered in borings B-25 and B-28 consisted of silty sands extending to a depth of 3½ feet BSG. Although debris was not encountered in the fill soils logged in borings B-25 and B-28, the near surface silty sands from these borings were logged as fill soils due to a soil stockpile that was noted as existing across the area where these borings were drilled. Boring B-32 encountered sandy lean clay fill soils with concrete debris as extending to a depth of about 1½ feet BSG. Underground utilities were marked as traversing different parts of the site. Thus, trench backfill soils for existing underground utilities are also present in the site area.

7.3 It should also be noted that soil samples with varying degrees of cementation were noted in several of the borings at depths ranging from about 2 to 5 feet BSG. However, one boring noted cementation in a sample collected at the ground surface, and two borings noted weak cementation in samples collected at a depth of about 5

feet BSG. Due to the cemented nature of the soils encountered in some of the borings with high standard penetration test resistance N-values, driving small diameter solar post/piles should anticipate increased resistance in some areas. Predrilling may be necessary to install the solar posts.

7.4 Historically, the site area where the on-site solar array exists and the surrounding vacant land where the solar array expansion is planned was formerly an airfield (War Eagle Field). The airfield was deactivated on October 1, 1945, and the land was later bought by Los Angeles County. The airfield was converted to a detention facility, and it continues to be used for that purpose. Due to the previous site uses, during installation of the proposed solar array, there is potential to encounter buried obstructions/remnants of the former development. In addition, undocumented fills were encountered in some of the borings and are anticipated to be encountered in other areas between soil borings. Borings B-21/B-21A encountered debris fill extending to depths of about 13 to 13¾ feet BSG. Refer to the report of supplemental backhoe pit excavations in Appendix G for additional information regarding the fill materials. Fill soils extending to shallower depths were also encountered in several of the other borings. The fill soils commonly contained various debris as indicated on the logs.

7.5 Due to the significant amount of debris (asphalt debris, grout debris/concrete fragments, tire fragments, and metal debris) encountered in fill soils in the area of Boring B-21/21A to a depth of about 13 to 13¾ feet BSG and the backhoe pits excavated in this area (refer to Appendix G), the debris fill materials are not considered suitable for support of the proposed ground mounted solar array foundations or surface equipment pads. Thus, if improvements are planned in this area of the site, it is recommended that all of the debris fills be removed from the area of B-21/B-21A and the excavations then backfilled with suitable engineered fill that is free of debris. The fill materials should meet the recommendations included in this report.

5.2 As indicated in the supplemental report in Appendix G, a buried asphalt layer was encountered in eight (8) of the twelve (12) backhoe pits excavated around borings B-13/B-13A. The buried asphalt layer is expected to result in difficulty installing the solar posts/piles and therefore pre-augering through the pavement should be anticipated for installation of the solar posts. The extent of the former pavement which remains is not known, however, based on the findings of the supplemental investigation and review of aerial photographs, a substantial amount of old pavement appears to be present at the site as noted in the supplemental report of Appendix G.

7.6 Some stockpiles of asphalt, concrete, mulch, tree trimmings, debris and soils were noted within the site. A group of trash bins were noted adjacent to several stockpiles of soil and debris on the west side of the existing solar array. Thus, substantial clearing/removal of debris will be required as part of preparation of the site.

7.7 One stockpile of fill soils was about 160 to 225 feet wide and about 930 feet long and had a maximum height of about 4 to 5 feet in the added scope of work area located in the southeast portion of the site. These fills will be required to be removed as part of the site preparation. In addition, any unsuitable debris encountered in the fill stockpile should be removed from the site and not mixed with soils to be reused as engineered fill.

7.8 An expansion index (EI) test indicated the near surface soils have a very low to medium expansion potential. Thus, expansive soils are considered to have an impact to the site. As a result, this report recommends that the proposed equipment pads be supported on a minimum of 18 inches of aggregate base over moisture conditioned and compacted subgrade soils prepared as recommended in this report.

7.9 The two consolidation tests conducted on sandy, silty clay and lean clay samples indicated the soils tested have high compressibility characteristics. The samples also exhibited free swell (0.8 percent swell) or slight collapse potential (0.1 percent collapse) upon inundation at normal loads of 0.5 kips per foot. The near surface soils are predominantly fine-grained soils and the results of laboratory testing indicates the potential for collapse induced settlement is not significant.

7.10 At the time of the field investigation (April 12 through 16, 2021), groundwater was not encountered in test borings drilled to the maximum depth of about 16½ feet BSG. Historical groundwater data in the vicinity of the site is shown to be greater than 100 feet BSG.

7.11 Based on our review of the 2010 Fault Activity Map of California, the nearest active fault with surface rupture is the San Andreas Fault Zone, which is located about 6 miles southwest of the site. Accordingly, the potential for surface fault rupture at the site is considered low.

7.12 Based on the generally clayey nature of the soils encountered in the borings, the lack of settlement sensitive structures planned for the project, our review of historical groundwater data, and our review of the liquefaction analysis conducted for the solar field project (now existing) and for the Lancaster State Prison bordering the south side of the subject site (refer to Section 3.3 of this report), the potential for liquefaction to impact the project is considered to be low.

7.13 The site is relatively flat with no significant slopes, with the exception of some sloped stockpiles of soil and debris, or stockpiles of mulch or vegetation, or gentle slopes along the sides of some drainage swales that cross the site in various areas. Due to the flat relief of the site, landslide hazards are not anticipated to be a factor for the project.

7.14 Increased excavation resistance should be anticipated for utility trenches (if any) that extend into cemented materials such as those encountered below depths of about 2 feet BSG in some of the soil borings drilled for this investigation. Thus, larger backhoes or excavators may be required for trenching through cemented materials.

7.15 The soil survey maps, prepared by the United States Department of Agriculture, Natural Resources Conservation Service, indicate “k” factors for erosion can range from 0.28 for the Tray sandy loam to 0.37 for the Pond loam, Pond silty clay loam and Tray loam which are all noted as mapped unit names across the site. Soils with higher values indicate the soil is more susceptible to sheet and rill erosion by water. The soil survey maps indicate the site has a “k” factor of 0.28 to 0.37, which indicate a moderate susceptibility to erosion.

7.16 Based on the Flood Insurance Rate Maps distributed by the Federal Emergency Management Agency (Community Panel number 06037C0405F), the northern and southwestern portions of the site are located in Zone X (areas determined to be outside the 0.2 percent annual chance flood plain). However, the southern and southeastern portions of the site are located in Zone X with a dotted pattern (areas of 0.2 percent annual chance flood; areas of 1 percent annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1 percent annual chance flood).

7.17 Based on our review of Cooperative Climatological Data Summaries at NOAA Cooperative Stations from the Western Regional Climate Center (https://wrcc.dri.edu/Climate/west_coop_summaries.php), between 1971 and 2000, the average low temperature in the vicinity of the site is less than 32 degrees Fahrenheit in the months of December and January in the Lancaster area. However, freezing temperatures are indicated to be short term conditions and frost heave is not a concern in this area of California. In addition, the ground mounted solar arrays will be supported on driven steel pile foundations or cast-in-drilled-hole pile foundations that extend deeper than conventional shallow spread foundations; thus, no special recommendations for freezing conditions are considered necessary.

8.0 RECOMMENDATIONS

Based on the evaluation of the field and laboratory data and our geotechnical experience in the vicinity of the project, we present the following recommendations for use in the project design and construction. However, this report should be considered in its entirety. When applying the recommendations for design, the background information, procedures used, findings and conclusions should be considered. The recommended design consultation and construction monitoring by Moore Twining are integral to the proper application of the recommendations.

Where the requirements of a governing agency, utility agency or product manufacturer differ from the recommendations of this report, the more stringent recommendations should be applied to the project.

8.1 General

8.1.1 At the time of preparation of this report, it was anticipated that some grading will be required within the proposed solar array limits to potentially remove areas of deeper fill soils, to construct level pads for equipment slabs, for removal of soil/mulch/debris stockpiles, and for grading of vehicular access paths. When preliminary grading plans are available, this information should be provided to Moore Twining for review. If the grading differs from that which is anticipated, the recommendations contained in this report may need to be revised.

8.1.2 A debris fill (asphalt debris, grout debris/concrete fragments, tire fragments, and metal debris) was encountered in borings B-21/B-21A and various backhoe pits as noted in the report in Appendix G. The debris fills encountered in these borings are unsuitable for support of the proposed ground mounted solar array foundations. Thus, if improvements are planned in areas of the site with debris fill (such as Backhoe Pit BP-12 and BP-15 as

noted in Appendix G), it is recommended that the fill soils and debris around borings B-21/B-21A and backhoe pits BP-12 and BP-15 be completely removed and off-hauled from the site and the excavations backfilled with engineered fill that is free of debris. Refer to the supplemental report in Appendix G for additional information regarding the debris fill materials.

8.1.3 Relatively high standard penetration test, blow counts were indicated in cemented materials encountered at depths of 2 feet BSG or deeper in some of the borings. Due to the presence of cemented, hardpan type materials as well as debris in surficial fill soils, and the presence of a buried pavement layer in areas of the site (refer to Appendix G), contractors should anticipate that predrilling may be necessary to install the solar posts in many areas of the site.

8.1.4 A preconstruction meeting including, as a minimum, Sunpower, the grading and foundation contractors, and Moore Twining, should be scheduled by the general contractor at least one week prior to the start of construction. The purpose of the meeting should be to discuss critical project requirements and the recommendations of this report.

8.1.5 Based on review of the Department of Water Resources, CIMIS (California Irrigation Management Information System) website, the average monthly temperature of soils in the Lancaster area between May 2020 through April 2021 is reported to range between about 43 and 71 degrees Fahrenheit. The average soil temperature during the hottest times of the year (June to September) is reported to be about 67 to 71 degrees Fahrenheit.

The average monthly temperature of soils in the Lancaster area is reported to range between about 46 and 75 degrees Fahrenheit. The average soil temperature during the hottest times of the year (June to September) is reported to be about 69 to 75 degrees Fahrenheit.

Based on the limited data available, ambient soil temperatures at depths of about 3 feet BSG would be anticipated to range from about 45 to 70 degrees Fahrenheit. Furthermore, based on the moisture content of the soils encountered at depths of around 3 feet BSG, during this investigation (generally about 8 to 32 percent), it is anticipated that the moisture content of these soils during the hottest time of the year may generally range from about 5 to 30 percent.

8.1.6 If wet soil or unstable soil conditions are experienced, methods such as aeration, mixing wet soils with drier soils, chemical (i.e., cement) treatment of the soil, or the use of aggregate base and a geotextile stabilization fabric such as Mirafi 600X or equivalent, may be required to achieve a stable condition.

8.1.7 The Contractor should use appropriate grading equipment such as low-pressure equipment, steel tracks, etc. to achieve the required over-excavation, compaction and subgrade stabilization to minimize rutting and subgrade instability.

8.2 Site Grading and Drainage

8.2.1 The on-site clayey soils have relatively high fines contents and are anticipated to have poor drainage capacity (low permeability). It is recommended to develop and maintain site grades which will drain surface runoff away from foundations, both during and after construction. Exterior finished grades should be sloped a minimum of two percent for a distance of at least five feet away from foundations and slabs on grade or as necessary to establish and maintain positive drainage, whichever is more stringent.

8.2.2 Landscaping after construction (if any) should direct rainfall away from foundations and prevent ponding of water and erosion.

8.2.3 It is not recommended to place landscape or planted areas directly adjacent to the improvements. Trees should be setback from the proposed foundations at least 10 feet or a distance equal to the anticipated drip line radius of the mature tree. For example, if a tree has an anticipated drip line diameter of 30 feet, the tree should be at least 15 feet away (radius) from the proposed foundations.

8.3 Site Preparation

8.3.1 Areas of grading and new at grade improvements should be prepared by removal of all vegetation, topsoil, organics, root structures, etc. Several piles of vegetation (tree trimmings) and mulch were noted at the site and will be required to be removed. The general depth of stripping should be sufficiently deep to remove the organic material, root systems and organic top soils (if any). The actual depth of stripping should be reviewed by Moore Twining at the time of grading. All roots larger than ¼ inch in diameter or any accumulation of organic matter that will result in an organic content more than 3 percent by weight should be removed during stripping.

8.3.2 Scattered debris and significant amounts of debris piles were noted at the site and are shown on Drawing No. 3 in Appendix A. Some of the debris were noted within stockpiles of soil. All debris should be removed from the site including from soil stockpiles such that the on-site soils that are reused as engineered fill are free of debris.

8.3.3 Shallow swales existed north and south of the existing solar array at the site. Some portions of the drainages were filled in with tree trimmings. Where the drainages cross through the proposed solar arrays, the tree trimmings and any other debris should be removed from the drainages. Existing drainages that trend across the areas of the proposed foundations for the solar arrays should be backfilled and appropriate drainage systems should be designed to convey runoff around the new improvements. Loose and disturbed soils at the bottom of any drainages should be removed prior to backfilling. The drainages should then be backfilled in thin lifts with moisture conditioned engineered fill in accordance with the recommendations of this report.

8.3.4 Existing storm drain pipes appear to drain runoff to the existing drainage areas. If any storm drain piping crosses below ground where the solar array foundations are planned, the storm drains should be fully removed and not crushed and buried in-place. In addition, all trench backfill and soils disturbed from removal of the storm drain pipes should be removed and placed back as engineered fill.

8.3.5 A sign indicating, "Leach Field, Pipe Termination," was noted in the southwest portion of the site, between borings B-34 and B-35. Thus, it is possible that a septic system with a leach field exists in the southwestern portion of the site. If a septic tank/leach field is still in use and planned to remain, the solar array foundations should be setback from the existing septic tank/leach field to remain in accordance with County requirements. However, if the septic tank/leach field are no longer in use, these improvements should be removed where existing in areas of the proposed solar field. Over-excavation should extend to at least 12 inches below the improvements to be removed, or to the depth necessary to remove all disturbed soils resulting from the removal of the septic tank and leach field.

8.3.6 As part of the site preparation, undocumented fills extending deeper than 2 feet BSG should be removed and the excavations backfilled with engineered fill. Fill soils extending deeper than 2 feet BSG were encountered around borings B-21/B-21 and the backhoe pits excavated around these borings, as well as backhoe pit BP-12 (refer to the boring logs in Appendix B and the supplemental report in Appendix G for depth of fill encountered). In addition, one soil stockpile of fill was about 160 to 225 feet wide and about 930 feet long and had a maximum height of about 4 to 5 feet in the added scope of work area located in the southeast portion of the site. These fills will be required to be removed. In addition, any unsuitable debris encountered in the fill stockpile should be removed from the site and not mixed with soils to be reused as engineered fill. If improvements are planned in the areas where debris fills were encountered, the debris fill materials encountered in backhoe pits BP-12 and BP-15 (refer to supplemental report in Appendix G) and Borings B-21/21A should be removed and replaced with on-site soils that are free of debris or replaced with a clean import fill meeting the recommendations of Section 8.4. Debris fills may be encountered in other areas of the site that were not explored. If additional debris fills/unsuitable materials are encountered during grading or construction, these materials should also be removed.

Areas of undocumented fill should be excavated to expose undisturbed native soils as verified by observation by Moore Twining. Once verification of adequate removal of the fill materials is completed, the bottom of the excavation should be scarified to a depth of 8 inches, moisture conditioned and compacted as engineered fill. The excavation should then be backfilled as engineered fill.

8.3.7 The backfilled soils in the areas of the backhoe pits from Moore Twining's supplemental investigation should also be removed and placed back as engineered fill (refer to the drawings in the supplemental geotechnical engineering investigation (backhoe pit investigation) in Appendix G for the locations of the backhoe pits). The backhoe pit locations were also staked in the field after backfilling them.

8.3.8 Following stripping and removal of existing surface and subsurface improvements, areas to receive fill should be scarified to a depth of 8 inches, moisture conditioned and compacted as engineered fill prior to placement of fill soils.

8.3.9 In the event that the solar array improvements are to be supported on shallow spread foundations, after stripping and removal of existing surface and subsurface improvements, the new foundation areas should be prepared by removal of all fill soils, followed by scarification to a depth of 8 inches, followed by moisture-conditioning to between one (1) and four (4) percent above the optimum moisture content, and compacted to a dry density of at least 90 percent of the maximum dry density as determined by ASTM Test Method D1557. Where undocumented fills are removed, the horizontal limits of over-excavation should extend at least 5 feet horizontally beyond the edges of the new foundations, or by a horizontal distance equal to the depth of fill, whichever is greater.

8.3.10 After stripping and removal of existing surface and subsurface improvements, areas of concrete slabs on grade for equipment pads should be over-excavated to a depth of at least 12 inches below preconstruction site grade, to the depth required to remove artificial fill and disturbed soils, and to a minimum of 12 inches below the bottom of the aggregate base layer recommended below the slabs, whichever is greater. The horizontal limits of over-excavation should extend a minimum of 3 feet horizontally beyond the limits of the slabs, or a horizontal distance equal to the depth of fill removal, whichever is greater. The bottom of the excavation should be scarified to a depth of 8 inches, moisture-conditioned to between one (1) and four (4) percent above the optimum moisture content, and compacted to a dry density of at least 90 percent of the maximum dry density as determined by ASTM Test Method D1557. Concrete slabs on grade for equipment pads should be underlain by at least 18 inches of Class 2 aggregate base. For precast concrete slabs on grade without thickened edges, the aggregate base layer should extend to a minimum of 2 feet beyond the edges of the slab.

8.3.11 After stripping and removal of existing surface and subsurface improvements, areas of dirt access aisles and gravel access roads should be scarified to a minimum of 12 inches below the resulting ground surface or finished subgrade (whichever is deeper), followed by moisture conditioning and compaction to a minimum of 95 percent relative compaction (ASTM D1557). The horizontal limits of scarification should extend a minimum of 3 feet horizontally beyond the edges of the access roads. It is recommended the subgrade soils and the surface of the roads within 3 feet of the access roads be sloped at least 2 percent to prevent water from ponding on or near the roads. A gravel/base cover would be required for all weather access.

8.3.12 All fill required to bring the site to final grade should be placed as engineered fill on relatively level (not sloping) surfaces. In addition, all native soils over-excavated should be compacted as engineered fill.

8.4 Engineered Fill

8.4.1 The near surface soils encountered are generally lean clays, lean clays with sand and sandy lean clays. However, some areas encountered near surface silty sands, sandy silts or silts with sand in six (6) of the borings. The on-site soils with an expansion index of less than 75 will be suitable for use as engineered fill material below the recommended aggregate base materials, provided they are free of organics, particles 6 inches in dimension and larger are removed, and the soils are free of debris and root systems. The upper 18 inches below the bottom of the slabs-on-grade for the equipment pads should consist of Class 2 aggregate base. If soils other than those considered in this report are encountered, Moore Twining should be notified to provide alternate recommendations.

8.4.2 Import fill soil should be free of recycled materials, non-expansive and granular in nature with the following acceptance criteria recommended.

Percent Passing 3-Inch Sieve	100
Percent Passing No. 4 Sieve	75 - 100
Percent Passing No. 200 Sieve	15 - 40
Expansion Index (ASTM D4829)	Less than 20
Organics	Less than 3 percent by weight
Sulfates	< 0.05 percent by weight
Min. Resistivity	>5,000 ohm-cm

Prior to importing fill, the Contractor shall submit test data that demonstrates that the proposed import complies with the recommended criteria for both geotechnical and environmental compliance. Also, prior to being transported to the site, the import material shall be certified by the Contractor and the supplier (to the satisfaction of Sunpower and/or the property owner as applicable) that the soils do not contain any environmental contaminates regulated by local, state or federal agencies having jurisdiction. Contractors should provide a minimum of 7 working days to complete the geotechnical testing.

8.4.3 On-site silt and clayey soils placed as engineered fill should be placed in loose lifts approximately 8 inches thick or less, moisture-conditioned to one (1) to four (4) percent above optimum moisture content, and compacted to a dry density of at least 90 percent of the maximum dry density as determined by ASTM Test Method D1557. The upper 12 inches of subgrade soils in proposed vehicle access aisles and gravel access roads and fills placed deeper than 10 feet BSG should be compacted to a dry density of at least 95 percent of the maximum dry density as determined by ASTM Test Method D1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

8.4.4 On-site granular soils and imported soils placed as engineered fill should be placed in loose lifts approximately 8 inches thick or less, moisture-conditioned to optimum and three (3) percent above optimum moisture content, and compacted to a dry density of at least 92 percent of the maximum dry density as determined by ASTM Test Method D1557. The upper 12 inches of subgrade soils in proposed vehicle access aisles and gravel access roads and fills placed deeper than 10 feet BSG should be compacted to a dry density of at least 95 percent of the maximum dry density as determined by ASTM Test Method D1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

8.4.5 Utility trench backfill should be placed in 8 inch lifts or less, moisture conditioned and compacted as engineered fill per the recommendations of sections 8.4.3 and 8.4.4. The upper 12 inches of subgrade soils in proposed vehicle access aisles and gravel access roads should be compacted to a dry density of at least 95 percent of the maximum dry density as determined by ASTM Test Method D1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable.

8.4.6 Aggregate base shall comply with State of California Department of Transportation requirements for Caltrans Class 2 aggregate base. Documentation that the aggregate base to be used for the project meets the Class 2 material requirements (R-value, gradation, sand equivalent, durability, etc.) should be provided to Sunpower. All aggregate base should be compacted to a minimum of 95 percent relative compaction.

8.4.7 Open graded gravel and rock material such as ¾-inch crushed rock or ½-inch crushed rock is not recommended for trench backfill. In the event gravel or rock is required by a regulatory agency for use as backfill, all open graded materials shall be fully encased in a geotextile filter fabric, such as Mirafi 140N, to reduce the potential for migration of fine grained soils into the porous material. Open graded gravel should be placed in thin (less than 8 inch) lifts and densified with vibratory equipment using a minimum of three (3) passes.

8.5 Slabs-on-Grade for Equipment Pads

8.5.1 The proposed equipment pads should be supported on a minimum of 18 inches of aggregate base over moisture conditioned and compacted subgrade soils prepared as recommended in the "Site Preparation" section of this report.

8.5.2 An allowable soil bearing pressure of 1,500 pounds per square foot may be used for design of equipment pads prepared as recommended in this report. A structural engineer experienced in foundation design should recommend the thickness, design details and concrete specifications for the proposed equipment slabs based on a total static settlement and heave of 1 inch and a differential static settlement and heave of ½ inch across the slab on grade, or over a distance of 30 feet, whichever is the shortest distance.

8.5.3 Cast in place equipment slabs-on-grade should be designed with thickened edges which extend to at least to the bottom of the aggregate base layer or as required by the slab designer, whichever is greater.

8.5.4 The subgrade soils should be verified to be consistent with the soils generally encountered during the field investigation. The moisture content of the prepared clayey subgrade soils should be verified to be at least one (1) percent above optimum moisture content prior to placing the aggregate base, and also within 48 hours of placement of the slab-on-grade. If necessary to achieve the recommended moisture content, the subgrade soils could be over-excavated, moisture conditioned as necessary and compacted as engineered fill.

8.5.5 An allowable passive resistance of the compacted native soils may be assumed to be equal to the pressure developed by a fluid with a density of 300 pounds per cubic foot, with a one-third increase for wind or seismic loading. The upper 12 inches of subgrade soils should be neglected in design for equipment pad areas. The bottom surface area of concrete slabs in direct contact with aggregate base can be used to resist lateral loads using an allowable coefficient of friction of 0.40.

8.6 Solar Arrays Supported on Shallow Spread Foundations

The following recommendations are intended for new solar array foundations in the event they are supported on shallow spread foundations. Recommendations are provided later sections of this report for driven solar post/pile foundations and cast-in-drilled-hole foundations for support of the solar array improvements.

8.6.1 An allowable average soil bearing pressure of 2,000 pounds per square foot may used for the proposed array foundations in the event they are supported on shallow spread foundations. This value may be increased by ⅓ for short duration loading. The subgrade soils should be prepared in accordance with the recommendations included in Section 8.3 of this report. A structural engineer experienced in foundation design should recommend the thickness, design details and concrete specifications for the shallow foundations based on a total static settlement and heave of 1 inch, and a differential static settlement of ½ inch between the foundations.

8.6.2 The shallow foundations should extend to at least 12 inches below the lowest adjacent site grade. In addition, foundations in close proximity to the ponding basin, located east of the added scope of work area in the southeast portion of the site, should be setback at least 20 feet from the top of the ponding basin slope. If any existing drainages are to remain where the solar array improvements are planned, the foundations should be setback at least 20 feet from the top of the slope for the drainage. If the drainages are to be backfilled, site preparation recommendation section 8.3.3 should be followed.

8.6.3 The bottom surface area of concrete footings in direct contact with native soils or engineered fill can be used to resist lateral loads. An allowable coefficient of friction of 0.35, can be used for design.

8.6.4 The following seismic factors were developed using online data obtained from the Ground Motion Parameter Calculator provided by the Structural Engineers Association of California website (https://seismicmaps.org/) based upon a latitude of 36.698898 degrees, a longitude of -118.228960 degrees and a Site Class D. The data provided in Table No. 3 are based upon the procedures of Sections 1613.2.1 through 1613.2.4 of the 2019 California Building Code and were not determined based upon a ground motion hazard analysis. The structural engineer should review the values in Table No. 3 and determine whether a ground motion hazard analysis is required for the project considering the seismic design category, structural details, and requirements of ASCE 7-16 (Section 11.4.8 and other applicable sections). If required, Moore Twining should be notified and requested to conduct the additional analysis, develop updated seismic factors for the project, and update the following values.

Table No. 3

Seismic Factor	CBC Value
Site Class	D
Maximum Considered Earthquake (geometric mean) peak ground acceleration adjusted for site effects (PGA_M)	0.709
Mapped Maximum Considered Earthquake (geometric mean) peak ground acceleration (PGA)	0.645
Spectral Response At Short Period (0.2 Second), S_S	1.5
Spectral Response At 1-Second Period, S_1	0.601
Site Coefficient (based on Spectral Response At Short Period), F_a	1.0
Site Coefficient (based on spectral response at 1-second period), F_V	See Note
Maximum considered earthquake spectral response acceleration for short period, S_{MS}	1.5
Maximum considered earthquake spectral response acceleration at 1 second, S_{M1}	See Note

Seismic Factor	CBC Value
Five percent damped design spectral response accelerations for short period, S_{DS}	1.0
Five percent damped design spectral response accelerations at 1-second period, S_{D1}	See Note

Note: Requires ground motion hazard analysis per ASCE Section 21.2 (ASCE 7-16, Section 11.4.8), unless an Exception of Section 11.4.8 of ASCE 7-16 is applicable for the project design.

8.6.5 The active pressure of the compacted engineered fill soils in a "drained" condition may be assumed to be equal to the pressures developed by a fluid with a density of 40 pounds per cubic foot. The allowable passive resistance of the compacted native soils may be assumed to be equal to the pressure developed by a fluid with a density of 300 pounds per cubic foot, with a one-third increase for wind or seismic loading. The upper 12 inches of subgrade soils should be neglected in design.

8.7 General Recommendations for Solar Arrays Supported on Driven Steel Pile Foundations or Cast-in-Drilled-Hole Foundations

As noted in this report, shallow, very dense and cemented soils were encountered in some of the borings. In addition, surface fill soils with debris are present. These conditions may impact driving piles for support of the solar array improvements. The following recommendations were prepared for solar arrays supported on driven piles. As an alternative to driven piles, cast-in-drilled hole foundations could also be considered to reduce the issues associated with driving light solar piles. Recommendations for installation of driven solar posts are included in Section 8.8 of this report and recommendations for construction of cast-in-drilled-hole foundations are included in Section 8.9 of this report.

8.7.1 A California registered civil or structural engineer should prepare structural details for the solar array pile foundations to resist shear, moment, and axial (tension and compression) loads. The design engineer should specify the thickness, design details and specifications for the foundations based on a total static settlement of 1 inch and a differential static settlement of ½ inch between foundations.

8.7.2 Foundations in close proximity to the ponding basin, located east of the added scope of work area in the southeast portion of the site, should be setback at least 20 feet from the top of the ponding basin slope. If any existing drainages are to remain where the solar array improvements are planned, the foundations should be setback at least 20 feet from the top of the slope for the drainage. If the drainages are to be backfilled, site preparation recommendation section 8.3.3 should be followed.

8.7.3 The skin friction in the upper portion of the piles, to a depth of ½ foot, should be neglected for design. This assumes that the site preparation recommendations of section 8.3.6 are followed prior to installation of the solar posts. The allowable downward capacities of the piles embedded a

minimum of 6 feet BSG, may be estimated based on an allowable skin friction value of 275 pounds per square foot. The skin friction values may be increased ⅓ for short duration wind loading.

8.7.4 The allowable uplift resistance of the pile foundations may be assumed to be ½ the allowable vertical skin friction.

8.7.5 Piles should be placed no closer to each other than three pile diameters, center-to-center. For alternate spacing, the capacity of piles in groups should be reduced using appropriate group reduction formulas.

8.7.6 The passive resistance in the upper portion of the piles, to a depth of ½ foot, should be neglected for design. The allowable passive resistance of the soils below a depth of ½ foot BSG may be assumed to be equal to the pressure developed by a fluid with a density of 300 pounds per cubic foot. These values may be increased by one-third for short duration wind or seismic loads. No other increases should be applied to the allowable passive pressure. The passive pressure for pile foundations spaced at least three (3) pile diameters may be applied over a width equal to 2 pile diameters.

8.7.7 Piles should be placed no closer than three pile diameters, center-to-center. For alternate spacing, the capacity of piles in groups should be reduced using appropriate group reduction formulas.

8.7.8 Based on the soils encountered during our field investigation, the following soil parameters for pile foundations have been prepared for lateral analysis using the software program LPILE by Ensoft, Inc.:

Table No. 4

Soil Consistency	Depth BSG (feet)	Unit Weight (pcf)	Internal Angle of Friction (degrees)	Undrained Shear Strength (psf)	Soil Modulus K (pci)	Strain (E_{50})
Soft to Very Stiff Clays	0.5'-3.5'	100	N/A	250	30	0.02
Stiff to Hard Clays	3.5-5'	105	N/A	1,000	500	0.005
Stiff to Very Stiff Clays	5-8.5'	100	N/A	1,000	500	0.005
Soft to Stiff Clays and Medium Dense Sands	8.5-13'	100	N/A	250	30	0.02

Notes:
The upper 6 inches should be neglected in determining the lateral resistance
The above parameters do not apply to undocumented fill soils
NA - Not Applicable
pcf= pounds per cubic foot
psf= pounds per square foot
pci= pounds per cubic inch

8.8 Driven Pile Foundation Construction

8.8.1 Driven pile foundations should be installed in accordance with the requirements of this report, and the project plans and specifications, whichever is the most stringent.

8.8.2 Piles should be installed so that the axial alignment meets the minimum requirements specified by the tracker/panel manufacturer or project structural engineer, whichever is more stringent.

8.8.3 Due to the presence of cemented soils and fill with debris that were encountered in some of the borings, pre-augering should be anticipated for pile installation to maintain plumbness and reduce pile damage. In addition, the buried asphalt concrete pavement layer identified in the supplemental backhoe pit investigation (see Appendix G) is anticipated to require pre-augering, or excavation and removal prior to installation of the solar posts. Where pre-augering is conducted, pre-augering shall be limited to a maximum diameter equal to 90 percent of the least pile dimension. Jetting should not be permitted.

8.8.4 Piles that are bent or damaged during installation should not be relied upon for load support unless load testing is conducted to evaluate the load carrying capacity. If damage or inadequate capacity is indicated, corrective measures should be taken as determined by the structural engineer.

8.8.5 All piles should be driven continuously to their design tip elevation using appropriate equipment as determined by the contractor. The equipment should be selected considering the rigidity and size of the pile in order to achieve the required pile embedment and load capacities such that the risk of damage from driving stress is limited. Final pile installation methods and equipment should be determined by the foundation contractor as necessary to meet the requirements of this report and the project plans and specifications. The Contractor should be responsible for repair of all damage to the piles.

8.9 Cast-In-Drilled-Hole Pile Construction

8.9.1 It is assumed the structural engineer will prepare a specification for the construction of the deep foundations as part of the construction documents. The specifications should be consistent with the recommendations included in this report.

8.9.2 Based on the presence of cemented, hardpan materials and fill soils with debris as noted in some of the borings, the Contractor should anticipate increased drilling resistance in these materials.

8.9.3 Concrete should be placed in the drilled shaft as soon as possible following drilling.

8.9.4 Soils which are highly susceptible to caving were generally not encountered within the near surface soils. However, in the event of caving, the drilled holes should be stabilized by a method acceptable to the geotechnical engineer.

8.9.5 Drilled holes for pile foundations should be drilled within 2 degrees of vertical. The rebar cage should be suspended within 2 degrees of vertical in the center of the excavation. This condition should be verified and documented during construction. Minimum concrete cover, as specified by the project design engineer, should be maintained throughout the length of the excavation.

8.9.6 Free groundwater at the site is much deeper than expected foundation excavations. However, freewater seepage can occur due to perched water conditions directly above the hardpan materials. In the event freewater seepage is encountered during excavation, the water should either be pumped from the drilled holes or concrete should be placed from the bottom of the excavation by extending a tremie pipe or pump pipe to the bottom of the excavation and maintaining the outlet of the pipe below the wet concrete to prevent entrapment of freewater or slurry in the concrete. The concrete should be placed in a continuous manner to provide a seamless deep foundation element.

8.9.7 Moore Twining should inspect the drilling of the shafts to verify that the materials encountered are consistent with those evaluated during our geotechnical engineering investigation. This inspection should be conducted during drilling and prior to placement of reinforcing steel and concrete.

8.9.8 Loose soils should be removed from the drilled shaft excavation prior to placement of reinforcing steel and concrete.

8.10 Dirt or Gravel Paths of Access

8.10.1 If it is desired to provide an "all-weather" surface, asphalt concrete, crushed gravel or aggregate base should be provided and maintained as a temporary all weather surface for access roads. Unimproved, compacted dirt roads may not be accessible to rubber tired vehicles when wet. General recommendations are provided below for unimproved dirt access aisles, light duty gravel roads and heavy duty gravel roads.

8.10.2 The proposed dirt access aisles and gravel access roads should be prepared as recommended in the Site Preparation recommendations of this report. The upper 12 inches of subgrade soils should be compacted to a minimum of 95 percent relative compaction. The Contractor should proof roll the compacted subgrade of the areas to receive pavements prior to placement and compaction of the aggregate base (AB). All unstable areas should be removed, stabilized, and replaced with engineered fill under the observation of Moore Twining. The subgrade soils and the surface of the gravel roads should be crowned at the center of the roadway.

8.10.3 **Light Duty Gravel Section:** Based on our experience with other projects, light duty sections with primarily light pickup truck traffic were evaluated considering a minimum 8 inch crushed gravel or compacted (95 percent relative compaction) aggregate base section over subgrade soils prepared as recommended in this report. Based on a the light pickup truck loading, light duty gravel access roads would be expected to experience some rutting and potholing type effects over time due to compaction of the surface layer and compression of the subgrade soils. Based on our experience with similar improvements, regular maintenance such as regrading and placement of additional rock would be anticipated for the gravel access to remain serviceable. If a specific design truck loading and frequency are known for the gravel access roads, this information should be provided for Moore Twining to prepare specific recommendations.

8.10.4 **Heavy Duty Gravel Section:** Based on our experience with other projects, heavy duty access sections were evaluated considering a minimum 12 inch crushed rock or compacted (95 percent relative compaction) aggregate base section over subgrade soils prepared as recommended in this report and infrequent semi-tractor trailer loading. Gravel access roads would be expected to experience rutting and potholing type effects over time due to compaction of the surface layer and compression of the subgrade soils. Based on our experience with gravel road sections, regular maintenance such as regrading and placement of additional rock would be anticipated for the gravel access to remain serviceable. If a specific design truck loading and frequency are known for the gravel access roads, this information should be provided for Moore Twining to prepare specific recommendations.

8.10.5 The capacity of gravel pavement sections which are exposed to the elements, including surface water infiltration, runoff, sedimentation, etc. will be reduced due to infiltration of water and fines into the gravel section and reduction of subgrade strength. These factors should be anticipated to require regular maintenance of the road surface to maintain serviceability. Maintenance may include, but would not be limited to, removal of accumulated sediment/fines, regrading and compacting the surface of the gravel roads and application of additional gravel to the surface.

8.11 Temporary Excavations

8.11.1 It is the responsibility of the contractor to provide safe working conditions with respect to excavation stability. The contractor is responsible for site slope safety, classification of materials for excavation purposes, and maintaining slopes in a safe manner during construction. The grades, classification and height recommendations presented for temporary slopes are for consideration in preparing budget estimates and evaluating construction procedures.

8.11.2 In no case should excavations extend below a 2H to 1V zone below existing foundations or underground utilities. Excavations which are required to be advanced below the 2H to 1V envelope from existing improvements should be shored to support the foundations. Underground utilities should not be located within a 2H:1V plane from the bottom of adjacent foundations.

8.11.3 Temporary excavations should be constructed in accordance with CAL OSHA requirements.

8.12 Corrosion Protection

8.12.1 The soil corrosion test results included in Table No. 1 should be considered by the appropriate consultant and/or manufacturer to assess whether protective measures are required for improvements in contact with the soils.

8.12.2 These soil corrosion data should be provided to the manufacturers or suppliers of materials that will be in contact with soils (pipes or ferrous metal objects, etc.) to provide assistance in selecting the protection and materials for the proposed products or materials. If the manufacturers or suppliers cannot determine if materials are compatible with the soil corrosion conditions, a professional consultant, i.e., a corrosion consultant, with experience in corrosion protection should be consulted to design parameters. Moore Twining is not a corrosion engineer; thus, cannot provide recommendations for mitigation of corrosive soil conditions.

9.0 DESIGN CONSULTATION

9.1 Moore Twining should be retained to review those portions of the contract drawings and specifications that pertain to earthwork and foundations prior to finalization to determine whether they are consistent with our recommendations. This service is not part of this current contractual agreement.

9.2 If Moore Twining is not retained for review, we assume no liability for the misinterpretation of our conclusions and recommendations. This review is documented by a formal plan/specification review report provided by Moore Twining.

10.0 CONSTRUCTION MONITORING

10.1 It is recommended that Moore Twining be retained to observe the excavation, earthwork, and foundation phases of work to determine that the subsurface conditions are compatible with those used in the analysis and design. This service is not, however, part of this current contractual agreement.

11.0 NOTIFICATION AND LIMITATIONS

11.1 The conclusions and recommendations presented in this report are based on the information provided regarding the proposed construction, and the results of the field and laboratory investigation, combined with interpolation of the subsurface conditions.

11.2 If variations or undesirable conditions are encountered during construction, Moore Twining should be notified promptly so that these conditions can be reviewed and our recommendations reconsidered where necessary. It should be noted that unexpected conditions frequently require additional expenditures for proper construction of the project.

11.3 If the proposed construction is relocated or redesigned, or if there is a substantial lapse of time between the submission of our report and the start of work (more than 12 months) at the site, or if conditions have changed due to natural cause or construction operations at or adjacent to the site, the conclusions and recommendations contained in this report should be considered invalid unless the changes are reviewed and our conclusions and recommendations modified or approved in writing.

11.4 Recommendations for corrosion protection of metal and concrete improvements in direct contact with on-site soils were not included in this report.

11.5 Changed site conditions, or relocation of proposed structure(s), may require additional field and laboratory investigations to determine if our conclusions and recommendations are applicable considering the changed conditions or time lapse.

11.6 The conclusions and recommendations contained in this report are valid only for the project discussed in the Anticipated Construction section of this report. The use of the information and recommendations contained in this report for structure on this site not discussed herein is not recommended. The entity or entities that use or cause to use this report or any portion thereof for another structure or site not covered by this report shall hold Moore Twining, its officers and employees harmless from any and all claims and provide Moore Twining's defense in the event of a claim.

11.7 This report is issued with the understanding that it is the responsibility of the client to transmit the information and recommendations of this report to developers, owners, buyers, architects, engineers, designers, contractors, subcontractors, and other parties having interest in the project so that the steps necessary to carry out these recommendations in the design, construction and maintenance of the project are taken by the appropriate party.

11.8 Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally-accepted engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied.

11.9 Reliance on this report by a third party (i.e., that is not a party to our written agreement) is at the party's sole risk. If the project and/or site are purchased by another party, the purchaser must obtain written authorization and sign an agreement with Moore Twining in order to rely upon the information provided in this report for design or construction of the project.

12.0 CLOSING

We appreciate the opportunity to be of service to Sunpower Corporation. If you have any questions regarding this report, or if we can be of further assistance, please contact us at your convenience.

Sincerely,

MOORE TWINING ASSOCIATES, INC.
Geotechnical Engineering Division

DRAFT

Allen H. Harker, PG
Professional Geologist

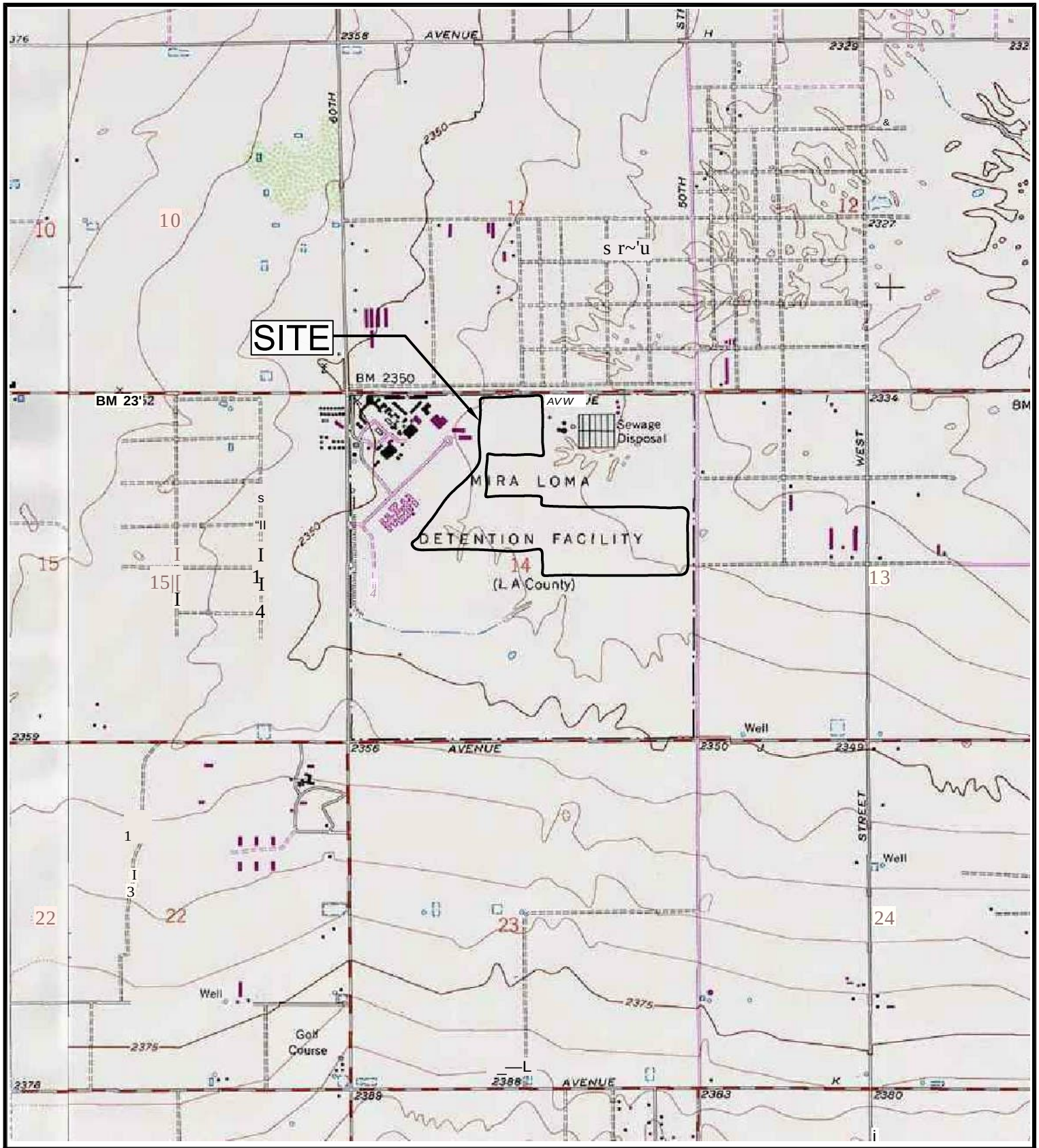
DRAFT

Read L. Andersen, RGE
Manager

APPENDIX A

DRAWINGS

Drawing No. 1 - Site Location Map
Drawing No. 2 - Test Boring Location Map
Drawing No. 3 - Test Boring Location Map Showing On-Site Features



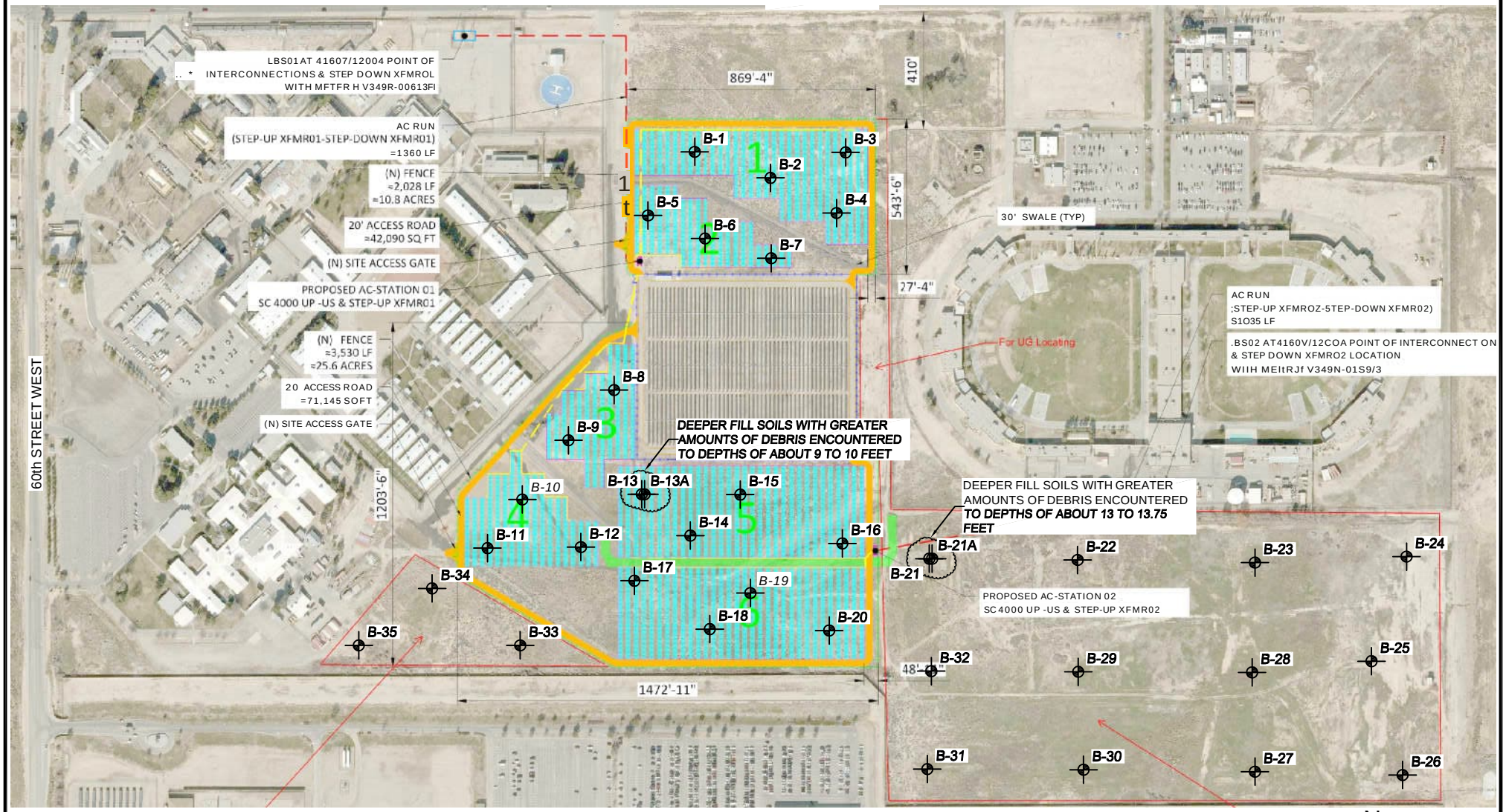
SOURCE: U.S.G.S. TOPOGRAPHIC MAP, 7 ½ MINUTE SERIES
LANCASTER WEST, CALIFORNIA QUADRANGLE 1974

0 2000
APPROXIMATE SCALE
IN FEET

SITE LOCATION MAP
PROPOSED GROUND MOUNTED SOLAR ARRAY
COUNTY OF LOS ANGELES HIGH DESERT EXPANSION
45100 60TH STREET WEST
LANCASTER, CALIFORNIA

FILE NO.: 468R6-01-01	DATE: 05/25/21
DRAWN BY: RM	APPROVED BY:
PROJECT NO. E468R6.01	DRAWING NO. 1

MOORE TWINING ASSOCIATES, INC.

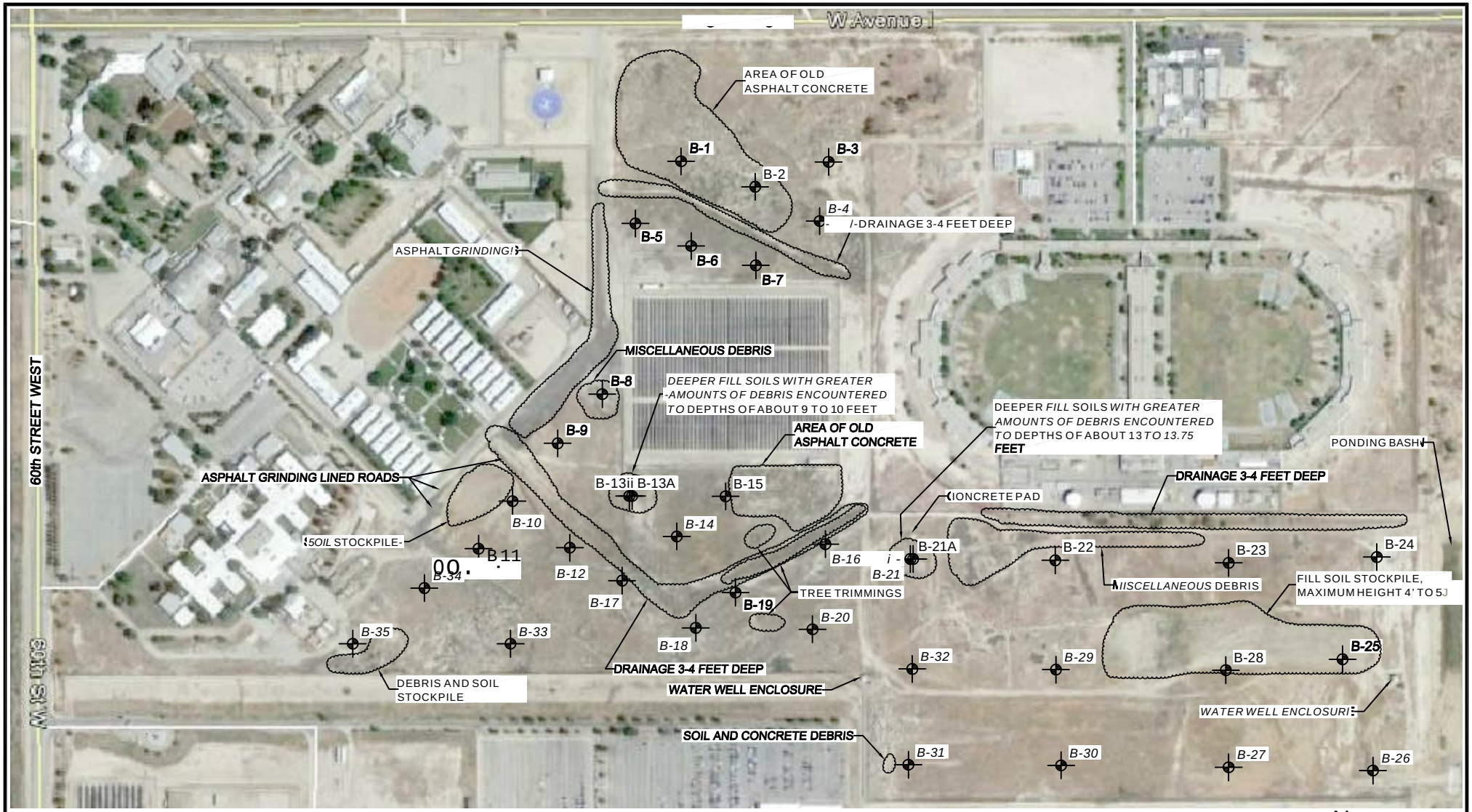


APPROXIMATE TEST BORING LOCATION

TEST BORING LOCATION MAP
PROPOSED GROUND MOUNTED SOLAR ARRAY
COUNTY OF LOS ANGELES HIGH DESERT EXPANSION
45100 60TH STREET WEST
LANCASTER, CALIFORNIA

FILE NO. 468R6-01-02	DATE DRAWN: 05/25/21
DRAWN BY: RM	APPROVED BY:
PROJECT NO. E468R6.01	DRAWING NO. 2

MOORE TWINING ASSOCIATES, INC.



TEST BORING LOCATION MAP SHOWING ON-SITE FEATURES
PROPOSED GROUND MOUNTED SOLAR ARRAY
COUNTY OF LOS ANGELES HIGH DESERT EXPANSION
45100 60TH STREET WEST
LANCASTER, CALIFORNIA

FILE NO. 468R6-01-02	DATE DRAWN: 05/25/21
DRAWN BY: RM	APPROVED BY:
PROJECT NO. E468R6.01	DRAWING NO. 3

MOORE TWINING ASSOCIATES, INC.

APPENDIX B

LOG OF TEST BORINGS

This appendix contains the final boring logs. The logs represents our interpretation of the contents of the field logs and the results of the field and laboratory tests.

The logs and related information depict subsurface conditions only at these locations and at the particular time designated on the logs. Soil conditions at other locations may differ from conditions occurring at the test boring locations. Also, the passage of time may result in changes in the soil conditions.

In addition, an explanation of the abbreviations used in the preparation of the logs and a description of the Unified Soil Classification System are provided at the end of Appendix B.

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-1

Project: Proposed Ground Mounted Solar Array

Project Number: E4686.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

Hammer Type: 140 lbs Auto Trip Hammer

Logged By: ZA

Date: April 13, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	6/6 5/6 6/6	CL	SANDY LEAN CLAY; stiff, moist, medium plasticity, brown	From 0-3.5': R-value = 37	11	
	17/6 18/6 23/6		Hard		41	
5	14/6 15/6 16/6		SANDY LEAN CLAY; very stiff, moist, medium plasticity, brown	DD = 104.9 pcf	31	16.3
	6/6 6/6 8/6		Stiff		14	
10	3/6 2/6 2/6		Soft, very moist		4	32.4
	3/6 2/6 2/6				4	
			Bottom of Boring B-1 at 13 feet.			
15						
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-2

Project: Proposed round Mounted Solar Array
Project Number: E4 8R6.01
Drilled By: JC
Drill Type: CME 75
Auger Type: 6 5/8" ollow Stem Augers
Hammer Type: 140 l s. Auto Trip Hammer

Logged By: ZA
Date: April 13, 2021
Elevation:
Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	6/6 7/6 8/6	CL	SANDY LEAN CLAY; stiff, damp, low plasticity, brown		15	
5	17/6 18/6 27/6		Very stiff, increased sand	DD = 107.3 pcf	45	15.9
10	6/6 6/6 5/6 5/6 6/6 6/6 2/6 2/6 2/6	SM CH	SILTY SAND; medium dense, moist, fine to medium grained, light brown FAT CLAY; stiff, very moist, very high plasticity, brown Soft	From 8.5-10': Gravel = 2.1% and = 81.4% 00 = 16.5%	11 12	
15			Bottom of Boring B-2 at 13 feet.	From 11.5-13': LL = 63 PI = 44	4	47.1
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-3

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

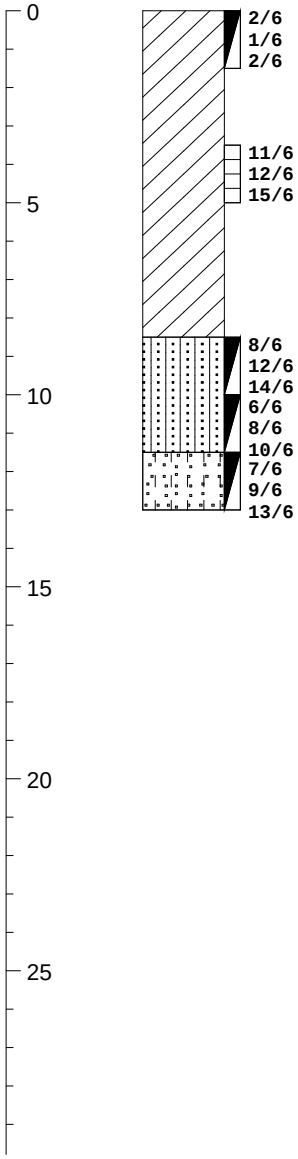
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 13, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
	CL	SANDY LEAN CLAY; soft, damp, high plasticity, brown	From 0-3': R-value = 36	3	
		Very stiff, increased sand	From 3.5-5': DD = 96.0 pcf Sand = 45.0% -200 = 55.0% LL = 47 PI = 25 ø = 33° c = 460 psf	27	15.0
	SM	SILTY SAND; medium dense, damp, fine to medium dense, brown		26	
				18	
	SP-SM	POORLY GRADED SAND WITH SILT; medium dense, damp, medium to coarse grained, tan brown		22	
		Bottom of Boring B-3 at 13 feet.			

Notes:

Figure Number

TJXMOORE TWINING ASSOCIATES, INC.

Test Boring: B-4

Project: Proposed round Mounted Solar Array
Project Number: E4 8R6.01
Drilled By: JC
Drill Type: CME 75
Auger Type: 6 5/8" ollow Stem Augers
Hammer Type: 140 l s. Auto Trip Hammer

Logged By: ZA
Date: April 13, 2021
Elevation:
Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	3/6 1/6 6/6	FILL CL	FILL - SANDY LEAN CLAY: soft.		4	
	43/6 50/3		plasticity, brown Hard, moderate cementation	DD = 90.7 pcf	>50	9.1
5	6/6 7/6 10/6		Very stiff, increased sand with depth		17	
	10/6 9/6 5/6 4/6 3/6 3/6	SM CL	SILTY SAND; medium dense, damp, fine to coarse grained brown LEAN CLAY; medium stiff, moist, low plasticity, brown		14 6	
15			Bottom of Boring B-4 at 13 feet.			
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-5

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 12, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	3/6 7/6 8/6	SM	SILTY SAND; medium dense, damp, fine to medium grained, brown, with some gravel, trace clay	From 0-5': Gravel = 11.8% Sand = 55.7% -200 = 32.5% LL = Non-viscous PI = Non-plastic EI = 9 DD = 101.7 pcf	15	
	16/6 22/6 36/6		Dense, moderate cementation		58	7.9
5	6/6 8/6 14/6		Medium dense		22	
10	3/6 5/6 6/6	CL	SANDY LEAN CLAY; stiff, moist, low plasticity, brown		11	
	3/6 2/6 2/6	CH	FAT CLAY; soft, very moist, very high plasticity, brown	From 11.5-13': LL = 94 PI = 65	4	60.0
15			Bottom of Boring B-5 at 13 feet.			
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-6

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

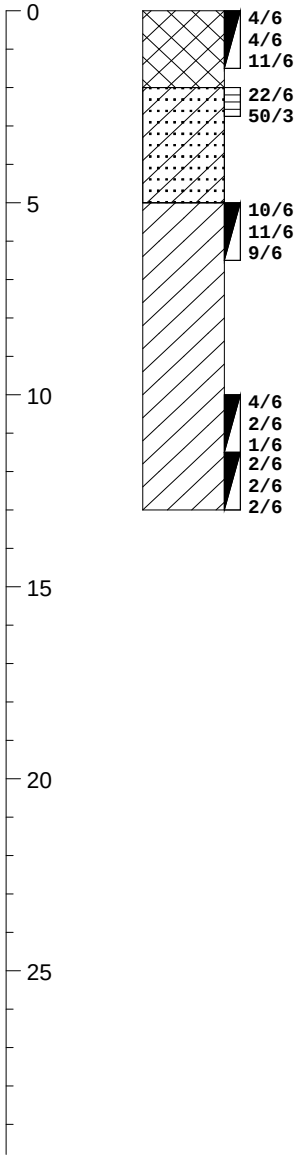
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 13, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
	FILL	FILL - SANDY LEAN CLAY; stiff, damp, low plasticity, brown, asphalt debris		15	
	SC	CLAYEY SAND; very dense, moist, fine to medium grained, brown, moderate cementation	DD = 101.7 pcf	>50	8.2
	CL	LEAN CLAY; very stiff, moist, low plasticity, brown, mottling		20	
		Soft, very moist		3	56.4
		light gray, trace gravel Brown		4	
		Bottom of Boring B-6 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-7

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

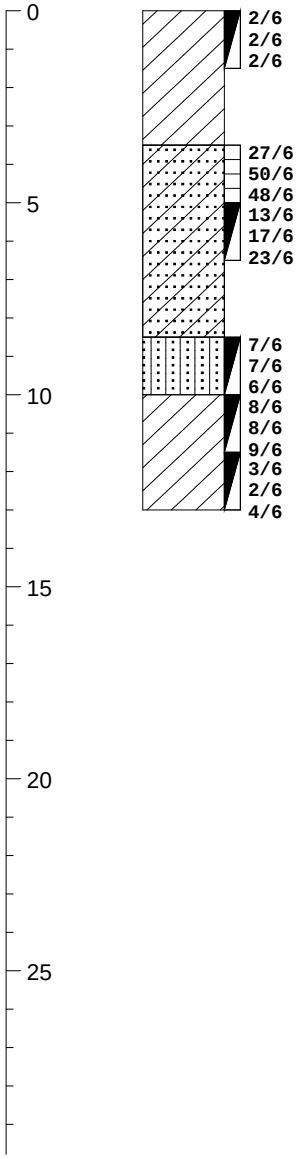
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 13, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
CL	SANDY LEAN CLAY; soft, damp, low plasticity, brown	From 0-3': pH = 7.9 SR = 620 ohm-cm Cl < 0.00060% SS = 0.29%	4	
SC	CLAYEY SAND; very dense, damp, fine to medium grained, brown	DD = 100.4 pcf	>50	11.6
	Dense		40	
SM	SILTY SAND; medium dense, damp, fine to medium grained, brown		13	
CL	LEAN CLAY; very stiff, moist, medium plasticity, brown, some sand		17	
	medium stiff		6	
	Bottom of Boring B-7 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-8

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	5/6 5/6 6/6	CL	LEAN CLAY WITH SAND; stiff, damp, low plasticity, brown		11	
	21/6 25/6 28/6	ML	SANDY SILT; moist, slight plasticity, brown, trace clay Hard	From 2-4': R-value = 68 DD = 78.9 pcf (sample disturbed)	>50	23.9
5	6/6 4/6 4/6	CL	LEAN CLAY WITH SAND; stiff, moist, low plasticity, brown		10	
10	3/6 3/6 4/6 4/6 4/6 4/6		Medium stiff trace root lets, light brown		7 8	
			Bottom of Boring B-8 at 13 feet.			
15						
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-9

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

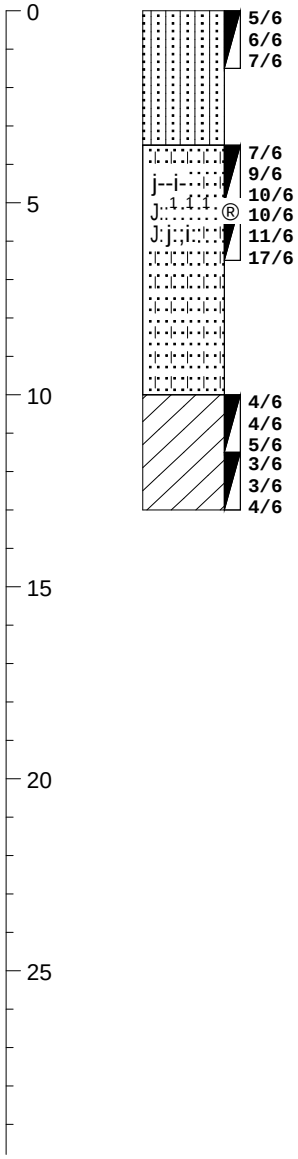
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		SM	SILTY SAND; medium dense, damp, fine to medium grained, brown, trace clay	From 0-3.5': pH = 9.1 SR = 1,900 ohm-cm Cl < 0.00060% SS = 0.06%	13	
		SW-SM	WELL GRADED SAND WITH SILT; medium dense, damp, fine to coarse grained, light brown, trace fine gravel	From 5-6.5': Gravel = 2.0% Sand = 91.0% -200 = 7.0%	19 28	
		CL	LEAN CLAY; stiff, moist, low plasticity, olive medium stiff, brown, calcification		9 7	
			Bottom of Boring B-0 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-10

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

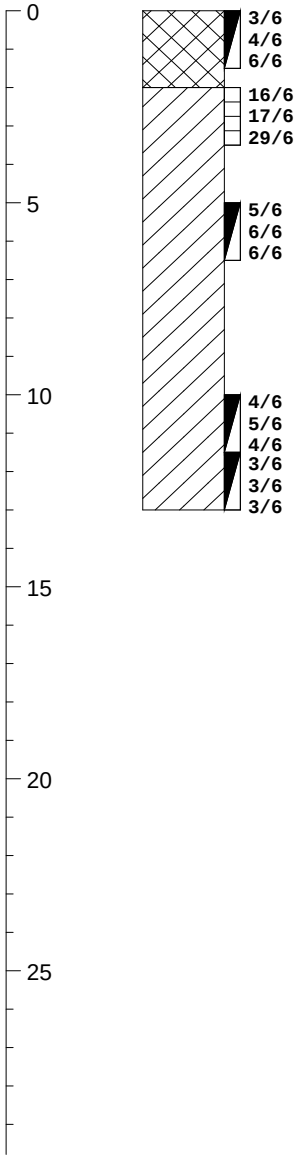
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		FILL	FILL - LEAN CLAY; stiff, damp, low plasticity, brown, trace asphalt debris	From 0-5': pH = 9.2 SR = 2,100 ohm-cm Cl < 0.00060% SS = 0.029%	10	
		CL	LEAN CLAY; hard, damp, low plasticity, light brown, weak cementation		46	15.1
			stiff, moist	From 2-3.5': DD = 94.3 pcf	12	
			Increased sand with depth		9	
			medium stiff, brown to olive		6	
			Bottom of Boring B-10 at 13 feet.			

Notes:

Figure Number

MOORE TWINING
fJjA S SO Cl A T E S, INC.

Test Boring: B-11

Project: Proposed Gr und Mounted Solar Array
Project Number: E468 6.01
Drilled By: JC
Drill Type: CME 75
Auger Type: 6 5/8" Ho low Stem Augers
Hammer Type: 140 lbs Auto Trip Hammer

Logged By: ZA
Date: April 15, 2021
Elevation:
Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	5/6 5/6 6/6	CL	LEAN CLAY; stiff, damp, low plasticity, brown	From 0-3.5': pH = 9.0 SR = 3,300 ohm-cm Cl < 0.00060% SS = 0.0017%	11	
5	9/6 10/6 6/6		Very stiff, weak cementation		16	
	4/6 4/6 5/6		Stiff		9	
10	9/6 10/6 11/6	SP	POORLY GRADED SAND; medium dense, dam medium to coarse		21	
	5/6 6/6 5/6	CL	A LEAN CLAY; stiff, moist, low plasticity, light brown		11	
15			Bottom of Boring B-11 at 13 feet.			
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-12

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	4/6 3/6 4/6	CL	LEAN CLAY; medium stiff, moist, low plasticity, brown, trace root lets	From 0-3': pH = 7.7 SR = 2,000 ohm-cm Cl < 0.00060% SS = 0.53%	7	
	25/6 44/6 17/6		Hard, moderate cementation		61	
5	30/6 25/6 23/6			DD = 78.9 pcf (sample disturbed)	48	23.3
10	5/6 6/6 8/6	SW-SM	WELL GRADED SAND WITH SILT; medium dense, damp, fine to coarse grained, light brown, trace fine gravel	From 10-11.5': Gravel = 1.2% Sand = 91.0% -200 = 7.8%	14	
	9/6 13/6 7/6	SP	POORLY GRADED SAND; medium dense, damp, medium to coarse grained,light brown		20	
15			Bottom of Boring B-12 at 13 feet.			
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-13

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

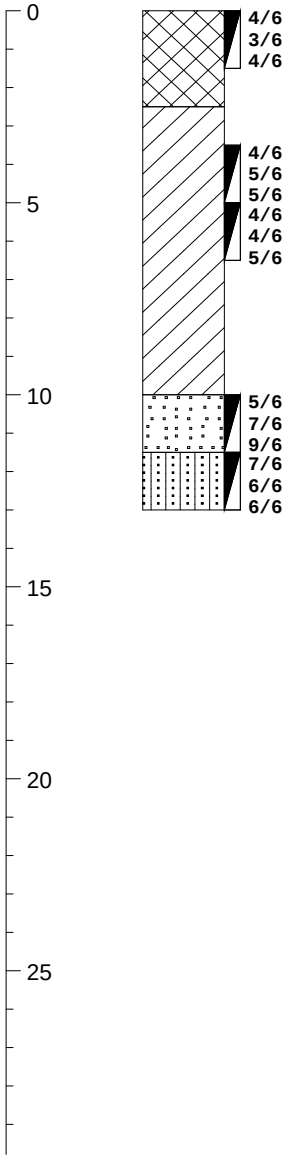
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		FILL	FILL - SANDY LEAN CLAY; medium stiff, damp, low plasticity, brown, trace asphalt debris	From 0-3.5': pH = 7.7 SR = 1,700 ohm-cm Cl < 0.00060% SS = 0.54%	7	
		CL	SANDY LEAN CLAY; damp, low plasticity, brown Stiff		10	
					9	
		SP	POORLY GRADED SAND; medium dense, moist, fine to medium grained, light brown		16	
		SM	SILTY SAND; medium dense, moist, fine to coarse grained, light brown, some clay		12	
			Bottom of Boring B-13 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-13A

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

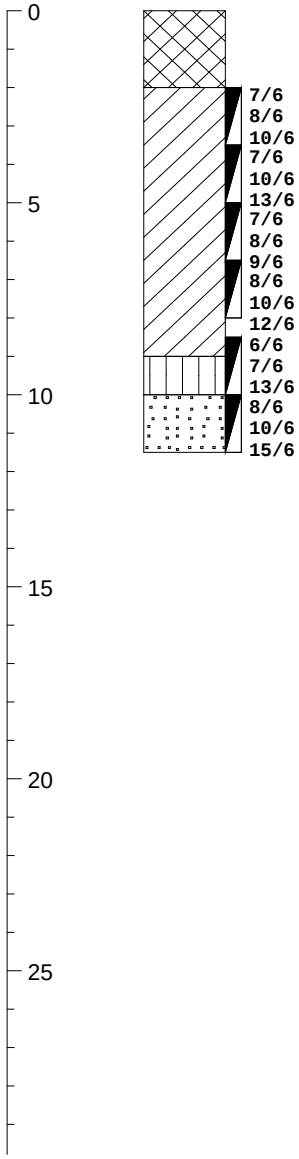
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 16, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		FILL	SANDY LEAN CLAY; damp, low plasticity, light brown, trace asphalt debris		18	
		CL	SANDY LEAN CLAY; damp, low plasticity, light brown, with calcification		23	
			Increased in moisture content		17	
					22	
			Decrease sand content		20	
		ML	SANDY SILT; very stiff, moist, non plastic, brown, increased sand with depth		25	
		SP	POORLY GRADED SAND; medium dense, damp, fine to medium grained, gray			
			Bottom of Boring B-13A at 11.5 feet.			

Notes:

Figure Number

MOORE TWINING
fJjA S SO Cl A T E S, INC.

Test Boring: B-14

Project: Proposed Gr und Mounted Solar Array

Project Number: E468 6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Ho low Stem Augers

Hammer Type: 140 lbs Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	7/6 10/6 19/6	CL	LEAN CLAY; very stiff, damp, low plasticity, brown, weak cementation	From 0-3.5': pH = 8.3 SR = 2,700 ohm-cm Cl = 0.0013% SS = 0.0078%	29	
	17/6 12/6 13/6				25	19.2
5	5/6 6/6 4/6		Stiff	From 3.5-5': DD = 94.0 pcf	10	
10	4/6 5/6 5/6		Sandy		10	
	7/6 8/6 9/6	SC	CLAYEY SAND; medium dense, moist fine to medium grained brown		17	
			Bottom of Boring B-14 at 13 feet.			
15						
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-15

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

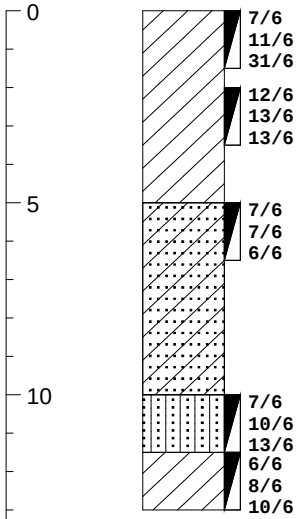
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	CL	LEAN CLAY; hard, damp, low plasticity, brown	From 0-5': pH = 8.3 SR = 2,900 ohm-cm Cl = 0.0011% SS = 0.0022%	31	
		very stiff		26	
5	SC	CLAYEY SAND; medium dense, damp, fine to medium dense, brown		13	
10	SM	SILTY SAND; medium dense, moist, fine to medium grained, brown		23	
	CL	SANDY LEAN CLAY; very stiff, moist, low plasticity, brown, some seams of sand		18	
15		Bottom of Boring B-15 at 13 feet.			
20					
25					

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-16

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 14, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	5/6 6/6 8/6	CL	SANDY LEAN CLAY; stiff, damp, medium plasticity, brown, weak cementation	From 0-5': pH = 9.0 SR = 3,400 ohm-cm Cl = 0.0071% SS = 0.0044% Gravel = 3.3% Sand = 43.9% -200 = 52.8% LL = 37 PI = 17 EI = 34 From 2-3.5': Sample disturbed	14	
	16/6 18/6 23/6		Hard, calcification, weak cementation		41	14.5
5	10/6 8/6 10/6	SM	SILTY SAND; medium dense, damp, fine to coarse grained, brown		18	
10	3/6 4/6 4/6	CL	LEAN CLAY; medium stiff, moist, low plasticity, brown, calcium		8	
	5/6 7/6 8/6		Stiff, with sand		15	
			Bottom of Boring B-16 at 13 feet.			
15						
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-17

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	4/6 5/6 5/6	CL	LEAN CLAY; stiff, damp, low plasticity, brown		10	
5	20/6 50/6 50/5	SM	SILTY SANDY; very dense, damp, fine to coarse grained, light brown, moderate cementation	DD = 127.7 pcf	>50	3.3
10	2/6 2/6 3/6 4/6 5/6 5/6	CL	LEAN CLAY; medium stiff, damp, low plasticity, light brown Stiff		5 10	
15	4/6 5/6 6/6		Bottom of Boring B-17 at 15 feet.		11	
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-18

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

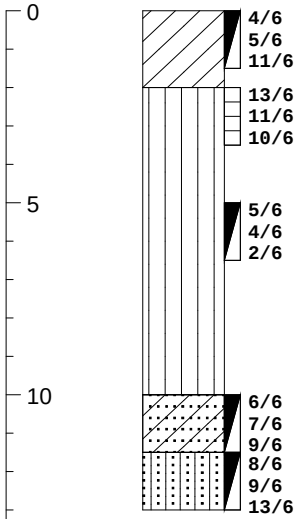
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
	CL	LEAN CLAY WITH SAND; very stiff, damp, medium plasticity, brown		16	
	ML	SANDY SILT; stiff, moist medium plasticity, brown, with clay, weak cementation, calcification	From 2-3.5': DD = 81.7 pcf Sand = 47.7% -200 = 52.3% LL = 47 PI = 19	21	25.1
		Medium Stiff		6	
	SC	CLAYEY SAND; medium dense, damp, fine to medium grained, brown		16	
	SM	SILTY SAND; medium dense, damp, fine to medium grained, brown		22	
		Bottom of Boring B-18 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-19

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

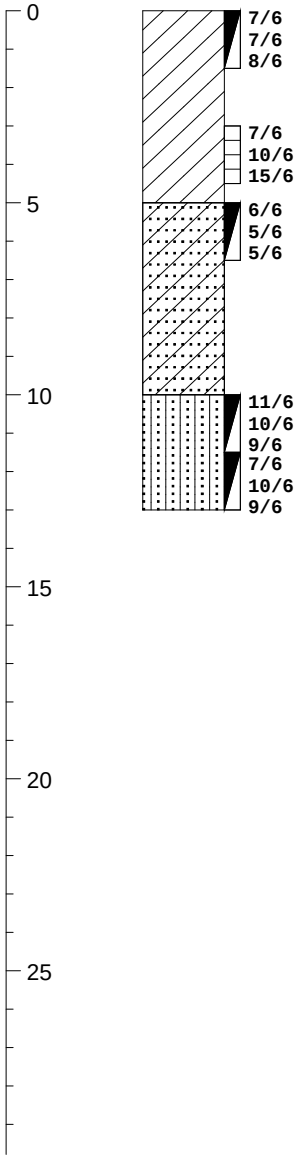
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 14, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		CL	LEAN CLAY; stiff, damp, low plasticity, brown	From 0-5': pH = 8.3 SR = 2,500 ohm-cm Cl = 0.0039% SS = 0.02%	15	
			SANDY LEAN CLAY; very stiff, damp, low plasticity, brown		25	11.9
		SC	CLAYEY SAND; loose, fine to coarse grained, brown	From 3-4.5': Only 3 rings recovered, sample disturbed	10	
		SM	SILTY SAND; medium dense, damp, fine to coarse grained, brown		19	
					19	
			Bottom of Boring B-19 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-20

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

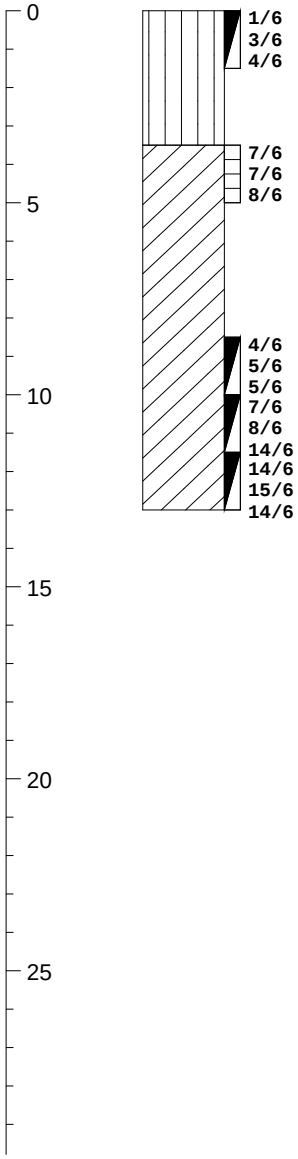
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	1/6 3/6 4/6	ML	SILT WITH SAND; medium stiff, damp, slight plasticity, brown, trace clay	From 0-3': R-value = 43	7	
5	7/6 7/6 8/6	CL	LEAN CLAY; Stiff, moist, low plasticity, brown, with calcification	DD = 88.5 pcf	15	13.9
10	4/6 5/6 5/6 7/6 8/6 14/6 14/6 15/6 14/6		With sand, weak cementation		10	
			Very stiff		22	
					29	
15			Bottom of Boring B-20 at 13 feet.			
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-21

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 13, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	2/6 4/6 6/6	FILL	FILL - SANDY LEAN CLAY; stiff, moist, low plasticity, brown	From 0-3.5' R-value = 23	10	
	9/6 10/6 11/6		Moderate cementation	DD = 93.9 pcf	21	10.8
5	10/6 11/6 13/6		Very stiff, with concrete fragments, metal wire in cuttings		24	
10	28/6 16/6 7/6				23	
	4/6 4/6 6/6	CL	SANDY LEAN CLAY; stiff, moist, low plasticity brown		10	
15			Bottom of Boring B-21 at 14.5 feet.			
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-21A

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

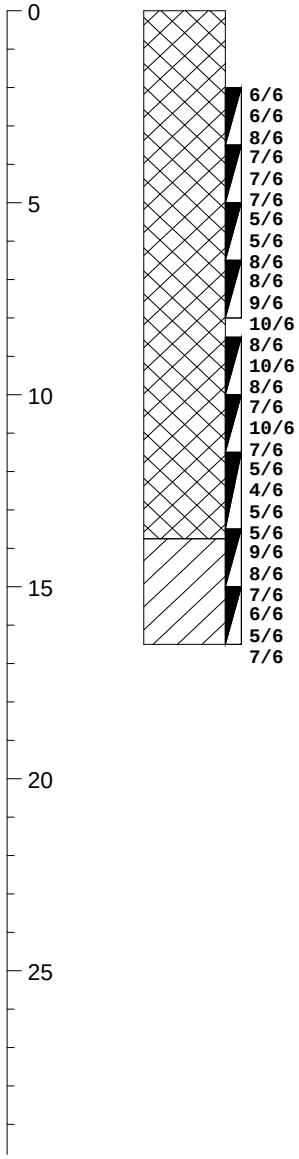
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 16, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
FILL	FILL - LEAN CLAY; damp, low plasticity, brown, some gravel			
	Stiff, blended soil, matrix with sand, cement grout fragments		14	
			14	
	FILL - CLAYEY SAND; medium dense, damp, fine to medium grained, brown		13	
	Very stiff, trace concrete fragments		19	
	Concrete fragments only, tire fragments in cuttings		18	
	Metal debris		17	
	Stiff		9	
	Seams of silty sand over fabric		15	
CL	SANDY LEAN CLAY; stiff, moist, low plasticity, brown		12	
	Increased sand with sand			
	Bottom of Boring B-21A at 16.5 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-22

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

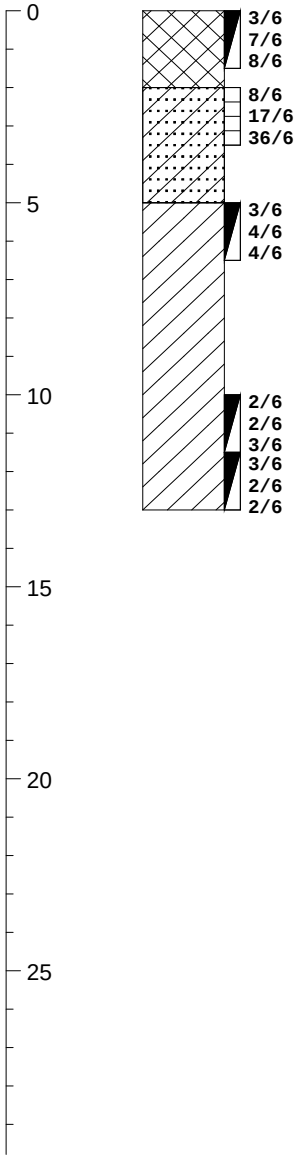
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 13, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		FILL	FILL - SANDY LEAN CLAY; stiff, damp, medium plasticity, brown, trace asphalt and grout debris		15	
		SC	CLAYEY SAND; dense, moist, fine to medium grained, brown	From 2-3.5': DD = 78.4 pcf Sand = 64.1% -200 = 35.9% ø = 44° c = 500 psf	53	32.3
		CL	LEAN CLAY; medium stiff, moist, medium plasticity, brown		8	
			increase in moisture		5	
			Soft, high plasticity	From 11.5-13': LL = 44 PI = 28	4	27.9
			Bottom of Boring B-22 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-23

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

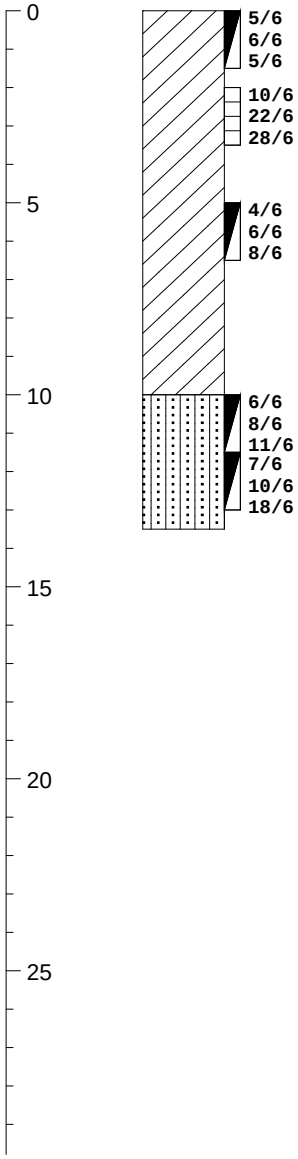
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 14, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
	CL	SANDY LEAN CLAY; stiff, moist, high plasticity, brown	From 0-5': Gravel = 3.8% Sand = 44.1% -200 = 52.1% LL = 42 PI = 24 EI = 68	11	
		Hard		50	30.1
		Stiff, weak cementation, calcification	From 2-3.5': DD = 81.8 pcf	14	
	SM	SILTY SAND; medium dense, damp, fine to coarse grained, brown		19	
		Increased fines		28	
		Bottom of Boring B-23 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-24

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

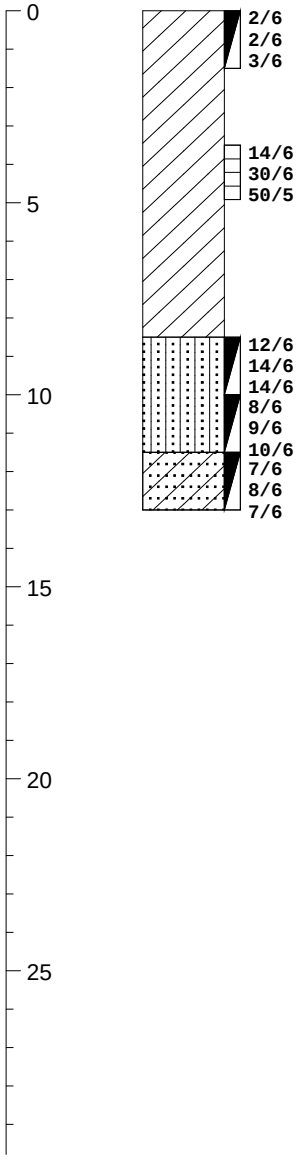
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 14, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		CL	LEAN CLAY; medium stiff, damp, low plasticity, brown	From 0-3.5': pH = 8.8 SR = 440 ohm-cm Cl = 0.051% SS = 0.24%	5	
			Hard, sandy, moderate cementation	DD = 115.4 pcf	>50	6.8
		SM	SILTY SAND; medium dense, moist, fine to medium grained, brown		28 19	
		SC	CLAYEY SAND; medium dense, moist, fine to medium grained, brown		15	
			Bottom of Boring B-24 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-25

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

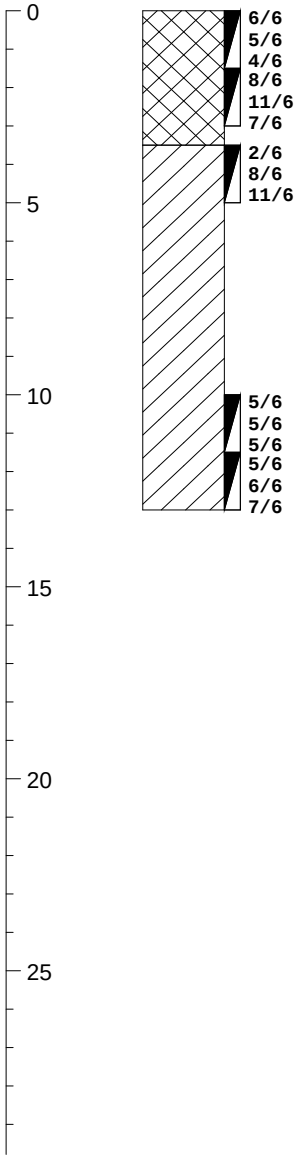
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 14, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		FILL	FILL - SILTY SAND; loose, moist, fine to coarse grained, red-brown	From 0-3.5': R-value = 66	9	
			Medium Dense		18	
		CL	SANDY LEAN CLAY; very stiff, moist, low plasticity, brown		19	
			Stiff		10	
			Olive-brown		13	
			Bottom of Boring B-25 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-26

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 13, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	4/6 5/6 6/6	CL	SANDY LEAN CLAY; stiff, damp, low plasticity, brown	From 0-3': pH = 9.7 SR = 2,300 ohm-cm Cl = 0.0049% SS = 0.0041% From 3-4.5': DD = 109.5 pcf Gravel = 3.8% Sand = 44.1% -200 = 52.1% LL = 26 PI = 6	11	
	13/6 11/6 10/6	CL-ML	SANDY, SILTY CLAY; stiff, moist, low plasticity, brown, trace fine gravel		21	8.3
5						
	10/6 11/6 13/6	SM	SILTY SAND; medium dense, damp, fine to coarse grained, brown		24	
	3/6 4/6 5/6		Loose		9	
10	3/6 5/6 6/6	ML	SANDY SILT; stiff, moist, non-plastic, brown		11	
			Bottom of Boring B-26 at 13 feet.			
15						
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-27

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

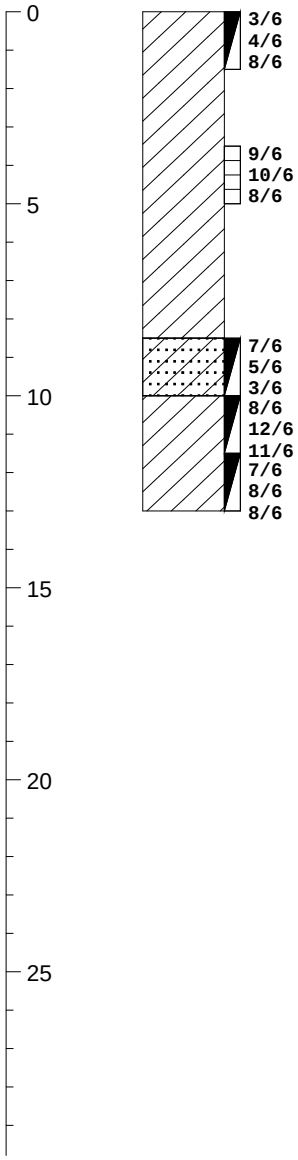
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 13, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		CL	LEAN CLAY; stiff, damp, low plasticity, light brown		12	
				DD = 90.6 pcf	18	17.2
		SC	CLAYEY SAND; loose, moist, fine to medium grained, brown		8	
		CL	SANDY LEAN CLAY; very stiff, moist, low plasticity, brown		23	
					16	
			Bottom of Boring B-27 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-28

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

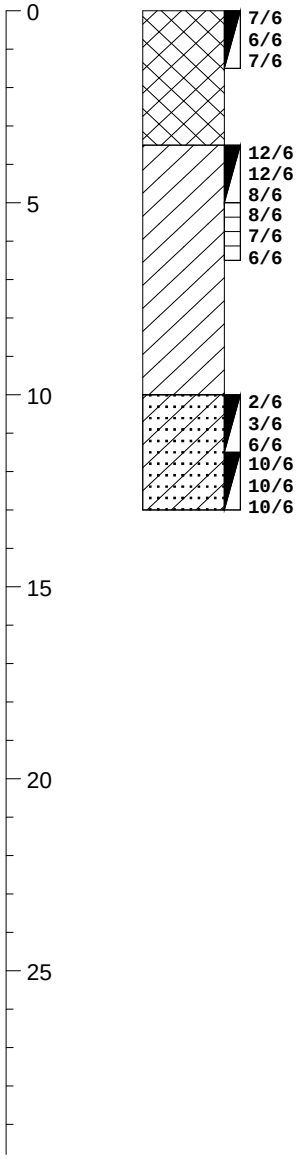
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 14, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		FILL	FILL - SILTY SAND; medium dense, damp, fine to medium grained, brown	From 0-3.5': pH = 7.9 SR = 5,900 ohm-cm Cl < 0.00060% SS = 0.0011%	13	
		CL	LEAN CLAY; very stiff, damp, low plasticity, brown, weak cementation, calcification		20	
			Medium stiff, weak cementation	Sample disturbed	13	16.9
		SC	CLAYEY SAND; loose, moist, fine to medium grained, brown		9	
			Medium dense		20	
			Bottom of Boring B-28 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-29

Project: Proposed round Mounted Solar Array
Project Number: E4 8R6.01
Drilled By: JC
Drill Type: CME 75
Auger Type: 6 5/8" ollow Stem Augers
Hammer Type: 140 l s. Auto Trip Hammer

Logged By: ZA
Date: April 13, 2021
Elevation:
Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	3/6 3/6 4/6	CL	SANDY LEAN CLAY; medium stiff, damp, low plasticity, brown	From 0-3': pH = 8.3 SR = 2,000 ohm-cm Cl = 0.0039% SS = 0.031% Sample disturbed	7	
5	13/6		Very stiff, light brown, calcification		39	22.8
					20	
10		SM	SILTY SAND; medium dense, fine to medium grained, brown		20	
			Dense		39	
			Bottom of Boring B-29 at 13 feet.			
15						
20						
25						

Notes:

Figure Number

MOORE TWINING
ASSOCIATES, INC.

Test Boring: B-30

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

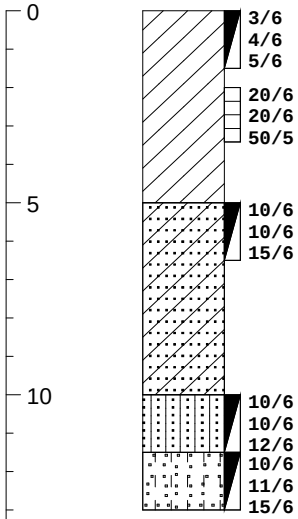
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 13, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		CL	LEAN CLAY; medium stiff, moist, low plasticity, brown	From 0-5': R-value = 22	9	
			Hard, moderate cementation	DD = 88.5 pcf	>50	11.8
		SC	CLAYEY SAND; medium dense, moist, fine to medium grained, brown		25	
		SM	SILTY SAND; medium dense, moist, fine to medium grained, brown		22	
		SP-SM	POORLY GRADED SAND WTH SILT; medium dense, damp, medium to coarse grained, brown		26	
			Bottom of boring B-30 at 13 feet.			

Notes:

Figure Number

MOORE TWINING
W-J ASSOCIATES, INC.

Test Boring: B-31

Project: Proposed round Mounted Solar Array
Project Number: E4 8R6.01
Drilled By: JC
Drill Type: CME 75
Auger Type: 6 5/8" ollow Stem Augers
Hammer Type: 140 l s. Auto Trip Hammer

Logged By: ZA
Date: April 13, 2021
Elevation:
Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	10/6 8/6 7/6	CL	LEAN CLAY; stiff, damp, low plasticity, brown		15	
	9/6 12/6 15/6		Very stiff, sandy	Sample disturbed	27	9.8
5	5/6 7/6 8/6		Stiff, increased sand		15	
10	7/6 8/6 8/6 8/6 10/6 12/6	ML	SANDY SILT; very stiff, moist, non-plastic, brown	From 10-11.5' Sand = 44.2% -200 = 55.8% LL = Non-viscous PI = Non-plastic	16 22	
			Bottom of Boring B-31 at 13 feet.			
15						
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-32

Project: Proposed round Mounted Solar Array
Project Number: E4 8R6.01
Drilled By: JC
Drill Type: CME 75
Auger Type: 6 5/8" ollow Stem Augers
Hammer Type: 140 l s. Auto Trip Hammer

Logged By: ZA
Date: April 13, 2021
Elevation:
Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	10/7 7/6 9/6	FILL	FILL - SANDY LEAN CLAY; very stiff,	From 0-3': 8.0 2,000 ohm-	16	
		CL	A [redacted] brown Very stiff, moderate cementation, calcification	0.0043% SS = 0.025% DD = 94.5 pcf	39	14.8
5	16/6 17/6 22/6					
	4/6 3/6 6/6		Stiff, with some sand		9	
	7/6 8/6 10/6	SM	SILTY SAND; medium dense, moist, fine to medium grained, brown		18	
	10/6 10/6 13/6	ML	SANDY SILT; very stiff, moist , non-plastic, brown		23	
15			Bottom of Boring B-32 at 13 feet.			
20						
25						

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-33

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

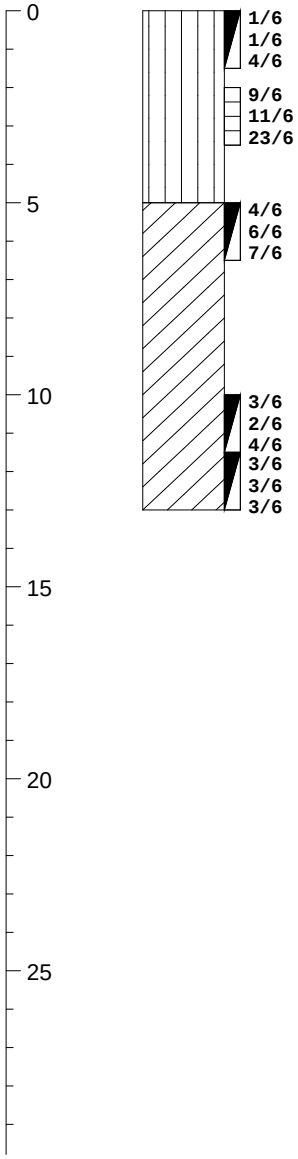
Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
		ML	SANDY SILT; medium stiff, damp, medium plasticity, brown, with clay	From 0-3.5': 45.1% -200 = 54.9% LL = 38 PI = 12 EI = 26 DD = 78.2 pcf (sample disturbed)	5	
			Very stiff		34	16.8
		CL	LEAN CLAY WITH SAND; stiff, moist, medium plasticity, brown, with weak cementation		13	
			medium stiff, calcification, weak cementation		6	
					6	
			Bottom of Boring B-33 at 13 feet.			

Notes:

Figure Number

MOORE TWINING ASSOCIATES, INC.

Test Boring: B-34

Project: Proposed Ground Mounted Solar Array

Project Number: E468R6.01

Drilled By: JC

Drill Type: CME 75

Auger Type: 6 5/8" Hollow Stem Augers

Hammer Type: 140 lbs. Auto Trip Hammer

Logged By: ZA

Date: April 15, 2021

Elevation:

Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	5/6 5/6 6/6	CL	LEAN CLAY; stiff, damp, low plasticity, brown	From 0-5': pH = 9.0 SR = 2,300 ohm-cm Cl = 0.00061% SS = 0.014%	11	
	8/6 10/6 12/6		Very stiff, some sand		22	
5	8/6 9/6 9/6	SM	SILTY SAND; medium dense, damp, fine to coarse grained, light brown		18	
10	8/6 4/6 3/6	CL	LEAN CLAY; medium stiff, moist, low plasticity, brown		7	
	9/6 7/6 6/6		Sandy, stiff		13	
			Bottom of Boring B-34 at 13 feet.			
15						
20						
25						

Notes:

Figure Number

MOORE TWINING
fJjA S SO Cl A T E S, INC.

Test Boring: B-35

Project: Proposed Gr und Mounted Solar Array
Project Number: E468 6.01
Drilled By: JC
Drill Type: CME 75
Auger Type: 6 5/8" Ho low Stem Augers
Hammer Type: 140 lbs Auto Trip Hammer

Logged By: ZA
Date: April 15, 2021
Elevation:
Depth to Groundwater First Encountered During Drilling: N/E

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-Values blows/ft.	Moisture Content %
0	3/6 4/6 5/6	CL	LEAN CLAY WITH SAND; stiff, damp, low plasticity, brown	From 0-3.5': R-value = 24	9	
5	8/6 10/6 13/6 3/6 5/6 5/6		Stiff, weak cementation medium stiff, increased sand, moist	From 3.5-5': DD = 106.4 pcf ø = 37° c = 260 psf	23 8	8.1
	1/6 1/6 1/6 1/6 3/6 3/6		ery moist, very wn, with	From 10-11.5': LL = 82 PI = 60	2 6	50.8
15			Bottom of Boring B-13 at 13 feet.			
20						

Notes:

Figure Number

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Lean clay
	Silty sand
	Fat clay
	Poorly graded sand with silt
	Fill
	Clayey sand
	Silt

Symbol	Description
	Well graded sand with silt
	Poorly graded sand
	Silty low plasticity clay
	Gravel
Soil Samplers	
	Standard penetration test
	California Modified split barrel ring sampler

Notes:

1. Exploratory borings were drilled on 4/12/21 through 4/16/21 using a CME 75 drill rigequipped with 6-5/8" outside diameter hollow stem augers.

2. Groundwater was not encountered in any of the borings.

3. Boring locations were measured or paced from existing features.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. The "N-value" reported for the California Modified Split Barrel Sampler is the uncorrected field blow count. This value should not be interpreted as an SPT equivalent N-value.

6. Results of tests conducted on samples recovered are reported on the logs.

DD = Natural dry density (pcf)	LL = Liquid Limit (%)
+4 = Percent retained on the No. 4 sieve(%)	PI = Plasticity Index (%)
-200 = Percent passing the No. 200 sieve (%)	EI = Expansion Index
Sand = Percent passing the No. 4 sieve and retained on No. 200 sieve (%)	Gravel = Percent passing 3-inch & retained on No. 4 sieves(%)
pH = Soil pH	SR = Soil resistivity (ohms-cm)
SS = Soluble sulfates (%)	Cl = Soluble chlorides (%)
ø = Internal Angle of Friction (degrees)	c = Cohesion (psf)
pcf = Pounds per cubic foot	psf = Pounds per square foot
O.D. = Outside diameter	AMSL = Above mean sea level
N/A = Not applicable	N/E = Not encountered

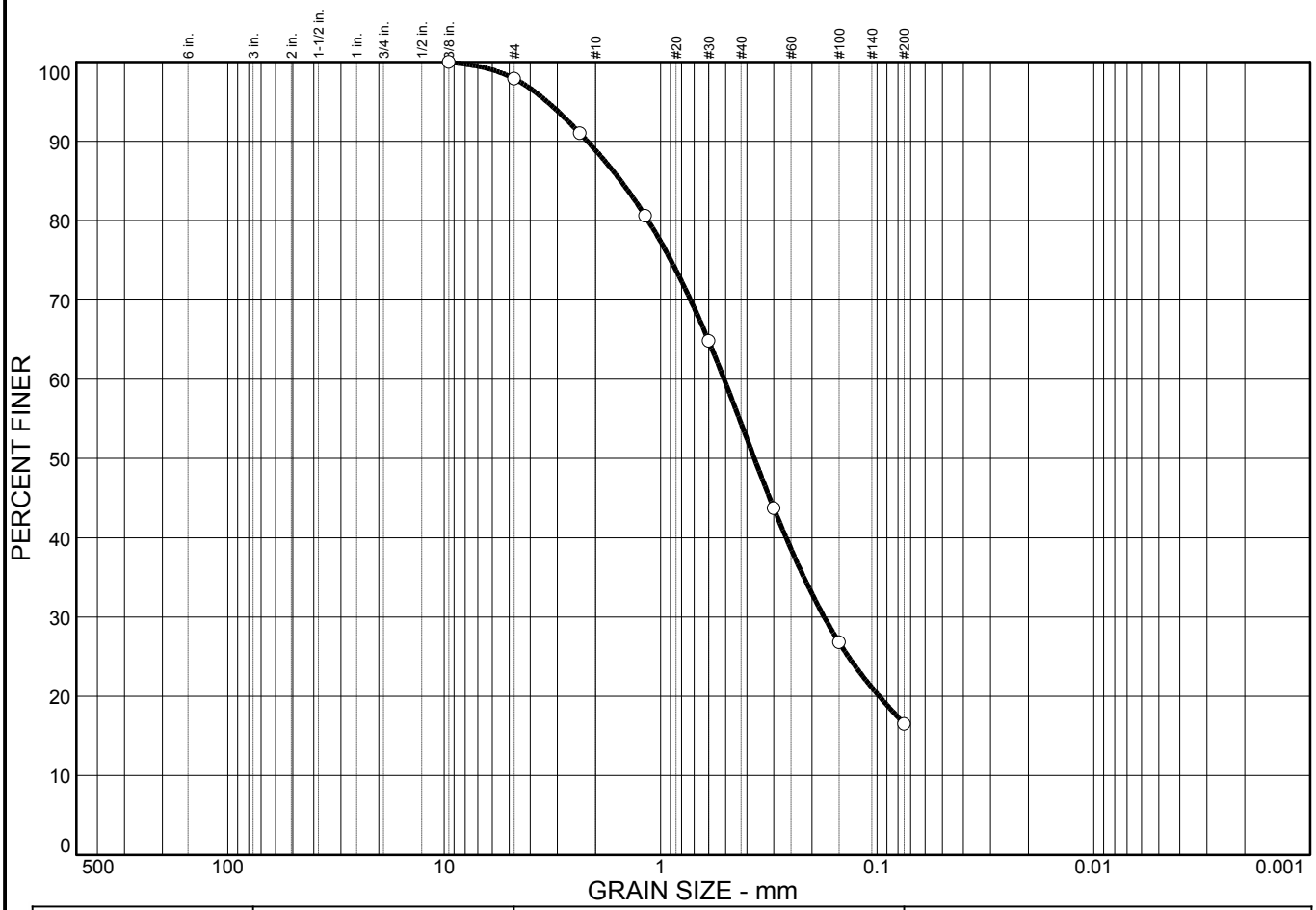
APPENDIX C

RESULTS OF LABORATORY TESTS

This appendix contains the individual results of the following tests. The results of the moisture content and dry density tests are included on the test pit logs in Appendix B. These data, along with the field observations, were used to prepare the final test boring logs in Appendix B.

These Included:	To Determine:
Moisture Content (ASTM D2216)	Moisture contents representative of field conditions at the time the sample was taken.
Dry Density (ASTM D2937)	Dry unit weight of sample representative of in-situ or in-place undisturbed condition.
Grain-Size Distribution (ASTM D422)	Size and distribution of soil particles, i.e., sand, gravel and fines (silt and clay).
Atterberg Limits (ASTM D4318)	Determines the moisture contents where the soil behaves as a viscous material (liquid limit) and the moisture content at which the soil reaches a plastic state (plastic limit)
Expansion Index (ASTM D4829)	Swell potential of soil with increases in moisture content.
Consolidation (ASTM 2435)	The amount and rate at which a soil sample compresses when loaded, and the influence of saturation on its behavior.
Direct Shear (ASTM D3080)	Soil shearing strength under varying loads and/or moisture conditions.
Moisture-Density Relationship (D1557)	The optimum (best) moisture content for compacting soil and the maximum dry unit weight (density) for a given compactive effort.
R-Value (ASTM D2844)	The capacity of a subgrade or subbase to support a pavement section designed to carry a specified traffic load.
Chloride Content (ASTM D4327)	Percentage of soluble chloride in soil. Used to evaluate the potential attack on encased reinforcing steel.
Sulfate Content (ASTM D4327)	Percentage of water-soluble sulfate as (SO4) in soil samples. Used as an indication of the relative degree of sulfate attack on concrete and for selecting the cement type.
pH (ASTM D4972)	The acidity or alkalinity of subgrade material.
Resistivity (ASTM G187)	The potential of the soil to corrode metal.
Thermal Resistivity (ASTM 5334)	A measure of the soils resistance to the transmission of heat

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	2.1	81.4	16.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in.	100.0		
#4	97.9		
#8	91.0		
#16	80.6		
#30	64.8		
#50	43.7		
#100	26.8		
#200	16.5		

(no specification provided)

Material Description

Silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.53 D_{60}= 0.510 D_{50}= 0.369
D_{30}= 0.176 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

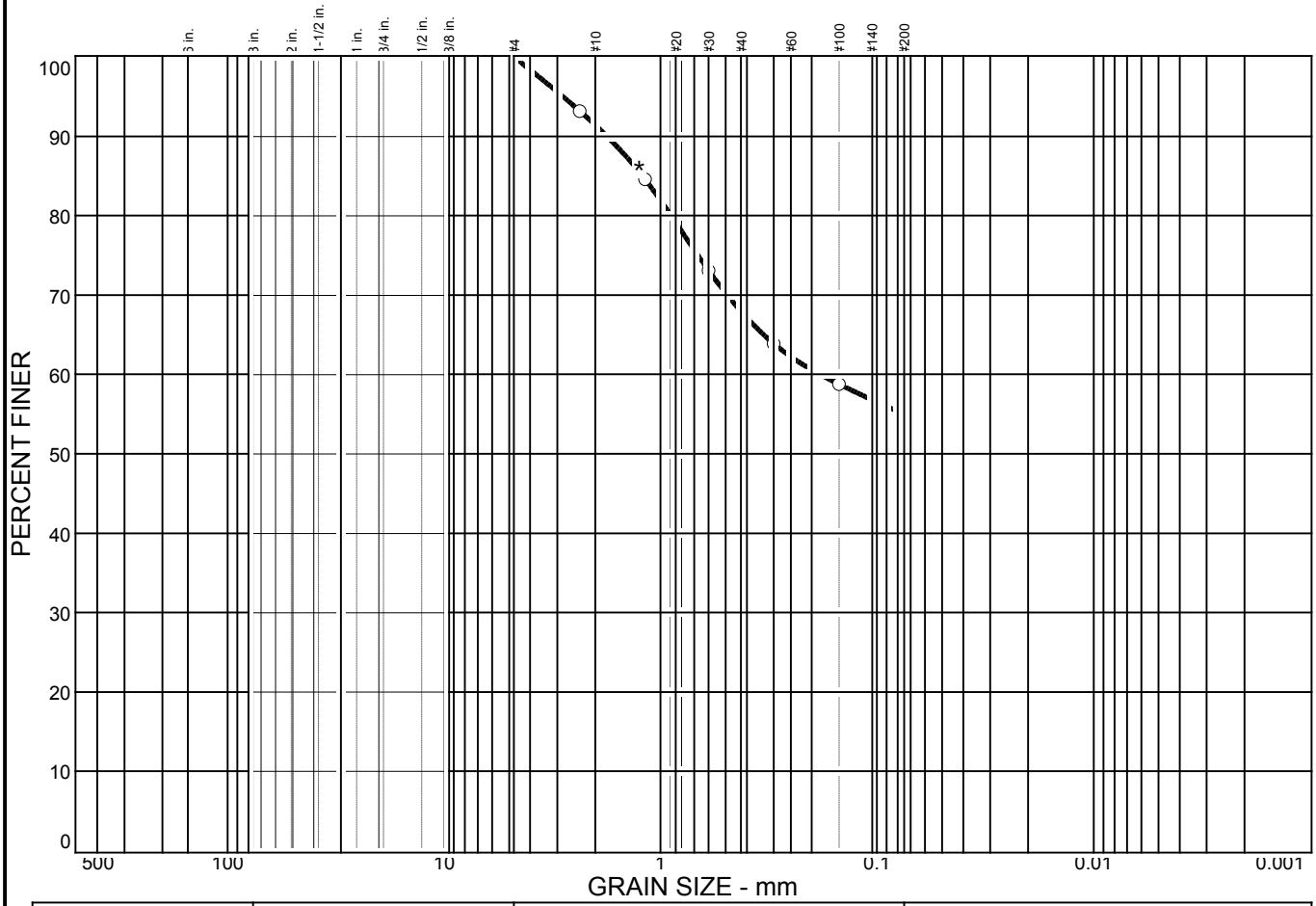
Sample No.: B-2 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 8.5-10'

Moore Twining Associates, Inc.

Fresno, CA

Client:
Project: Proposed Solar Array - Lancaster
Project No: E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	45.0	55.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	93.2		
#16	84.6		
#30	73.1		
#50	63.9		
#100	58.8		
#200	55.0		

(no specification provided)

Material Description

Sandy lean clay

Atterberg Limits

PL= 22 LL= 47 PI= 25

Coefficients

D_{85}= 1.21 D_{60}= 0.183 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

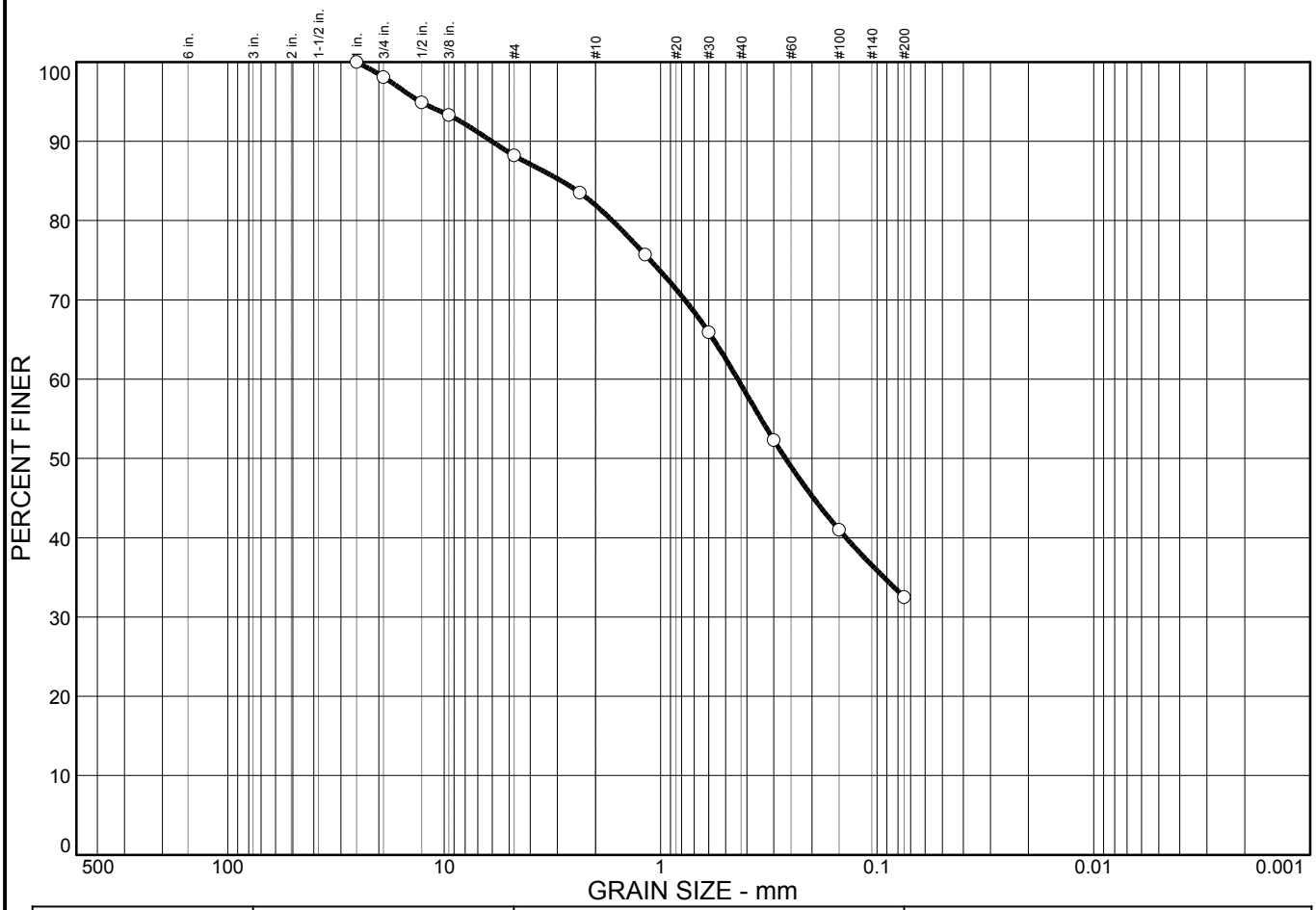
USCS= CL AASHTO=

Remarks

Sample No.: B-3 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 3.5-5'

Moore Twining Associates, Inc.	**Client:**
Fresno, CA	**Project:** Proposed Solar Array - Lancaster
	Project No: E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	11.8	55.7	32.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	98.1		
1/2 in.	94.9		
3/8 in.	93.3		
#4	88.2		
#8	83.5		
#16	75.7		
#30	65.9		
#50	52.3		
#100	41.0		
#200	32.5		

(no specification provided)

Material Description

Silty sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 2.87 D_{60}= 0.441 D_{50}= 0.265
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

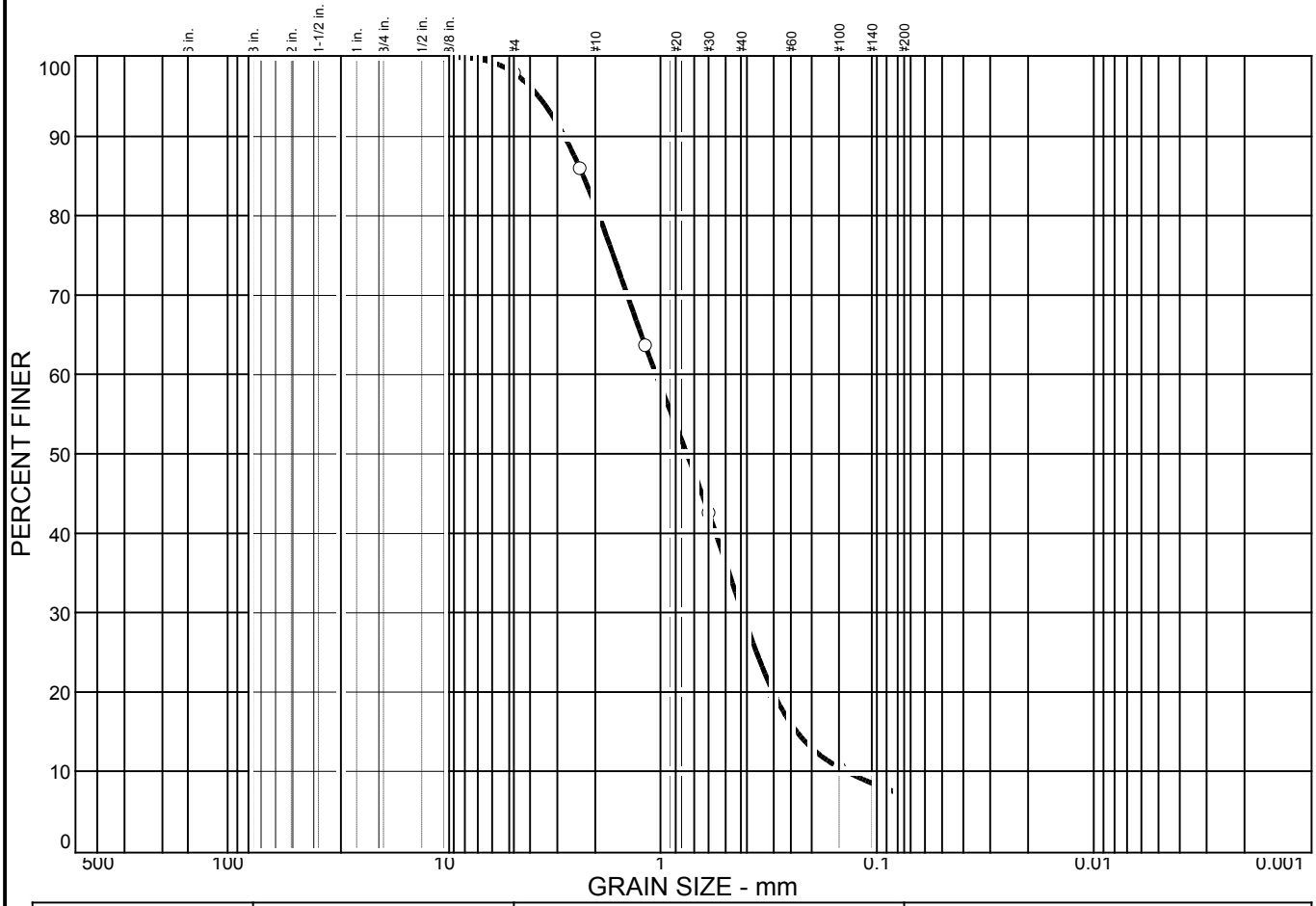
Sample No.: B-5 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 0-5'

Moore Twining Associates, Inc.

Fresno, CA

Client:
Project: Proposed Solar Array - Lancaster
Project No: E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	2.0	91.0	7.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in.	100.0		
#4	98.0		
#8	86.0		
#16	63.7		
#30	42.6		
#50	19.8		
#100	10.5		
#200	7.0		

(no specification provided)

Material Description

Well-graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 2.28 D_{60}= 1.05 D_{50}= 0.756
D_{30}= 0.419 D_{15}= 0.235 D_{10}= 0.139
C_u= 7.57 C_c= 1.21

Classification

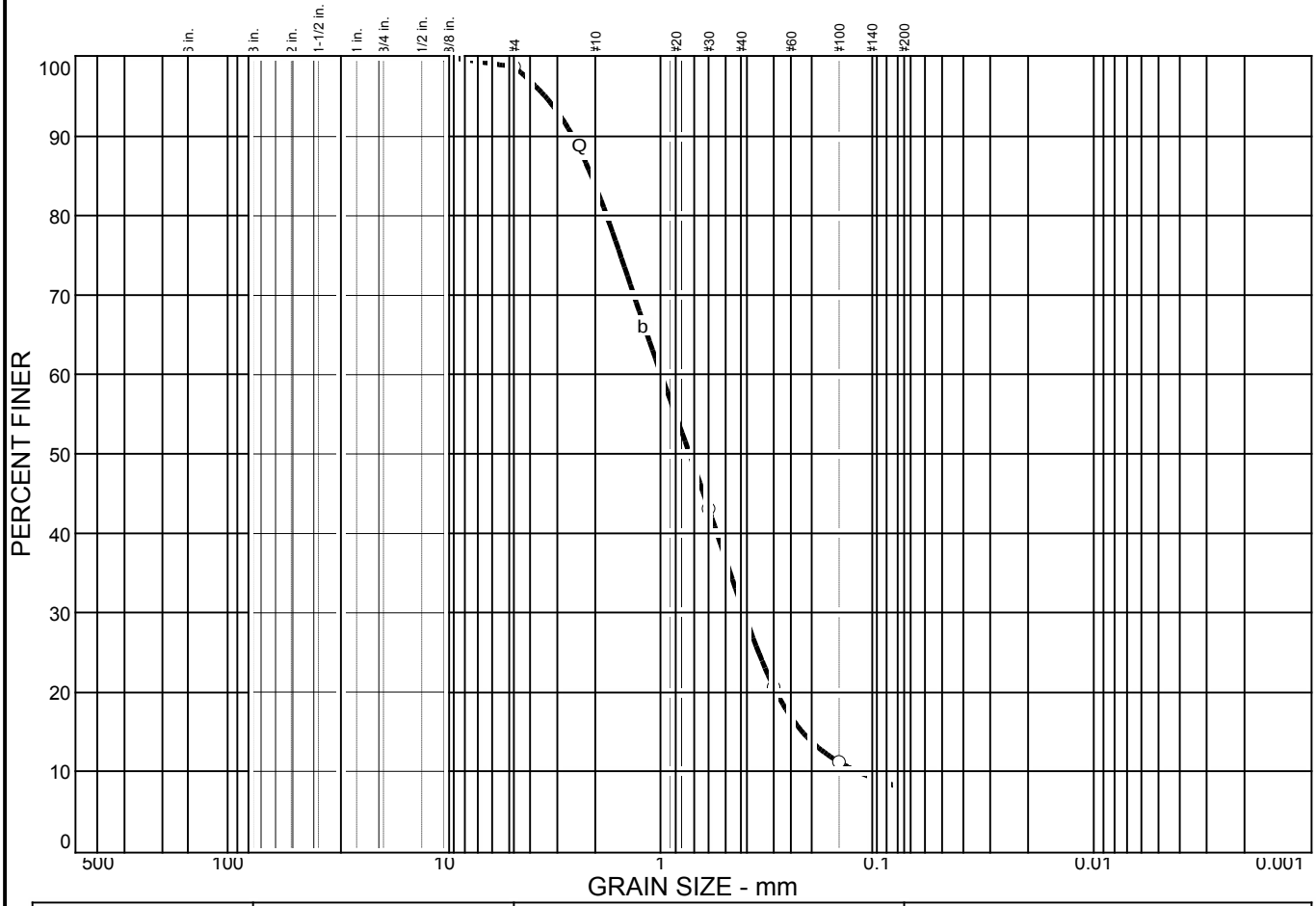
USCS= SW-SM AASHTO=

Remarks

Sample No.: B-9 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 5-6.5'

Moore Twining Associates, Inc.	**Client:**
Fresno, CA	**Project:** Proposed Solar Array - Lancaster
	Project No: E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	1.2	91.0	7.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in.	100.0		
#4	98.8		
#8	88.3		
#16	65.8		
#30	43.1		
#50	20.6		
#100	11.2		
#200	7.8		

(no specification provided)

Material Description

Well-graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 2.09 D_{60}= 0.995 D_{50}= 0.735
D_{30}= 0.413 D_{15}= 0.222 D_{10}= 0.123
C_u= 8.08 C_c= 1.39

Classification

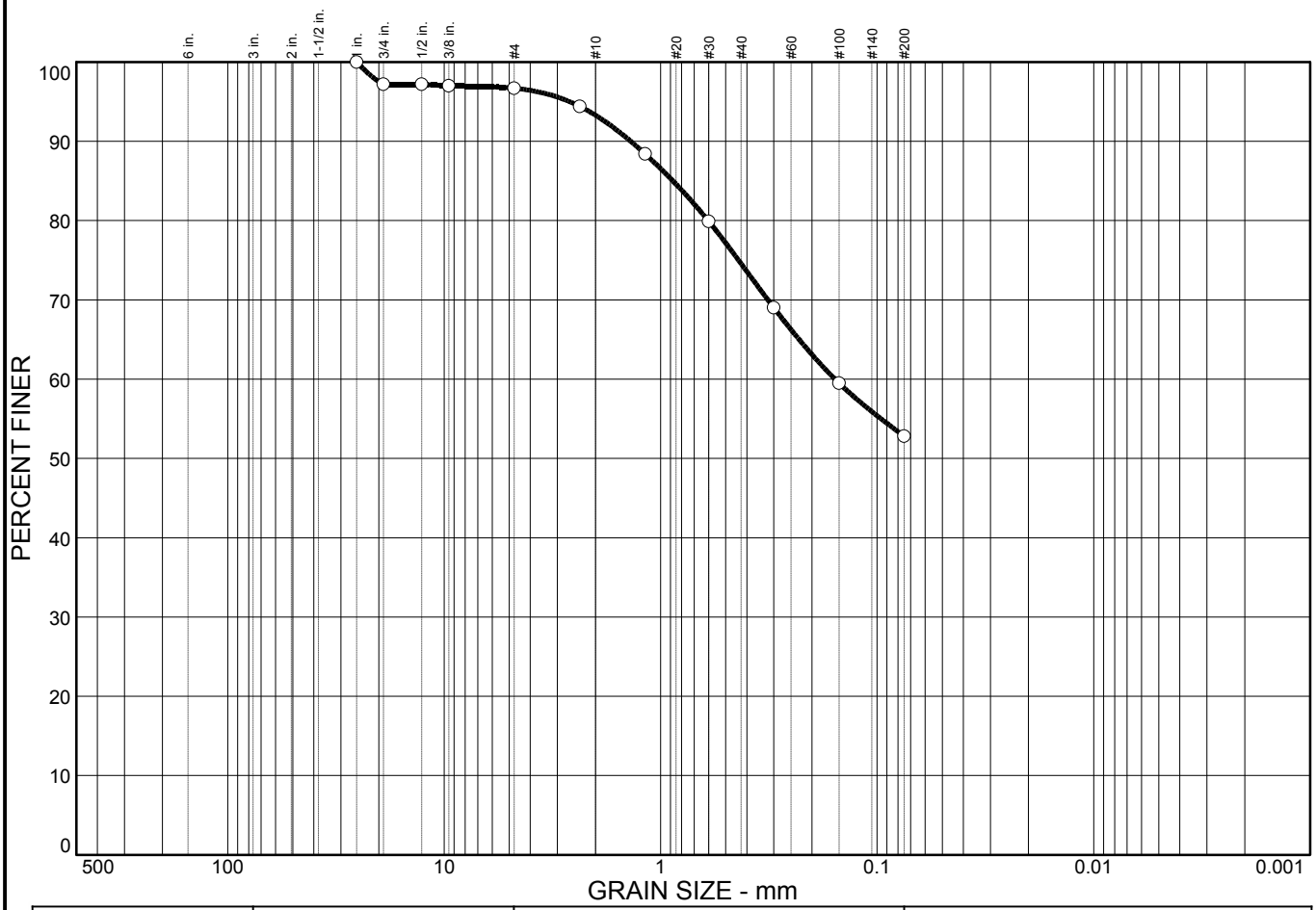
USCS= SW-SM AASHTO=

Remarks

Sample No.: B-12 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 10-11.5'

Moore Twining Associates, Inc. **Fresno, CA**	**Client:** **Project:** Proposed Solar Array - Lancaster **Project No:** E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	3.3	43.9	52.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	97.2		
1/2 in.	97.2		
3/8 in.	97.0		
#4	96.7		
#8	94.4		
#16	88.4		
#30	79.9		
#50	69.0		
#100	59.5		
#200	52.8		

(no specification provided)

Material Description

Sandy lean clay

Atterberg Limits

PL= 20 LL= 37 PI= 17

Coefficients

D_{85}= 0.878 D_{60}= 0.157 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

Sample No.: B-16 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 0-5'

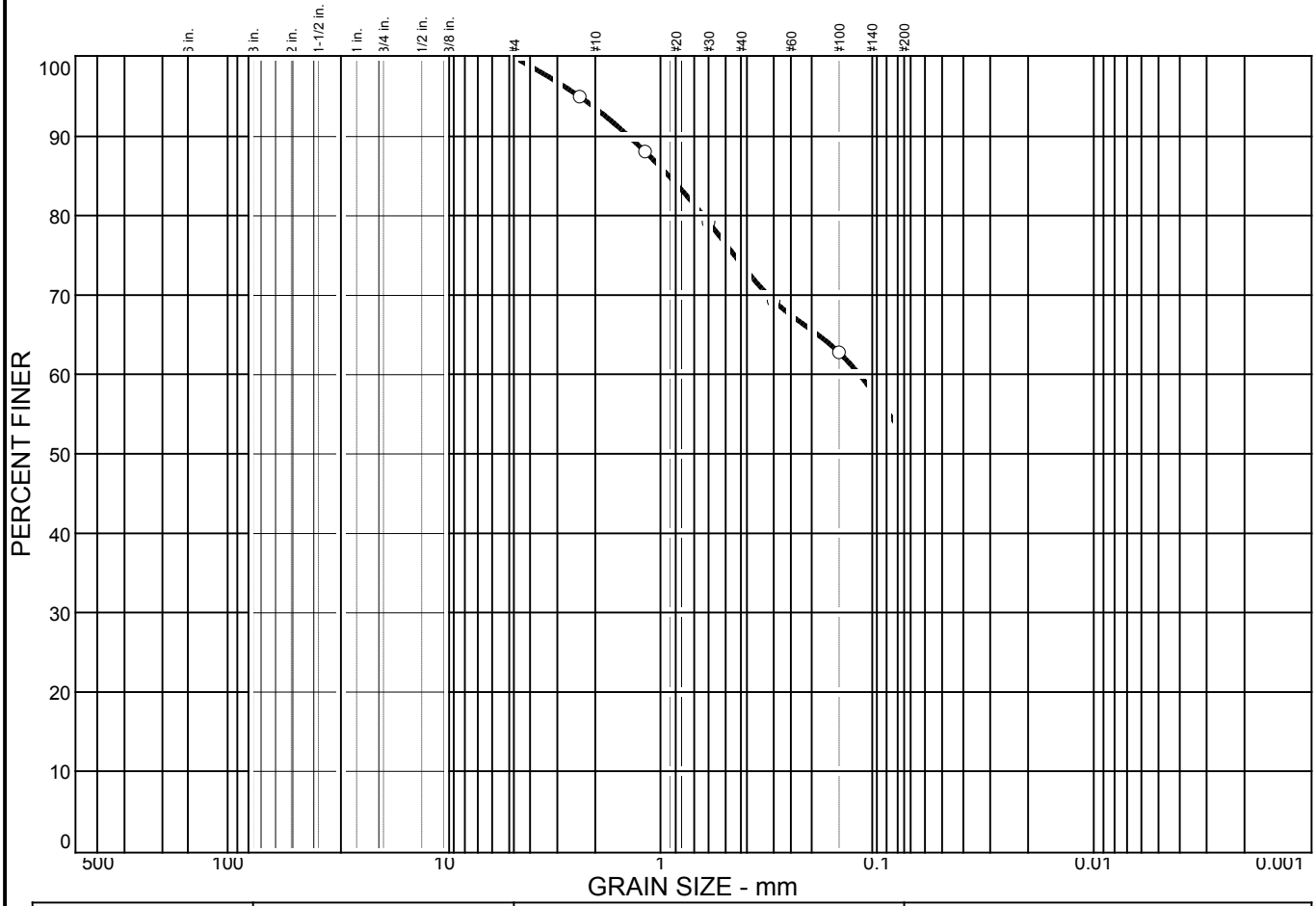
Moore Twining Associates, Inc.

Fresno, CA

Client:
Project: Proposed Solar Array - Lancaster

Project No: E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	47.7	52.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	95.0		
#16	88.1		
#30	79.2		
#50	69.3		
#100	62.8		
#200	52.3		

(no specification provided)

Material Description

Sandy silt

Atterberg Limits

PL= 28 LL= 47 PI= 19

Coefficients

D_{85}= 0.914 D_{60}= 0.121 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

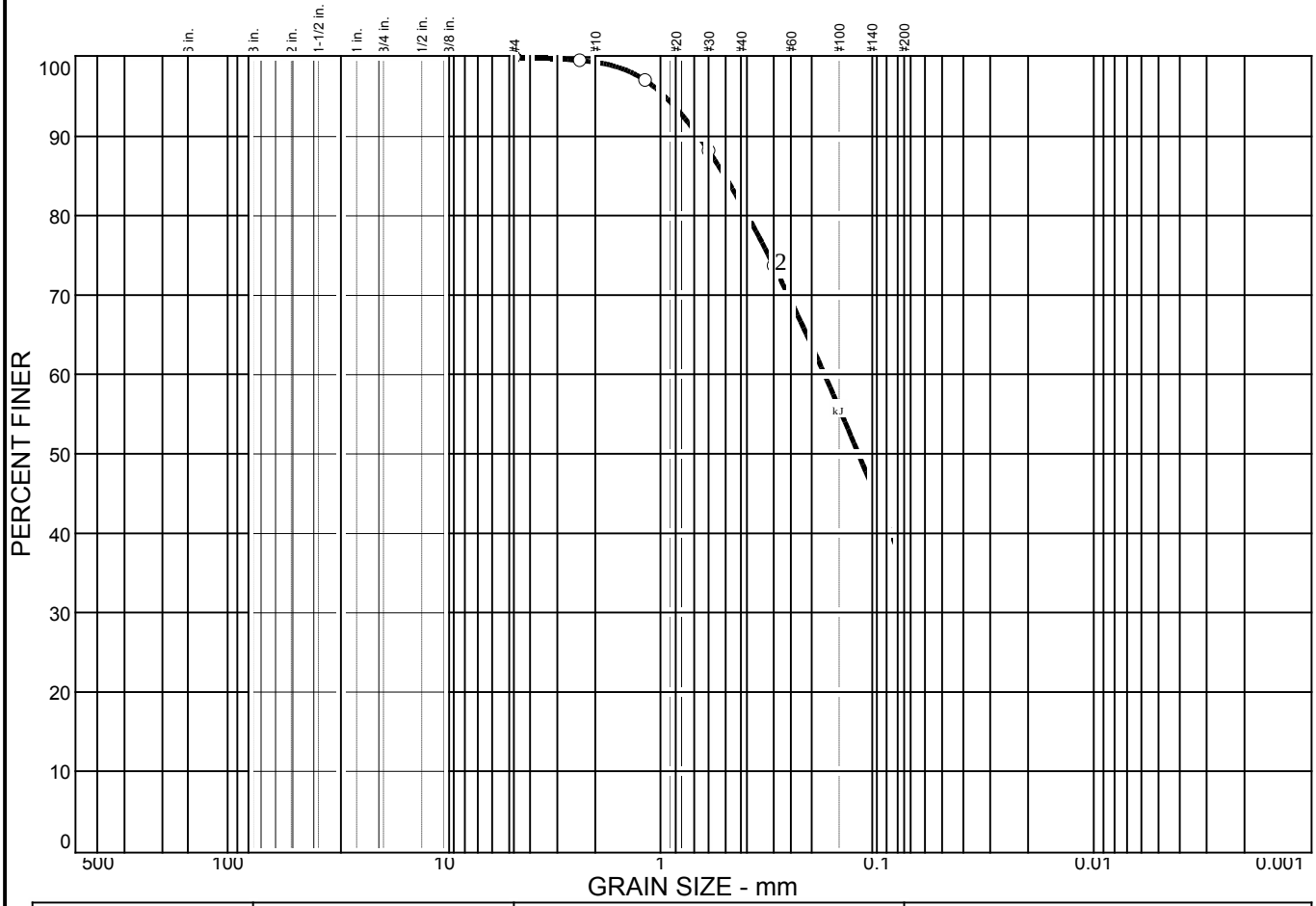
USCS= ML AASHTO=

Remarks

Sample No.: B-18 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 2-3.5'

Moore Twining Associates, Inc.	**Client:**
Fresno, CA	**Project:** Proposed Solar Array - Lancaster
	Project No: E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	64.1	35.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.6		
#16	97.1		
#30	88.2		
#50	73.7		
#100	55.8		
#200	35.9		

(no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

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

Classification

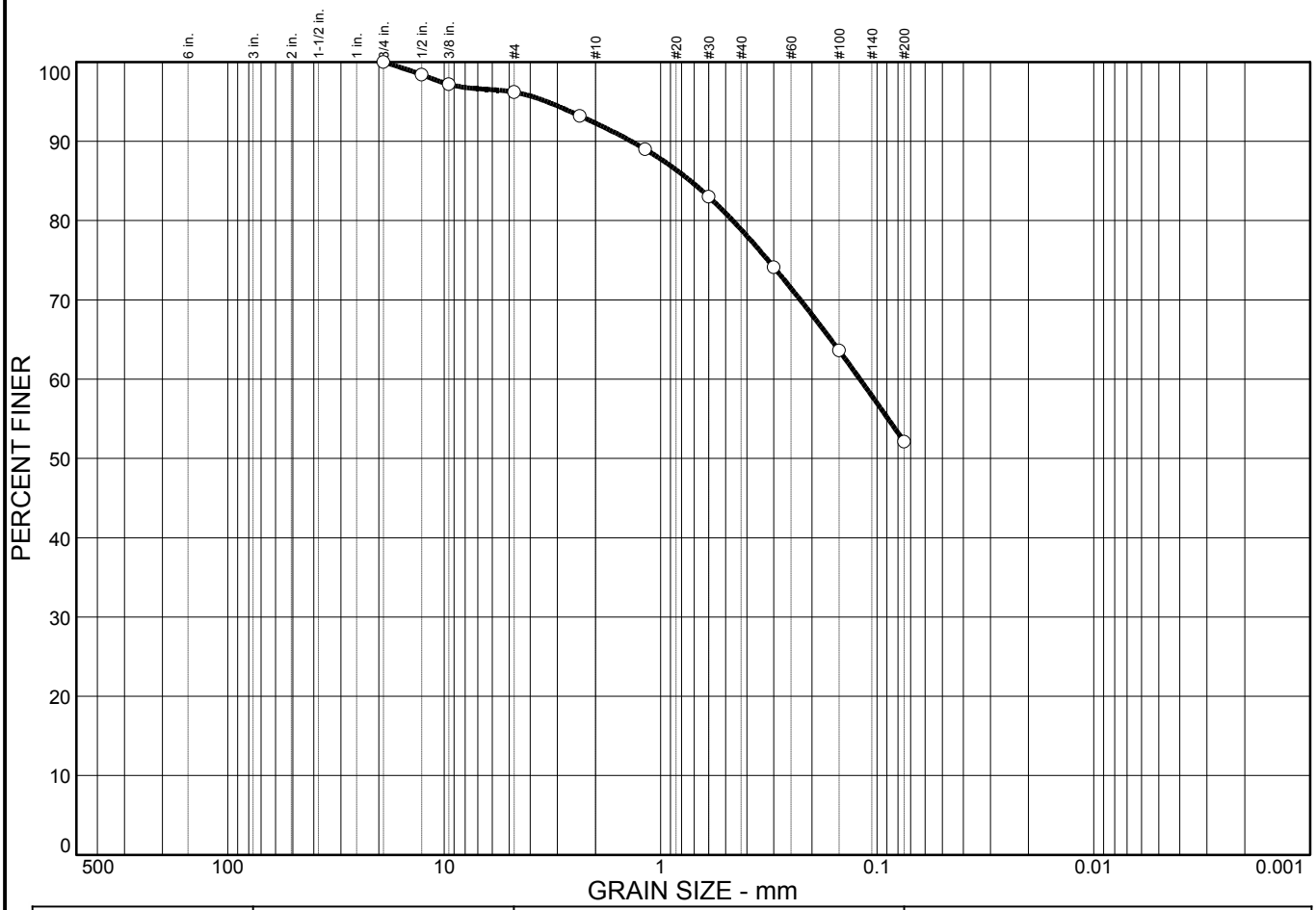
USCS= AASHTO=

Remarks

Sample No.: B-22 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 2-3.5'

Moore Twining Associates, Inc. **Fresno, CA**	**Client:** **Project:** Proposed Solar Array - Lancaster **Project No:** E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	3.8	44.1	52.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
1/2 in.	98.4		
3/8 in.	97.2		
#4	96.2		
#8	93.2		
#16	89.0		
#30	83.0		
#50	74.1		
#100	63.6		
#200	52.1		

(no specification provided)

Material Description

Sandy lean clay

Atterberg Limits

PL= 18 LL= 42 PI= 24

Coefficients

D_{85}= 0.729 D_{60}= 0.120 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

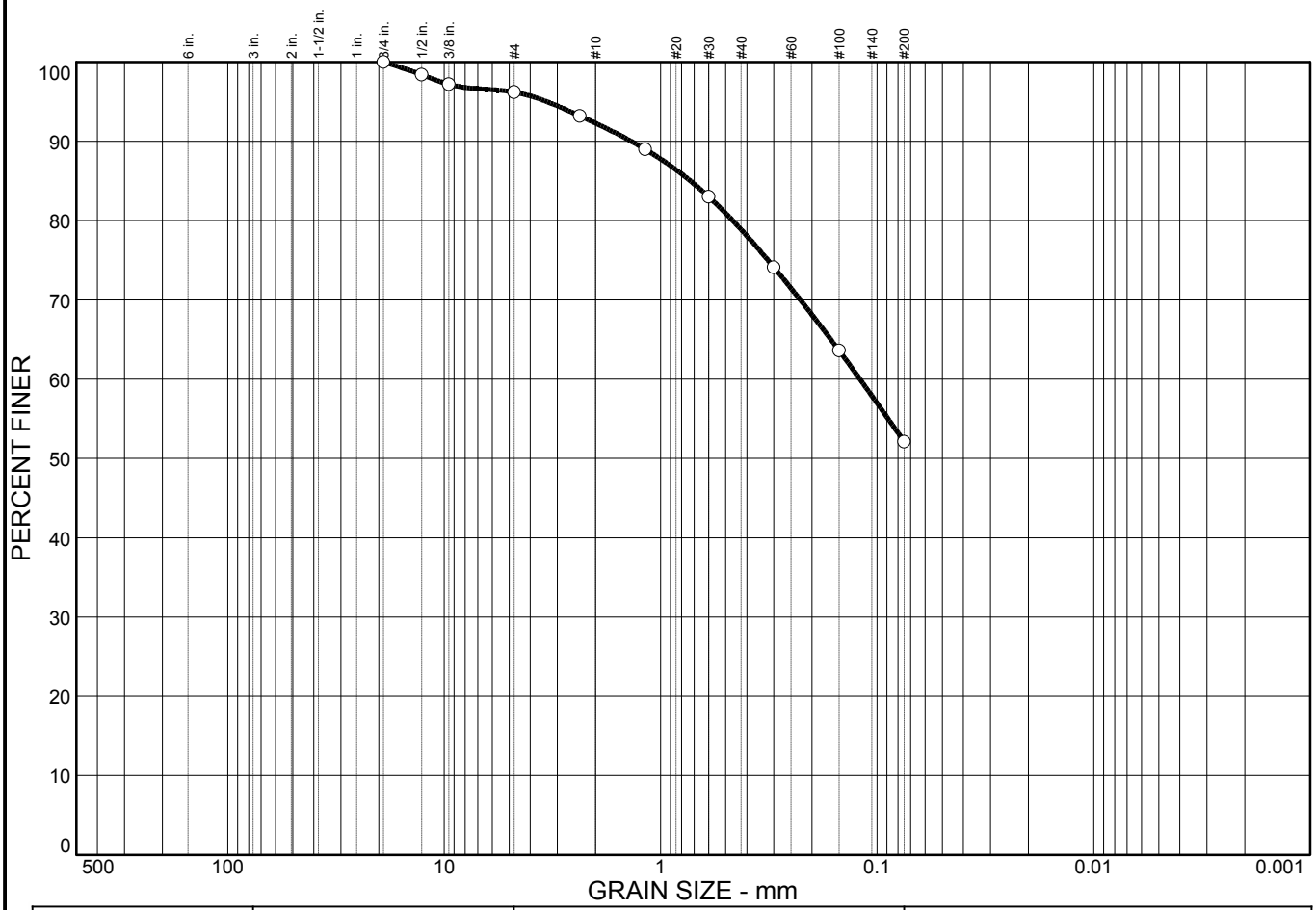
Sample No.: B-23 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 0-5'

Moore Twining Associates, Inc.

Fresno, CA

Client:
Project: Proposed Solar Array - Lancaster
Project No: E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	3.8	44.1	52.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
1/2 in.	98.4		
3/8 in.	97.2		
#4	96.2		
#8	93.2		
#16	89.0		
#30	83.0		
#50	74.1		
#100	63.6		
#200	52.1		

(no specification provided)

Material Description

Sandy silty clay

Atterberg Limits

PL= 20 LL= 26 PI= 6

Coefficients

D_{85}= 0.729 D_{60}= 0.120 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL-ML AASHTO=

Remarks

Sample No.: B-26 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 3-4.5'

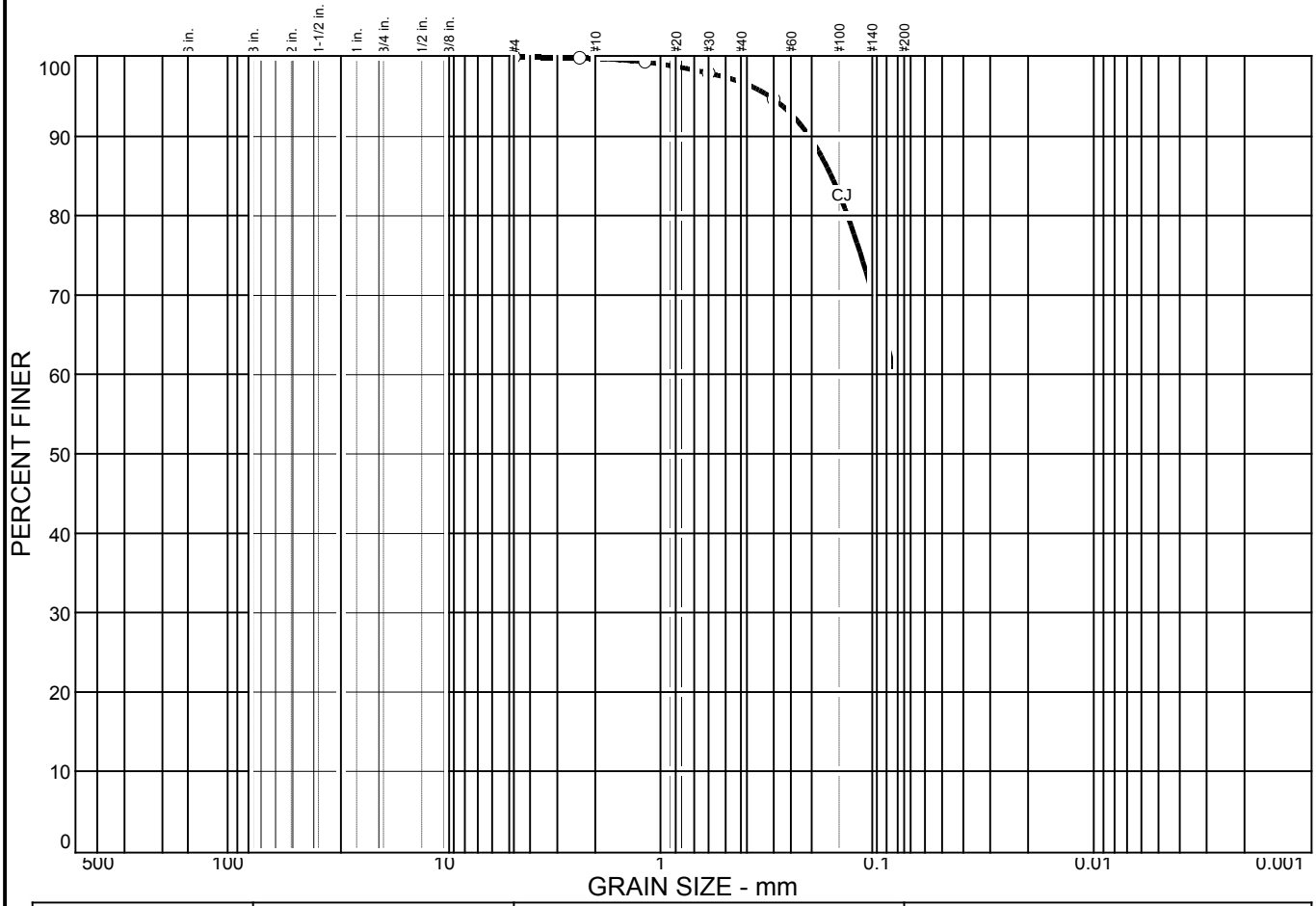
Moore Twining Associates, Inc.

Fresno, CA

Client:
Project: Proposed Solar Array - Lancaster

Project No: E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	44.2	55.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#16	99.4		
#30	98.0		
#50	94.7		
#100	82.8		
#200	55.8		

(no specification provided)

Material Description

Sandy silt

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 0.163 D_{60}= 0.0825 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

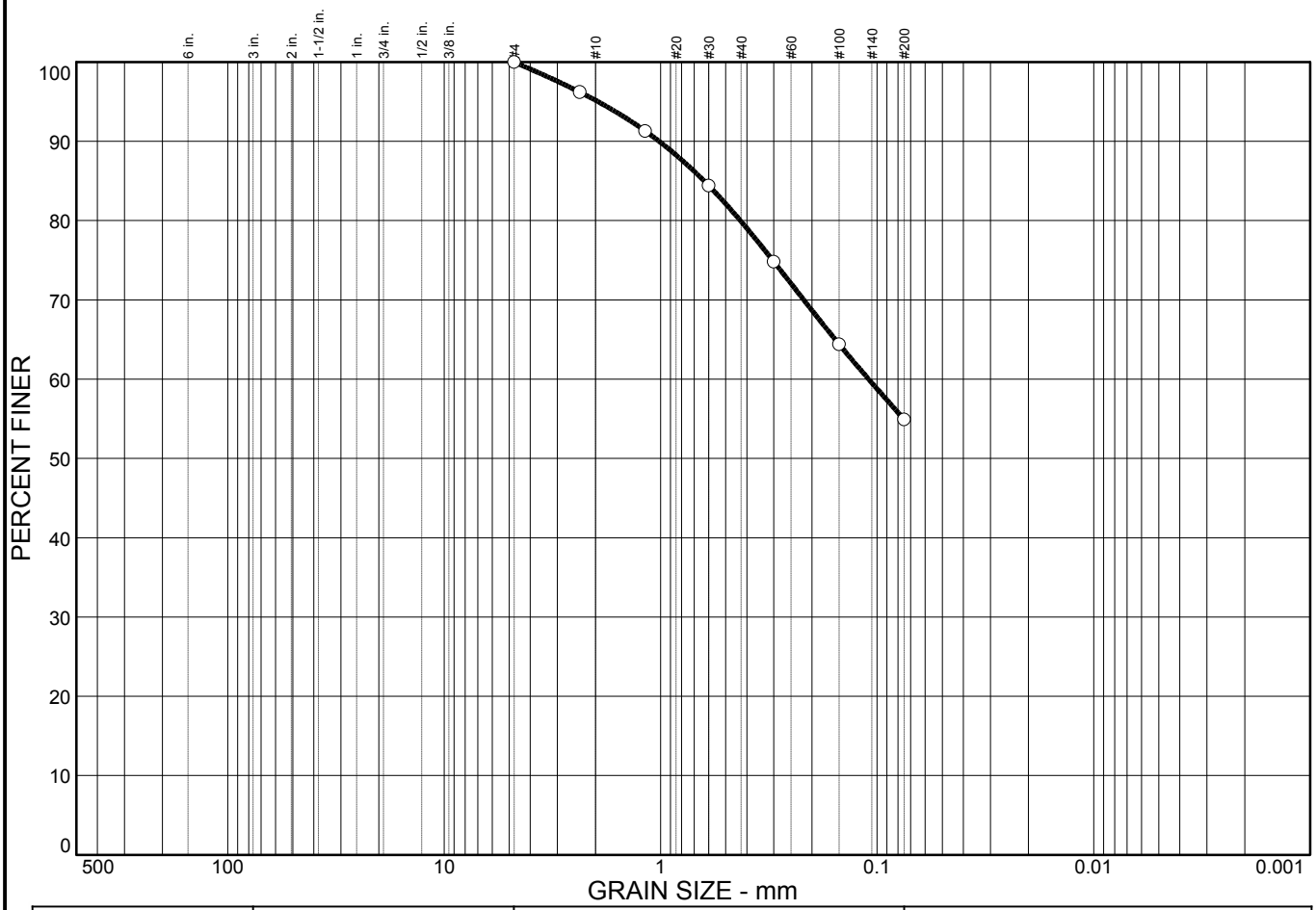
USCS= ML AASHTO=

Remarks

Sample No.: B-31 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 10-11.5'

Moore Twining Associates, Inc. **Fresno, CA**	**Client:** **Project:** Proposed Solar Array - Lancaster **Project No:** E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	45.1	54.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	96.2		
#16	91.3		
#30	84.4		
#50	74.8		
#100	64.4		
#200	54.9		

(no specification provided)

Material Description

Sandy silt

Atterberg Limits

PL= 26 LL= 38 PI= 12

Coefficients

D_{85}= 0.631 D_{60}= 0.110 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Sample No.: B-33 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 0-3.5'

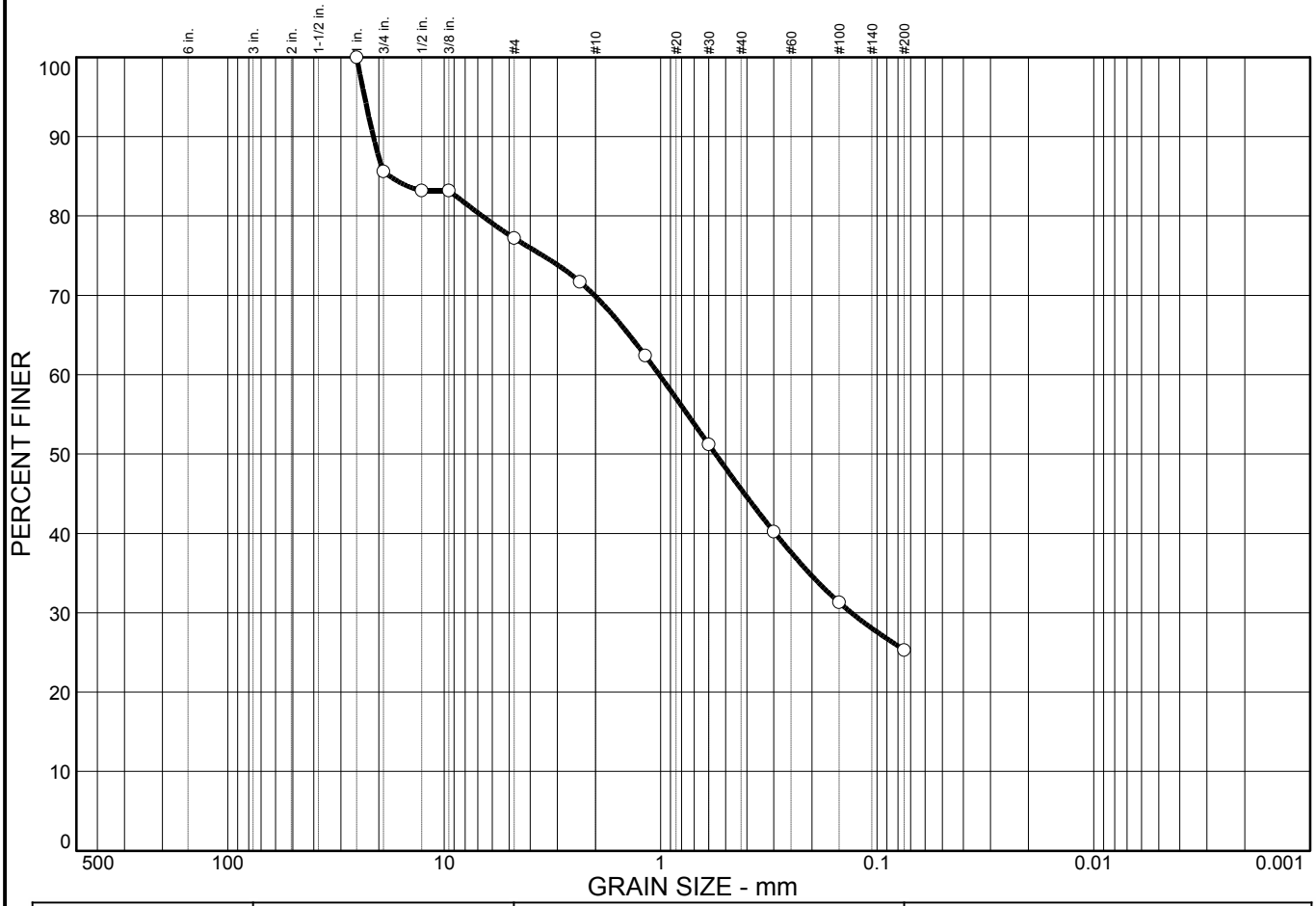
Moore Twining Associates, Inc.

Fresno, CA

Client:
Project: Proposed Solar Array - Lancaster

Project No: E468R6.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	22.8	51.9	25.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	85.6		
1/2 in.	83.2		
3/8 in.	83.2		
#4	77.2		
#8	71.7		
#16	62.4		
#30	51.2		
#50	40.2		
#100	31.3		
#200	25.3		

(no specification provided)

Material Description

Lean clay

Atterberg Limits

PL= LL= PI=

Coefficients

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

Classification

USCS= CL AASHTO=

Remarks

Sample No.: B-35 **Source of Sample:** **Date:** 4/12/21
Location: **Elev./Depth:** 3.5-5'

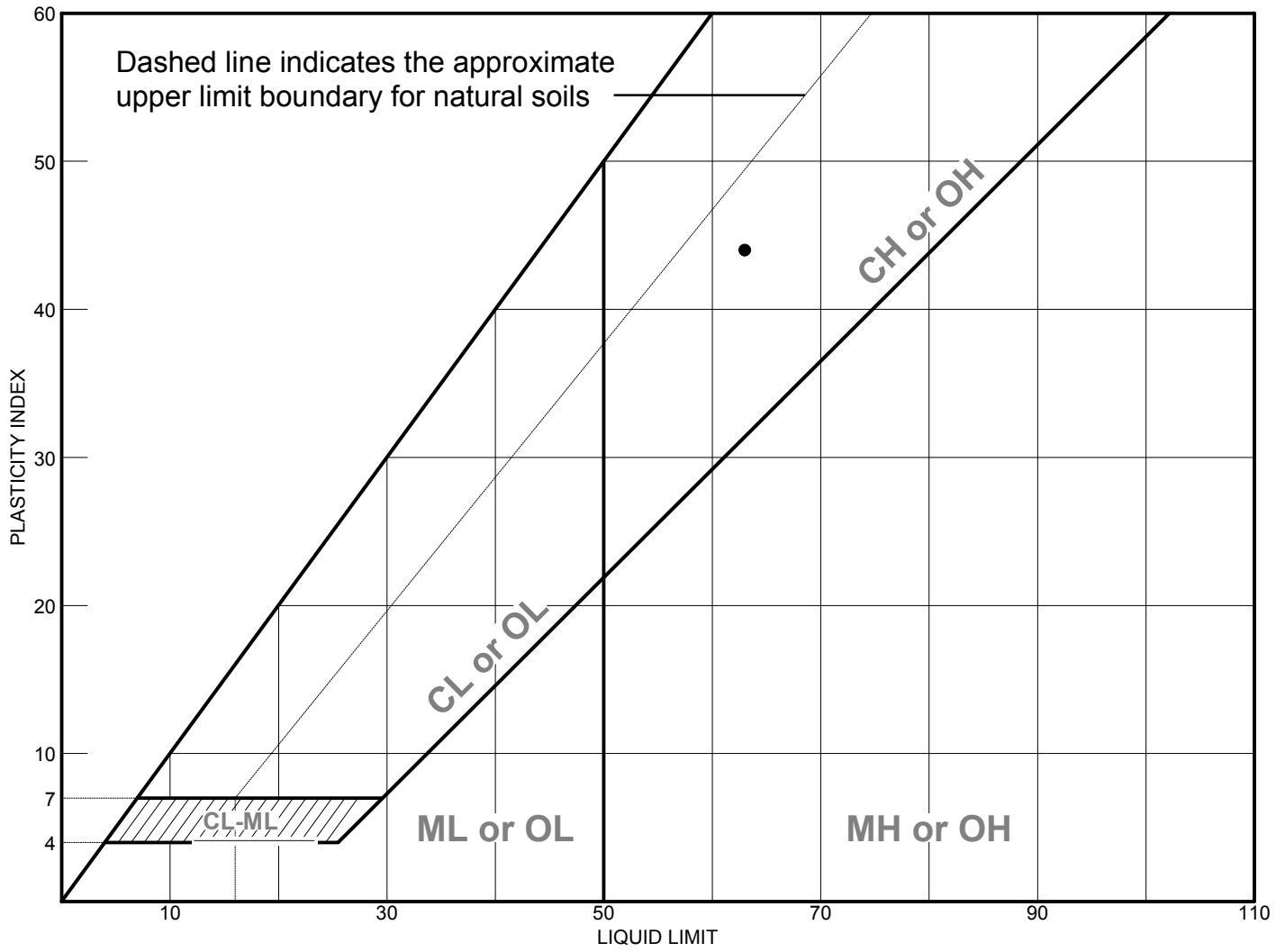
Moore Twining Associates, Inc.

Fresno, CA

Client:
Project: Proposed Solar Array - Lancaster

Project No: E468R6.01 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Fat clay	63	19	44			CH

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-2 **Elev./Depth:** 11.5-13'

Remarks:

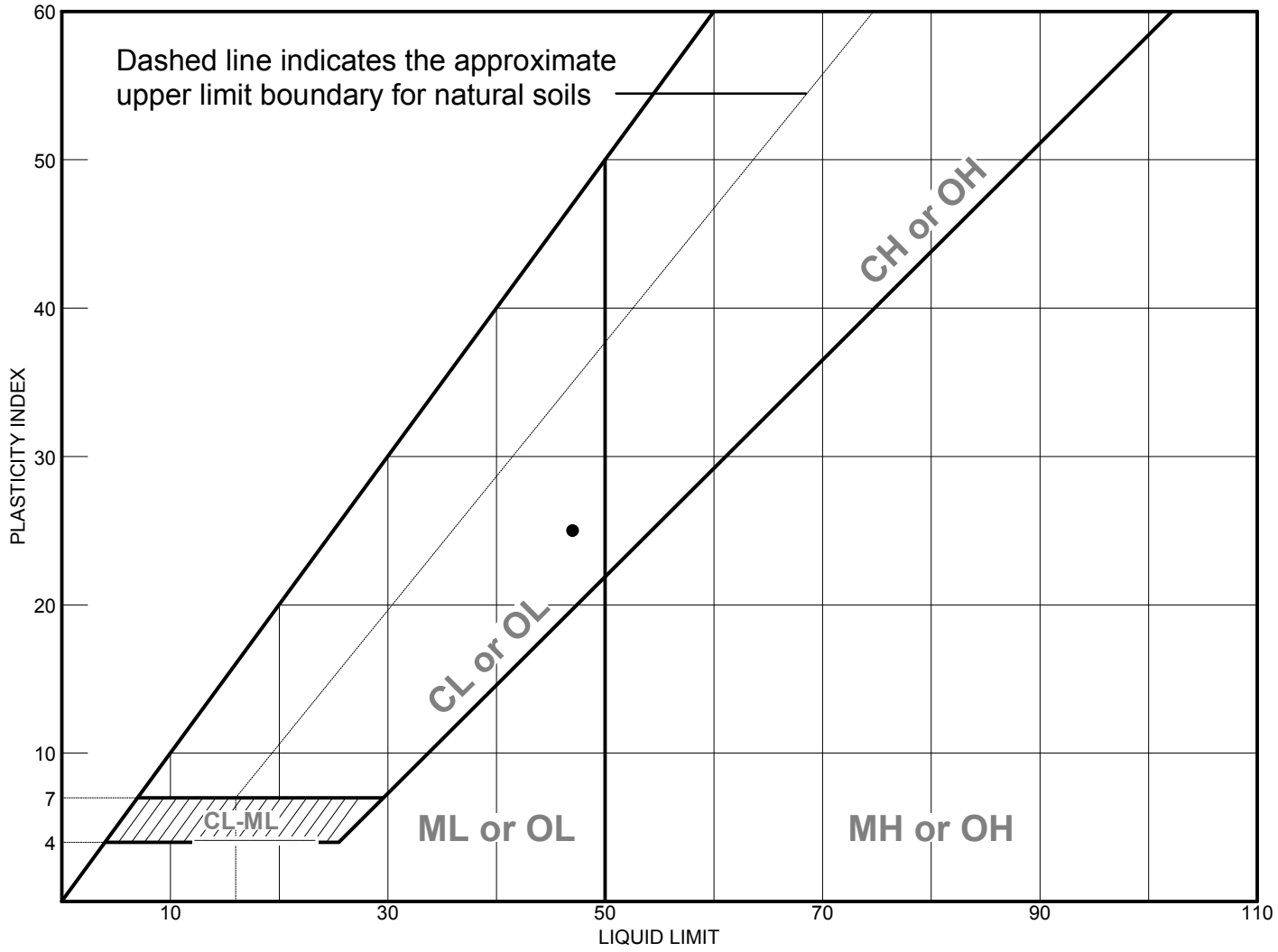
●

Moore Twining Associates, Inc.

Fresno, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy lean clay	47	22	25	68.0	55.0	CL

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-3 **Elev./Depth:** 3.5-5'

Remarks:

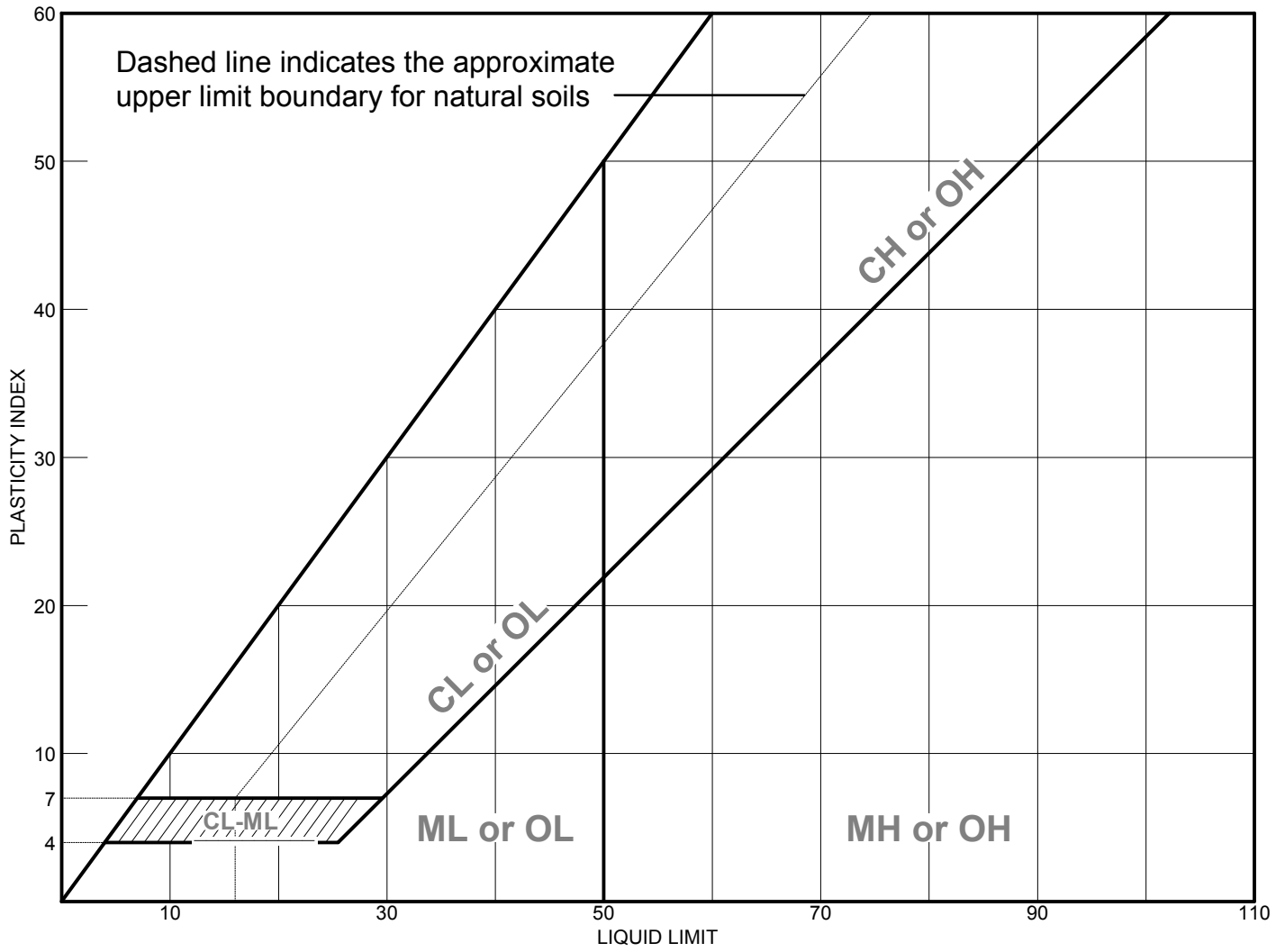
●

Moore Twining Associates, Inc.

Fresno, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silty sand	NV	NP	NP	59.3	32.5	SM

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-5 **Elev./Depth:** 0-5'

Remarks:

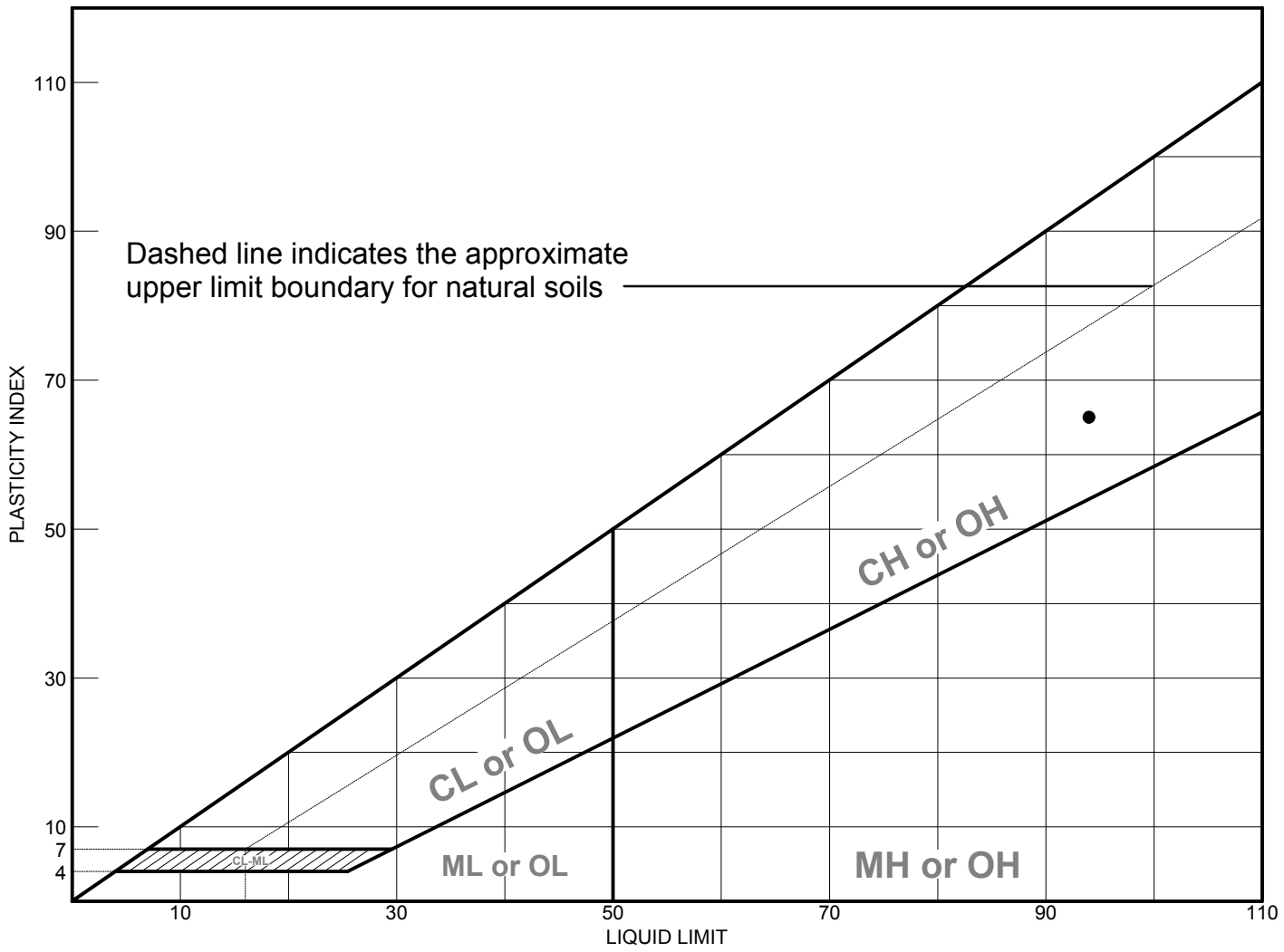
●

Moore Twining Associates, Inc.

Fresno, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Fat clay	94	29	65			CH

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-5 **Elev./Depth:** 11.5-13'

Remarks:

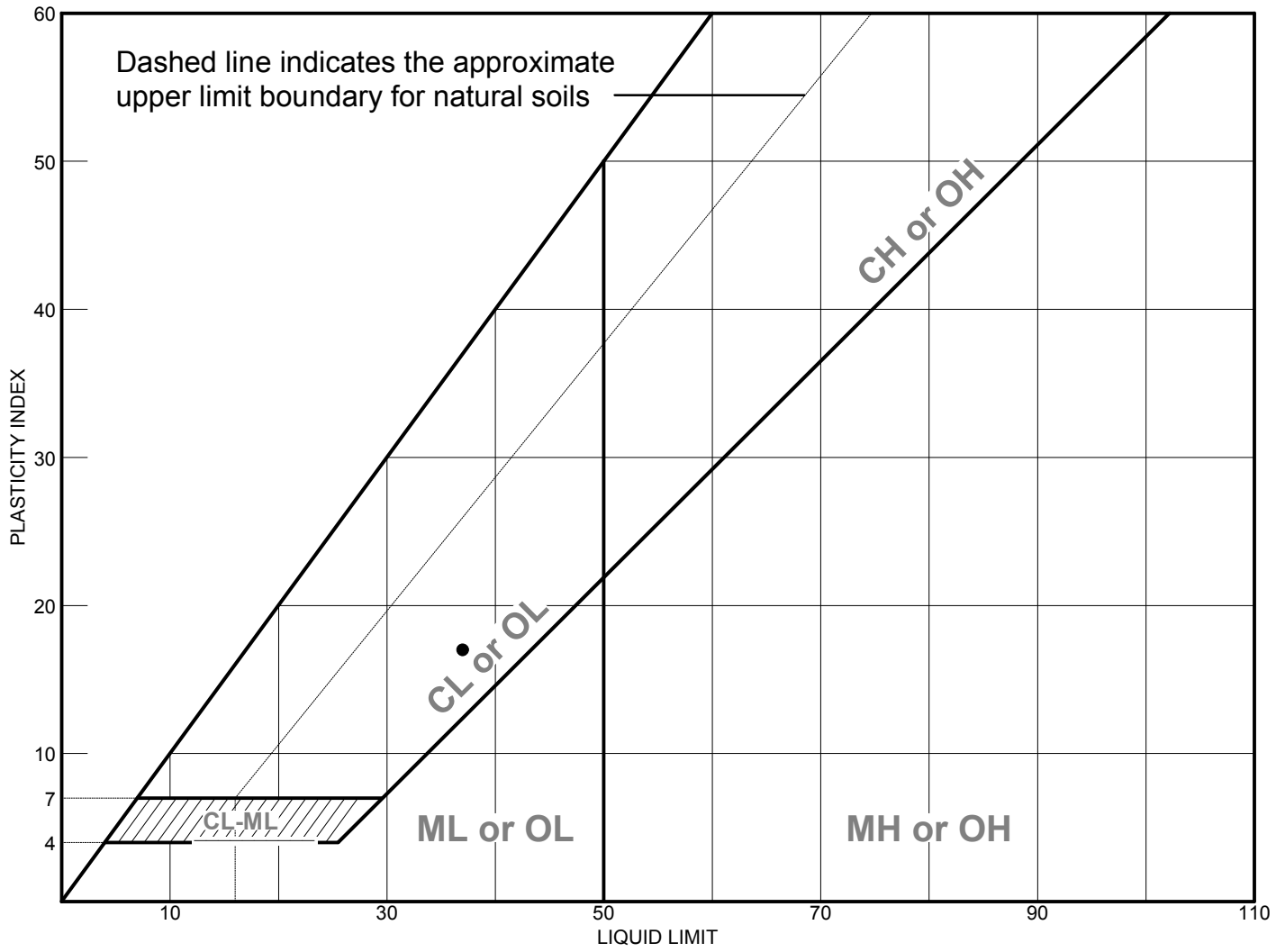
●

Moore Twining Associates, Inc.

Fresno, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy lean clay	37	20	17	74.6	52.8	CL

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-16 **Elev./Depth:** 0-5'

Remarks:

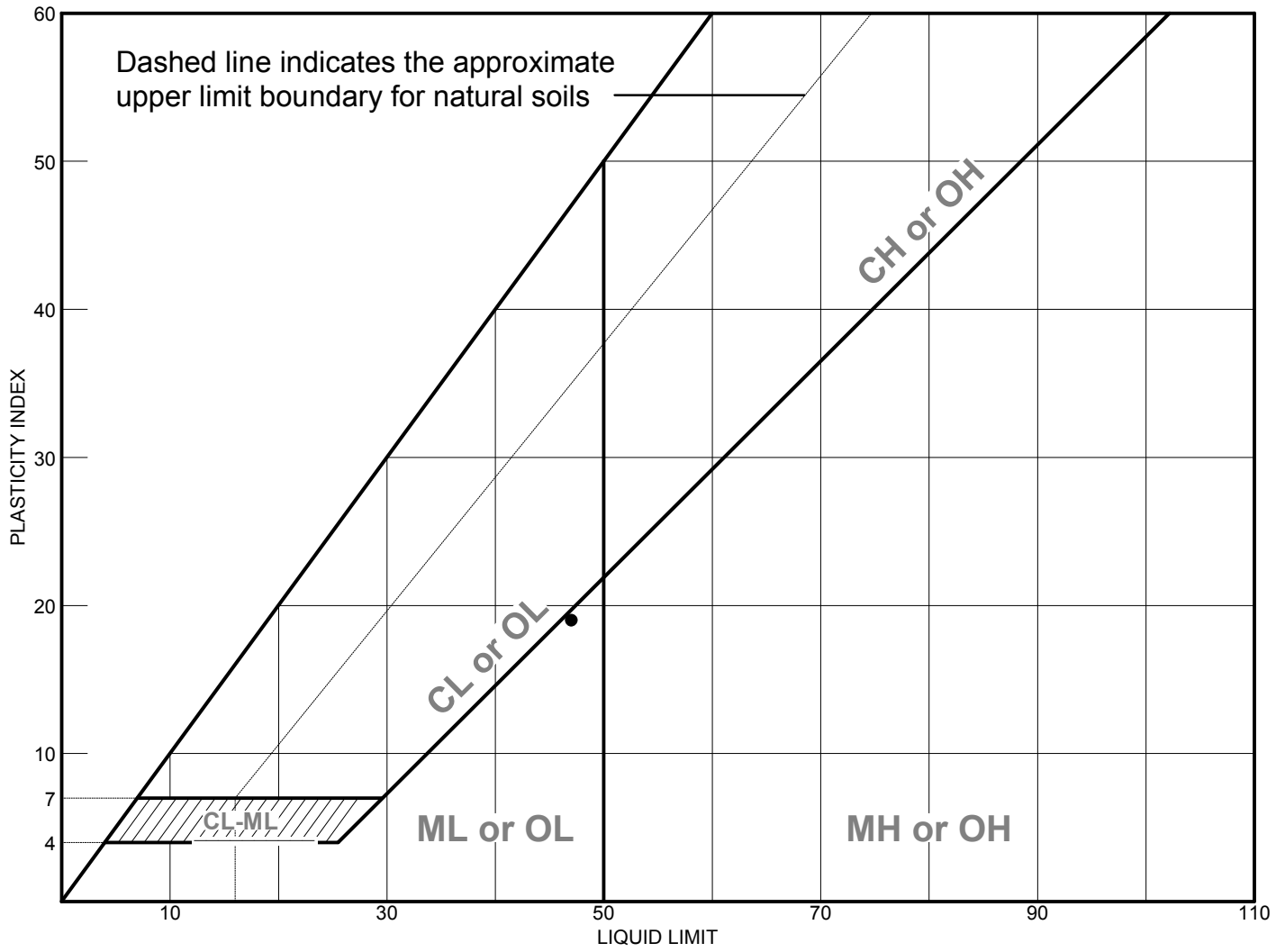
●

Moore Twining Associates, Inc.

Fresno, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy silt	47	28	19	74.0	52.3	ML

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-18 **Elev./Depth:** 2-3.5'

Remarks:

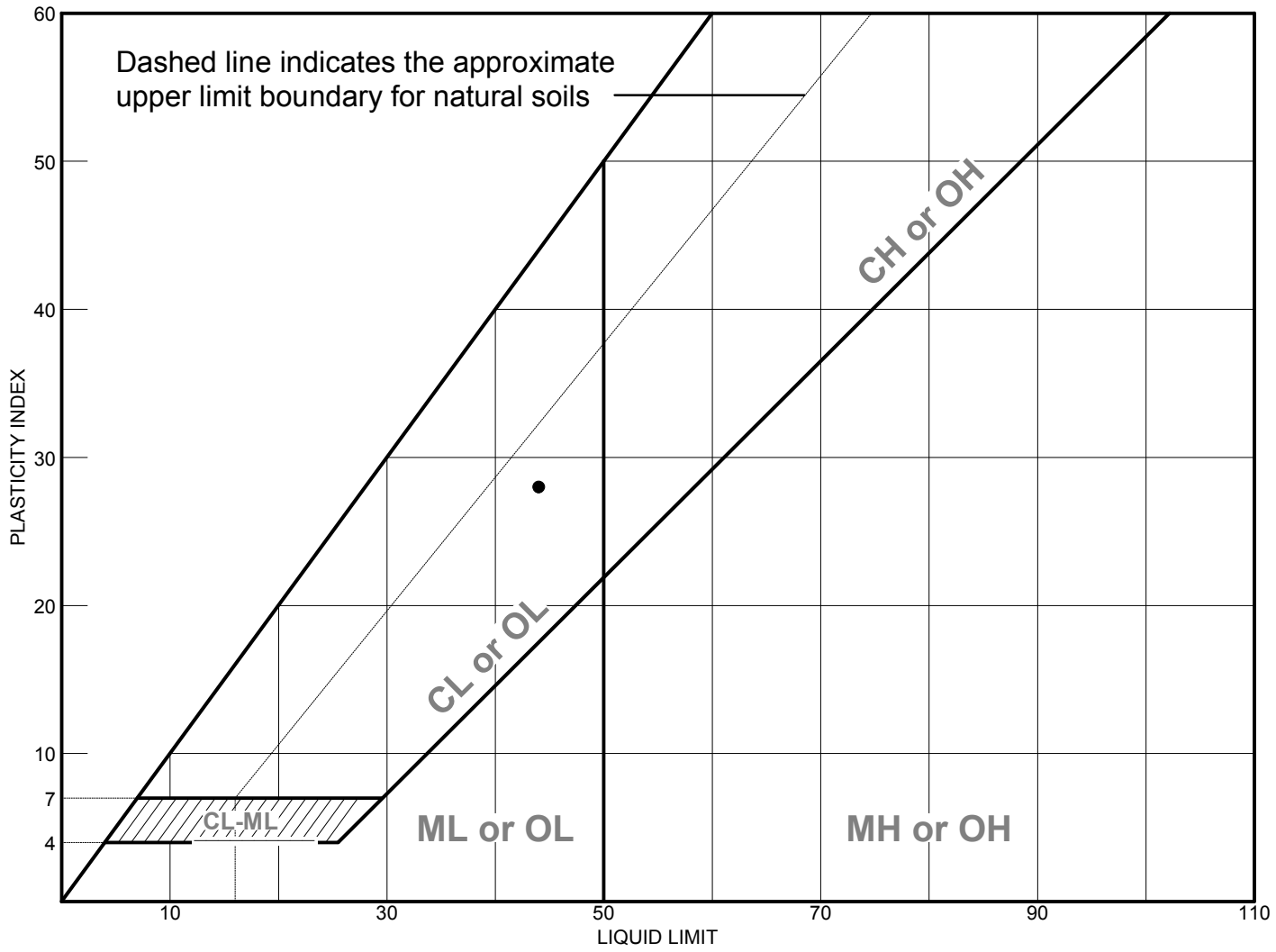
●

Moore Twining Associates, Inc.

Fresno, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean clay	44	16	28			CL

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-22 **Elev./Depth:** 11.5-13'

Remarks:

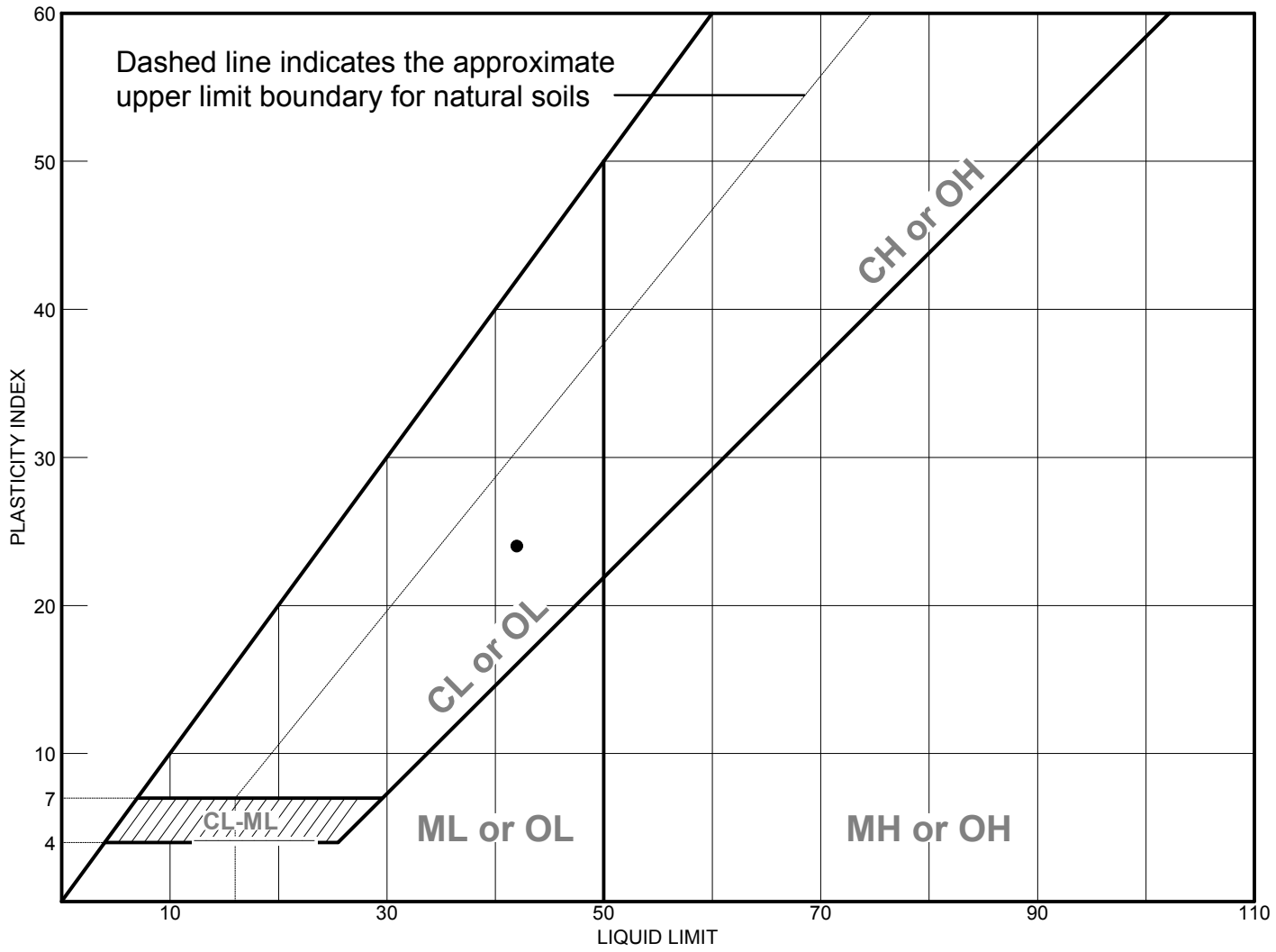
●

Moore Twining Associates, Inc.

Fresno, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy lean clay	42	18	24	78.9	52.1	CL

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-23 **Elev./Depth:** 0-5'

Remarks:

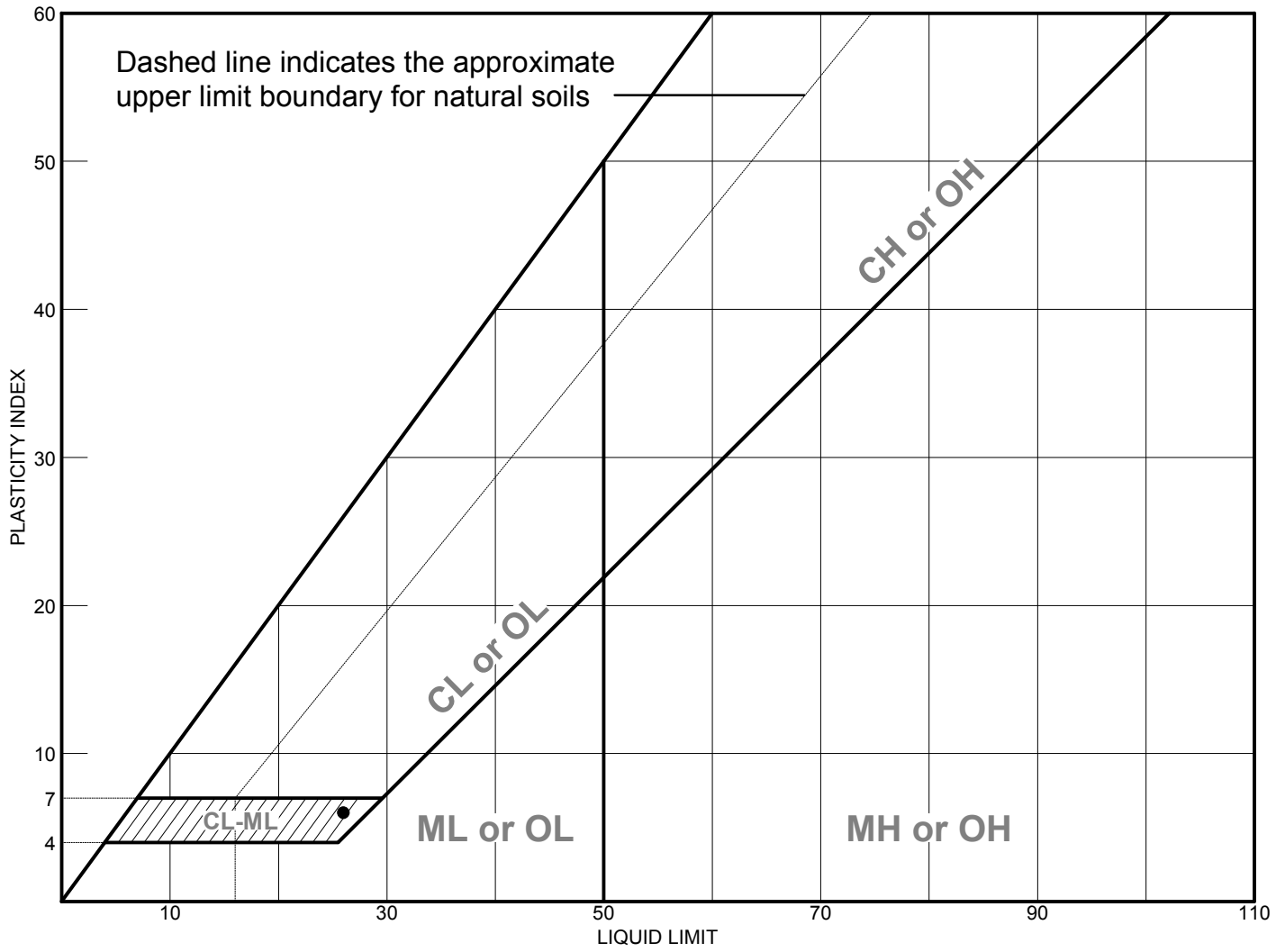
●

Moore Twining Associates, Inc.

Fresno, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy silty clay	26	20	6	78.9	52.1	CL-ML

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-26 **Elev./Depth:** 3-4.5'

Remarks:

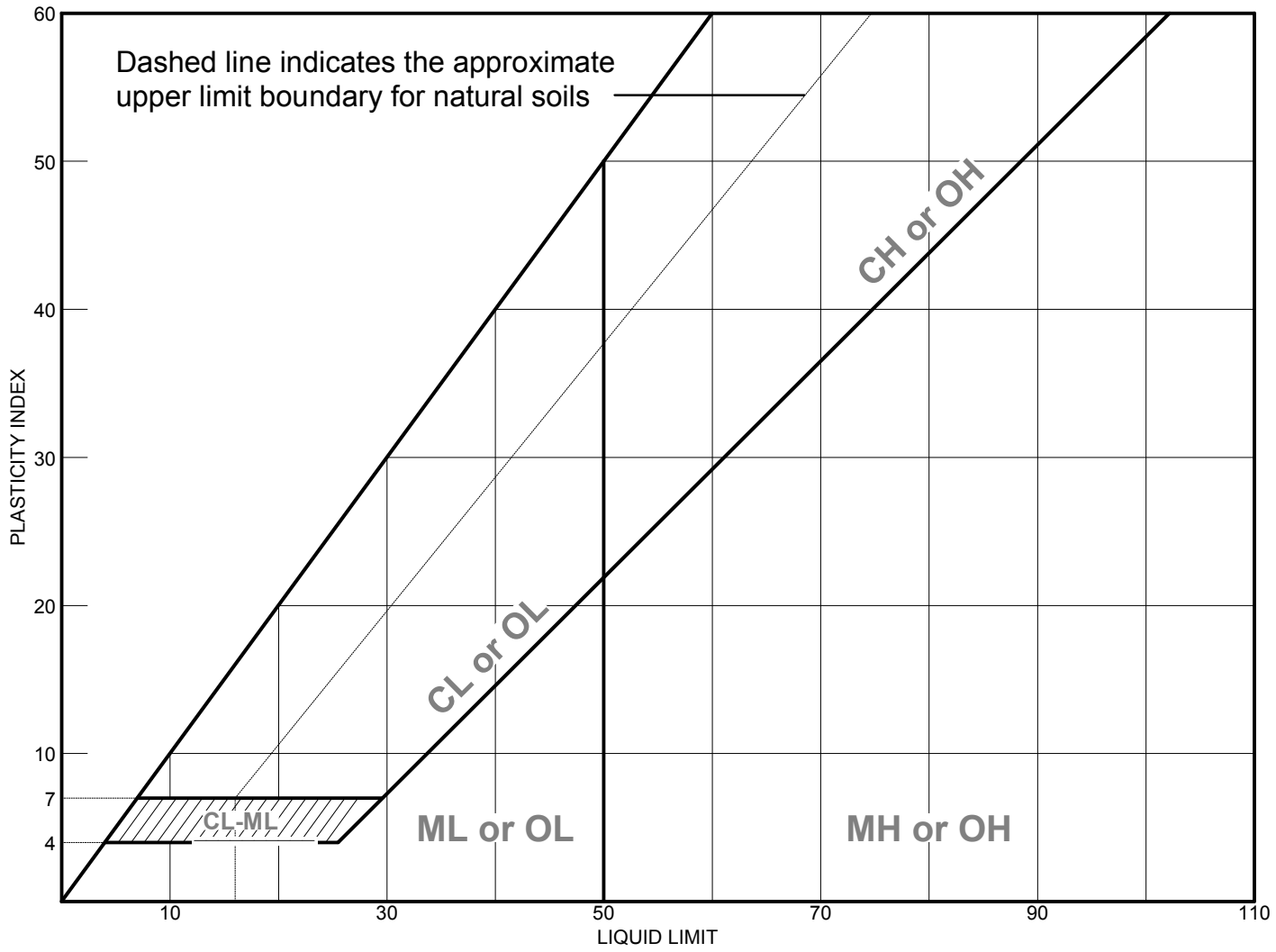
●

Moore Twining Associates, Inc.

Fresno, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy silt	NV	NP	NP	96.9	55.8	ML

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-31 **Elev./Depth:** 10-11.5'

Remarks:

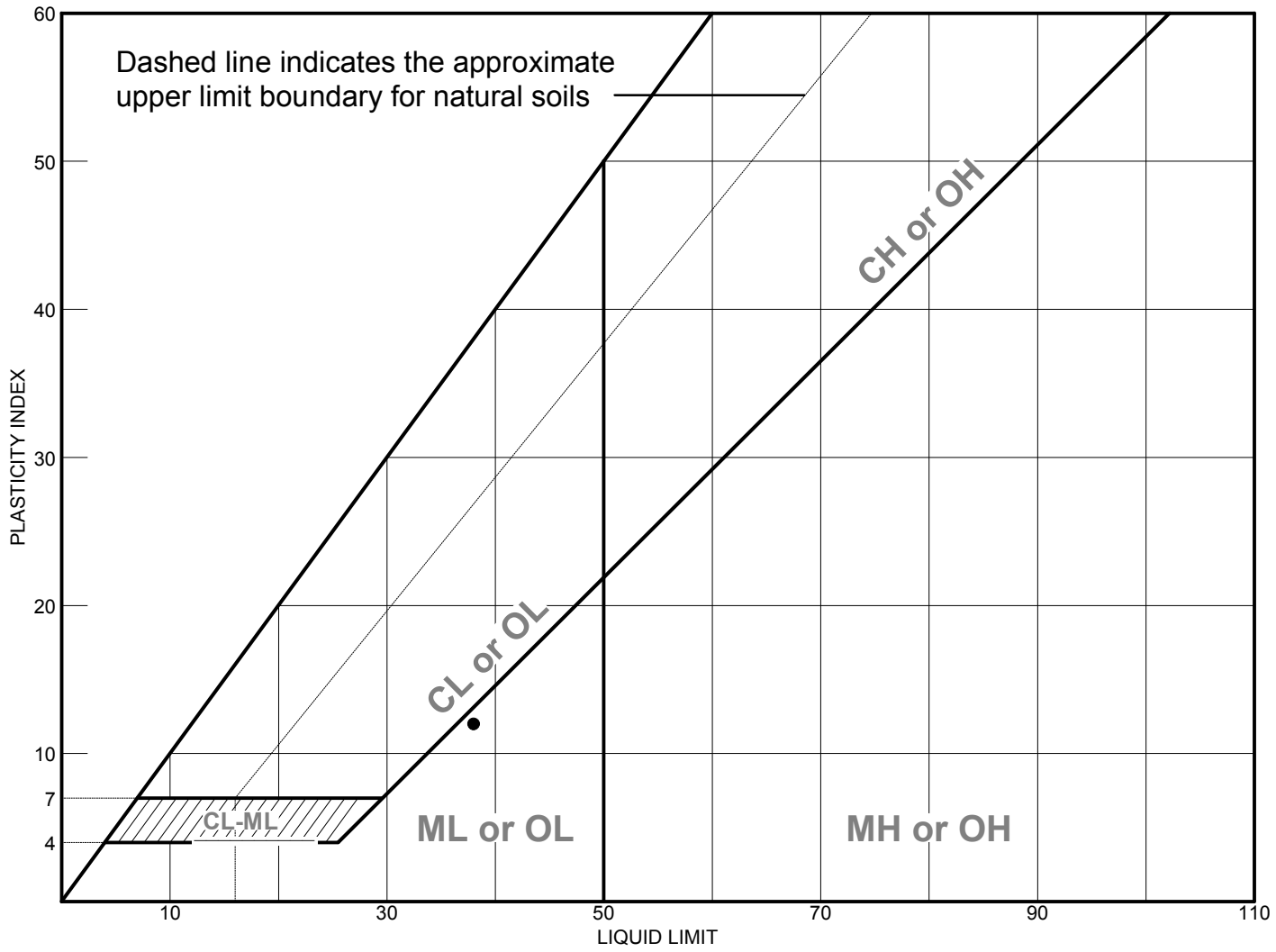
●

Moore Twining Associates, Inc.

Fresno, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy silt	38	26	12	79.9	54.9	ML

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-33 **Elev./Depth:** 0-3.5'

Remarks:

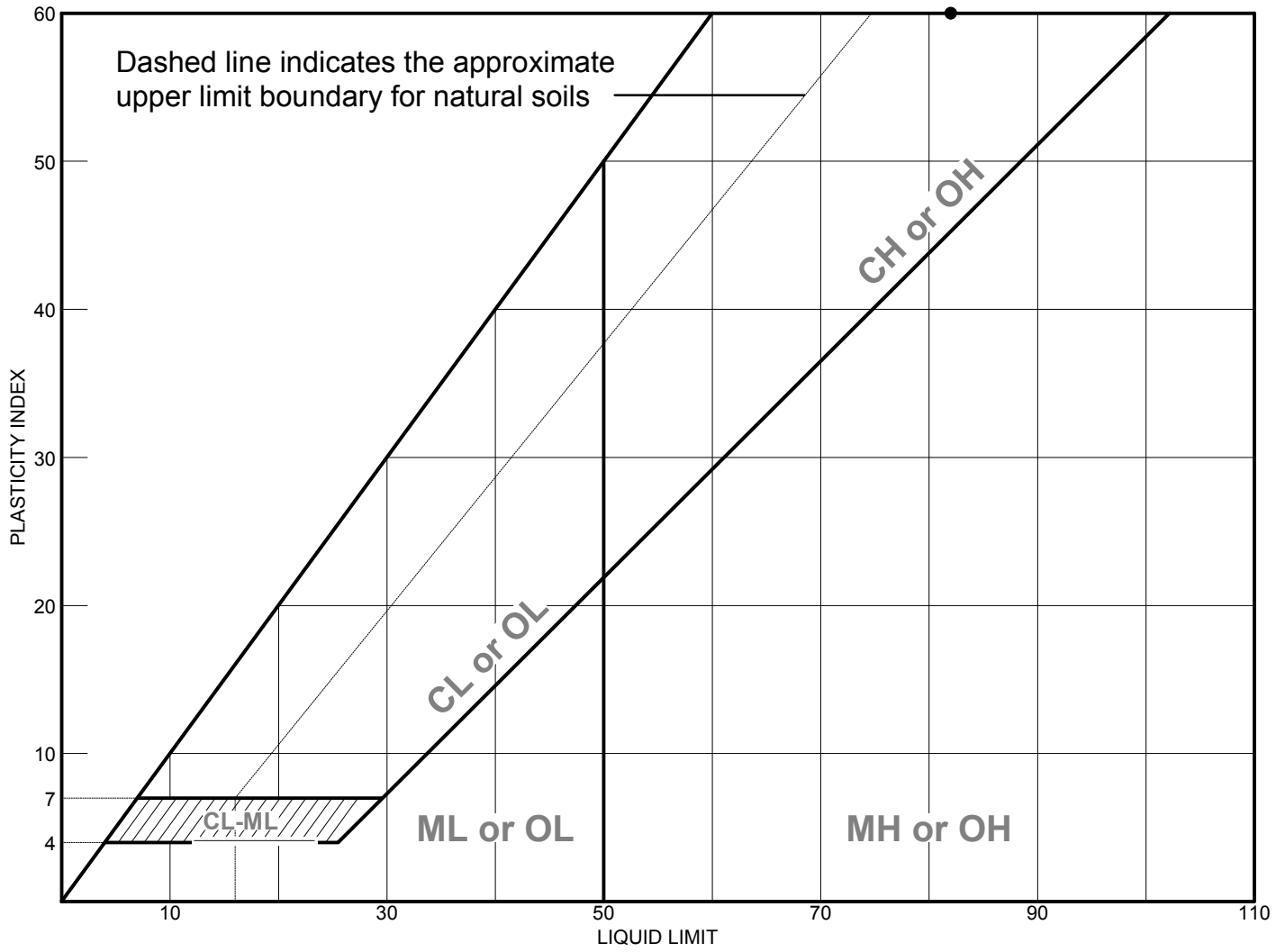
●

Moore Twining Associates, Inc.

Fresno, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Fat clay	82	22	60			CH

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-35 **Elev./Depth:** 10-11.5'

Remarks:

●

Moore Twining Associates, Inc.

Fresno, CA

Figure

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EXPANSION INDEX TEST, ASTM D4829

MTA PROJECT NAME:	Proposed Solar Array - Lancaster	REPORT DATE:	5/14/2021
		TEST DATE:	5/7/2021
MTA PROJECT NO.:	E468R6.01		
SAMPLE I.D.:	B-5 @ 0-5'		
SAMPLED BY:	ZA		
SAMPLE DATE:	4/12/2021	TESTED BY:	MA
MATERIALS DESCRIPTION:	Silty sand		
% PASSING # 4 SIEVE	100		

Initial Moisture Determination:		Final Moisture Determination:	
Pan + Wet Soil Wt., gm	250.0	Wet Soil Wt., lbs	0.9155
Pan + Dry Soil Wt., gm	222.8	Dry Soil Wt., lbs	0.7346
Pan Wt., gm	0.0		
Initial % Moisture Content	12.2	Final % Moisture Content	24.6

Initial Expansion Data:		**Final Expansion Data:**	
Ring + Sample Wt., lbs	0.8243	Ring + Sample Wt., lbs	0.9155
Ring Wt., lbs	0.0000	Ring Wt., lbs	0.0000
Remolded Wt., lbs	0.8243	Remolded Wt., lbs	0.9155
Remolded Wet Density, pcf	113.3	Remolded Wet Density, pcf	124.8
Remolded Dry Density, pcf	101.0	Remolded Dry Density, pcf	100.2

Expansion Data:		Initial Volume	Final Volume
		0.00727222	0.007334
Initial Gage Reading, in:	0.0500		
Final Gage Reading, in:	0.0585		
Expansion, in:	0.0085		
Expansion Index	9	**Comments:**	**Very Low Expansion Potential**

Classification of Expansive Soils. (Table No.1 From ASTM D4829)

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

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EXPANSION INDEX TEST, ASTM D4829

MTA PROJECT NAME:	Proposed Solar Array - Lancaster	REPORT DATE:	5/14/2021
		TEST DATE:	5/5/2021
MTA PROJECT NO.:	E468R6.01		
SAMPLE I.D.:	B-16 @ 0-5'		
SAMPLED BY:	ZA		
SAMPLE DATE:	4/12/2021	TESTED BY:	MA

MATERIALS DESCRIPTION: Sandy lean clay

% PASSING # 4 SIEVE 100

Initial Moisture Determination:		Final Moisture Determination:	
Pan + Wet Soil Wt., gm	250.0	Wet Soil Wt., lbs	0.8790
Pan + Dry Soil Wt., gm	216.0	Dry Soil Wt., lbs	0.6771
Pan Wt., gm	0.0		
Initial % Moisture Content	15.7	Final % Moisture Content	29.8

Initial Expansion Data:		**Final Expansion Data:**	
Ring + Sample Wt., lbs	0.7837	Ring + Sample Wt., lbs	0.8790
Ring Wt., lbs	0.0000	Ring Wt., lbs	0.0000
Remolded Wt., lbs	0.7837	Remolded Wt., lbs	0.8790
Remolded Wet Density, pcf	107.8	Remolded Wet Density, pcf	116.9
Remolded Dry Density, pcf	93.1	Remolded Dry Density, pcf	90.0

Expansion Data:		Initial Volume	Final Volume
		0.00727222	0.007522
Initial Gage Reading, in:	0.0500		
Final Gage Reading, in:	0.0843		
Expansion, in:	0.0343		
Expansion Index	34	**Comments:**	**Low Expansion Potential**

Classification of Expansive Soils. (Table No.1 From ASTM D4829)

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

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EXPANSION INDEX TEST, ASTM D4829

MTA PROJECT NAME:	Proposed Solar Array - Lancaster	REPORT DATE:	5/14/2021
		TEST DATE:	5/5/2021
MTA PROJECT NO.:	E468R6.01		
SAMPLE I.D.:	B-23 @ 0-5'		
SAMPLED BY:	ZA		
SAMPLE DATE:	4/12/2021	TESTED BY:	MA
MATERIALS DESCRIPTION:	Sandy lean clay		
% PASSING # 4 SIEVE	100		

Initial Moisture Determination:		Final Moisture Determination:	
Pan + Wet Soil Wt., gm	250.0	Wet Soil Wt., lbs	0.8766
Pan + Dry Soil Wt., gm	216.0	Dry Soil Wt., lbs	0.6526
Pan Wt., gm	0.0		
Initial % Moisture Content	15.7	Final % Moisture Content	34.3

Initial Expansion Data:		**Final Expansion Data:**	
Ring + Sample Wt., lbs	0.7553	Ring + Sample Wt., lbs	0.8766
Ring Wt., lbs	0.0000	Ring Wt., lbs	0.0000
Remolded Wt., lbs	0.7553	Remolded Wt., lbs	0.8766
Remolded Wet Density, pcf	103.9	Remolded Wet Density, pcf	112.9
Remolded Dry Density, pcf	89.7	Remolded Dry Density, pcf	84.0

Expansion Data:		Initial Volume	Final Volume
		0.00727222	0.007765
Initial Gage Reading, in:	0.0500		
Final Gage Reading, in:	0.1177		
Expansion, in:	0.0677		
Expansion Index	68	**Comments:**	**Medium Expansion Potential**

Classification of Expansive Soils. (Table No.1 From ASTM D4829)

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

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EXPANSION INDEX TEST, ASTM D4829

MTA PROJECT NAME:	Proposed Solar Array - Lancaster	REPORT DATE:	5/14/2021
		TEST DATE:	5/7/2021
MTA PROJECT NO.:	E468R6.01		
SAMPLE I.D.:	B-33 @ 0-5'		
SAMPLED BY:	ZA		
SAMPLE DATE:	4/12/2021	TESTED BY:	MA
MATERIALS DESCRIPTION:	Sandy silt		
% PASSING # 4 SIEVE	100		

Initial Moisture Determination:		Final Moisture Determination:	
Pan + Wet Soil Wt., gm	250.0	Wet Soil Wt., lbs	0.8479
Pan + Dry Soil Wt., gm	214.0	Dry Soil Wt., lbs	0.6423
Pan Wt., gm	0.0		
Initial % Moisture Content	16.8	Final % Moisture Content	32.0

Initial Expansion Data:		**Final Expansion Data:**	
Ring + Sample Wt., lbs	0.7504	Ring + Sample Wt., lbs	0.8479
Ring Wt., lbs	0.0000	Ring Wt., lbs	0.0000
Remolded Wt., lbs	0.7504	Remolded Wt., lbs	0.8479
Remolded Wet Density, pcf	103.2	Remolded Wet Density, pcf	113.6
Remolded Dry Density, pcf	88.3	Remolded Dry Density, pcf	86.1

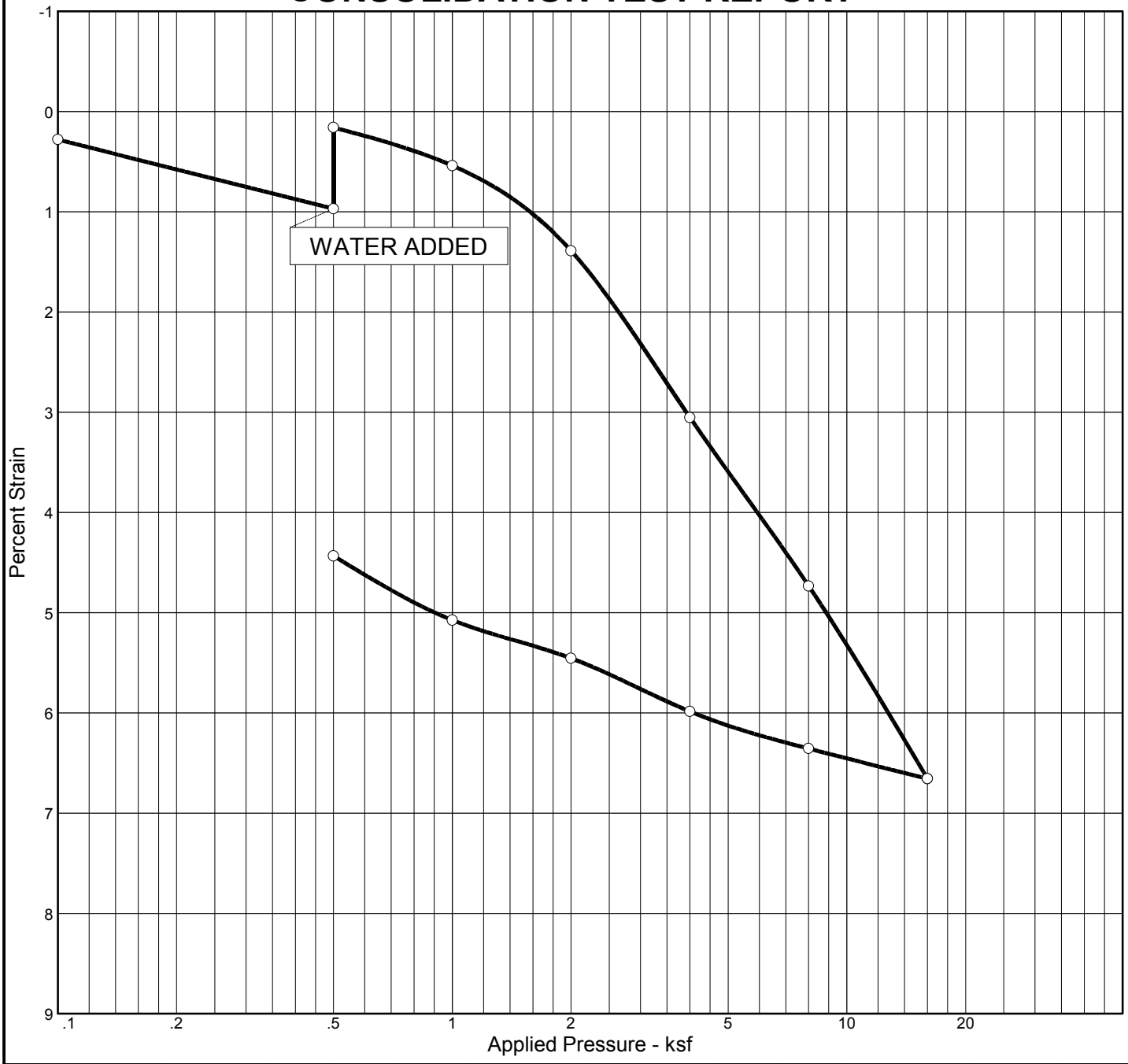
Expansion Data:		Initial Volume	Final Volume
		0.00727222	0.007461
Initial Gage Reading, in:	0.0500		
Final Gage Reading, in:	0.0760		
Expansion, in:	0.0260		
Expansion Index	26	**Comments:**	**Low Expansion Potential**

Classification of Expansive Soils. (Table No.1 From ASTM D4829)

Expansion Index	Potential Expansion
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

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CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
78.0 %	13.7 %	112.9	26	6	2.65		2.58	0.09	0.02	1.54	0.8	0.466

MATERIAL DESCRIPTION	USCS	AASHTO
Sandy silty clay	CL-ML	

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

Source: **Sample No.:** B-26 **Elev./Depth:** 3-4.5'

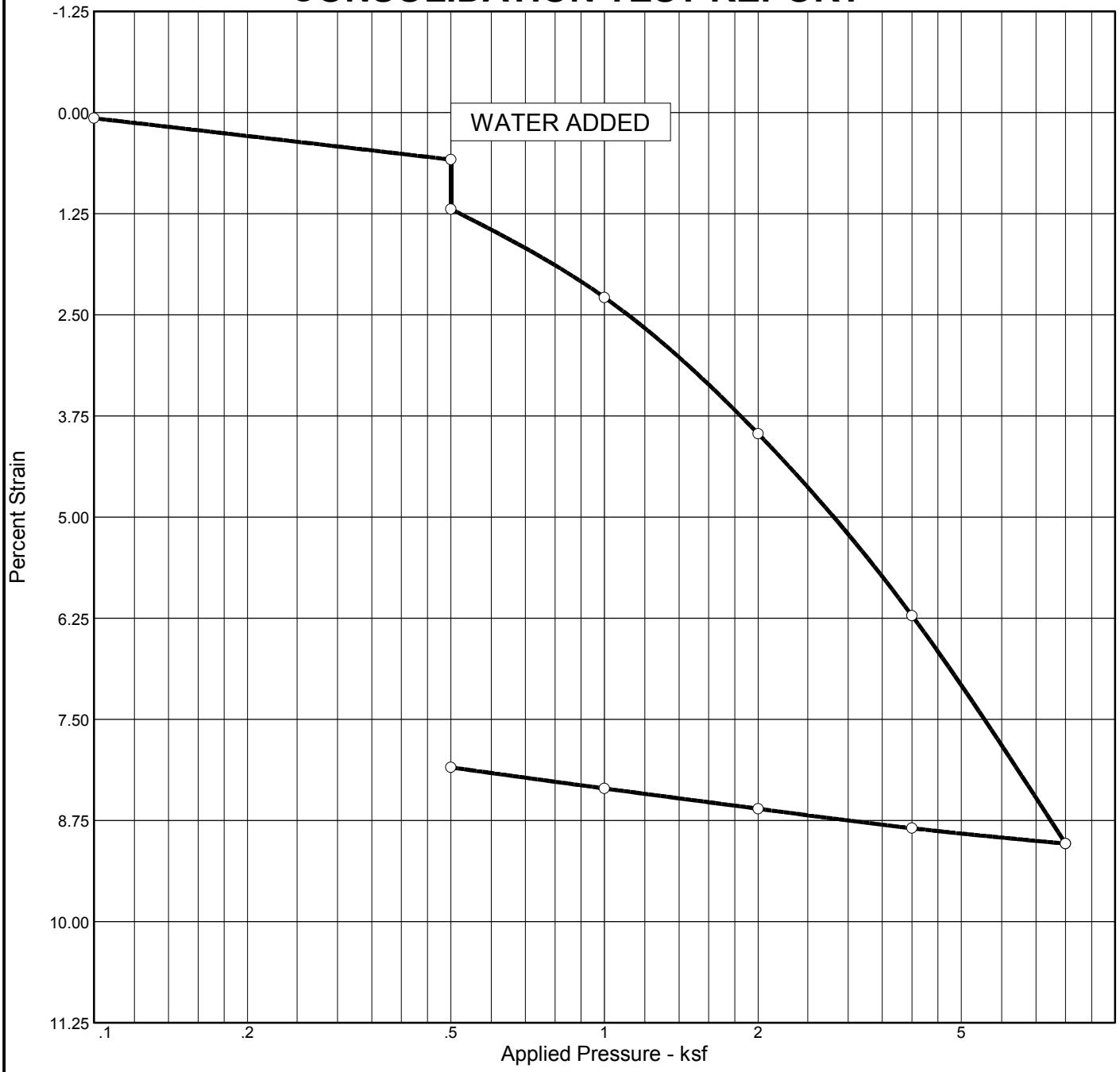
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Remarks:

Figure

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Clpse. %	e_o
Sat.	Moist.											
44.6 %	21.2 %	73.3			2.65		1.79	0.21	0.02		0.6	1.258

MATERIAL DESCRIPTION	USCS	AASHTO
Sandy silt	ML	

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

Source: **Sample No.:** B-33 **Elev./Depth:** 2-3.5'

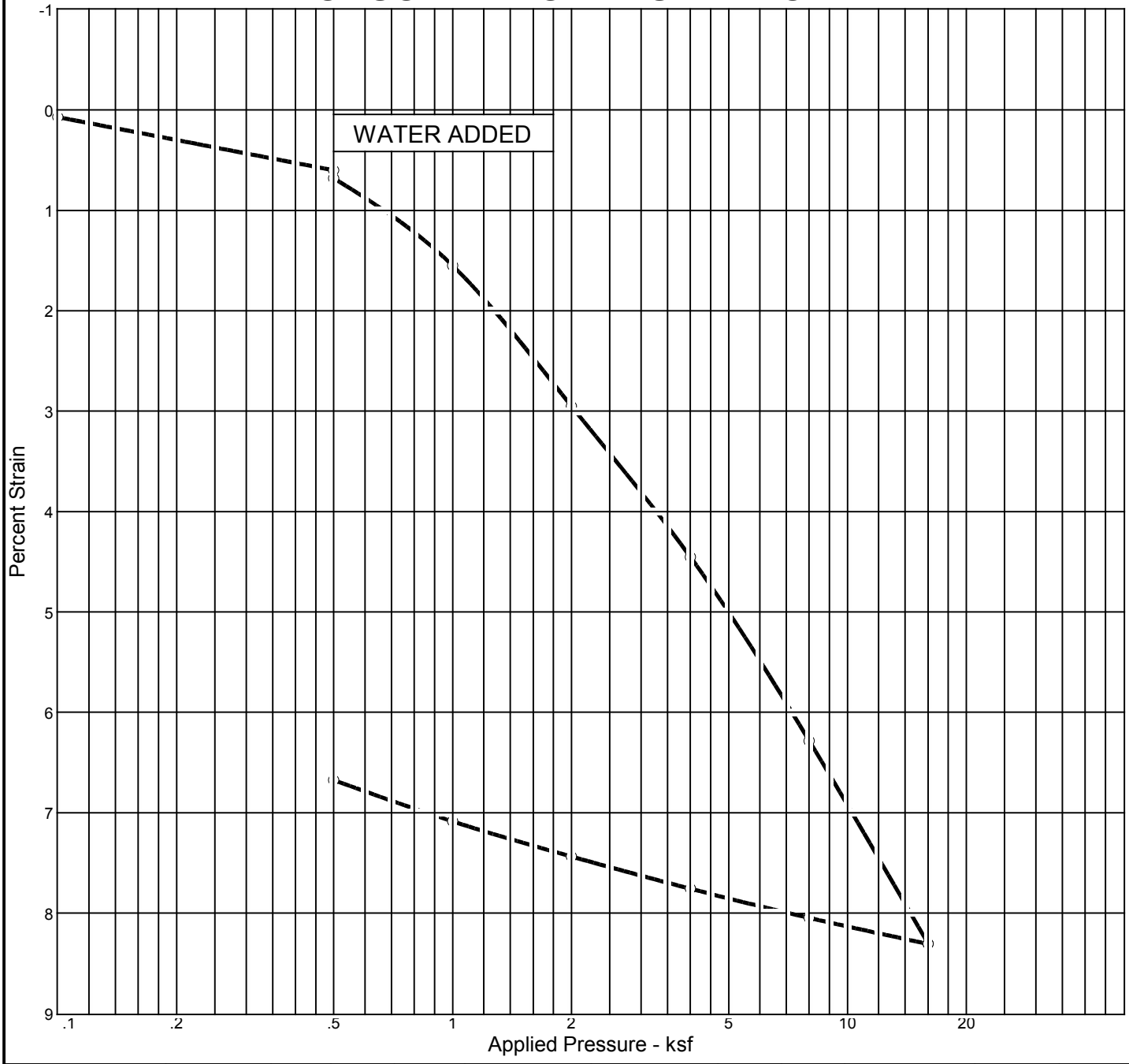
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Remarks:

Figure

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Clpse. %	e_o
Sat.	Moist.											
55.2 %	11.9 %	105.1			2.65		1.92	0.11	0.02		0.1	0.573

MATERIAL DESCRIPTION	USCS	AASHTO
Lean clay	CL	

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

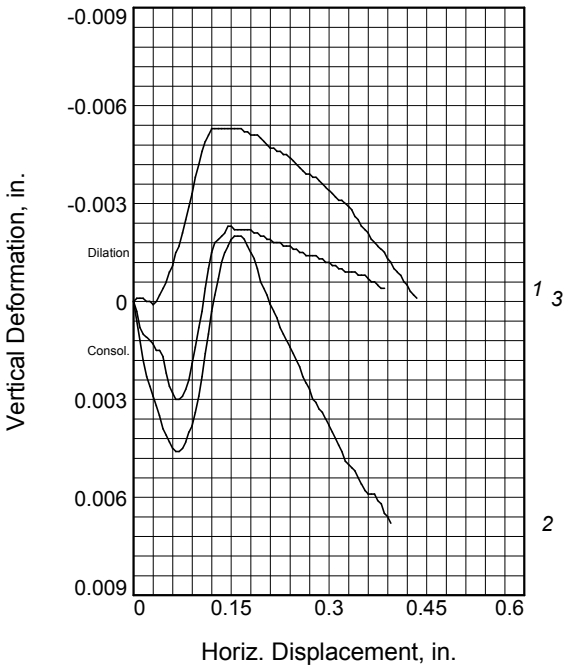
Source: **Sample No.:** B-35 **Elev./Depth:** 3.5-5'

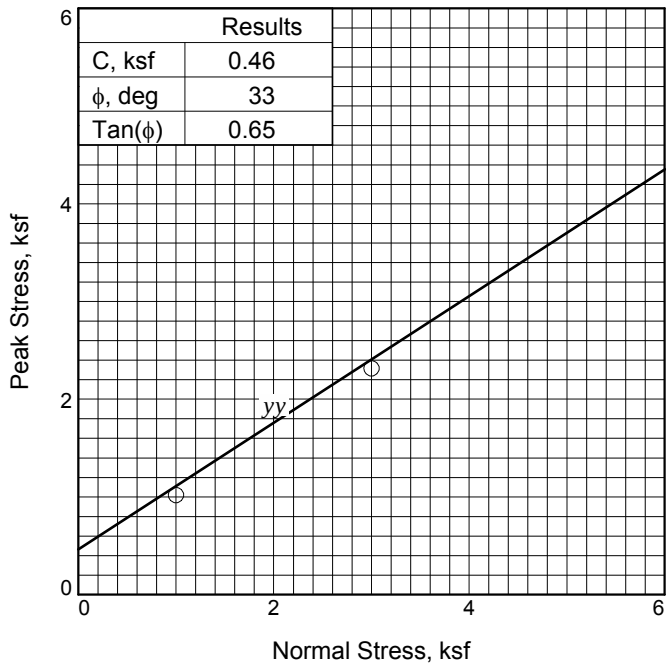
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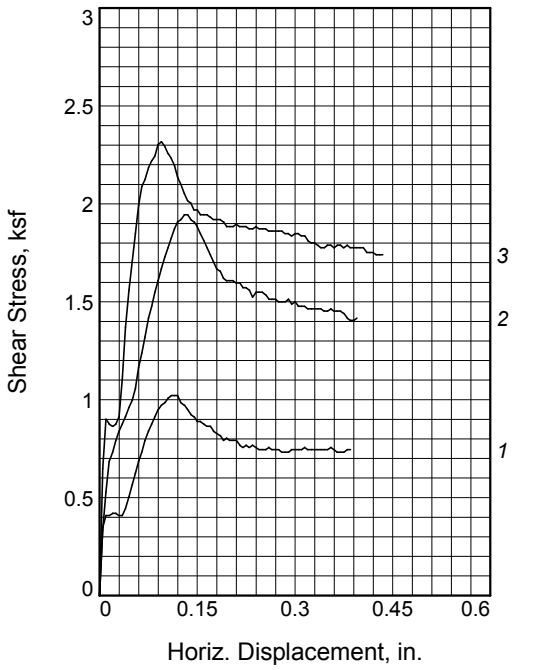
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Figure







Sample No.		1	2	3
Initial	Water Content, %	22.0	21.1	22.7
	Dry Density, pcf	90.2	84.8	98.3
	Saturation, %	70.0	58.9	87.9
	Void Ratio	0.8332	0.9509	0.6829
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	30.1	32.8	23.7
	Dry Density, pcf	91.4	87.3	101.3
	Saturation, %	98.5	97.1	99.2
	Void Ratio	0.8102	0.8957	0.6324
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.99	0.97	0.97
Normal Stress, ksf		1.00	2.00	3.00
Peak Stress, ksf		1.02	1.94	2.32
Displacement, in.		0.11	0.13	0.10
Ultimate Stress, ksf				
Displacement, in.				
Strain at peak, %		4.6	5.4	3.9

Sample Type:
Description: Sandy lean clay

LL= 47 **PL=** 22 **PI=** 25
Specific Gravity= 2.65
Remarks:

Figure _____

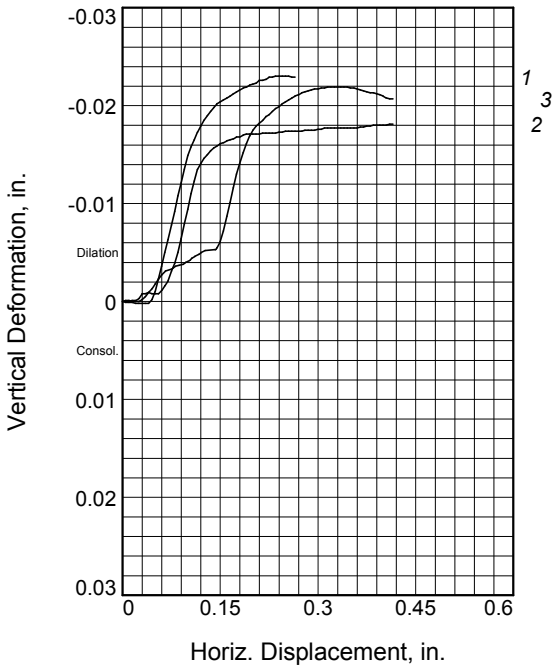
Client:

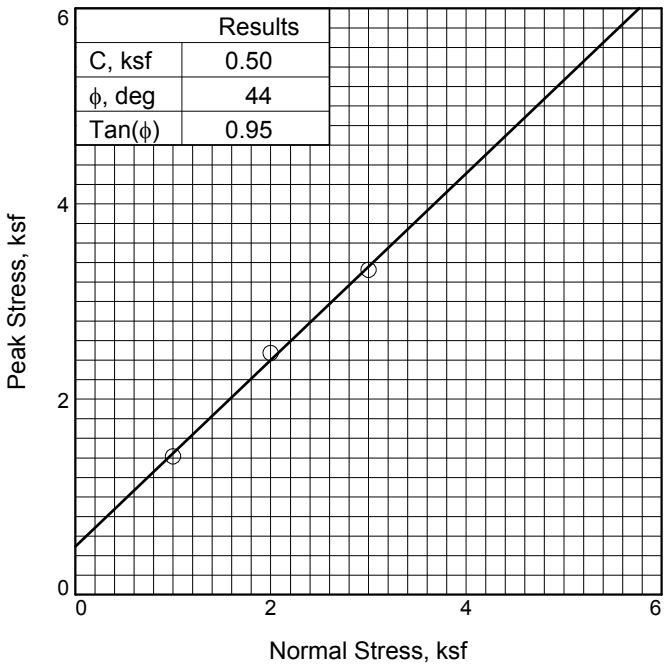
Project: Proposed Solar Array - Lancaster

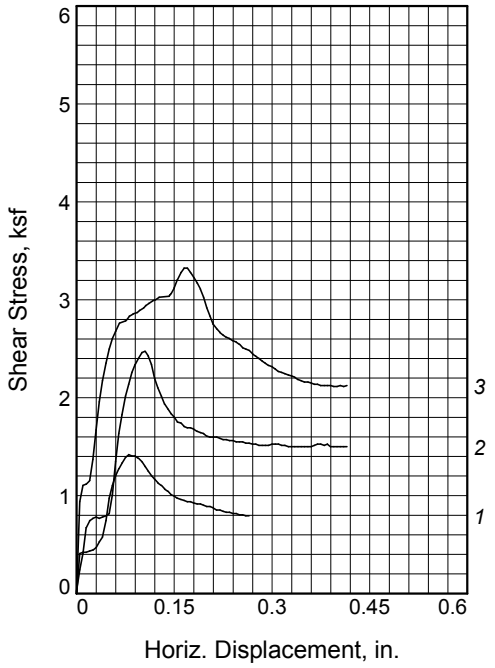
Sample Number: B-3 **Depth:** 3.5-5'

Proj. No.: E468R6.01 **Date Sampled:** 4/12/21

DIRECT SHEAR TEST REPORT
Moore Twining Associates, Inc.
Fresno, CA







Sample No.		1	2	3
Initial	Water Content, %	35.6	40.3	39.3
	Dry Density, pcf	72.3	71.6	72.7
	Saturation, %	73.3	81.5	81.7
	Void Ratio	1.2883	1.3095	1.2752
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	46.3	47.0	45.6
	Dry Density, pcf	73.0	72.9	74.7
	Saturation, %	96.8	98.1	99.5
	Void Ratio	1.2675	1.2696	1.2147
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.99	0.98	0.97
Normal Stress, ksf		1.00	2.00	3.00
Peak Stress, ksf		1.42	2.47	3.32
Displacement, in.		0.08	0.11	0.17
Ultimate Stress, ksf				
Displacement, in.				
Strain at peak, %		3.3	4.3	6.8

Sample Type:

Description: Clayey Sand

Specific Gravity= 2.65

Remarks:

Figure _____

Client:

Project: Proposed Solar Array - Lancaster

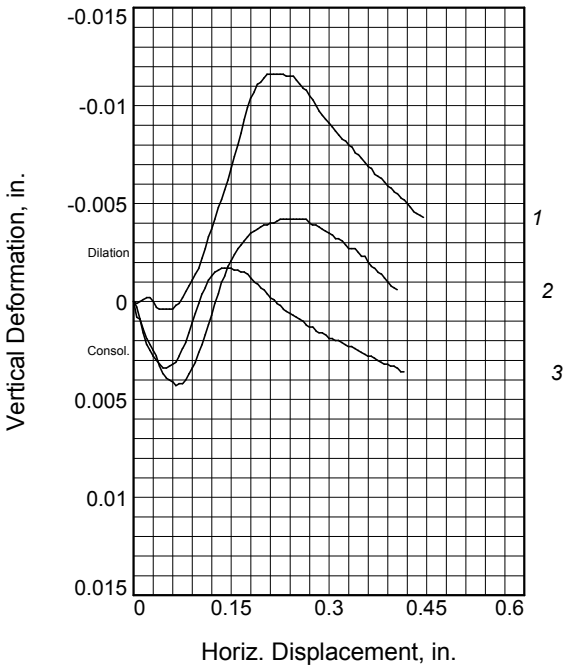
Sample Number: B-22 **Depth:** 2-3.5'

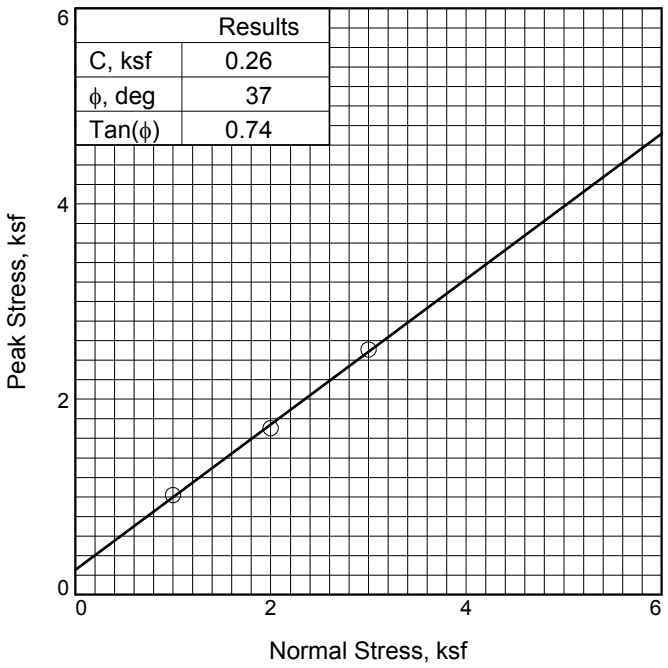
Proj. No.: E468R6.01 **Date Sampled:** 4/12/21

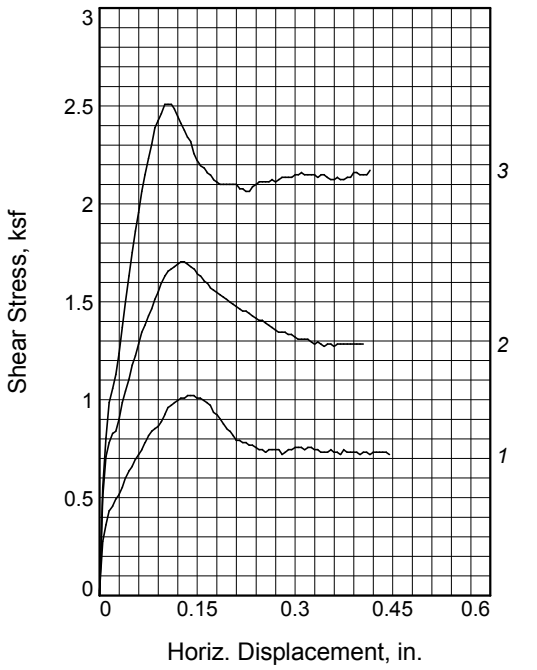
DIRECT SHEAR TEST REPORT

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Sample No.		1	2	3
Initial	Water Content, %	13.0	13.1	13.3
	Dry Density, pcf	102.6	104.0	103.3
	Saturation, %	56.1	58.8	58.5
	Void Ratio	0.6120	0.5901	0.6016
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	21.9	20.7	19.3
	Dry Density, pcf	103.9	106.5	108.6
	Saturation, %	98.1	99.1	97.7
	Void Ratio	0.5930	0.5534	0.5235
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.99	0.98	0.95
Normal Stress, ksf		1.00	2.00	3.00
Peak Stress, ksf		1.02	1.70	2.51
Displacement, in.		0.14	0.13	0.10
Ultimate Stress, ksf				
Displacement, in.				
Strain at peak, %		5.6	5.2	4.1

Sample Type:
Description: Lean clay

Specific Gravity= 2.65
Remarks:

Figure _____

Client:

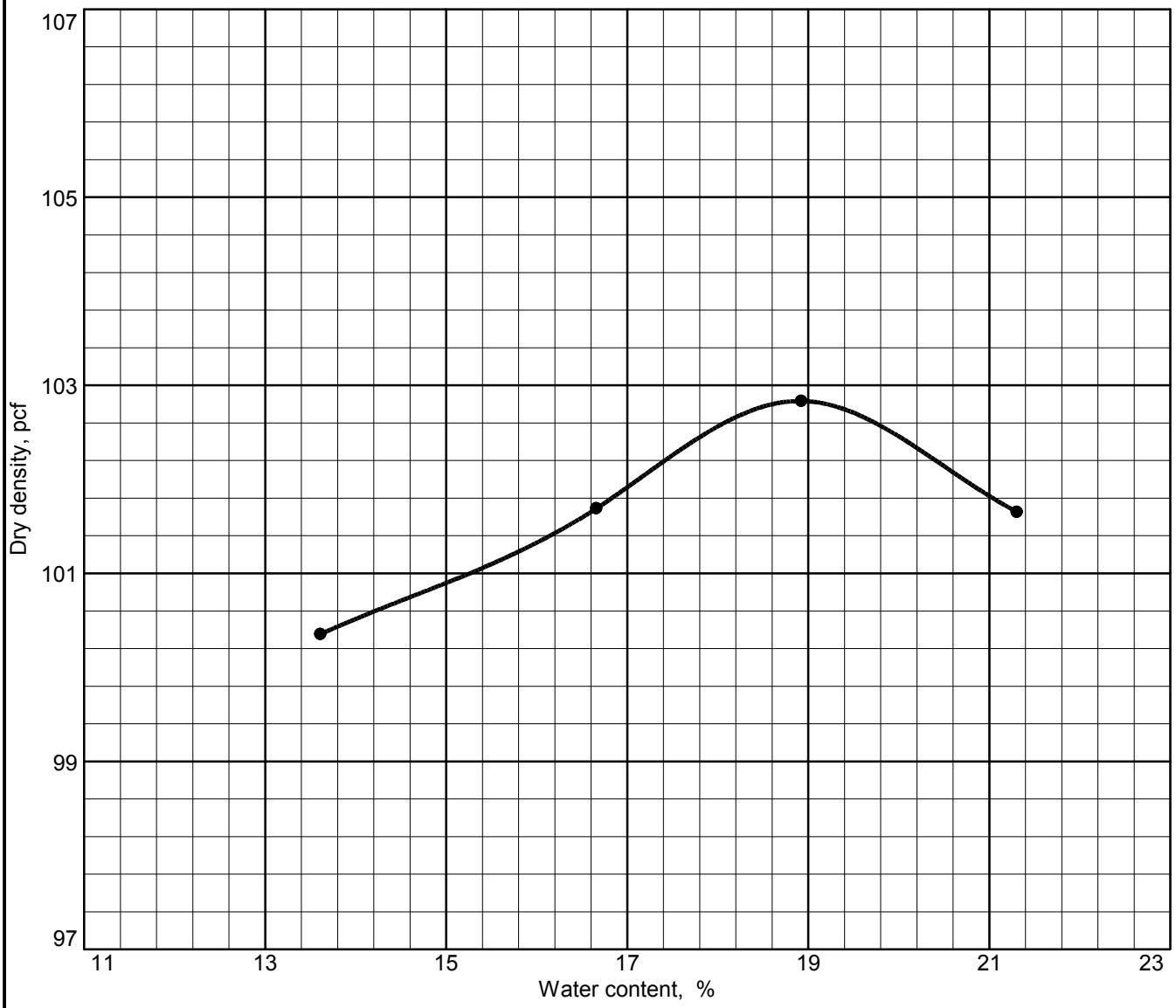
Project: Proposed Solar Array - Lancaster

Sample Number: B-35 **Depth:** 3.5-5'

Proj. No.: E468R6.01 **Date Sampled:** 4/12/21

DIRECT SHEAR TEST REPORT
Moore Twining Associates, Inc.
Fresno, CA

COMPACTION TEST REPORT



Test specification: ASTM D 1557-12 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0-3'	CL							

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 102.8 pcf Optimum moisture = 18.9 %	Sandy lean clay

Project No. E468R6.01 **Client:**

Project: Proposed Solar Array - Lancaster

● **Source:** **Sample No.:** B-4 **Elev./Depth:** 0-3'

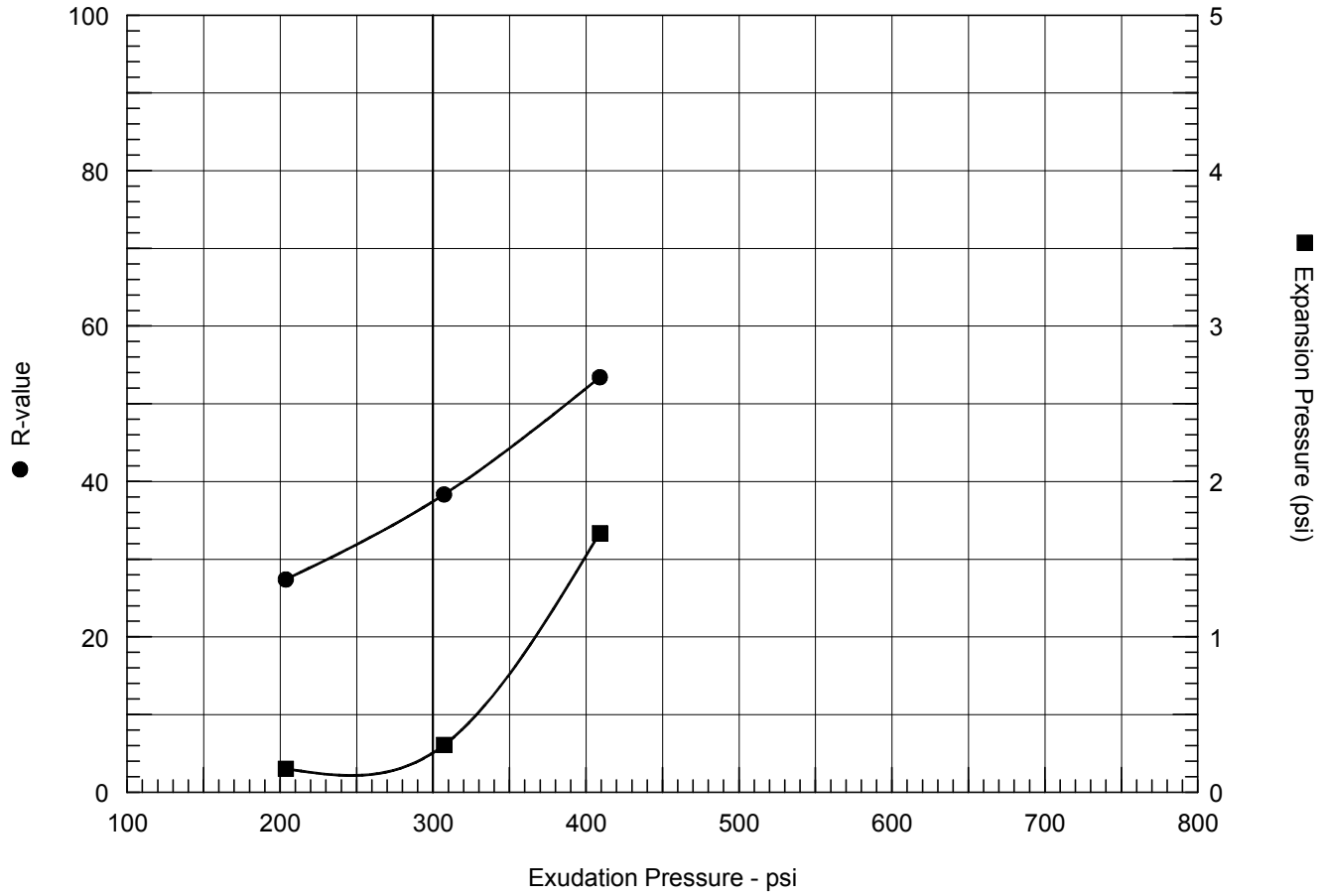
Remarks:

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Figure

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D 2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	120	101.9	22.6	0.15	102	2.54	204	27	27
2	350	104.9	20.3	1.67	56	2.47	409	53	53
3	210	103.9	21.5	0.30	85	2.49	307	38	38

Test Results	Material Description
R-value at 300 psi exudation pressure = 37 **Exp. pressure at 300 psi exudation pressure =** 0.25 psi	Sandy lean clay

Project No.: E468R6.01
Project: Proposed Solar Array - Lancaster
Sample Number: B-1 **Depth:** 0-3.5'
Date: 5/19/2021

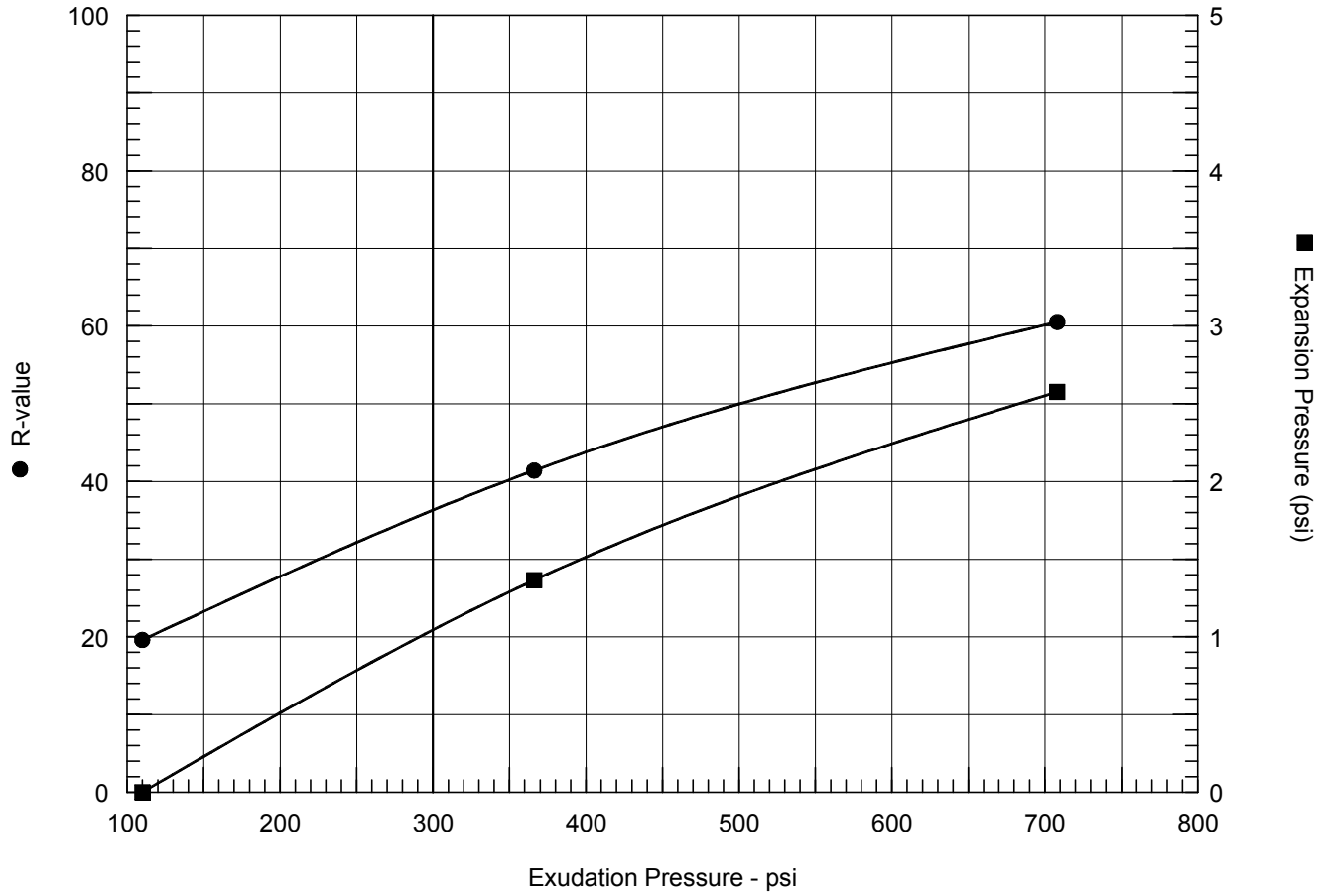
Tested by: MP
Checked by: MS
Remarks:

R-VALUE TEST REPORT

Moore Twining Associates, Inc.

Figure NA

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D 2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	350	107.7	20.3	1.36	70	2.48	366	41	41
2	80	104.3	23.1	0.00	109	2.55	110	20	20
3	350	109.2	19.1	2.58	44	2.45	708	61	61

Test Results	Material Description
R-value at 300 psi exudation pressure = 36 **Exp. pressure at 300 psi exudation pressure =** 1.05 psi	Sandy lean clay

Project No.: E468R6.01
Project: Proposed Solar Array - Lancaster
Sample Number: B-3 **Depth:** 0-3'
Date: 5/19/2021

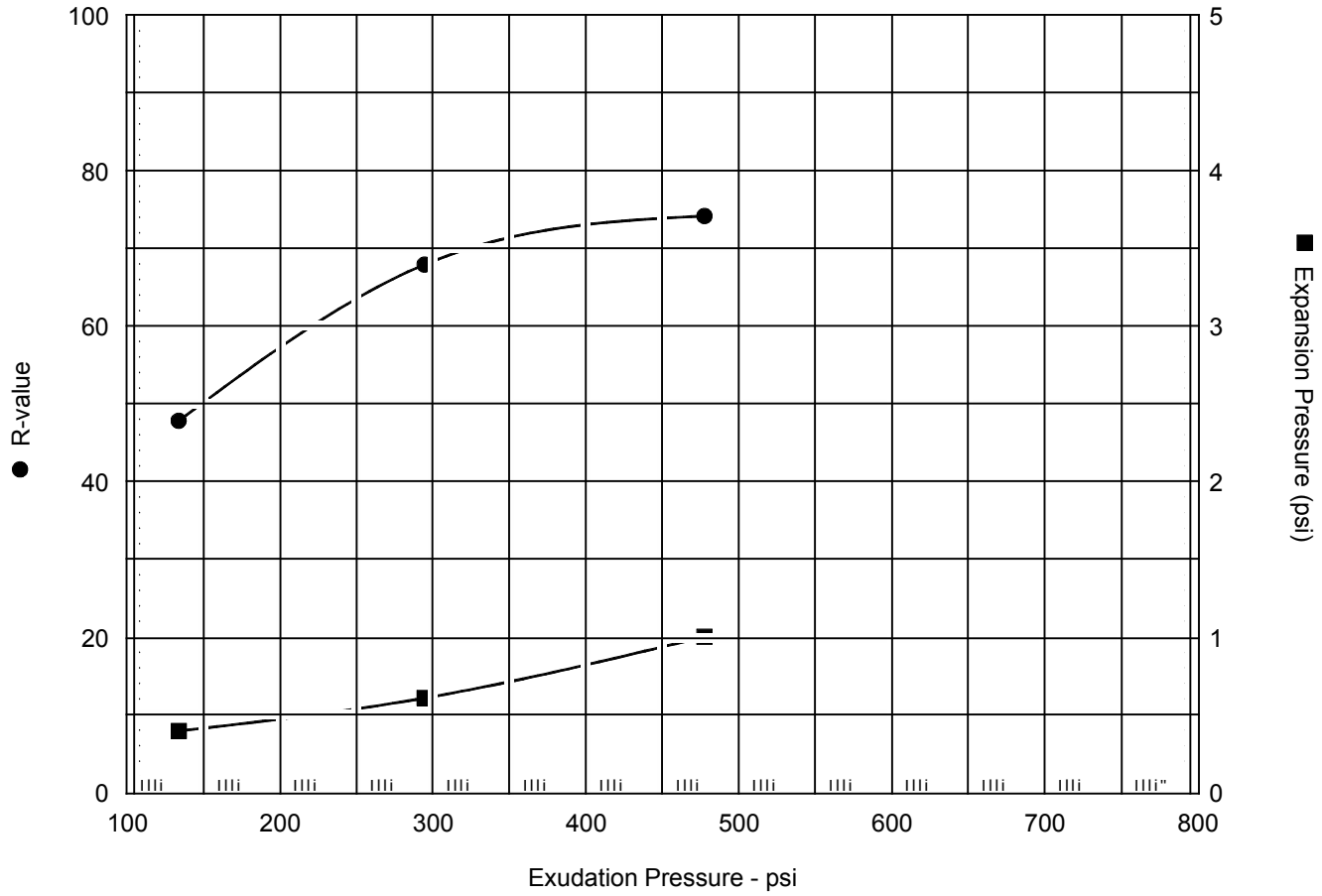
Tested by: MP
Checked by: MS
Remarks:

R-VALUE TEST REPORT

Moore Twining Associates, Inc.

Figure NA

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D 2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	220	98.4	23.2	0.39	56	2.56	134	46	48
2	350	101.0	21.4	0.61	30	2.49	294	68	68
3	350	105.2	20.2	1.00	21	2.40	477	76	74

Test Results	Material Description
R-value at 300 psi exudation pressure = 68 **Exp. pressure at 300 psi exudation pressure =** 0.62 psi	Sandy silt

Project No.: E468R6.01
Project: Proposed Solar Array - Lancaster
Sample Number: B-8 **Depth:** 2-4'
Date: 5/20/2021

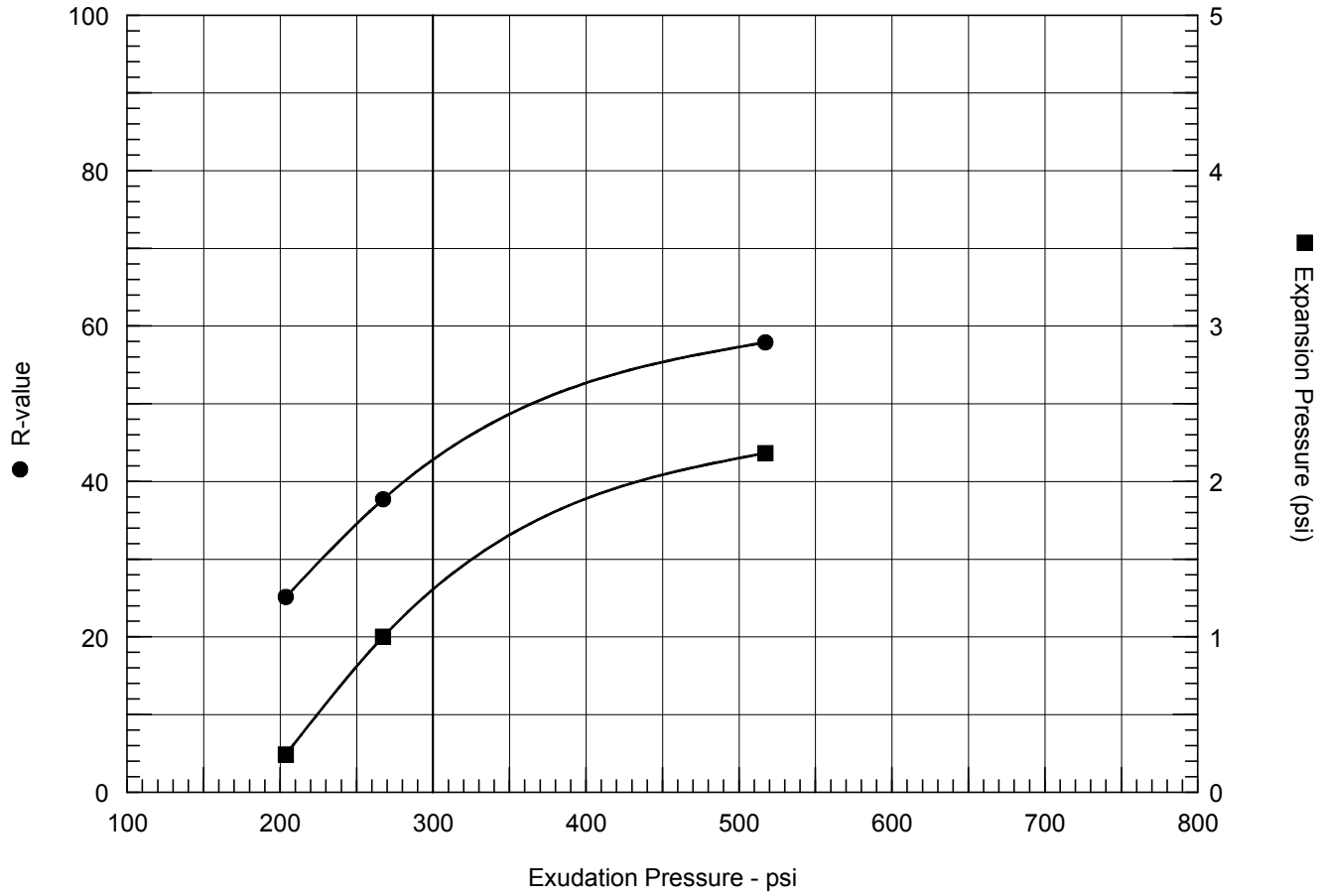
Tested by: MP
Checked by: MS
Remarks:

R-VALUE TEST REPORT

Moore Twining Associates, Inc.

Figure NA

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D 2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	80	98.8	23.7	0.24	105	2.57	204	24	25
2	280	101.5	22.0	1.00	80	2.51	267	38	38
3	350	103.2	20.8	2.18	50	2.47	517	58	58

Test Results	Material Description
R-value at 300 psi exudation pressure = 43 **Exp. pressure at 300 psi exudation pressure =** 1.31 psi	Silt with sand

Project No.: E468R6.01
Project: Proposed Solar Array - Lancaster
Sample Number: B-20 **Depth:** 0-3'
Date: 5/20/2021

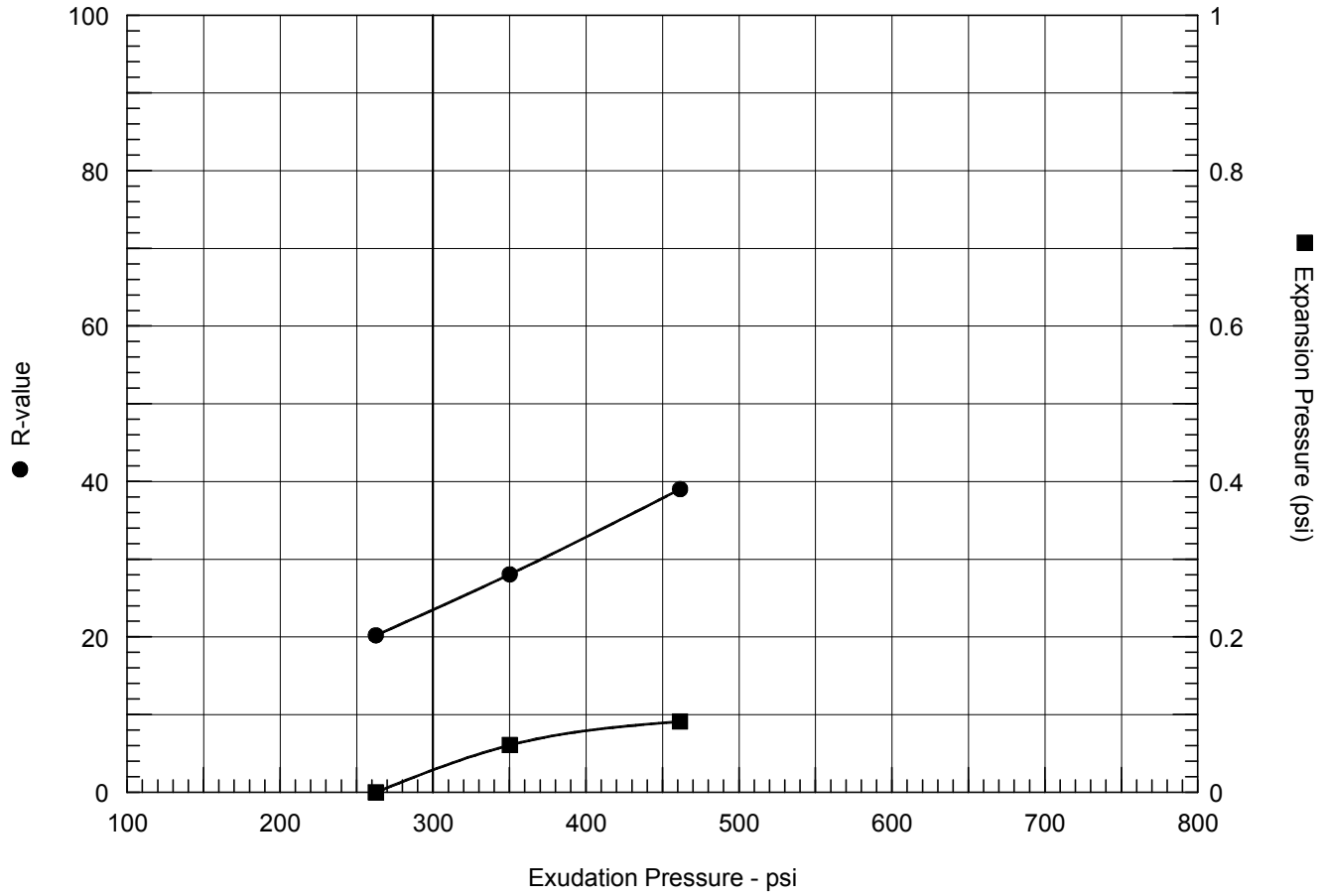
Tested by: MP
Checked by: MS
Remarks:

R-VALUE TEST REPORT

Moore Twining Associates, Inc.

Figure NA

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D 2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	100	117.3	14.8	0.09	85	2.61	462	36	39
2	90	114.3	15.8	0.06	104	2.66	350	25	28
3	70	111.8	17.2	0.00	118	2.66	263	18	20

Test Results	Material Description
R-value at 300 psi exudation pressure = 23 **Exp. pressure at 300 psi exudation pressure =** 0.03 psi	Sandy lean clay

Project No.: E468R6.01
Project: Proposed Solar Array - Lancaster
Sample Number: B-21 **Depth:** 0-3.5'
Date: 5/20/2021

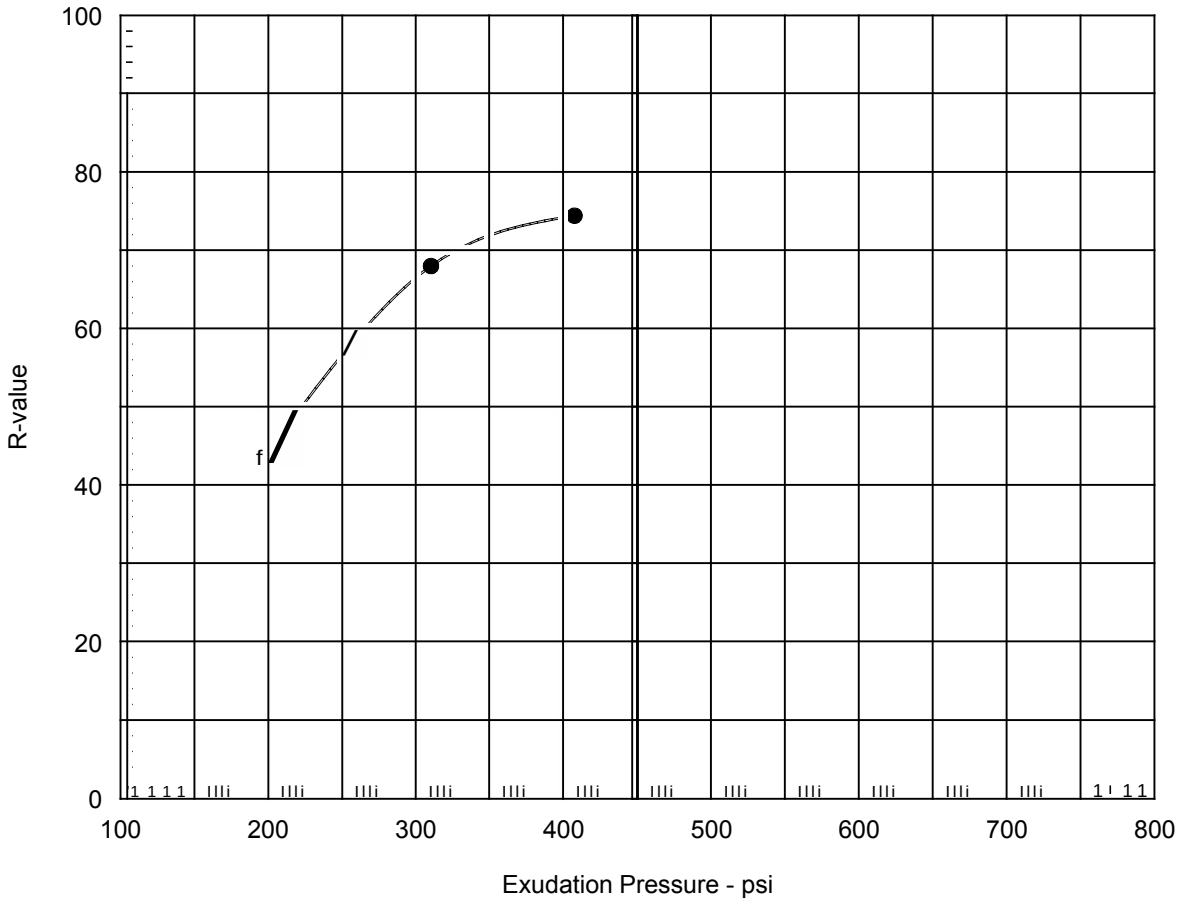
Tested by: MP
Checked by: MS
Remarks:

R-VALUE TEST REPORT

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Figure NA

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D 2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	350	127.7	9.5	0.00	32	2.50	310	68	68
2	230	125.6	10.9	0.00	59	2.52	197	44	44
3	350	128.3	9.0	0.00	21	2.48	407	74	74

Test Results	Material Description
R-value at 300 psi exudation pressure = 66	Silty sand

Project No.: E468R6.01
Project: Proposed Solar Array - Lancaster
Sample Number: B-25 **Depth:** 0-3.5'
Date: 5/19/2021

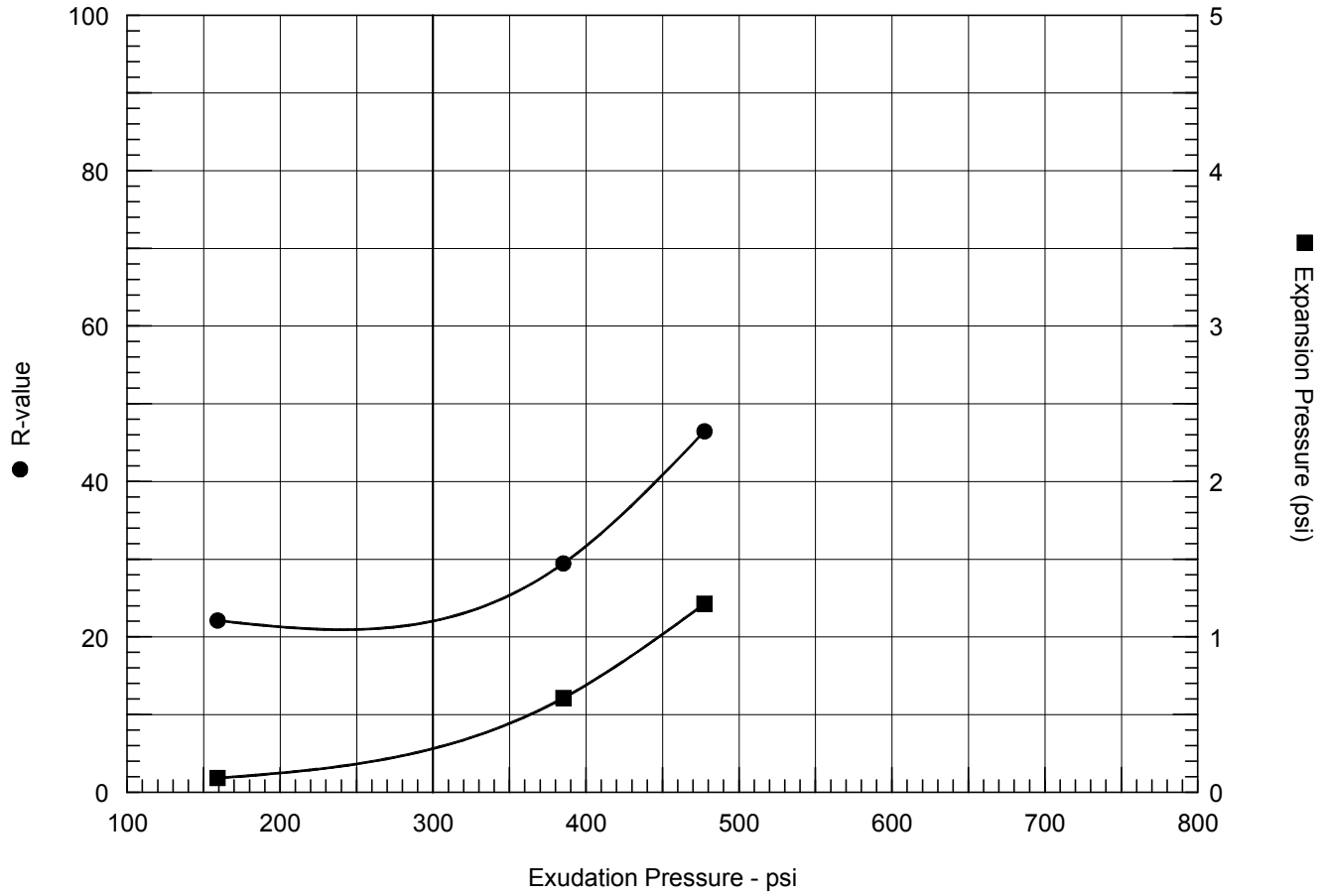
Tested by: MP
Checked by: MS
Remarks:

R-VALUE TEST REPORT

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Figure NA

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D 2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	80	95.5	25.8	0.09	114	2.64	159	20	22
2	130	99.2	24.0	0.61	98	2.54	385	29	29
3	280	102.5	22.2	1.21	68	2.47	477	46	46

Test Results	Material Description
R-value at 300 psi exudation pressure = 22 **Exp. pressure at 300 psi exudation pressure =** 0.28 psi	Lean clay

Project No.: E468R6.01
Project: Proposed Solar Array - Lancaster
Sample Number: B-30 **Depth:** 0-5'
Date: 5/19/2021

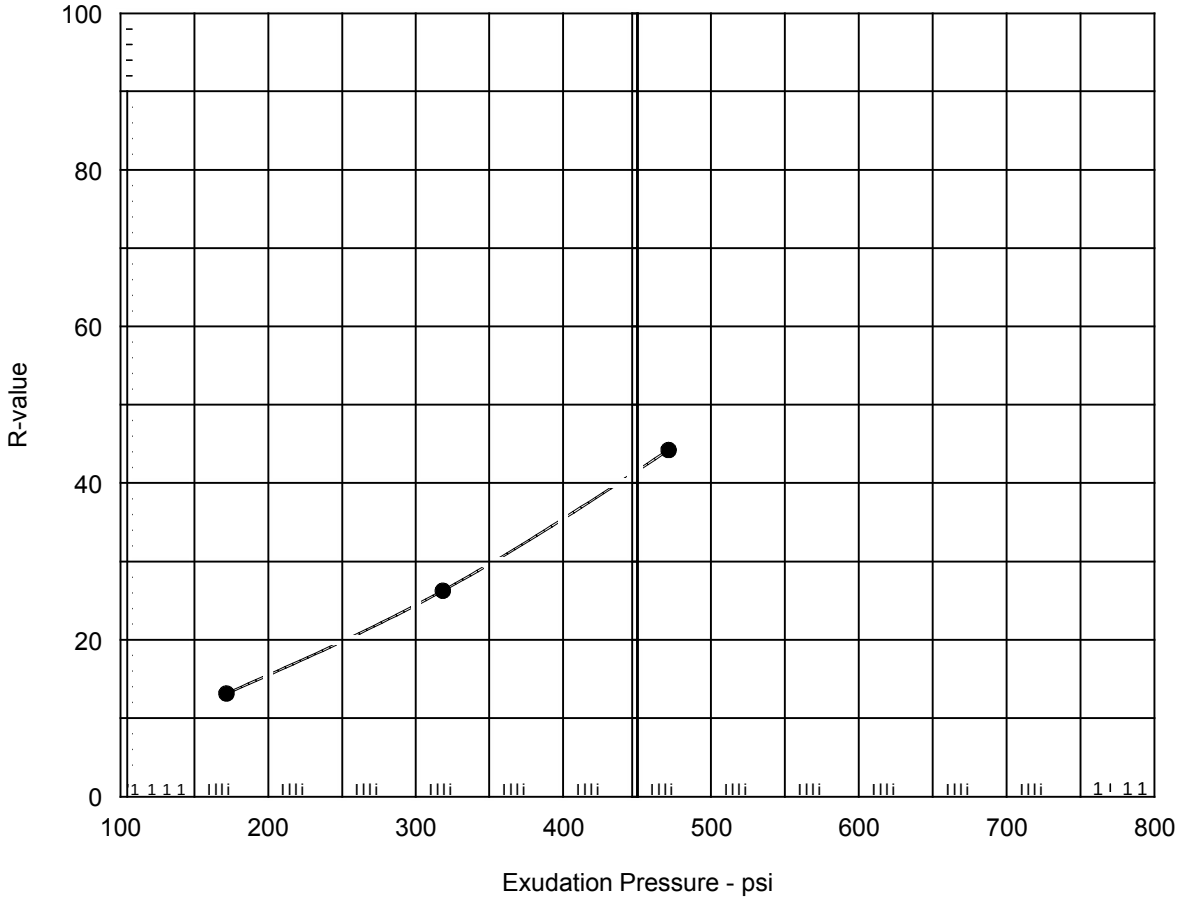
Tested by: MP
Checked by: MS
Remarks:

R-VALUE TEST REPORT

Moore Twining Associates, Inc.

Figure NA

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D 2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	90	106.4	19.5	0.00	97	2.41	318	28	26
2	30	101.6	21.3	0.00	123	2.53	172	13	13
3	230	108.0	18.4	0.00	66	2.37	471	48	44

Test Results	Material Description
R-value at 300 psi exudation pressure = 24	Lean clay

Project No.: E468R6.01
Project: Proposed Solar Array - Lancaster
Sample Number: B-35 **Depth:** 0-3.5'
Date: 5/20/2021

Tested by: MP
Checked by: MS
Remarks:

R-VALUE TEST REPORT

Moore Twining Associates, Inc.

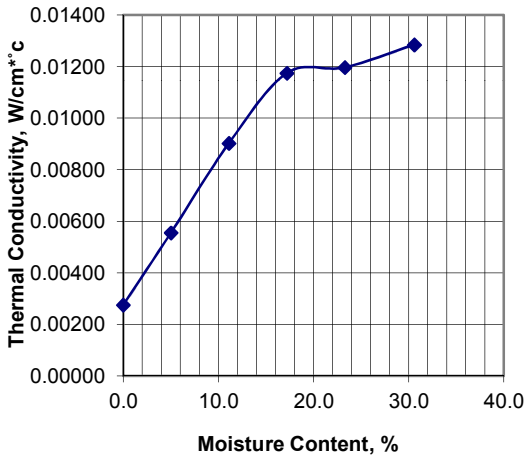
Figure NA

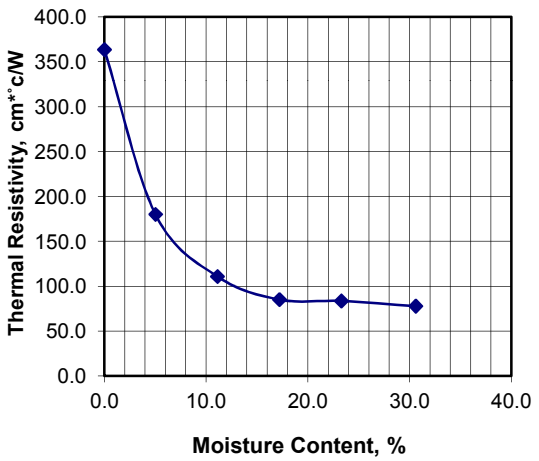
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THERMAL CONDUCTIVITY BY THERMAL PROBE, ASTM D5334-14

Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/20/2021
		Sample Date:	4/12/2021
Project Number	E468R6.01	Test Date:	5/14/2021
Sample I.D.:	B-2 @ 2-4'	Sampled By:	ZA
Sample Description:	Sandy lean clay	Tested By:	MA

Wet Weight, gm	657.0	690.0	730.0	770.0	810.0	858.0
Dry Weight, gm	657.0	657.0	657.0	657.0	657.0	657.0
Moisture content, %	0.0	5.0	11.1	17.2	23.3	30.6
Average Length, in	6.000	6.000	6.000	6.000	6.000	6.000
Average Diameter, in	2.40	2.40	2.40	2.40	2.40	2.40
Dry Density, pcf	92.1	92.1	92.1	92.1	92.1	92.1
Thermal Conductivity, W/cm*˚c	0.00275	0.00555	0.00902	0.01174	0.01196	0.01284
Thermal Resistivity, cm*˚c/W	363.6	180.2	110.9	85.2	83.6	77.9





Note: Remolded to Approximately 85% of the dry max. dry density of 108.4, pcf as per ASTM D698.

Thermal Conductivity Units: W/cm*˚c
Thermal Resistivity Units: cm*˚c/W
Where: W: Watt cm: Centimeter ˚c degree Celsius

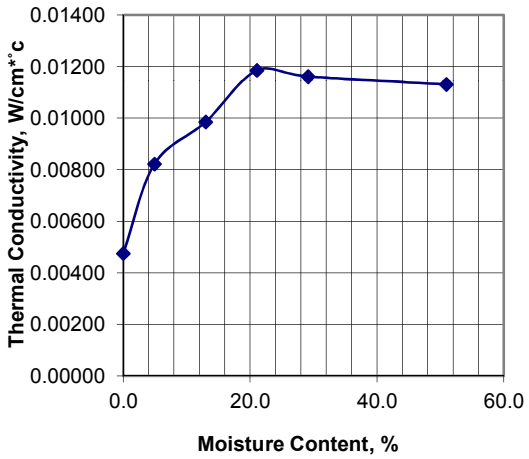
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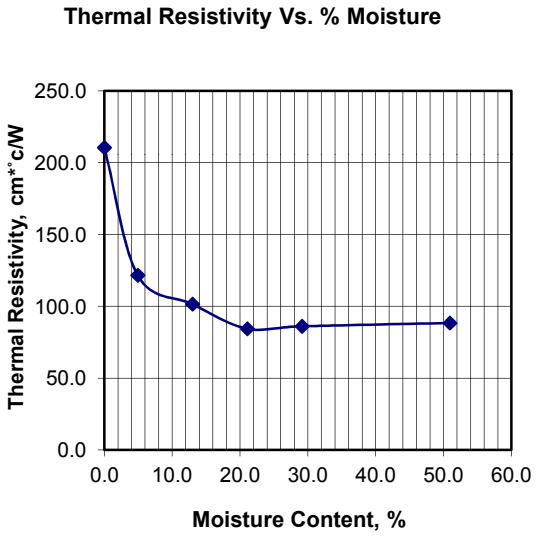
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THERMAL CONDUCTIVITY BY THERMAL PROBE, ASTM D5334-14

Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/20/2021
		Sample Date:	4/12/2021
Project Number	E468R6.01	Test Date:	5/13/2021
Sample I.D.:	B-6 @ 2-4'	Sampled By:	ZA
Sample Description:	Clayey sand	Tested By:	MA

Wet Weight, gm	619.5	650.0	700.0	750.0	800.0	935.0
Dry Weight, gm	619.5	619.5	619.5	619.5	619.5	619.5
Moisture content, %	0.0	4.9	13.0	21.1	29.1	50.9
Average Length, in	6.000	6.000	6.000	6.000	6.000	6.000
Average Diameter, in	2.40	2.40	2.40	2.40	2.40	2.40
Dry Density, pcf	86.8	86.8	86.8	86.8	86.8	86.8
Thermal Conductivity, W/cm*˚c	0.00475	0.00822	0.00985	0.01185	0.01161	0.01131
Thermal Resistivity, cm*˚c/W	210.5	121.7	101.5	84.4	86.1	88.4





Note: Remolded to Approximately 85% of the dry max. dry density of 102.1, pcf as per ASTM D698.

Thermal Conductivity Units: W/cm*˚c
Thermal Resistivity Units: cm*˚c/W
Where: W: Watt cm: Centimeter ˚c degree Celsius

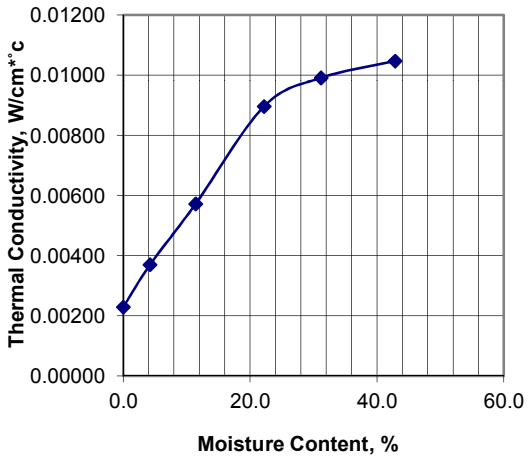
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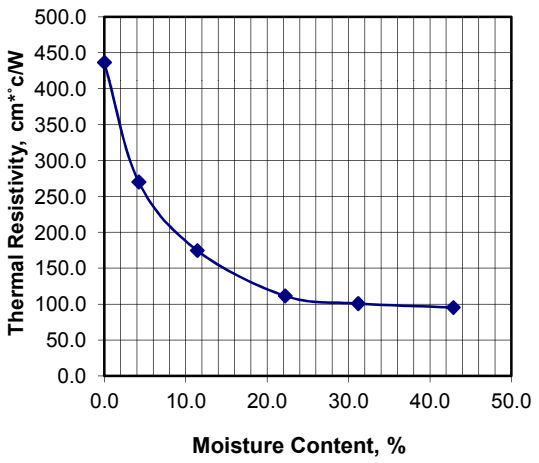
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THERMAL CONDUCTIVITY BY THERMAL PROBE, ASTM D5334-14

Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/20/2021
		Sample Date:	4/12/2021
Project Number	E468R6.01	Test Date:	5/17/2021
Sample I.D.:	B-18 @ 2-4'	Sampled By:	ZA
Sample Description:	Lean clay with sand	Tested By:	MA

Wet Weight, gm	556.5	580.0	620.0	680.0	730.0	795.0
Dry Weight, gm	556.5	556.5	556.5	556.5	556.5	556.5
Moisture content, %	0.0	4.2	11.4	22.2	31.2	42.9
Average Length, in	6.000	6.000	6.000	6.000	6.000	6.000
Average Diameter, in	2.40	2.40	2.40	2.40	2.40	2.40
Dry Density, pcf	78.0	78.0	78.0	78.0	78.0	78.0
Thermal Conductivity, W/cm*˚c	0.00229	0.0037	0.00572	0.00896	0.00991	0.01047
Thermal Resistivity, cm*˚c/W	436.7	270.3	174.8	111.6	100.9	95.5





Note: Remolded to Approximately 85% of the dry max. dry density of 91.8, pcf as per ASTM D698.

Thermal Conductivity Units: W/cm*˚c
Thermal Resistivity Units: cm*˚c/W
Where: W: Watt cm: Centimeter ˚c degree Celsius

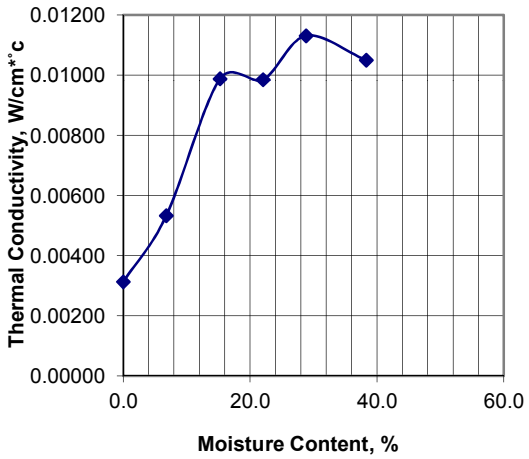
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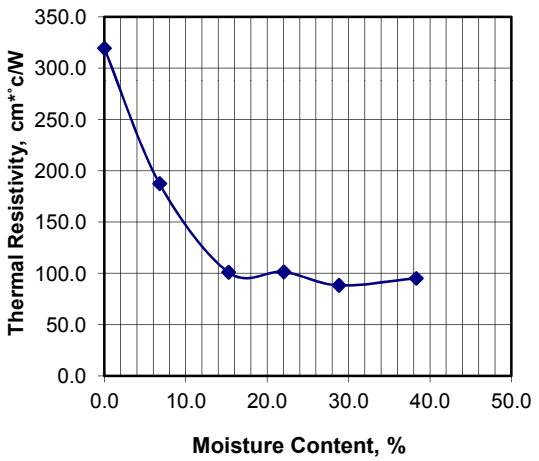
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THERMAL CONDUCTIVITY BY THERMAL PROBE, ASTM D5334-14

Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/20/2021
		Sample Date:	4/12/2021
Project Number	E468R6.01	Test Date:	5/17/2021
Sample I.D.:	B-22 @ 2-4'	Sampled By:	ZA
Sample Description:	Lean clay with sand	Tested By:	MA

Wet Weight, gm	590.0	630.0	680.0	720.0	760.0	816.0
Dry Weight, gm	590.0	590.0	590.0	590.0	590.0	590.0
Moisture content, %	0.0	6.8	15.3	22.0	28.8	38.3
Average Length, in	6.000	6.000	6.000	6.000	6.000	6.000
Average Diameter, in	2.40	2.40	2.40	2.40	2.40	2.40
Dry Density, pcf	82.7	82.7	82.7	82.7	82.7	82.7
Thermal Conductivity, W/cm*˚c	0.00313	0.00533	0.00988	0.00985	0.01131	0.0105
Thermal Resistivity, cm*˚c/W	319.5	187.6	101.2	101.5	88.4	95.2





Note: Remolded to Approximately 85% of the dry max. dry density of 97.3, pcf as per ASTM D698.

Thermal Conductivity Units: W/cm*˚c
Thermal Resistivity Units: cm*˚c/W
Where: W: Watt cm: Centimeter ˚c degree Celsius

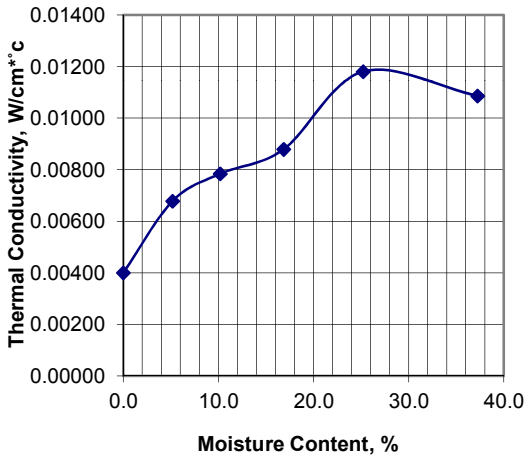
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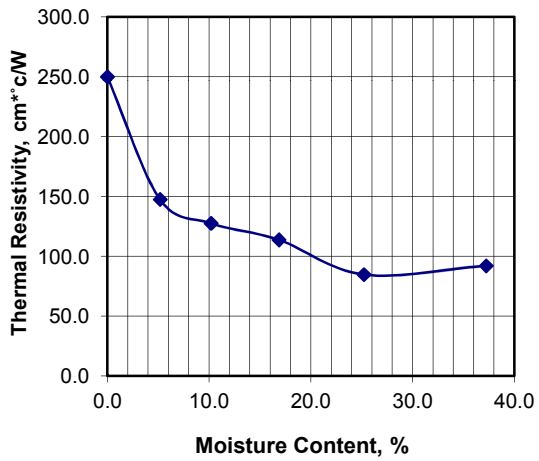
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THERMAL CONDUCTIVITY BY THERMAL PROBE, ASTM D5334-14

Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/20/2021
		Sample Date:	4/12/2021
Project Number	E468R6.01	Test Date:	5/18/2021
Sample I.D.:	B-27 @ 2-4'	Sampled By:	ZA
Sample Description:	Lean clay	Tested By:	MA

Wet Weight, gm	599.0	630.0	660.0	700.0	750.0	822.0
Dry Weight, gm	599.0	599.0	599.0	599.0	599.0	599.0
Moisture content, %	0.0	5.2	10.2	16.9	25.2	37.2
Average Length, in	6.000	6.000	6.000	6.000	6.000	6.000
Average Diameter, in	2.40	2.40	2.40	2.40	2.40	2.40
Dry Density, pcf	84.0	84.0	84.0	84.0	84.0	84.0
Thermal Conductivity, W/cm*˚c	0.00400	0.00678	0.00784	0.00879	0.0118	0.01086
Thermal Resistivity, cm*˚c/W	250.0	147.5	127.6	113.8	84.7	92.1





Note: Remolded to Approximately 85% of the dry max. dry density of 98.8, pcf as per ASTM D698.

Thermal Conductivity Units: W/cm*˚c
Thermal Resistivity Units: cm*˚c/W
Where: W: Watt cm: Centimeter ˚c degree Celsius

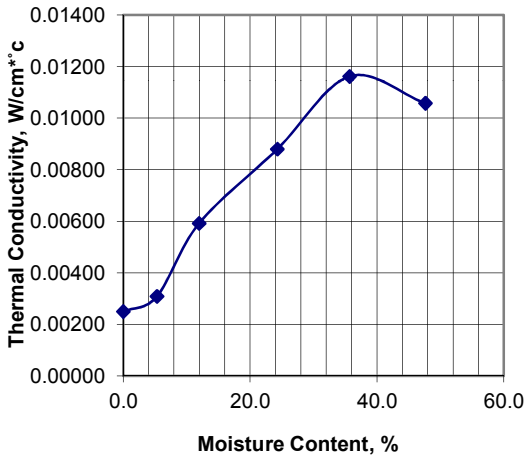
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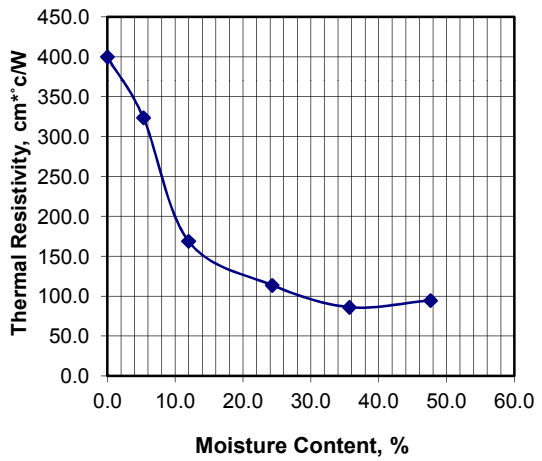
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THERMAL CONDUCTIVITY BY THERMAL PROBE, ASTM D5334-14

Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/20/2021
		Sample Date:	4/12/2021
Project Number	E468R6.01	Test Date:	5/18/2021
Sample I.D.:	B-31 @ 2-4'	Sampled By:	ZA
Sample Description:	Lean clay	Tested By:	MA

Wet Weight, gm	527.0	555.0	590.0	655.0	715.0	778.0
Dry Weight, gm	527.0	527.0	527.0	527.0	527.0	527.0
Moisture content, %	0.0	5.3	12.0	24.3	35.7	47.6
Average Length, in	6.000	6.000	6.000	6.000	6.000	6.000
Average Diameter, in	2.40	2.40	2.40	2.40	2.40	2.40
Dry Density, pcf	73.9	73.9	73.9	73.9	73.9	73.9
Thermal Conductivity, W/cm*˚c	0.00250	0.00309	0.00592	0.0088	0.01162	0.01058
Thermal Resistivity, cm*˚c/W	400.0	323.6	168.9	113.6	86.1	94.5





Note: Remolded to Approximately 85% of the dry max. dry density of 86.9, pcf as per ASTM D698.

Thermal Conductivity Units: W/cm*˚c
Thermal Resistivity Units: cm*˚c/W
Where: W: Watt cm: Centimeter ˚c degree Celsius

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ASSOCIATES, INC.
California ELAP Certificate #1371

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(559) 268-7021 Phone
(559) 268-0740 Fax

May 04, 2021

Work Order #: **HD26013**

Zubair Anwar
MTA Geotechnical Division
2527 Fresno Street
Fresno, CA 93721

RE: Proposed Solar Array- Lancaster

Enclosed are the analytical results for samples received by our laboratory on **04/26/21** . For your reference, these analyses have been assigned laboratory work order number **HD26013**.

All analyses have been performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, Moore Twining Associates, Inc. (MTA) is not responsible for use of less than complete reports. Results apply only to samples analyzed.

If you have any questions, please feel free to contact us at the number listed above.

Sincerely,

Moore Twining Associates, Inc.

Julio Morales
Client Services Supervisor

MOORE TWINING ASSOCIATES, INC.
California ELAP Certificate #1371

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Fresno, CA 93721
(559) 268-7021 Phone
(559) 268-0740 Fax

MTA Geotechnical Division	**Project:** Proposed Solar Array- Lancaster	**Reported:**
2527 Fresno Street	**Project Number:** E468R6.01	05/04/2021
Fresno CA, 93721	**Project Manager:** Zubair Anwar	

Analytical Report for the Following Samples

Sample ID	Notes	Laboratory ID	Matrix	Date Sampled	Date Received
B7 @ 0-3		HD26013-01	Soil	04/13/21 00:00	04/26/21 10:44
B9 @ 0-3.5		HD26013-02	Soil	04/15/21 00:00	04/26/21 10:44
B10 @ 0-5		HD26013-03	Soil	04/15/21 00:00	04/26/21 10:44
B11 @ 0-3.5		HD26013-04	Soil	04/15/21 00:00	04/26/21 10:44
B12 @ 0-3		HD26013-05	Soil	04/15/21 00:00	04/26/21 10:44
B13 @ 0-3.5		HD26013-06	Soil	04/15/21 00:00	04/26/21 10:44
B14 @ 0-3.5		HD26013-07	Soil	04/15/21 00:00	04/26/21 10:44
B15 @ 0-5		HD26013-08	Soil	04/15/21 00:00	04/26/21 10:44
B16 @ 0-5		HD26013-09	Soil	04/14/21 00:00	04/26/21 10:44
B19 @ 0-5		HD26013-10	Soil	04/14/21 00:00	04/26/21 10:44
B24 @ 0-3.5		HD26013-11	Soil	04/14/21 00:00	04/26/21 10:44
B26 @ 0-3		HD26013-12	Soil	04/13/21 00:00	04/26/21 10:44
B28 @ 0-3.5		HD26013-13	Soil	04/14/21 00:00	04/26/21 10:44
B29 @ 0-3		HD26013-14	Soil	04/13/21 00:00	04/26/21 10:44
B32 @ 0-3		HD26013-15	Soil	04/13/21 00:00	04/26/21 10:44
B34 @ 0-5		HD26013-16	Soil	04/14/21 00:00	04/26/21 10:44

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

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California ELAP Certificate #1371

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MTA Geotechnical Division	**Project:** Proposed Solar Array- Lancaster	**Reported:**
2527 Fresno Street	**Project Number:** E468R6.01	05/04/2021
Fresno CA, 93721	**Project Manager:** Zubair Anwar	

B7 @ 0-3

HD26013-01 (Soil) Sampled: 04/13/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		ND	30	mg/kg	15	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		ND	0.0030	% by Weight	15	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.29**	0.0090	% by Weight	45	[CALC]	05/03/21	05/03/21	[CALC]
pH		**7.9**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**2900**	90	mg/kg	45	B1D2915	04/29/21	05/03/21	Cal Test 417

B9 @ 0-3.5

HD26013-02 (Soil) Sampled: 04/15/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		ND	18	mg/kg	9	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		ND	0.0018	% by Weight	9	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.06**	0.0018	% by Weight	9	[CALC]	04/30/21	04/30/21	[CALC]
pH		**9.1**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**600**	18	mg/kg	9	B1D2915	04/29/21	04/30/21	Cal Test 417

B10 @ 0-5

HD26013-03 (Soil) Sampled: 04/15/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		ND	18	mg/kg	9	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		ND	0.0018	% by Weight	9	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.029**	0.0018	% by Weight	9	[CALC]	04/30/21	04/30/21	[CALC]
pH		**9.2**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**290**	18	mg/kg	9	B1D2915	04/29/21	04/30/21	Cal Test 417

B11 @ 0-3.5

HD26013-04 (Soil) Sampled: 04/15/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		ND	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		ND	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.0017**	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
pH		**9.0**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**17**	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 417

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California ELAP Certificate #1371

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MTA Geotechnical Division	**Project:** Proposed Solar Array- Lancaster	**Reported:**
2527 Fresno Street	**Project Number:** E468R6.01	05/04/2021
Fresno CA, 93721	**Project Manager:** Zubair Anwar	

B12 @ 0-3

HD26013-05 (Soil) Sampled: 04/15/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		ND	30	mg/kg	15	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		ND	0.0030	% by Weight	15	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.53**	0.012	% by Weight	60	[CALC]	05/03/21	05/03/21	[CALC]
pH		**7.7**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**5300**	120	mg/kg	60	B1D2915	04/29/21	05/03/21	Cal Test 417

B13 @ 0-3.5

HD26013-06 (Soil) Sampled: 04/15/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		ND	42	mg/kg	21	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		ND	0.0042	% by Weight	21	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.54**	0.013	% by Weight	63	[CALC]	05/03/21	05/03/21	[CALC]
pH		**7.7**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**5400**	130	mg/kg	63	B1D2915	04/29/21	05/03/21	Cal Test 417

B14 @ 0-3.5

HD26013-07 (Soil) Sampled: 04/15/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		**13**	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		**0.0013**	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.0078**	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
pH		**8.3**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**78**	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 417

B15 @ 0-5

HD26013-08 (Soil) Sampled: 04/15/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		**11**	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		**0.0011**	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.0022**	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
pH		**9.3**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**22**	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 417

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MTA Geotechnical Division	**Project:** Proposed Solar Array- Lancaster	**Reported:**
2527 Fresno Street	**Project Number:** E468R6.01	05/04/2021
Fresno CA, 93721	**Project Manager:** Zubair Anwar	

B16 @ 0-5

HD26013-09 (Soil) Sampled: 04/14/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		**71**	18	mg/kg	9	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		**0.0071**	0.0018	% by Weight	9	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.0044**	0.0018	% by Weight	9	[CALC]	04/30/21	04/30/21	[CALC]
pH		**9.0**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**44**	18	mg/kg	9	B1D2915	04/29/21	04/30/21	Cal Test 417

B19 @ 0-5

HD26013-10 (Soil) Sampled: 04/14/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		**39**	18	mg/kg	9	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		**0.0039**	0.0018	% by Weight	9	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.02**	0.0018	% by Weight	9	[CALC]	04/30/21	04/30/21	[CALC]
pH		**8.3**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**200**	18	mg/kg	9	B1D2915	04/29/21	04/30/21	Cal Test 417

B24 @ 0-3.5

HD26013-11 (Soil) Sampled: 04/14/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		**510**	36	mg/kg	18	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		**0.051**	0.0036	% by Weight	18	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.24**	0.0072	% by Weight	36	[CALC]	05/03/21	05/03/21	[CALC]
pH		**8.8**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**2400**	72	mg/kg	36	B1D2915	04/29/21	05/03/21	Cal Test 417

B26 @ 0-3

HD26013-12 (Soil) Sampled: 04/13/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		**49**	18	mg/kg	9	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		**0.0049**	0.0018	% by Weight	9	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.0041**	0.0018	% by Weight	9	[CALC]	04/30/21	04/30/21	[CALC]
pH		**9.7**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**41**	18	mg/kg	9	B1D2915	04/29/21	04/30/21	Cal Test 417

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MTA Geotechnical Division	**Project:** Proposed Solar Array- Lancaster	**Reported:**
2527 Fresno Street	**Project Number:** E468R6.01	05/04/2021
Fresno CA, 93721	**Project Manager:** Zubair Anwar	

B28 @ 0-3.5

HD26013-13 (Soil) Sampled: 04/14/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		ND	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		ND	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.0011**	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
pH		**7.9**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**11**	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 417

B29 @ 0-3

HD26013-14 (Soil) Sampled: 04/13/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		**39**	12	mg/kg	6	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		**0.0039**	0.0012	% by Weight	6	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.031**	0.0012	% by Weight	6	[CALC]	04/30/21	04/30/21	[CALC]
pH		**8.3**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**310**	12	mg/kg	6	B1D2915	04/29/21	04/30/21	Cal Test 417

B32 @ 0-3

HD26013-15 (Soil) Sampled: 04/13/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		**43**	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		**0.0043**	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.025**	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
pH		**8.0**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**250**	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 417

B34 @ 0-5

HD26013-16 (Soil) Sampled: 04/14/21 00:00

Analyte	Flag	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Inorganics									
Chloride		**6.1**	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 422
Chloride		**0.00061**	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
Sulfate as SO4		**0.014**	0.00060	% by Weight	3	[CALC]	04/30/21	04/30/21	[CALC]
pH		**9.0**	0.10	pH Units	1	B1D2915	04/29/21	05/03/21	Cal Test 643
Sulfate as SO4		**140**	6.0	mg/kg	3	B1D2915	04/29/21	04/30/21	Cal Test 417

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MTA Geotechnical Division	**Project:** Proposed Solar Array- Lancaster	**Reported:**
2527 Fresno Street	**Project Number:** E468R6.01	05/04/2021
Fresno CA, 93721	**Project Manager:** Zubair Anwar	

Notes and Definitions

DUP1	A high RPD was observed between a sample and this sample's duplicate.
µg/L	micrograms per liter (parts per billion concentration units)
mg/L	milligrams per liter (parts per million concentration units)
mg/kg	milligrams per kilogram (parts per million concentration units)
ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
	Analysis of pH, filtration, and residual chlorine is to take place immediately after sampling in the field. If the test was performed in the laboratory, the hold time was exceeded. **(for aqueous matrices only)**

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Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Sandy lean clay	Test Date:	4/27/2021
Location:	B-7 @ 0-3'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
100 mls	10,000
125 mls	1,600
150 mls	770
175 mls	690
200 mls	650
225 mls	620
250 mls	620
275 mls	640

Remarks: Min. Resistivity is 620 Ohm-cm

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h J MOORE TWINING ASSOCIATES, INC.

Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Silty sand	Test Date:	4/27/2021
Location:	B-9 @ 0-3.5'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
100 mls	2,200
125 mls	1,900
150 mls	1,900
175 mls	2,100

Remarks: Min. Resistivity is 1,900 Ohm-cm

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Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Lean clay	Test Date:	4/27/2021
Location:	B-10 @ 0-5'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
100 mls	2,200
125 mls	2,100
150 mls	2,100
175 mls	2,200

Remarks: Min. Resistivity is 2,100 Ohm-cm

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Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Lean clay	Test Date:	4/27/2021
Location:	B-11 @ 0-3.5'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
100 mls	3,600
125 mls	3,300
150 mls	3,400
175 mls	3,600

Remarks: Min. Resistivity is 3,300 Ohm-cm

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Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Lean clay	Test Date:	4/27/2021
Location:	B-12 @ 0-3'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
100 mls	2,200
125 mls	2,000
150 mls	2,000
175 mls	2,100

Remarks: Min. Resistivity is 2,000 Ohm-cm

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Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Sandy lean clay	Test Date:	4/28/2021
Location:	B-13 @ 0-3.5'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
100 mls	1,900
125 mls	1,800
150 mls	1,700
175 mls	1,800

Remarks: Min. Resistivity is 1,700 Ohm-cm

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Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Lean clay	Test Date:	4/28/2021
Location:	B-14 @ 0-3.5'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
125 mls	3,000
150 mls	2,900
175 mls	2,800
200 mls	2,700
225 mls	2,800

Remarks: Min. Resistivity is 2,700 Ohm-cm

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Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Lean clay	Test Date:	4/28/2021
Location:	B-15 @ 0-5'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
125 mls	3,000
150 mls	2,900
175 mls	3,000

Remarks: Min. Resistivity is 2,900 Ohm-cm

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Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Sandy lean clay	Test Date:	4/29/2021
Location:	B-16 @ 0-5'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
100 mls	3,600
125 mls	3,400
150 mls	3,400
175 mls	3,500

Remarks: Min. Resistivity is 3,400 Ohm-cm

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Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Lean clay	Test Date:	4/29/2021
Location:	B-19 @ 0-5'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
150 mls	2,800
175 mls	2,600
200 mls	2,500
225 mls	2,500
250 mls	2,600

Remarks: Min. Resistivity is 2,500 Ohm-cm

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Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Lean clay	Test Date:	4/29/2021
Location:	B-24 @ 0-3.5'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
150 mls	1,400
175 mls	460
200 mls	450
225 mls	440
250 mls	440
275 mls	450

Remarks: Min. Resistivity is 440 Ohm-cm

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Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Sandy lean clay	Test Date:	4/29/2021
Location:	B-26 @ 0-3'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
125 mls	2,400
150 mls	2,300
175 mls	2,300
200 mls	2,400

Remarks: Min. Resistivity is 2,300 Ohm-cm

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h J MOORE TWINING ASSOCIATES, INC.

Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Silty sand	Test Date:	4/29/2021
Location:	B-28 @ 0-3.5'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
100 mls	8,000
125 mls	6,200
150 mls	6,000
175 mls	5,900
200 mls	6,000

Remarks: Min. Resistivity is 5,900 Ohm-cm

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2527 Fresno Street
Fresno, CA 93721

h J MOORE TWINING ASSOCIATES, INC.

Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Sandy lean clay	Test Date:	4/30/2021
Location:	B-29 @ 0-3'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
150 mls	2,100
175 mls	2,000
200 mls	2,000
225 mls	2,100

Remarks: Min. Resistivity is 2,000 Ohm-cm

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h J MOORE TWINING ASSOCIATES, INC.

Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Sandy lean clay to lean clay	Test Date:	4/30/2021
Location:	B-32 @ 0-3'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
150 mls	2,200
175 mls	2,000
200 mls	2,100

Remarks: Min. Resistivity is 2,000 Ohm-cm

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h J MOORE TWINING ASSOCIATES, INC.

Project Name:	Proposed Solar Array - Lancaster	Report Date:	5/14/2021
		Sample Date:	4/12/2021
Project Number:	E468R6.01		
		Sampled By:	ZA
Subject:	Minimum Resistivity, ASTM G187	Tested By:	MA
Material Description:	Lean clay	Test Date:	4/30/2021
Location:	B-34 @ 0-5'		

Laboratory Test Results, Minimum Resistivity - ASTM G187

Total Water Added, mls	Resistivity, Ohm-cm
125 mls	2,600
150 mls	2,400
175 mls	2,300
200 mls	2,400

Remarks: Min. Resistivity is 2,300 Ohm-cm

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APPENDIX D

RESULTS OF FIELD RESISTIVITY TESTING

6280 Riverdale Street
San Diego, CA 92120
(877) 215-4321 | oneatlas.com

April 30, 2021

Atlas No. 121129SWG
Report No. 1

MR. ALLEN H. HARKER
MOORE TWINNING ASSOCIATES, INC
2527 FRESNO STREET
LANCASTER, CALIFORNIA 93721

Subject: GEOPHYSICAL EVALUATION – ELECTRICAL RESISTIVITY
SUNPOWER 60TH STREET WEST SUBSTATION
LANCASTER, CALIFORNIA

Dear Mr. Harker

In accordance with your authorization, we have performed a geophysical evaluation pertaining to the Sunpower 60th Street West Substation project located in Lancaster, California (Figure 1). The purpose of our evaluation was to collect in-situ electrical resistivity measurements. Our services were conducted on April 5th, 2021. This report presents our methodology, equipment used, analysis, and results.

Our scope of services for the project included collection of electrical resistivity data at the site, compilation of the data collected, and preparation of this data report. Specifically, we conducted eight soundings at the project site (R-1 through R-8). Each sounding consisted of two orthogonal test lines with sixteen lines in total and electrode spacings selected by you and your office. Figure 2 illustrates the approximate sounding locations, and Figures 3a through 3d depict the general site conditions in the study area.

The data was collected in general accordance with ASTM G57 using an Advanced Geosciences, Inc. (AGI) MiniSting earth resistivity meter and four steel electrodes in a Wenner configuration. For each line, soil resistance measurements were collected at electrode spacings of 2, 4, 6, 8, 10, 25, 50, 75, 100 and 200 feet along the line. Stainless steel electrodes were hammered in place at your specified locations and the soils surrounding the electrodes were moistened with saline water (potable water with added table salt) to help overcome soil contact resistance.

The results of the electrical resistivity study are presented in Figures 4a through 4d. The collected measurements are generally consistent (with some slight variations) indicating that the subsurface conditions at depth are fairly uniform with respect to apparent resistivity.

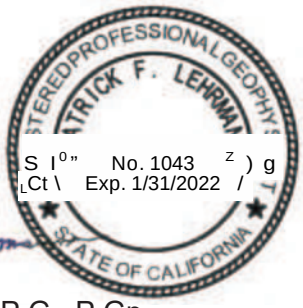
The field services and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding

the conclusions presented in this report. Please also note that our evaluation was limited to measuring in-situ apparent soil resistivity at two sounding locations selected by your office.

Atlas should be contacted if the reader has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of this report by parties other than the client is undertaken at said parties' sole risk.

We appreciate the opportunity to be of service on this project. Should you have any questions related to this report, please contact the undersigned at your convenience.

Respectfully submitted,
Atlas Technical Consultants LLC



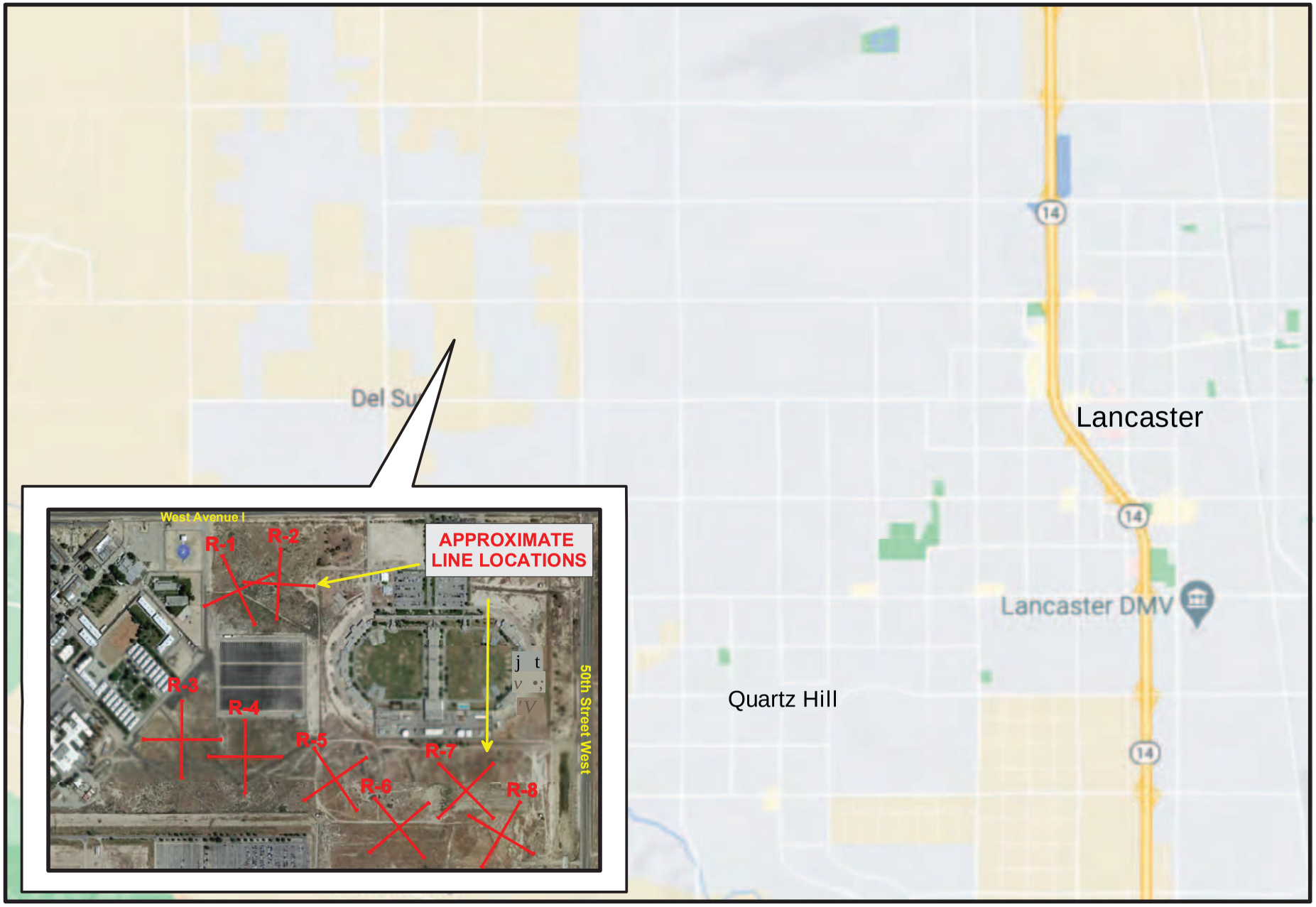
Orion A. Adah
Staff Geophysicist

Patrick F. Lehrmann, P.G., P.Gp.
Principal Geologist/Geophysicist

OAA:PFL:ds

Attachments:
Figure 1 – Site Location Map
Figure 2 – Resistivity Line Location Map
Figure 3a – Site Photographs (R-1 and R-2)
Figure 3b – Site Photographs (R-3 and R-4)
Figure 3c – Site Photographs (R-5 and R-6)
Figure 3d – Site Photographs (R-7 and R-8)
Figure 4a – Electrical Resistivity Results (R-1 and R-2)
Figure 4b – Electrical Resistivity Results (R-3 and R-4)
Figure 4c – Electrical Resistivity Results (R-5 and R-6)
Figure 4d – Electrical Resistivity Results (R-7 and R-8)

Distribution: AllenH@mooretwinning.com



SITE LOCATION MAP

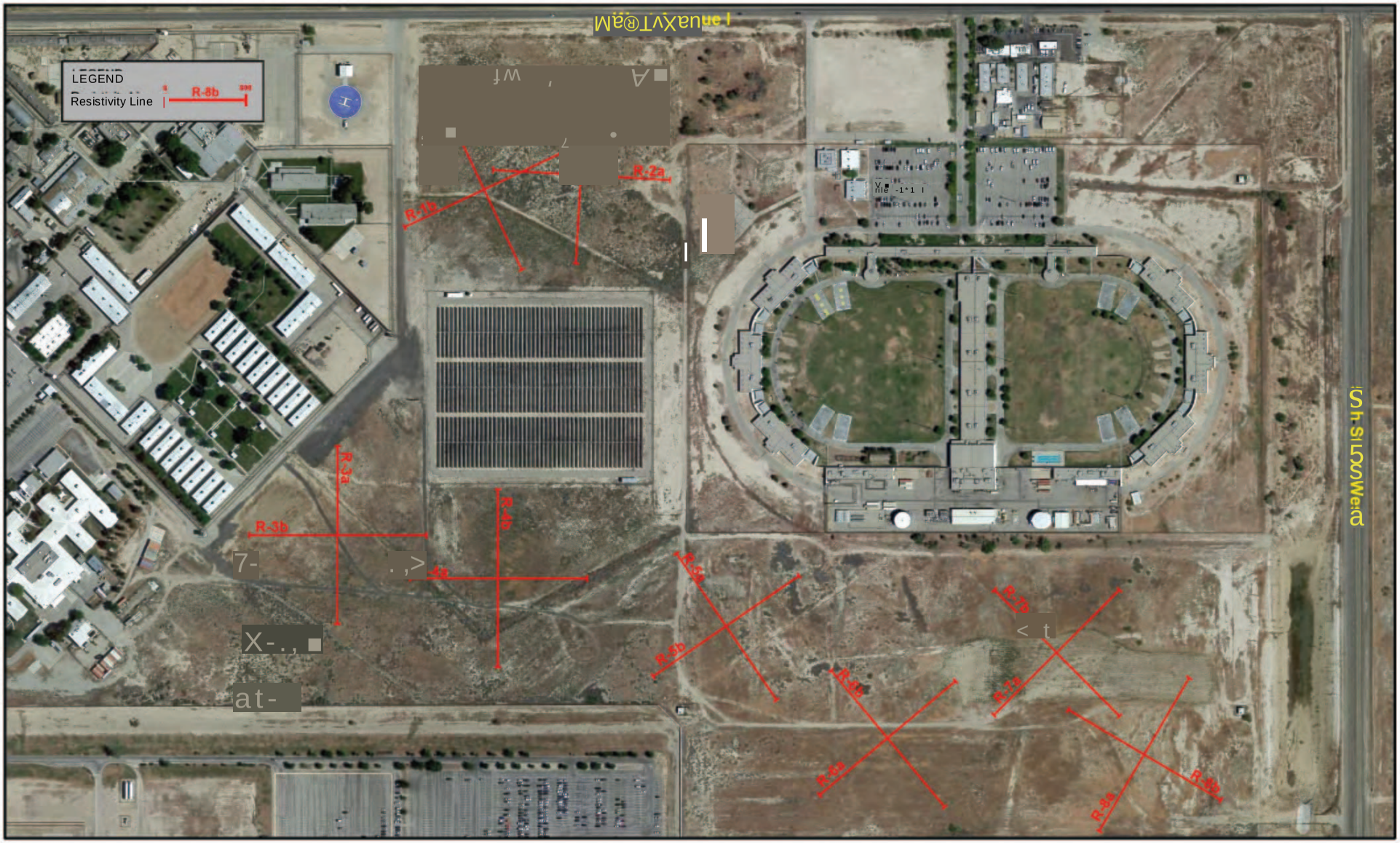
N

SunPower 60th Street West Substation
Lancaster, California

Project No.: 121129SWG | Date: 04/21

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Figure 1



RESISTIVITY LINE LOCATION MAP

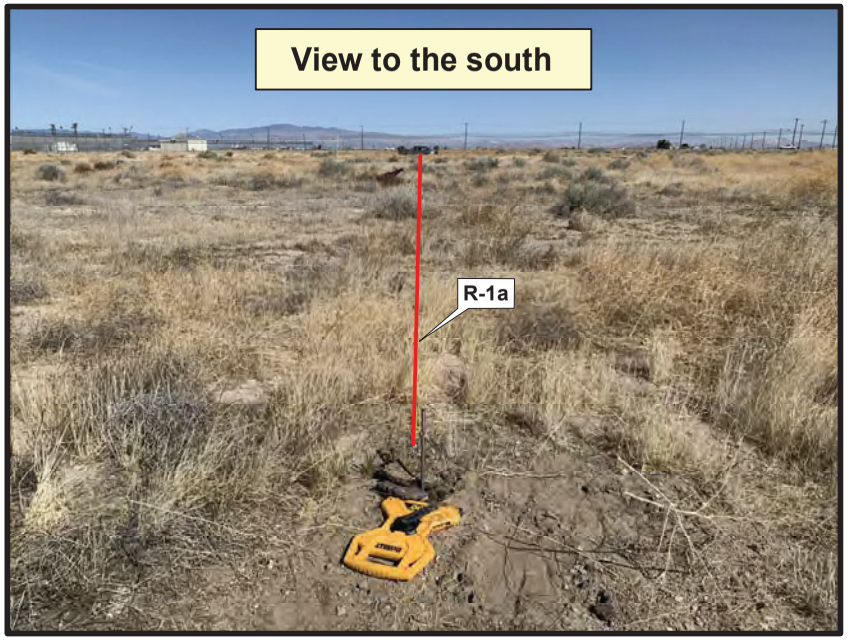
SunPower 60th Street West Substation
Lancaster, California

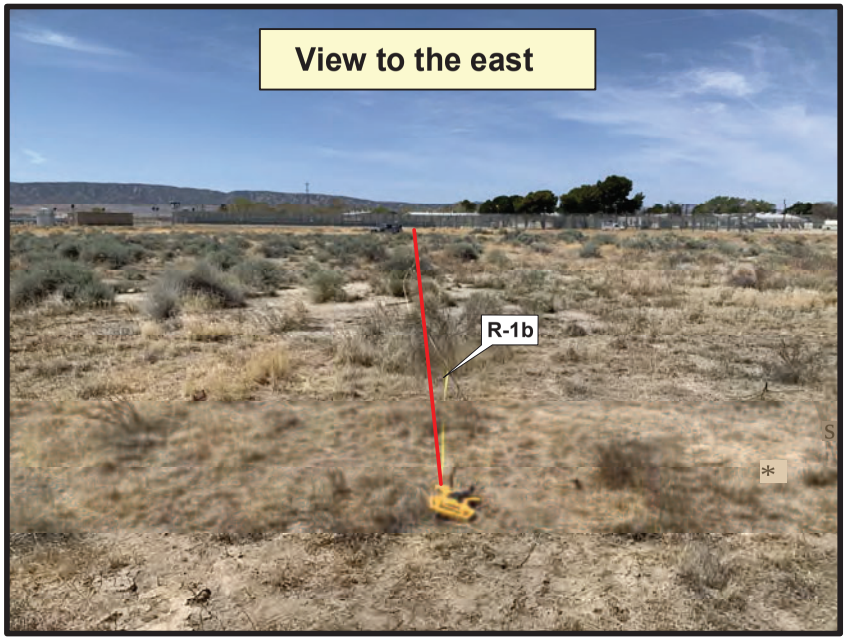
ATLAS

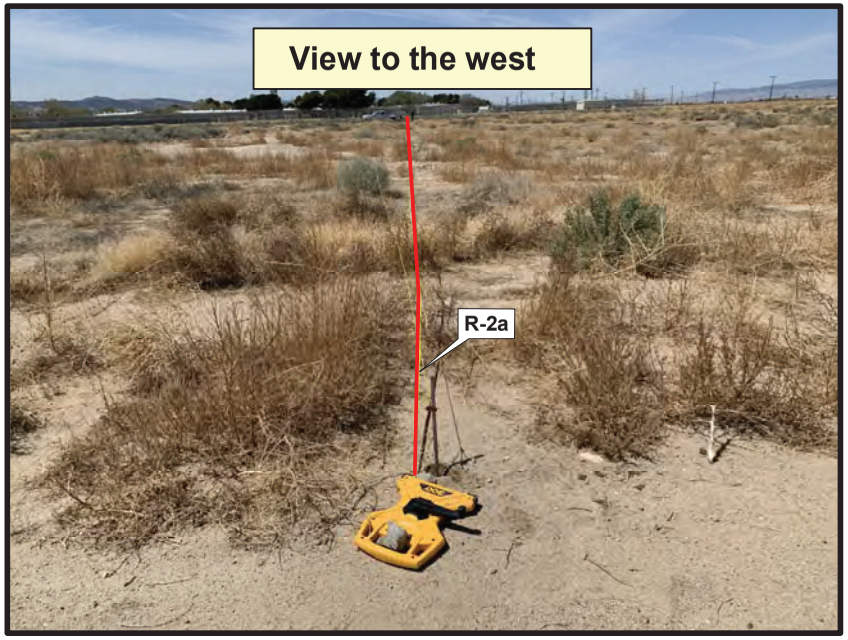
Figure 2

0 300 600 900 1200

approximate scale in feet









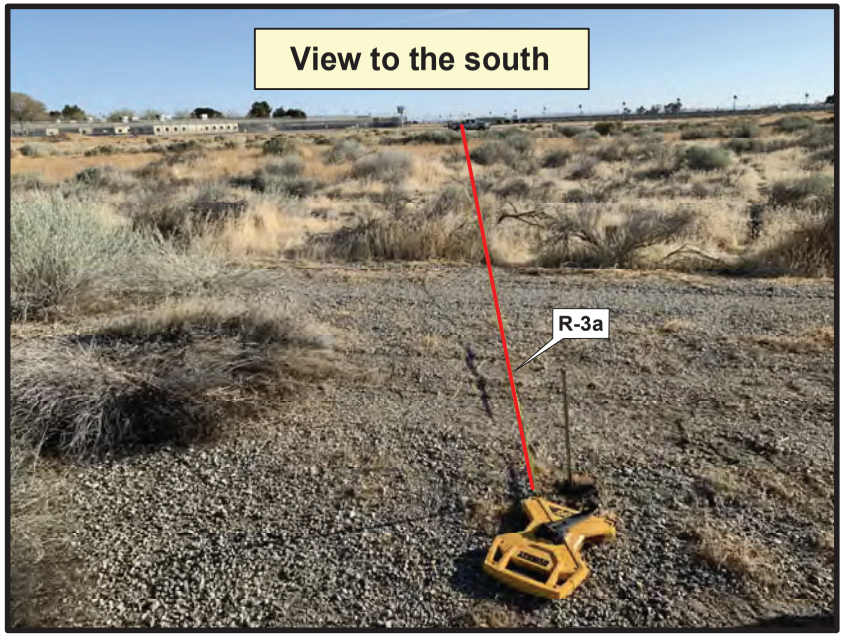
SITE PHOTOGRAPHS

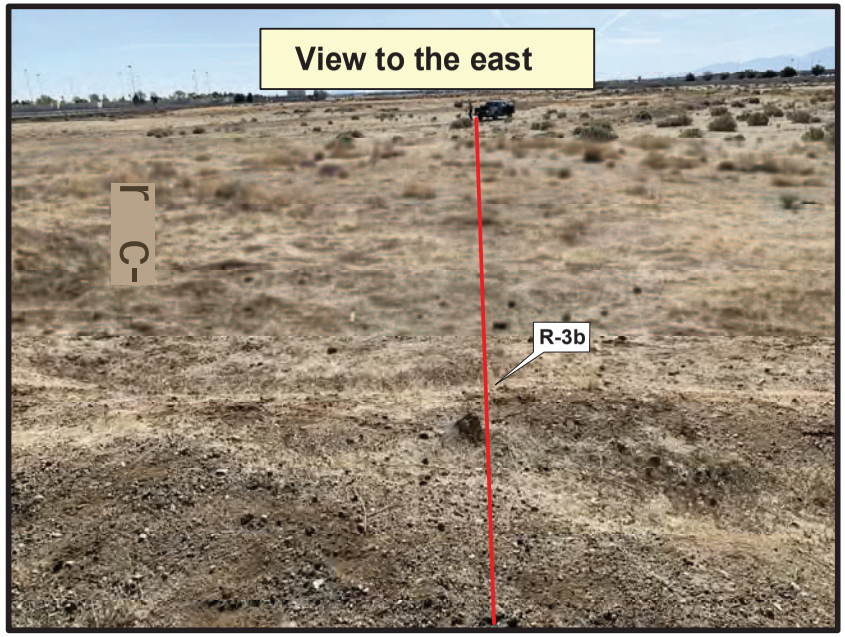
SunPower 60th Street West Substation
Lancaster, California

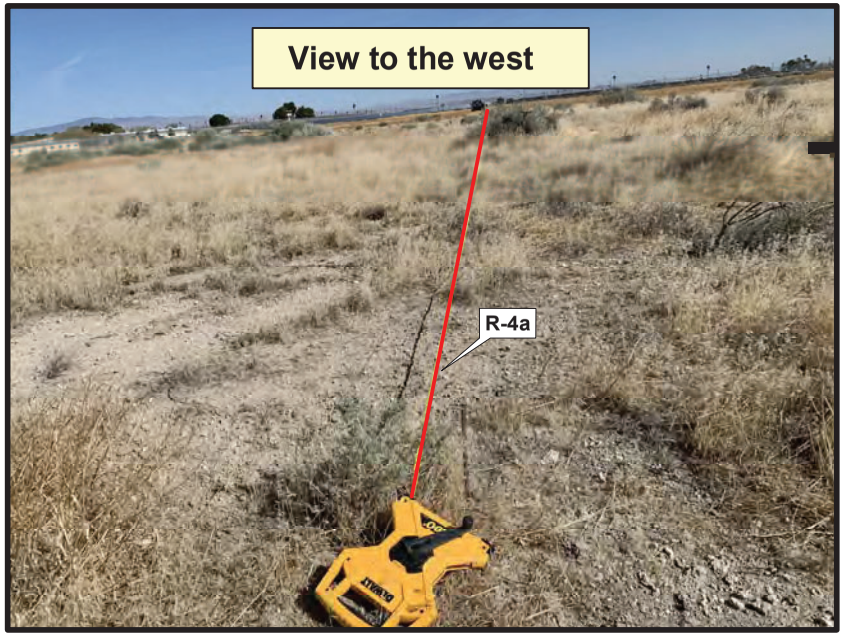
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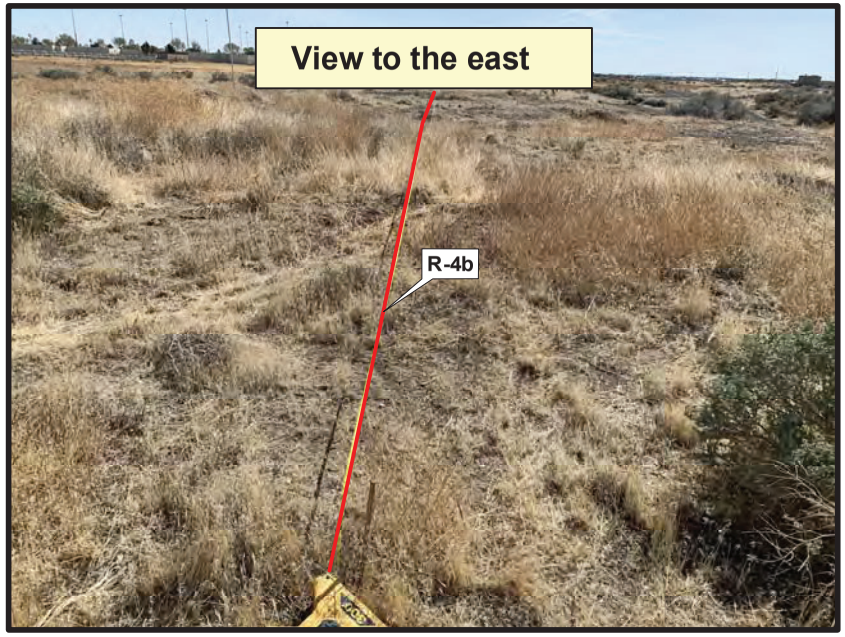
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Figure 3a









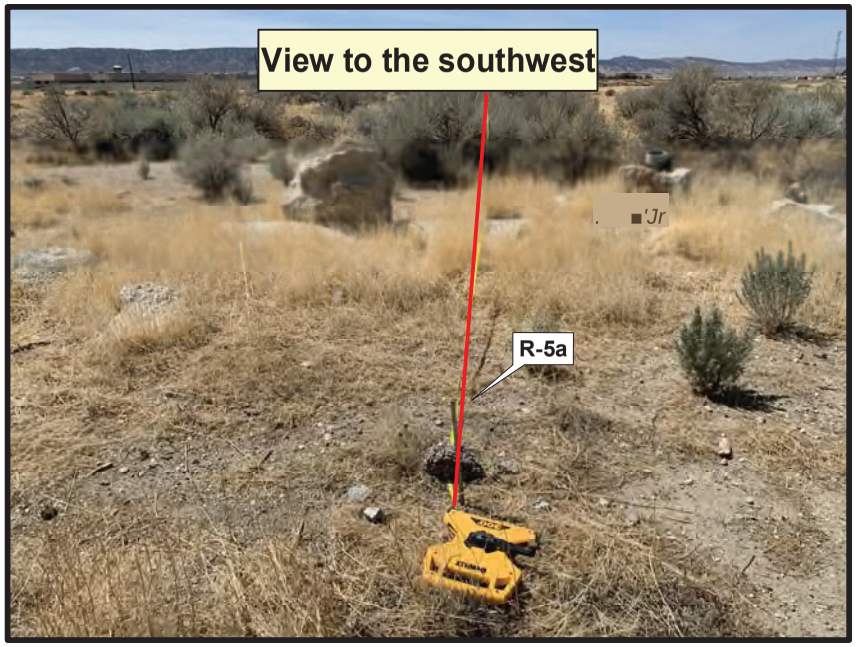
SITE PHOTOGRAPHS

SunPower 60th Street West Substation
Lancaster, California

Project No.: 121129SWG | Date: 04/21

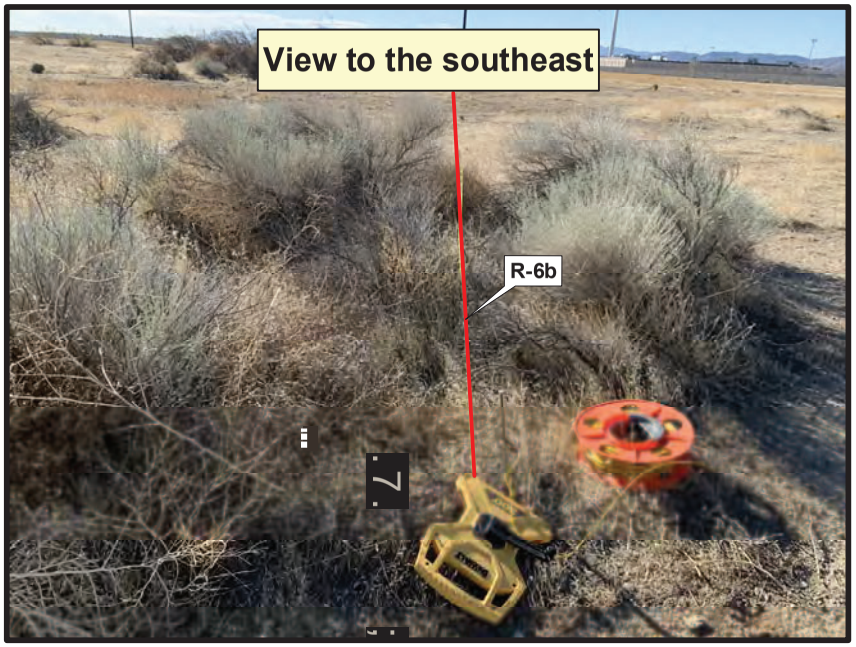
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Figure 3b









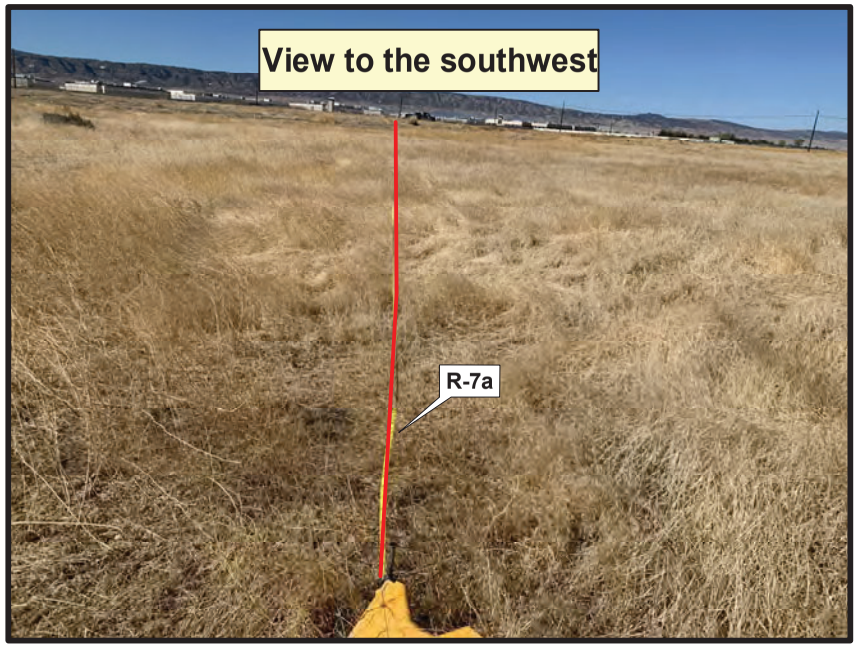
SITE PHOTOGRAPHS

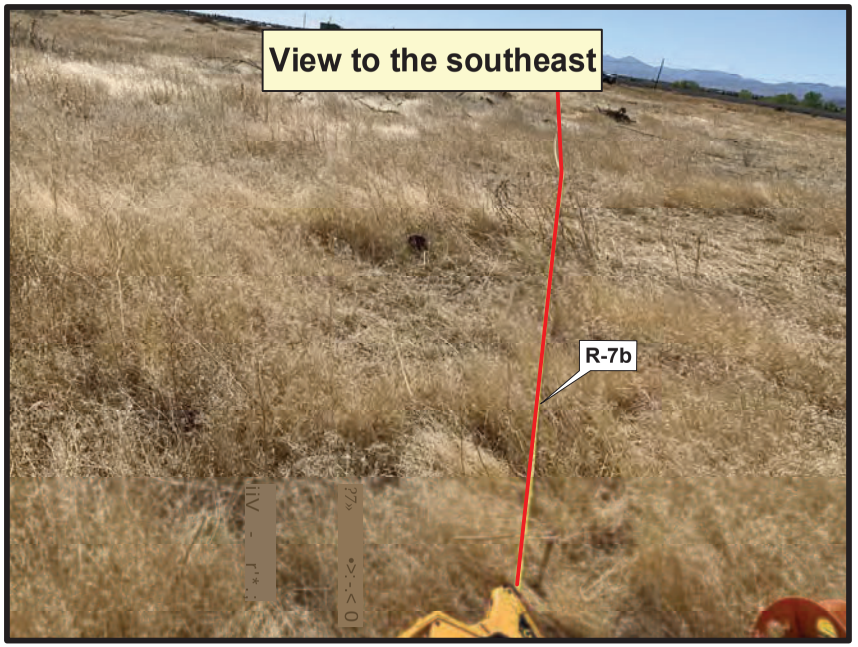
SunPower 60th Street West Substation
Lancaster, California

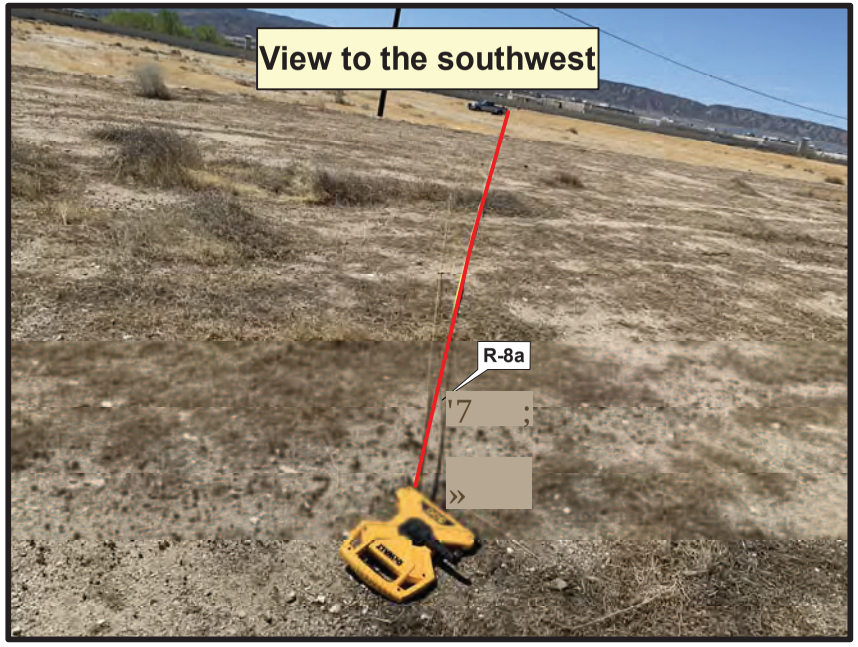
Project No.: 121129SWG | Date: 04/21

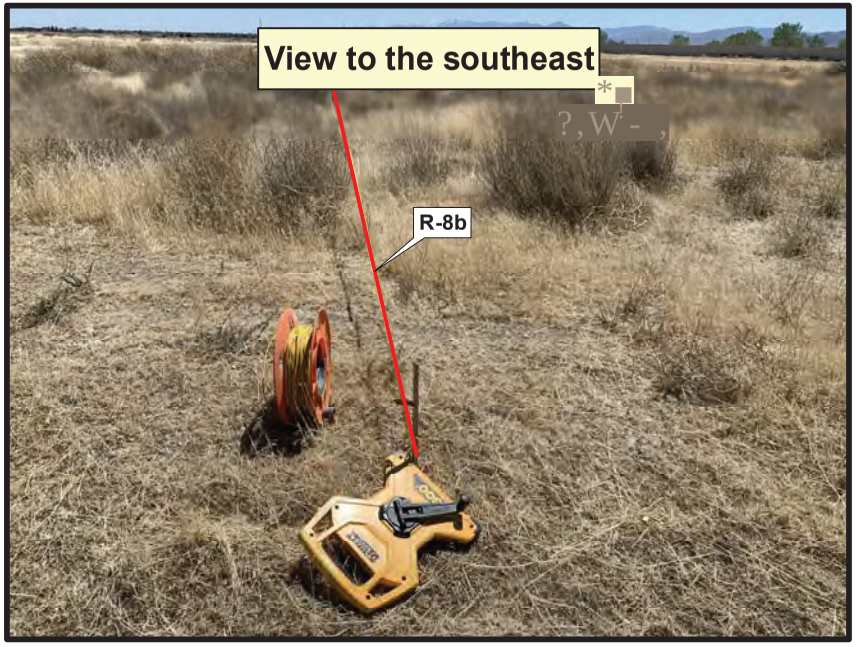
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Figure 3c









SITE PHOTOGRAPHS

SunPower 60th Street West Substation
Lancaster, California

Project No.: 121129SWG | Date: 04/21

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Figure 3d

Line No. (Boring/Orientation)	Spacing (ft)	Current (mA)	Resistance (Ohms)	Error (%)	Apparent Resistivity (ohm-cm)	(ohm-ft)
R-1a	2	100	10.450	0.1	4002.59	131.30
(NW-SE)	4	100	4.099	0.1	3140.02	103.00
	6	100	1.707	0.0	1961.46	64.36
	8	50	1.126	0.0	1725.13	56.58
	10	200	0.911	0.0	1744.86	57.25
	25	100	0.402	0.0	1926.13	63.19
	50	200	0.236	0.0	2259.83	74.16
	75	200	0.154	0.1	2209.08	72.46
	100	200	0.110	0.0	2106.62	69.12
	200	100	0.053	0.0	2036.53	66.82
R-1b	2	20	12.510	0.1	4791.61	157.21
(NE-SW)	4	200	3.987	0.1	3054.22	100.20
	6	100	1.839	0.2	2113.14	69.33
	8	100	1.287	0.0	1971.80	64.69
	10	20	1.174	0.1	2248.34	73.76
	25	200	0.467	0.0	2234.94	73.32
	50	200	0.240	0.0	2301.01	75.49
	75	200	0.148	0.1	2124.34	69.70
	100	200	0.106	0.0	2037.68	66.85
	200	100	0.052	0.1	1982.14	65.03
R-2a	2	200	3.567	0.1	1366.24	44.82
(E-W)	4	100	1.826	0.0	1398.80	45.89
	6	100	1.181	0.0	1357.05	44.52
	8	200	0.909	0.0	1392.98	45.70
	10	200	0.912	0.0	1746.77	57.31
	25	500	0.284	0.0	1360.21	44.63
	50	200	0.149	0.0	1427.72	46.84
	75	200	0.117	0.0	1677.64	55.04
	100	100	0.097	0.0	1852.49	60.78
	200	200	0.053	0.0	2035.77	66.79
R-2b	2	20	4.171	0.0	1597.59	52.41
(N-S)	4	200	2.185	0.0	1673.81	54.91
	6	200	2.436	0.1	2799.13	91.83
	8	200	1.048	0.0	1605.63	52.68
	10	200	0.747	0.0	1430.40	46.93
	25	100	0.263	0.1	1256.79	41.23
	50	200	0.139	0.0	1331.96	43.70
	75	200	0.111	0.0	1598.64	52.45
	100	200	0.102	0.0	1961.08	64.34
	200	100	0.064	0.2	2439.09	80.02

ELECTRICAL RESISTIVITY RESULTS (R-1 and R-2)

SunPower 60th Street West Substation
Lancaster, California

Project No.: 121129SWG | Date: 04/21

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Figure 4a

Line No. (Boring/Orientation)	Spacing (ft)	Current (mA)	Resistance (Ohms)	Error (%)	Apparent Resistivity (ohm-cm)	(ohm-ft)
R-3a	2	100	47.950	0.0	18365.94	602.56
(N-S)	4	100	19.620	0.0	15029.81	493.10
	6	100	8.024	0.0	9220.12	302.50
	8	100	3.906	0.0	5984.35	196.34
	10	100	2.149	0.0	4115.58	135.03
	25	100	0.544	0.0	2602.64	85.39
	50	100	0.328	0.0	3136.00	102.89
	75	200	0.230	0.0	3303.57	108.38
	100	200	0.178	0.0	3416.56	112.09
	200	20	0.099	0.0	3808.39	124.95
R-3b	2	50	47.790	0.0	18304.65	600.55
(E-W)	4	50	19.440	0.0	14891.92	488.58
	6	100	8.503	0.0	9770.52	320.56
	8	100	4.324	0.0	6624.76	217.35
	10	100	2.331	0.0	4464.13	146.46
	25	200	0.478	0.0	2290.48	75.15
	50	200	0.310	0.0	2964.60	97.26
	75	200	0.264	0.0	3787.62	124.27
	100	100	0.209	0.0	4004.50	131.38
	200	100	0.089	0.0	3420.01	112.21
R-4a	2	5	34.670	0.0	13279.40	435.68
(E-W)	4	10	4.072	0.0	3119.34	102.34
	6	5	2.601	0.0	2988.73	98.06
	8	10	1.831	0.0	2805.26	92.04
	10	10	1.386	0.0	2654.35	87.08
	25	20	0.703	0.0	3366.77	110.46
	50	50	0.472	0.0	4519.67	148.28
	75	50	0.464	0.1	6658.85	218.47
	100	100	0.366	0.0	7001.65	229.71
	200	200	0.126	0.0	4826.09	158.34
R-4b	2	20	24.030	0.0	9204.03	301.97
(N-S)	4	20	4.072	0.0	3119.34	102.34
	6	5	2.034	0.0	2337.20	76.68
	8	20	1.521	0.0	2330.31	76.45
	10	20	1.372	0.0	2627.54	86.21
	25	20	0.769	0.0	3681.33	120.78
	50	20	0.617	0.0	5910.04	193.90
	75	5	0.521	0.1	7489.05	245.70
	100	50	0.405	0.1	7756.21	254.47
	200	200	0.155	0.0	5944.51	195.03

ELECTRICAL RESISTIVITY RESULTS (R-3 and R-4)

SunPower 60th Street West Substation
Lancaster, California

Project No.: 121129SWG | Date: 04/21

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Figure 4b

Line No. (Boring/Orientation)	Spacing (ft)	Current (mA)	Resistance (Ohms)	Error (%)	Apparent Resistivity (ohm-cm)	(ohm-ft)
R-5a	2	20	35.580	0.1	13627.95	447.11
(NW-SE)	4	100	6.512	0.1	4988.49	163.66
	6	50	4.469	0.0	5135.18	168.48
	8	20	3.929	0.0	6019.58	197.49
	10	50	2.966	0.0	5680.23	186.36
	25	50	0.786	0.0	3762.24	123.43
	50	50	0.496	0.0	4752.35	155.92
	75	200	0.389	0.0	5585.91	183.26
	100	50	0.316	0.0	6042.18	198.23
	200	100	0.132	0.0	5052.07	165.75
R-5b	2	20	35.860	0.1	13735.19	450.63
(NE-SW)	4	50	9.011	0.0	6902.83	226.47
	6	50	5.635	0.1	6475.00	212.43
	8	50	4.416	0.1	6765.71	221.97
	10	50	3.210	0.0	6147.51	201.69
	25	50	0.742	0.1	3550.14	116.47
	50	50	0.440	0.0	4217.08	138.36
	75	100	0.360	0.0	5172.24	169.69
	100	100	0.317	0.0	6067.08	199.05
	200	50	0.122	0.0	4657.56	152.81
R-6a	2	20	13.710	0.0	5251.24	172.28
(NE-SW)	4	20	3.558	0.0	2725.59	89.42
	6	20	2.678	0.0	3077.20	100.96
	8	10	2.182	0.0	3343.02	109.68
	10	5	1.979	0.1	3790.01	124.34
	25	20	1.393	0.0	6669.38	218.81
	50	50	0.893	0.0	8549.07	280.48
	75	20	0.710	0.1	10199.41	334.63
	100	100	0.551	0.0	10552.27	346.20
	200	50	0.170	0.0	6507.55	213.50
R-6b	2	20	10.630	0.0	4071.53	133.58
(NW-SE)	4	10	3.833	0.0	2936.25	96.33
	6	10	2.869	0.0	3296.68	108.16
	8	20	2.238	0.0	3428.82	112.49
	10	10	1.988	0.0	3807.25	124.91
	25	100	1.517	0.0	7263.07	238.29
	50	50	1.205	0.0	11538.56	378.56
	75	20	0.785	0.0	11275.23	369.92
	100	50	0.556	0.0	10638.45	349.03
	200	50	0.222	0.0	8518.42	279.48

ELECTRICAL RESISTIVITY RESULTS (R-5 and R-6)

SunPower 60th Street West Substation
Lancaster, California

Project No.: 121129SWG I Date: 04/21

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Figure 4c

Line No. (Boring/Orientation)	Spacing (ft) '	Current (mA)	Resistance (Ohms)	Error (%)	Apparent Resistivity (ohm-cm)	(ohm-ft)
R-7a	2	2	369.600	0.0	141565.17	4644.53
(NE-SW)	4	10	63.640	0.0	48751.12	1599.45
	6	2	16.950	0.0	19476.70	639.00
	8	2	5.137	0.0	7870.35	258.21
	10	10	3.612	0.0	6917.39	226.95
	25	10	1.458	0.0	6980.59	229.02
	50	20	0.972	0.0	9305.54	305.30
	75	10	0.698	0.0	10031.36	329.11
	100	50	0.501	0.0	9585.14	314.47
	200	50	0.165	0.0	6335.19	207.85
R-7b	2	5	370.600	0.0	141948.20	4657.09
(NW-SE)	4	5	63.030	0.0	48283.84	1584.12
	6	10	17.230	0.0	19798.44	649.56
	8	5	7.930	0.0	12149.48	398.60
	10	5	3.862	0.0	7396.17	242.66
	25	10	1.257	0.0	6018.24	197.45
	50	5	0.870	0.0	8328.83	273.26
	75	100	0.605	0.0	8694.14	285.24
	100	100	0.421	0.0	8066.46	264.65
	200	100	0.201	0.0	7691.09	252.33
R-8a	2	20	34.940	0.0	13382.81	439.07
(NE-SW)	4	10	17.590	0.0	13474.74	442.08
	6	20	8.600	0.0	9881.98	324.21
	8	10	6.059	0.0	9282.94	304.56
	10	50	4.325	0.0	8282.86	271.75
	25	100	1.766	0.0	8455.23	277.40
	50	50	0.827	0.0	7918.04	259.78
	75	200	0.542	0.0	7787.81	255.51
	100	200	0.418	0.0	7999.43	262.45
	200	20	0.168	0.0	6434.78	211.11
R-8b	2	20	36.250	0.1	13884.57	455.53
(NW-SE)	4	20	17.280	0.0	13237.26	434.29
	6	100	12.920	0.0	14845.96	487.07
	8	50	7.591	0.1	11630.10	381.56
	10	100	3.783	0.0	7244.87	237.69
	25	100	1.922	0.0	9202.12	301.91
	50	100	0.900	0.0	8618.01	282.74
	75	200	0.658	0.0	9456.83	310.26
	100	200	0.476	0.0	9112.11	298.95
	200	50	0.183	0.1	6990.16	229.34

ELECTRICAL RESISTIVITY RESULTS (R-7 and R-8)

SunPower 60th Street West Substation
Lancaster, California

Project No.: 121129SWG | Date: 04/21

AVP-bAG-

Figure 4d

APPENDIX E

Flood Insurance Rate Map Community Panel number 06037C0405F

NOTES TO USERS

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elevation, description, and/or location information for **bench marks** map, please contact the Information Services Branch of the tic Survey at **(301) 713-3242,** or visi its website at aia.gov'.

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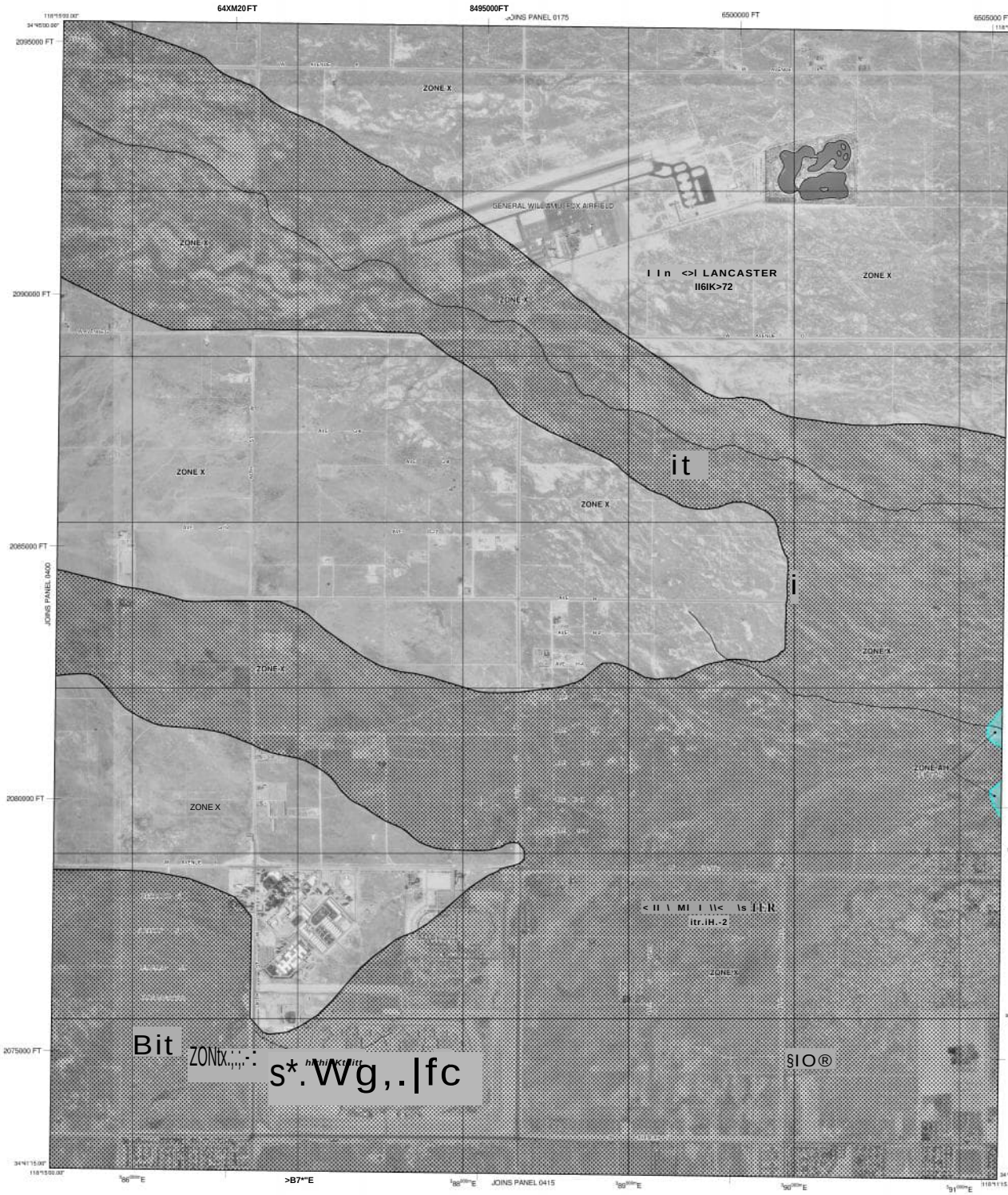
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LEGEND

SPECIAL R.OOD HAZARD AfrEAS CSFHA6) SUBJECT TO »UM»na« BV THE 1% ANSUAL OUNCE

E C 7tt" flood (100-year flood), also known as the base flood, is the flood of having equaled or exceeded in any given year. The Special Flood Hazard Area is the 1% annual chance flood. Areas su s." I"SWt " Alt, A99, V and VE. The Base rtavlOMlxv.ulta•nr.rtt ihnvimSW IX annual chance flood.

ZONE A hi Aw Andntramw mnmlvil
2DHC AC Base Flood Elevations determined.
ZOIt AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from this 1% annual chance or greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

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The floodway is the chan *> <tA ruevn eu *ttf* aeyxrei|tMuUin eeu thH matte kept free of encroachmen tn Sut»M amvi rtXvreiT«1 CM t* certd ettcU substantial increases in ftood heights.

L'THER FLOOD WEAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage weeslea tto» 1 square mile; and areas protected by levees from 1% annual chance flood.

JINEKnUEAS

Areas determined to be outside the 0.2% annual chance floodplain.

Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

Jli J-.-VILL FH.UILLILLi toll ··• (OPAs)

as and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 Base Flood Elevation line and value; elevation in feet*
(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*
* Referenced to the North American Vertical Datum of 1988 (NAVD 88)
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To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
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NATIONAL FLOOD INSURANCE PROGRAM

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Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037CM05F

EFFECTIVE DATE
SEPTEMBER 26, 2006

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APPENDIX F

Photographic Log



Photograph No. 1: Vegetation stockpile on north side of California State Prison, Los Angeles County.



Photograph No. 2: Debris (foreground) and soil stockpiles with debris (background) on south side of Los Angeles County Challenger Memorial Youth Camps.



Photograph No. 3: Vegetation stockpile south of existing solar field.



Photograph No. 4: Typical dry grasses, weeds, brush and scattered debris covering the site.



Photograph No. 5: Mulch piles in southwest portion of the site.



Photograph No. 6: Soil stockpile near mulch stockpiles in southwest portion of the site.



Photograph No. 7: Soil stockpile on south side of site near state prison.



Photograph No. 8: Leach Field Pipe Termination Sign in Southwest Portion of Site.



Photograph No. 9: West end of V-shaped drainage on southwest side of existing solar array.



Photograph No. 10: East end of V-shaped drainage (filled with tree trimmings) located southeast of existing solar array.



Photograph No. 11: Trash bins and debris stockpiles on west side of existing solar field.



Photograph No.12: Concrete debris, trailer and other debris stockpiles adjacent to trash bins on west side of existing solar field.

APPENDIX G

SUPPLEMENTAL BACKHOE PIT INVESTIGATION

September 17, 2021

E468R6.01

Mr. Tim Christman
SunPower Corporation
1414 Harbour Way South, Suite 1901
Richmond, CA 94804

Subject: Supplemental Geotechnical Engineering Investigation
Proposed Ground Mounted Solar Array
County of Los Angeles High Desert Expansion
45100 60th Street West
Lancaster, California

Reference: Geotechnical Engineering Investigation, Proposed Ground Mounted Solar Array County of Los Angeles High Desert Expansion, 45100 60th Street West, Lancaster, California, dated July 9, 2021, prepared by Moore Twining Associates, Inc., Moore Twining Project No. E468R6.01

Dear Mr. Christman:

We are pleased to submit this supplemental geotechnical engineering investigation report for the proposed ground mounted solar array planned at the County of Los Angeles High Desert Expansion site at 45100 60th Street West in Lancaster, California. The contents of this report include the purpose of the supplemental investigation, scope of services, investigative procedures, our findings, conclusions, and recommendations. The report appendices contain the drawings (Appendix A); the logs of backhoe pits (Appendix B); and a Photographic Log (Appendix C).

1.0 BACKGROUND

As background, Moore Twining Associates, Inc. (Moore Twining) prepared a draft Geotechnical Engineering Investigation report for the proposed ground mounted solar array project at the 45100 60th Street West in Lancaster, California, dated July 9, 2021. In the draft report, Moore Twining indicated the following:

"Deep fills and significant amounts of debris (asphalt debris, grout debris/concrete fragments, tire fragments, and metal debris) were encountered in borings B-13/B-13A and B-21/B-21A. The deep debris fills encountered in these borings are unsuitable for support of the proposed ground mounted solar array foundations. Thus, it is recommended that the fill soils and debris be removed in the areas of B-13/B-13A and B-21/B-21A and the excavations backfilled with engineered fill that is free of debris. It is recommended that test pits be excavated to better delineate the extent of the deeper fills with significant amounts of debris encountered in borings B-13/B-13A and B-21/B-21A."

2.0 PURPOSE OF SCOPE OF SERVICES

2.1 Purpose: The purpose of this supplemental investigation was to excavate backhoe pits in the areas of previously drilled borings B-13/B-13A and B-21/B-21A to better define the composition of the fills and to estimate the lateral extent of the deeper fills, some of which encountered significant amounts of debris.

2.2 Scope: Our proposal (Contract Amendment No. 2), dated July 14, 2021, outlined the scope of our services. The actions undertaken during this supplemental investigation are summarized as follows:

2.2.1 Information regarding the fill materials encountered from the draft Geotechnical Engineering Investigation, Proposed Ground Mounted Solar Array County of Los Angeles High Desert Expansion, 45100 60th Street West, Lancaster, California, dated July 9, 2021, prepared by Moore Twining Associates, Inc., Moore Twining Project No. E468R6.01, was reviewed.

2.2.2 Backhoe pits were excavated and logged in the areas where the previous soil borings encountered deep fills.

2.2.3 The data obtained from the backhoe pit investigation were used to develop a map showing the interpreted extent of the deeper fill soils encountered

2.2.3 Logs of the backhoe pits were prepared describing the depth of the fill soils and debris encountered.

2.2.4 This report was prepared.

3.0 INVESTIGATIVE PROCEDURES

The supplemental field exploration is summarized in the following subsections.

3.1 Field Exploration: The field exploration included excavating pits with a backhoe in the areas of previously drilled borings B-13/B-13A and B-21/B-21A. At the time of this investigation between August 24 and 25, 2021, the weather was mostly sunny with high temperatures of about 96 and 99 degrees Fahrenheit.

3.2 Excavating Backhoe Pits: During this supplemental field exploration, twelve (12) backhoe pits (BP-1 through BP-12) were excavated to depths of 3 to 10 feet below site grade (BSG)

around the area of previously drilled borings B-13/B-13A, and five (5) backhoe pits (BP-13 through BP-17) were excavated to depths of 4½ to 14 feet below site grade (BSG) around the area of previously drilled borings B-21/B-21A. The pits were excavated with a John Deere 310 LEP backhoe with a 24-inch wide excavating bucket.

The overall site showing the approximate areas where the backhoe pits were excavated are shown on Drawing No. 1. The approximate backhoe pit locations are shown on Drawing Nos. 2 and 3 in Appendix A. Photos of some of the conditions encountered in the backhoe pits are presented in Appendix C of this report.

The soils encountered in the backhoe pits were logged during excavation by a representative of Moore Twining. The field soil classification was in accordance with the Unified Soil Classification System and consisted of particle size, color, and other distinguishing features. The presence and elevation of free water, if any, in the backhoe pits were noted and recorded during the excavations.

The backhoe pit locations were determined by field measurements from existing site features. The backhoe pits were loosely backfilled with soils excavated from the pits. A stake was placed in the middle of each pit in the area around previously drilled borings B-13/B-13A. A stake was placed at each end of the pits in the area around previously drilled borings B-21/B-21A. It is recommended the staked backhoe pit locations be surveyed by Sunpower for planning and design purposes and so the Contractor can located the pits later in the event the stakes get removed.

4.0 FINDINGS AND RESULTS

The findings and results of the field exploration and laboratory testing are summarized in the following subsections.

4.1 Findings from Backhoe Pits Excavated Around Borings B-13/B-13A: The soils encountered in the backhoe pits excavated around B-13/B-13A on the south side of the existing solar array consisted of sandy lean clay fill soils with relatively small amounts of debris that extended to depths ranging from about 1 to 2½ feet BSG. Borings B-13 and B-13A originally encountered sandy lean clay fill soils with trace asphalt debris that were interpreted to extend to depths of about 9 to 10 feet BSG at the time the original soil borings were drilled. However, based on the backhoe pits that were excavated and logged, the fill soils are much shallower in this area than interpreted from the soil borings. The backhoe pits excavated around B-13/B-13A encountered some debris in the fill with relatively small amounts of asphalt, concrete, brick, wire and trash which are described on the backhoe pit logs in Appendix B of this report. However, a debris fill was encountered in BP-12 extending to a depth of about 1 foot. Based on our observations, the amount of debris encountered in most of the backhoe pits around B-13/B-13A could likely be removed by hand labor or other means prior to reuse of the soils as engineered fill for the project. However, it should be noted that

a buried asphalt layer with a thickness of about 1 to 1½ inches was encountered in many of the backhoe pits excavated around borings B-13/B-13A. Additional pits were excavated to explore the general extent of the buried asphalt layer. The 1 to 1½ inch thick asphalt layer was encountered at depths of about 8 to 12 inches in eight (8) of the twelve (12) backhoe pits excavated around borings B-13/B-13A. The buried asphalt pavement covers a significant area and the full extent of the buried pavement was not delineated for this study. The backhoe pits could not be excavated beyond the area marked for Underground Service Alert to the south in order to delineate the limits of the buried asphalt layer extending south of borings B-13/B-13A. Backhoe pit BP-7 was excavated at the southern edge of the area marked for USA which was about 150 feet south of borings B-13/B-13A. Thus, the buried asphalt layer extends at least 150 feet south of boring B-13/B-13A. Due to the limited thickness of the asphalt layer, the buried asphalt layer may not have been apparent during drilling of the previous soil borings. In order to provide more information concerning the potential extent of the buried pavement, various historic aerial photographs were reviewed from online sources and the Phase I ESA report prepared by WSP, dated April 30, 2021. Based on our review, the buried pavement layer may be associated with the former runway pavement that was part of War Eagle Field. The general area of former pavements at the site from aerial photographs is depicted on Drawing No. 4 in Appendix A attached to this report. This drawing also depicts the general area where an old asphalt concrete pavement is exposed at the ground surface.

4.1 <u>Findings from Backhoe Pits Excavated Around Borings B-21/B-21A</u>: The soils encountered in the backhoe pits excavated around borings B-21/B-21A on the south side of the existing Los Angeles County Challenger Memorial Youth Camps consisted of fill soils that were described as either sandy lean clays, clayey sands, silty/clayey sands, or silty sands with varying types and amounts of debris that extended to depths ranging from about 4 feet BSG to nearly 14 feet BSG. Borings B-21 and B-21A originally encountered lean clay or sandy lean clay and clayey sand and "debris fill" which included grout debris and concrete fragments, tire fragments, and metal debris that extended to depths of about 13 to 13¾ feet BSG. A seam of silty sand over a fabric was noted at the bottom of the fill soils encountered in boring B-21A at a depth of 13 feet BSG (fill/native soil contact).

Backhoe pit BP-13 was excavated about 24 feet east of boring B-21 and encountered clayey sand and sandy lean clay fill soils with asphalt debris that extended to a depth of about 4½ feet BSG.

Backhoe pit BP-14 was excavated about 15 feet south of boring B-21 and encountered clayey sand fill soils with asphalt debris chunks up to about 3 inches in diameter that extended to a depth of about 1 foot BSG.

The conditions encountered in backhoe pit BP-15, excavated about 15 feet west of boring B-21, encountered a similar depth of fill material as encountered in borings B-13/B-13A. The materials encountered in BP-15 are considered a "debris fill". The debris fill encountered in backhoe pit BP-

15 consisted of chunks of asphalt, concrete, brick, and glass debris in the upper 3 feet BSG. Between depths of about 3 feet BSG to depths of about 8½ to 10½ feet BSG, the debris encountered increased significantly in backhoe pit BP-15 and consisted of plastic containers, electronic devices, wood fragments, plastic cups and bags, wires, and concrete chunks up to 12 inches in diameter. Below the fill layer described above with the abundant debris, a silty sand fill layer with trace asphalt and concrete debris was encountered and extended to nearly the maximum depth explored, about 14 feet BSG.

Backhoe pit BP-16 was excavated about 15 feet further west of backhoe pit BP-15 (described above) and encountered clayey sand fill soils with metal wire, plastic and asphalt debris (asphalt chunks up to 3 inches in diameter) that extended to a depth of about 3½ feet BSG. The native soils encountered in backhoe pit BP-16 consisted of lean clays from depths of 3½ feet to 4½ feet BSG which were underlain by native silty sands that extended to the maximum depth explored, about 5 feet BSG.

Backhoe pit BP-17 was excavated about 15 feet north of boring B-21A and encountered clayey sand fill soils with asphalt debris extending from the ground surface to a depth of about 2 to 2½ feet BSG and were underlain by silty sand fill soils with pieces of glass that extended to a depth of about 4 feet BSG.

The fill soils were underlain by native sandy silt, poorly graded sand and silty sands to the maximum depth explored.

5.0 CONCLUSIONS

5.1 The soils encountered in the backhoe pits excavated around borings B-13/B-13A on the south side of the existing solar array consisted of sandy lean clay fill soils with varying types and amounts of debris that extended to depths ranging from about 1 to 2½ feet BSG. The depth of the fill soils identified in the backhoe pits were much shallower than originally interpreted to be encountered in the drilled borings. A debris fill was encountered in backhoe pit BP-12 extending to a depth of about 1 foot. Based on our observations, the amount of debris encountered in most of the backhoe pits around B-13/B-13A could likely be removed by hand labor or other means prior to reuse of the soils as engineered fill for the project. However, the debris fill materials encountered in BP-12 would not be suitable to reuse. In addition, it should be noted that a buried asphalt layer with a thickness of about 1 to 1½ inches was also encountered in many of the backhoe pits excavated around borings B-13/B-13A. Refer to Section 5.2 for additional information. The buried asphalt layer is expected to result in difficulty installing the solar posts/piles and therefore pre-augering through the pavement should be anticipated for installation of the solar posts.

5.2 The buried asphalt layer was encountered in eight (8) of the twelve (12) backhoe pits excavated around borings B-13/B-13A as shown on Drawing No. 3. Historic aerial photos referenced in the July 9, 2021 Geotechnical Engineering Investigation report were reviewed to identify former pavement areas of War Eagle Field, which are approximately shown on Drawing No. 4 in Appendix A. The extent of the former pavement which remains is not known, however, based on the findings of the supplemental investigation and review of aerial photographs, a substantial amount of old pavement appears to be present at the site.

5.3 Debris fill materials and fill with debris were encountered in the backhoe pits excavated in the area of boring B-21. In general, the amount of debris present in the fill appeared to increase below a depth of about 3 or 4 feet. The conditions encountered in backhoe pit BP-15, excavated about 15 feet west of boring B-21, encountered a similar fill depth and similar concentration of debris that was encountered in borings B-21/B-21A. A debris fill is present in this area to a depth of at least 14 feet that will not be suitable for reuse as engineered fill. If the solar array is planned in this area of the site, the debris fill materials should be completely removed and replaced with on-site soils that are free of debris or replaced with a clean import fill placed and compacted in accordance with the recommendations of the geotechnical engineering investigation report. Drawing No. 3 in Appendix A delineates the general extent of the deeper debris fill encountered in the backhoe pits around the areas of borings B-21/B-21A. The final extent of the debris/fill removal should be determined based on observations of the progress of the excavation by Moore Twining. Areas of shallow fill (less than ~4 feet) with minor concentrations of debris may be left in place, if desired; however, installation of solar posts may require pre-drilling or other methods where obstructions are encountered during installation.

6.0 RECOMMENDATIONS

Based on the findings and conclusions from this supplemental backhoe pit investigation, the recommendations of our referenced draft July 9, 2021 Geotechnical Engineering Investigation report have been amended and incorporated into an updated report (revised report now dated September 17, 2021).

7.0 CLOSING

Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally-accepted engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied.

We appreciate the opportunity to be of service to SunPower Corporation. If you have any questions regarding this matter, or if we can be of any further assistance, please contact us at your convenience.

Sincerely,
MOORE TWINING ASSOCIATES, INC.

DRAFT

Allen H. Harker
Professional Geologist
Geotechnical Engineering Division

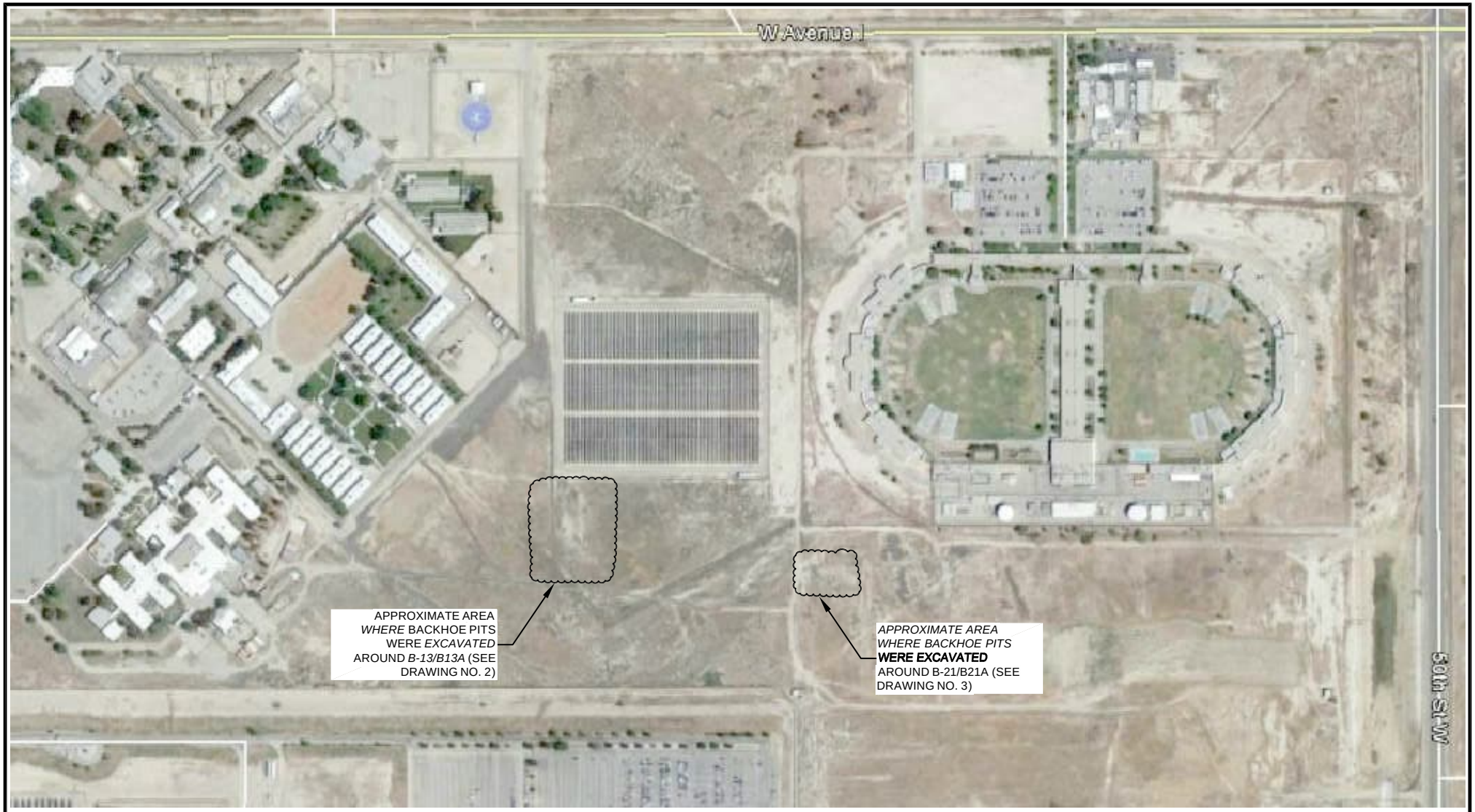
DRAFT

Read L. Andersen, RGE
Manager
Geotechnical Engineering Division

APPENDIX A

DRAWINGS

Drawing No. 1 - Approximate Areas Where Backhoe Pits Were Excavated
Drawing No. 2 - Backhoe Pit Location Map Around Borings B-13/B-13A
Drawing No. 3 - Backhoe Pit Location Map Around Borings B-21/B-21A
Drawing No. 4 - Approximate Limits of Previous Pavements



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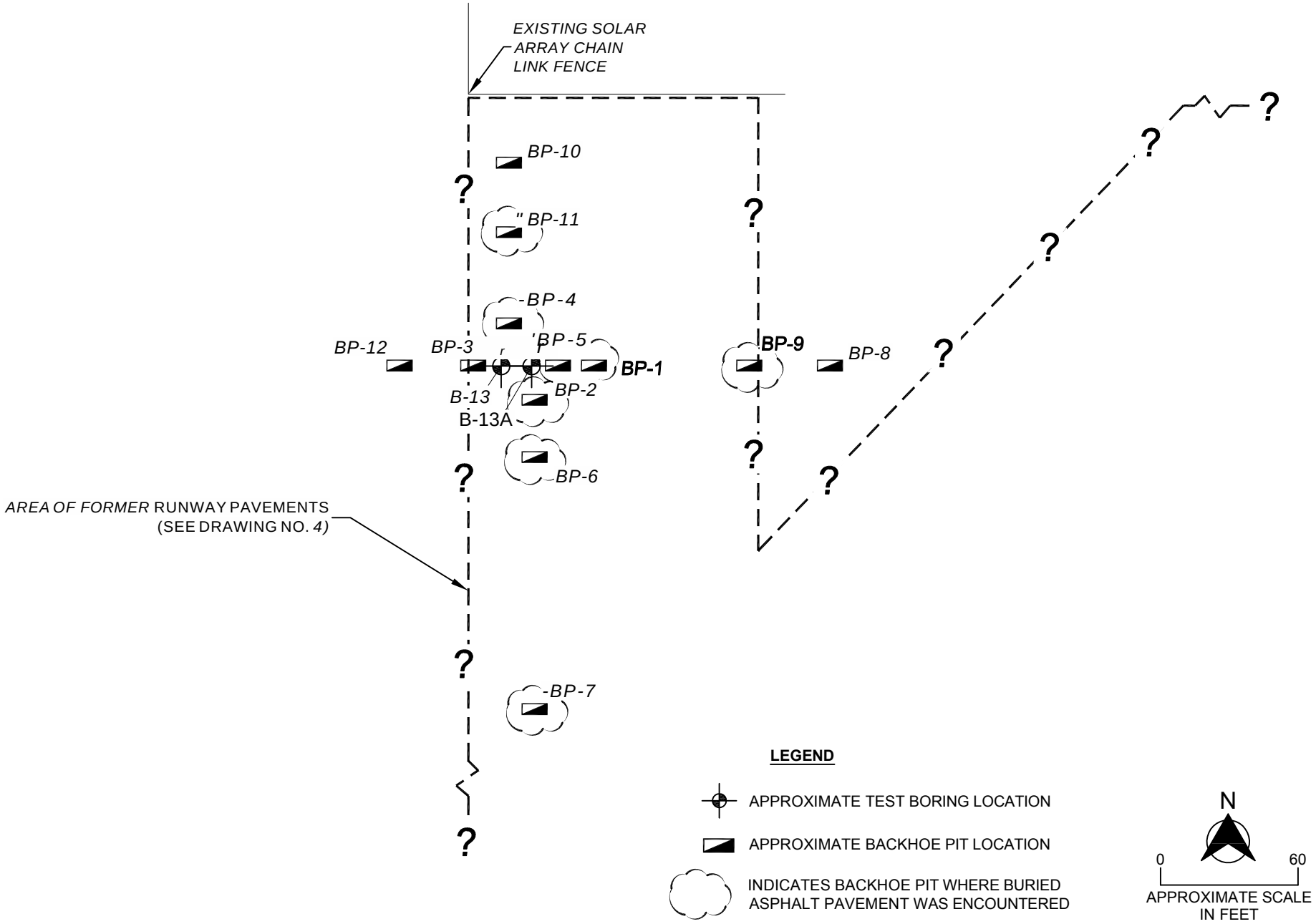
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APPROXIMATE SCALE IN FEET

APPROXIMATE AREA WHERE BACKHOE PITS WERE EXCAVATED
PROPOSED GROUND MOUNTED SOLAR ARRAY
COUNTY OF LOS ANGELES HIGH DESERT EXPANSION
45100 60TH STREET WEST
LANCASTER, CALIFORNIA

FILE NO. 468R6-01-02	DATE DRAWN: 09/15/21
DRAWN BY: RM	APPROVED BY:
PROJECT NO. E468R6.01	DRAWING NO. 1

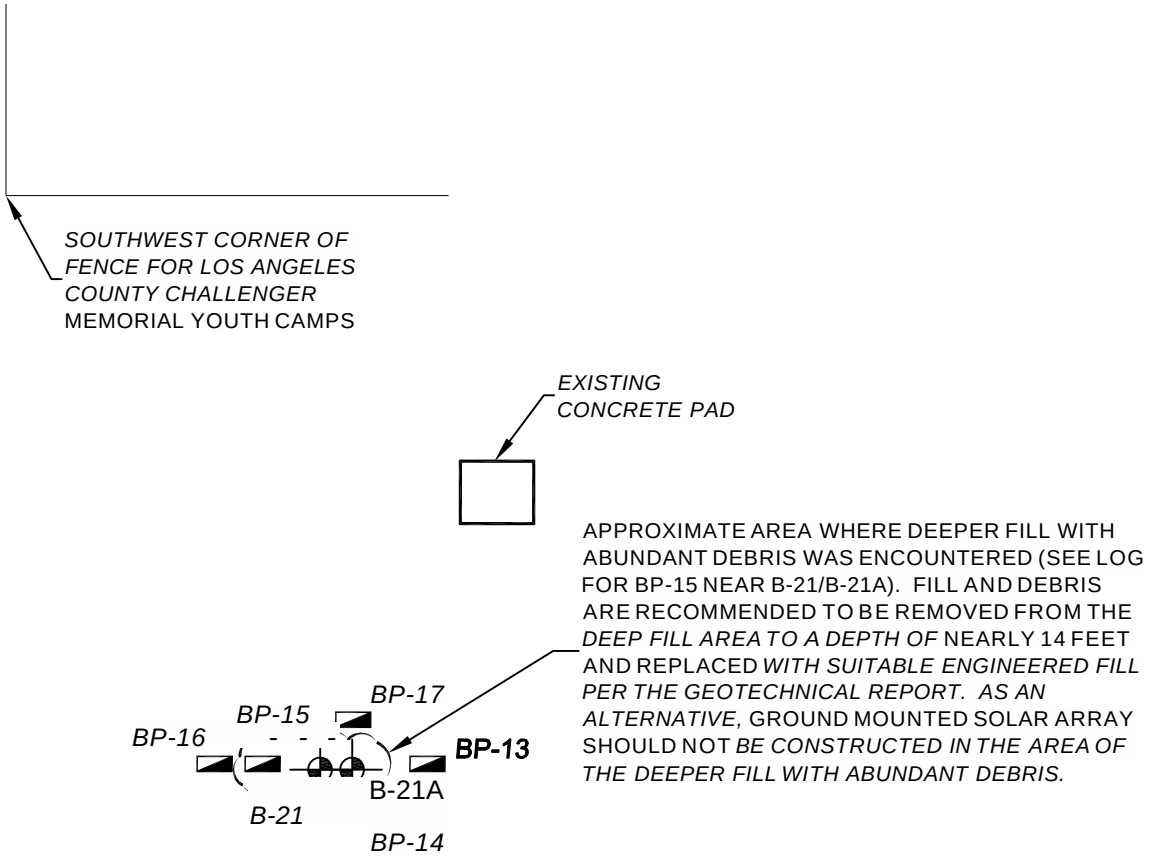
MOORE TWINING ASSOCIATES, INC.



BACKHOE PIT LOCATION MAP - NEAR BORING B-13 & B-13A
PROPOSED GROUND MOUNTED SOLAR ARRAY
COUNTY OF LOS ANGELES HIGH DESERT EXPANSION
45100 60TH STREET WEST
LANCASTER, CALIFORNIA

FILE NO. 468R6-01-02	DATE DRAWN: 09/07/21
DRAWN BY: RM	APPROVED BY:
PROJECT NO. E468R6.01	DRAWING NO. 2

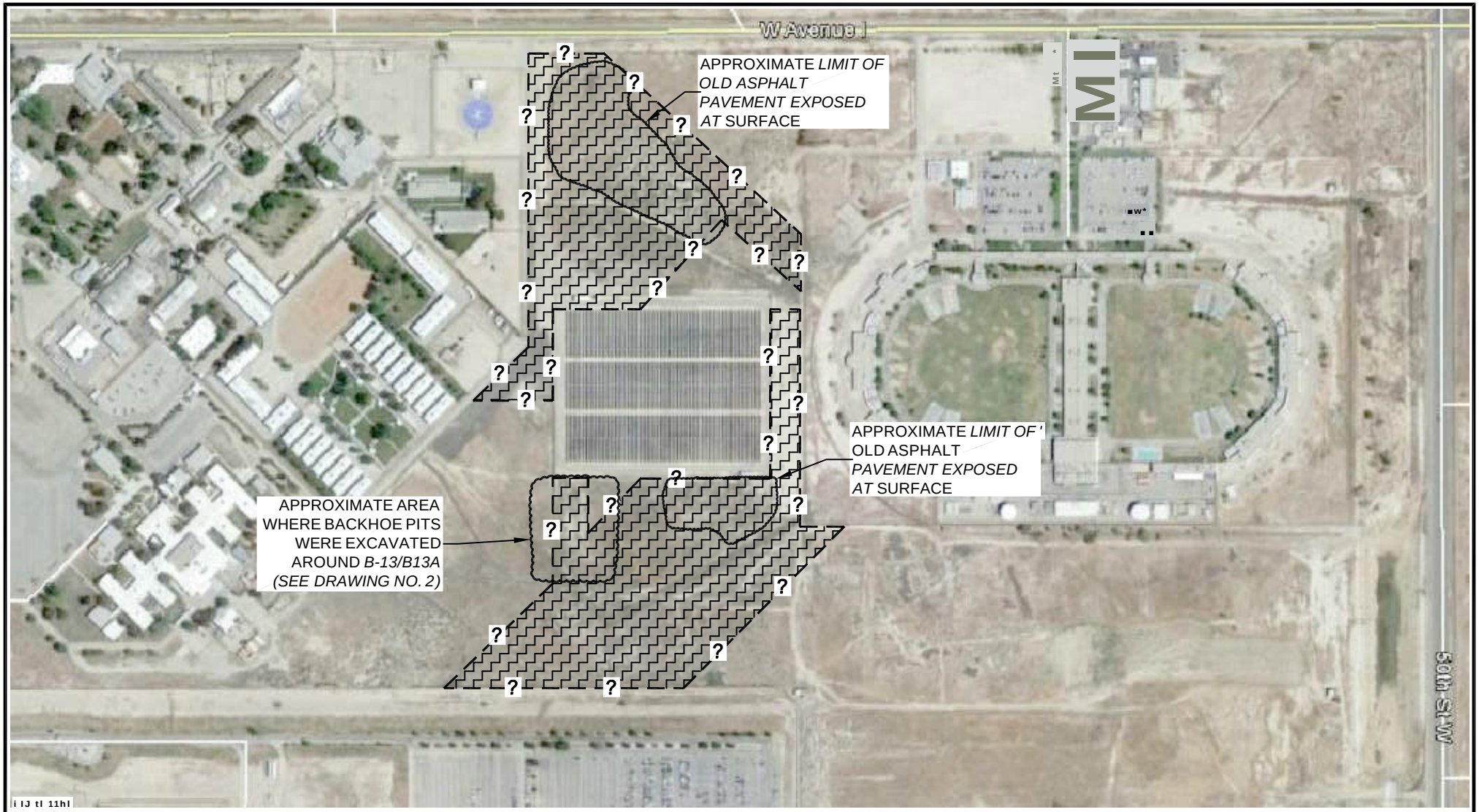
MOORE TWINING ASSOCIATES, INC.



BACKHOE PIT LOCATION MAP - NEAR BORING B-21 & B-21A
PROPOSED GROUND MOUNTED SOLAR ARRAY
COUNTY OF LOS ANGELES HIGH DESERT EXPANSION
45100 60TH STREET WEST
LANCASTER, CALIFORNIA

FILE NO. 468R6-01-02	DATE DRAWN: 09/07/21
DRAWN BY: RM	APPROVED BY:
PROJECT NO. E468R6.01	DRAWING NO. 3

MOORE TWINING ASSOCIATES, INC.



LEGEND

AREA OF FORMER RUNWAY PAVMENTS

N

0 500

APPROXIMATE SCALE IN FEET

APPROXIMATE LIMITS OF PREVIOUS PAVEMENTS
PROPOSED GROUND MOUNTED SOLAR ARRAY
COUNTY OF LOS ANGELES HIGH DESERT EXPANSION
45100 60TH STREET WEST
LANCASTER, CALIFORNIA

FILE NO. 468R6-01-02	DATE DRAWN: 09/15/21
DRAWN BY: RM	APPROVED BY:
PROJECT NO. E468R6.01	DRAWING NO. 4

MOORE TWINING ASSOCIATES, INC.

APPENDIX B

LOG OF BACKHOE PITS

This appendix contains the final backhoe pit logs. The logs represents our interpretation of the contents of the field logs.

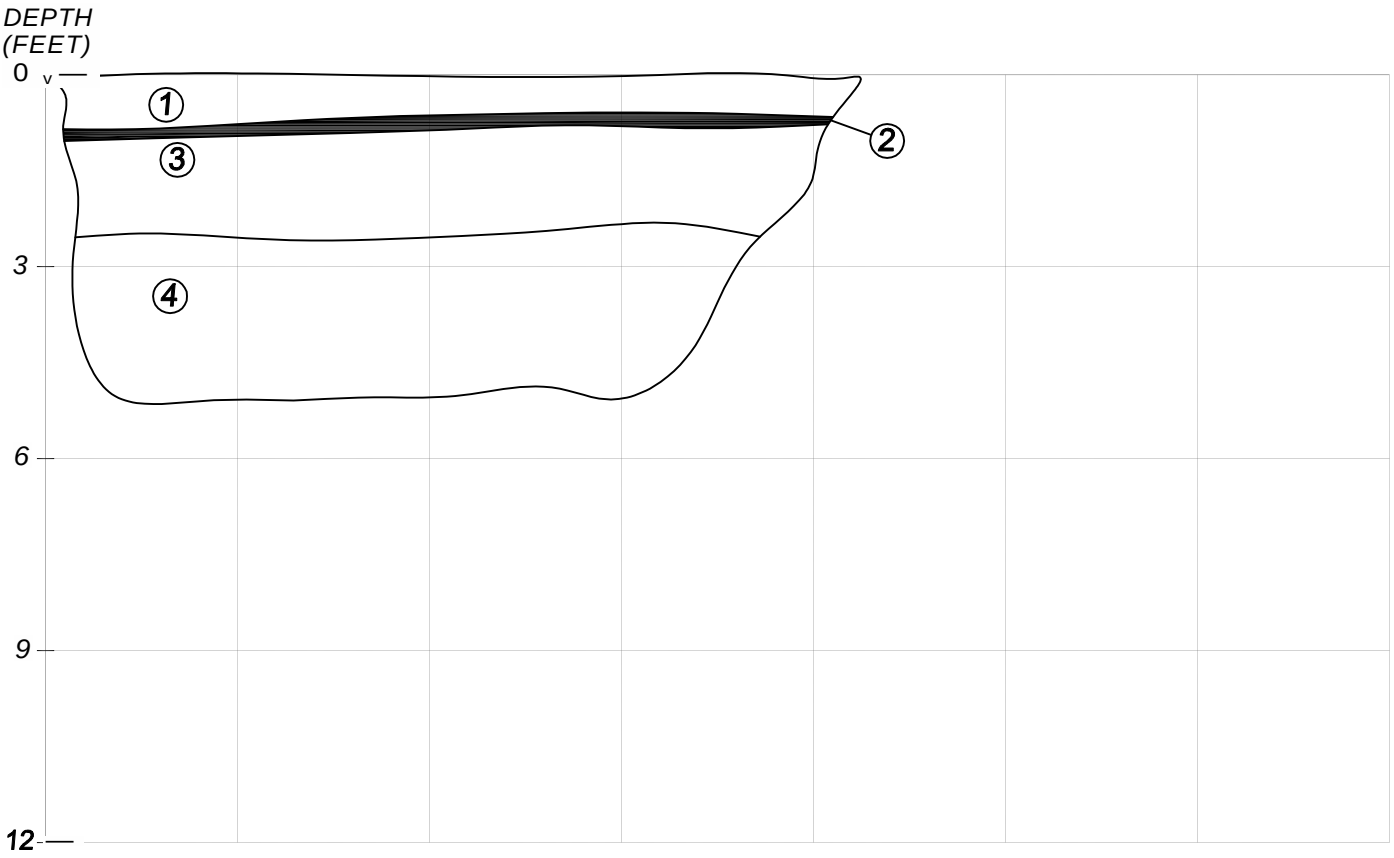
The logs and related information depict subsurface conditions only at these locations and at the particular time designated on the logs. Soil conditions at other locations may differ from conditions occurring at the backhoe pit locations. Also, the passage of time may result in changes in the soil conditions.

In addition, an explanation of the abbreviations used in the preparation of the logs and a description of the Unified Soil Classification System are provided at the end of Appendix B.

BACKHOE PIT LOG

BACKHOE *PIT NO.: 1*

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: *E468R6.01*
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" BUCKET)		*DATE: 08/25/2021*
DEPTH TO WATER: N.E.	LOGGED BY: A.V.	*ELEV.: N/A*



SCALE: 1" 3'

SOIL DESCRIPTIONS SURFACE: CHUNKS (6" IN DIAMETER) OF ASPHALT AND *CONCRETE*

(T) *FILL: SANDY LEAN* CLAY; *MOIST, LOW PLASTICITY,* BROWN, TRACE ASPHALT AND *CONCRETE DEBRIS*

(2) *1-INCH THICK ASPHALT CONCRETE LAYER*

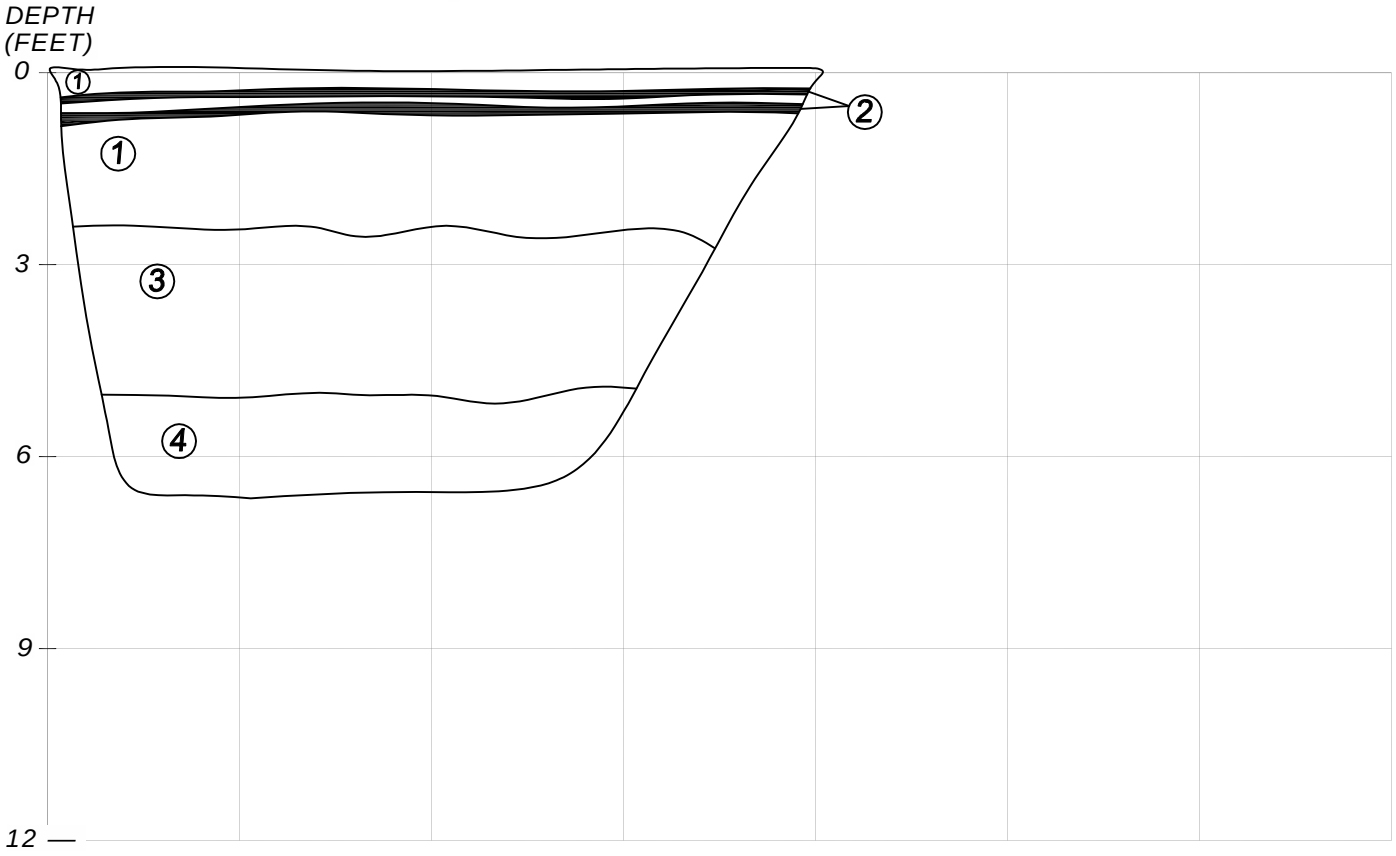
(3) *FILL: SANDY LEAN CLAY; MOIST, LOW PLASTICITY,* BROWN, *CALCIFICATION, TRACE FINE GRAVEL*

(4) *CL: SANDY LEAN CLAY; MOIST, LOW PLASTICITY, LIGHT BROWN, CALCIFICATION, WEAK TO MODERATE CEMENTATION, ROOTLETS*

BACKHOE PIT LOG

BACKHOE *PIT NO.: 2*

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: E468R6.01
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP *(24" BUCKET)*		DATE: 08/25/2021
DEPTH TO WATER; N.E.	LOGGED BY: A.V.	ELEV.: N/A



SCALE: *1"* *3'*

SOIL DESCRIPTIONS

SURFACE: DIRT WITH SOME GRAVEL AND ASPHALT I CONCRETE CHUNKS (18")

(?) FILL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY,* BROWN, TRACE FINE GRAVEL

(2) 1-INCH *THICK ASPHALT CONCRETE LAYER*

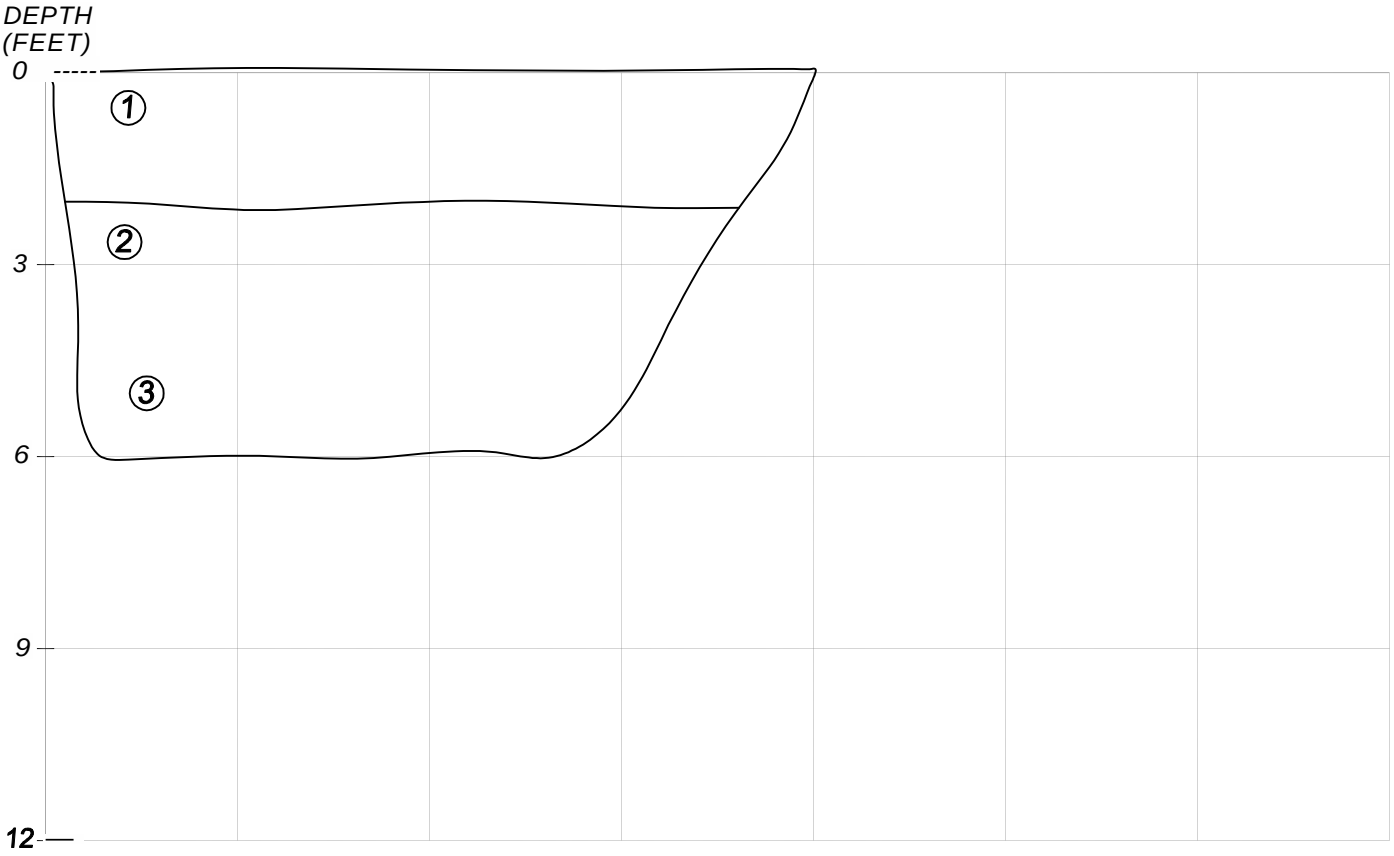
(3) CL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY, LIGHT BROWN, CALCIFICATION, TRACE FINE GRAVEL*

(4) SM: SILTY SAND; MOIST, FINE TO COARSE GRAINED, BROWN

BACKHOE PIT LOG

BACKHOE *PIT NO.: 3*

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: *E468R6.01*
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" BUCKET)		*DATE: 08/25/2021*
DEPTH TO WATER: N.E.	LOGGED BY: A.V.	*ELEV.: N/A*



SCALE: 1" 3'

SOIL DESCRIPTIONS

SURFACE: ASPHALT DEBRIS

(?) FILL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY,* BROWN, TRACE FINE GRAVEL / ASPHALT DEBRIS, ROOTLETS

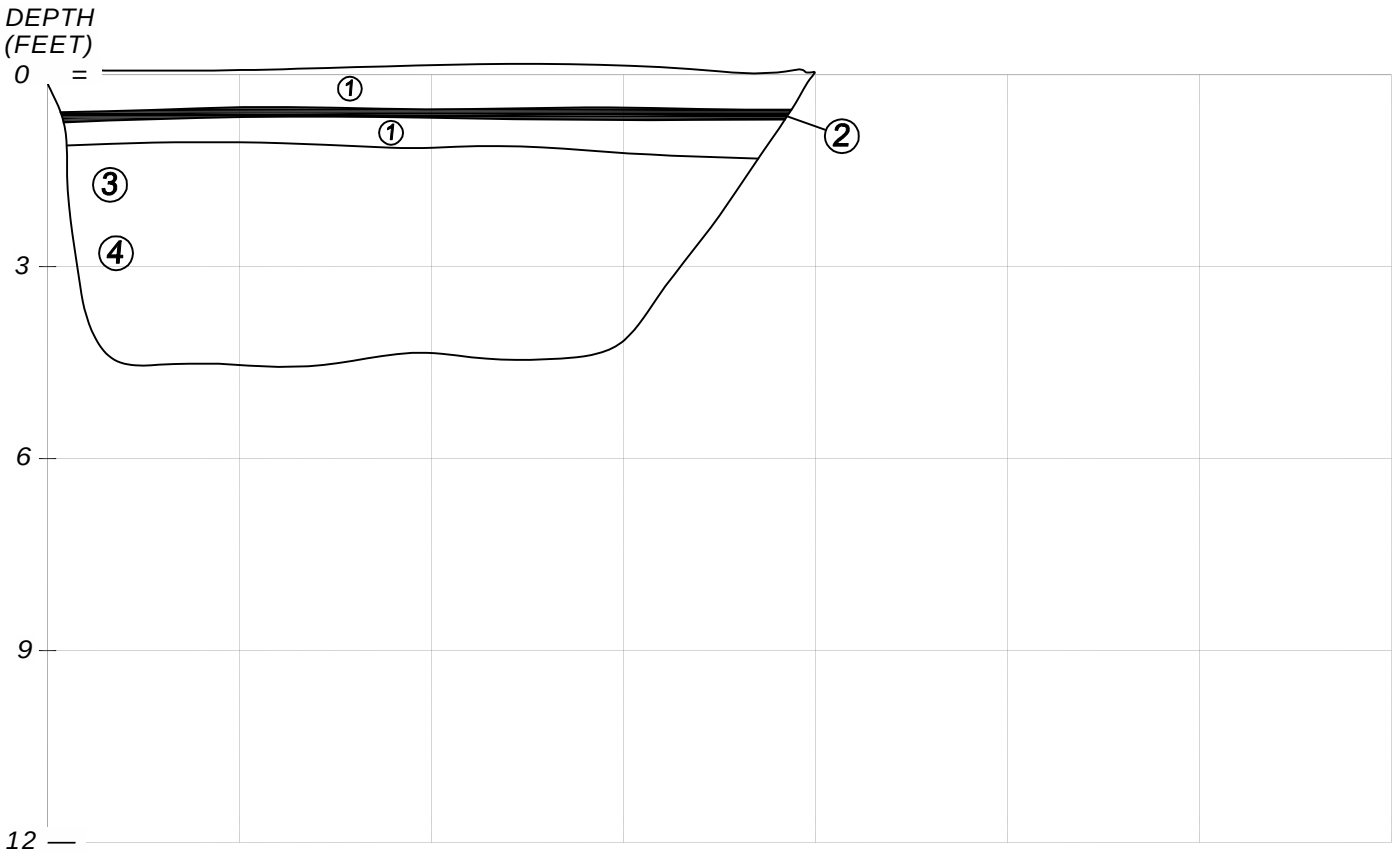
(2) CL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY, LIGHT BROWN, ROOTLETS, SOME COARSE SAND*

(3) SLIGHT *INCREASE IN PLASTICITY, BROWN*

BACKHOE PIT LOG

BACKHOE *PIT NO.: 4*

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: *E468R6.01*
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" BUCKET)		*DATE: 08/25/2021*
DEPTH TO WATER: N.E.	LOGGED BY: A.V.	*ELEV.: N/A*



SCALE: 1" 3'

SOIL DESCRIPTIONS

(?) FILL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY,* BROWN, *CONCRETE CHUNKS UP TO 8" IN DIAMETER, TRACE ASPHALT DEBRIS*

(2) 1-INCH THICK ASPHALT CONCRETE LAYER

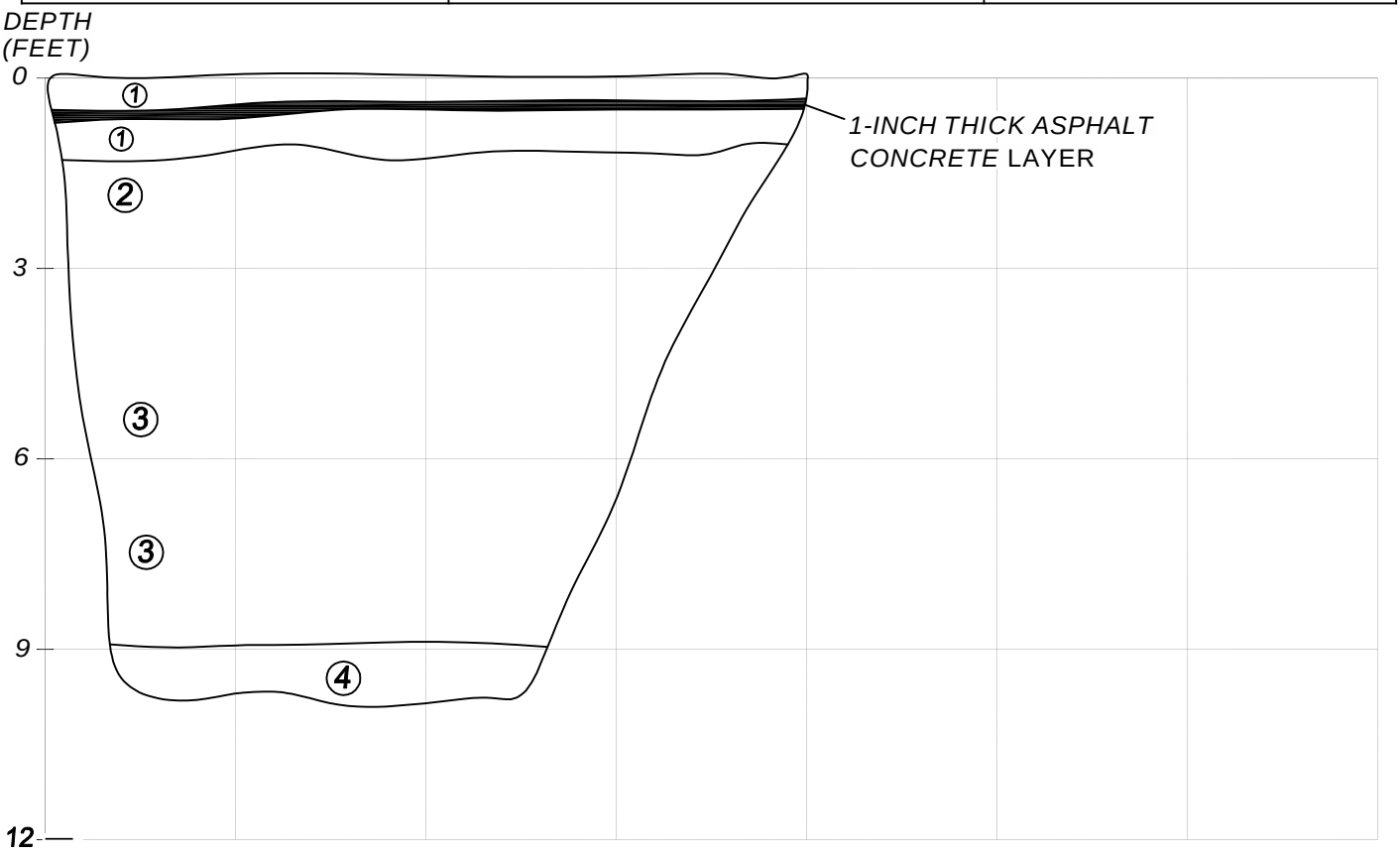
(3) CL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY, LIGHT BROWN, WITH COARSE SAND, TRACE FINE GRAVEL*

(4) PLASTICITY INCREASE

BACKHOE PIT LOG

BACKHOE *PIT NO.: 5*

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: E468R6.01
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" *BUCKET)*		DATE: 08/25/2021
DEPTH TO WATER; N.E.	LOGGED BY: A.V.	*ELEV.: N/A*



SCALE: *1"* *3'*

SOIL DESCRIPTIONS

(T) *FILL: SANDY LEAN* CLAY; *MOIST, LOW PLASTICITY,* BROWN, *WITH ASPHALT, CONCRETE, AND RED BRICK DEBRIS*

(2) *CL: SANDY LEAN CLAY, MOIST, LIGHT BROWN, LOW PLASTICITY*

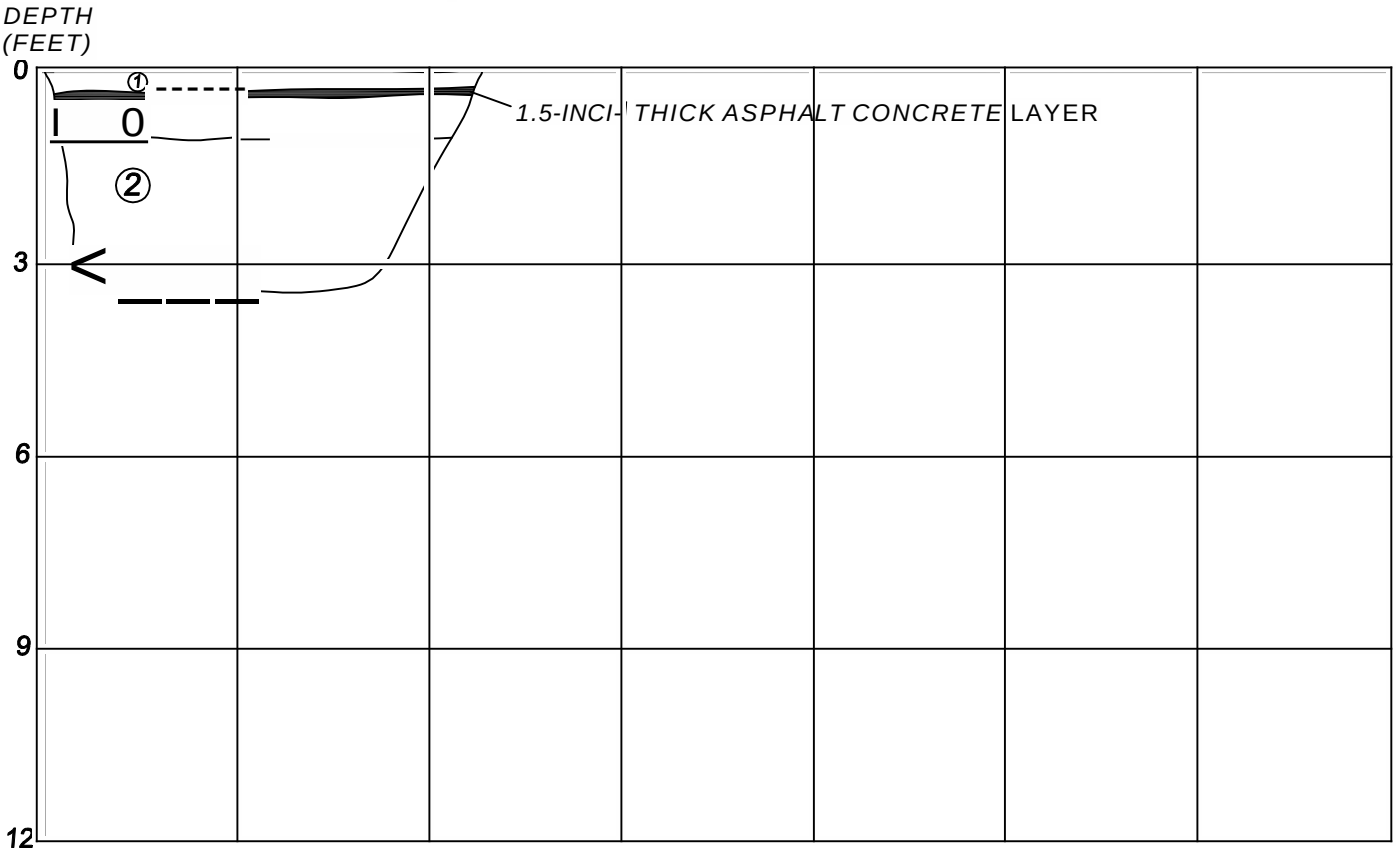
(3) BROWN, *IRON-OXIDE STAINING, MANGANESE STAINING*

(4) *SP-SM: POORLY GRADED SAND WITH SILT; MOIST, FINE TO COARSE GRAINED, GRAYISH* BROWN, IRON-OXIDE *STAINING*

BACKHOE PIT LOG

BACKHOE *PIT NO.: 6*

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: E468R6.01
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" *BUCKET)*		DATE: 08/25/2021
DEPTH TO WATER; N.E.	LOGGED BY: A.V.	*ELEV.: N/A*



SCALE: *1"* = *3'*

SOIL DESCRIPTIONS

① FILL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY, BROWN, WITH* TRACE ASPHALT AND *CONCRETE DEBRIS*

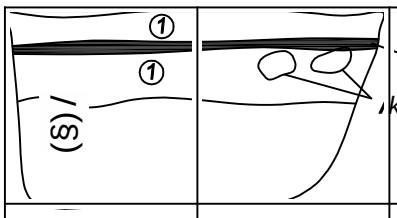
② *CL: SANDY LEAN CLAY; MOIST, LOW PLASTICITY,* BROWN

BACKHOE PIT LOG

BACKHOE *PIT NO.:* 7

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: E468R6.01
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" *BUCKET)*		DATE: 08/25/2021
DEPTH TO WATER; N.E.	LOGGED BY: A.V.	*ELEV.: N/A*

DEPTH
(FEET)



1 TO *1.5-INCH THICK ASPHALT CONCRETE LAYER*
ASPHALT CONCRETE CHUNKS

0
3
6
9
12

SCALE: *1"* = *3'*

SOIL DESCRIPTIONS

① *FILL: SANDY LEAN CLAY; MOIST, LOW PLASTICITY, BROWN, ASPHALT AND BRICK DEBRIS*

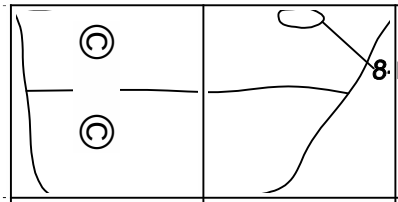
② *CL: SANDY LEAN CLAY; MOIST, LOW PLASTICITY,* BROWN, ROOTLETS

BACKHOE PIT LOG

BACKHOE *PIT NO.: 8*

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: E468R6.01
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" *BUCKET)*		DATE: 08/25/2021
DEPTH TO WATER; N.E.	LOGGED BY: A.V.	*ELEV.: N/A*

DEPTH (FEET)



0 — 8 INCH ASPHALT *CONCRETE CHUNK*

3

6

9

12

SCALE: *1"* = *3'*

SOIL DESCRIPTIONS

① FILL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY, BROWN, TRACE ASPHALT CONCRETE AND BRICK DEBRIS*

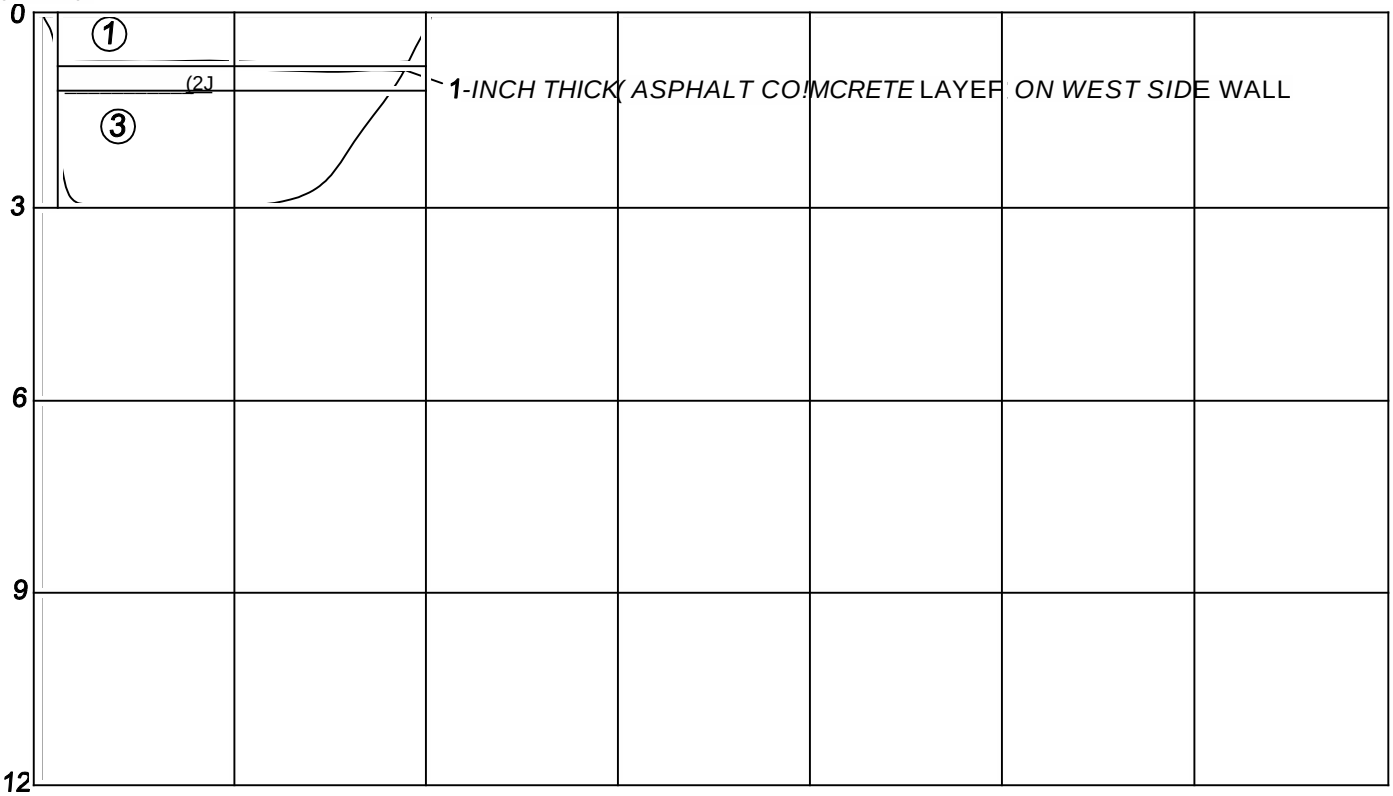
② *CL: SANDY LEAN CLAY; MOIST, LOW PLASTICITY,* BROWN, ROOTLETS

BACKHOE PIT LOG

BACKHOE *PIT NO.: 9*

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: E468R6.01
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" *BUCKET)*		DATE: 08/25/2021
DEPTH TO WATER; N.E.	LOGGED BY: A.V.	ELEV.: N/A

DEPTH (FEET)



SCALE: *1"* = *3'*

SOIL DESCRIPTIONS

(T) FILL: ROUND GRAVEL WITH SANDY LEAN CLAY

(2) FILL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY, BROWN, TRACE FINE GRAVEL AND ASPHALT CONCRETE DEBRIS*

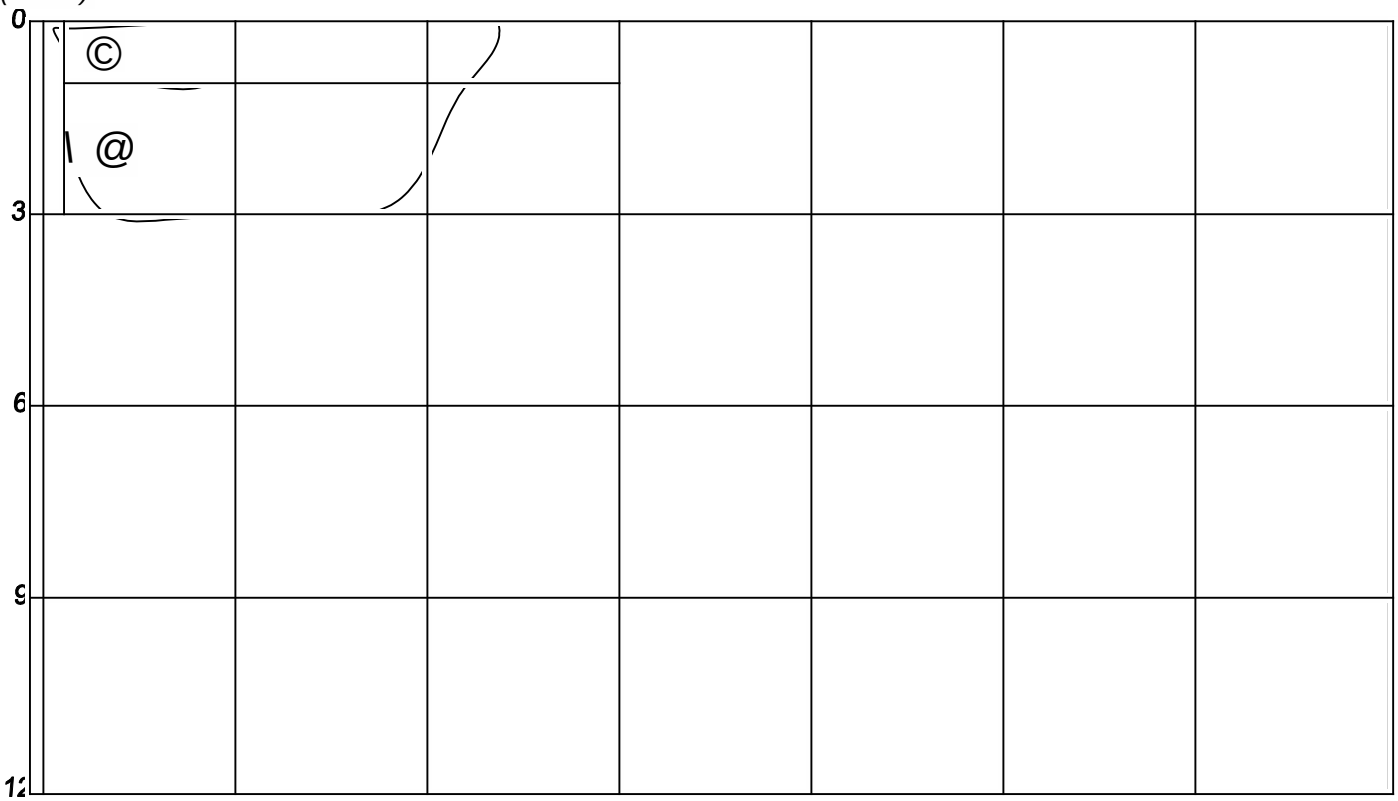
(3) CL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY,, BROWN, ROOTLETS*

BACKHOE PIT LOG

BACKHOE PIT NO.: 10

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: E468R6.01
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" *BUCKET)*		DATE: 08/25/2021
DEPTH TO WATER; N.E.	LOGGED BY: A.V.	*ELEV.: N/A*

DEPTH (FEET)



SCALE: *1"* = *3'*

SOIL DESCRIPTIONS

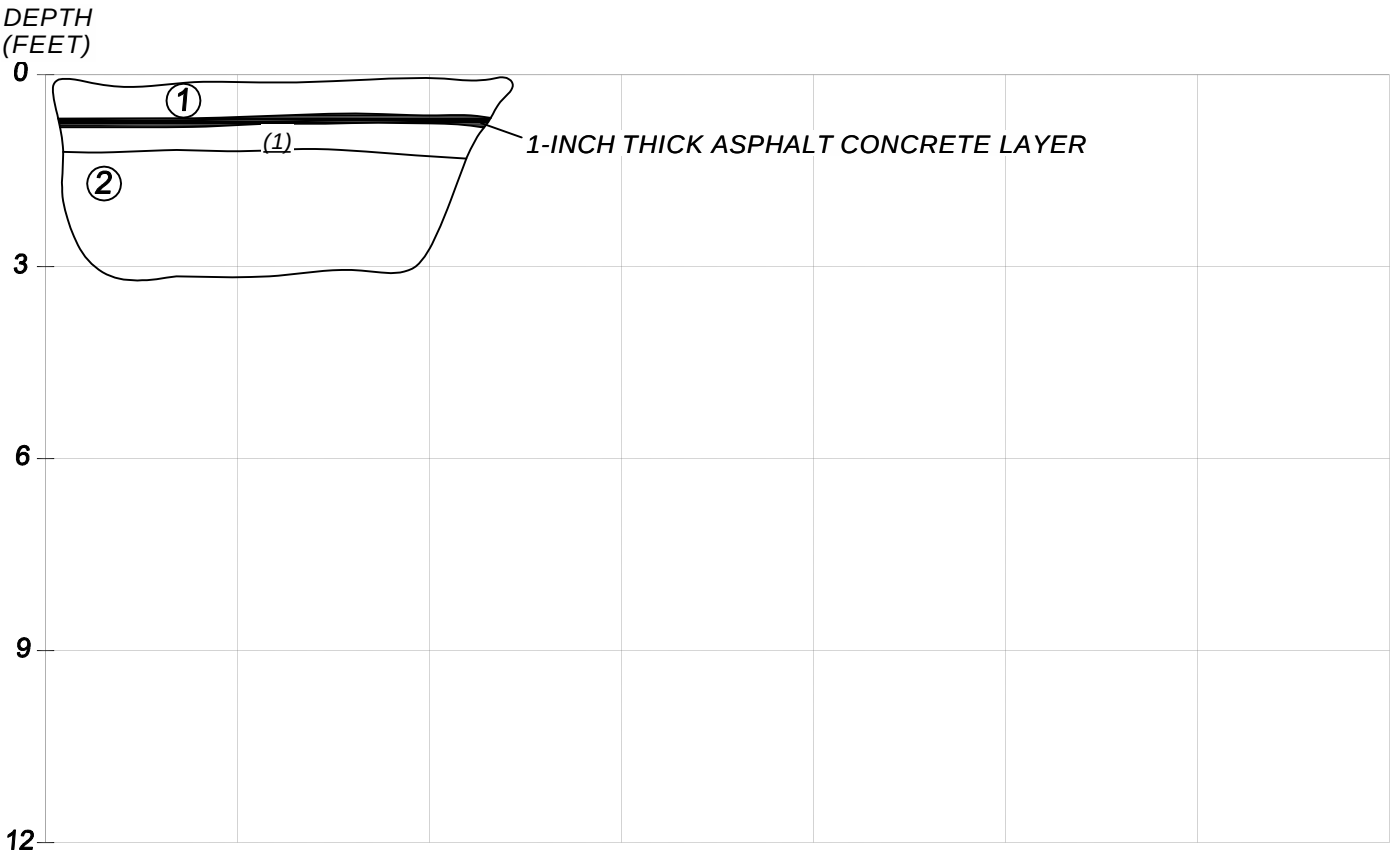
(T) *FILL: SANDY LEAN* CLAY; *MOIST, LOW PLASTICITY,* BROWN, *SOME* FINE GRAVEL (DISTURBED)

(2) CL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY, LIGHT BROWN, ROOTLETS, SOME CALCIFICATION*

BACKHOE PIT LOG

BACKHOE PIT NO.: 11

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		*PROJECT NO.: E468R6.01*
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" BUCKET)		*DATE: 08/25/2021*
DEPTH TO WATER: N.E.	LOGGED BY: A.V.	*ELEV.: N/A*



SCALE: *1"* = *3'*

SOIL DESCRIPTIONS

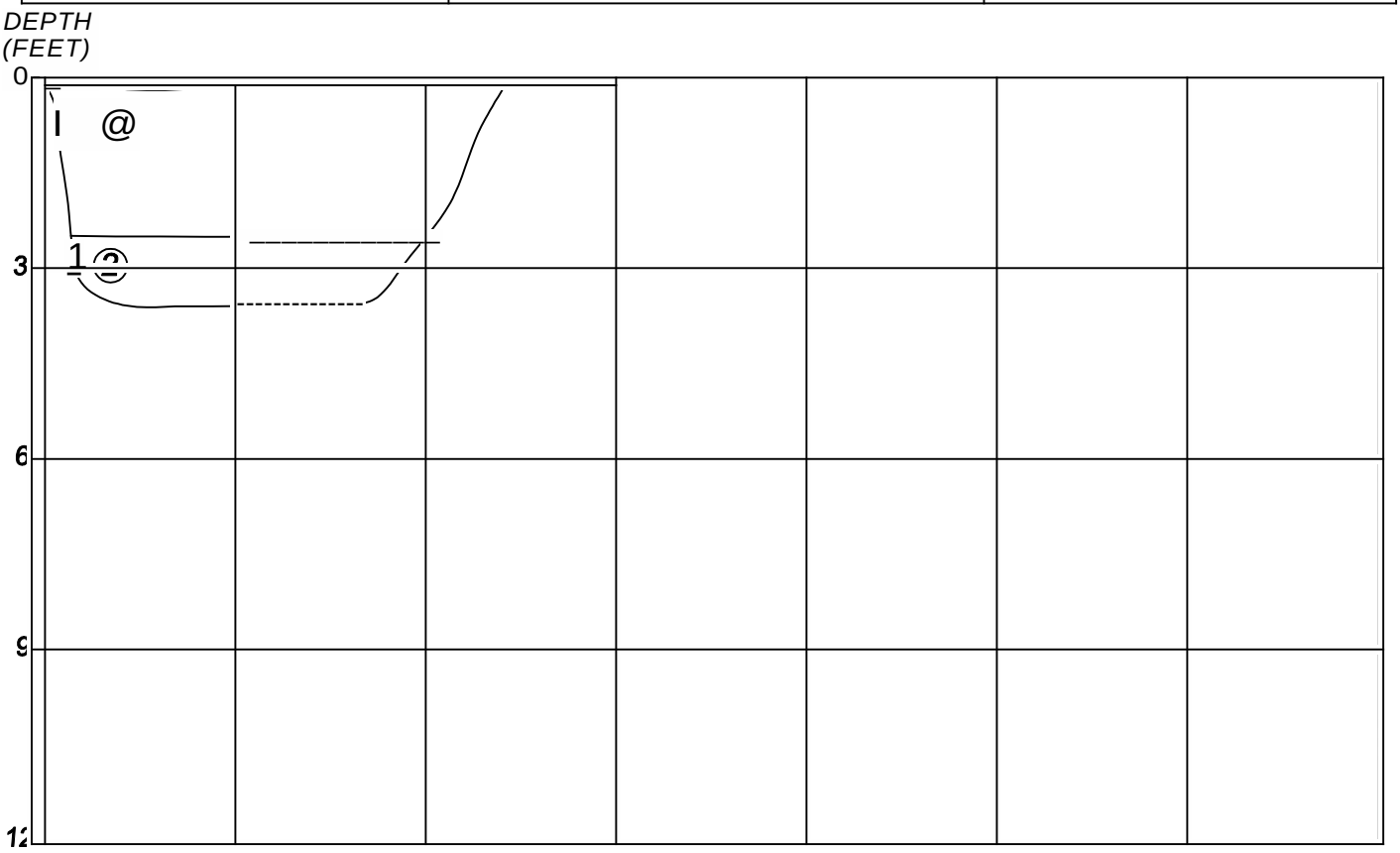
(?) FILL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY, LIGHT BROWN, WITH ASPHALT CONCRETE DEBRIS AND GRAVEL*

(2) CL: SANDY LEAN CLAY; MOIST, LOW PLASTICITY, LIGHT BROWN, ROOTLETS

BACKHOE PIT LOG

BACKHOE PIT NO.: 12

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: E468R6.01
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP *(24" BUCKET)*		DATE: 08/25/2021
DEPTH TO WATER; N.E.	LOGGED BY: A.V.	*ELEV.: N/A*



SCALE: *1"* = *3'*

SOIL DESCRIPTIONS

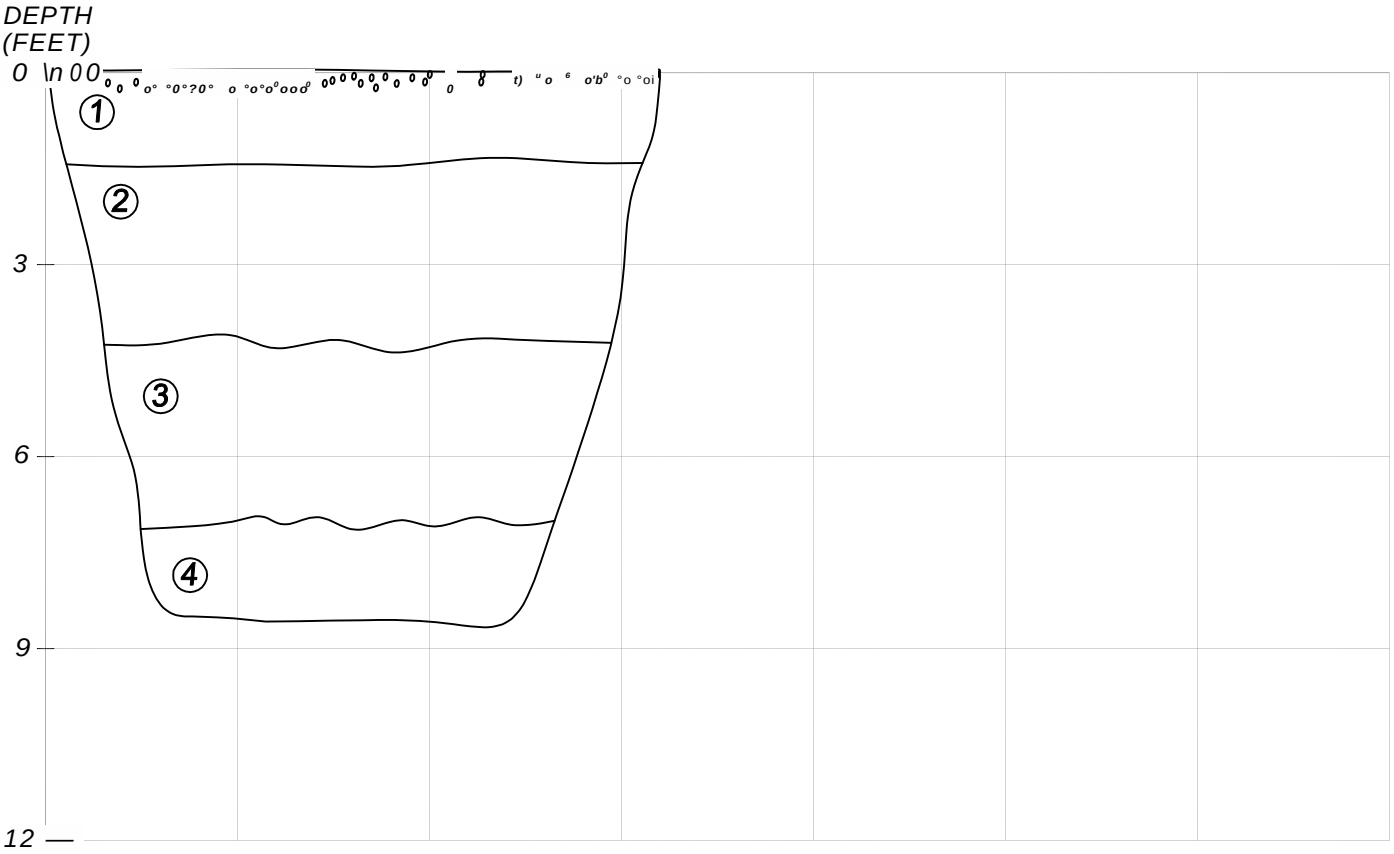
(T) *FILL: SILTY SAND; MOIST, FINE TO* MEDIUM GRAINED, LIGHT BROWN, WITH FINE GRAVEL, AND ASPHALT CONCRETE CHUNKS (8"), WIRES, TRASH DEBRIS

(2) CL: SANDY LEAN CLAY; *MOIST, LOW PLASTICITY,* BROWN, MODERATE CEMENTATION, SOME COARSE SAND

BACKHOE PIT LOG

BACKHOE PIT NO.: 13

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: *E468R6.01*
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" BUCKET)		*DATE: 08/24/2021*
DEPTH TO WATER: N.E.	LOGGED BY: A.V.	*ELEV.: N/A*



SCALE: 1" 3'

SOIL DESCRIPTIONS

SURFACE: *COVERED WITH ROUNDED GRAVEL*

(T) FILL: CLAYEY SAND; MOIST, FINE TO MEDIUM GRAINED, BROWN, ROCK AND ASPHALT FRAGMENTS, GRAVEL-ROUNDED

(2) FILL: SANDY LEAN CLAY; MOIST, LOW PLASTICITY, LIGHT BROWN, ASPHALT DEBRIS, TRACE FINE GRAVEL

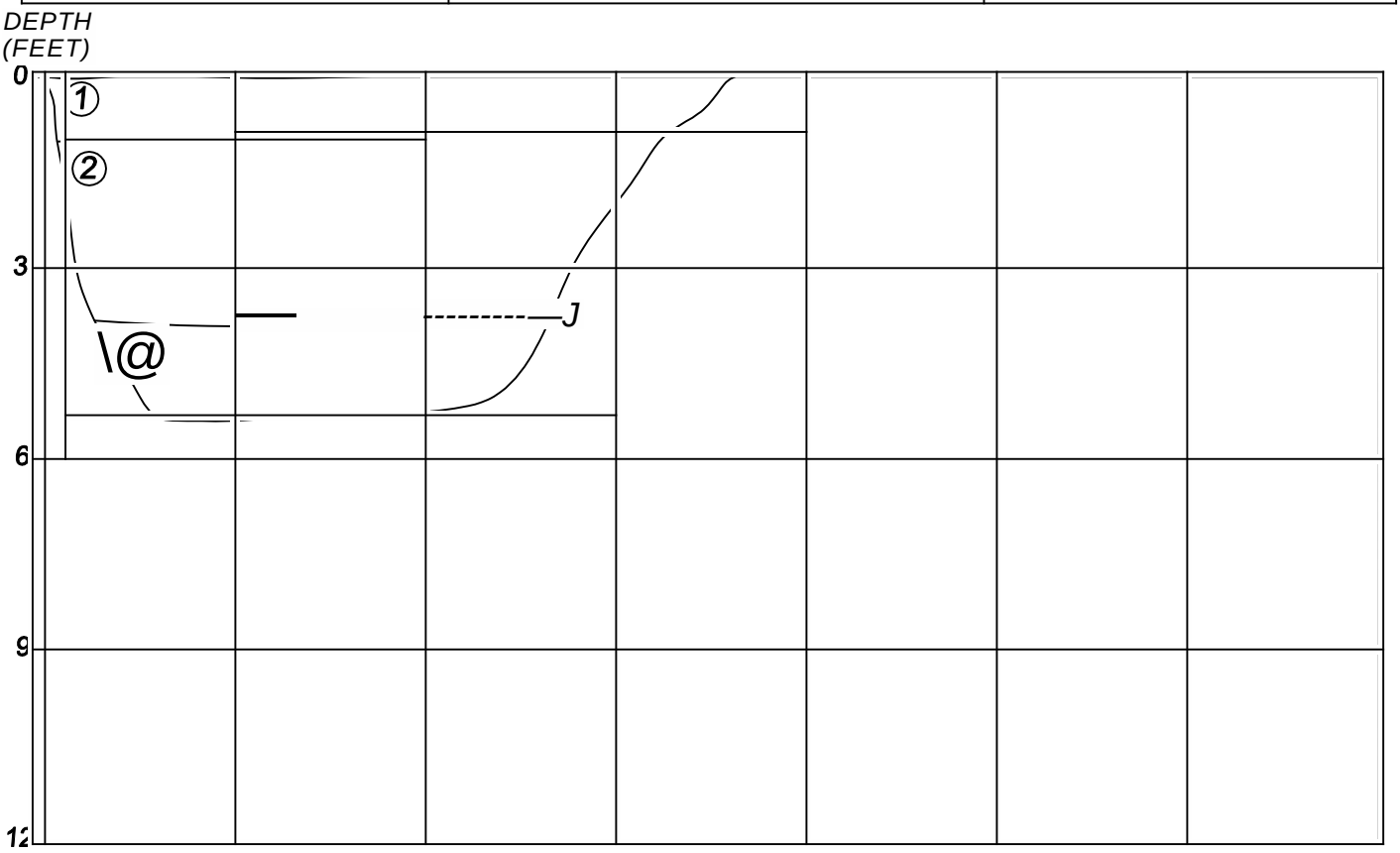
(3) SANDY SILT; *MOIST, NON-LOW PLASTICITY, VERY LIGHT BROWN TO WHITE, WEAK TO* MODERATE *CEMENTATION*

(4) SILTY SAND; MOIST, FINE TO MEDIUM GRAINED, BROWN, SOME FINE GRAVEL

BACKHOE PIT LOG

BACKHOE PIT NO.: 14

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.; E468R6.01
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" *BUCKET)*		DATE: 08/24/2021
DEPTH TO WATER; N.E.	LOGGED BY: A.V.	ELEV.: N/A



SCALE: *1"* = *3'*

SOIL DESCRIPTIONS

SURFACE: COVERED WITH FINER GRAVEL

(T) *FILL: CLAYEY SAND; MOIST, FINE TO COARSE GRAINED, BROWN, ASPHALT CHUNKS (UP TO 3 INCHES IN* DIAMETER)

(2) SM: SILTY SAND; *MOIST,* FINE TO *MEDIUM GRAINED,* BROWN, WEAK CEMENTATION,, CALCIFICATION AT 3.5 FEET

(3) ML; SANDY SILT; *MOIST, NON-LOW PLASTICITY, WEAK CEMENTATION, VERY LIGHT BROWN*

BACKHOE PIT LOG

BACKHOE PIT NO.: 15

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: E468R6.01
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" *BUCKET)*		DATE: 08/24/2021
DEPTH TO WATER; N.E.	LOGGED BY: A.V.	ELEV.: N/A



SCALE: 1" = 3'

® SOIL DESCRIPTIONS ‘ “ T ™

(T) DEBRIS *FILL: SILTY I* CLAYEY SAND; MOIST, FINE TO MEDIUM GRAINED, BROWN, CHUNK OF ASPHALT, CONCRETE, BRICK, GLASS UP TO *13-INCH IN DIAMETER*

Q\ ‿ *DEBRIS FILL: PLASTIC CONTAINER, ELECTRONIC DEVICES, WOOD FRAGMENTS, PLASTIC CUPS AND BAGS, WIRING, CONCRETE I CONCRETE* CHUNKS *(UP TO 12 INCHES)*

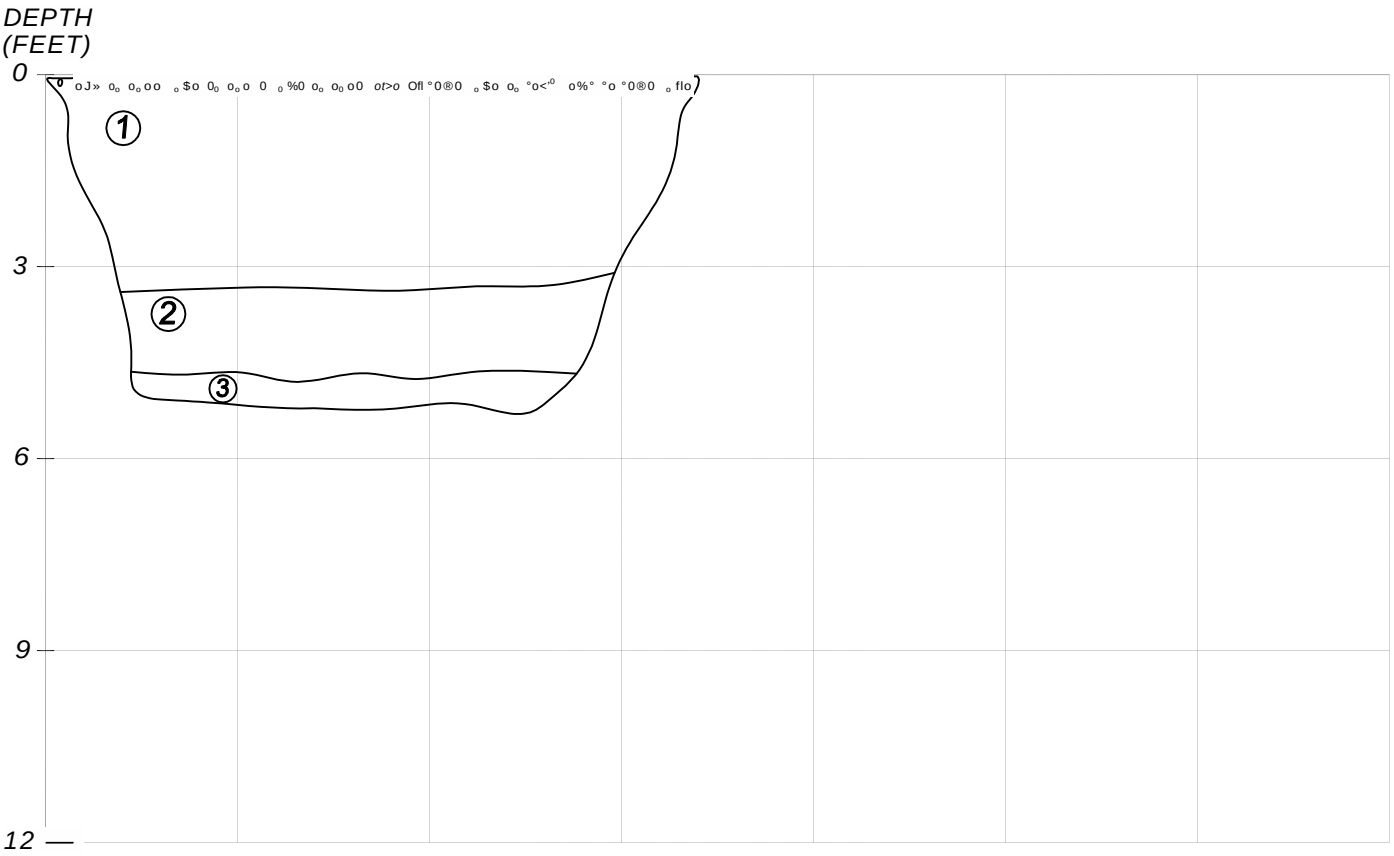
zgx W FILL - SILTY SAND: *MOIST, FINE TO COARSE GRAINED, YELLOWISH BROWN, TRACE ASPHALT / CONCRETE DEBRIS WITH NATIVE POORLY GRADED SAND WITH SILT LAYER AT BOTTOM OF BACKHOE PIT*

(4) BOTTOM OF BACKHOE PIT

BACKHOE *PIT LOG*

BACKHOE PIT NO.: 16

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: *E468R6.01*
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" BUCKET)		*DATE: 08/24/2021*
DEPTH TO WATER: N.E.	LOGGED BY: A.V.	*ELEV.: N/A*



SCALE: 1" 3'

SOIL DESCRIPTIONS

SURFACE: COVERED WITH ROUNDED GRAVEL

(T) FILL: CLAYEY SAND; MOIST, FINE TO MEDIUM GRAINED, BROWN, WITH METAL DEBRIS, METAL WIRE, *PLASTIC DEBRIS, ASPHALT CHUNKS (UP TO 3-INCH IN* DIAMETER)

(2) LEAN CLAY; *MOIST, LOW PLASTICITY, BROWN, ROOTLETS*

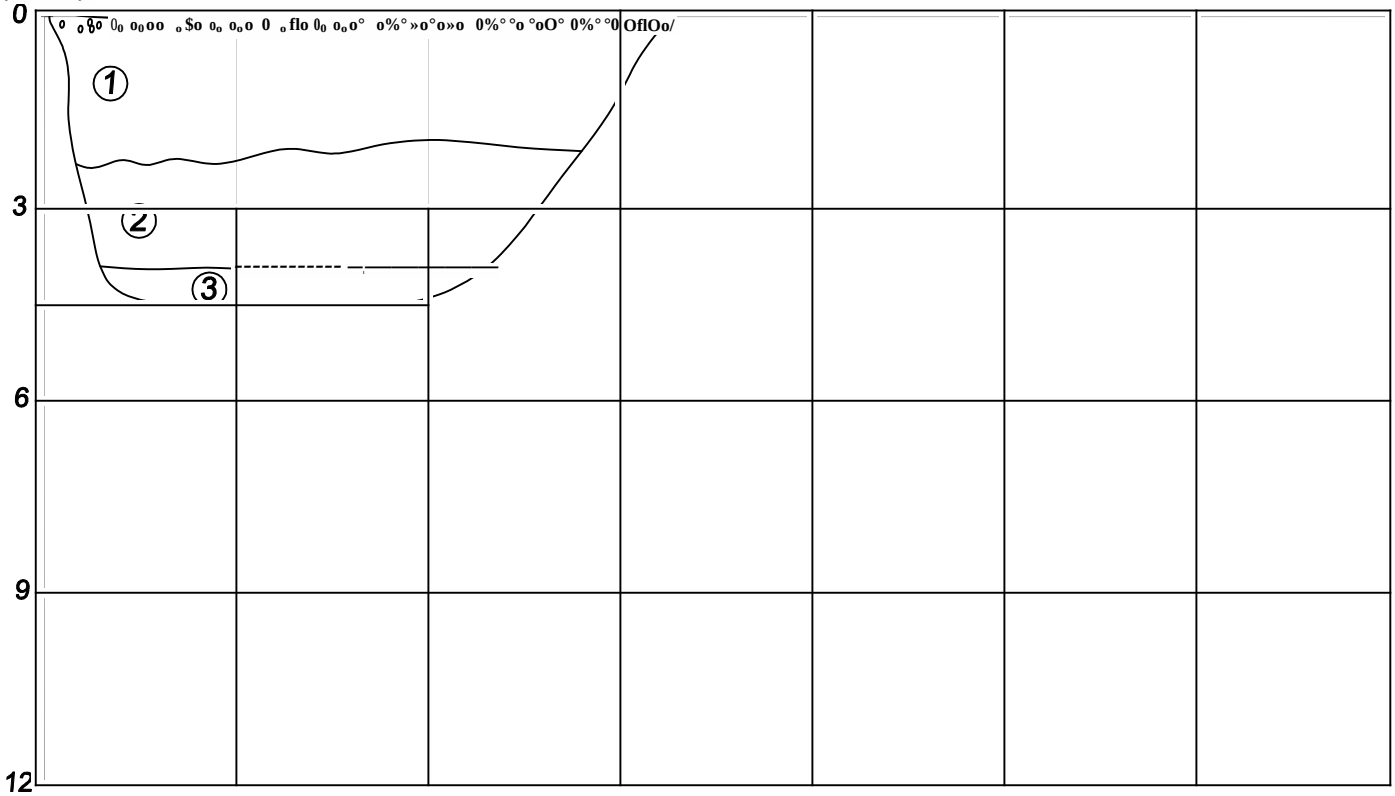
(3) SILTY SAND; *MOIST, FINE TO* MEDIUM GRAINED, BROWN

BACKHOE PIT LOG

BACKHOE PIT NO.: 17

PROJECT: PROPOSED GROUND MOUNTED SOLAR ARRAY, LANCASTER		PROJECT NO.: E468R6.01
EQUIPMENT: JOHN DEERE BACKHOE 310 LEP (24" *BUCKET)*		DATE: 08/25/2021
DEPTH TO WATER; N.E.	LOGGED BY: A.V.	ELEV.: N/A

DEPTH (FEET)



SCALE: *1"* = *3'*

SOIL DESCRIPTIONS SURFACE: *COVERED WITH ROUNDED GRAVEL*

(T) FILL: CLAYEY SAND; MOIST,FINE TO MEDIUM GRAINED, BROWN, SOME GRAVEL AND ASPHALT DEBRIS

(2) FILL: SILTY SAND; MOIST, FINE TO MEDIUM GRAINED, VERY *LIGHT BROWN, WITH* GLASS *PIECES (UP TO 1.5-INCHES)*

(3) SILTY SAND; *MOIST, FINE TO MEDIUM GRAINED, YELLOWISH* BROWN

APPENDIX C

PHOTOGRAPHIC LOG



Photograph No. 1: Buried asphalt layer encountered in backhoe pit BP-1 (near borings B-13/B-13A).



Photograph No. 2: Buried asphalt layers encountered in backhoe pit BP-2 (near borings B-13/B-13A).



Photograph No. 3: Buried asphalt layer encountered in backhoe pit BP-4 (near borings B-13/B-13A).



Photograph No. 4: Buried asphalt layer in backhoe pit BP-6 (near borings B-13/B-13A).



Photograph No. 5: Buried asphalt layer and two large asphalt chunks encountered in backhoe pit BP-7 (near borings B-13/B-13A).



Photograph No. 6: Wire debris encountered in backhoe pit BP-12 (near borings B-13/B-13A).



Photograph No. 7: Asphalt chunk excavated from backhoe pit BP-13 (near borings B-21/B-21A).



Photograph No. 8: Asphalt chunks excavated from backhoe pit BP-14 (near borings B-21/B-21A).



Photograph No. 9: Large chunk of concrete debris encountered in backhoe pit BP-15 (near borings B-21/B-21A).



Photograph No. 10: Large concrete and brick debris chunks encountered in backhoe pit BP-15 (near borings B-21/B-21A).



Photograph No. 11: Plastic debris encountered at a depth of about 4 feet below site grade in backhoe pit BP-15 (near borings B-21/B-21A).



Photograph No.12: Concrete and rusted pipe debris encountered in backhoe pit BP-15 (near borings B-21/B-21A).



Photograph No. 13: Wood, plastic and metal debris encountered in backhoe pit BP-15 (near borings B-21/B-21A).



Photograph No. 14: Electronic devices and wiring, plastic, asphalt, concrete and brick debris encountered in backhoe pit BP-15 (near borings B-21/B-21A).



Photograph No. 15: Miscellaneous debris encountered in backhoe pit BP-15 (near borings B-21/B-21A).



Photograph No. 16: Glass debris encountered in backhoe pit BP-15 (near borings B-21/B-21A).



Photograph No. 17: Wood debris encountered in backhoe pit BP-15 (near borings B-21/B-21A).



Photograph No. 18: Wood debris encountered in backhoe pit BP-15 (near borings B-21/B-21A).



Photograph No. 19: Wood debris encountered at depth in backhoe pit BP-15 (near borings B-21/B-21A).



Photograph No. 20: Green and black colored plastic debris encountered at depths of about 4 to 5 feet below site grade in backhoe pit B-15 (near borings B-21/B-21A).