# COUNTY OF LOS ANGELES
## DEPARTMENT OF PUBLIC WORKS

*"To Enrich Lives Through Effective and Caring Service"*

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331

http://dpw.lacounty.gov

GAIL FARBER, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460


ADOPTED
BOARD OF SUPERVISORS
COUNTY OF LOS ANGELES

28 August 5, 2014

SACHI A. HAMAI
EXECUTIVE OFFICER

SET FOR HEARING: AUGUST 26, 2014

August 05, 2014

The Honorable Board of Supervisors
County of Los Angeles
383 Kenneth Hahn Hall of Administration
500 West Temple Street
Los Angeles, California 90012

Dear Supervisors:

**RESOLUTION OF INTENTION AND ORDINANCE TO GRANT A 35-YEAR PROPRIETARY ELECTRICAL TRANSMISSION FRANCHISE TO TA - ACACIA, LLC, IN THE COUNTY OF LOS ANGELES HIGHWAYS KNOWN AS WEST AVENUE J AND 110TH STREET WEST IN THE UNINCORPORATED COUNTY AREA OF ANTELOPE VALLEY (SUPERVISORIAL DISTRICT 5) (3 VOTES)**

## SUBJECT

This action is to grant an electrical transmission franchise to TA - Acacia, LLC, a Delaware Limited Liability Company, in the County of Los Angeles highways known as West Avenue J and 110th Street West in the unincorporated County area of Antelope Valley.

## IT IS RECOMMENDED THAT THE BOARD:

1. Find that the grant of a proprietary electrical transmission franchise to TA - Acacia, LLC, a Delaware Limited Liability Company, is within the scope of the Mitigated Negative Declaration and Mitigation Monitoring Program previously adopted by the Los Angeles County Planning Commission on behalf of the County of Los Angeles.

2. Approve the Resolution of Intention to grant TA - Acacia, LLC, a Delaware Limited Liability Company, a proprietary electrical transmission franchise, set the matter for a public hearing on August 26, 2014, and instruct the Executive Officer of the Board to publish a Notice of Public Hearing pursuant to California Public Utilities Code Section 6232.

AFTER THE PUBLIC HEARING, IT IS RECOMMENDED THAT THE BOARD:

Adopt the ordinance to grant TA - Acacia, LLC, a Delaware Limited Liability Company, a proprietary electrical transmission franchise in the County of Los Angeles highways known as West Avenue J and 110th Street West in the unincorporated County area of Antelope Valley.

## PURPOSE/JUSTIFICATION OF RECOMMENDED ACTION

The purpose of the recommended actions is to approve a Resolution of Intention (Enclosure A), schedule a Public Hearing, and publish a Notice of Public Hearing, as needed, to adopt an ordinance (Enclosure B) to grant TA - Acacia, LLC, a 35-year proprietary electrical transmission franchise in the County of Los Angeles highways known as West Avenue J and 110th Street West in the unincorporated County area of Antelope Valley.

### Implementation of Strategic Plan Goals

The Countywide Strategic Plan directs the provisions of Operational Effectiveness/Fiscal Sustainability (Goal 1) and Integrated Service Delivery (Goal 3). The revenue received from this transaction will help promote fiscal sustainability for the operation and maintenance of County highways. This transaction also allows for the continuation of utility services through renewable sources.

## FISCAL IMPACT/FINANCING

There will be no impact to the County General Fund.

TA - Acacia, LLC, a Delaware Limited Liability Company, has paid the County a one-time granting fee of $5,000 to process the ordinance to grant the franchise and will pay the first year's franchise fee of $2,500, which will be deposited into the County Road Fund. Subsequent franchise fees will be adjusted annually per the Consumer Price Index for All Consumers.

## FACTS AND PROVISIONS/LEGAL REQUIREMENTS

The West Antelope Solar Energy Project consists of the construction, operation, and maintenance of a 20-megawatt, photovoltaic solar electric generating facility located on a 178.5-acre site. Three conduit cable circuits cross at West Avenue J and three at 110th Street West in the unincorporated County area of Antelope Valley. The Los Angeles County Regional Planning Commission approved a Conditional Use Permit for the project on February 12, 2014.

Division 3, Title 16, of the County Code authorizes the Board to grant a franchise associated with electrical transmission lines. County Counsel has reviewed the accompanying Resolution of Intention and Ordinance and approved them as to form.

Pursuant to Section 6232 of the California Public Utilities Code, the Executive Officer of the Board shall arrange for the publishing of a Notice of Public Hearing in a newspaper of general circulation in the County at least once within 15 days after the Board's adoption of the Resolution of Intention.

**ENVIRONMENTAL DOCUMENTATION**

On February 12, 2014, the Los Angeles County Regional Planning Commission, on behalf of the County, adopted the Mitigated Negative Declaration and Mitigation Monitoring Program for this project and approved the Conditional Use Permit for this project, subject to Conditions of Approval. The recommended action is within the scope of the project in the previously adopted Mitigated Negative Declaration.

Upon the Board's approval of the project, the Department of Public Works will file a Notice of Determination with the office of the Registrar-Recorder/County Clerk (County Clerk) in accordance with Section 21152(a) of the California Public Resources Code and pay the required processing fee with the County Clerk in the amount of $75.

**IMPACT ON CURRENT SERVICES (OR PROJECTS)**

There will be no impact or adverse effect to any current services or future County projects.

**CONCLUSION**

Please return one adopted copy of this letter, the Resolution of Intention, and the Ordinance to the Department of Public Works, Survey/Mapping & Property Management Division. Retain the duplicate for your files.

Respectfully submitted,

GAIL FARBER
Director

GF:SGS:tw

Enclosures

c: Auditor-Controller (Accounting Division - Asset Management)
Chief Executive Office (Rita Robinson)
County Counsel
Executive Office

# Enclosure A

**RESOLUTION OF INTENTION TO GRANT A 35-YEAR PROPRIETARY ELECTRICAL TRANSMISSION FRANCHISE TO TA - ACACIA, LLC, A DELAWARE LIMITED LIABILITY COMPANY**

BE IT RESOLVED by the Board of Supervisors of the County of Los Angeles, State of California.

A. TA - Acacia, LLC (Franchisee), has applied to the Board of Supervisors of the County of Los Angeles, State of California, for a franchise for a period of thirty-five (35) years, beginning on September 25, 2014, the operative date of the franchise, to construct, operate, maintain, renew, repair, change the size of, or remove or abandon in place any electrical transmission system consisting of conduits, manholes, vaults, cables, wires, switches, communications circuits and other equipment, appliances, and appurtenances necessary and appropriate for cable circuit crossings for the purpose of conducting and transmitting electricity and electrical energy for light, heat, and power purposes and for any and all other purposes for which electricity can be used for Franchisee's operations in connection with the solar-photovoltaic, power generating facility in the vicinity of 110th Street West and West Avenue J, on, along, upon, in, under, or across any and all highways as defined in Section 16.36.080 of the Los Angeles County Code, now or hereafter dedicated to public use within the unincorporated territory of the County of Los Angeles, State of California, identified as three (3) cable circuit crossings of West Avenue J between 115th Street West and 110th Street West, and three (3) cable circuit crossings of 110th Street West, south of West Avenue J as more particularly shown on Exhibit A to the Ordinance, attached hereto and made a part hereof (Franchise Area).

B. It is the intention of the Board of Supervisors of the County of Los Angeles, State of California, to grant the franchise applied for upon the terms and conditions herein mentioned. The Franchisee and its successors and assigns will, during the life of its franchise, comply with the terms of the franchise from the date of the granting of the franchise, and in the event such terms are not fulfilled, the franchise will be forfeited.

C. The franchise described in the Ordinance is a franchise for electric transmission purposes.

D. That on August 26, 2014, at the hour of 9:30 a.m. of said day, a day not less than twenty (20) or more than sixty (60) days after the date of the passage of this Resolution of Intention, in the Hearing Room of the Board of Supervisors, Room 381, Kenneth Hahn Hall of Administration, 500 West Temple Street, Los Angeles, California 90012, all persons having any objection to the granting of the franchise hereinabove

described may appear before the Board of Supervisors and be heard thereon.

E. The Executive Officer of the Board of Supervisors shall cause notice of said hearing to be published at least once within fifteen (15) days after adoption of this Resolution of Intention in a newspaper of general circulation published in the County of Los Angeles, State of California.

The foregoing resolution was on the 5th day of August 2014, adopted by the Board of Supervisors of the County of Los Angeles, State of California, and ex officio the governing body of all other special assessment and taxing districts, agencies, and authorities for which said Board so acts.

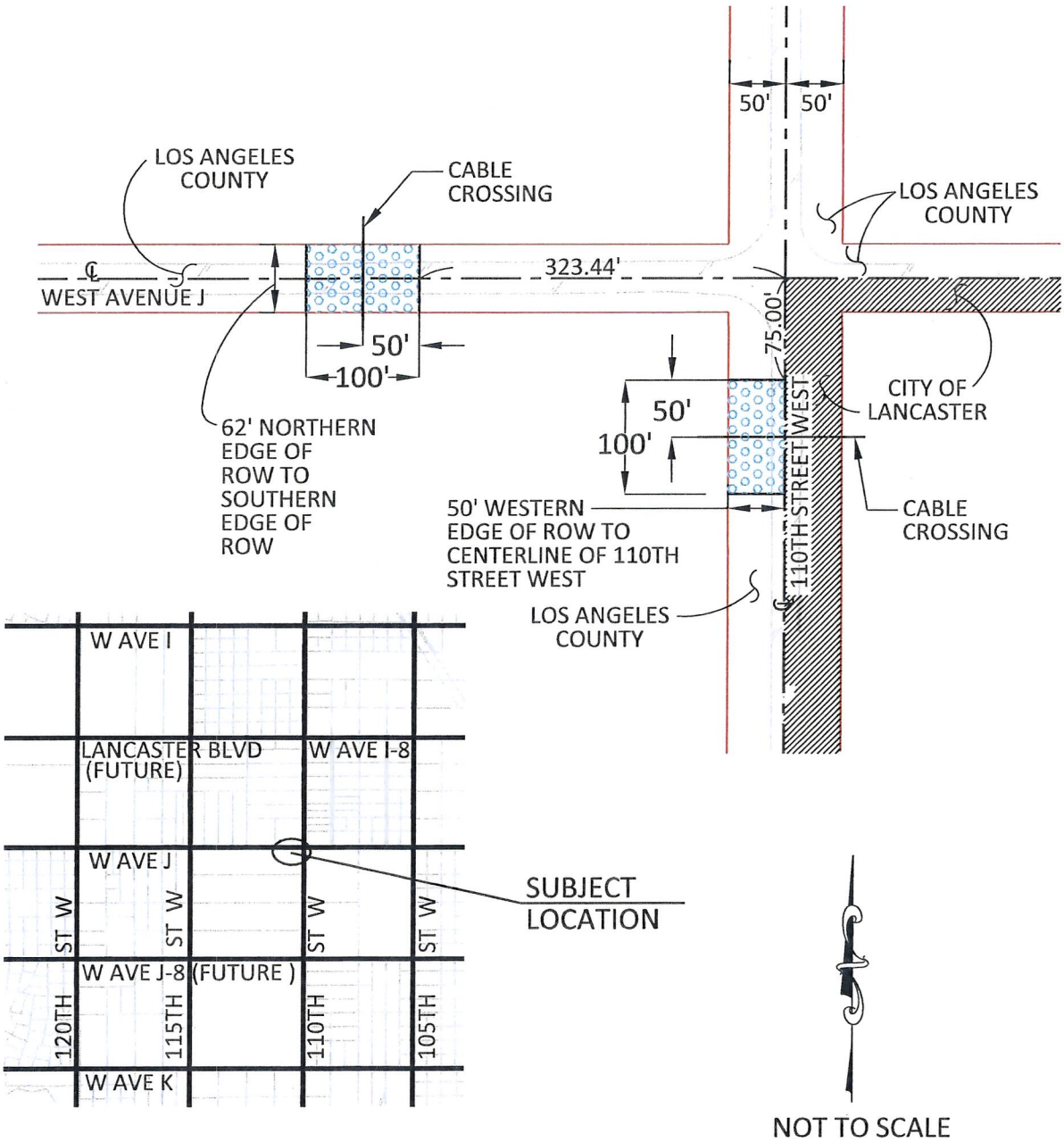
SACHI A. HAMAI
Executive Officer of the
Board of Supervisors of the
County of Los Angeles

By _____
Deputy

APPROVED AS TO FORM:

JOHN F. KRATTLI
County Counsel

By _____
Deputy




| LEGEND | | | |
|---|---|---|---|
| FRANCHISE AREA ON THIS SHEET 11,200 S.F. | | REVISION: | MAP PREPARED BY: J. DELANEY |
| | | TA-ACACIA, LLC. | |

| SD. | RD. | A.M.B. | T.G. | EXHIBIT A | DRAWING NO. |
|---|---|---|---|---|---|
| 5 | 551 | 3267-011<br>3267-004<br>3207-014 | 4013-D7 | FRANCHISE ORDINANCE FOR TA-Acacia, LLC | M1477001 |
| SCALE NONE | | DATE 07/07/14 | I.M. 354-177 | | |

# Los Angeles County
# Department of Regional Planning

*Planning for the Challenges Ahead*

Richard J. Bruckner
Director

February 18, 2014

Antonio Rodriguez
Canadian Solar
2420 Camino Ramon, Suite 125
San Ramon, CA 94583

**REGARDING:** **PROJECT NO. R2012-01589-(5)**
**CONDITIONAL USE PERMIT NO. 201200086**
**NORTHWEST AND SOUTHWEST CORNERS OF WEST AVENUE J AND 110TH STREET WEST (APNs: 3267-004-016, 3267-004-017, 3267-004-018, 3267-004-025, 3267-004-026, 3267-004-027, 3267-004-028, 3267-004-029, 3267-004-044, 3267-004-045, 3267-004-046, 3267-014-017, 3267-014-018, 3267-014-019, 3267-014-020.)**

The Regional Planning Commission, by its action of February 12, 2014, has **APPROVED** the above-referenced project. Enclosed are the Commission's Findings and Conditions of Approval. Please carefully review each condition. This approval is not effective until the appeal period has ended and the required documents and applicable fees are submitted to the Regional Planning Department (see enclosed Affidavit of Acceptance Instructions).

**Appeals:**

The applicant or any other interested persons may appeal the Regional Planning Commission's decision. The appeal period for this project will end at 5:00 p.m. on **February 26, 2014. Appeals must be delivered in person.**

**To file an appeal, please contact:**
Executive Office of the Board of Supervisors
Room 383, Kenneth Hahn Hall of Administration
500 West Temple Street, Los Angeles, CA 90012
(213) 974-1426

Upon completion of the appeal period, the notarized Affidavit of Acceptance and any applicable fees must be submitted to the planner assigned to your case. Please make an appointment to ensure that processing will be completed in a timely manner. Failure to submit these documents and applicable fees within 60 days will result in a referral to Zoning Enforcement for further action.



320 West Temple Street ▪ Los Angeles, CA 90012 ▪ 213-974-6411 ▪ Fax: 213-626-0434 ▪ TDD: 213-617-2292

For questions or for additional information, please contact Anthony Curzi of the Zoning Permits North Section at (213) 974-6443, or by email at acurzi@planning.lacounty.gov. Our office hours are Monday through Thursday, 7:30 a.m. to 5:30 p.m. We are closed on Fridays.

Sincerely,
DEPARTMENT OF REGIONAL PLANNING
Richard J. Bruckner

Paul McCarthy, Supervising Regional Planner
Zoning Permits North Section

Enclosures: Findings, Conditions of Approval, Affidavit of Acceptance (Permittee's Completion)
c: Board of Supervisors; DPW (Building and Safety); Zoning Enforcement;

PMC:amc

**FINDINGS AND ORDER OF THE REGIONAL PLANNING COMMISSION**
**COUNTY OF LOS ANGELES**
**PROJECT NO. R2012-01589-(5)**
**CONDITIONAL USE PERMIT NO. 201200086**

1. **ENTITLEMENT REQUESTED.** The applicant, Canadian Solar, is requesting a Conditional Use Permit ("CUP") to authorize the construction, operation, and maintenance of a photovoltaic solar electric generating plant in the A-2-5 (Heavy Agricultural – Five Acre Minimum Required Lot Area) Zone pursuant to the Los Angeles County ("County") Code Section 22.24.150.

2. **HEARING DATE.** February 12, 2014.

3. **PROCEEDINGS BEFORE THE REGIONAL PLANNING COMMISSION.** A duly-noticed public hearing was held on February 12, 2014 before the Regional Planning Commission (Commission). Staff presented the case and recommended approval. Two of the applicant's representatives testified in favor of the project and discussed the project's benefits. The Commission asked the representatives about the management of the mitigation land and if it was secured and about the water supply. The representative responded that the mitigation land would most likely be managed by a conservancy, and that the mitigation land had not yet been secured. Regarding the water supply, the applicant responded that the project had secured water from the Cawelo Water District, a water bank based out of Bakersfield.

   Members of the public testified both in support and in opposition to the project. Testimony in support referred to the ability of the project to provide renewable energy and jobs. Testimony in opposition included questioning the adequacy of the environmental analysis, asserting that the 84.5 acres of on-site mitigation land was not appropriate and that all mitigation land should be off-site and connected to existing dedicated open space, asserting that the current drought conditions would create serious dust problems during construction, questioning the survival of the landscaping in the desert environment, questioning the impact to rural communities from dust and possible Valley Fever, and stating that the jobs created by the project would be short-term only. Another testifier stated that there should be more coordination between renewable energy companies and the town councils.

   The applicant's representatives gave rebuttal and stated that all impacts from the project could be reduced to levels of insignificance with the recommended and agreed-upon mitigation measures and that the project would minimize grading and submit a dust control plan. The Commission questioned the reliability of the water supply and asked if additional measures should be in place in case the applicant was unable to secure water. Staff responded that the applicant had secured water from a water bank, which means the water had been obtained during a period of surplus rainfall and stored below ground for use during a drought. The water had been obtained outside the adjudicated area of the Antelope Valley Groundwater Basin. It is physically available now and guaranteed to the applicant. The Commission then discussed the project and stated that it was a relatively small

facility and that it was important to encourage the development of renewable energy. There being no further testimony, the Commission closed the public hearing, adopted the Mitigated Negative Declaration, and approved the project 4:0:0:1.

4. **PROJECT DESCRIPTION.** The applicant is requesting a CUP for the construction, operation, and maintenance of a 20-megawatt, photovoltaic solar energy facility located on 178.5 acres of a 263-acre site. The project will also entail the construction of an 8-foot-wide trail as required by the County Department of Parks and Recreation (Parks and Recreation) and perimeter landscaped vegetative screening along 110th Street West, West Avenue J, and the northern edge of the project site. The facility will include an on-site substation, switchyard, interconnection generation-tie (gen-tie) line, an equipment enclosure, a meteorological station, and two minimum 10-000 gallon water tanks for use by the Fire Department and applicant. The project will obtain water from a source located outside the adjudicated area of the Antelope Valley Groundwater Basin. A 6-foot-tall fence topped with 2 feet of barbed wire will surround the site and will have intermittent 1-foot openings at the bottom to allow for wildlife passage.

   The project will be constructed with a "light-on-land" approach. There will be no mass grading; solar arrays will be driven directly into the ground. Grading will only occur for the access roads, project substation, inverter pads, water tank pads, retention basins, and trail areas. At a maximum, 20 acres could be in active disturbance at one time, although it will be more common for only three acres to be in disturbance. The project soil will be stabilized with binders and will be watered during construction to prevent fugitive dust. An as-built plan will detail how the project has been constructed and if additional vegetative restoration is necessary. In the event such restoration is necessary, a Revegetation Plan will be required.

5. **LOCATION.** The subject site is located at the northwest and southwest corners of the West Avenue J and 110th Street West intersection in unincorporated Los Angeles County (near the western boundary of the City of Lancaster). The location is within the Fifth Supervisorial District of Los Angeles County and the Antelope Valley West Zoned District. The Assessor's Parcel Numbers are 3267-004-016, 3267-004-017, 3267-004-018, 3267-004-025, 3267-004-026, 3267-004-027, 3267-004-028, 3267-004-029, 3267-004-044, 3267-004-045, 3267-004-046, 3267-014-017, 3267-014-018, 3267-014-019, 3267-014-020.

6. **SITE PLAN DESCRIPTION.** The site plan depicts the subject site located west of 110th Street West and both north and south of Avenue J, divided into a North Portion and South Portion. Two 20-foot-wide driveways, both on Avenue J, provide access to the North and South Portions. The two minimum 10,000-gallon water tanks are depicted at both entrances of the North and South Portions, near the driveways. Five hundred-kilovolt transmission line towers are shown along the westerly boundary of the North and South portions running in a north-to-south direction, and along the southerly boundary of the South Portion, running west to east.

Solar arrays comprise a majority of the L-shaped North Portion and the square-shaped South Portion. The solar arrays are depicted arranged in blocks of 250 kilowatts. Perimeter and internal roads are also shown in the fields. The on-site electrical sub-station is depicted in the northeast corner of the South Portion.

Elevations depict the approximately 18-foot-tall water tank with access ladder. Six-foot-tall chain-link fencing topped with 2 feet of barbed wire is also depicted.

7. **EXISTING ZONING.** The zoning of the subject property is A-2-5 in the Antelope Valley West Zoned District.

   Surrounding properties are zoned as follows:
   North: A-2-5, A-1-2 (Light Agricultural – Two Acre Minimum Required Lot Area).
   South: A-2-5.
   East: A-2-2 (Heavy Agricultural – Two Acre Minimum Required Lot Area), City of Lancaster (RR-2.5 [Rural Residential – 2½ Acre Minimum Required Lot Area], SP [Specific Plan]).
   West: A-2-5.

8. **EXISTING LAND USES.** The land use on the subject site is vacant land and Southern California Edison ("SCE") transmission lines.

   Surrounding properties are developed as follows:
   North: Vacant land, single-family residential.
   South: Vacant land, single-family residential.
   East: Vacant land, single-family residential.
   West: Vacant land.

9. **PREVIOUS CASES/ZONING HISTORY.** Ordinance No. 7397 established the A-2-5 zone on the subject property on September 23, 1958.

10. **GENERAL PLAN / COMMUNITY PLAN CONSISTENCY.**
    The project site is located within the "R" (Non-Urban) category of the County General Plan ("General Plan") and the "N1" (Non-Urban 1) land use category of the Antelope Valley Areawide General Plan ("Community Plan"). These designations are intended for low-density and low-intensity uses such as low-density residential uses. (The N1 designation permits 0.5 dwelling units per acre.)

    The proposed use is not a residential project; however, the Community Plan allows for utility uses and non-residential uses in rural areas provided certain conditions are met. These include a public hearing process which shall impose appropriate conditioning for the project to ensure that negative impacts on adjacent land uses are minimized. This project has gone through the public hearing process and conditions have been adopted to ensure that impacts are minimized. Furthermore, an environmental review has been performed and mitigation measures have been identified that further reduce the environmental impacts of the project.

The Community Plan provides further guidelines for the development of non-residential uses in non-urban areas. These guidelines specify that the location, access, and design of the proposed use are compatible with the community's rural character and will not have negative impacts to surrounding uses. The location, access, and design of the proposed project are all compatible with the surrounding area, making the project appropriate for the area.

The photovoltaic solar energy facility is a largely passive utility-type use that is unobtrusive in its operation and maintenance and is therefore consistent with the permitted uses of the underlying land use categories.

The following policies of the General Plan are applicable to the proposed project:

- *General Goals and Policies Chapter – Land Use and Urban Development Pattern – Policy 23 (Page I-21): "Ensure that development in non-urban areas is compatible with rural lifestyles, does not necessitate the expansion of urban service systems, and does not cause significant negative environmental impacts or subject people and property to serious hazards.*

The proposed photovoltaic solar facility will be designed in a manner that is compatible with the rural lifestyle in the area. It is located on former farmland adjacent to large transmission lines. It will be a largely passive utility-type use and will require little maintenance. It will be designed with a hiking/mountain biking/equestrian trail and will be screened from public view with perimeter landscaping. The project will not cause significant negative environmental impacts, nor will it subject people or property to serious hazard because measures have been adopted in the conditions to ensure that risks from fugitive dust will be reduced.

- *General Goals and Policies Chapter - Area Development Priorities – Policy 61 (Page I-31): "Maintain the open and rural character of the non-urban areas of the Antelope Valley."*

The project site is an area that is considered rural. It is surrounded by vacant land, scattered residences, and ranches. The proposed project would essentially preserve the rural character of the community by developing a low-intensity land use on the property. The majority of the acreage of the fenced area of the solar array (102.5 acres of the 178.5-acre site) would be undisturbed, and the development that is proposed is modest in its scale and use. Furthermore, the dedication and construction of the Poppy Trail as required by Parks and Recreation will allow residents to traverse 110$^{th}$ Street West in a north/south direction. The applicant will be required to provide 272.5 acres of off-site mitigation land as well.

- *Conservation and Open Space Chapter – Needs and Policies – Policy 2 (Page II-26): "Support the conservation of energy and encourage the development and utilization of new energy sources including geothermal, thermal waste, solar, wind and ocean-related sources."*

The project is for a photovoltaic solar energy facility that will generate 20 megawatts of renewable energy.

- *Conservation and Open Space Chapter – Needs and Policies – Policy 3 (Page II-26): "Promote the use of solar energy to the maximum extent possible."*

The project is for a photovoltaic solar energy facility that will generate 20 megawatts of renewable energy.

- *Conservation and Open Space Chapter – Needs and Policies – Policy 13 (Page II-28): "Encourage open space easements and dedications as a means of meeting scenic, recreational and conservation needs."*

The project will be required to provide 357 acres of on- and off-site mitigation land. This includes 272.5 acres of off-site land near the project site and 84.5 acres on-site outside the fence-in area of the solar arrays.

- *Conservation and Open Space Chapter – Needs and Policies – Policy 30 (Page II-31): "Develop a system of bikeways, scenic highways, and riding and hiking trails; link recreational facilities where possible."*

As part of the project, the applicant will dedicate and construct approximately one mile of the Poppy Trail.

The following policies of the Community Plan are applicable to the proposed project:

- *Policy 19 (Page V-3): "Minimize disruption and degradation of the environment as land use development occurs, integrating land uses so that they are compatible with natural environmental systems."*

The project will maintain natural drainages and minimizes grading to the site. Grading will only occur for access roads, retention basins, and water tanks.

- *Policy 40 (Page V-6): "Encourage efficient utilization of resources in allocation of land to various uses, and incorporate energy conservation measures into the design and implementation of public and private projects.*
  The project will generate 20 megawatts of carbon-free energy, reducing greenhouse gas emissions and allowing the State to meet its goals to reduce global warming. The project will also minimize ground disturbance and puts modest demands on public infrastructure.

11. **ZONING ORDINANCE AND DEVELOPMENT STANDARDS COMPLIANCE.** The subject site is comprised of 15 parcels and totals 263 gross acres. All required development standards are met on the subject site.

12. **NEIGHBORHOOD IMPACT/LAND USE COMPATIBILITY.** The proposed facility will comprise a photovoltaic solar energy field on 178.5 acres of a 263-acre site. Additionally, the project will incorporate perimeter landscaping along West Avenue J, 110$^{th}$ Street West, and the northern edge of the project site. A 12-foot-wide easement (with an 8-foot-wide useable trail) for the Poppy Trail will be dedicated and constructed along 110$^{th}$ Street West for pedestrians, hikers, mountain bikers, and equestrians.

The subject property is located in a rural area with the closest residence located 700 east of the project site on West Avenue J. Fifteen single-residence properties are located within a one-mile radius of the project boundary. The project site is comprised of previously disturbed farmland and contains mostly annual grasslands and small patches of native perennial grasses. Southern California Edison's Tehachapi Renewable Transmission Project transmission towers are located along the westerly edge of the North and South Portions; they also traverse the southern edge of the South Portion. The project site is located near the Antelope Substation and across the street from the approved Plainview Solar Project in the City of Lancaster. As such, the introduction of a solar facility on the subject property incorporating landscaping and a trail will result in a compatible land use with the neighborhood.

Electricity generating plants are permitted in the A-2 zone subject to a CUP. Furthermore, while solar facilities are classified as an "electric generating plant" under the County Code, the subject proposal is more comparable to a utility use, which is a permitted use under the Community Plan, the governing land use plan for the area.

The facility will be largely a passive, unstaffed facility with periodic maintenance visits. The site will have a fenced in area containing the solar arrays, but will also have 84.5 acres of an unfenced area that will remain in the current natural state, providing mitigation land for plants and species. The applicant will also be required to provide 272.5 acres of off-site mitigation land. As such, impacts related to biological resources will be mitigated, and open space will be set aside and preserved for the community's enjoyment.

13. **COUNTY DEPARTMENT COMMENTS AND RECOMMENDATIONS.**

County Department of Public Works ("Public Works")

Public Works recommends approval of this project and has recommended conditions of approval, compliance with which are required by the proposed conditions.

County Fire Department ("Fire Department")

The Fire Department recommends approval of this project and has recommended conditions, compliance with which are required by the proposed conditions.

Parks and Recreation

Parks and Recreation requests an easement be dedicated and a recreational trail be constructed along 110th Street West as part of the Poppy Trail, requirements which are included in the proposed conditions.

County Department of Public Health ("Public Health")

Public Health recommends approval of the proposed project with recommended conditions pertaining to potable water supply, sewage disposal, noise, and air quality, compliance with which are required by the proposed conditions.

14. **OTHER AGENCY COMMENTS AND RECOMMENDATIONS.**

California Department of Transportation ("Caltrans")

Caltrans' letter asked to County to consider and be mindful of storm water run-off and that a transportation permit will be required from Caltrans for the transportation of heavy equipment and materials which require a permit.

California Department of Fish and Wildlife ("CDFW")

CDFW's letter pertained to the County's analysis of burrowing owls, Swainson's hawk, and mitigation land. CDFW disagreed with the MND's conclusions regarding these resources. The County has incorporated CDFW's recommendations into the MND and MMP. CDFW's letter also recommended that the Initial Study ("IS")/MND analyze impacts to stream and riparian resources, and that the Decommissioning Plan be released for public review and comment. Since the Decommissioning Plan is not required until after project approval, the County could not release it for public review and comment.

Antelope Valley Air Quality Management District ("AVAQMD")

AVAQMD letter states that phased construction meets their requirements for reduction of dust, that a Dust Control Plan is required, and specifies requirements for watering the site to prevent fugitive dust. AVAQMD's requirements are included in the proposed conditions for the project.

Lahontan Regional Water Quality Control Board ("LRWQCB")

LRWQCB commented on an early draft of the IS/MND. LRWQCB's letter concurred with the County's decision to proceed with an MND, and requested specific mitigation measures to protect natural drainages. Such measures are included in the proposed conditions.

Southern California Edison ("SCE")

SCE commented on the project's IS/MND released for public and agency review. The SCE letter clarified certain text and mitigation measures pertaining to the gen-tie line and hazardous waste.

City of Palmdale

The City of Palmdale commented on an early draft of the IS/MND. Comments from Palmdale pertained to ensuring that impacts from fugitive dust and $PM_{10}$ were minimized. Palmdale also asked how dust would be controlled post construction. Dust control measures are required in the proposed mitigation measures.

15. **LEGAL NOTIFICATION AND PUBLIC OUTREACH.** Pursuant to the provisions of Sections 22.60.174 and 22.60.175 of the County Code, the community was appropriately notified of the public hearing by mail, newspaper and property posting.

The applicant has met 15 times with members of the community, including the new and original Antelope Acres Town Councils, Fairmont Town Council, Oso Town Council, Friends of Antelope Valley Open Space, City of Lancaster, Antelope Valley Resource Conservation District, and International Brotherhood of Electrical Workers Union to present and discuss the project.

16. **PUBLIC COMMENTS.** One letter in support, one letter in opposition, and one telephone call in opposition were received. Eight letters commenting on the MND were also received.

## CONDITIONAL USE PERMIT SPECIFIC FINDINGS

17. The subject property is governed by the Antelope Valley Areawide General Plan, a component of the County General Plan. Its land use designation is N1 (Non-Urban 1). The N1 designation is intended for low-density residential uses of a maximum of 0.5 dwelling units per acre. The proposed use is not a residential project; however, the Community Plan allows for utility uses and non-residential uses in rural areas provided certain conditions are met. These include a public hearing process, which shall require appropriate conditioning of the project to ensure that negative impacts on adjacent land uses are minimized. This project has gone through the public hearing process and conditions have been adopted to ensure that impacts are minimized. Furthermore, an environmental review has been performed and mitigation measures have been identified that further reduce the environmental impacts of the project.

    The Community Plan provides further guidelines for the development of non-residential uses in non-urban areas. These guidelines specify that the location, access, and design of the proposed use are compatible with the community's rural character and will not have negative impacts to surrounding uses. As the project will be a low-intensity, largely passive utility use appropriately located on disturbed land, will have adequate access to well-maintained and sufficiently wide streets, will be attractively landscaped at its perimeter, and will be appropriately fenced with wildlife-friendly fencing, it is appropriate for the subject location.

    Therefore, the proposed use will be consistent with the adopted general plan for the area.

18. The requested use is a largely passive utility use. It will not interfere with others quiet enjoyment of their property. The photovoltaic facility will contain rows of solar panels with a maximum height of 8 feet at full tilt. Two minimum 10,000-gallon water tanks, painted in earth tone colors and with a maximum height of approximately 18 feet, will also be located on the project site. During construction, the project will be screened from view by fabric or slats in the perimeter fence. The fence will be 6 feet tall and topped with 2 feet of barbed wire. Furthermore, perimeter landscaping will soften the aesthetic impact of the facility. An equestrian/mountain biking/hiking trail (Poppy Trail) will be constructed along 110$^{th}$ Street West and will allow community residents and visitors to traverse the edge of the site. A Dust Control Plan will ensure that fugitive dust from the construction and operation of the project will be minimized.

    Therefore, the requested use at the location proposed will not adversely affect the health, peace, comfort or welfare of persons residing or working in the surrounding area, will not be materially detrimental to the use, enjoyment or valuation of

property of other persons located in the vicinity of the site, and will not jeopardize, endanger or otherwise constitute a menace to the public health, safety or general welfare.

19. The project site is comprised of 15 separate parcels and totals 263 acres and is located both north and south of West Avenue J. The solar facility will occupy 178.5 acres. The site is large enough to accommodate all County requirements for fire safety, clearances, flood easements, perimeter landscaping and for the construction of the 12-foot-wide trail easement (with 8-foot-wide useable trail) of the Poppy Trail. As the site will be remotely monitored, there will be periodic visits for maintenance purposes. There is adequate space in the solar field for maintenance vehicles to park.

    Therefore, the proposed site is adequate in size and shape to accommodate the yards, walls, fences, parking, landscaping and other development features prescribed in this Title 22, or as is otherwise required in order to integrate said use with the uses in the surrounding area.

20. The project is at the northwest and southwest corners of 110th Street West and West Avenue J. 110th Street West is a 100-foot-wide Major Highway as identified on the County Master Plan of Highways. West Avenue J is a 62-foot-wide Major Highway to the east of the project site, at the intersection with 110th Street West. Both highways are paved and are adequately improved the carry the traffic generated by both the construction and operation of the proposed facility. The facility is not expected to generate pedestrian or bicycle traffic, but a hiking trail will be constructed along the project's frontage along 110th Street West to accommodate hikers and pedestrians, and the County Bicycle Master Plan identifies 110th Street West as a future route for a Class III bike path from Johnson Road to Avenue G. Ingress and egress to the site will be from two driveways, both located on West Avenue J with one leading to the North Portion and one to the South Portion. As the project will generate electricity for public consumption, a gen-tie line will be constructed along West Avenue J 1.5 miles to the east to the Antelope Substation.

    Therefore, the proposed site is adequately served by highways or streets of sufficient width and improved as necessary to carry the kind and quantity of pedestrian, bicycle, and vehicle traffic such use would generate, and by other public or private service facilities as are required.

## ENVIRONMENTAL DETERMINATION

21. The County, as Lead Agency for the project, has analyzed the environmental impacts of the project in a Mitigated Negative Declaration ("MND") (SCH No. 2013101055). The MND includes Response to Comments dated January 30, 2014 and identifies mitigation measures to be implemented as part of the project. The Commission has reviewed and considered the MND and finds that it reflects the

independent judgment of the County. As stated in the MND, identified impacts to aesthetic resources, air quality, biological resources, cultural resources, hazards and hazardous materials, recreation, and utilities and service systems can be reduced to acceptable levels with the mitigation measures identified in the MND and incorporated as conditions in this grant. A Mitigation Monitoring Program ("MMP") consistent with the MND, has been prepared by the County, and its requirements have been incorporated into the conditions of approval for this project. The MMP prepared in conjunction with the MND identifies in detail the manner in which compliance with the measures adopted to mitigation or avoid potential adverse impacts of the project to the environment is ensured.

Therefore, the Commission, having considered the MND together with any comments received during the public review process, finds on the basis of the whole record before the Commission that there is no substantial evidence that the project will have a significant effect on the environment as modified, finds that the Mitigated Negative Declaration reflects the independent judgment and analysis of the Commission.

22. The Initial Study concluded that there are certain potentially significant environmental impacts associated with the project that can be reduced to less than significant with the implementation of the proposed mitigation measures. As mitigation measures to reduce impacts to levels below significant were identified in the Initial Study phase, an MND is the appropriate environmental documentation. The draft Mitigation Monitoring Program ("MMP") is included as an attachment to this report.

    The areas of environmental impact found to be less than significant with project mitigation incorporated include the following:
    - Aesthetics
    - Air Quality
    - Biological Resources
    - Cultural Resources
    - Hazards and Hazardous Materials
    - Recreation
    - Utilities/Service Systems
    - Mandatory Findings of Significance

    The following areas require no mitigation as described in the Initial Study.
    - Agriculture and Forest Resources
    - Energy
    - Geology and Soils
    - Greenhouse Gas Emissions
    - Hydrology and Water Quality
    - Land Use and Planning
    - Mineral Resources
    - Noise
    - Population and Housing

- Public Services
- Transportation/Traffic

23. **TERM LIMIT.** To assure continued compatibility between the use of the subject property allowed by this grant and surrounding land uses, the Commission determines that it is necessary to limit the term of the grant to thirty-five (35) years.

24. **RECORD OF PROCEEDINGS.** The location of the documents and other materials constituting the record of proceedings upon which the Commission's decision is based in this matter is at the Los Angeles County Department of Regional Planning, 13th Floor, Hall of Records, 320 West Temple Street, Los Angeles, CA 90012. The custodian of such documents and materials shall be the Section Head of the Zoning Permits North Section, Los Angeles County Department of Regional Planning.

BASED ON THE FOREGOING, THE REGIONAL PLANNING COMMISSION CONCLUDES:

A. That the proposed use will be consistent with the adopted general plan for the area; and

B. That the requested use at the location proposed will not adversely affect the health, peace, comfort or welfare of persons residing or working in the surrounding area, will not be materially detrimental to the use, enjoyment or valuation of property of other persons located in the vicinity of the site, and will not jeopardize, endanger or otherwise constitute a menace to the public health, safety or general welfare; and

C. That the proposed site is adequate in size and shape to accommodate the yards, walls, fences, parking, landscaping and other development features prescribed in this Title 22, or as is otherwise required in order to integrate said use with the uses in the surrounding area; and

D. That the proposed site is adequately served by highways or streets of sufficient width and improved as necessary to carry the kind and quantity of pedestrian, bicycle, and vehicle traffic such use would generate, and by other public or private service facilities as are required.

THEREFORE, the information submitted by the applicant and presented at the public hearing substantiates the required findings for a CUP as set forth in Section 22.56.090 of the County Code (Zoning Ordinance).

**REGIONAL PLANNING COMMISSION ACTION:**

1. The Commission, having considered the MND together with any comments received during the public review process, finds on the basis of the whole record before the Commission that there is no substantial evidence that the project will have a significant effect on the environment as modified, finds that the Mitigated

Negative Declaration reflects the independent judgment and analysis of the Commission, and adopts the Mitigated Negative Declaration and Mitigation Monitoring Program for the project.

2. In view of the findings of fact and conclusions presented above, CUP No. 201200086 is approved subject to the attached conditions.

**ACTION DATE: February 12, 2014**

**VOTE: Concurring:Dissenting:Abstaining:Absent, 4:0:0:1**
Concurring: Valadez, Louie, Shell, Modugno

Dissenting: 0

Abstaining: 0

Absent: Pedersen

SMT:amc
February 12, 2014

c: Each Commissioner, Zoning Enforcement, Building and Safety

**CONDITIONS OF APPROVAL**
**COUNTY OF LOS ANGELES**
**PROJECT NO. R2012-01589-(5)**
**CONDITIONAL USE PERMIT NO. 201200086**

## PROJECT DESCRIPTION

The applicant is requesting a Conditional Use Permit ("CUP") for the construction, operation, and maintenance of a 20-megawatt, photovoltaic solar energy facility located on 178.5 acres of a 263-acre site. The project will also entail the construction of an 8-foot-wide trail (within a 12-foot-wide easement) as required by the County Department of Parks and Recreation (Parks and Recreation) and perimeter landscaped vegetative screening along 110th Street West, West Avenue J, and the northern edge of the project site. The facility will include an on-site substation, switchyard, interconnection generation-tie ("gen-tie") line, an equipment enclosure, a meteorological station, and two minimum 10,000 gallon water tanks for use by the Fire Department and applicant. The project will obtain water from a water bank located outside the adjudicated area of the Antelope Valley Groundwater Basin. A 6-foot-tall fence topped with 2 feet of barbed wire will surround the site and will have intermittent 1-foot openings at the bottom to allow for wildlife passage.

The project will be constructed with a "light-on-land" approach. There will be no mass grading; solar arrays will be driven directly into the ground. Grading will only occur for the access roads, project substation, inverter pads, water tank pads, retention basins and trail areas. At a maximum, 20 acres could be in active disturbance at one time, although it will be more common for only three acres to be in disturbance. The project soil will be stabilized with binders and will be watered during construction to prevent fugitive dust. An as-built plan will detail how the project has been constructed and if additional vegetative restoration is necessary. In the event such restoration is necessary, a Revegetation Plan will be required.

## GENERAL CONDITIONS

1. Unless otherwise apparent from the context, the term "permittee" shall include the applicant, owner of the property, and any other person, corporation, or other entity making use of this grant.

2. This grant shall not be effective for any purpose until the permittee, and the owner of the subject property if other than the permittee, have filed at the office of the County Department of Regional Planning ("Regional Planning") their affidavit stating that they are aware of and agree to accept all of the conditions of this grant, and that the conditions of the grant have been recorded as required by Condition No. 7, and until all required monies have been paid pursuant to Condition Nos. 10, 11, and 14. Notwithstanding the foregoing, this Condition No. 2 and Condition Nos. 4, 5, 9, and 12 shall be effective immediately upon the date of final approval of this grant by the County.

3. Unless otherwise apparent from the context, the term "date of final approval" shall mean the date the County's action becomes effective pursuant to Section 22.60.260 of the County Code.

4. The permittee shall defend, indemnify, and hold harmless the County, its agents, officers, and employees from any claim, action, or proceeding against the County or its agents, officers, or employees to attack, set aside, void, or annul this permit approval, which action is brought within the applicable time period of Government Code Section 65009 or any other applicable limitations period. The County shall promptly notify the permittee of any claim, action, or proceeding and the County shall reasonably cooperate in the defense. If the County fails to promptly notify the permittee of any claim, action, or proceeding, or if the County fails to cooperate reasonably in the defense, the permittee shall not thereafter be responsible to defend, indemnify, or hold harmless the County.

5. In the event that any claim, action, or proceeding as described above is filed against the County, the permittee shall within ten days of the filing make an initial deposit with Regional Planning in the amount of up to $5,000.00, from which actual costs and expenses shall be billed and deducted for the purpose of defraying the costs or expenses involved in Regional Planning's cooperation in the defense, including but not limited to, depositions, testimony, and other assistance provided to permittee or permittee's counsel.

   If during the litigation process, actual costs or expenses incurred reach 80 percent of the amount on deposit, the permittee shall deposit additional funds sufficient to bring the balance up to the amount of $5,000.00. There is no limit to the number of supplemental deposits that may be required prior to completion of the litigation.

   At the sole discretion of the permittee, the amount of an initial or any supplemental deposit may exceed the minimum amounts defined herein. Additionally, the cost for collection and duplication of records and other related documents shall be paid by the permittee according to County Code Section 2.170.010.

6. If any material provision of this grant is held or declared to be invalid by a court of competent jurisdiction, the permit shall be void and the privileges granted hereunder shall lapse.

7. Prior to the use of this grant, the permittee, or the owner of the subject property if other than the permittee, shall **record the terms and conditions** of the grant in the office of the County Registrar-Recorder/County Clerk ("Recorder"). In addition, upon any transfer or lease of the property during the term of this grant, the permittee, or the owner of the subject property if other than the permittee, shall promptly provide a copy of the grant and its conditions to the transferee or lessee of the subject property.

8. **This grant shall terminate on February 12, 2047.** Entitlement to use of the property thereafter shall be subject to the regulations then in effect. If the permittee intends to continue operations after such date, whether or not the

permittee proposes any modifications to the use at that time, the permittee shall file a new Conditional Use Permit application with Regional Planning, or shall otherwise comply with the applicable requirements at that time. Such application shall be filed at least six (6) months prior to the expiration date of this grant and shall be accompanied by the required fee. In the event that the permittee seeks to discontinue or otherwise change the use, notice is hereby given that the use of such property may require additional or different permits and would be subject to the then-applicable regulations.

9. This grant shall expire unless used within two (2) years from the date of final approval of the grant. A single one-year time extension may be requested in writing and with the payment of the applicable fee prior to such expiration date.

10. The subject property shall be maintained and operated in full compliance with the conditions of this grant and any law, statute, ordinance, or other regulation applicable to any development or activity on the subject property. Failure of the permittee to cease any development or activity not in full compliance shall be a violation of these conditions. Inspections shall be made to ensure compliance with the conditions of this grant as well as to ensure that any development undertaken on the subject property is in accordance with the approved site plan on file. The permittee shall deposit with the County the sum of **$8,000.00**. The deposit shall be placed in a performance fund, which shall be used exclusively to compensate Regional Planning for all expenses incurred while inspecting the premises to determine the permittee's compliance with the conditions of approval. The fund provides for **six inspections during the construction period and one annually for the remainder of the grant term, for a total of 40 inspections**. Inspections shall be unannounced.

    If additional inspections are required to ensure compliance with the conditions of this grant, or if any inspection discloses that the subject property is being used in violation of any one of the conditions of this grant, the permittee shall be financially responsible and shall reimburse Regional Planning for all additional enforcement efforts necessary to bring the subject property into compliance. The amount charged for additional inspections shall be $200.00 per inspection, or the current recovery cost at the time any additional inspections are required.

11. Within three (3) days of the date of final approval of this grant, the permittee shall remit processing fees payable to the County of Los Angeles in connection with the filing and posting of a Notice of Determination (NOD) for this project and its entitlements in compliance with Section 21152 of the Public Resources Code. Unless a Certificate of Exemption is issued by the California Department of Fish and Wildlife pursuant to Section 711.4 of the California Fish and Game Code, the permittee shall pay the fees in effect at the time of the filing of the NOD, as provided for in Section 711.4 of the Fish and Game Code, currently **$2,231.25** ($2,156.25 for a Mitigated Negative Declaration plus $75.00 processing fee). No land use project subject to this requirement is final, vested or operative until the fee is paid.

12. The permittee shall comply with all mitigation measures identified in the Mitigation Monitoring Program ("MMP"), which are incorporated by this reference as conditions of approval.

13. Within thirty (30) days of the date of final approval of the grant by the County, the permittee shall record a covenant and agreement, which attaches the MMP and agrees to comply with the mitigation measures imposed by the Mitigated Negative Declaration for this project, in the office of the Recorder. Prior to recordation of the covenant, the permittee shall submit a draft copy of the covenant and agreement to Regional Planning for review and approval. As a means of ensuring the effectiveness of the mitigation measures, the permittee shall submit annual mitigation monitoring reports to Regional Planning for approval or as required. The reports shall describe the status of the permittee's compliance with the required mitigation measures.

14. The permittee shall deposit an initial sum of $6,000.00 with Regional Planning within thirty (30) days of the date of final approval of this grant to defray the cost of reviewing and verifying the information contained in the reports required by the MMP. The permittee shall replenish the mitigation monitoring account if necessary until all mitigation measures have been implemented and completed.

15. Notice is hereby given that any person violating a provision of this grant is guilty of a misdemeanor. Notice is further given that the Regional Planning Commission ("Commission") or a Hearing Officer may, after conducting a public hearing, revoke or modify this grant, if the Commission or Hearing Officer finds that these conditions have been violated or that this grant has been exercised so as to be detrimental to the public's health or safety or so as to be a nuisance, or as otherwise authorized pursuant to Chapter 22.56, Part 13 of the County Code.

16. All development pursuant to this grant must be kept in full compliance with the County Fire Code to the satisfaction of said department.

17. All development pursuant to this grant shall conform with the requirements of the County Department of Public Works ("Public Works") to the satisfaction of said department.

18. All development pursuant to this grant shall comply with the requirements of Title 22 of the County Code and of the specific zoning of the subject property, unless specifically modified by this grant, as set forth in these conditions, including the approved Exhibit "A," or a revised Exhibit "A" approved by the Director of Regional Planning ("Director").

19. The permittee shall maintain the subject property in a neat and orderly fashion. The permittee shall maintain free of litter all areas of the premises over which the permittee has control.

20. All structures, walls and fences open to public view shall remain free of graffiti or other extraneous markings, drawings, or signage that was not approved by

Regional Planning. These shall include any of the above that do not directly relate to the business being operated on the premises or that do not provide pertinent information about said premises. The only exceptions shall be seasonal decorations or signage provided under the auspices of a civic or non-profit organization.

In the event of graffiti or other extraneous markings occurring, the permittee shall remove or cover said markings, drawings, or signage within 24 hours of notification of such occurrence, weather permitting. Paint utilized in covering such markings shall be of a color that matches, as closely as possible, the color of the adjacent surfaces.

21. The subject property shall be developed and maintained in substantial compliance with the plans marked Exhibit "A." If changes to the site plan are required as a result of instruction given at the public hearing, **three (3) copies of** a modified Exhibit "A" shall be submitted to Regional Planning within sixty (60) days of the date of final approval.

22. In the event that subsequent revisions to the approved Exhibit "A" are submitted, the permittee shall submit **three (3) copies of** the proposed plans to the Director for review and approval. All revised plans must be accompanied by the written authorization of the property owner(s) and applicable fee for such revision.

**PERMIT SPECIFIC CONDITIONS - CONDITIONAL USE PERMIT**

23. The permittee shall dedicate and construct a 12-foot-wide easement for a recreational trail along 110th Street West, as required by County Parks and Recreation and as depicted on the Exhibit "A".

24. The permittee shall submit to Regional Planning a Landscape Plan for review and approval and shall comply with all requirements of such plan.

25. The permittee shall submit to Regional Planning an "as-built" plan, detailing how the project has been constructed and what areas, if any, need vegetative restoration. In the event vegetative restoration is required, the applicant shall submit a Revegetation Plan for review and approval by Regional Planning, as indicated on the MMP.

26. The permittee shall undertake and comply with a landscape maintenance program that controls the spread of invasive species on the subject property during the life of the grant term. The landscape maintenance program shall be submitted to Regional Planning for review and approval.

27. Prior to energization, the permittee shall install a perimeter landscaped vegetative screen along the property fronting 110th Street West, West Avenue J, and the northern edge of the project site, as depicted on the approved Landscape Plan. The landscaped vegetative screen shall not encroach upon the recreational trail.

28. The permittee shall irrigate the perimeter landscaped vegetative screen for a minimum of three years or until the landscaping has successfully established. The permittee shall ensure that the landscaped screen remains successfully established to the satisfaction of Regional Planning throughout the entire grant term. The permittee shall maintain all landscaping in a neat, clean, and healthful condition and shall properly prune, weed, remove litter, fertilize and replace plants when necessary.

29. The use of pesticides, herbicides, and rodenticides shall be prohibited on the subject property during the life of the grant term.

30. Prior to any ground disturbance and/or the issuance of grading permits, the permittee shall submit a dust control plan for review and approval by Regional Planning and the Antelope Valley Air Quality Management District ("AVAQMD"). The permittee shall abide by all requirements and conditions of the approved dust control plan.

31. The offsite generation tie-line shall be placed underground for the entire length to the Antelope Substation to the extent feasible.

32. Prior to obtaining any building permit, the permittee shall provide the County with a decommissioning plan ("Decommissioning Plan") in connection with any and/or all of the terminating events described in Condition No. 34, which Plan shall include, at a minimum, a detailed plan for decommissioning and deconstructing the facility and for restoration of the site (collectively referred to as "decommissioning"). The Decommissioning Plan shall be developed to the satisfaction of the Director and the Director of Public Works and subject to their review and approval.

    The Decommissioning Plan shall provide for, including, but not limited to, the following:

    a. Removal of solar panel structures and all appurtenant above-ground equipment;
    b. Removal of on-site overhead poles and above-ground electricity lines;
    c. Removal of all on-site water and sewage lines and septic tanks;
    d. Removal of permanent above-ground transmission lines and poles located in the public right-of-way if determined not usable by Public Works and/or any other applicable public or private utility;
    e. Restoration of any disturbed soil and revegetation of the site to its pre-construction condition, with native vegetation similar to the vegetation in the surrounding vicinity;
    f. Restoration or reclamation of project roads to their pre-construction condition unless the then-existing owner of the site elects to retain the improved roads for access throughout the site;
    g. Documentation of the pre-construction condition of the project site, including, but not limited to, a photographic record; and
    h. Details of the performance and financial assurance guarantees described in Condition No. 32, explaining the amounts and schedule for the provision of such guarantees.

33. Prior to obtaining any building permits, the permittee shall provide to the County, to the satisfaction of the Director and the Director of Public Works, performance and financial assurance guarantees in an amount sufficient to ensure the performance of the approved Decommissioning Plan, as described in Condition No. 31. Additionally, the permittee shall be solely responsible for the costs and expenses associated with decommissioning the site after any of the terminating events described in Condition No. 34. In the event that the performance and financial assurance guarantees are not sufficient to fully compensate the County for the cost and expense of decommissioning the site, the permittee shall be responsible for compensating the County for any shortfall. In determining the sufficiency of the performance and financial assurance guarantees, the residual value of the solar panels, support structures, and other salvageable equipment (collectively "Salvageable Property") shall be considered. The residual value of the real property itself shall not be considered or included in the determination of whether the performance and financial guarantees are sufficient.

    With respect to the performance and financial assurance guarantees, the following requirements shall apply:

    a. The permittee shall ensure that such guarantees are detailed in the approved Decommissioning Plan to the satisfaction of the Director and the Director of Public Works, and that such Decommissioning Plan shall explain the amounts and schedule for the provision of such guarantees.
    b. The permittee shall provide a report to the Director every five years after the date of final approval of this grant to confirm that the performance and financial assurance guarantees are sufficient to ensure performance and implementation of the Decommissioning Plan. The report shall be subject to review and approval by the Director and Director of Public Works particularly as to whether the performance and financial assurance guarantees are adequate to meet existing conditions at the time of the report.
       A decommissioning pro forma summarizing the residual value of the Salvageable Property shall be included in the report. The pro forma shall include, at a minimum, the expected revenue from all Salvageable Property, as defined in this Condition No. 32, the then-current cost of decommissioning the site, as required by the approved Decommissioning Plan, and the then-current value of any performance and financial assurance guarantees that have been provide as of the date of such report. In the event it is determined that the performance and financial assurance guarantees as insufficient to perform the decommissioning of the site as required by the approved Decommissioning Plan, the permittee shall be required to provide additional performance and financial assurance guarantees to the satisfaction of the Director and the Director of Public Works;
    c. Any funds not used by the County in connection with decommissioning the site shall be returned to the permittee; and

d. The performance and financial assurance guarantees may consist of, including, but not limited to, one or more of the following, to the satisfaction of the Director and Director of Public Works:
(1) An irrevocable letter of credit;
(2) A surety bond;
(3) An appropriate insurance policy;
(4) A trust fund or escrow account established and maintained in accordance with approved financial assurances and practices to guarantee that decommissioning the site will be completed in accordance with the approved Decommissioning Plan as approved by the Department of Public Works; or
(5) Other financial assurances as reviewed and approved by the respective County administrative offices, in consultation with Regional Planning.

A corporate guarantee shall not be considered a sufficient financial assurance guarantee.

34. Upon discontinuance of the permittee's operation as set forth in Condition No. 34, abandonment of the project in whole or in part, or termination of this grant as described in Condition No. 8, and in the event that a new permit application is not timely filed for a continued similar use or reuse of the site, the permittee shall perform decommissioning in accordance with the approved Decommissioning Plan, or compensate the County for use of a County-contracted consultant to perform such decommissioning. In the alternative, and at the County's sole election, the County shall be entitled to use any performance and/or financial assurance guarantees, as described in Condition No. 32 (d), to perform the decommissioning itself or to contract for such decommissioning. The permittee shall grant the County the necessary access to the subject property to perform such decommissioning or to allow a County-retained contractor to perform such decommissioning.

35. In the event that any portion of the solar field is not in operational condition for a consecutive period of 24 months, operations for the portion of the site shall be deemed to have been discontinued and that portion of the facility shall be removed from the site within 60 days from the date that written notice is sent to the permittee from Regional Planning. Within this 60-day period, the permittee may provide the Director a written request and justification for an extension of up to 12 months to resume operations of that portion of the site, which request shall be subject to the satisfaction and approval of the Director. A second written request and justification for a second extension of up to 12 months may also be submitted, which the Director may grant if the request is adequately justified based on the Director's determination. In no event shall the operations of the solar field or portion of the solar field be discontinued for more than 36 months from the date such operations were first deemed discontinued without being decommissioned pursuant to the approved Decommissioning Plan. Further, in no event shall any extension of the period to resume operations of any portion of the site pursuant to this Condition No. 34 be deemed to extend the term or expiration date of this grant.

36. The permittee shall not use any groundwater extracted from within the Antelope Valley Adjudicated Water Basin for the construction, operation, and/or maintenance of the solar facility.

**PROJECT SITE SPECIFIC CONDITIONS**

37. This grant shall authorize the construction, operation, and maintenance of a photovoltaic solar energy facility, offsite generation tie-line, and appurtenant equipment on 178.5 acres of a 263-acre site.

38. The permittee shall hire and retain an on-site compliance monitor: a "Special Inspector."

39. The permittee shall install a mechanical dust-monitoring device on the subject property subject to the approval of AVAQMD.

40. The project shall comply with all requirements of the Rural Outdoor Lighting District.

41. The permittee shall install portable wheel wash stations for the duration of construction activities to prevent the spread of invasive weed seed from the tire treads of vehicles entering and leaving the project sites. The seeds collected from the debris basins of these wash stations shall be disposed of in green waste or trash receptacles when the basins require maintenance. Wheel wash stations shall comply with CSQA BMP Construction Handbook.

42. Nothing in this grant shall prevent the permittee from installing more efficient solar panels in the future, increasing output, provided the footprint and overall disturbance area of the project does not increase. At such time the permittee wishes to install more efficient solar panels, a Revised Exhibit "A" shall be submitted to the County for such installation.

43. All fencing shall be wildlife-friendly fencing as depicted on the Exhibit "A".

44. The permittee shall revegetate disturbed areas to the extent feasible with indigenous drought-tolerant plants.

45. The two water tanks on the subject property shall be painted an earth-tone color (beige, sand, taupe or similar colors) to blend in with the surroundings, subject to review and approval by the Director.

46. Temporary screening of construction and staging areas (e.g. fencing with fabric or slats) shall be installed prior to construction activities to the satisfaction of Regional Planning.

47. The project shall only use water from a source, approved by the Director of Public Works, located outside the boundaries of the Antelope Valley Groundwater Adjudication Basin.

48. The Regional Planning project number, conditional use permit number and lease holder contact information shall be prominently displayed on the facility accessible to the public where it can be easily viewed at or near eye level.

49. Appropriate training for respiratory protection shall be provided to construction workers. Dust masks (National Institute for Occupational Safety and Health [NIOSH] approved) shall be provided with proper training to construction workers to mitigate against dust exposure and possibly Valley Fever during high-wind events and/or dust-generating activities. Evidence of this training shall be kept on site and shall be made available to County staff upon request.

50. The permittee shall comply with all conditions set forth in the attached County Public Works, Fire, Public Health, Parks and Recreation Department letters dated October 15, 2013, August 7, 2012, September 27, 2013, and October 15, 2013, which are incorporated as if set forth in full herein.

Attachments:
Mitigation Monitoring Program (pages 1- 13)
Fire, Public Works, Public Health, Parks and Recreation Department letters dated October 15, 2013, August 7, 2012, September 27, 2013, and October 15, 2013

## MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)
## PROJECT NO. R2012-01589-(5) / PERMIT NO. CUP 201200086 / ENV NO. 201200158

| MM# | Mitigation | Action Required | When Monitoring to Occur | Responsible Party | Monitoring Agency or Party |
|---|---|---|---|---|---|
| **Aesthetics** | | | | | |
| 1 | The Project shall incorporate landscaping with native, drought-tolerant vegetation for the exterior of the Project Site along the portions of the perimeter fence facing 110th Street West, West Avenue J, and along the northern boundary of the site. A Landscape Plan shall be prepared, subject to the review and approval of the County of Los Angeles. Irrigation via water trucks would be conducted until the landscaping is established. Such landscaping shall be maintained as approved during the operational phase of the Project. All perimeter landscaping shall be planted prior to energization of the solar panels. | Submittal and approval of a Landscape Plan. | Prior to issuance of certificate of occupancy | Applicant | DRP |
| | | Installation of landscaping as described in the Landscape Plan. | Prior to energization of the solar panels | Applicant | DRP |
| | | Maintenance of landscaping during operation. | During operation | Operator | DRP |
| 2 | Lighting to be installed in specific locations around the periphery of the Project site, as required for nighttime security purposes, shall consist of modern, low-intensity, downward-shielded fixtures that are motion-activated, and shall be directed onto the Project site. Motion-detectors shall be set at a sensitivity level that cannot be triggered by small animal movement. | Review and approval of a lighting plan with mitigation measure requirements incorporated. | Prior to issuance of building permit | Applicant | DRP |
| | | Installation of lighting as described in plans and specifications. | Prior to energization of the solar panels | Applicant | DRP |
| 3 | The glass used to cover the Project's flat-plate photovoltaic (PV) panels shall be "high-transmission, low-iron" tempered glass and have a reflectance value of 8 percent or less. All other structures and equipment associated with the Project, including the water tanks and Substation, shall be painted with a color chosen to blend with the surroundings and minimize visual impacts. | Review and approval of the site plan with mitigation measure requirements incorporated. | Prior to issuance of building permit | Applicant | DRP |
| | | Installation of PV panels as described in plans and specifications. | Prior to energization of the solar panels | Applicant | DRP |
| **Air Quality** | | | | | |

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| 4 | During construction of the Project, the Project shall comply with Antelope Valley Air Quality Management District's (AVAQMD's) Rule 403, Fugitive Dust, to prepare a Dust Control Plan for controlling fugitive dust and avoiding nuisance. Compliance with this rule would result in a reduction in short term particulate pollutant emissions. The Dust Control Plan shall be subject to the review and approval of the AVAQMD and shall include the following strategies:<br><br>• Minimal Grading and Ground Disturbance: The Project shall perform the minimum amount of grading and disturb the minimum amount of existing vegetation to construct the Project. Grading shall generally be limited to the proposed access roads, retention basins, Project Substation foundation, inverter pads, water tank pads, and trail areas. The existing vegetation in all other areas shall be mowed to a height consistent with vegetation management requirements and left in place.<br>• Vehicle Use: The Project shall only use construction vehicles with tires and shall prohibit use of equipment with rotating wheel tracks (e.g. tank treads or caterpillar tracks).<br>• Construction Scheduling: Grading activities shall be temporarily halted and/or site watering shall be increased during wind speeds that exceed 25 miles per hour, or when visible dust plumes have the potential to be transported: 1) off the Project site or 2) 200 feet beyond the centerline of the construction of linear facilities (such as the Grid-Tie). Earth-moving activities on the Project site shall be scheduled during to occur during the latter portion of the rainy season, when it is anticipated that natural rainfall shall assist with mitigation of fugitive dust.<br>• Water Application: The Project shall apply water to the construction site as necessary to control fugitive dust. As required by the AVAQMD, when water is used as fugitive dust control, watering is required three times a day and increased to a minimum of four times a day if there is evidence of visible wind-driven fugitive dust.<br>• Soil Binders/Wood Mulch: Soil binders and wood mulch shall be applied as necessary.<br>• Stock Piles Stabilization: All stock not currently in use shall be stabilized from erosion through the use of watering, soil binders, or protected with a plastic or geo-textile mat.<br>• Final Stabilization: Prior to completion of construction, all disturbed areas shall be | Submittal and approval of a Dust Control Plan. | Prior to issuance of grading or building permits, whichever occurs first | Applicant | DRP<br>AVAQMD |
| | | Implementation of dust control measures as described in the Dust Control Plan during construction. | During construction | Applicant | AVAQMD<br>Applicant-appointed monitor |

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| | permanently stabilized through the use of an all-weather surface treatment and existing vegetation shall be maintained at a maximum height of 6 inches, per LACFD requirements.<br>• Monitoring: A qualified construction mitigation manager (CMM) or delegate shall be retained to be on-site during all grading activities to ensure compliance with the approved Dust Control Plan. The CMM or delegate shall monitor all construction activities for visible dust plumes. The CMM or Delegate shall promptly implement additional dust plume reduction measures in the event that such visible dust plumes are observed. Additional measures to be implemented, as necessary, shall include increased watering, application of dust palliatives, and/or scaled back construction activities up to and including temporary work cessation. | Implementation of dust control measures as described in the Dust Control Plan during operation. | During operation | Operator | DRP |
| **Biological Resources** | | | | | |

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| 5 | A pre-construction survey for the burrowing owl shall be conducted within 14 days prior to start of construction/ground-breaking activities. For those burrows located along the Grid-Tie transmission route off the Project site, a second survey will be conducted within 24 hours of any ground-breaking activities. If these surveys do not detect occupied burrowing owls, then no further mitigation is required. If burrows occupied by burrowing owls are detected on the Project site, the Project Applicant shall notify the California Department of Fish and Wildlife (CDFW) and shall implement the following actions prior to construction (either Set A for breeding burrowing owls [March to July] or Set B for non-breeding burrowing owls [August to February]). Buffer distances are based on the recommended restricted activity dates and setback distances by level of disturbance listed in the CDFW's 2012 Staff Report on Burrowing Owl Mitigation.<br><br><u>Set A Measures (for Breeding Burrowing Owls, between March and July)</u><br><br>A1) No work shall occur within 200 meters (50 meters between October 16 and March 31) of the active nesting burrow; the CDFW may be consulted to determine whether a reduced buffer is acceptable.<br>A2) Provide weekly monitoring of the burrowing owl nesting burrow to determine nesting outcome.<br>A3) Provide CDFW with monthly updates of burrowing owl nesting success.<br>A4) Resume construction at the burrow site once the Biologist determines that fledglings have left the nest and are no longer dependent on the parent.<br>If burrows occupied by burrowing owls are detected within 200 meters of the off-site Grid-Tie disturbance areas, the Project Biologist shall monitor the owl(s) to ensure that the Project does not negatively impact breeding. If negative indirect impacts are suspected, the Project Biologist shall propose measures to reduce indirect impacts to the owl(s) during construction. | Pre-construction Burrowing Owl survey. Review and approval of the Burrowing Owl survey results. | Prior to start of construction or ground-breaking activities | Applicant | DRP<br>CDFW |

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| | Set B Measures (for Non-Breeding Burrowing Owls, between August and February)<br><br>B1) A qualified Biologist shall notify the CDFW of the occupied burrow location and that either passive or active relocation measures will be implemented.<br>B2) The Biologist shall remove the burrow.<br>If impacts to burrowing owl occupied burrows are unavoidable, preservation of lands containing potentially suitable burrowing owl habitat shall be preserved at a 1:1 ratio and in accordance with guidance of the CDFW's 2012 Staff Report on Burrowing Owl Mitigation. The 1:1 ratio is expected to be adequate due to the homoogenous landscape of the project area resulting in very high likelihood of highly similar, and thereby successful, mitigation lands.. Impacted lands shall be defined as the directly impacted occupied burrows and immediately adjacent habitat areas. Replacement lands shall be within the Project region (i.e. western Antelope Valley) and shall be located as close to the Project site as feasible. Vegetation types present and condition of mitigation lands shall be similar to those found on the impacted occupied burrowing owl lands. If suitable natural burrows are not present within the Project site, artificial burrows shall be constructed in accordance with guidance of the CDFW's 2012 Staff Report on Burrowing Owl Mitigation and California Burrowing Owl Consortium (1993) Guidelines. Maintenance of such lands shall be the responsibility of the Project Applicant and shall ensure that conditions and general biological value remain consistent over time. Mitigation lands shall be preserved in perpetuity, or for the length of project impacts if temporal, with a conservation easement or other form of legal dedication. Lands may be deeded to a land management-conservation entity with prior approval from the County. Mitigation lands and deeds or conservation easements proposed shall be approved by the County prior to issuance of grading permits.<br>Within 60 days of recordation of the permanent deed restriction(s) or conservation easement(s), a Maintenance Plan for the off-site mitigation lands shall be submitted to the County for review and approval. The plan shall include the maintenance requirements for the mitigation area, based on the characteristics of the mitigation land and the mitigation requirements described above. The Maintenance Plan shall also describe the performance standards for determining that mitigation requirements for the lands have been met. | | | | |

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| 6 | If construction activities on the Project site and along the Grid-Tie alignment are completed between September 16 and March 31 (i.e., non-nesting season), then additional surveys for Swainson's hawk are not required.<br>If new or ongoing construction activities (i.e., additional removal of potential foraging habitat through ground-disturbing activities) would occur on the Project site and along the Grid-Tie alignment between April 1 and September 15, surveys for Swainson's hawk shall be conducted following the 2010 CDFG survey protocol for the Antelope Valley prior to or concurrent with construction activities. If no active nests are detected, then no further mitigation is necessary.<br>If the survey detects an active Swainson's hawk nest within a 5-mile radius of the Project site, all construction activities must fully and immediately cease and the CDFW shall be notified. If the nest is determined to be unsuccessful by a qualified Biologist, the Project Applicant may resume construction activities as long as no other active nests are located within the 5-mile radius of the Project site, as authorized by CDFW and LACDRP. If Swainson's hawk nests are determined to be successful, the Project Applicant shall consult with CDFW to determine if a "take" authorization of a State-listed species (per the California Endangered Species Act) is warranted in light of the mitigation land requirements set forth under MM CML-1. If warranted, the Project Applicant shall pursue a CDFW permit, which will include any additional conditions requiring impact minimization to the Swainson's hawk. | Pre-construction Swainson's Hawk survey, only if construction or ground-breaking activities occur during the nesting season. | Prior to start of construction/ground-breaking activities | Applicant | DRP<br>CDFW |
| 7 | If jurisdictional waters cannot be avoided, the Project Applicant shall apply for a Section 401 permit from the Regional Water Quality Control Board (RWQCB) and a 1602 Streambed Alteration Agreement from CDFW. These permits shall be obtained prior to approval of improvement plans; issuance of grading permits; and/or any clearing, grading, or excavation work on the Project site. The Project Applicant shall ensure that the Project would result in no net loss of "Waters of the State" by providing mitigation through impact avoidance; impact minimization; and/or compensatory mitigation for the impact, as determined in the Streambed Alteration Agreement. Compensatory mitigation may consist of (a) obtaining credits from a mitigation bank; (b) making a payment to an in-lieu fee program that would conduct wetland, stream, or other aquatic resource restoration, creation, enhancement, or preservation activities (these programs are generally administered by government agencies or nonprofit organizations that have established an agreement with the regulatory agencies to use in-lieu fee payments collected from permit Applicants); and/or (c) providing compensatory mitigation through an aquatic resource restoration, establishment, enhancement, and/or preservation activity. This last type of compensatory mitigation may be provided at or adjacent to the impact site (i.e., on-site mitigation) or at another location, usually within the same watershed as the permitted impact (i.e., off-site mitigation). The Project Applicant retains responsibility for the implementation and success of the mitigation project. Evidence of secured permits shall be provided prior to approval of improvement plans; issuance of grading permits; and/or any clearing, grading, or excavation work on the Project site. | If juridictional waters cannot be avoided, a Section 401 permit and SAA must be obtained. | Prior to approval of improvement plans; issuance of grading permits; and/or any clearing, grading, or excavation work | Applicant | DRP<br>RWQCB |

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| 8 | Temporary construction staking or fencing shall be erected under the supervision of a qualified Biologist at or outside the edge of the impact areas where they interface with jurisdictional features. This fencing shall be erected prior to commencement of grading activities and shall demarcate areas where human and equipment access and disturbance from grading are prohibited. A qualified Biologist shall monitor all site preparation and grading activities near these interfaces during construction. Staging areas shall be restricted to approved impact areas only. | Temporary staking or fencing of jurisdictional features. | Prior to start of construction or ground-breaking activities | Applicant/ Construction Manager | DRP |
| 9 | The perimeter fencing surrounding the Project site will be raised at regular intervals above ground level to allow for the passage of wildlife to the lesser of either: 18 inches above grade or to the maximum height allowed by the PUC. | Review and approval of the site plan with mitigation measure requirements incorporated. Installation of perimeter fencing as described in plans and specifications. | Prior to issuance of grading or building permits, whichever occurs first | Applicant/ Construction Manager | DRP |

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| 10 | To ensure compliance with the Migratory Bird Treaty Act (MBTA) and Section 3503.5 of the California Fish and Game Code, construction activities shall be conducted during the non-nesting season (September 1–January 31) to avoid any potential disturbance of avian breeding activities. Project-related activities with the potential to disturb suitable bird nesting habitat shall be prohibited from February 1 through August 31, unless a Project Biologist acceptable to the Director of Regional Planning surveys the Project area prior to disturbance to confirm the absence of active nests or nesting habitat. Disturbance shall be defined as any activity that physically removes or damages vegetation or habitat or any action that may cause disruption of nesting behavior such as loud noise from equipment or artificial night lighting. If site clearing, construction or other ground disturbance would be conducted within the general nesting season (February 1–August 31), then a pre construction nesting bird survey shall be conducted by a qualified Biologist within three days prior to disturbance. If an active nest is located within or adjacent to the construction area and the Biologist determines that work activities may impact nesting, the Biologist shall demarcate an appropriate buffer zone around the nest, generally prohibiting construction activities within 300 feet (500 feet for raptors) of the active nest. The size of the buffer may vary (depending on site features, the sensitivity of the species, and the type of construction activity), but will be designed to prevent disruption of nesting activity. If construction activities must occur within the buffer zone of an active bird nest, the Biologist must monitor the construction activities to avoid undue disturbance to the nesting activities. The buffer zone restrictions will be eliminated once the Biologist determines that nesting activity has ceased. Surveys shall be conducted weekly, beginning no earlier than 30 days and ending no later than 3 days prior to the commencement of disturbance. The Project Applicant shall record the results of the recommended protective measures described above and submit the records to the Department of Regional Planning to document compliance with applicable State and Federal laws pertaining to the protection of native birds. | Pre-construction nesting bird surveys. Review and approval of the nesting bird survey results. | Prior to start of construction or ground-breaking activities | Applicant/ Construction Manager | DRP CDFW |
| **Cultural Resources** | | | | | |

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| 11 | In the event of the discovery of potential cultural resources during ground-disturbing activities, ground-disturbing activities within 50 feet of the discovery shall be halted and diverted until a qualified Archaeologist assesses the resource for significance. The qualified Archaeologist will assess the resource pursuant to Section 21083.2(g) of the California Public Resources Code and Section 15064.5(a) of the State CEQA Guidelines to make recommendations of significance. The Archaeologist shall provide their recommendations to the County for a determination of significance. If the County determines the resource to be a significant resource, a "unique archaeological resource", or a "historical resource", the Archaeologist shall formulate a mitigation plan in consultation with the County that will mitigate impacts to the resource to a less than significant level. Potential mitigation could include planning construction to avoid the resource; protection and preservation in place; and/or data recovery excavation of a representative sample of the site's constituents.<br><br>The Archaeologist shall prepare a report of the results of any study prepared as part of a testing or mitigation plan, following accepted professional practice. The report shall follow guidelines of the California Office of Historic Preservation. Copies of the report shall be submitted to the County of Los Angeles and to the California Historic Resources Information System at the South Central Coastal Information Center (SCCIC). | If potential cultural resources are discovered, they must be evaluated. If significant, a mitigation plan must be formulated. | During construction | Applicant/ Construction Manager | DRP |
| 12 | Should fossils/paleontological resources be found during ground disturbing activities for the Project, ground-disturbing activities within 50 feet of the discovery shall be halted or diverted until a qualified Paleontologist inspects the find and evaluates it for significance. Work may proceed in other areas of the site, subject to the direction of the Paleontologist. If determined significant, the Paleontologist shall be authorized to quickly and efficiently salvage and remove the fossil from its locality, as appropriate, before ground disturbing activities resume in the area. These actions, as well as final disposition of the resources, shall be subject to the approval of the County of Los Angeles. These would include identification and evaluation of the discovery and curation of the fossil in perpetuity in an accredited scientific institution approved by the County. | If paleontological resources are discovered, they must be evaluated. If significant, a mitigation plan must be formulated. | During construction | Applicant/ Construction Manager | DRP |
| 13 | In accordance with Section 7050.5 of the California Health and Safety Code, if human remains are found during ground-disturbing activities, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur. The County Coroner shall be notified within 24 hours of the discovery. If the County Coroner determines that the remains are or believed to be Native American, s/he shall notify the NAHC in Sacramento within 24 hours of the discovery. In accordance with Section 5097.98 of the California Public Resources Code, the NAHC must immediately notify those persons it believes to be the most likely descended from the deceased Native American. The descendents shall complete their inspection within 48 hours of being granted access to the site by the Property Owner. The property owner would then determine, in consultation with a designated Native American representative, the final disposition of the human remains (14 California Code of Regulations §15064.5[e]). | If human remains are discovered, the County Coroner must be notified. | During construction | Applicant/ Construction Manager | DRP Coroner |

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| **Hazards and Hazardous Materials** | | | | | |
| 14 | During construction activities, any hazardous materials encountered on the Project site requiring off-site disposal that meet hazardous waste criteria shall be transported off site by a properly licensed hazardous waste hauler who shall comply with all applicable State and federal requirements, including California Department of Transportation (Caltrans) regulations under Title 49 of the Code of Federal Regulations (CFR). Hazardous materials that may be encountered during proposed Project implementation would be handled, treated, and/or disposed of in accordance with applicable regulations and/or the requirements of the local oversight agency(ies). | If encountered, transfer and dispose of hazardous materials in compliance with applicable regulations. | During construction | Applicant/ Construction Manager | Applicant-appointed monitor |
| 15 | The Contractor shall conduct construction activities in compliance with the regulations of the Los Angeles County Fire Department, which serves as the designated Certified Unified Program Agency (CUPA), and shall implement the State and federal regulations related to (1) the Hazardous Waste Generator Program; (2) Hazardous Materials Release Response Plans and Inventory Program; (3) California Accidental Release Prevention Program (Cal-ARP); (4) the aboveground storage tank (AST) Program; and (5) the underground storage tank (UST) Program. | Conduct construction activities in compliance with regulations of LACFD. | During construction | Applicant/ Construction Manager | LACFD |
| 16 | Prior to commencement of on-site ground-disturbing activities, the Project Applicant shall obtain a statistically valid number of soil samples from the identified areas and analyze for the presence of organochlorine pesticides and arsenic. The results of testing shall be made available to the County for review and confirmation. If the results of the soil testing show the presence of chemicals below regulatory levels, grading or excavation may proceed accordingly. If chemical levels are above regulatory standards, remediation and/or removal of contaminated soils in compliance with applicable local, State, and federal standards and requirements shall be conducted prior to Project construction. | Pre-construction soil testing and compliance with applicable regulations. | Prior to start of construction or ground-breaking activities | Applicant/ Construction Manager | LACFD |
| 17 | If abnormal soil staining and/or odors are encountered during grading and excavation activities that could indicate the presence of petroleum hydrocarbons, heavy metals, or other contamination, construction activities shall be halted and an assessment of the soils shall be conducted prior to the continuation of grading or excavation activities. If the results of the soil testing show the presence of chemicals below regulatory levels, grading or excavation may proceed accordingly. If chemical levels are above regulatory standards, remediation and/or removal of contaminated soils in compliance with applicable local, State, and federal standards and requirements shall be conducted prior to Project construction. | Halting of construction and soil testing, if abnormal soil conditions are encountered. | During construction | Applicant/ Construction Manager | Applicant-appointed monitor |
| 18 | During operation, the County shall require the use of demineralized water in all photovoltaic (PV) panel cleaning activities. No other cleaning agents or additives shall be used. | Requires use of water only for panel cleaning. | During operation | Applicant/ Operator | Applicant-appointed monitor |
| **Recreation** | | | | | |

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| 19 | The Applicant shall design and construct an eight-foot- (8') wide trail along the eastern boundary of the Project site, in a manner consistent with the County of Los Angeles Trails Manual (Trails Manual), to form part of Los Angeles County Trail Number 130 (California Poppy Trail) on the Los Angeles County Trails Map. The trail shall be constructed within a twelve-foot (12') easement that shall be dedicated and recorded as a separate document.<br><br>Prior to issuance of Building Permits, the Applicant shall submit detailed grading information for the trail construction to the Department of Parks and Recreation and include all pertinent information required in the Trails Manual. | Design a trail in compliance with County Trails Manual. | Prior to issuance of grading or building permits, whichever occurs first | Applicant | DPR |
| | | Construct a trail in compliance with County Trails Manual. | Prior to energization of the solar panels | Applicant | DRP |
| **Utilities and Service Systems** | | | | | |
| 20 | Construction activities on the Project site shall be conducted in compliance with Chapter 20.87 (Construction and Demolition Debris Recycling and Reuse) of the Los Angeles County Code. Therefore, a Recycling and Reuse Plan (RRP) must be submitted to the Los Angeles County Department of Public Works, Environmental Programs Division, prior to permits (grading or building, whichever comes first) being issued for the Project. | Submittal and approval of a RRP. | Prior to issuance of grading or building permits, whichever occurs first | Applicant/ Construction Manager | DRP |
| **Mandatory Findings of Significance** | | | | | |

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| 21 | Prior to the issuance of a grading permit, Project Applicant shall provide dedicated open-space lands at a minimum 2:1 ratio (replacement:impact) for the lands disturbed by Project implementation, according to the terms of the Habitat Mitigation and Monitoring Plan (HMMP). The acreage of impacted lands requiring mitigation is calculated to include all graded areas and all areas within the fenced confines of the proposed facility, including areas directly beneath and between solar panels. A total of 357 acres of mitigation land shall therefore be provided by the Project Applicant. The 84 acres of the Project site that shall not be developed may count towards satisfaction of a portion of the total required acreage. The remaining 273 acres shall be acquired off-site. Off-site mitigation lands must be located within the Project region (i.e. western Antelope Valley) and shall be located as close to the Project site as feasible. The vegetation types, overall biological value, and the condition of mitigation lands shall be comparable to those found on the impacted lands on the Project site. Maintenance of such lands shall be the responsibility of the Project Applicant and the mitigation lands must be maintained to ensure conditions and general biological value remain consistent over time. Mitigation lands shall be selected in consultation with CDFW and preserved with a conservation easement or other form of legal dedication in perpetuity, or until the Project site is restored to its pre-developed conditions per the requirements of the approved Decommissioning Plan. Lands may be deeded to a land management-conservation entity with prior approval from the County. Mitigation lands and deeds or conservation easements proposed shall be approved by the County prior to issuance of grading permits.<br><br>Within 60 days of recordation of the permanent deed restriction(s) or conservation easement(s), a Maintenance Plan for the off-site mitigation lands shall be submitted to the County for review and approval. The plan shall include the maintenance requirements for the mitigation area, based on the characteristics of the mitigation land and the mitigation requirements described above. The Maintenance Plan shall also describe the performance standards for determining that mitigation requirements for the lands have been met. | Obtain dedicated open space<br><br>Prepare HMMP | Prior to issuance of grading or building permits, whichever occurs first<br><br>Prior to grading | Applicant/ Construction Manager<br><br>Applicant | DRP<br><br>DRP |

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| 22 | The Construction Staging Plan (CSP), to be reviewed and approved by the County, will detail access routes, storage areas, high-traffic areas, and methods for the installation of the panels and other equipment in non-graded areas. The CSP will ensure that construction staging areas are sited in upland areas outside stream channels and other surface waters on or around the Project site. Buffer areas will be identified and exclusion fencing will be used to protect the water resource and to prevent unauthorized vehicles or equipment from entering or otherwise disturbing stream channels. Construction equipment will be required to use existing roadways to the extent feasible. A qualified construction mitigation manager (CMM) or delegate will be responsible for documenting adherence to the CSP during the construction phase of the project.<br><br>A post-construction "as-built" plan will be required prior to energization of the project, which shall detail areas of disturbance needing further restorative work in order to meet the expected criteria upon which the cumulative impacts analyses were based. In the event that the as-built plan reveals the need for restoration after construction, a Revegetation Plan that details steps proposed for the restoration of disturbed areas after construction will be required to be prepared and implemented. Restoration performance goals shall be based upon the quality of the on-site vegetation at the time of the CUP approval. The Revegetation Plan shall include a five-year annual reporting program to document the site's recovery towards these expected criteria, and shall include provisions for adaptive management contingencies if adequate re-vegetation has not occurred within a three-year period from energization. | Submittal and approval of CSP and "as-built" plan | Prior to issuance of grading permit for the CSP, and prior to energization for the "as-built" plan | Applicant/ Construction Manager | DRP |
| | After the five-year monitoring period has elapsed, the mitigation may be deemed complete if the performance goals have been satisfied. Further mitigation may be required, subject to enforcement penalties, if the performance goals have not been met.<br><br>Maintenance of the site in keeping with performance goal criteria shall be a condition of the CUP, subject to enforcement penalties, and shall be confirmed through a requirement in the project MMRP that annual reporting shall continue for the life of the project. | Maintennance of the site | Life of project | Applicant/ Construction Manager | DRP |

# COUNTY OF LOS ANGELES
# FIRE DEPARTMENT

**Land Development Unit – Fire Prevention Division**
**5823 Rickenbacker Road**
**Commerce, California 90040-3027**
**Office (323) 890-4243, Fax (323) 890-9783**

**DATE:** August 7, 2012

**TO:** Department of Regional Planning
Zoning Permits North Section – Anthony Curzi

**PROJECT #:** CUP #2012-01589

**LOCATION:** Avenue J, between 110th Street West & 115th Street West

## FIRE DEPARTMENT SOLAR ARRAY FIELD CONDITIONS

**General Comments:**

1. The proposed project is ***"Cleared"*** for public hearing.
2. As indicated on the site plan, the proposed solar array field will require a minimum of one entry/ exit location at the Northern Segment and Southern Segment
3. As indicated on the site plan, provide a 20-foot on-site perimeter Fire Department access road.
4. As indicated on the site plan, provide interior access roads which meet the Fire Department's access width and turning radius requirements.
5. As noted on the site plan, provide one water tank at the Northern Segment and one water tank the Southern Segment of the proposed solar array field. Each water tank shall be located near the address side entry/ exit gates. Each water tank shall have a-low level water local alarm at both 10,000 gallon water level and the low water level, which shall be in compliance with all applicable codes and regulations.

**Off-site & On-site Fire Apparatus Access Road Requirements:**

1. The fire apparatus off-site and on-site access roads shall be installed and maintained in a drivable condition for the duration of the solar project.
2. The fire apparatus off-site and on-site access roads shall be installed prior to occupancy or operation of the facility.
3. Provide access to any on-site building, above and below grade, including electrical collection vaults, and comply with the below listed requirements.
4. The fire apparatus off-site and on-site access roads for the solar array field shall have a soil compaction of 90%, OR the apparatus access road shall be excavated and re-compacted to 90%.
5. Provide a Fire Department access road around the entire on-site perimeter of the solar project, along with interior access throughout the solar array field. The interior access roads shall comply with all access requirements.

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**Off-site & On-site Fire Apparatus Access Road Requirements Continue:**

6. Provide a minimum width of 20 feet, clear-to-the sky, for the fire apparatus off-site and all on-site access roads. The fire access roads include the interior perimeter road, and interior roads. Provide a center-line turning radius of 32 feet, with an inner radius of 22 feet and an outer radius of 42 feet, for each turn in the solar array field.

**On-Site Ingress/ Egress Gates:**

1. The onsite ingress/ egress gate shall be located on the address side of the property, and shall be a minimum of 50 feet from the edge of payment or road.
2. The onsite ingress/ egress gate width shall be a minimum 20 feet, clear-to-he sky, with all gate hardware clear of the road way width.
3. The facility emergency contact information shall be provided with each limited access device, per LACoFD Regulation 5, and shall be clearly indicated with an appropriate placard at each ingress location. The minimum size of the placard shall be 12 inches X 12 inches.
4. The onsite ingress/ egress gates shall be in compliance with LACoFD Fire Prevention Regulation #5.
5. No other gates are permitted on the interior access roads.

**Water & Water Tank Requirements:**

1. This development requires the installation of one water tank with a minimum tank size of 10,000 gallons for Fire Department use only.
2. The water tanks shall be clearly identified for "Fire Department Use Only".
3. The water tanks shall be located near the ingress/ egress gate located on the address side of the property.
4. The water tanks shall be in compliance with LACoFD Regulation 19, which provide direction for the installation of a water tank.
5. Each water tank shall have a-low level water local alarm at both 10,000 gallon water level and the low water level, which shall be in compliance with all applicable codes and regulations.
6. The water tank shall have a Fire Department supply outlet of 2 1/2 inches in diameter with National Standard threads. The supply outlet is to be located 14-24 inches above the finished grade, and is required to be protected by approved barricades.
7. If the outlet is not provided directly off of the tank, provide a 6 inch underground pipe to a 4 inch upright pipe with an outlet of 2 ½ inches with National Standard threads, which is required to be protected by barricades.

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**Vegetation Management:**

1. The clearance of vegetation shall be in compliance with the brush clearance regulation as defined by the Fire Code or as directed by the Fire Official.
2. The vegetation shall be trimmed to a maximum height of 6 inches within the boundaries of the solar array.
3. Electrical transformer vaults or structures shall have all vegetation cleared to mineral soil for a distance of 50 feet.

**Electrical Equipment:**

1. All electrical disconnect locations shall be clearly identified.
2. All electrical shall be in compliance with all applicable state and local codes.

**Additional Requirements:**

1. All Fire Protection facilities, including access and water, must be provided prior to and during construction. Should any questions arise regarding this matter, please feel free to call our office at (323) 890-4243.

Inspector: *Wally Collins*

# COUNTY OF LOS ANGELES

## DEPARTMENT OF PUBLIC WORKS

*"To Enrich Lives Through Effective and Caring Service"*

GAIL FARBER, Director

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
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ALHAMBRA, CALIFORNIA 91802-1460


IN REPLY PLEASE
REFER TO FILE: LD-3

October 15, 2013

TO: Susan Tae
Zoning Permits North Section
Department of Regional Planning

Attention Anthony Curzi

FROM: Steve Burger
Land Development Division
Department of Public Works

**CONDITIONAL USE PERMIT (CUP) NO. 201200086**
**PROJECT NO. R2012-01589**
**110TH STREET WEST AND AVENUE J**
**UNINCORPORATED COUNTY AREA OF LANCASTER**

☒ Public Works recommends approval of this CUP.

☐ Public Works does **NOT** recommend approval of this CUP.

We reviewed the site plan associated with CUP No. 201200086 in the unincorporated County area of Lancaster. The project consists of developing a 263-acre site with a solar energy facility that would produce 20 megawatts of alternating current of renewable electric power during daytime hours. The renewable energy would be transmitted to Southern California Edison's nearby Antelope Substation located at 95th Street West and Avenue J. An off-site, grid-tie, transmission line (Grid-Tie) would run east from the project site, parallel with Avenue J, for approximately 1.5 miles. The Grid-Tie would enter the Antelope Substation in order to connect the project to the existing transmission infrastructure.

Public Works recommends approval of this CUP with the conditions noted below:

1. Road

1.1 Dedicate right of way, 32 feet from centerline, along the property frontage on Avenue J to the satisfaction of Public Works. An additional two feet of right of way is required. A fee deposit will be required for the review of the dedication documents.

1.2 Dedicate right of way, 52 feet from centerline, along the property frontage on 110th Street West to the satisfaction of Public Works. An additional two feet of right of way is required. A fee deposit will be required for the review of the dedication documents.

1.3 Make an offer of private and future right of way, 32 feet from centerline, along the property frontage on 115th Street West (south of Avenue J) to the satisfaction of Public Works. A fee deposit will be required for the review of the dedication documents.

1.4 Make an offer of private and future right of way, 32 feet from centerline, along the property frontage on Avenue J-8 (southerly property boundary) to the satisfaction of Public Works. A fee deposit will be required for the review of the dedication documents.

1.5 Dedicate an adequate right-of-way corner cut-off (beginning of curb return [BCR] to end of curb return [ECR]), based on a 35-foot curb return radius, at the intersections of 110th Street West and Avenue J and 110th Street West and Avenue J-8 to the satisfaction of Public Works. A fee will be required for the review of the dedication documents.

1.6 Dedicate an adequate right-of-way corner cut-off, BCR to ECR, based on a 25-foot curb return radius, at the intersection of 115th Street West and Avenue J to the satisfaction of Public Works. A fee will be required for the review of the dedication documents.

1.7 Make an offer for a right-of-way corner cut-off, BCR to ECR, based on a 25-foot curb return radius, at the intersection of 115th Street West and Avenue J-8 to the satisfaction of Public Works. A fee will be required for the review of the dedication documents.

1.8 Provide a minimum 10-foot-wide slope and drainage easement beyond the right-of-way offers, along all street frontages where deficient, to the satisfaction of Public Works. All proposed trails shall be located outside of any existing or proposed drainage and/or slope easements and onsite setbacks shall be adjusted where applicable to the satisfaction of Public Works and Regional Planning.

1.9 Whenever there is an offer of a future street, or a private and future street, provide a drainage statement/letter.

1.10 Underground new utility lines within the County right of way to the satisfaction of Public Works and Southern California Edison. A franchise agreement will be required for distribution/transmission facilities within the public right of way.

1.11 Construction within the road right of way and private and future streets shall not occur unless a permit is obtained from Public Works for the proposed work.

1.12 Repair any public improvements damaged during construction along the property frontage to the satisfaction of Public Works.

1.13 Execute an Agreement to Improve for the street improvements prior to the issuance of a building or grading permit, as applicable.

For questions regarding the road conditions, please contact Patricia Constanza of Public Works' Land Development Division at (626) 458-4921 or pconstan@dpw.lacounty.gov.

2. Grading

2.1 Agency/regulatory permits, or letters of nonjurisdiction, may be required prior to grading plan approval.

2.2 Submit a grading plan for approval. The grading plan must show and call out items including, but not limited to, construction of all drainage devices and details, paved driveways, elevation and drainage of all pads, water quality devices, and any required landscaping and irrigation not within a common area or maintenance easement. Acknowledgement and/or approval from all easement holders may be required. Grading shall be

limited to only the access roads, substations, tanks, inverter pads and basins. Grading is not permitted in the areas where the solar panels are to be located; the disturbance in these areas shall be minimized to the extent possible and be confined to mowing of existing vegetation and with limited use of vehicles and other equipment for the purpose of panel installations to the satisfaction of Public Works and Regional Planning.

2.3 Provide approval of the latest drainage concept/hydrology plan from Land Development Division's Storm Drain and Hydrology Section.

2.4 A maintenance agreement may be required for all privately maintained drainage devices.

2.5 Provide soil/geology approval of the grading plan from Public Works' Geotechnical and Materials Engineering Division, as applicable.

2.6 Obtain all applicable jurisdictional and regulatory permits. These agencies may include the State of California Regional Water Quality Control Board; State of California Department of Fish and Wildlife; State of California Department of Conservation, Division of Oil, Gas and Geothermal Resources; and U.S. Army Corps of Engineers.

For questions regarding the grading conditions, please contact Patricia Constanza of Land Development Division at (626) 458-4921 or pconstan@dpw.lacounty.gov.

3. Building and Safety

3.1 Submit plans and specifications to meet current applicable codes and standards for structures, grading, mechanical, plumbing, and electrical.

3.2 All electrical installations shall comply with the County of Los Angeles Electrical Code.

3.3 Comply with fire, life safety, structural, and accessibility requirements including Americans with Disabilities Act guidelines.

3.4 Any occupiable building must have a restroom for employees.

3.5 All foundations must be engineered to comply with existing soil conditions.

3.6 Obtain approval from other agencies prior to permit issuance.

For questions regarding the building and safety conditions, please contact Clint Lee of Public Works' Building and Safety Division at (626) 458-3173 or cllee@dpw.lacounty.gov.

4. Drainage

4.1 Comply with the requirements of the hydrology study/water quality plan, which was approved on September 19, 2013, to the satisfaction of Public Works.

4.2 Prior to grading plan approval, the applicant shall obtain a jurisdictional determination letter or equivalent from the US Army Corps of Engineers and written acknowledgement from the State Department of Fish and Wildlife that no jurisdictional surface water drainages occur in the grading footprint. Documentation from jurisdictional agencies shall be obtained to the satisfaction of Public Works.

a. This site is located in Zone A per the Federal Flood Insurance Rate Map. A Conditional Letter of Map Revision from FEMA may be required for any encroachments into Zone A. This letter shall be obtained to the satisfaction of Public Works.

4.3 Portions of the site contain a drainage area designated as a 50-foot-wide Floodplain Management Path as shown on the Antelope Valley Master Drainage Plan. The County reserves the right to restrict construction within this flood hazard area. Prior to grading plan approval, obtain and record a covenant dedicating to the County the right to restrict the erection of buildings or other structures in the flood hazard area as shown on the Antelope Valley Master Drainage Plan to the satisfaction of Public Works.

For questions regarding the drainage conditions, please contact Ernesto Rivera of Land Development Division at (626) 458-4921 or erivera@dpw.lacounty.gov.

If you have any other questions or require additional information, please contact Matthew Dubiel of Land Development Division at (626) 458-4921 or mdubiel@dpw.lacounty.gov.

MD:tb
P:\ldpub\SUBPCHECK\Plan Check\CUP\CUP 201200086\TCUP 2012-86\2013-09-17 TCUP 2012-86 \CUP 2012-86 Recommended Conditions.docx

COUNTY OF LOS ANGELES
**Public Health**

**JONATHAN E. FIELDING, M.D., M.P.H.**
Director and Health Officer

**CYNTHIA A. HARDING, M.P.H.**
Acting Chief Deputy Director

**ANGELO J. BELLOMO, REHS**
Director of Environmental Health

**JACQUELINE TAYLOR, REHS**
Director of Environmental Protection Bureau

**PATRICK NEJADIAN, REHS**
Chief EHS, Land Use Program

**MICHELLE TSIEBOS, REHS**
Environmental Health Specialist IV
Land Use Program
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September 27, 2013

TO: Susan Tae
Supervising Regional Planner
Department of Regional Planning

FROM: Michelle Tsiebos, REHS (M.T)
Environmental Health Division
Department of Public Health

**SUBJECT: CUP CONSULTATION**
**PROJECT NO. R2012-01589/ RCUP 201200086**
**West Antelope Valley Solar Energy Project**
**Location: West Avenue J and 110th Street West,**

☒ Public Health recommends approval of this CUP.
☐ Public Health does **NOT** recommend approval of this CUP.

The Department of Public Health – Environmental Health Division has reviewed the CUP for the above referenced project. The project is proposing the construction and operation of a 20.0 megawatt (MW) photovoltaic (PV) solar electric generating facility.

The Department recommends approval of this CUP with the following conditions:

Potable Water Supply and Sewage Disposal

As mobile sanitation facilities are proposed, the applicant shall submit for review, approval, and permitting, a Mobile Sanitation Facility Plan consistent with Public Health's guideline, "Sanitation Facilities at Remote Worksite Locations." Please see the guidelines attached at the end of this document.

For questions regarding the above requirements, please contact Patrick Nejadian at (626) 430-5390.

Noise and Air Quality

1. There are no sensitive use receptors near or in close proximity to the proposed project. However, the applicant shall still adhere to the requirements of the Los Angeles County Noise Control Ordinance, as contained in Chapter 12.08 of the Los Angeles County Code, Title 12.

2. According to the initial study, the Project Applicant shall prepare a Dust Control Plan that includes requirements for minimal grading, vehicle use, construction scheduling, water application, soil binders/wood mulch, stock piles stabilization, final stabilization, and monitoring. The applicant shall implement MM AQ-1 to prevent or minimize the Project from substantially increasing windblown dust concentrations.

For questions regarding the above comments, please contact Evenor Masis or Robert Vasquez at (213) 738-3220.

If you should have any questions or need additional information, please contact me at (626) 430-5382.

## Sanitation Facilities at Remote Worksite Locations

### 1.0 Background and Purpose

Typically, permanently installed restroom and potable water facilities are required to be provided at worksite locations. In situations where permanent restrooms and potable water facilities are not feasible, the County Department of Public Health (Department) may approve the use of *"mobile sanitation facilities"* consistent with standards specified in Los Angeles County Code, Title 11 and the California Code of Regulations, Title 8.

The purpose of this document is to outline the procedure for obtaining Departmental approval for the use of *"mobile sanitation facilities"* by mobile crews at unattended commercial worksites located in remote areas of the County where conventional restroom facilities are unavailable and/or impractical due to the lack of a potable water supply.

### 2.0 Definition

A *"mobile sanitation facility"* is a portable restroom facility that is self-contained, and equipped with potable water, a toilet, a hand washing facility, and a waste water storage tank. *[Note: A portable chemical toilet, commonly referred to as a "porta-potty", is not considered a mobile sanitation facility.]*

### 3.0 Regulatory Requirements

The following requirements are based on provisions of Los Angeles County Code, Title 11 - Health & Safety, and Cal-OSHA sanitation standards in Section 3360, Title 8, California Code of Regulations.

#### 3.1 Mobile Sanitation Facility Plan

An applicant seeking to use a "mobile sanitation facility" in conjunction with a conditional use permit to develop and operate a remote commercial work site shall submit to the Department for review and approval a *mobile sanitation facility plan* to include the following:

**3.1.1** The projected number of employees that will use the proposed mobile sanitation facility.

**3.1.2** A Site Plan showing the proposed location(s) of the facility.

**3.1.3** A service and maintenance schedule for the facility.

**3.1.4** Description of how potable drinking water will be provided in a manner as to be readily accessible to employees. Identification of potable water source and method of dispensing (container and single-use cups or bottled water). Description of how drinking water containers are maintained, including methods to prevent contamination of drinking water.

**3.1.5** Copy of a service agreement with a permitted toilet rental agency to provide a mobile sanitation facility approved by the Department. If the applicant proposes to design and construct the mobile sanitation facility, design drawings and specifications shall be included.

#### 3.2 Permitting, Maintenance and Storage Requirements

Upon approval of the plan referenced in 3.1 above, the Department will issue an annual operating permit to the applicant. The operating permit will include the following conditions:

**3.2.1** The mobile sanitation facility shall be maintained in a safe and sanitary condition so as not to constitute a public health hazard or nuisance.

**3.2.2** The mobile sanitation facility must be removed from the work site at the end of each work day, and be returned to an approved storage site.

For questions regarding these requirements, please contact the Department's Land Use Program at (626) 430-5380.

COUNTY OF LOS ANGELES
DEPARTMENT OF PARKS AND RECREATION
*"Parks Make Life Better!"*
Russ Guiney, Director John Wicker, Chief Deputy Director

March 11, 2013

TO: Anthony Curzi
Current Planning Section
Department of Regional Planning

Sent via e-mail: acurzi@planning.lacounty.gov

FROM: Olga Ruano OR
Park Planning Assistant
Trails Section

SUBJECT: **COUNTY PROJECT NO. R2012-01589-(5)**
**CONDITIONAL USE PERMIT NO. RCUP201200086**
**TUUSSO ENERGY, LLC**
**ANTELOPE VALLEY WEST**
**TRAIL CONDITIONS REPORT**

The Department of Parks and Recreation requests that the Department of Regional Planning condition the above mentioned project with the following conditions:

**Trail Specific Conditions**

1. Prior to issuance of a grading permit, building permit or improvement plans, or whichever comes first, the Applicant shall:

    a. Dedicate by separate document to the County of Los Angeles, Department of Parks and Recreation, a twelve foot (12') wide non-motorized, multi-use (hiking, mountain biking, and equestrian) trail easement on the east side of the project site contiguous to, though outside of the 110th St. road right-of-way and/or slope easement, for purposes of the California Poppy Trail.
    b. Dedications and the following language (in exact form) must be shown for trail dedications on the proposed site plan and in the easement document.
        - "We hereby dedicate to the County of Los Angeles Department of Parks and Recreation a twelve foot (12') wide trail easement for multi-use (hiking, mountain biking and equestrian) purposes for the California Poppy Trail. Full public access shall be provided for the multi-use (hiking, mountain biking, and equestrian) twelve foot (12') wide trail easement."

**General Conditions**

1. The trail easement shall be recorded as a separate document and the plat map and legal description shall be attached.
2. Trail easement document and supporting documentation shall be submitted to the satisfaction of the Director of Department of Parks and Recreation.

**Trail Construction Conditions:**

1. Trails shall be designed and constructed in a manner consistent with the County of Los Angeles Trails Manual (Trails Manual). The County of Los Angeles Trails Manual is available online at http://lacountytrailsmanual.com/. Significant deviation from the guidelines within the Trails Manual must be approved in writing by the Department of Parks and Recreation.

2. Prior to use and reliance on this conditional use permit, and prior to issuance of a grading or building permit, the Applicant shall:

   a. Provide to the Department of Parks and Recreation, grading plans, to include detailed grading information for the segment of trail. The detailed grading information for the trail construction, shall include all pertinent information required, per Department of Parks and Recreation trail standards and all applicable codes, but not limited to the following:

      i. Cross slope gradients not to exceed four percent (4%) with two (2%) preferred, and longitudinal (running) slope gradients not to exceed twelve percent (12%) for more than fifty (50') feet. The Department of Parks and Recreation will review and may allow slopes slightly greater than twelve percent (12%) on a case by case basis.

      ii. Typical trail section and details to include:

         - Name of trail
         - Longitudinal (running) gradients
         - Cross slope gradients
         - Width of trail or, if requested by Department of Parks and Recreation, denote as variable width.

      iii. Bush Hammer (or equivalent) finish at minimum width of eight (8') feet for roadway trail crossings at all concrete surfaces.

      iv. Appropriate fencing where deemed necessary, for user safety and property security, as approved by the Department of Parks and Recreation.

      v. Trail easement must be outside of the road right-of-way, and/or slope easement.

      vi. Any streetlight pole(s) must have cross-walk activation buttons at two heights to accommodate both pedestrian and equestrian traffic. Request coordination with Public Works to address crosswalk design standards.

      vii. Mid-point trail street crossings must be approved by Public Works.

   b. Submit a cost estimate for the construction of the trails with the grading plans.

c. Upon Department of Parks and Recreation approval of the trail alignments and construction specifications shown on the grading plans, the Applicant shall post Faithful Performance and Labor and Materials (FPLM) bonds with the Department of Parks and Recreation for construction of the trail in the amount specified on within the cost estimate.

3. Prior to initiation of trail construction, the Applicant shall:

   a. Submit a preliminary construction schedule showing milestones for completing the trail. The Applicant's representative shall provide updated trail construction schedules to the Department of Parks and Recreation on a monthly basis. Schedule submittals shall include a "Two Week Look-Ahead" schedule, to reflect any modifications to the original schedule.

   b. Stake the centerline of the trail. The Applicant's representative shall then schedule a site meeting with the Department of Parks and Recreation's Park Planner within the Trails Section for trail alignment inspection and approval.

4. The Applicant shall notify the Department of Parks and Recreation for a Final Inspection Trail Walk within five (5) business days of completion of trail construction, including installation of all required amenities. Any portions of the constructed trail not approved shall be corrected and brought into compliance with the Department of Parks and Recreation's trail construction guidelines within thirty (30) calendar days. Upon completion of the punch list, the Applicant shall contact the Department of Parks and Recreation to schedule another site inspection.

5. Prior to Departmental final acceptance of the constructed trail by the Department of Parks and Recreation, the Applicant shall:

   a. Submit electronic copies on CD or DVD (AutoCAD 2005 or newer version) of the As-Built Trail, grading and construction drawings to the Department of Parks and Recreation, Trails Section.
   b. Submit a letter to the Department requesting acceptance of the dedicated constructed trail. The Department will issue a trail acceptance letter only after receiving as-built trail drawings.

**Rationale for the Trail Conditions**

This request for trail easement and trail construction for the purposes of the California Poppy Trail is consistent with:

1. The County of Los Angeles General Plan,
2. The County of Los Angeles Trails System adopted by the Board of Supervisors in 2007, and;
3. The Antelope Valley Area Plan adopted by the Board of Supervisors in 2007.

For any questions concerning trail alignment or conditions of approval, please contact Lorrie Bradley, Park Planner, by phone at (213) 738-2812 or by e-mail at lbradley@parks.lacounty.gov.

COUNTY OF LOS ANGELES
DEPARTMENT OF PARKS AND RECREATION
*"Parks Make Life Better!"*
Russ Guiney, Director John Wicker, Chief Deputy Director

August 27, 2012 Sent via e-mail: acurzi@planning.lacounty.gov

TO: Anthony Curzi
Department of Regional Planning

FROM: Julie Yom JY
Environmental and Regulatory Permitting Section

SUBJECT: **PERMIT CONSULTATION**
**COUNTY PROJECT NO. R2012-01589-(5)**
**CUP 201200086**
**110th STREET WEST AND WEST AVENUE J, ANTELOPE VALLEY**

The above project has been reviewed for potential impacts on the facilities of the Department of Parks and Recreation (DPR) for which we offer the following comment:

- A County Adopted Proposed Trail, California Poppy Trail, is to be located on the eastern part of the proposed project area (see attached map). DPR requests the dedication of a twelve foot wide trail easement including construction of the trail.

Thank you for including this Department in the review of this notice. If you have any trail related questions, please contact Ms. Olga Ruano at (213) 738- 2014 or email oruano@parks.lacounty.gov. For any other inquires, please contact Ms. Julie Yom at (213) 351-5127 or jyom@parks.lacounty.gov.

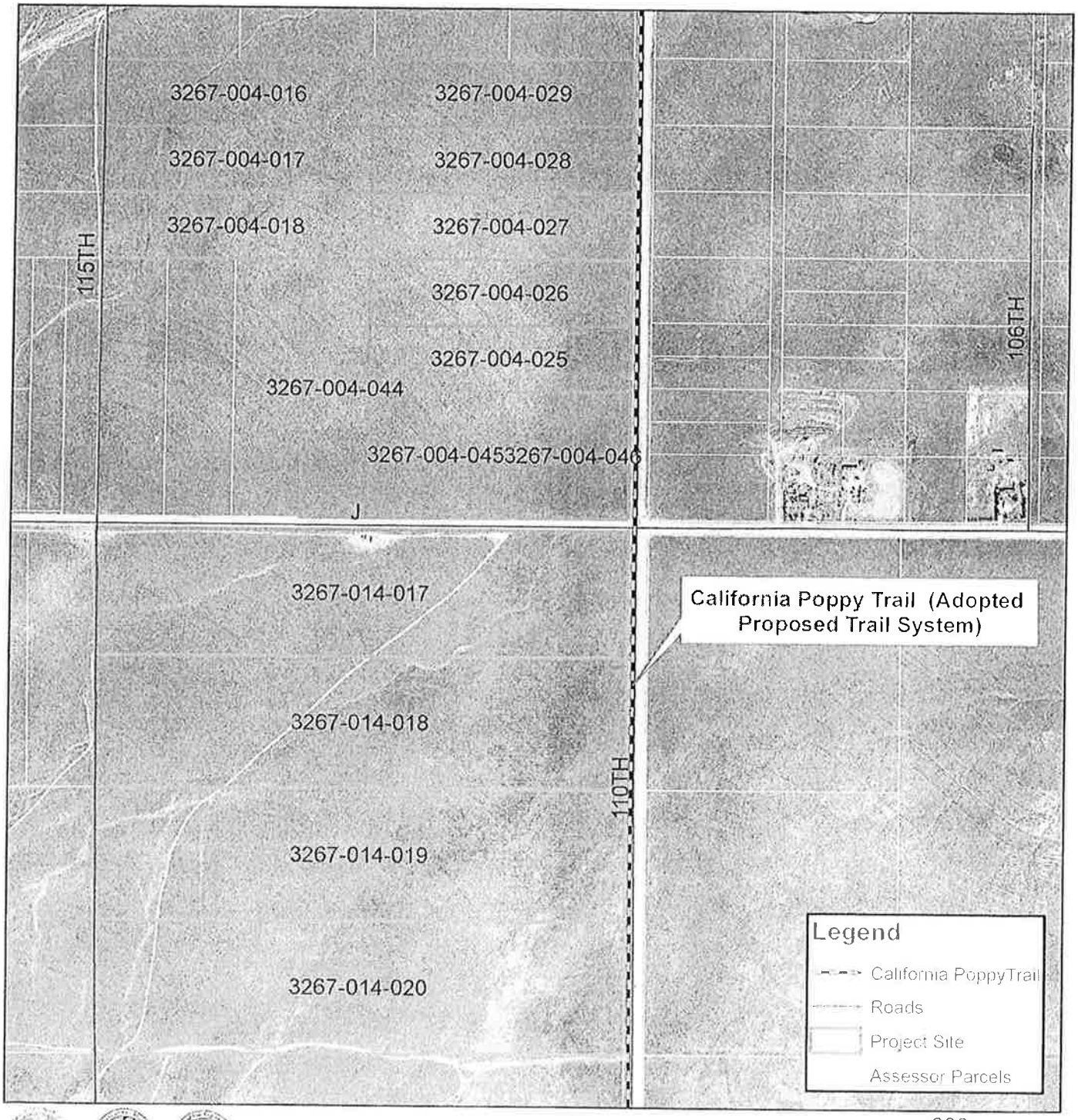
JY: OL/ Project Consultation for R2012-01589-(5)/ Antelope Valley

Enclosure: Map depicting the California Poppy Trail

c: Parks and Recreation (N. E. Garcia, K. King, J. Rupert, J. Barber, L. Bradley. O. Ruano)

Permit Consultation
R2012-01589-(5)/CUP201200086

DPR Trail Review




Los Angeles County
Department of Parks and Recreation

600 Feet

N

Sources
Trails: Department of Parks and Recreation
Parcel Data: Los Angeles County Assessor's Office
Roads: Thomas Brothers (All Rights Reserved)
Aerial Imagery: LARIAC 3

Date: August 1, 2012
Map Prepared by Planning Division
Los Angeles County Parks and Recreation

# Initial Study/Mitigated Negative Declaration

## West Antelope Solar Energy Project, Unincorporated Los Angeles County, California

### Project No. R2012-01589-(5)
### Permit No. Conditional Use Permit No. 201200086
### Environmental Assessment No. 201200158

Prepared for

County of Los Angeles
Department of Regional Planning
320 West Temple Street
Los Angeles, California 90012

Prepared by

BonTerra Consulting
225 South Lake Avenue, Suite 1000
Pasadena, California 91101
T: (626) 351-2000 F: (626) 351-2030

October 2013

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**Appendix**

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F Phase I Environmental Site Assessment
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G-2 Low Impact Development/Water Quality Report
G-3 Preliminary Storm Water Pollution Prevention Plan (SWPPP)
H Mitigation Monitoring and Reporting Program (MMRP)

# SECTION 1.0 EXECUTIVE SUMMARY

## 1.1 INTRODUCTION

The California Environmental Quality Act (CEQA) requires that local government agencies, prior to taking action on projects over which they have discretionary approval authority, consider the environmental consequences of such projects. An Initial Study/Mitigated Negative Declaration (IS/MND) is a public document designed to provide the public, responsible/trustee agencies, and other local and State governmental agencies with an analysis of the potential environmental consequences of implementing a project. This IS/MND has been prepared to address the environmental effects associated with implementing the proposed West Antelope Solar Energy Project (Project). The IS/MND indicates that, while the Project would have environmental impacts, modifications and/or mitigation measures have been incorporated into the Project to reduce its adverse impacts to levels considered less than significant (State CEQA Guidelines, Section 15070).

This Executive Summary presents a brief overview of the proposed Project; a tabular summary of the potential environmental effects of the Project; and the recommended mitigation program that would reduce potential impacts to a less than significant level. The reader is referred to the full text of this IS/MND and the attached technical appendices for a complete description and analysis of the Project's potential environmental effects.

## 1.2 PROJECT SUMMARY

The proposed Project site is located in unincorporated Los Angeles County, just outside the western boundaries of the City of Lancaster. The Project site consists of 15 contiguous parcels totaling approximately 263 acres. The Project site is bound by (but does not include) parcels 3267-004-014, 3267-004-015, 3267-004-030, and 3267-004-031 (just south of West Avenue I-8/Lancaster Boulevard) to the north, 110$^{th}$ Street West to the east, West Avenue J-8 to the south, and 115$^{th}$ Street West to the west. The Project site is bisected by West Avenue J, which divides it into a North Portion and a South Portion.

The Project would develop this currently vacant 263-acre site with a solar energy facility that could produce up to 20 megawatt alternating current (MWac) of renewable electric power during daytime hours. The electricity generated by the Project would be transmitted to Southern California Edison's (SCE) nearby Antelope Substation located at 95$^{th}$ Street West and West Avenue J. An off-site grid-tie transmission line (Grid-Tie) would run east from the Project site, parallel with West Avenue J, approximately 1.5 miles. The Grid-Tie would enter the Antelope Substation in order to connect the Project to the existing transmission infrastructure. This IS/MND addresses the potential environmental impacts from both the on-site build out of the Solar Energy Project and the off-site Grid-Tie and connection to the Antelope Substation. The proposed Project would consist of the following components:

- A solar field of approximately 1,600 north-south rows of crystalline silicon photovoltaic (PV) panels, mounted on single-axis tracking systems on steel support structures;
- An electrical collection and inverter system that aggregates the output from the PV panels and converts the electricity from direct current (DC) to alternating current (AC);
- A substation where all of the facility's output is combined and transformed to a voltage of 66 kilovolts (kV);
- A meteorological data collection system configured to collect meteorological information at the height of the PV panels;

- Construction of a trail as requested by the County Department of Parks and Recreation along the eastern boundary of the Project site, which would implement a portion of the proposed California Poppy Trail;
- Civil infrastructure, including driveways, internal access roads, drainage design, secure fencing, landscaping, and two water tanks; and
- An off-site 66-kV, 1.5-mile-long transmission line that runs from the Project site's eastern boundary to the Antelope Substation along West Avenue J.

The proposed Project is planned for construction in late 2013, with the facility in operation by mid-2014. The Project is expected to be in operation for at least 20 years or longer if the Project remains economically viable. At the end of the economically useful life of the Project, the Property would be restored to its pre-developed state in accordance with County requirements and an approved Decommissioning Plan.

## 1.3 SUMMARY OF SIGNIFICANT ENVIRONMENTAL IMPACTS

Implementation of the proposed Project would result in potentially significant impacts to Aesthetics, Air Quality, Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Recreation, Utilities/Service Systems, and Mandatory Findings of Significance prior to implementation of mitigation measures. Mitigation measures (MMs) are detailed in each environmental analysis presented in Section 4.0, Environmental Checklist Form, of this IS/MND. With incorporation of the MMs into the Project, all potentially significant environmental impacts would be reduced to less than significant levels. A copy of the Mitigation Monitoring and Reporting Program (MMRP) is included in Appendix H of this document.

# SECTION 2.0 INTRODUCTION

## 2.1 PURPOSE OF THE INITIAL STUDY

In accordance with the California Environmental Quality Act (CEQA) (*California Public Resources Code,* Sections 21000 et seq.) and its Guidelines (*California Code of Regulations,* Title 14, Sections 15000 et seq.), this Initial Study (IS) has been prepared as documentation for a Mitigated Negative Declaration (MND) for the proposed West Antelope Solar Energy Project (Project). This IS/MND includes a description of the proposed Project; location of the Project site; evaluation of the potential environmental impacts of Project implementation; and recommended mitigation measures to lessen or avoid impacts on the environment.

Pursuant to Section 15367 of the State CEQA Guidelines, the County of Los Angeles (County) is the lead agency for the Project. The lead agency is the public agency that has the principal responsibility for carrying out or approving a project. In addition to addressing the potential environmental impacts that would result from the proposed Project, this IS/MND serves as the primary environmental document for future activities associated with the Project, including all discretionary approvals requested or required for Project implementation. This includes, but is not limited to, City of Lancaster approval for construction within their right-of-way for a proposed transmission line along West Avenue J from the Project site to the Antelope Substation; a County of Los Angeles utility crossing permit under West Avenue J to connect the North and South Portions of the Project site; and any other approvals required for the utility connection and Project development.

The County, as the lead agency, has reviewed and revised, as necessary, all submitted drafts and technical studies and has commissioned the preparation of this IS/MND to reflect its own independent judgment, including (1) reliance on applicable County technical personnel and (2) review of all technical subconsultant reports. Data for this IS/MND was obtained from on-site field observations; discussions with affected agencies; review of available technical studies, reports, guidelines, and data; and specialized environmental assessments prepared for the Project. The County has the authority for Project approval and adoption of this IS/MND.

## 2.2 SUMMARY OF INITIAL STUDY FINDINGS

Section 4.0, Environmental Checklist Form, discusses the potential environmental effects of the proposed Project and the recommended mitigation program, including mitigation measures (MMs) that would reduce all potential impacts to levels considered less than significant. According to Section 15370 of the CEQA Guidelines, “mitigation” includes the following:

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- Compensating for the impact by replacing or providing substitute resources or environments.

Implementation of the proposed West Antelope Solar Energy Project would result in potentially significant impacts to Aesthetics, Air Quality, Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Recreation, Utilities/Service Systems, and Mandatory Findings of Significance prior to mitigation. Implementation of the MMs, as detailed in each environmental analysis presented in Section 4.0 of this IS/MND, would reduce all potentially significant impacts to a less than significant level. According to the CEQA Guidelines, it is appropriate to prepare an MND for the proposed Project because, with incorporation of MMs, potentially significant environmental impacts would be eliminated or reduced to a less than significant level.

## 2.3 PROJECT APPROVAL

A Notice of Intent to Adopt (NOI) an MND was published in the *Antelope Valley Press* and *La Opinión* newspapers on September 26, 2013, and was submitted to the Los Angeles County Registrar-Recorder/County Clerk in the City of Norwalk for posting in accordance with Section 15072(a) of the CEQA Guidelines. The NOI and IS/MND have been submitted to potentially affected responsible and trustee agencies and are available for public review online at http://planning.lacounty.gov/. Hardcopies will be available for review during business hours at the Lancaster Public Library, 601 West Lancaster Boulevard, Lancaster, California, 93534 and at the Los Angeles County Department of Regional Planning, 320 W. Temple Street, 13th Floor (Room 1348), Los Angeles, California 90012. The IS/MND has also been submitted to the State Clearinghouse for review by potentially affected State agencies.

There will be a 30-day public review period for the IS/MND in accordance with Section 15073 of the State CEQA Guidelines, beginning Monday, October 21, 2013 through Wednesday, November 20, 2013. In reviewing the IS/MND, the reviewer should focus on the sufficiency of the document in identifying and analyzing the potential impacts on the environment and ways in which the potentially significant effects of the proposed Project are avoided or mitigated through components of the Project. Comments on the analysis contained herein may be sent to Mr. Anthony Curzi via email at acurzi@planning.lacounty.gov, or mailed to the County address listed below.

Mr. Anthony Curzi
County of Los Angeles
Department of Regional Planning
320 West Temple Street, 13th Floor
Los Angeles, California 90012

In accordance with Section 15074 of the State CEQA Guidelines, prior to approving the Project, the County of Los Angeles Regional Planning Commission and, if the Project entitlements are appealed, the County of Los Angeles Board of Supervisors would consider the proposed MND together with any comments received during the public review process. The Regional Planning Commission and potentially the Board of Supervisors would adopt the proposed MND only if it finds that that there is no substantial evidence that the Project would have a significant effect on the environment.

## 2.4 ORGANIZATION OF THE INITIAL STUDY

The IS/MND is organized into the following sections:

**Section 1, Executive Summary:** This section provides a summary of the Project description, Project impacts, and mitigation to reduce those impacts to less than significant levels.

**Section 2, Introduction:** This section provides an introduction to the IS/MND process and an outline of the IS/MND.

**Section 3, Environmental Setting and Project Description:** This section provides a description of the Project location, the existing environmental setting of the Project area, and the proposed Project Description (i.e., physical and operational characteristics).

**Section 4, Environmental Checklist Form:** The completed CEQA checklist form provides an overview of the potential impacts that may result from proposed Project implementation. The environmental checklist form also includes “mandatory findings of significance”, in accordance with CEQA requirements. This section contains the analysis of environmental impacts identified in the environmental checklist and identifies mitigation measures that would eliminate potential significant effects and/or reduce them to a less than significant level.

**Section 5, References:** This section identifies the references used in preparation of the IS/MND.

# SECTION 3.0 ENVIRONMENTAL SETTING AND PROJECT DESCRIPTION

## 3.1 ENVIRONMENTAL SETTING

### 3.1.1 PROJECT LOCATION

The proposed Project is located in unincorporated Los Angeles County, just outside the western boundaries of the City of Lancaster in an area referred to as the Northwest Antelope Valley. The Project site is approximately 44 miles north of downtown Los Angeles and approximately 4.5 miles west of the nearest developed subdivision within the City of Lancaster. The San Gabriel Mountain Range is located to the south of the Project site.

Regional access to the Project site is provided from either (1) the Golden Gate Freeway (Interstate [I] 5), merging onto the northbound Antelope Valley Freeway (State Route [SR] 14), exiting 20th Street and traveling westward to connect with West Avenue J or (2) from the Mojave Freeway (I-15), merging onto SR-138, which transitions into SR-14. The regional location of the Project site is depicted on Exhibit 3-1, Regional Location.

### 3.1.2 PROJECT SITE CHARACTERISTICS

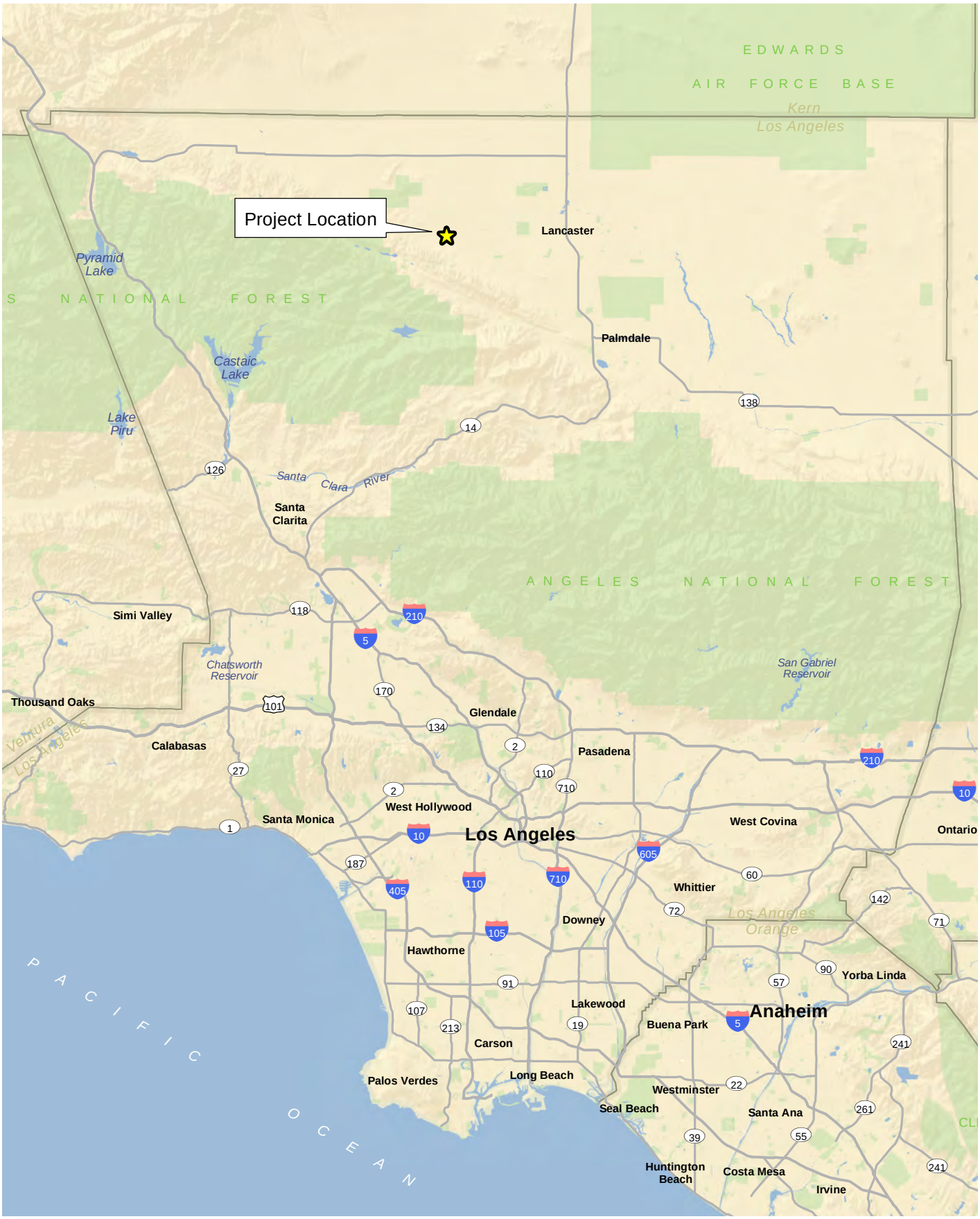
The Project site consists of 15 contiguous parcels totaling approximately 263 acres. The Project site is bound by (but does not include) parcels 3267-004-014, 3267-004-015, 3267-004-030, and 3267-004-031 (just south of West Avenue I-8/Lancaster Boulevard) to the north, 110th Street West to the east, West Avenue J-8 to the south, and 115th Street West to the west. Only 110th Street West and a portion of West Avenue J are paved; all other surrounding roads are dirt roads.

The Project site is bisected by West Avenue J, dividing it into a North Portion and a South Portion. The North Portion contains approximately 110 acres, and the South Portion contains approximately 153 acres. However, the Project site contains several utility, drainage, and slope easements, which reduce the available buildable area to approximately 220 acres. Table 3-1 lists the Assessor's Parcel Number (APN) and acreage for each Project parcel.

**TABLE 3-1**
**SITE PARCEL SUMMARY**

| Assessor's Parcel Number | Gross Acreage | Net Acreage |
|---|---|---|
| **North Portion** | | |
| 3267-004-016 to 3267-004-018 | 30.00 | 24.48 |
| 3267-004-025 to 3267-004-029 | 50.00 | 46.95 |
| 3267-004-044 to 3267-004-046 | 30.00 | 17.70 |
| **South Portion** | | |
| 3267-014-017 to 3267-014-020 | 153.00 | 131.58 |
| **Total Acres** | **263.00** | **220.71** |
| Source: Los Angeles County Office of the Assessor 2012. | | |

The Project site contains no habitable buildings, structures or development of any kind, and mostly consists of sparse and dry vegetation. Southern California Edison's (SCE) Tehachapi Renewable Transmission Project (TRTP) transmission towers run across the western edge of the North and South Portions; they also run through the southern edge of the South Portion along West Avenue J-8. The topography is relatively flat with no major distinguishing features. On-site vegetation consists of annual grassland with small patches of native perennial grasses.




# Regional Location

Exhibit 3-1

*West Antelope Solar Project*

N W E S

10 5 0 10 Miles

BonTerra CONSULTING

(Rev: 10-09-2013 CJS) Projects\TAAC\J001\Graphics\ISMND\Ex3-1_RL.pdf

D:\Projects\TAAC\J001\mxd\Ex_RL.mxd

The annual grassland includes a mix of native and non-native plant species and is dominated by Pacific fescue.

The Project site contains one on-site ephemeral drainage feature that would be under the jurisdiction of resource agencies (i.e., California Department of Fish and Wildlife[1] and Regional Water Quality Control Board). This drainage feature runs along the west side of 110th Street West and flows north, joining a northern ephemeral drainage before draining into a culvert, which then flows east.

The Project includes the installation of an off-site transmission line to connect the proposed Project to the SCE Antelope Substation. A grid-tie transmission line (Grid-Tie) transmission line would be located outside the Project site boundaries (in areas referred to as "off-site areas"). The Grid-Tie would run generally parallel with the southern edge of West Avenue J, approximately 1.5 miles to the Antelope Substation, located at West Avenue J and 95th Street West.

### 3.1.3 SURROUNDING LAND USES

The entire 263-acre Project site is located in unincorporated Los Angeles County; however, it is immediately adjacent to the western boundary of the City of Lancaster. As depicted in the aerial photograph in Exhibit 3-2, Local Vicinity and Aerial Photograph, the Project site is largely surrounded by undeveloped open space, with the exception of the SCE TRTP transmission lines, agricultural fields to the northwest, and sparse rural development. There are approximately 15 single-family residential properties located within an approximate 1-mile radius of the Project boundaries. The nearest residential property is located approximately 700 feet east of the Project site along West Avenue J in unincorporated Los Angeles County. A small alfalfa farm is located approximately 0.5 mile to the northwest from the Project site's western boundary. There are no industrial or manufacturing land uses in the Project vicinity, with the exception of the Antelope Substation, which is located approximately 1.5 miles to the east of the Project site.

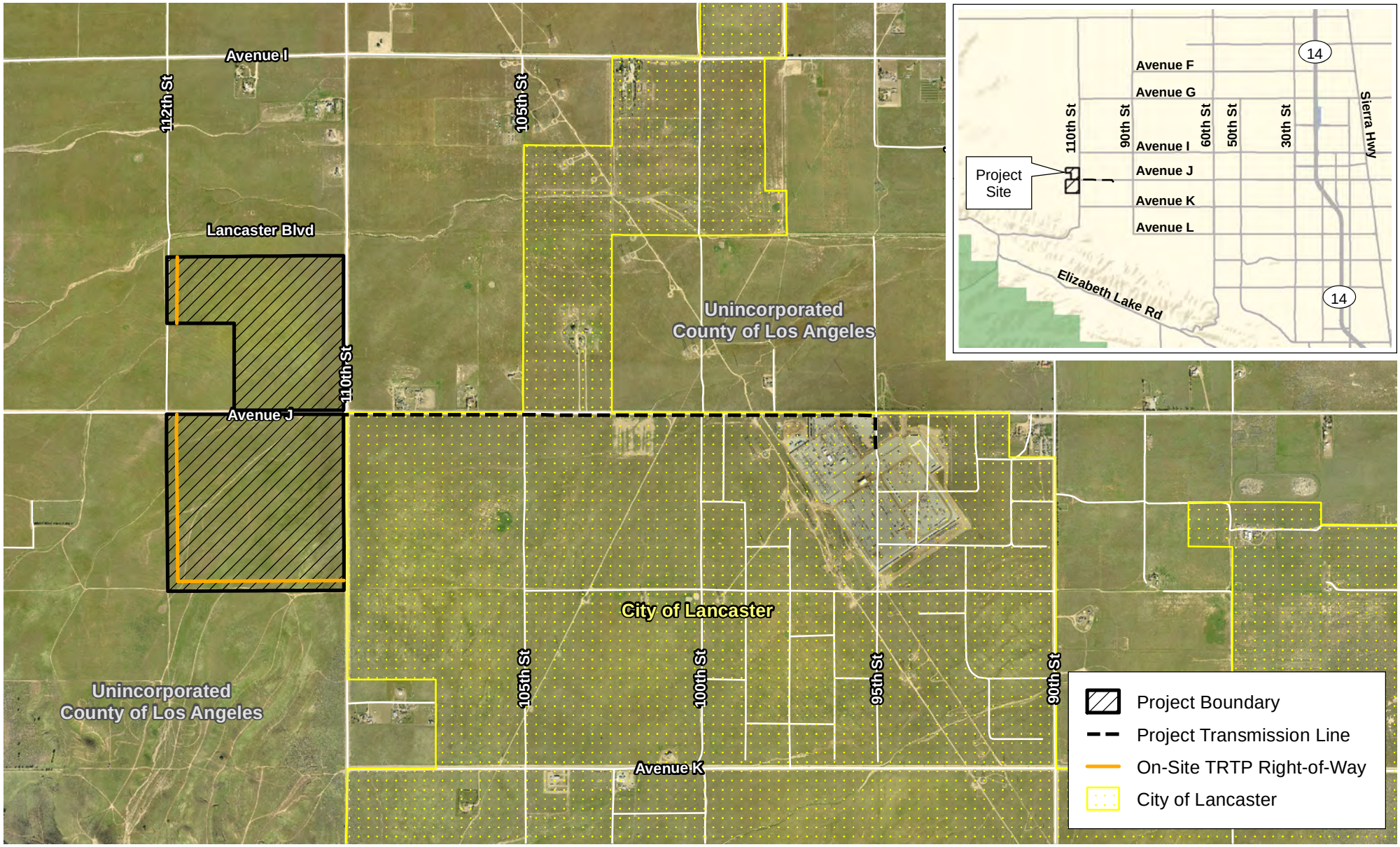
## 3.2 PROJECT DESCRIPTION

The Project would develop this currently vacant site with a solar energy facility that could produce up to 20 megawatts alternating current (MWac) of renewable electric power during daytime hours. The layout of the Project is shown in Exhibit 3-3A, Site Plan and Details. The electricity generated by the Project would be transmitted to the nearby SCE Antelope Substation, but the power would be sold to Pacific Gas & Electric (PG&E). The Grid-Tie would run parallel with West Avenue J approximately 1.5 miles through the City of Lancaster to the Antelope Substation, located at 95th Street West and West Avenue J. The Grid-Tie would enter the Antelope Substation in order to connect the Project to the existing transmission infrastructure. This IS/MND addresses the potential environmental impacts from both the on-site build-out of the Project and the off-site Grid-Tie and connection to the Antelope Substation.

### 3.2.1 PROJECT COMPONENTS

The Project is a solar energy generation facility that employs photovoltaic (PV) panels that absorb sunlight and directly produce renewable electricity without use of heat transfer fluid or cooling water. The Project Applicant plans to develop the facility as described herein. The facility would operate year-round, producing electric power during daytime hours.

[1] The California Department of Fish and Game (CDFG) changed its name to the California Department of Fish and Wildlife (CDFW) effective January 1, 2013.




# Local Vicinity and Aerial Photograph

Exhibit 3-2

*West Antelope Solar Project*

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

(Rev: 10-09-2013 CJS) Projects\TAAC\J001\Graphics\IS-MND\Ex3-2_LV_aerial.pdf

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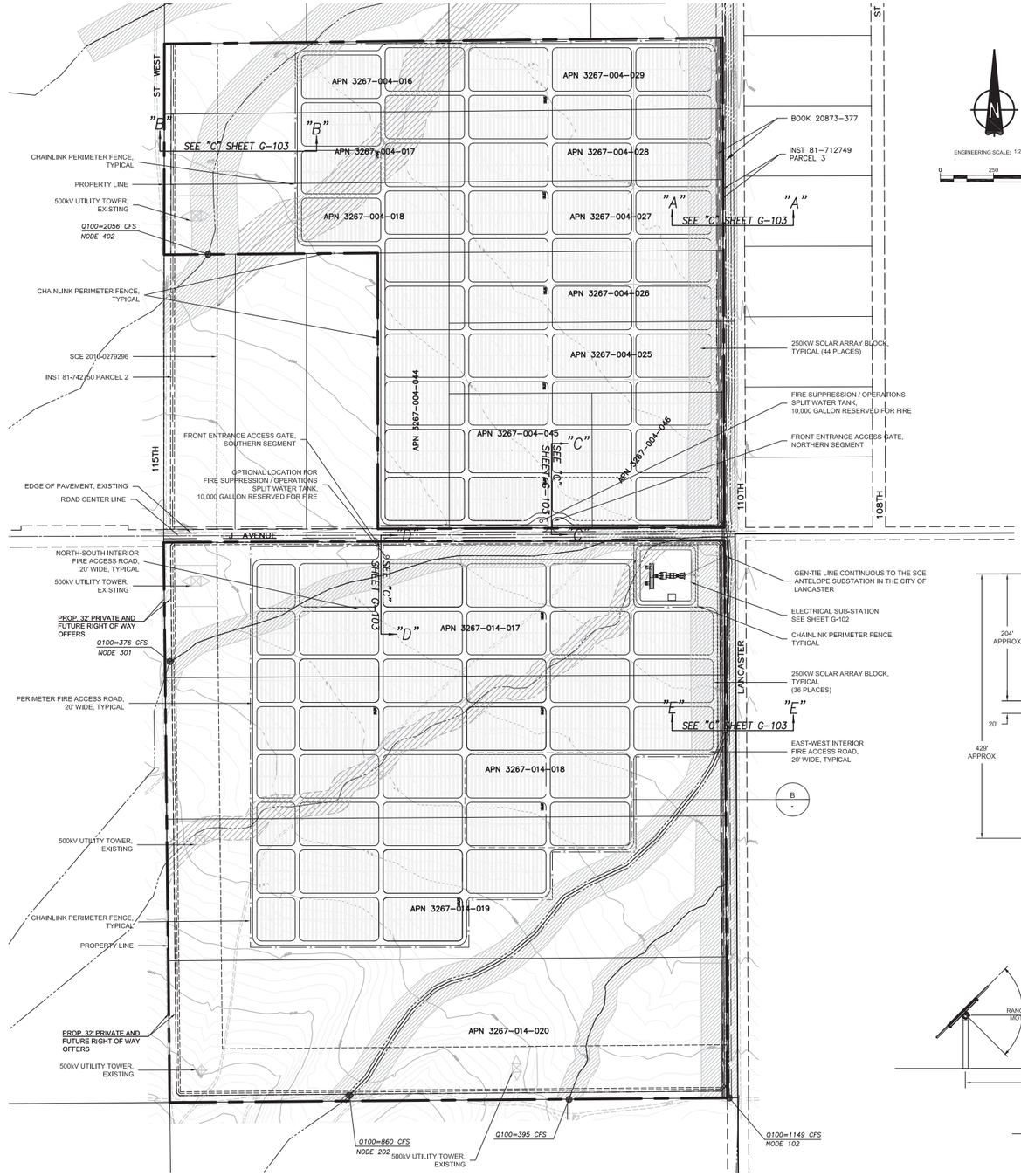
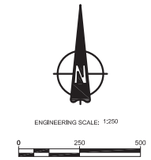


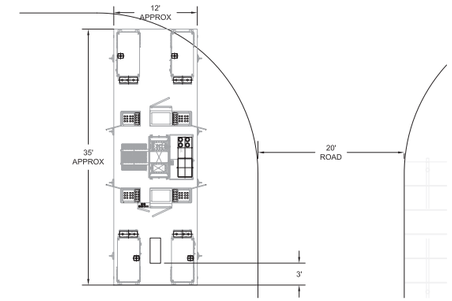

## EARTHWORK SUMMARY:

| | CUT | FILL |
|---|---|---|
| RAW | 6,500 CY | 6,500 CY |

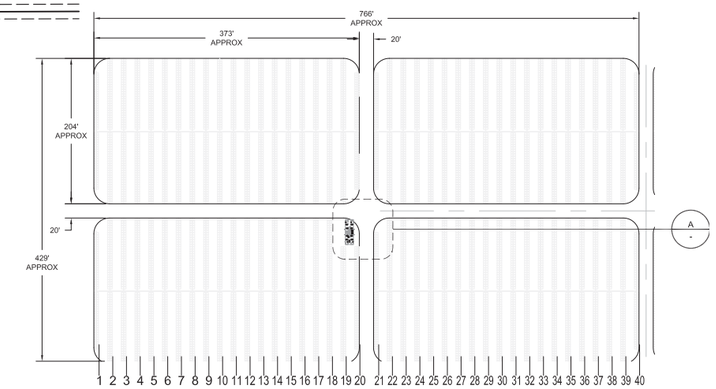
TOTAL DISTURBED AREA = 178.5 AC (7,775,460 SF)

**NOTE:**
CLEARING AND GRUBBING AND MINOR FINE GRADING ONLY. GRADING IS ALLOWED ONLY FOR FIRE ACCESS ROADS, SUBSTATION, TANK AND INVERTER PADS, AND BASINS. THE EXISTING VEGETATION WHERE SOLAR PANELS ARE PROPOSED SHALL NOT BE DISTURBED, BUT CAN BE MOWED.

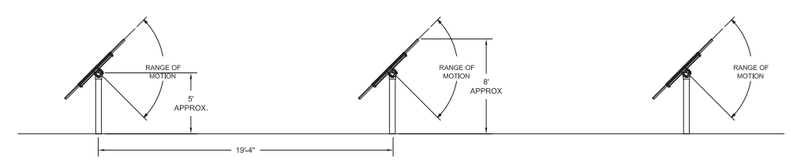



**A | UTILITY INVERTER ENCLOSURE EXAMPLE**
N.T.S.




**B | TYPICAL 4 X 250KW PV ARRAY BLOCK**
N.T.S.




**C | TYPICAL ZERO TILT SINGLE AXIS TRACKING ELEVATION**
Scale: NTS

Source: AEI-Casc Consulting, 2013

# Site Plan Details

# Exhibit 3-3A

*West Antelope Solar Energy Project*

BonTerra CONSULTING

(Rev 10/16/13 JAZ) PAS\Projects\TAAC\J001\Graphics\IS-MND\Ex3-3A_SitePlanDetails.pdf

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The proposed Project would consist of the following components:

- A solar field of approximately 1,600 north-south rows of crystalline silicon PV panels, mounted on single-axis tracking systems on steel support structures;
- An electrical collection and inverter system that aggregates the output from the PV panels and converts the electricity from direct current (DC) to alternating current (AC);
- A substation where all the facility's output is combined and transformed to a voltage of 66 kilovolts (kV);
- A meteorological data collection system configured to collect meteorological information at the height of the PV panels;
- A trail that would be constructed (as requested by the County Department of Parks and Recreation) along the eastern boundary of the Project site in order to implement a portion of the proposed California Poppy Trail;
- Civil infrastructure, including driveways, internal access roads, drainage design, secure fencing, landscaping, and two water tanks; and
- An off-site 1.5-mile-long 66-kV transmission line that runs from the Project site's eastern boundary to the Antelope Substation along West Avenue J.

At the end of the economically useful life of the Project, the Property would be restored to its pre-developed state in accordance with County requirements and an approved Decommissioning Plan.

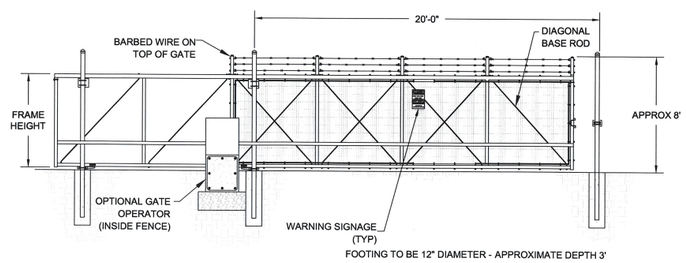
Exhibit 3-3A shows the locations of all existing and proposed uses, structures, fences, landscaping, improvements, and distances between structures and property lines; locations of all driveways and points of ingress and egress; and an elevation sketch of proposed structures, including dimensions and heights above the ground. Exhibit 3-3B, Site Details and Elevations, depicts the preliminary design, heights, and dimensions of various Project components, including the preliminary water tank design gate and fencing designs, and four cross-sections (i.e. Section A-A, B-B, C-C, and D-D) as located on Exhibit 3-3A.

Remote Supervisory Control and Data Acquisition (SCADA) monitoring would be incorporated into the process control system to allow unmanned operations. The facility would have no toilet or on-site septic or sewer system connections, nor would there be any potable water lines. Any on-site water for ongoing use, which would be intermittent and minimal for the photovoltaic plant, would be trucked to the site from available commercial water sources outside the Antelope Valley Groundwater Basin.

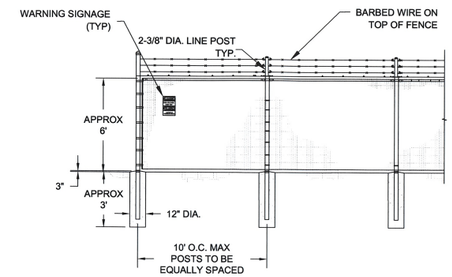
**Solar Photovoltaic Panels**

The solar field would consist of PV panels mounted on steel support structures. The supports would be configured with a pivoting, single-axis tracking system. As depicted in Exhibit 3-3A, the assembled PV panels would have a typical height of about six feet and a maximum height of approximately eight feet, depending on the angle of the tracking system as it changes over the course of each day. The PV panels would consist of polycrystalline panels, and would be arranged in approximately 1,600 rows with center-to-center spacing of about 19 feet. The rows would be aligned north to south, and the PV panels would pivot to an angle of up to 45 degrees around a north-south axis, tracking the sun from east to west. The mounting poles for the panels would have an approximate diameter of six inches. A photo simulation showing the buildout of the Project can be found in Exhibit 4-3 in Section 4.1, Aesthetics, of this document.

## 1 | TYPICAL GATE PLAN DETAIL



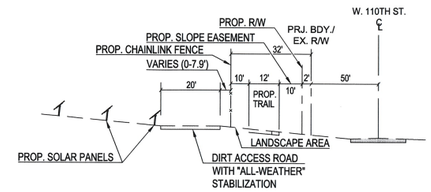

## 2 | TYPICAL GATE ELEVATION DETAIL



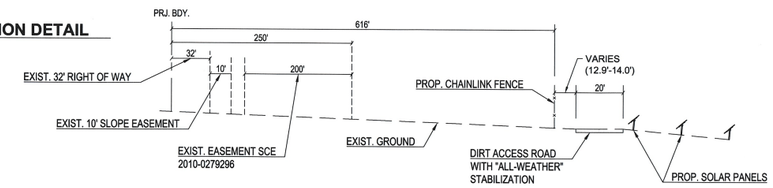

## 3 | TYPICAL FENCE ELEVATION DETAIL

## A | FENCE & GATE DETAILS

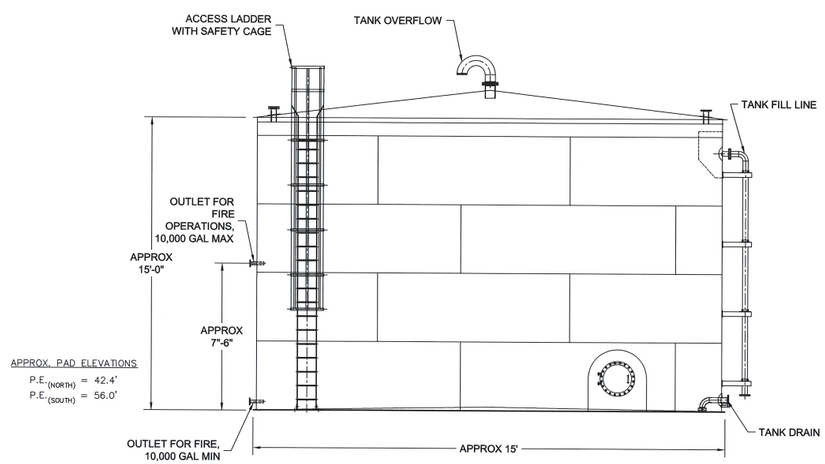
Scale: NTS




SECTION "A-A"
N.T.S.




SECTION "B-B"
N.T.S.



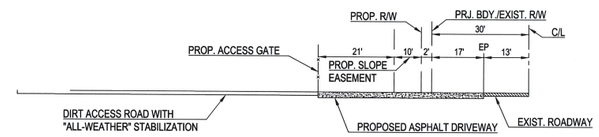

NOTES:

IN ACCORDANCE WITH LOS ANGELES COUNTY FIRE CODE:

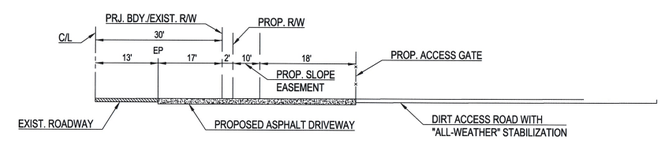
1. THE SUPPLY OUTLET SHALL BE AT EAST 4 INCHES IN DIAMETER FROM THE BASE OF THE TANK TO THE POINT OF OUTLET AT THE FIRE DEPARTMENT CONNECTION. THE FIRE DEPARTMENT CONNECTION SHALL BE AT LEAST ONE 4-INCH NATIONAL STANDARD THREAD (MALE), REDUCE TO ONE 2½ INCH NATIONAL STANDARD THREAD (MALE). ADDITIONAL OUTLETS MAY BE REQUIRED.
2. THE LOCATION OF THE FIRE DEPARTMENT OUTLET TO BE DETERMINED ON THE PLOT PLAN WHEN SUBMITTED TO THE FIRE DEPARTMENT. CONSIDERATION WILL BE GIVEN TO TOPOGRAPHY, ELEVATIONS, AND DISTANCE FROM STRUCTURES, DRIVEWAY ACCESS, PREVAILING WINDS, ETC.
3. THE OUTLET SHALL BE LOCATED ADJACENT TO THE FIRE ACCESS ROAD.

## B | WATER TANK DETAIL

Scale: NTS




SECTION "C-C"
N.T.S.

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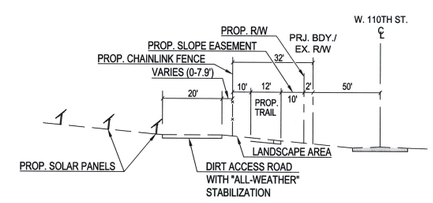


SECTION "E-E"
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## C | TYPICAL SECTIONS

Scale: NTS

Source: AEI-Casc Consulting, 2013

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# Site Details and Elevations

Exhibit 3-3B

*West Antelope Solar Energy Project*

BonTerra CONSULTING

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## Electrical Collection System

As shown in Exhibit 3-3A, the PV panels would be organized into electrical groups referred to as "blocks". Each block would encompass approximately 7.6 acres of PV panels (capable of producing about 1 MWac) and would include 1 modular inverter enclosure. A 1-MWac block would measure approximately 767 feet by 429 feet. The size of each block would depend primarily on the ratio of DC power to AC power (typically 1.3:1), and the ground cover ratio (GCR)[2] is currently planned at 33 percent. The lower the GCR, the less space the PV panels occupy, thereby minimizing shading from row to row in the early morning and late afternoon hours.

Exhibit 3-3C, Electrical Details and Elevations, shows special weather and sunlight resistant conductors that would be attached under the PV panels, which would terminate into special DC source circuit combiner boxes. From the combiner boxes, the cabling would transition underground via buried trenches, feeding into the inverters and associated switchgear housed in each block's inverter enclosure. Each inverter enclosure is anticipated to be a 12-foot by 35-foot prefabricated (or assembled on site) utility enclosure up to 15 feet in height and would be unoccupied except during inspection and maintenance. Each inverter utility enclosure would include an associated outdoor utility-grade transformer to step up the electricity voltage from the inverter output level (e.g., 480-V) to 34.5-kV.

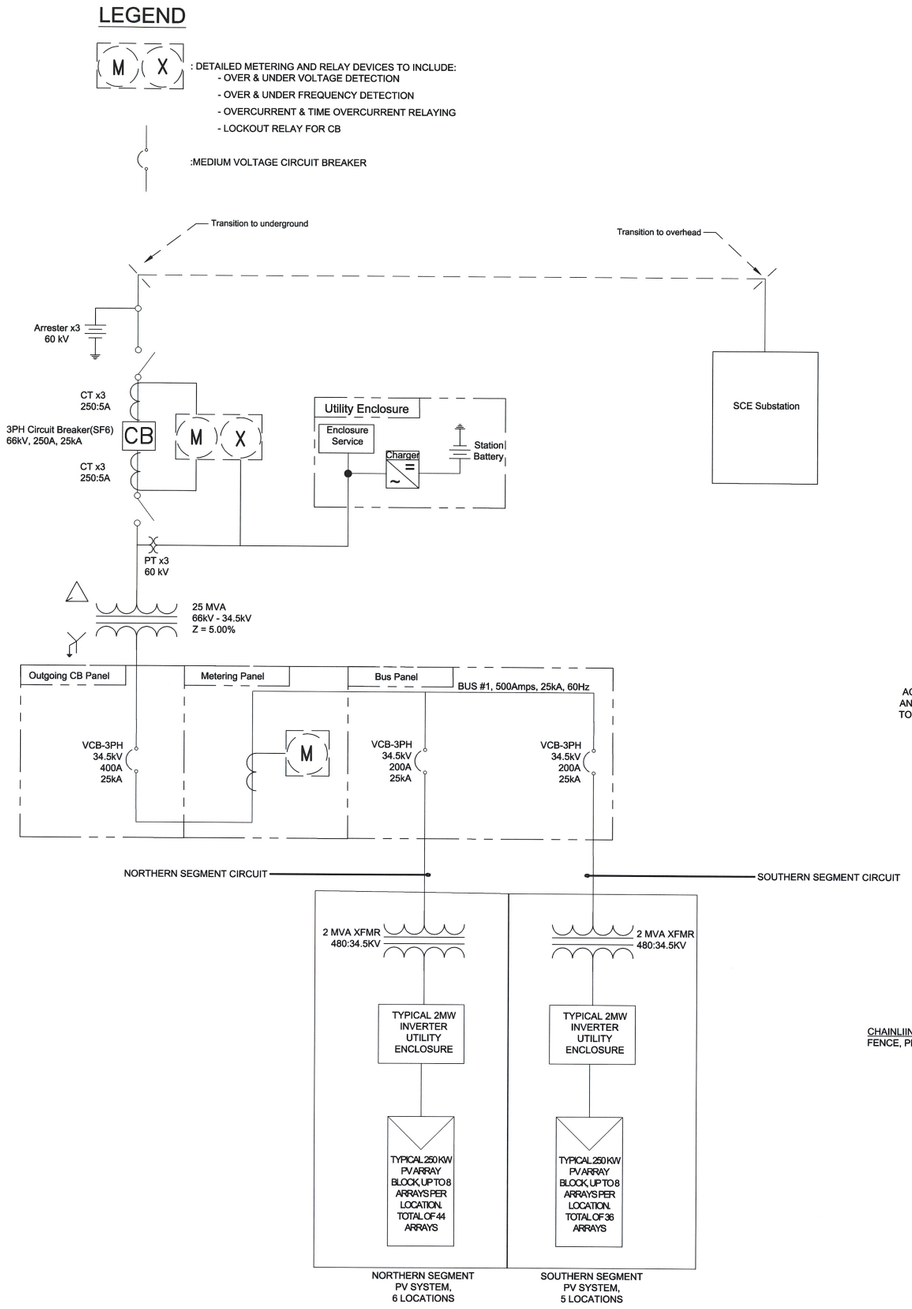
From these transformers, electricity would be conveyed via an underground 34.5-kV collector circuit to a common 34.5-kV switchboard in the Project Substation (described below) to be located along the eastern boundary of the Project site. This underground 34.5 kV collector circuit would also cross under West Avenue J in order to electrically join the North and South Portions of the Project site.

## Project Substation and SCE Interconnection

Exhibit 3-3C shows the layout of the proposed electrical collection system and on-site Project Substation, as well as a plan view of the Substation. The Project Substation would be located along the eastern boundary of the Project site. It would serve as a central hub for the 34.5-kV collector circuits that would convert the electricity voltage from 34.5 kV to 66 kV. The Project Substation would be the origin of the 66-kV Grid-Tie running approximately 1.5 miles to the Antelope Substation in order to deliver power generated by the Project to the existing transmission grid. The Project Substation would occupy approximately 1.5 to 2.0 acres and would include, among others, the following major components:

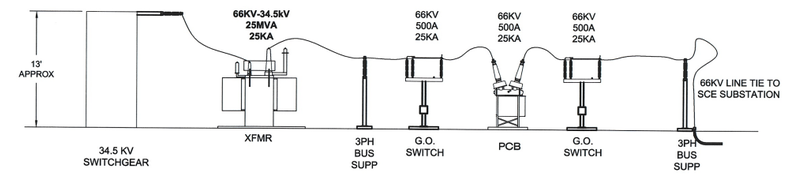
- 34.5-kV switchgear;
- 66-kV bus and associated switching and circuit breaking devices;
- 25-Mega-Volt-Ampere (MVA), 34.5/66-kV transformers;
- 34.5-kV capacitors;
- A tubular steel support structure up to 13 feet high;
- A grounding grid;
- A prefabricated utility control enclosure (which would be unoccupied except during inspection and maintenance);
- A perimeter fence; and

[2] Ground cover ratio is the space that the PV panels occupy as a percentage of land area beneath them.



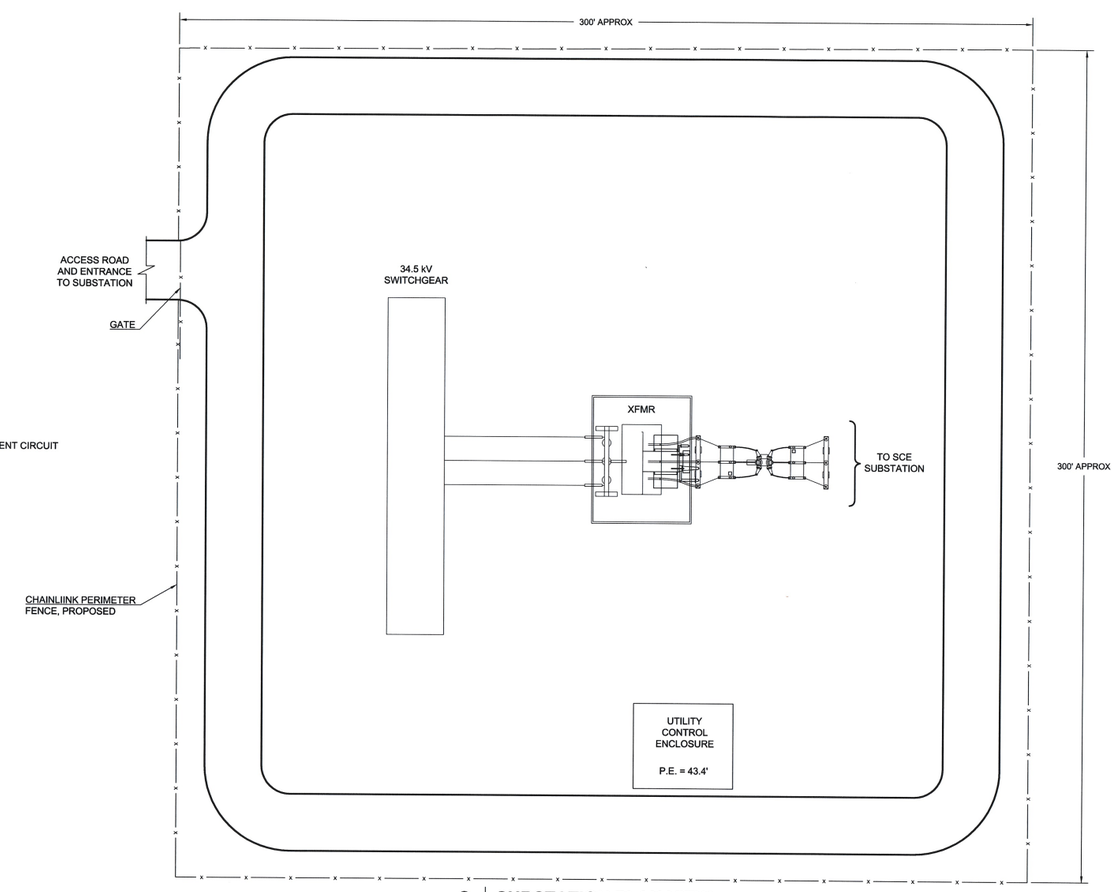

**A | PHOTOVOLATIC SOLAR AND SUBSTATION SINGLE LINE**

Scale: NTS




**B | SUBSTATION ELEVATION**

Scale: NTS




**C | SUBSTATION PLAN VIEW**

Scale: NTS

Source: AEI-Casc Consulting, 2013

# Electrical Details and Elevations

Exhibit 3-3C

*West Antelope Solar Energy Project*

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- A SCADA system that would be remotely monitored by both the Project Applicant's Operations and Maintenance group (O&M) and the utility.

The Project Applicant is currently in discussions with Southern California Edison (SCE), the City of Lancaster, and Silverado Power to determine the best path for the Grid-Tie to connect to the Antelope Substation. This MND covers the CEQA analysis for the Project-related transmission line work to be completed by SCE. Silverado Power's proposed transmission poles are analyzed in a separate CEQA document. The two alternatives under consideration are described below:

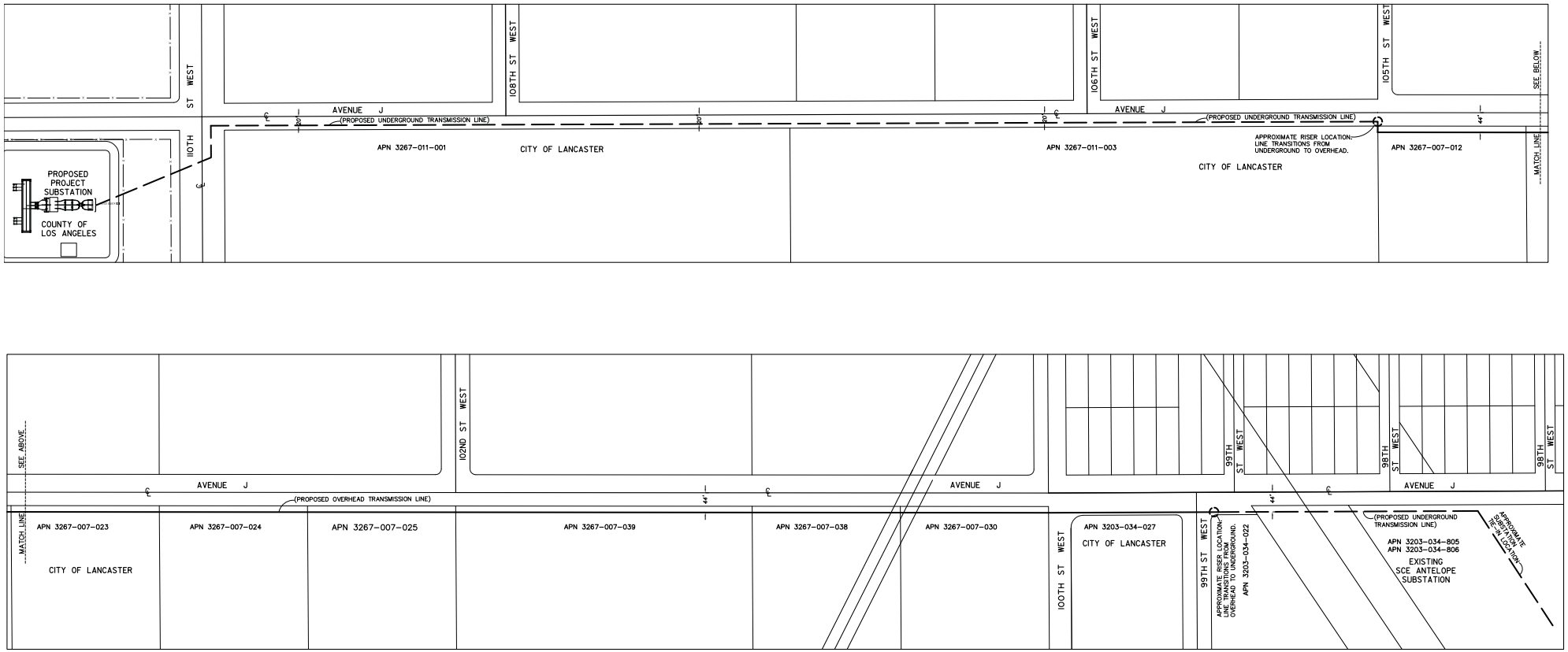
> **Path A:** As shown in Exhibit 3-3D, Proposed Path A Grid-Tie Transmission Line, the Grid-Tie would run underground or overhead along the southern edge of West Avenue J (approximately 20 feet from centerline of the road) until it reaches Silverado Power's collector substation at 105th Street West. At that point, the Grid-Tie, if underground, would transition from underground to overhead up a riser pole. The overhead line would be strung along Silverado Power's planned overhead transmission poles (approximately 44 feet from centerline of West Avenue J).[3] At approximately 99th Street West (about 10 feet west of the western boundary of SCE's right-of-way for the 220-kV transmission lines), the Grid-Tie would hand-off to SCE at the first 75-foot-tall pole with a pole switch; SCE would also construct an identical second pole with a pole switch, and a 70-foot-tall tubular steel riser pole, where it would transition back underground, until connecting into the 66-kV bus at the Antelope Substation.
>
> **Path B:** Under this alternative, shown in Exhibit 3-3E, Proposed Path B Grid-Tie Transmission Line, the Grid-Tie would run underground (approximately 20 feet from centerline of Avenue J) all the way to a riser pole and would hand-off overhead to SCE at approximately 99th Street West. At this point, the Grid-Tie would hand-off to SCE at the first 75-foot-tall pole with a pole switch; SCE would also construct an identical second pole with a pole switch and a 70-foot-tall lightweight steel riser pole that would transition back underground, until connecting into the 66-kV bus at the Antelope Substation.

For the purposes of this document, the Path B alternative is analyzed as it would be more construction-intensive than Path A. Two communication paths (fiber optic lines) would also extend along generally the same path as the Grid-Tie. These communication lines would run (i) overhead along existing Verizon utility poles located on the north side of West Avenue J, (ii) overhead along Silverado Power's planned overhead transmission poles on the south side of West Avenue J, and/or (iii) underground along the south side of West Avenue J (or some combination of these three options) to two hand-off points. From the Antelope Substation, a primary communication path would run underground to a point near the electrical overhead hand-off described above on the south side of West Avenue J, which would serve as the "South Hand-off Point". A secondary communication path would run underground directly across West Avenue J from the Antelope Substation to the north side of the street, where there would be the "North Hand-off Point". The two communication paths would thus run from the Project site; one would run to the South Hand-off Point and the other would run to the North Hand-off Point.

**<u>Meteorological Data Collection System</u>**

The Project facility would also include at least one meteorological data collection system, which would be configured to collect the meteorological data listed below at the level of the solar panels or approximately six to eight feet above the ground. Information gathered from this

[3] The Silverado Power project is analyzed in a separate CEQA document by the City of Lancaster.




Source: AEI-CASC Consulting, 2012

# Proposed Path A Grid-Tie Transmission Line

# Exhibit 3-3D

*West Antelope Solar Energy Project*

N W E S

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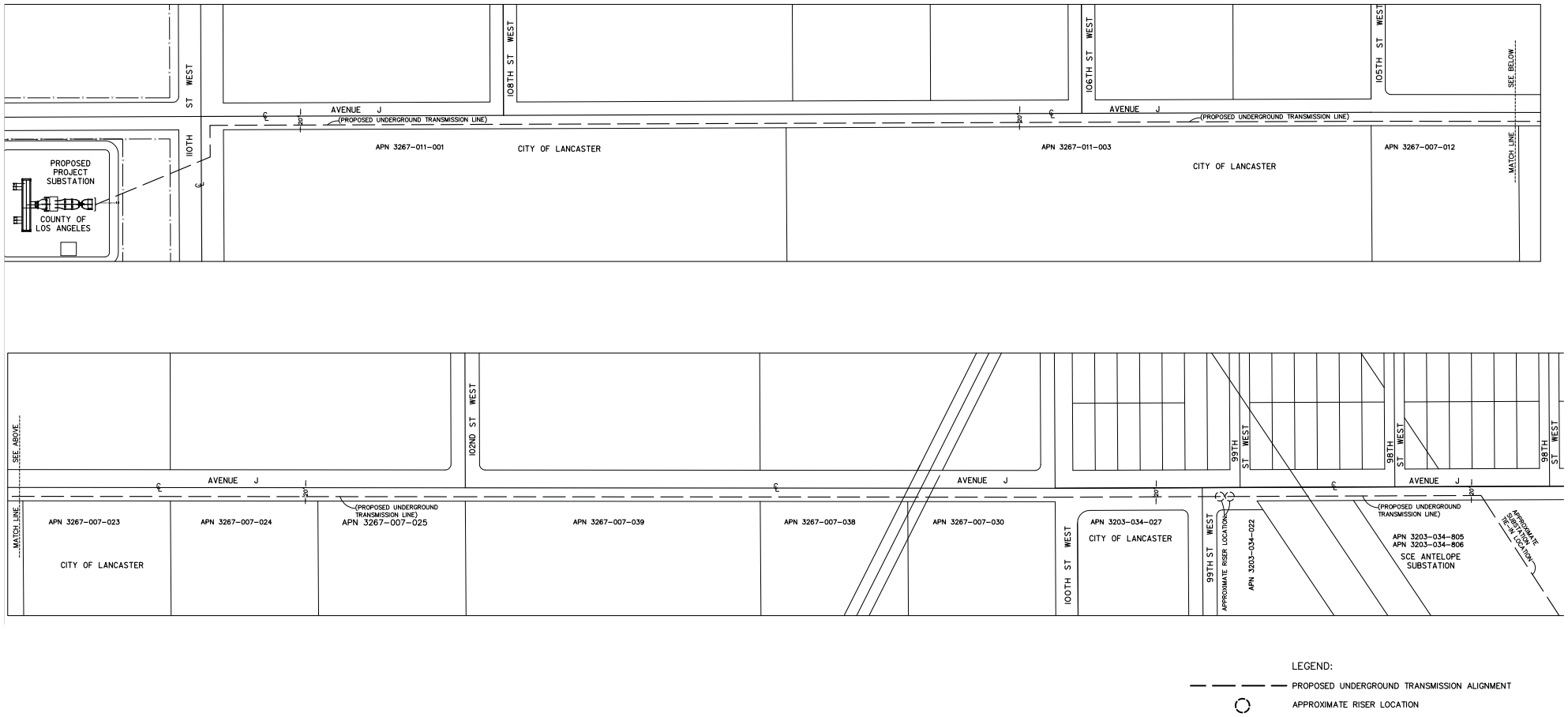


LEGEND:

PROPOSED UNDERGROUND TRANSMISSION ALIGNMENT

APPROXIMATE RISER LOCATION

Source: AEI-CASC Consulting, 2012

# Proposed Path B Grid-Tie Transmission Line

# Exhibit 3-3E

*West Antelope Solar Energy Project*

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system would be used to position the PV panels for optimum utilization. Types of information to be collected include: global horizontal irradiance; global irradiance/plane of array; ambient temperature; PV cell temperature; wind speed; wind direction; relative humidity; precipitation; barometric pressure; and visibility.

## Infrastructure

### *Driveways and Access Roads*

As shown in Exhibit 3-3F, Retention Basins and Access Driveways, the two proposed access driveways would be located on West Avenue J; one would lead to the North Portion and one would lead to the South Portion. Each driveway would provide emergency access and access for maintenance and operation purposes. A network of minimum 20-foot-wide access roads with 32-foot center-line turning radii would also be provided throughout the Project site and around the perimeter, constructed in compliance with all applicable Los Angeles County Fire Department (LACFD) design requirements. The interior access roads would run between the PV panel blocks and would be spaced approximately 400 feet or less from each other in either north-south or east-west directions.

The proposed interior and perimeter access roads would generally be flat, with slopes less than four percent and would be graded closely to the existing elevation to minimize the earthwork for the Project. All interior and perimeter access roads would be compacted to 90 percent to allow for “all-weather” access per Los Angeles County Department of Public Works (LACDPW) requirements. To protect them from wind and water erosion, various erosion-control methods may be used, such as application of a soil binder or laying of aggregate. The soil binder would be reapplied annually or as needed to ensure the continued integrity of the access roads.

### *Drainage*

Existing and proposed flows and volumes have been calculated for 1-, 2-, 5-, 10-, 25-, and 50-year storm events to determine the quantity of storm water to be retained on site. Storm water impacts are further discussed in Section 4.10, Hydrology and Water Quality. Based on the analysis, the increased volume from the 50-year storm event (difference between post-development and pre-development volumes) would be retained via a series of “small” retention basins placed throughout the Project site.[4] Exhibit 3-3F shows a conceptual depiction of the retention basins. Basins would be positioned throughout the Project site in such a way that they would not inhibit emergency vehicles or maintenance activities. The soil displaced by each basin would be spread between basins. In addition, as shown in Exhibit 3-3A, the Project has been designed to avoid the potential jurisdictional drainage feature located along the eastern edge of the Project site’s North Portion.

### *Landscaping*

This Project has been designed to maintain the existing vegetation and to minimize disturbed areas by keeping grading and ground disturbance to a minimum. A Landscape Plan would be prepared, subject to review and approval by the County, which would include drought-tolerant landscaping along the portions of the perimeter fence facing 110$^{th}$ Street West, West Avenue J, and along the northern boundary of the site. The Landscape Plan would include new landscaping consisting of drought-tolerant vegetation along portions of the exterior of the perimeter fencing (spaced regular intervals per Landscape Plan requirements) to partially obscure/screen views into the Project site and to increase the visual aesthetics and

[4] Also referred to as “infiltration trenches” in the technical reports.

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Source: AEI-Casc Consulting, 2013

Retention Basins and Access Driveways

Exhibit 3-3F

*West Antelope Solar Energy Project*

BonTerra CONSULTING

(Rev 06/04/2013 MMD) PAS\Projects\TAAC\J001\Graphics\IS-MND\Ex3-3F_siteplan_basins.pdf

beautification of the site for nearby residences and users of the proposed California Poppy Trail. A Preliminary Landscape Plan has been included in Appendix A of this document. Irrigation via water trucks would be conducted for three years after planting in order to establish the landscaping. No long-term irrigation infrastructure is proposed.

### *Fencing*

As shown on Exhibit 3-3B, the site perimeter would be secured by six-foot-high chain-link fencing with one additional foot of three-strand barbed wire surrounding the PV system and on-site Project Substation. The driveways on West Avenue J would have automatic gates approximately 20 feet long and would be setback 50 feet from the road edge to allow for LACFD and maintenance access and turnaround. An approved “Fire Department Knox Lock” would be provided at both gates. Perimeter fencing would be raised at intervals to allow for wildlife passage through the Project site to a height that is the lesser of either: one foot above grade or the maximum height allowed by the PUC. “Warning High Voltage” signs would be placed on the fencing at about 100-foot intervals and at each gate.

### *Lighting*

Lighting would be installed in specific locations around the periphery of the Project site, as required for nighttime security purposes. Lighting would consist of modern, low intensity, downward-shielded fixtures that are motion-activated, and would be directed onto the Project site. Motion-detectors would be set at a sensitivity level that could not be triggered by small animal movement.

### *Fire Suppression and Safety*

Combustible vegetation on and around the Project boundary would be managed through fuel modification in accordance with the Fire Code or as directed by the Fire Official. Accordingly, all vegetation would be trimmed to a maximum height of six inches within the boundaries of the solar array. In addition, electrical transformer vaults or structures would have all vegetation cleared to mineral soil for a distance of 50 feet.

The proposed interior and perimeter access roads would provide access for fire and emergency vehicles. The Project Applicant would also coordinate with the LACFD to provide PV training to fire responders, construction, operational and maintenance staff. The intent of this training would be to familiarize both responders and on-site employees with the codes, regulations, and associated hazards related to solar electricity. This training would include techniques for fire suppression of PV systems.

### *Water Tanks*

Two water tanks would be installed on the Project site, with each tank providing water for both fire suppression, three years of landscaping establishment, and O&M activities. One tank would be located on the North Portion and the other tank would be located on the South Portion, both located along West Avenue J immediately adjacent to the North and South driveways, respectively. Each water tank would be a split-tank, with one portion having a minimum of 10,000 gallon capacity for exclusive LACFD use, with outlets clearly identified as for “Fire Department Use Only”. The other portion of each split-tank would be available for O&M use. Each water tank would have an approximate diameter of 15 feet and a height of 15 feet and would be designed in accordance with the Los Angeles County Fire Code requirements.

### *California Poppy Trail Construction*

The Project includes the construction of an eight-foot (8') wide trail along the eastern boundary of the Project site, to be located within a 12-foot-wide multi-use (hiking, mountain biking, and equestrian) trail easement. The trail would be constructed in accordance with Los Angeles County standards in a manner consistent with the *County of Los Angeles Trails Manual* (Trails Manual), and forming part of Los Angeles County Trail Number 130 (California Poppy Trail) on the Los Angeles County Trails Map, which can be found in Exhibit 4-14 in Section 4.16, Recreation, of this document. This trail is mapped along the eastern boundary of the Project site up 110$^{th}$ Street West and would loop westward at Avenue D West to encompass the Antelope Valley California Poppy State Natural Reserve (SNR) approximately four miles northwest of the Project site (LACDRP 2007). The California Poppy Trail is identified as an "adopted proposed trail system" that is not yet completely constructed.

## 3.2.2 PROJECT CONSTRUCTION

Project construction would include several phases occurring simultaneously, including (1) pile driving piers or posts and placing trackers on support piers; (2) trenching and installing the DC and AC collection system, including the inverter enclosures; (3) constructing electrical transmission facilities, including the on-site Project Substation and Grid-Tie transmission line; and (4) grading access roads and the trail, and constructing drainage elements.

### Grading and Construction Activities

### *On-Site Activities*

As the terrain on the Project site is generally flat, grading and ground disturbance for the Project would be minimal and would be primarily limited to access roads and the retention basins, but would also include the Project Substation, inverter pads, water tank pads, and trail areas. The solar arrays would be installed using pile-driving techniques, rather than grading, to minimize soil disturbance. This reduced grading would help maintain existing hydrologic features and patterns on the Project site. Table 3-2, Grading Quantities, shows the anticipated grading and ground disturbance quantities and acres of impact due to Project implementation.

Of the entire 263-acre site, approximately 178.5 acres would be contained within the fenced areas and would be subject to both long-term grading and ground disturbance for the roads, structure pads, water tanks, and retention basins, as well as short-term staging areas for construction. Construction of the Project would begin with the clearing and grubbing of vegetation in only those areas that would be disturbed, which includes approximately 30.36 acres of the 263–acre Project site, as shown in Table 3-2. The Project would require approximately 14,189 cubic yards (cy) of cut and 13,794 cy of fill materials, leaving approximately 395 cy of fill materials to be balanced on-site. This minor amount of extra soil would be generally accounted for through soil shrinkage and site compaction. There would be no import or export of soils.

Construction would involve grading and ground disturbance for the access roads and the trail; installing the PV system; on-site trenching for the electrical DC and AC collection system, including the telecommunication lines; installing the inverter enclosures; installing an underground 34.5-kV line for each collection system that leads to the Project Substation; and constructing the 34.5/66-kV Project Substation.

The Project Substation would require grading of an approximate two-acre area, as shown on Exhibit 3-3C. Approximately 11 inverter pads would be located throughout the Project site, each of which is approximately 12 feet by 35 feet. Each of these pads would be graded but, as with the Project Substation area, the proposed elevation would be set to minimize earthwork. The Project Substation and inverters would be placed on poured-in-place concrete slabs or steel piles. The footings for the steel support structures that hold the PV panels would be installed on the existing grade. Any undulations in the terrain would be accounted for by varying the mounting height of the PV panels. The existing vegetation in all other areas of the Project site would be mowed to a maximum height of 6 inches, per LACFD requirements. Minor trenching would be required to electrically connect all Project components, including trenching under West Avenue J to link the North and South Portions of the Project site together. No import or export of soils is proposed as part of the Project.

### *Off-Site Activities*

The Project would connect to the existing transmission grid via a 66-kV Grid-Tie transmission line that runs approximately 1.5 miles east to the SCE Antelope Substation, as previously discussed. Placing the Grid-Tie underground would require minor off-site trenching and would include excavation to a depth of approximately three to four feet deep along the southern edge of West Avenue J. Under both proposed alternatives, the riser would hand-off overhead to Southern California Edison (SCE) at approximately 99$^{th}$ Street West, where it would travel along two switch poles and another riser pole before transitioning back underground, until connecting into the 66-kV bus at the Antelope Substation. As part of this hand-off, SCE would construct an underground trench, including several vaults.

Under the Path B scenario, in which the Grid-Tie would remain underground the whole way, the length of underground work of would be approximately 6,880 linear feet. As shown in Table 3-2, assuming a five-foot wide trench, the area of disturbance would be approximately 34,400 square feet, or 0.79 acres. Assuming a depth of 3.5 feet, the volume of earthwork would be approximately 4,459 cubic yards.

This IS/MND covers the required environmental analysis pursuant to CEQA for the Project-related transmission line work to be completed by SCE. As there are existing and planned/approved utility poles along this path that cross into the City of Lancaster, appropriate easements and permits from the City of Lancaster would be required. As further discussed in Section 4.4, Biological Resources, the Grid-Tie would also avoid the potential jurisdictional features located on West Avenue J.

**TABLE 3-2**
**GRADING QUANTITIES**

| Project Component | Cut Materials (cubic yards) | Fill Materials (cubic yards) | Net Change (cubic Yards | Disturbed Areas (acres) |
|---|---|---|---|---|
| **On-Site** | | | | |
| Access Roads | 6,015 | 6,575 | (-560) | 23.5 |
| Structure Pads | 1,451 | 496 | 955 | 0.10 |
| Water Tanks | 10 | 1 | 9 | 0.01 |
| Trails | 242 | 251 | (-9) | 1.25 |
| Retention Basins | 6,471 | 6,471[1] | 0 | 5.50 |
| **Sub-Totals** | **14,189** | **13,794** | **395**[2] | **30.36** |

**TABLE 3-2**
**GRADING QUANTITIES**

| Project Component | Cut Materials (cubic yards) | Fill Materials (cubic yards) | Net Change (cubic Yards | Disturbed Areas (acres) |
|---|---|---|---|---|
| **Off-Site** | | | | |
| Grid-Tie Path B[3] | 4,459 | 4,459 | 0 | 0.79 |
| **TOTAL** | **18,648** | **18,253** | **395** | **31.15** |

[1] Soil generated by the basin cuts will be placed adjacent to the basins and stabilized.
[2] The volumes provided are raw numbers, so there will be shrinkage and subsidence that will be incorporated later during final engineering.
[3] Only the Path B numbers are shown as it is the more construction-intensive alternative.

## Dust and Erosion Control

During construction, the Project would comply with Antelope Valley Air Quality Management District's (AVAQMD's) Rule 403, Fugitive Dust to prepare and implement a Dust Control Plan (see MM AQ-1) for controlling fugitive dust. Additionally the Project would be required to prepare a Storm Water Pollution Prevention Plan (SWPPP) as required by the State Water Resources Control Board's Construction General Permit, which would further control water and wind erosion during construction. The Dust Control Plan and SWPPP would incorporate a number of strategies during construction to control fugitive dust due to high winds from the Project site, including the following:

- Minimal Grading and Ground Disturbance: The Project would perform the minimum amount of grading and disturb the minimum amount of existing vegetation to construct the Project. Grading would generally be limited to the proposed access roads, retention basins, Project Substation foundation, inverter pads, water tank pads, and trail areas. The existing vegetation in all other areas would be mowed to a height consistent with vegetation management requirements and left in place.
- Vehicle Use: The Project would only use construction vehicles with tires and would prohibit use of equipment with rotating wheel tracks (e.g. tank treads or caterpillar tracks).
- Construction Scheduling: Grading activities would be temporarily halted and/or site watering would be increased during wind speeds that exceed 25 miles per hour, or when visible dust plumes have the potential to be transported: 1) off the Project site or 2) 200 feet beyond the centerline of the construction of linear facilities (such as the Grid-Tie). Earth-moving activities on the Project site would be scheduled during winter months, when it is anticipated that natural rainfall would assist with mitigation of fugitive dust.
- Water Application: The Project would apply water to the construction site as necessary to control fugitive dust. As required by the AVAQMD, when water is used as fugitive dust control, watering is required three times a day and increased to a minimum of four times a day if there is evidence of visible wind-driven fugitive dust. .
- Soil Binders/Wood Mulch: Soil binders and wood mulch would be applied as necessary.
- Stock Piles Stabilization: All stock not currently in use would be stabilized from erosion through the use of watering, soil binders, or protected with a plastic or geo-textile mat.

- Final Stabilization: Prior to completion of construction, all disturbed areas would be permanently stabilized through the use of an all-weather surface treatment and existing vegetation would be maintained at a maximum height of 6 inches, per LACFD requirements.
- Monitoring: A qualified construction mitigation manager (CMM) or delegate would be retained to be on-site during all grading activities to ensure compliance with the approved Dust Control Plan. The CMM or delegate would monitor all construction activities for visible dust plumes. The CMM or Delegate would promptly implement additional dust plume reduction measures in the event that such visible dust plumes are observed. Additional measures to be implemented, as necessary, would include increased watering, application of dust palliatives, and/or scaled back construction activities up to and including temporary work cessation.

**Construction Water Demands**

During construction, water would be used to suppress fugitive dust during grubbing, clearing, grading, trenching, and soil compaction. Water for construction activities can be of non-potable quality. All construction water would be trucked to the site from available commercial water sources outside the Antelope Valley Groundwater Basin. The Project site is outside of the Los Angeles County Waterworks District No. 40 (District) service area, but within its sphere of influence. Various options are available to the Project Applicant to obtain water from State Water Project Table A entitlement water (sourced from northern California), including obtaining water deliveries through a negotiated program between the Antelope Valley-East Kern Water Agency (AVEK) and the District, or purchasing a new permanent water supply, or contracting with a water bank outside the Antelope Valley Groundwater Basin for the entire life of the Project and transferring those supplies to the AVEK and the District for use on the Project site (LACDPW 2013). The Applicant has an agreement with the Cawelo Water District, who would transfer banked water to AVEK. AVEK would then sell it to the District, who would then provide it to the Project (Cawelo 2013).

Construction activities for the proposed Project are anticipated to require an estimated average water demand of 100,000 gallons per day. The daily water demand estimate assumes that on an average construction day, 20 acres are in active construction, requiring 10 continuous hours of water using five water trucks, assuming 4,000-gallon capacity trucks. Construction of the Project would require approximately six months, or 156 work days (Monday - Saturday), to complete. Based upon these parameters, the construction water demand for the proposed Project is estimated to total 15.6 million gallons, or 47.87 acre-feet (one acre-foot is equal to 325,851 gallons). Assuming construction for six months (i.e. 156 working days), and assuming use of a 6,000-gallon water delivery truck, the delivery of 47.87 acre-feet of water would require approximately 17 truck trips per day.

Table 3-3, Total Estimated Water for Project Construction, shows the estimated water demand associated with construction of the proposed Project.

**TABLE 3-3**
**TOTAL ESTIMATED WATER FOR PROJECT CONSTRUCTION**

| | Construction Period (work days)[a] | Demand Factor (gallons per day)[b] | Total Estimated Water Demand (gallons) | Total Estimated Water Demand (acre-feet) |
|---|---|---|---|---|
| **West Antelope Solar Project** | 156 days | 100,000 | 15,600,000 | 47.87 |

[a] Assumes 26 work days per month, with work occurring Monday through Saturday.
[b] Assumes that water will be used for washing down construction equipment, access roads, and dust control. Assumes that a maximum of 20 acres will require continuous watering for a 10-hour construction day using 6,000-gallon water trucks. This is a very conservative assumption because only 3 acres would be subject to ground disturbance/grading at any one time.

Source: LACDRP 2013.

### *Landscape Irrigation*

Water would also be necessary to establish the landscape buffer along portions of the perimeter fence. The Project includes an approximately 10-foot-wide vegetated strip along the site frontage facing 110th Street West, West Avenue J, and along the northern boundary of the site, which totals approximately 113,810 square feet or 2.61 acres. Project landscaping would consist of drought tolerant species, and incorporate native species as appropriate. Once established, the species would not require on-going irrigation. The irrigation needs for landscaping establishment are assumed to last for three consecutive years following installation.

The formula used to estimate the Maximum Water Allowance (MWA) is based on the local annual evapotranspiration rate (ETo) of 66.19 inches[5], the ET adjustment factor (ET) of 0.267[6], and conversion factors of 0.62 to obtain gallons per square foot, and a conversion factor of 7.48 to obtain square feet per acre (CVWD 2007). Thus, the MWA is 1.46 acre-foot per acre of landscaping. The formula below details the approach used to estimate the annual MWA per acre for low water demanding landscaping (CVWD 2007).

$$\begin{aligned} MWA &= ((ETo)(ET)(0.62))/7.48 \\ &= (66.19)(0.267)(0.62)/7.48 \\ &= 475{,}742 \text{ gallons per acre or } 1.46 \text{ acre-foot per acre} \end{aligned}$$

As shown in Table 3-4, Total Estimated Water for Landscape Irrigation, assuming periodic irrigation for establishment purposes over a 3-year period, it is estimated that approximately 3.81 acre-feet of water will be needed annually to assure plant establishment on the Project site. Irrigation for the 3-year landscaping establishment period would be obtained from the two water tanks on the Project site, rather than daily water truck trips.

[5] Evapotranspiration is the quantity of water evaporated from soil surfaces and transpiration of plants and varies do to local climatic conditions, such as the direction of wind, intensity of sun, and presence of shade. As reported in the Final Antelope Valley 2010 Integrated Regional Urban Water Management Plan (IRUWMP), the region has an annual ETo rate of 66.19 inches.

[6] The ET adjustment factor is dependent upon the water needed for plant species and the type of irrigation used. For analysis purposes it is assumed that the irrigation efficiency is 0.75. It is assumed that native and drought tolerant species dominate the proposed plant palate, thus a low water demanding plant factor of 0.2 is used. The resulting ET is 0.267.

**TABLE 3-4**
**TOTAL ESTIMATED WATER FOR LANDSCAPE IRRIGATION**

| | Square Feet[a] | Acres[b] | MWA Factor[c] | Estimated Annual Water Demand (acre-feet)[d] |
|---|---|---|---|---|
| **Landscape Irrigation** | 113,810 | 2.61 | 1.46 | 3.81 |

[a] Consistent with the requirements of the jurisdiction, the property frontage along 110th Street West, both sides of West Avenue J, and the northern boundary is approximately 113,810 linear feet. Combined with a 10- foot wide buffer, the total landscaped area is estimated to be 113,810 square feet.
[b] One acre = 43,560 square feet.
[c] Maximum Water Allowance for drought tolerant desert landscaping per acre.
[d] It is assumed that the entire vegetated strip will be watered for a three-year establishment period.

Source: CVWD 2007.

Under Section 3.2.3, Operational Characteristics, Table 3-6 presents the Total Estimated Water for Operation and Maintenance, and Table 3-7 presents Total Estimated Project Water Use, which includes estimated water demands for construction needs, landscaping, and operations and maintenance.

## Construction Phasing and Schedule

Construction of the Project is anticipated to commence in fourth quarter 2013 and would require approximately six months to complete. Table 3-5, Project Construction Schedule, provides the Project's proposed schedule. While the schedule may be modified due to the date of County Project approval as well other Project approval/permits, this table illustrates the approximate duration of major Project activities. Construction activities would occur between the hours of 7:00 AM and 7:00 PM Monday through Saturday.

**TABLE 3-5**
**PROJECT CONSTRUCTION SCHEDULE**

| Project Activity | Timing |
|---|---|
| Right-of-way/property acquisition | 3rd quarter 2012 |
| Conditional Use Permit approved | 3rd quarter 2013 |
| Acquisition of additional required permits | 3rd quarter 2013 |
| Construction begins | 4th quarter 2013 |
| Completion of construction | 2nd quarter 2014 |
| Project operational | 2nd quarter 2014 |
| Source: TA-Acacia. | |

## Construction Workforce and Staging

Trip generation for employees and delivery trucks would vary depending on the phase of construction. During the peak of construction, a typical day would include the transportation of workers, movement of heavy equipment, and transportation of materials. The anticipated peak traffic day, which would occur when grading and equipment delivery trucks overlap with worker trips for panel installations, would involve approximately 51 round-trip truck trips (including 17 trips for water delivery trucks) and 54 round-trip worker trips. This peak activity is estimated to occur over approximately 10 working days, but may be more or less depending on the actual timing of construction phase overlap. Table 3-6, Construction Equipment, lists commonly

associated equipment with the construction of solar facilities. A detailed breakdown of the estimated number of trucks being operated for each construction task is found in Appendix B.

Construction would require small gas-powered generators to power hand tools and gas-powered welders to assemble the steel portions of the tracking system and for general assembly. Construction staging and material lay-down areas would be set up for each section of the Project site to allow for efficient distribution of components to different parts of the Project. These lay-down areas would be located within the Project site boundaries, temporarily fenced, and would each cover approximately 1.5 acres.

The Project would provide a mobile sanitation facility for use by workers during the construction period. Per Los Angeles County Department of Public Health regulations, a Mobile Sanitation Facility Plan would be submitted for review prior to construction (LACDPH 2012). The mobile sanitation facility would be maintained in a safe and sanitary condition so as not to constitute a public hazard or nuisance. Domestic wastewater would be treated using existing facilities per County regulations.

**TABLE 3-6**
**CONSTRUCTION EQUIPMENT**

| Equipment | Use |
|---|---|
| **For Installation of Solar Arrays** | |
| Boom Truck/Truck-Mounted Crane | Moving materials |
| Bore/Drill Rigs | Drilling holes into the ground |
| Concrete Mixing Trucks | Delivering concrete used for slabs and foundations |
| Disposal Containers | Disposing of and removing construction debris |
| Dump Trucks | Delivering and spreading aggregates |
| Excavators | Trenching and pouring foundations |
| Forklifts | Moving materials; loading and unloading trucks |
| Generator Sets/Load Banks | Providing temporary power |
| Graders | Leveling access roads and driveways |
| Other Material Handling Equipment | Moving materials |
| Paving Equipment | Paving, if required |
| Plate Compactors/Jumping Jacks | Compacting soil under concrete slabs and foundations |
| Pile/Vibratory Drivers | Driving structure posts |
| Pressure Washers | Cleaning |
| Rollers | Compacting access roads and driveways |
| Skid Steer Loaders | Completing light soil work for slabs and foundations |
| Sweepers/Scrubbers | Controlling dust on paved areas |
| Tractors/Loaders/Backhoes | Clearing, grubbing, and moving soil |
| Trenchers | Completing light trench work |
| Welders | Assembling structures |
| Storage Containers | Storing on-site materials |
| Other General Industrial Equipment | Assembling structures |
| Service Trucks | Maintaining heavy equipment |
| Personnel transport vehicles | Transporting workers |
| Water Trucks | Controlling dust and landscape watering |

**TABLE 3-6**
**CONSTRUCTION EQUIPMENT**

| Equipment | Use |
|---|---|
| **For Grid-Tie Connection to Antelope Substation** | |
| Driller | Civil-related work |
| Dump Truck | Civil-related work |
| Cement Truck | Civil-related work |
| Skip Loader | Civil-related work |
| Water Truck | Civil-related work |
| Forklift | Civil and electrical related work |
| Trencher | Civil-related work |
| Bobcat | Civil-related work |
| Tool Truck | Civil-related work |
| Reach Manlift | Electrical-related work. |
| Pickup Trucks | Electrical-related work |
| 14-Ton Crane | Electrical-related work |
| Crew Trucks | Electrical-related work |
| 5-Ton Truck | Electrical-related work |
| Inspection Services | Electrical-related work |
| Source: AECOM and SCE 2012. | |

### 3.2.3 OPERATIONAL CHARACTERISTICS

**Operations Workforce**

The workforce performing ongoing O&M would be relatively small. The workforce is comprised of general labor for cleaning purposes; skilled electricians for visual inspections, repairs, and performance testing; and skilled mechanics to inspect and maintain the mechanical portions of the tracking system. Because the entire facility would be monitored remotely in real time (as described in detail below), it is anticipated that only four to five O&M personnel would make about two to three visits per year to conduct the on-site O&M functions.

Other than O&M, general landscape labor would include vegetation maintenance at some interval to maintain ground cover and remove unwanted vegetation that could block or shadow the panels. As required by the LACFD, vegetation would be trimmed to a maximum height of six inches within the Project site boundaries. Further, electrical transformer vaults or other structures would have all vegetation cleared to mineral soil for a minimum distance of 50 feet (LACFD 2012).

Skilled operations monitoring personnel would review the information provided by the SCADA system. In addition, if a fault or an error occurs, an automatically generated email would be sent to monitoring personnel to alert them. The monitoring personnel would assess the fault or error information to determine what corrective actions would be needed. In most cases with PV systems, the fault is auto-correctable and does not require reactive repair at the site.

**Facility Maintenance**

PV facilities contain very few moving parts and have limited ongoing maintenance requirements. Maintenance activities would consist of checking electrical performance parameters via remote monitoring; performing periodic inspections and maintaining

transformers and inverters; responding to any problems detected by remote monitoring; conducting weed abatement and dust-control activities; cleaning PV panels; and maintaining driveways, which is detailed below. No major equipment is anticipated to be required for maintenance of the facility except as necessary for maintenance of the access roads.

**Dust Control and Operations Water Use**

After construction is complete, the roads would be maintained on an as-needed basis. It is anticipated that road maintenance would occur annually, depending on local weather and frequency of use. Internal road maintenance would involve superficial re-grading and erosion control measures, as needed. As previously discussed, all disturbed areas would be permanently stabilized through the use of an all-weather surface treatment.

In addition, O&M of solar facilities includes the periodic cleaning of solar panels, and washing down trucks, maintenance equipment, and other ancillary activities. Based on estimates from the U.S. Department of the Interior Bureau of Land Management (BLM) and the U.S. Department of Energy (DOE), the demand associated with the cleaning of PV panels is approximately 0.05 acre feet per MW. Ancillary activities are assumed to generate an annual demand of 0.02 acre feet per MW (BLM and DOE 2010). Based on these demand factors, O&M of the proposed Project is estimated to generate a water demand of approximately 1.00 acre-foot per year for panel cleaning and 0.40 acre-foot per year for ancillary activities, such as washing down equipment other than solar panels.

Cleaning of the PV panels would involve spraying of the panels with demineralized water to remove dust buildup, grime, bird droppings, and/or soot from the PV panels. Cleaning water would be allowed to infiltrate into the ground or evaporate as it drips off the PV modules.

Two water tanks would be installed on the Project site, each providing water for both fire suppression and O&M activities. Each water tank would be a split-tank, with one portion having a minimum of 10,000-gallon capacity for exclusive LACFD use, with outlets clearly identified as for “Fire Department Use Only”. The other portion of the split-tank would be available for O&M use. Each water tank would have an approximate diameter of 15 feet and a height of 15 feet and would be designed in accordance with the Los Angeles County Fire Code requirements. It is assumed that the portion of the split tank designated for emergency fire protection would be flushed and refilled once per year over the 20-year life of the Project, thereby generating an overall demand of 400,000 gallons (1.23 acre-feet). The operator intends to employ a water conservation practice to reuse flushed water from the fire department tanks. Possible uses will depend on water quality (i.e., not containing debris, oil, or other contaminants) and timing of O&M activities. As feasible, flushed water from the tanks could be used for panel washing, ancillary O&M and/or to supplement landscaping establishment.

As shown in Table 3-7, Total Estimated Water for Operation and Maintenance, panel washing, ancillary O&M, and refilling the water tanks at the proposed Project is expected to generate an annual water demand of 1.23 acre-feet per year during the O&M phase of the Project.

**TABLE 3-7**
**TOTAL ESTIMATED WATER FOR OPERATION AND MAINTENANCE**

| | MW Capacity | Acre-Feet per MW | Annual Demand (acre-feet) |
|---|---|---|---|
| Panel Washing | 20 | 0.05 | 1.00 |
| Ancillary Activities | 20 | 0.02 | 0.40 |
| Fire Dept. Emergency Tank[a] | – | – | 1.23 |
| **Total** | | | 2.63 |

[a] Assumes that the 10,000-gallon portion of the split tank for LACFD use will be flushed and refilled once per year over the 20-year life of the Project.

Source: BLM and DOE 2010.

The Project would provide a mobile sanitation facility for use by workers during O&M activities. Per Los Angeles County Department of Public Health regulations, a Mobile Sanitation Facility Plan would be submitted for review prior to construction (LACDPH 2012). The mobile sanitation facility would be maintained in a safe and sanitary condition so as not to constitute a public hazard or nuisance. Waste generated by the mobile sanitation facility would be disposed and treated per County regulations.

### 3.2.4 DECOMMISSIONING PLAN

A Decommissioning Plan for the Project would be prepared and submitted for approval to Los Angeles County Department of Regional Planning prior to the issuance of a grading permit. This Plan would ensure that the land is returned to a beneficial use upon termination of the use of the property as a solar site.

The Plan would include information regarding decommissioning timing; equipment removal; and habitat restoration for the site in accordance with Los Angeles County, State, and federal regulations and requirements. The Plan would also include details of ground treatments, erosion control, fertilization, seed sources, vegetation planting methods, and irrigation methods, as well as information on appropriate post-closure uses of the site, which may include agricultural land, open space, or some other use consistent with County plans and ordinances.

**Timeline for Reclamation Plan**

For the purposes of the analysis contained within this IS/MND, the impact analysis assumes implementation of the Decommissioning Plan implementation at 20 years from the commencement of operations, as the Applicant has a Power Purchase Agreement (PPA) for 20 years with PG&E. It is more likely that the solar facilities would obtain a lease extension for the continued operation of the solar arrays because the useful life of these solar panels is approximately 30 years, although the efficiency of the panels would be diminished.

For the purposes of the analysis, it is also assumed that decommissioning construction activities of the Project site would require the same timeframe as construction of the site.

**Removal of Equipment**

Once the power facility is shut off, the first step would be to remove all chemicals, fuels, oils, transformer oils, and other potential hazards chemicals and wastes from the Project site. These would be disposed of in accordance with Los Angeles County, State, and federal laws. All equipment and foundations would be removed from the Project site so that it may be utilized for other uses. Solar modules would be unbolted from the support structures and consolidated in a

designated lay-down area. The modules have value and would be sold to an off-site recycler. They would be loaded onto trucks in batches and moved off-site. The beams supporting the panels would be extracted from the ground and moved to the lay-down area where they would be cleaned, stockpiled, and consolidated. They would be moved off-site and recycled.

The inverters would be removed and moved onto an impermeable base in the lay-down area. Care would be taken that no leaks or spills occur from this temporary storage area. The inverters have value and would be recycled. They would be loaded onto trucks in batches and moved off-site.

The electrical substation would be removed and the components moved to the lay-down area. Care would be taken that no leaks or spills occur from this temporary storage area. The substation equipment has value and would be recycled. The concrete foundation for the substation would also be removed. The security fence, water tanks, Gen-Tie Line, and riser poles would be taken down and sold with the other scrap material. Any other miscellaneous remaining equipment or other material would be removed.

**Contouring, Erosion, and Sediment Control**

All disturbed areas, including access roads, retention basins, and equipment foundations would be removed and restored to the previous or better condition than prior to construction. It is assumed that the trail would be dedicated to the County Department of Recreation and Parks and remain permanently in-place as part of the California Poppy Trail system. Contouring of the site would be conducted using standard grading and/or farming equipment to return the land to approximately match the pre-construction surface conditions. The site drainage features would be restored to their original condition. Temporary erosion and sediment control measures such as soil stabilizers would be used as needed. The original site conditions would be recorded prior to beginning construction for referral during final restoration.

**Decommissioning**

This section of the plan would provide information on the appropriate post-closure uses of the site which may be agricultural land, open space or some other use consistent with County plans and ordinances. Details of ground treatments, erosion control, fertilization, seed sources, vegetation planting methods, and irrigation systems would be added to the plan before it is implemented.

Water usage for restoration of vegetation in previously disturbed areas was estimated using the methodology used above for landscape irrigation and is summarized in Table 3-8, Total Estimated Water for Decommissioning. Based on a disturbed area of 29.11 acres[7], it is estimated that approximately 42.5 acre-feet of water would be required for landscape restoration. Assuming that the same amount of water would be required for deconstruction as was required for construction, the total amount of water required for decommissioning would be approximately 90.37 acre-feet.

[7] The total disturbed area shown in Table 3-2 of 30.36 acres, minus the acreage of the trail (1.25 acres), which would be kept in place.

**TABLE 3-8**
**TOTAL ESTIMATED WATER FOR DECOMMISSIONING**

| Activity | Total Demand (acre-feet) |
|---|---|
| Deconstruction<br>Landscape Restoration | 47.87<br>42.50 |
| **Total** | 90.37 |

It is unknown at this time if solar would continue to be utilized on this land in excess of 20 years, and thus the future long-term use of the site would be updated periodically with the Decommissioning Plan as it becomes better known.

## 3.3 PROJECT WATER DEMAND

Table 3-9, Total Estimated Project Water Use, includes estimated water demands for construction needs, landscaping, and operations and maintenance over the 20-year life of the Project. In total, the Project will require approximately 110.59 acre-feet (36.04 million gallons [MG]) of water over the 20-year life of the Project. It is anticipated that implementation of the Decommissioning Plan at the end of the useful life of the solar array will require approximately 90.37 acre-feet, resulting in a total of approximately 201 acre-feet from Project construction through decommissioning.

**TABLE 3-9**
**TOTAL ESTIMATED PROJECT WATER USE**

| | Year 1 Demand (acre-feet) | Year 2 Demand (acre-feet) | Year 3 Demand (acre-feet) | Annual Demand Year 4 through Year 20 (acre-feet) | Total Demand (acre-feet) |
|---|---|---|---|---|---|
| Construction Water | 47.87 | – | – | – | **47.87** |
| Landscaping Establishment Water | 3.81 | 3.81 | 3.81 | – | **11.43** |
| Operation and Maintenance Water | 1.32 | 2.63 | 2.63 | 2.63 (x17 years) | **51.29** |
| **Subtotal** | 53.00 | 6.44 | 6.44 | 44.71 | **110.59** |
| Decommissioning | – | – | – | – | **90.37** |
| **Total** | | | | | **200.96** |

## 3.4 REGULATORY BACKGROUND FOR SOLAR ENERGY PROJECTS

In 2002, the California Senate adopted Senate Bill (SB) 1078 (later accelerated by SB 107 in 2006), which established California's Renewables Portfolio Standard (RPS). The RPS requires electric service providers to increase the use of eligible renewable energy resources by at least 1 percent of their retail sales annually until they reach 20 percent by 2010. Executive Orders S-14-08 (issued on November 17, 2008) and S-21-09 (issued on September 15, 2009) establish a further goal of 33 percent renewable energy use by 2020. The California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) are jointly responsible for implementing this program.

The CPUC's central role is regulating utilities—and the water and electricity supply controlled by the utilities—and it is responsible for implementing the RPS. The CPUC also provides a number of key incentives for the development of distributed power generation, including the California Solar Initiative (SB 1) and the Self Generation Incentive Program (SGIP).

Solar thermal projects above 50 MW require approval from the CEC. Smaller projects are subject to approval by local authorities. The CEC is responsible for certifying solar facilities as eligible renewable resources for the RPS. Solar energy projects proposed in the desert area on Bureau of Land Management (BLM) land require approval from the BLM. Since the proposed solar array Project would have less than 50 MW of capacity and would be located on County land, it would not require BLM or CEC approval. However, as the Project would directly supply power to PG&E, it would need to be certified by the CEC as an eligible renewable resource.

## 3.5 ANTICIPATED PROJECT APPROVALS/RESPONSIBLE AGENCIES

The County of Los Angeles is the Lead Agency for the proposed Project. However, the Project would require a number of permits and approvals from other State and local agencies, including those listed below.

### 3.5.1 DISCRETIONARY PERMITS

- California Energy Commission: Certification as an eligible renewable resource.
- California Department of Fish and Wildlife: Section 1604 Streambed Alteration Agreement (Note: This would only be required if jurisdictional drainage features would be impacted).
- Lahontan Regional Water Quality Control Board: Section 401 Water Quality Certification (Note: This would only be required if jurisdictional drainage features would be impacted).
- County of Los Angeles: Conditional Use Permit for the West Antelope Solar Project (Case No. R2012-01589).

### 3.5.2 MINISTERIAL PERMITS

- State Water Resources Board: NPDES Construction General Permit
- County of Los Angeles: Grading Permit, Building Permit, Driveway Permit, and Utility Crossing Permit for West Avenue J and 110th Street West.
- City of Lancaster: Easement for construction within West Avenue J right-of-way.

# SECTION 4.0 ENVIRONMENTAL CHECKLIST FORM

This section includes the completed environmental checklist form. The checklist form is used to assist in evaluating the potential environmental impacts of the proposed Project. The checklist form identifies whether the proposed Project is expected to have potential significant impacts. Substantiation and clarification for each checklist response is provided below each environmental topic.

1. **Project Title:** West Antelope Solar Energy Project

2. **Lead Agency Name and Address:** County of Los Angeles
   320 West Temple Street
   Los Angeles, California 90012

3. **Contact Person and Phone Number:** Mr. Anthony Curzi
   County of Los Angeles
   Department of Regional Planning
   (213) 974-6443

4. **Project Location:** Northwest and southwest corners of the West Avenue J and 110th Street West intersection in unincorporated Los Angeles County (near the western boundary of the City of Lancaster).

5. **Project Sponsor's Name and Address:** TA – Acacia, LLC
   119 First Avenue South, Suite 100
   Seattle, Washington 98104
   (206) 303-0198

6. **General Plan Designation:** N-1 (Non-Urban 1)

7. **Zoning:** A-2-5 (Heavy Agricultural)

8. **Description of Project:** The Project would develop the approximately 263-acre site with solar energy facilities that have a total system capacity of 20 MWac. The Project would consist of (1) mounted solar photovoltaic (PV) panels; (2) an electrical collection system; (3) the Project Substation; (4) an underground (or partially underground) transmission line along Avenue J to the SCE Antelope Substation; (5) a meteorological data collection system; and (6) civil infrastructure including driveways, internal access roads, drainage design, a hiking trail, secure fencing, landscaping, and two water tanks. At the end of the economically useful life of the Project, the Property would be restored to its pre-developed state in accordance with County requirements and an approved Decommissioning Plan.

9. **Surrounding Land Uses and Setting:** The 263-acre Project site is largely surrounded by undeveloped open space with the exception of the Southern California Edison's (SCE's) Tehachapi Renewable Transmission Project (TRTP) transmission lines, which pass through the Project site. Agricultural fields are located to the northwest, and open space with sparse rural residential development surrounds the Project site. Surrounding lands are relatively flat, with no major distinguishing topographic features and contain largely ruderal vegetation.

10. **Other Public Agencies Whose Approval is Required:** California Energy Commission, California Department of Fish and Wildlife (only if impacting jurisdictional drainage features), Lahontan Regional Water Quality Control Board (only if impacting jurisdictional drainage features), County of Los Angeles, City of Lancaster.

## ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this Project, involving at least one impact that is a "Less Than Significant With Mitigation" as indicated on the following pages.

- ☒ Aesthetics
- ☒ Air Quality
- ☒ Cultural Resources
- ☐ Geology and Soils
- ☒ Hazards and Hazardous Materials
- ☐ Land Use and Planning
- ☐ Noise
- ☐ Public Services
- ☐ Transportation/Traffic
- ☒ Mandatory Findings of Significance
- ☐ Agriculture and Forest Resources
- ☒ Biological Resources
- ☐ Energy
- ☐ Greenhouse Gas Emissions
- ☐ Hydrology and Water Quality
- ☐ Mineral Resources
- ☐ Population and Housing
- ☒ Recreation
- ☒ Utilities and Service Systems

## DETERMINATION:

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION would be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there would not be a significant effect in this case because revisions to the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION would be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Anthony Curzi
Signature of Lead Agency Representative

10/16/2013
Date

Anthony Curzi
Printed name

County of Los Angeles
Agency

| **4.1 AESTHETICS** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Have a substantial adverse effect on a scenic vista? | ☐ | ☒ | ☐ | ☐ |
| b) Be visible from or obstruct views from a regional riding or hiking trail? | ☐ | ☐ | ☒ | ☐ |
| c) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? | ☐ | ☐ | ☒ | ☐ |
| d) Substantially degrade the existing visual character or quality of the site and its surroundings because of height, bulk, pattern, scale, character, or other features? | ☐ | ☒ | ☐ | ☐ |
| e) Create a new source of substantial shadows, light or glare which would adversely affect day or nighttime views in the area? | ☐ | ☒ | ☐ | ☐ |

### 4.1.1 ENVIRONMENTAL SETTING

The 263-acre Project site is surrounded by and includes SCE TRTP transmission towers. It is partially bisected by West Avenue J, but is otherwise undeveloped, and it mostly consists of sparse and dry vegetation. SCE TRTP transmission towers run across the western edge of the North and South Portions, as well as the southern edge of the South Portion along West Avenue J-8. The topography is relatively flat with no major distinguishing features. On-site vegetation consists of annual grassland with small patches of native perennial grasses.

The area surrounding the Project site is generally undeveloped open space, with the exception of the agricultural fields to the northwest, sparse rural development, and transmission line corridors crisscrossing the area. There are approximately 15 single-family residential properties located within an approximate 1-mile radius of the Project boundaries. The nearest residential property is located 0.14 mile east of the Project site along West Avenue J in unincorporated Los Angeles County. A small alfalfa farm is located approximately 0.5 mile to the northwest from the Project site's western boundary. There are no industrial or manufacturing land uses in the Project vicinity, except for the Antelope Substation, which is located approximately 1.5 miles to the east of the Project site, and numerous nearby transmission lines.

Exhibits 4-1 and 4-2, Site Photographs, show photographs of the site from several different vantage points:

- ***Exhibit 4-1 – Views of North Portion of Project site.*** Photos 1 and 2 are views from the northeastern corner of the site looking west and south. Photo 3 is a view from West Avenue J looking west. As shown, the site is flat and mostly consists of sparse and dry vegetation. Distant hills are visible in the viewshed.

- ***Exhibit 4-2 – Views of South Portion of Project site.*** Photos 4 and 5 are from the southeastern corner of the site looking north and west. Photo 6 is a view from the intersection of 112$^{th}$ Street and West Avenue J looking southeast. The TRTP towers are visible, as are distant views of the San Gabriel Mountains.

**Photo 1:** Northeast corner of site looking west.

**Photo 2:** Northeast corner of site looking south.

**Photo 3:** Intersection of Avenue J and 110th St. looking west.

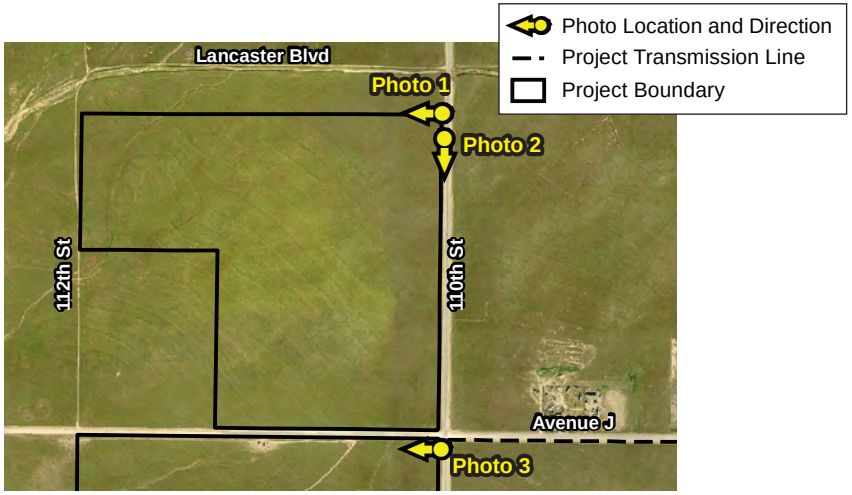


Photo location map.

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# Views of North Portion of Project Site

Exhibit 4-1

*West Antelope Solar Energy Project*

BonTerra CONSULTING

(Rev: 09/07/12 MMD) Projects\TAAC\J001\Graphics\IS-MND\Ex4-1_CUP_photosA.pdf

**Photo 4:** Southeast corner of site looking north.

**Photo 5:** Southeast corner of site looking west.

**Photo 6:** Avenue J and western edge of site looking southeast.

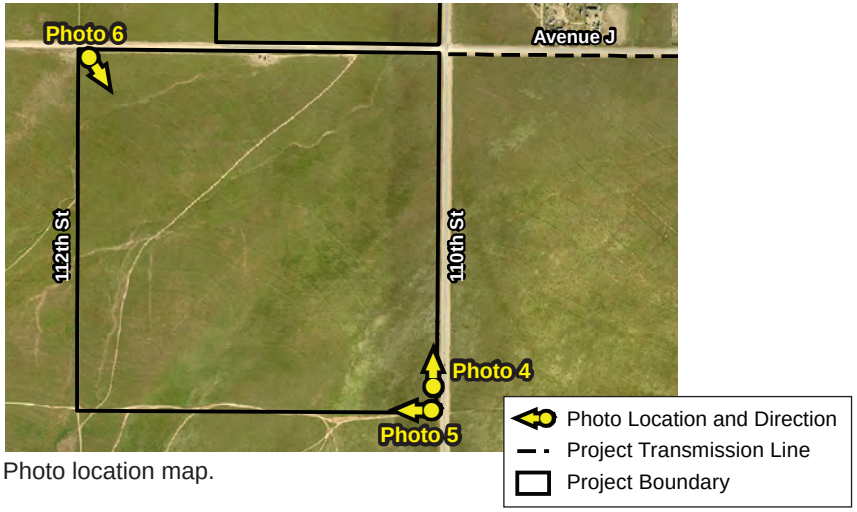


Photo location map.

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# Views of South Portion of Project Site

Exhibit 4-2

*West Antelope Solar Energy Project*

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According to the California Scenic Highway Mapping System, there are no officially designated or eligible State scenic highways near the Project site vicinity (Caltrans 2007). A segment of 110th Street West between Lancaster Boulevard/West Avenue I and West Avenue L, which is adjacent to the Project site, is identified by the Scenic Highway Element of the *Los Angeles County's General Plan* and the *Antelope Valley Areawide Plan* (LACDRP 1980, 1986) as a "Second Priority" scenic route. Second Priority Scenic Routes are proposed for further study upon completion of all first priority corridor studies.

The *City of Lancaster General Plan* has not established any scenic corridors. However, it does discuss local views of surrounding buttes and Quartz Hill and long-distance views of the San Gabriel Mountains and desert expanses as being scenic resources in the Lancaster area (Lancaster 2009b).

As the area is a rural environment with few existing land uses that emit ambient light, the Project site and surrounding areas do not contain bright or uniquely noticeable lighting. There are no street or traffic lights in the vicinity of the Project site. The nearest stationary sources of nighttime lighting are the residential properties along West Avenue J.

### 4.1.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities, as well as short-term construction and long-term operational impacts.

**a) Would the project have a substantial adverse effect on a scenic vista?**

**d) Would the project substantially degrade the existing visual character or quality of the site and its surroundings because of height, bulk, pattern, scale, character, or other features?**

***Less Than Significant With Mitigation.*** There are no officially designated or eligible State scenic highways or vistas in the vicinity of the Project site (Caltrans 2007). A segment of 110th Street West between Lancaster Boulevard/West Avenue I and West Avenue L, located adjacent to the Project site, is identified by the County Scenic Highway Element as a "Second Priority" Scenic Route. Second Priority Scenic Routes are proposed for further study upon completion of all first priority corridor studies (LACDRP 1980). The proposed 2012 Draft General Plan 2035 no longer prioritizes routes for further study, but rather relies on the official State list of Scenic Highways and Corridors (LACDRP 2012b). The proposed Antelope Valley Area Plan Update states the goal of identifying and protecting natural landforms and vistas with significant visual value by designating them as Scenic Resource Areas (LACDRP 2011b).

While the Project would not affect a designated scenic vista, there are natural features on and around the Project site that could be considered scenic by some. The proposed Project involves the installation of a solar array and related appurtenances on a currently undeveloped site. Thus, changes in the visual characteristics of the site would occur. Approximately 178.5 acres of currently open space of undeveloped, desert landscape would be replaced with numerous grids of PV panels, equipment buildings, and chain-link fencing. The proposed PV panels would be placed on mounting structures and are anticipated to reach approximately six to eight feet above the ground. The top height of the panels would vary slightly throughout the day as the panels rotate to track the movement of the sun across the sky. The site would also be surrounded by six-foot-high perimeter fencing. The tallest components of the Project would be higher than eye-level and, therefore, the solar facility would obstruct views through the Project site for viewers adjacent to the site on 110th Street West, West Avenue J (between the North Portion and South Portion), or other adjacent roadways. The Project would also include off-site

improvements, including the installation of the Grid-Tie transmission line, switch poles, and riser poles that connect the Project to the Antelope Substation.

The lands surrounding the Project site are largely open space and sparsely developed with residential homes, and very few people are traveling adjacent to the Project site at any given time. The proposed Project site is not located near any heavily visited land uses and would not be viewed regularly by the general public. Nevertheless, the visual change in character of the Project site from open space to developed solar facilities would be considered a significant impact.

MM AES-1 requires the preparation of a Landscape Plan, subject to the review and approval of the County of Los Angeles, mandating the planting of drought-tolerant plants for the exterior of the Project site along portions of the perimeter fence facing 110$^{th}$ Street West, West Avenue J, and the northern side of the Project site. This landscaping would provide a visual buffer between the public roadways and the solar facilities, and views into the Project site would be obscured and naturalized through the use of the required landscaping along the perimeter fencing. A Preliminary Landscape Plan is included in Appendix A of this IS/MND.

As shown on Exhibits 4-3A and 4-3B, Photo Simulations, the proposed solar array and associated fencing would not degrade or obstruct views of the surrounding mountains and buttes from the vantage points surrounding the Project site. Exhibit 4-3A shows the proposed viewshed from the northeast corner of the Project site looking south on 110$^{th}$ Street West. Exhibit 4-3B shows the proposed viewshed from the intersection of West Avenue J and 110$^{th}$ Street West looking west. The viewsheds depicted in Exhibits 4-3A and 4-3B would be further improved upon implementation of MM AES-1, which would reduce impacts to public views of the Project site from adjacent areas. Implementation of MM AES-1 would reduce the visual impacts of the on-site solar array to less than significant.

The Grid-Tie connecting the Project to the Antelope Substation may run overhead or underground, with the possibility of running overhead for about half of the 1.5-mile stretch along planned transmission poles shared with Silverado Power. These poles, which are already permitted by the City of Lancaster, would be similar in nature to typical electrical utility poles and would not significantly obstruct public views. At approximately 99$^{th}$ Street West, the Grid-Tie would hand-off to SCE at the first 75-foot-tall pole with a pole switch; SCE would also construct an identical second pole with a pole switch, and a 70-foot-tall tubular steel riser pole, where it would transition back underground, until connecting into the 66-kV bus at the Antelope Substation. These transmission poles would extend approximately 0.2-mile along West Avenue J adjacent to the northwest corner of the SCE Antelope Substation. The poles would be similar in height to existing electrical transmission towers in the area and similar in character to the adjacent Antelope Substation. Therefore, the slim profile of the poles would have a minimal effect on public views or the visual character of the area.

Considering the mix of existing surrounding land uses (i.e., open space, rural development, agriculture, utility infrastructure) and the potential for approvals of future solar facilities in the Project vicinity, implementation of the Project would be generally compatible with the character of the existing surrounding land uses. The utility-related function and aesthetic of the proposed Project would not substantially degrade the character of the surrounding area. Per the Los Angeles County Code, electric generating plants are a conditionally allowed use in the Heavy Agricultural (A-2-5) zone upon obtaining a Conditional Use Permit (CUP), which shows that the County generally considers it to be a compatible use in the area. Further, “utility and communication installations” are allowed uses in the Non-Urban 1 land use category of the *Antelope Valley Areawide General Plan* (LACDRP 1986). There is existing electrical

Existing Conditions

Proposed Conditions

# Photo Simulation – Viewshed Looking South on 110th Street West

Exhibit 4-3A

*West Antelope Solar Energy Project*

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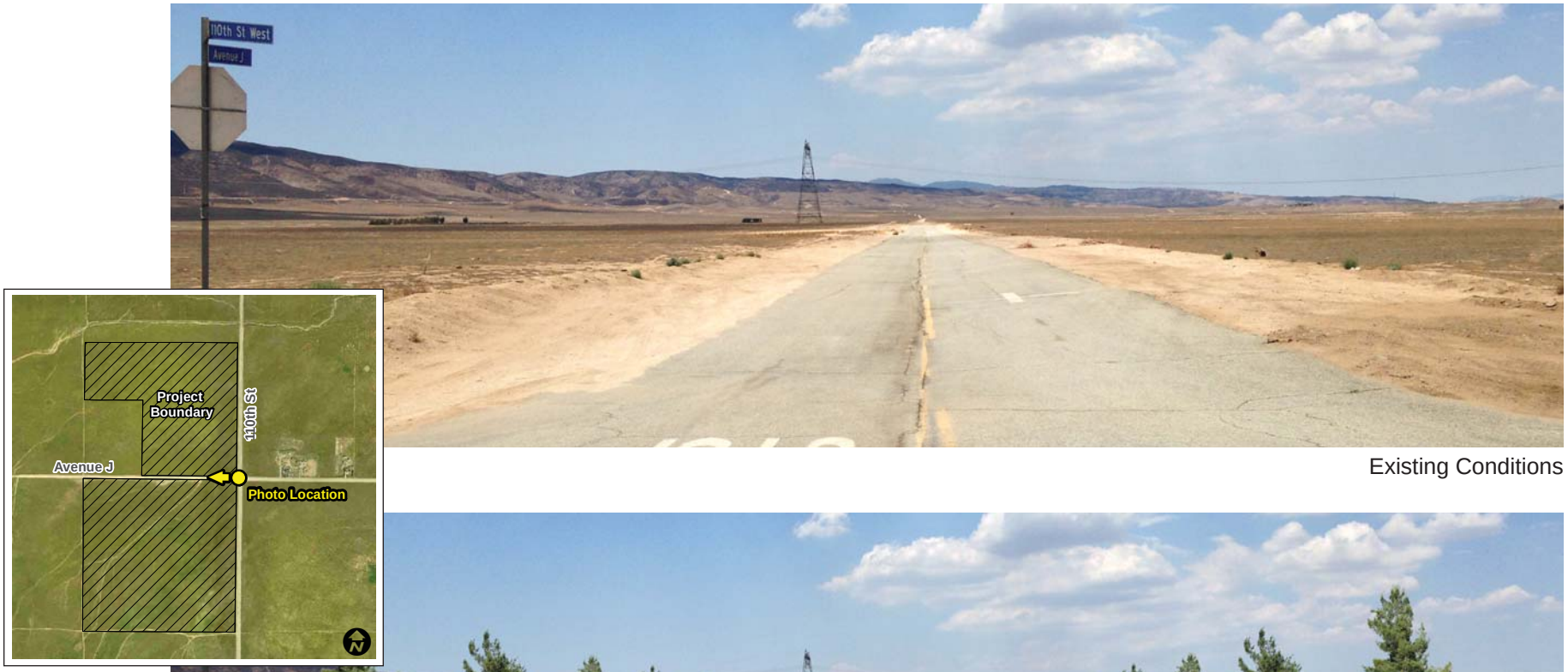


Existing Conditions

Proposed Conditions

# Photo Simulation – Viewshed Looking West on West Avenue J

Exhibit 4-3B

*West Antelope Solar Energy Project*

BonTerra CONSULTING

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infrastructure in the area, including the SCE TRTP transmission lines and the Antelope Substation.

As it is a sparsely developed rural area, the proposed site is an appropriate location for operation of a solar facility. However, the proposed Project would change the visual characteristics of the Project site from vacant to developed, and this change could be perceived as substantially degrading the existing visual character or quality of the site and its surroundings. With incorporation of MM AES-1, impacts would be less than significant.

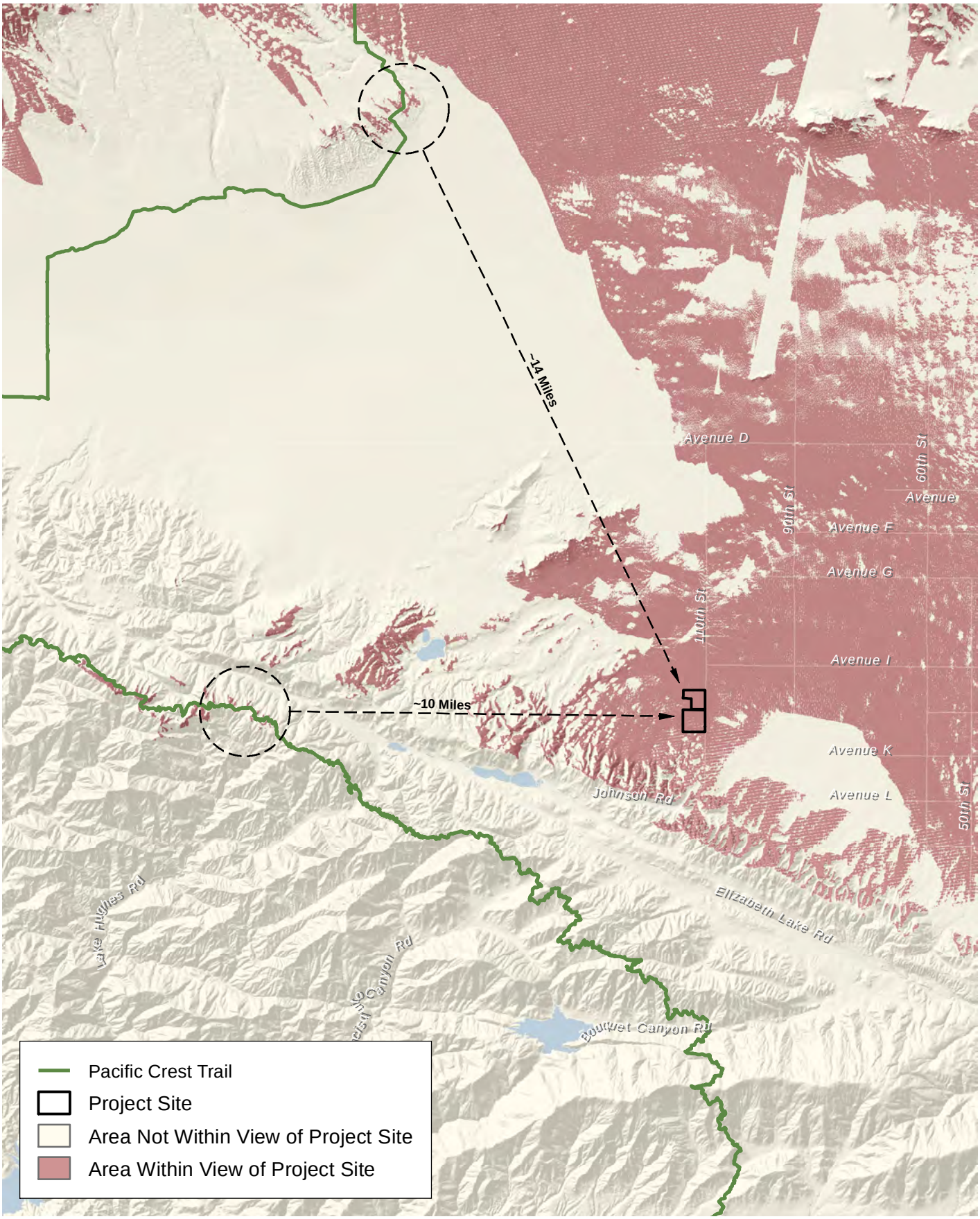
As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). Therefore, any visual impacts created by the Project would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**b) Would the project be visible from or obstruct views from a regional riding or hiking trail?**

***Less Than Significant Impact.*** As discussed fully in Section 4.16, Parks and Recreation, there are a variety of State, federal, and County trails in the Project area. The western edge of the Project site is within five miles of the Pacific Crest Trail (PCT). The PCT is the most notable trail in the western United States, extending from Mexico to Canada. Locally, the PCT extends through the Angeles National Forest and provides views of the Antelope Valley, including rural/agricultural and suburban land development; varied terrain; vegetation; wilderness; and the San Gabriel Mountains. The northern edge of the Angeles National Forest is located approximately four miles south of the site.

Portions of the Project site may be intermittently visible from segments of the PCT. As shown on Exhibit 4-4, Pacific Crest Trail Viewshed Analysis, the closest locations that allow for a view of the Project site from the PCT are at a distance of approximately 9 to10 miles. Therefore, due to distance and intervening topography, views of the Project site from the existing PCT alignment are very limited, and Project implementation would not substantially affect the visual experience. Additionally, based on historical data from the National Oceanic and Atmospheric Administration (NOAA) for the years of 2010 through 2013 "visibility" in the Antelope Valley was limited to less than 10 miles approximately 49% of the time between the hours of 7:00 AM and 7:00 PM (NOAA 2013). Therefore, on average, the Project site would not even be visible from this location of the PCT for half of the daylight hours throughout the year.

The nearest regional trail is Los Angeles County Trail Number 130 (California Poppy Trail), which is located on the Project site and runs along the eastern boundary, following 110$^{th}$ Street West and looping westward at Avenue D West towards the Antelope Valley California Poppy State Natural Reserve (SNR), approximately four miles northwest of the Project (LACDRP 2007). This trail is an “adopted proposed” trail system that is not yet constructed. The Project includes dedication of a 12-foot-wide trail easement and construction of a portion of the trail. The Project would be clearly visible from this trail, as it runs along the eastern edge of the site. Views to the north and the south of the trail would not be affected. However, the proposed PV panels and chain-link fencing on the site would partially obstruct views of the open space and mountains to the west. Since this segment of the California Poppy Trail is not yet constructed or operational, there is no impact from the Project.

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# Pacific Crest Trail Viewshed Analysis

Exhibit 4-4

*West Antelope Solar Energy Project*

N W E S

3 1.5 0 3 Miles

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There are also a number of trails that traverse the Antelope Valley California Poppy SNR. Due to the higher elevation of the SNR, the proposed Project may be visible from some vantage points along the trails. However, due to distance and/or intervening topography, views of the Project site from these trails would be limited, and Project implementation would not substantially affect the visual experience. In addition, these trails are primarily used only during the wildflower bloom season, which generally occurs from mid-March through mid-April. Therefore, implementation of the Project would not significantly obstruct views from an existing regional hiking or riding trail and no mitigation would be required.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest), with the exception of the trail, which would dedicated to and maintained by the Department of Recreation and Parks. Therefore, any visual impacts from hiking trails created by the Project would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**c) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?**

***Less Than Significant Impact.*** As previously discussed, based on review of the California Scenic Highway Mapping System, there are no officially designated or eligible State scenic highways in the Project site vicinity (Caltrans 2007). The Scenic Highway Element of the *Los Angeles County's General Plan* and the *Antelope Valley Areawide Plan* identify a segment of 110$^{th}$ Street West between Lancaster Boulevard/West Avenue I and West Avenue L, which is adjacent to the Project site, as a "Second Priority" scenic route (Los Angeles County 1980, 1986). Second Priority Scenic Routes are proposed for further study upon completion of all first priority corridor studies.

While the Project site does not contain any trees, rock outcroppings, or other prominent visual features, the open space nature of the site and surrounding area may be considered by many to be a scenic resource. The *City of Lancaster General Plan* discusses local views of surrounding buttes and Quartz Hill and long-distance views of the San Gabriel Mountains and desert expanses as being scenic resources in the Lancaster area (Lancaster 2009b). The site is not located in or near these visual resources, and the proposed Project would not hinder views of these resources from any public viewsheds.

As shown on Exhibit 4-3A and 4-3B, the proposed solar array would stand between six and eight feet tall, and would not degrade or obstruct views of the surrounding mountains and buttes from the vantage points surrounding the Project site. From 110$^{th}$ Street West, the PV panels would largely be hidden behind the chain-link fence. The fencing would be visually buffered by the proposed landscaping. The Grid-Tie connecting the Project to the Antelope Substation would primarily run underground, with the possibility of running overhead for about half of the 1.5-mile stretch along transmission poles shared with Silverado Power. These poles, which are already permitted by the City of Lancaster, would be similar in nature to typical electrical utility poles and would not significantly obstruct public views. The approximate 75-foot switch poles and 70-foot-tall riser pole would be similar in height to existing electrical transmission towers in the area, but have a minimal affect on public views due to its slim profile. Therefore, there would be a less than significant impact to scenic resources and no mitigation is required.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). Therefore, any visual impacts to scenic resources would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**e) Would the project create a new source of substantial shadows, light or glare which would adversely affect day or nighttime views in the area?**

***Less Than Significant With Mitigation.*** As previously noted, the Project site is a rural environment with few existing land uses that emit ambient light. The nearest stationary sources of nighttime lighting are the residential properties along West Avenue J. In addition, transitory vehicle headlights from West Avenue J and 110$^{th}$ Street West contribute to lighting on the Project site. However, due to the rural nature of the surrounding area, any additional contribution of night lighting would be considered a significant impact.

The proposed Project would include perimeter lighting for security, but no nighttime activities would be associated with the Project. Lighting would be installed in specific locations around the periphery of the Project site, as required for nighttime security purposes. In order to reduce potential impacts associated with the security lighting, MM AES-2 requires that on-site lighting consist of modern, low intensity, downward-shielded fixtures that are motion-activated, and would be directed onto the immediate site. Since the lights are motion-activated, they would only be occasionally visible by nearby residences when activity in the area triggers the lights. Motion-detectors would be set at a sensitivity level that could not be triggered by small animal movement. Implementation of MM AES-2 would reduce impacts from lighting to a level less than significant.

Glare that would adversely affect day or nighttime views in the Project area would be significant. Because there are no solar rays that could be reflected at night, there would be no impact related to glare affecting nighttime views. During the daylight hours, operation of the solar array involves tracking to follow the sun's path across the sky.

As depicted in Exhibit 3-3A, the assembled PV panels would have a typical height of about six feet and a maximum height of approximately eight feet, depending on the angle of the tracking system as it changes over the course of each day. The rows of solar arrays would be aligned north to south, and the PV panels would pivot to an angle of up to 45 degrees around a north-south axis, tracking the sun from east to west. As the PV panels would tilt east to west, travelers on West Avenue J and residents east of the Project site that would have a direct line of sight into the Project site could potentially be exposed to temporary glare from the solar array, resulting in a significant impact for daytime views in the Project area.

As required by MM AES-3, the proposed solar array would consist of flat-plate PV panels, which have a transparent glass cover to protect the solar cells. The glass used for the panels would be "high-transmission, low-iron" tempered glass. This type of glass absorbs more light, while producing less glare and reflectance than normal glass, having a reflectance value of 8 percent or less. Even at full tilt, the PV panels would not reflect sunlight directly onto the roadway. Moreover, due to the generally flat topography of the area, the chain-link fencing and landscaping around the Project site would also help minimize glare impacts by blocking direct lines of sight into the Project site. All other structures and equipment associated with the Project, including the water tanks and Project Substation, would be constructed out of steel and painted with a non-reflective color chosen to blend with the surroundings and minimize visual

impacts. Implementation of MM AES-3 would reduce impacts related to glare from the solar panels to less than significant.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the commencement of grading for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest), and all light and glare impacts discussed above would be eliminated entirely.

### 4.1.3 MITIGATION MEASURES

**MM AES-1** The Project shall incorporate landscaping with drought-tolerant vegetation for the exterior of the Project site along the portions of the perimeter fence facing 110th Street West, West Avenue J, and along the northern boundary of the site. A Landscape Plan shall be prepared, subject to the review and approval of the County of Los Angeles. Irrigation via water trucks would be conducted until the landscaping is established. No long-term irrigation infrastructure would be constructed. All perimeter landscaping shall be planted prior to issuance of the certificate of occupancy.

**MM AES-2** Lighting to be installed in specific locations around the periphery of the Project site, as required for nighttime security purposes, shall consist of modern, low intensity, downward-shielded fixtures that are motion-activated, and shall be directed onto the Project site. Motion-detectors shall be set at a sensitivity level that cannot be triggered by small animal movement.

**MM AES-3** The glass used to cover the Project's flat-plate photovoltaic (PV) panels shall be "high-transmission, low-iron" tempered glass and have a reflectance value of 8 percent or less. All other structures and equipment associated with the Project, including the water tanks and Substation, shall be painted with a color chosen to blend with the surroundings and minimize visual impacts.

Implementation of these mitigation measures would reduce impacts to aesthetics to a less than significant level.

| **4.2 AGRICULTURE AND FOREST RESOURCES** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | ☐ | ☐ | ☐ | ☒ |
| b) Conflict with existing zoning for agricultural use, with a designated Agricultural Opportunity Area, or a Williamson Act contract? | ☐ | ☐ | ☒ | ☐ |
| c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220[g]), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g])? | ☐ | ☐ | ☐ | ☒ |
| d) Result in the loss of forest land or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ☒ |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ☒ |

### 4.2.1 ENVIRONMENTAL SETTING

The Project site is located on undeveloped land, formerly used for agriculture (Leighton 2012b). The nearest active agricultural use is an alfalfa farm located approximately 0.5 mile northwest of the Project site. The California Department of Conservation Farmland Mapping and Monitoring Program (FMMP) indicates that the Project site consists of Grazing Land and does not contain any Prime Farmland or Unique Farmland (FMMP 2009). Grazing Land generally consists of land on which the existing vegetation is suited to the grazing of livestock. Although Grazing Land is often described as important farmland because it is one of the categories used in preparing the FMMP maps, it is not defined as Farmland of Local Importance by the County of Los Angeles.[8] Both the State FMMP and the Farmland Protection Policy Act (FPPA) defer to local agencies to determine which lands are of local importance. No agricultural lands within Los Angeles County have ever been under Williamson Act contract. As such, no part of the Project site is under Williamson Act contract.

The *Antelope Valley Areawide General Plan* (AVAGP) Plan designates “Agricultural Opportunity Areas” on its Hazards and Resources Map (LACDRP 1986). These areas historically or currently have an agricultural use. The AVAGP calls “for these areas to be protected from incompatible uses”. The Project site is in an area designated as an Agricultural Opportunity Area on the AVAGP’s Hazards and Resources Map (LACDRP 1986). There are no forest lands on the site or surrounding the Project site. It is also not designated as “Forests” in the Forest

[8] Los Angeles County defines Farmland of Local Importance as “[p]roducing lands that would meet the standard criteria for Prime or Statewide but are not irrigated”.
http://www.conservation.ca.gov/dlrp/fmmp/Documents/Local_definitions_00.pdf

and Range Assessment by the California Department of Forestry and Fire Protection (FRAP 2003). The site has never been developed and has not supported native trees under natural conditions.

### 4.2.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities, as well as short-term construction and long-term operational impacts.

**a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?**

***No Impact.*** Project implementation would result in the conversion of approximately 260 acres of Grazing Land to urban and other land uses. Lands that the California Department of Conservation has designated as Prime Farmland, Farmland of Statewide Importance and Unique Farmland are not present on the Project site. Therefore, there would be no impact.

**b) Would the project conflict with existing zoning for agricultural use, with a designated Agricultural Opportunity Area, or a Williamson Act contract?**

***Less Than Significant Impact.*** The Project site is zoned by the County as "Heavy Agricultural" and designated as "Non-Urban 1" by the General Plan's Land Use Map and an "Agricultural Opportunity Area" by the AVAGP (LACDRP 1980, 1986). The site is not under a Williamson Act contract. While a review of historic aerial photographs show that the site has not supported any authorized agricultural uses (farming or grazing) for at least 23 years (Leighton 2012b), the Project would result in the conversion of the site to a non-agricultural land use. While some properties in the area are still utilized for agriculture, the majority of properties do not have enough water to irrigate crops. Many of these properties have ceased farming activity over the last two decades and remain as unproductive fallow land. Electric generating plants are a conditionally allowed use in the Heavy Agricultural zone upon obtaining a Conditional Use Permit (CUP) (LACDRP 1986). Also, as identified in the draft *Antelope Valley Areawide General Plan Update*, Policy COS 7.3 supports the use of alternative and renewable energy systems in conjunction with agricultural activities (LACDRP 2011b).

The AVAGP allows for applications for non-agricultural uses in "Agricultural Opportunity Areas", but states that they must be evaluated for their impact upon adjacent agricultural operations. As a stand-alone solar generating facility, the proposed Project would not impact any adjacent agricultural operations. The proposed PV panels and accessory components would not be tall enough to cast shadows on adjacent crops and affect productivity. Further, the proposed Project would not impact the limited groundwater supply in the area by reducing the amount of water available for irrigation.

Table 4-1, FMMP Resources in Los Angeles County 2002–2010, summarizes the amount of FMMP-designated lands present in the County and the percent change in each category over that decade. The year 2010 is currently the most recent year for which the Department of Conservation has published FMMP data.

**TABLE 4-1**
**FMMP RESOURCES IN LOS ANGELES COUNTY 2002–2010**

| Category | Acreage[a] | | | | |
|---|---|---|---|---|---|
| | 2002[b] | 2006 | 2008[c] | 2010 | 2002–2010 % Change |
| Prime Farmland | 32,187 | 32,610 | 32,406 | 30,876 | (4.1) |
| Farmland of Statewide Importance | 939 | 1,024 | 1,228 | 952 | 1.4 |
| Unique Farmland | 1,155 | 1,024 | 1,177 | 1,129 | (2.3) |
| Farmland of Local Importance | 8,171 | 8,973 | 7,193 | 6,855 | (16.1) |
| Grazing Land | 233,399 | 228,730 | 229,474 | 231,475 | (0.8) |
| **Total FMMP Land** | **275,851** | **272,361** | **271,478** | **271,287** | **(1.7)** |

FMMP: Farmland Mapping and Monitoring Program; DOC: Department of Conservation

[a] The acreage for agricultural land is from DOC estimates and does not necessarily reflect the acreage published in the Los Angeles County crop reports. This is due to the fact that lands mapped by the State may not have actually been in agricultural use for the years identified in the DOC reports.

[b] The first use of orthorectified imagery in 2002 resulted in significant boundary adjustments, particularly in areas with terrain. These improvements resulted in a net decrease in the number of Urban acres during the 2002 update. Due to the incorporation of digital soil survey data (SSURGO) in 2002, acreages for farmland, grazing and other land categories differ from those published in the 2000–2002 Farmland Conversion Report. A large reclassification of Farmland of Local Importance to Grazing Land seen in the revised 2002 data is due to these factors and an analysis of the long-term idling of dryland farming areas.

[c] Total Area Inventoried changed in 2008 due to addition of the Edwards Air Force Base soil survey and adoption of updated county boundary file. All added acreage was classified as "Other Land".

Source: DOC 2011.

The table shows that there was 231,475 acres of Grazing Land available in Los Angeles County in 2010. Implementation of the Project would result in a 0.11 percent decrease in Grazing Land. Further, as required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to a beneficial use upon termination of the use of the land as a solar site, including a potential return to Grazing Land or other agricultural uses. Therefore, the proposed Project would not conflict with existing zoning for agricultural use and impacts would be less than significant.

**c) Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220[g]), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g])?**

**d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?**

***No Impact.*** The Project does not include forest land, timberland, or timberland zoned Timberland Production, nor does it include any conversion of forest land. The proposed Project also would not cause changes in the environment that could indirectly affect the conversion of forest land to non-forest use. Therefore, there would be no impact.

**e) Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?**

***No Impact.*** The Project includes the construction of a Grid-Tie transmission line, which would add additional electrical infrastructure to the region. However, the Project does not provide any additional distribution facilities that could be available to developers in the region for residential/commercial/industrial development. Any future development in the region would have to access electricity through SCE's existing or future distribution network, which is a separate and independent network than the Project's transmission line. The proposed Project would not cause changes in the environment that could indirectly result in the conversion of farmland to non-agricultural uses because the Project would not be growth-inducing or otherwise hinder the future agricultural use of adjacent lands. Therefore, there would be no impact.

### 4.2.3 MITIGATION MEASURES

Project implementation would not result in significant impacts related to agricultural or forest resources; therefore, no mitigation is required.

| **4.3 AIR QUALITY** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Conflict with or obstruct implementation of applicable air quality plans of either the South Coast AQMD (SCAQMD) or the Antelope Valley AQMD (AVAQMD)? | ☐ | ☐ | ☐ | ☒ |
| b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation? | ☐ | ☐ | ☒ | ☐ |
| c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? | ☐ | ☐ | ☒ | ☐ |
| d) Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ☒ | ☐ | ☐ |
| e) Create objectionable odors affecting a substantial number of people? | ☐ | ☐ | ☒ | ☐ |

### 4.3.1 ENVIRONMENTAL SETTING

The Project site is located in the Mojave Desert Air Basin (MDAB), which includes parts of Kern, Los Angeles, Riverside, and San Bernardino Counties. Air quality management within the MDAB is divided among several air districts, which each have primary authority for air quality in their jurisdiction; the Project site lies in the southwestern area of the MDAB and within the boundaries of the Antelope Valley Air Quality Management District (AVAQMD). Both the State of California (State) and the federal government have established health-based Ambient Air Quality Standards (AAQS) for seven air pollutants, which are known as “criteria pollutants”. These pollutants include ozone ($O_3$), carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), inhalable particulate matter with a diameter of 10 microns or less (PM10), fine particulate matter with a diameter of 2.5 microns or less (PM2.5), and lead. The State has also established AAQS for additional pollutants. The AAQS are designed to protect the health and welfare of the populace within a reasonable margin of safety. Federal and State standards for pollutants that are addressed in this analysis are shown below in Table 4-2, California and National Ambient Air Quality Standards.

## TABLE 4-2
## CALIFORNIA AND NATIONAL AMBIENT AIR QUALITY STANDARDS

| Pollutant | Averaging Time | State Standards | Federal Standards | |
|---|---|---|---|---|
| | | | Primary | Secondary |
| $O_3$ | 1 Hour | 0.09 ppm (180 µg/m$^3$) | – | – |
| | 8 Hour | 0.070 ppm (137 µg/m$^3$) | 0.075 ppm (147 µg/m$^3$) | Same as Primary |
| PM10 | 24 Hour | 50 µg/m$^3$ | 150 µg/m$^3$ | Same as Primary |
| | AAM | 20 µg/m$^3$ | – | Same as Primary |
| PM2.5 | 24 Hour | – | 35 µg/m$^3$ | Same as Primary |
| | AAM | 12 µg/m$^3$ | 15.0 µg/m$^3$ | Same as Primary |
| CO | 1 Hour | 20 ppm (23 mg/m$^3$) | 35 ppm (40 mg/m$^3$) | None |
| | 8 Hour | 9.0 ppm (10 mg/m$^3$) | 9 ppm (10 mg/m$^3$) | None |
| $NO_2$ | AAM | 0.030 ppm (57 µg/m$^3$) | 0.053 ppm (100 µg/m$^3$) | Same as Primary |
| | 1 Hour | 0.18 ppm (339 µg/m$^3$) | 0.100 ppm | None |
| $SO_2$ | AAM | – | 0.030 ppm (80 µg/m$^3$) | – |
| | 24 Hour | 0.04 ppm (105 µg/m$^3$) | 0.14 ppm (365 µg/m$^3$) | – |
| | 3 Hour | – | – | 0.5 ppm (1,300 µg/m$^3$) |
| | 1 Hour | 0.25 ppm (655 µg/m$^3$) | | |

$O_3$: ozone; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less; CO: carbon monoxide; $NO_2$: nitrogen dioxide; $SO_2$: sulfur dioxide; AAM: annual arithmetic mean; µg/m$^3$: micrograms per cubic meter; –: No Standard; ppm: parts per million; mg/m$^3$: milligrams per cubic meter

Note: Standards for criteria pollutants analyzed for this Project are presented above. Other criteria pollutants exist but are not included in this table.

Source: CARB 2012.

Regional air quality is defined by whether the area has attained or not attained State and federal standards, as determined by monitoring. Areas that are in non-attainment are required to prepare plans and implement measures that would bring the region into attainment. When an area has been reclassified from non-attainment to attainment for a federal standard, the status is identified as “maintenance”, and there must be a plan and measures established that would keep the region in attainment for the following ten years. Table 4-3, Designations of Criteria Pollutants in the Antelope Valley Portion of the (MDAB), lists the current attainment designations for the MDAB.

**TABLE 4-3**
**DESIGNATIONS OF CRITERIA POLLUTANTS IN THE ANTELOPE VALLEY PORTION OF THE MOJAVE DESERT AIR BASIN**

| Ambient Air Quality Standard | Attainment Status |
|---|---|
| 1-hour $O_3$ (Federal)* | Nonattainment; classified Severe-17 |
| 8-hour $O_3$ (Federal 84 ppb) | Nonattainment; classified Severe-17 |
| 8-hour $O_3$ (Federal 75 ppb) | Nonattainment (expected) |
| $O_3$ (State) | Nonattainment; classified Extreme |
| PM10 (Federal) | Unclassified |
| PM2.5 (Federal) | Unclassified/attainment |
| PM2.5 (State) | Unclassified |
| PM10 (State) | Nonattainment |
| CO (State and Federal) | Attainment |
| $NO_2$ (State and Federal) | Attainment/unclassified |
| $SO_2$ (State and Federal) | Attainment/unclassified |
| Lead (State and Federal) | Attainment |
| Particulate Sulfate (State) | Unclassified |
| Hydrogen Sulfide (State) | Unclassified |
| Visibility Reducing Particles (State) | Unclassified |

$O_3$: ozone; ppb: parts per billion; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less: CO: carbon monoxide; $NO_2$: nitrogen dioxide; $SO_2$: sulfur dioxide.

* Standard has been revoked; this is historical information only.

Source: AVAQMD 2011.

The U.S. Environmental Protection Agency (USEPA) designates an area as “Unclassifiable” if, based on available information, it cannot be classified as either meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant. For the California Air Resources Board (CARB), an “Unclassified” designation indicates that the air quality data for the area are incomplete and do not support a designation of attainment or nonattainment.

Table 4-3 above shows that the USEPA has designated the AVAQMD portion of the MDAB as being in Severe-17 Nonattainment for ambient $O_3$ concentrations. Pursuant to the approved 2008 Federal Ozone Attainment Plan and given the Severe-17 Nonattainment designation, the AVAQMD has 13 years from the plan approval date (2004) to achieve attainment (i.e., 2021). The State has designated the AVAQMD portion of the MDAB as being in Extreme Nonattainment for $O_3$. The Extreme status allows the use of undefined reductions based on the anticipated development of new control technologies or improvement of existing technologies in the Attainment Plan; this status could extend the attainment date by three years to 2024. To be designated as an Attainment area by the State, the AVAQMD portion of the MDAB would need to achieve both the 1-hour and 8-hour $O_3$ standards (AVAQMD 2004).

In 2007, the USEPA revoked the annual PM10 standard as research indicated that there are no considerable health effects associated with long-term exposure to PM10. With this change, the basin is technically in Attainment of the federal PM10 standards, although the redesignation process has not yet begun. The USEPA has designated the AVAQMD portion of the MDAB as being an Unclassified area for PM10. The State has designated the AVAQMD portion of the MDAB as being in Nonattainment for the State PM10 standard, which is more restrictive than the federal standard.

### 4.3.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities, as well as short-term construction and long-term operational impacts.

**a) Would the project conflict with or obstruct implementation of applicable air quality plans of either the South Coast AQMD (SCAQMD) or the Antelope Valley AQMD (AVAQMD)?**

***No Impact.*** The AVAQMD's current air quality planning documentation, pursuant to State Implementation Plan (SIP) and California Clean Air Act (CCAA) requirements applicable to the Project site, includes four separate documents: (1) the *AVAQMD 2004 Ozone Attainment Plan (State and Federal)*; (2) the *AVAQMD List and Implementation Schedule for District Measures to Reduce PM Pursuant to Health & Safety Code §39614(d)*; (3) the *8-Hour Reasonably Available Control Technology – State Implementation Plan Analysis*; and (4) the *AVAQMD Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area)*.

A project is considered non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable AVAQMD rules and regulations; complies with all proposed control measures that are not yet adopted from the applicable plan(s); and is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan). Conformity with growth forecasts can be established by demonstrating that the project is consistent with the land use plan that was used to generate the growth forecast. An example of a non-conforming project would be one that increases the gross number of dwelling units; increases the number of trips; and/or increases the overall vehicle miles traveled in an affected area (relative to the applicable land use plan) (AVAQMD 2011).

The proposed Project would result in construction criteria pollutant emissions below the CEQA significance thresholds established by the AVAQMD, as shown in response 4.3(b) below, and therefore would not conflict with or delay implementation of any applicable attainment or maintenance plan. The Project would not conflict with the applicable land use plan because there would be negligible long-term emissions of criteria pollutants, as discussed in response 4.3(b), and the proposed Project would not generate new growth on the Project site. No impacts would occur, and no mitigation is required.

**b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?**

***Less Than Significant Impact.*** The AVAQMD's *CEQA and Federal Conformity Guidelines* (2011) establish significance thresholds to assess the regional impact of Project-related air pollutant emissions in the AVAQMD. Table 4-4, AVAQMD Criteria Pollutant Significance Emissions Thresholds, summarizes the AVAQMD's mass emissions thresholds, which are presented as annual values for long-term operational and short-term construction emissions. A Project with emission rates below these thresholds is considered to have a less than significant effect on regional air quality throughout the AVAQMD portion of the MDAB.

**TABLE 4-4**
**AVAQMD CRITERIA POLLUTANT SIGNIFICANCE EMISSIONS THRESHOLDS**

| Criteria Pollutant | Annual Threshold (tons) | Daily Threshold (pounds) |
|---|---|---|
| Carbon Monoxide (CO) | 100 | 548 |
| Oxides of Nitrogen (NOx) | 25 | 137 |
| Volatile Organic Compounds (VOC) | 25 | 137 |
| Oxides of Sulfur (SOx) | 25 | 137 |
| Particulate Matter (PM10) | 15 | 82 |
| Particulate Matter (PM2.5) | 15 | 82 |
| Hydrogen Sulfide ($H_2S$) | 10 | 54 |
| Lead (Pb) | 0.6 | 3 |
| Source: AVAQMD 2011. | | |

## Construction

Construction of the proposed Project would result in emissions of reactive organic gases (ROGs), oxides of nitrogen ($NO_X$), carbon monoxide (CO), sulfur oxides ($SO_X$), PM10, and PM2.5. Emissions from construction would result from fuel combustion and exhaust from construction equipment and vehicle traffic (i.e., worker commute and delivery truck trips) and grading and site work. Emissions estimates are based on the assumptions detailed in Appendix B.

Construction of the Project is anticipated to commence in fourth quarter 2013 and would require approximately six months to complete. Construction activities would occur between the hours of 7:00 AM and 7:00 PM Monday through Saturday. Project construction would include several phases occurring simultaneously, including (1) pile driving of piers or posts, and the placement of trackers on support piers; (2) trenching and installation of the DC and AC collection system, including the installation of the inverter enclosures; (3) the construction of electrical transmission facilities, including the construction of a Project Substation and transmission line to the Antelope Substation; and (4) the grading of access roads, a hiking trail, and construction of drainage elements.

It should be noted that because AVAQMD thresholds are presented in tons per year, maximum daily trips are not needed for purposes of estimating emissions and only total annual vehicle trips are considered. For the proposed Project, it was assumed that 879 total truck trips would be required for the delivery of materials. Delivery truck emissions were calculated from the point of entry into the air basin. Delivery truck trips (including water trucks) were assumed to originate 10 miles away (20 miles roundtrip) and hauling truck trips were assumed to originate from 14 miles away (26 miles roundtrip). Additionally, it was assumed that 20 total truck trips would be required to remove vegetation from the site. It was assumed there would be a total of 5,957 trips for worker commute for all phases of construction.

The proposed Project construction emissions were estimated using the assumptions provided by the Project Applicant and emission factors from EMFAC2011 and OFFROAD2007. Project-specific input was based on the factors described above; general information known about the Project description; engineering judgment; and standard practices. Although there would be no significant impacts related to this issue, the Project would be required to comply with AVAQMD Rule 403, Fugitive Dust, as a standard condition (MM AQ-1), which requires implementation of a Dust Control Plan. The Dust Control Plan includes strategies such as minimal grading and

ground disturbance, regular watering, application of soil binders and wood mulch, control of track-out from the site, and presence of an on-site monitor. Therefore, dust-control measures are included in the emissions calculations. The emissions calculations data sheets showing equipment assumptions and detailed emissions are included in Appendix B. The results of the calculations are shown in Table 4-5, and indicate that Project-related emissions would be less than the construction mass emissions CEQA thresholds established by the AVAQMD.

**TABLE 4-5**
**ESTIMATED ANNUAL CONSTRUCTION EMISSIONS (TONS)**

| | VOC | NOx | CO | SOx | PM10 | PM2.5 |
|---|---|---|---|---|---|---|
| Annual emissions in 2013 | 1 | 12 | 6 | <1 | 1 | 1 |
| ***AVAQMD Annual Thresholds*** | ***25*** | ***25*** | ***100*** | ***25*** | ***15*** | ***15*** |
| **Exceeds AVAQMD Thresholds?** | **No** | **No** | **No** | **No** | **No** | **No** |

VOC: volatile organic compound(s); NOx: nitrogen oxides; CO: carbon monoxide; SOx: sulfur oxides; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less.

Source: AVAQMD 2011 (thresholds). See Appendix B for calculations.

Therefore, short-term construction emissions with dust-control measures required in accordance with MM AQ-1 would ensure that the proposed Project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. Impacts would be less than significant, and no mitigation is required.

**Operations**

The workforce performing ongoing O&M would be relatively small and would typically be off site. The workforce is comprised of general labor for cleaning purposes; skilled electricians for visual inspections and performance testing; and skilled mechanics to inspect and maintain the mechanical portions of the tracking system. Because the entire facility would be monitored remotely in real time as described in detail below, it is anticipated that four to five O&M personnel would make about two to three visits per year to conduct the on-site O&M functions.

Other than O&M, general landscape laborers would perform vegetation maintenance at some interval to maintain ground cover and to remove unwanted vegetation. Additional water truck trips would be necessary during the first three years of operations for irrigation to establish the landscape buffer.

Skilled operations monitoring personnel would review the information provided by the SCADA system. In addition, if a fault or an error occurs, an automatically generated email would be sent to monitoring personnel to alert them. The monitoring personnel would assess the fault or error information to determine what corrective actions would be needed. In most cases with PV systems, the fault is auto-correctable and does not require reactive repair at the site.

PV facilities contain very few moving parts and have limited ongoing maintenance requirements. Maintenance activities would consist of checking electrical performance parameters via remote monitoring; performing periodic inspections and maintaining transformers and inverters; responding to any problems detected by remote monitoring; conducting weed

abatement and dust-control activities; cleaning PV panels; and maintaining driveways and retention basins. Water would be used for cleaning PV panels and controlling dust (less than one acre-foot per year), but no water would be used by the facility for the production of electricity. No major equipment is anticipated to be required for maintenance of the facility except as necessary for maintenance of driveways and retention basins.

With the conservative assumption of 50 annual trips at a one-way distance of 50 miles for O&M personnel, 100 annual trips for O&M water trucks, and an additional 195 water truck trips during the first three years of operations for irrigation to establish the landscaping, annual pollutant emissions from maintenance visits were calculated with emission factors from EMFAC2011. As shown in Table 4-6, long-term operational emissions would be below the AVAQMD regional thresholds of significance. Therefore, impacts would be less than significant, and no mitigation is required.

**TABLE 4-6**
**ESTIMATED ANNUAL OPERATIONAL EMISSIONS (TONS)**

| Year | VOC | NOx | CO | SOx | PM10 | PM2.5 |
|---|---|---|---|---|---|---|
| 2013 | 0.0114 | 0.0882 | 0.0735 | 0.0002 | 0.0031 | 0.0024 |
| ***AVAQMD Annual Thresholds*** | ***25*** | ***25*** | ***100*** | ***25*** | ***15*** | ***15*** |
| **Exceeds AVAQMD Thresholds?** | **No** | **No** | **No** | **No** | **No** | **No** |

VOC: volatile organic compound(s); NOx: nitrogen oxides; CO: carbon monoxide; SOx: sulfur oxides; PM10: respirable particulate matter with a diameter of 10 microns or less; PM2.5: fine particulate matter with a diameter of 2.5 microns or less.

Source: AVAQMD 2011 (thresholds). See Appendix B for calculations.

## Decommissioning

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). It is assumed that decommissioning of the site would require the same construction scenario (activities, equipment, duration) as the initial development of the site; however, future air quality impacts would be less than those currently projected due to anticipated advancements in technology and a cleaner-burning construction equipment fleet mix. Therefore, future air quality impacts related to decommissioning would also be less than significant.

**c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?**

***Less Than Significant Impact.*** The AVAQMD portion of the MDAB is a nonattainment area for PM10 and $O_3$. The Project would contribute $O_3$ precursors and PM10 pollutants to the area during short-term construction. However, as described in Response 4.3(b) above, these emissions would be far below the AVAQMD regional thresholds.

As discussed further in Section 4.19, Mandatory Findings of Significance, a total of 11 known solar energy projects are currently proposed within a 3-mile radius of the proposed Project. Three of these projects are located in the County of Los Angeles and all are part of the Silverado Power West Solar Projects. The remaining eight are under review with the City of Lancaster.

According to the Notice of Preparation issued for the Silverado Power West Los Angeles County projects, construction is anticipated to begin in 2013 and be completed and operational within 2014, and has the potential to overlap with the proposed Project's construction. Given that the Project's contribution of PM10 during construction, as shown in Table 4-5, is only 6.6 percent of the AVAQMD threshold and the fact that construction activities would be less than six months in duration, the Project's PM10 and $O_3$ emissions would not be cumulatively considerable when considered in combination with other proposed projects in the Project vicinity. $O_3$ precursors include VOC and NOx. As shown in Table 4-5, Project construction would result in approximately 1 ton of VOC and 12 tons of NOx emissions, representing approximately 4 percent and 48 percent of the AVAQMD thresholds, respectively. Long-term operations would generate a negligible amount of air pollutants, as shown in Table 4-6, and would not be cumulatively considerable. No mitigation is required.

**d) Would the project expose sensitive receptors to substantial pollutant concentrations?**

***Less Than Significant With Mitigation.*** The nearest residential property is located 0.14 mile east of the Project site along West Avenue J. There are approximately 15 single-family residential properties located within approximately 1 mile of the Project site's outer boundary. A small agricultural farm is located approximately 0.5 mile to the northwest from the Project site's western boundary. As discussed further in Section 4.9, Hazards and Hazardous Materials, there are no schools within 0.25 mile of the Project site (for the air quality analysis, schools within 0.25 mile would be subject to additional analysis). The nearest school is Del Sur Elementary, which is located at 9023 West Avenue H, approximately 2.4 miles to the northeast of the Project site. Exposure of sensitive receptors is addressed for two situations: CO hotspots and diesel exhaust emissions. A CO hotspot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically at signalized intersections. As described above, vehicle trip generation from the operation of the proposed Project would be negligible. Because existing traffic volumes in the area are low and the Project would not generate significant traffic volumes, it would not create or contribute to a CO hotspot and, therefore no analysis is necessary.

CARB identified particulate exhaust emissions from diesel-fueled engines (diesel PM) as Toxic Air Contaminants (TACs) in 1998. Construction of the Project would result in the generation of diesel PM emissions from the use of on-site, heavy-duty, and off-road diesel equipment that is required for construction activities, and from on-road diesel equipment used to bring materials to and from the Project site. Exposure is a combination of the emissions rate and the length of time exposed, with exposures calculated over periods of 9 to 70 years. The proposed Project would utilize relatively limited diesel equipment and the construction period using diesel equipment would only last a total of six months. The exposure to nearby individuals (sensitive receptors) would be much less than threshold levels and the impact would be less than significant. No mitigation would be required.

However, Valley Fever has been a concern in the Antelope Valley for several years. Although not a direct air pollutant, valley fever (coccidioidomycosis) fungal spore infections develop through inhalation of airborne fungal spores contained in windblown dust, and is recognized to be endemic in areas with dry, alkaline soil conditions. Grading or other soil disturbing activities have been known to release the spores into the air, thereby increasing the risk that nearby people could inhale the spores. In order to prevent exacerbating the existing windblown dust issues in the Project area, all construction activity for the Project (including decommissioning activities) would be conducted under a rigorous Dust Control Plan prepared in accordance with AVAQMD Rule 403. As set forth in MM AQ-1, the Project Applicant shall prepare a Dust Control Plan that includes requirements for minimal grading, vehicle use, construction scheduling, water

application, soil binders/wood mulch, stock piles stabilization, final stabilization, and monitoring. Implementation of MM AQ-1 would prevent the Project from substantially increasing windblown dust concentrations compared to background levels and would reduce potential impacts to sensitive receptors to levels less than significant.

**e) Would the project create objectionable odors affecting a substantial number of people?**

***Less Than Significant Impact.*** The proposed Project would not handle trash; generate or treat sewage; use or generate chemicals; or engage in other activities that would generate odors. Diesel exhaust fumes would be generated by equipment during site-preparation and construction activities. Diesel fumes would result in odors that may be perceptible to occupants of facilities in the immediate vicinity of the Project site. Diesel odors would occur for short periods and would dissipate within a short distance from the Project site. The odors would not be objectionable because of the relatively small magnitude and short duration, as well as the lack of residents adjacent to the Project site. Operation of the Project would not cause any objectionable odors. Therefore, Project impacts related to odor would be less than significant, and no mitigation is necessary.

### 4.3.3 MITIGATION MEASURES

**MM AQ-1** During construction of the Project, the Project shall comply with Antelope Valley Air Quality Management District's (AVAQMD's) Rule 403, Fugitive Dust, to prepare a Dust Control Plan for controlling fugitive dust and avoiding nuisance. Compliance with this rule would result in a reduction in short-term particulate pollutant emissions. The Dust Control Plan shall include the following strategies:

- Minimal Grading and Ground Disturbance: The Project shall perform the minimum amount of grading and disturb the minimum amount of existing vegetation to construct the Project. Grading shall generally be limited to the proposed access roads, retention basins, Project Substation foundation, inverter pads, water tank pads, and trail areas. The existing vegetation in all other areas shall be mowed to a height consistent with vegetation management requirements and left in place.
- Vehicle Use: The Project shall only use construction vehicles with tires and shall prohibit use of equipment with rotating wheel tracks (e.g. tank treads or caterpillar tracks).
- Construction Scheduling: Grading activities shall be temporarily halted and/or site watering shall be increased during wind speeds that exceed 25 miles per hour, or when visible dust plumes have the potential to be transported: 1) off the Project site or 2) 200 feet beyond the centerline of the construction of linear facilities (such as the Grid-Tie). Earth-moving activities on the Project site shall be scheduled during winter months, when it is anticipated that natural rainfall shall assist with mitigation of fugitive dust.
- Water Application: The Project shall apply water to the construction site as necessary to control fugitive dust. As required by the AVAQMD, when water is used as fugitive dust control, watering is required three times a day and increased to a minimum of four times a day if there is evidence of visible wind-driven fugitive dust.
- Soil Binders/Wood Mulch: Soil binders and wood mulch shall be applied as necessary.

- Stock Piles Stabilization: All stock not currently in use shall be stabilized from erosion through the use of watering, soil binders, or protected with a plastic or geo-textile mat.
- Final Stabilization: Prior to completion of construction, all disturbed areas shall be permanently stabilized through the use of an all-weather surface treatment and existing vegetation shall be maintained at a maximum height of 6 inches, per LACFD requirements.
- Monitoring: A qualified construction mitigation manager (CMM) or delegate shall be retained to be on-site during all grading activities to ensure compliance with the approved Dust Control Plan. The CMM or delegate shall monitor all construction activities for visible dust plumes. The CMM or Delegate shall promptly implement additional dust plume reduction measures in the event that such visible dust plumes are observed. Additional measures to be implemented, as necessary, shall include increased watering, application of dust palliatives, and/or scaled back construction activities up to and including temporary work cessation.

Implementation of this mitigation measure would reduce impacts to air quality to a less than significant level.

| **4.4 BIOLOGICAL RESOURCES** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW) or U.S. Fish and Wildlife Service (USFWS)? | ☐ | ☒ | ☐ | ☐ |
| b) Have a substantial adverse effect on any sensitive natural communities (e.g., riparian habitat, coastal sage scrub, oak woodlands, non-jurisdictional wetlands) identified in local or regional plans, policies, regulations or by CDFW or USFWS? | ☐ | ☒ | ☐ | ☐ |
| c) Have a substantial adverse effect on federally or state protected wetlands (including, but not limited to, marshes, vernal pools, coastal wetlands, and drainages) or waters of the United States, as defined by Section 404 of the federal Clean Water Act or California Fish & Game code Section 1600, et seq. through direct removal, filling, hydrological interruption, or other means? | ☐ | ☒ | ☐ | ☐ |
| d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ☐ | ☒ | ☐ | ☐ |
| e) Convert oak woodlands (as defined by the state, oak woodlands are oak stands with greater than 10% canopy cover with oaks at least 5 inch in diameter measured at 4.5 feet above mean natural grade) or otherwise contain oak or other unique native trees (junipers, Joshuas, southern California black walnut, etc.)? | ☐ | ☐ | ☐ | ☒ |
| f) Conflict with any local policies or ordinances protecting biological resources, including Wildflower Reserve Areas (L.A. County Code, Title 12, Ch. 12.36), the Los Angeles County Oak Tree Ordinance (L.A. County Code, Title 22, Ch. 22.56, Part 16), the Significant Ecological Areas (SEAs) (L.A. County Code, Title 22, § 22.56.215), and Sensitive Environmental Resource Areas (SERAs) (L.A. County Code, Title 22, Ch. 22.44, Part 6)? | ☐ | ☐ | ☐ | ☒ |
| g) Conflict with the provisions of an adopted state, regional, or local habitat conservation plan? | ☐ | ☐ | ☐ | ☒ |

### 4.4.1 ENVIRONMENTAL SETTING

Several Biological Resources reports have been prepared for the Project by BonTerra Consulting and are provided in the technical appendices. These include the Jurisdictional Delineation Report (Appendix C-1), the Burrowing Owl Letter Report (Appendix C-2), the Swainson's Hawk Letter Report (Appendix C-3), and the Plant Letter Report (Appendix C-4). A Memorandum assessing the post-construction biological value of the Project site is provided in Appendix C-5. The findings of these reports are summarized, where relevant, in this section.

The data provided below are based on literature searches, database reviews, and field observations, as well as BonTerra Consulting's studies for other projects in the same vicinity as the proposed Project site and site-specific surveys performed for the Project. A plant survey of the Project site was conducted by BonTerra Consulting's Botanist and Certified Arborist, Fred Roberts, on April 17 and 18, 2012. Focused surveys for the western burrowing owl (*Athene cunicularia*) were conducted by BonTerra Consulting Biologists Brian Daniels, Steve Morris, Raeanne Murphy, and Kristin Smith on April 15; May 7 and 29; and June 18, 2012. Focused surveys for the Swainson's hawk (*Buteo swainsoni*) were conducted by BonTerra Consulting Biologists Brian Daniels and Jonathan Feenstra on April 12, 19, 27; May 9, 15, 30; June 13; and July 3 and 13, 2012.

The proposed Project is located on the U.S. Geological Survey's (USGS') Del Sur 7.5-minute quadrangle. The topography within the primary Project Area is generally flat with a gentle upward south-trending slope. There are some low rises in the southern portion of the proposed Project area. The elevation ranges from 2,480 to 2,620 feet above mean sea level (msl). The transmission corridor for the proposed Grid-Tie is on relatively flat ground and is situated at about 2,535 feet above msl at the west end and 2,490 feet above msl at the east end.

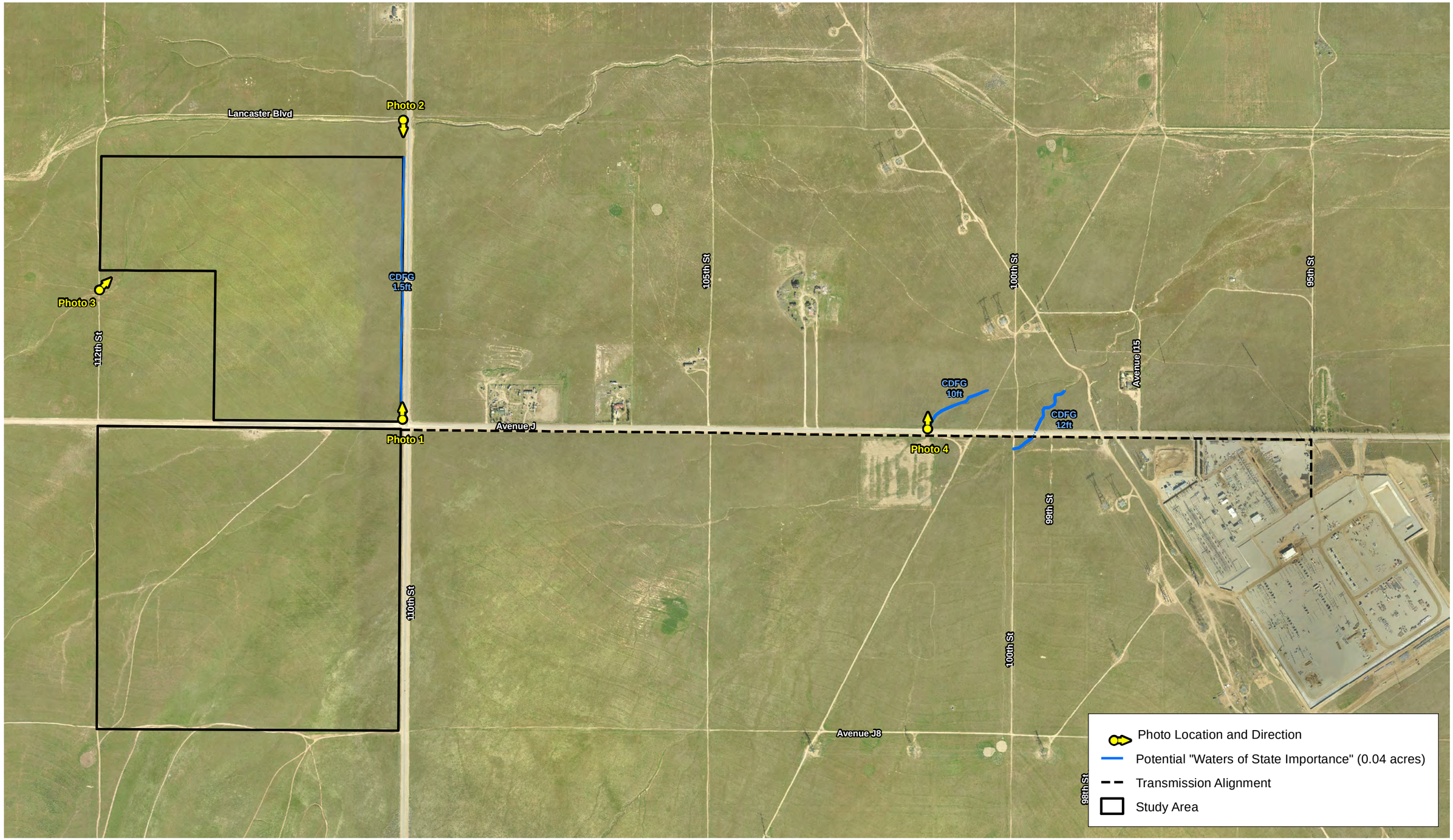
The majority of the soils in the Project area are mapped as Greenfield sandy loam (2 to 9 percent slope), as shown in Exhibit 4-8, Soil Types, in Section 4.7, Geology and Soils. The northern border is mapped as Ramona coarse sandy loam (0 to 2 percent slopes), and the southeastern corner is mapped as Ramona coarse sandy loam (2 to 5 percent or 5 to 9 percent slope). Small units of Hanford coarse sandy loam just barely enter the site in the southwest corner (USDA NRCS 2012).

**Jurisdictional Features**

The Project survey area contains two ephemeral drainage features. The on-site drainage feature is located on the northeastern boundary of the Project site along the west side of 110$^{th}$ Street West. This feature flows north and joins an off-site ephemeral drainage that drains in an easterly direction into 24-inch corrugated steel pipe culverts located at Lancaster Boulevard and 110$^{th}$ Street West. A second off-site drainage consists of two tributaries that flow north to south. The easterly tributary crosses over West Avenue J and terminates south of the road. Both the tributaries are modified portions of the blueline drainage feature and are shown on Exhibit 4-5, Potential Jurisdictional Drainage Features.

All drainage features within the West Antelope Valley Watershed ultimately flow into dry lakebeds, and consequently do not ultimately connect to traditional navigable waters; therefore, these drainage features—which are within the West Antelope Valley Watershed—would be considered "isolated waters". Therefore, both the on-site and off-site drainage features do not meet the requirements for U.S. Army Corps of Engineers (USACE) jurisdiction. The USACE would need to concur with this finding as part the submittal of a Preliminary Jurisdictional Determination request.

However, the Regional Water Quality Control Board (RWQCB) and the California Department of Fish and Wildlife (CDFW) take jurisdiction over both connected and isolated waters. Therefore, these drainage features could be considered "jurisdictional waters". Based on field observations and data collection, 0.04 acre (0.02 hectare) of potential RWQCB and CDFW jurisdiction are located within the Project site boundaries.

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## Potential Jurisdictional Drainage Features

Exhibit 4-5

*West Antelope Solar Project*

N W E S

800 400 0 800 Feet

BonTerra CONSULTING

(Rev: 10-09-2013 CJS) Projects\TAAC\J001\Graphics\IS-MND\Ex4-5_JD_potential.pdf

**Vegetation**

Exhibit 4-6, Vegetation Map, shows that the vegetation in the Project area consists of native annual grassland with small patches of native perennial grasses. The annual grassland is dominated by Pacific fescue (*Festuca microstachys*) with common goldfields (*Lasthenia gracilis*), redstem filaree (*Erodium cicutarium*), red brome (*Bromus madritensis ssp. rubens*), cheat grass (*Bromus tectorum*), and doveweed (*Croton setiger*). The character of the grassland oscillates somewhat between the native and non-native elements in dominance. The distribution and density of dried stalks from last year indicate that small fescue dominated the vegetation in 2011 but, in 2012, the distribution of non-native species was more prevalent. Overall, the species composition in the Project Area was very coastal-like in its make-up with very few desert elements. Associated species include rattlesnake weed (*Chamaecyce albomarginata*), valley popcornflower (*Plagiobothrys canescens*), California poppy (*Eschscholzia californica*), and tumble mustard (*Sisymbrium altissimum*). Small patches of nodding needlegrass (*Stipa cernua*) and big squirreltail (*Elymus multisetus*) were scattered over the primary Project area, especially on the eastern and southern portions. Due to its abundance in the region, the annual grassland found at the Project site is not considered to be special status vegetation type. A single special status species was observed during the focused surveys: Peirson's morning-glory (*Calystegia peirsonii*), which has a California Rare Plant Rank (CRPR) of 4.2.

The transmission line corridor for the Grid-Tie to the Antelope Substation is very similar in terms of vegetation to the primary Project area, except that approximately 25 feet adjacent to West Avenue J is cleared, presumably for fire protection and road maintenance. The cleared area supports a fair diversity of weeds including red-stemmed filaree, Russian thistle (*Salsola tragus*), red brome, tumble mustard, and western tansy mustard (*Descurainia pinnata*) in addition to some forbs, including rattlesnake weed and miniature lupine (*Lupinus bicolor*).

Small patches of native grassland dominated by big squirreltail and a small patch of rubber rabbitbush (*Ericameria nauseosus*) are situated within the grasslands at the west end of the transmission line corridor.

**Wildlife**

Although the Project site is undeveloped open space, a relatively low level of wildlife diversity is present due to the singular type of habitat found across the Project site. The site was previously disturbed, so much of the original habitat was cleared. Further, the Project site is bound by the SCE TRTP corridor on the western and southern edges and 110th Street West along the eastern edge, resulting in increase edge effects (e.g., higher occurrence of invasive species, fires, and wildlife/human interactions) in these areas on the perimeter of the Project site. The transmission line corridor to the Antelope Substation along West Avenue J consists mainly of ruderal and disturbed areas as a result of the existing infrastructure. Based on initial site visits by BonTerra Consulting's biologists and their experience and familiarity with the Project site and vicinity, it was determined that focused surveys for the western burrowing owl (*Athene cunicularia*) and the Swainson's hawk (*Buteo swainsoni*) were necessary.

### 4.4.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the**

Source: USDA, NRCS 2012

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# Vegetation Map

Exhibit 4-6

*West Antelope Solar Project*

N W E S

800 400 0 800 Feet

Bonterra CONSULTING

(Rev: 8-29-2013 CJS) PAS\Projects\TAAC\J001\Graphics\Plant Report\Ex_veg.pdf

**California Department of Fish and Wildlife (CDFW) or U.S. Fish and Wildlife Service (USFWS)?**

***Less Than Significant With Mitigation.*** This section is divided into discussions about Special Status Plant Species and Special Status Wildlife Species that occur on the Project site. For a discussion of cumulative impacts, refer to Section 4.19, Mandatory Findings of Significance, Threshold (c).

**Special Status Plant Species**

The literature search and database review revealed a list of ten special status plant species known to occur in the Project vicinity. Various factors are required to be present in order to demonstrate suitable habitat for a particular species, including distribution of vegetation types, slope, aspect, topography, rainfall, soil types, and other substrate features. The determination of suitable habitat is based on the presence or absence of appropriate biological features for each species. These plants and their potential to occur on the Project site are summarized below in Table 4-7, Special Status Plant Species Known to Occur in the Vicinity of the Project Study Area.

**TABLE 4-7**
**SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE VICINITY OF THE PROJECT STUDY AREA**

| Species | Status | | | Potential to Occur in the Survey Area. Results of Focused Survey |
|---|---|---|---|---|
| | USFWS | CDFW | CRPR | |
| *Astragaulus preussii* var. *Laxiflorus* Lancaster milk-vetch | — | — | 1B.1 | No potentially suitable habitat (alkaline flats) is present, and it was not observed during focused surveys. |
| *Boechera lincolnensis* Darwin rockcress | — | — | 2.3 | No potentially suitable habitat (rocky slopes, carbonate substrates) is present, and it was not observed during focused surveys. The reports in the western Los Angeles USGS quadrangles are apparently unverified, but appears to be confined mostly to desert mountains. |
| *California macrophylla* Round-leaved filaree | — | — | 1B.1 | No potentially suitable habitat (mesic grasslands) is present. This species is historically known locally the Elizabeth Lakes region (1884) where moister conditions prevail. This species was not observed during focused surveys. |
| *Calochortus clavatus* var. *gracilis* slender mariposa lily | — | — | 1B.2 | No potentially suitable habitat is present (too dry). This species is not known to occur on the north side of the San Gabriel Mountains. This species was not observed during focused surveys. |
| *Calochortus striatus* alkali mariposa lily | — | — | 1B.2 | No potentially suitable habitat (alkaline flats, meadows, and springy areas) is present, and it was not observed during focused surveys. |

# TABLE 4-7
# SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE VICINITY OF THE PROJECT STUDY AREA

| Species | Status | | | Potential to Occur in the Survey Area. Results of Focused Survey |
|---|---|---|---|---|
| | USFWS | CDFW | CRPR | |
| ***Calystegia peirsonii*** **Peirson's morning-glory** | **—** | **—** | **4.2** | Suitable habitat is present on site. **One site was located during the focused surveys.** |
| *Canbya candida* white pygmy-poppy | — | — | 4.2 | No potentially suitable habitat (sandy soils in desert vegetation) is present. This species is found east of Lancaster, and it was not observed during focused surveys. |
| *Castilleja plagiotoma* Mojave paintbrush | — | — | 4.3 | No potentially suitable habitat (alluvial Great Basin scrub, Joshua Tree woodland, pinon, pine forests) is present. This species is found east of Lancaster on the desert floor, and it was not observed during focused surveys. |
| *Chorizanthe parryi* var. *Fernandina* San Fernando Valley spineflower | FC | CE | 1B.2 | Limited potentially suitable habitat (sandy soils) is present. This species was historically located (1920s) in the Elizabeth Lake region, about 3 miles southwest of the Project site. However, it is not known in the Antelope Valley proper. No *Chorizanthe* species were observed during focused surveys. |
| *Chorizanthe parryi* var. *parryi* Parry's spineflower | — | — | 2.1 | Limited potentially suitable habitat (sandy soils) is present. This species was historically located (1896) in the Lancaster area. No *Chorizanthe* species were observed during focused surveys. |
| *Chorizanthe spinosa* Mojave spineflower | — | — | 4.2 | No potentially suitable habitat (alluvial fan scrub, Mojavean desert scrub, pinyon-juniper woodlands, little sand) is present. This species was not observed during focused surveys. |
| *Chorizanthe xanti* var. *leucotheca* white-bracted spineflower | — | — | 1B.2 | No potentially suitable habitat (Chenopod scrub, Joshua tree woodland, Mojavean desert scrub, little sand) is present. This species is generally located east of Lancaster, and it was not observed during focused surveys. |
| *Cryptantha clokeyi* Clokey's cryptantha | — | — | 1B.2 | Potentially suitable habitat is present. The nearest location of this species is about 4 miles to the northwest (Poppy Preserve in similar habitat). This species was not observed during focused surveys. |
| *Goodmania luteola* golden goodmania | — | — | 4.2 | No potentially suitable habitat (alkaline or clay soils) is present. This species is found primarily east of Lancaster in the desert, and it was not observed during focused surveys. |
| *Layia heterotricha* pale-yellow layia | — | — | 1B.1 | No potentially suitable habitat (alkaline or clay soils) is present. This species was historically known found in area near Lancaster (1895). This species was not observed during focused surveys. |
| *Lepechinia rossii* Ross' pitcher sage | — | — | 1B.2 | No potentially suitable habitat (chaparral, mountains) is present. This species was not observed during focused surveys. |

**TABLE 4-7**
**SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE VICINITY OF THE PROJECT STUDY AREA**

| Species | Status | | | Potential to Occur in the Survey Area. Results of Focused Survey |
|---|---|---|---|---|
| | USFWS | CDFW | CRPR | |
| *Loeflingia squarrosa* var. *artemisiarum* sagebrush loeflingia | — | — | 2.2 | No potentially suitable habitat (sandy soils) is present. This species was not observed during focused surveys. |

USFWS: U.S. Fish and Wildlife Service: CDFW: California Department of Fish and Wildlife; CRPR: California Rare Plant Rank; USGS: U.S. Geological Survey

**LEGEND:**

| **Federal (USFWS)** | | **State (CDFW)** | |
|---|---|---|---|
| FC | Candidate | CE | Endangered |

**CRPR Categories**

1B Plants Rare, Threatened, or Endangered in California and Elsewhere
2 Plants Rare, Threatened, or Endangered in California But More Common Elsewhere
4 Plants of Limited Distribution – A Watch List

**CRPR Threat Code Extensions**
None Plants lacking any threat information
.1 Seriously Endangered in California (over 80% of occurrences threatened; high degree and immediacy of threat)
.2 Fairly Endangered in California (20–80% of occurrences threatened)
.3 Not Very Threatened in California (low degree/immediacy of threat or no current threats known)

Notes:
The Project Study Area is the USGS' Del Sur and surrounding 7.5-minute quadrangles.
**Boldface** type indicates species found on site.

Source: BonTerra Consulting 2012c.

A list of all plants observed on the proposed Project site during the focused surveys is presented in Appendix C-3. Due to conditions at the Project site (30 percent of normal rainfall), there is a possibility that species could be present on site but were not detectable at the time of the surveys.

A single special status plant species (CRPR 4.2) was observed during the focused surveys: Peirson's morning-glory. The single site was found about 330 feet northwest of the intersection of West Avenue J and 110th Street West. A total of 30 individuals were found (BonTerra Consulting 2012c).

Impacts on the small population of Peirson's morning-glory on the Project site would be considered less than significant because the loss of this small population would not substantially affect the regional population of this species. Therefore, no mitigation would be required.

## Special Status Wildlife Species

The literature search and database review revealed a list of 18 special status wildlife species known to occur in the Project vicinity. These wildlife species and their potential to occur on the Project site are summarized below in Table 4-8, Special Status Wildlife Species Known to Occur in the Project Vicinity.

# TABLE 4-8
# SPECIAL STATUS WILDLIFE SPECIES KNOWN TO OCCUR IN THE PROJECT VICINITY

| Species | Status | Likelihood to Occur on the Project Site |
|---|---|---|
| **Reptiles** | | |
| *Gopherus agassizii*<br>desert tortoise | FT, ST | Not expected to occur; no potentially suitable habitat. |
| *Phrynosoma blainvillii*<br>Coast horned lizard | SSC | Not expected to occur; no potentially suitable habitat and outside known range. |
| *Anniella pulchra pulchra*<br>silvery legless lizard | SSC | Not expected to occur; no potentially suitable habitat and outside known range. |
| **Birds** | | |
| ***Buteo swainsoni***<br>**Swainson's hawk** | **ST** | **May occur for foraging only; limited potentially suitable habitat for foraging and no potentially suitable habitat for nesting**. |
| *Circus cyaneus*<br>northern harrier | SSC | May occur for foraging only; suitable habitat for winter forage; no potentially suitable nesting habitat. |
| *Charadrius alexandrinus nivosus*<br>western snowy plover | FT, SSC | Not expected to occur; no potentially suitable habitat. |
| *Charadrius montanus*<br>mountain plover | SSC | Not expected to occur; no potentially suitable habitat. |
| ***Athene cunicularia***<br>**burrowing owl** | **SSC** | **Observed during surveys; occupied burrows found on both sides of West Ave J east of 110th Street.** |
| *Asio otus*<br>long-eared owl | SSC | Not expected to occur; no potentially suitable habitat. |
| *Asio flammeus*<br>short-eared owl | SSC | Not expected to occur; no potentially suitable habitat. |
| *Buteo regalis*<br>Ferruginous Hawk | SS | Observed during surveys; suitable habitat for winter forage; breeds outside region. |
| *Cathartes aura*<br>turkey vulture | SS | Observed during surveys; suitable foraging habitat; no potentially suitable nesting habitat. |
| *Falco mexicanus*<br>prairie falcon | SS | Observed during surveys; suitable foraging habitat; no potentially suitable nesting habitat. |
| *Geococcyx californianus*<br>greater roadrunner | SS | Observed during surveys; suitable foraging habitat, but no potentially suitable nesting habitat. |
| *Lanius* ludovicianus<br>loggerhead shrike | SSC | May occur for foraging only: no potentially suitable foraging habitat. |
| *Numenius americanus*<br>long-billed curlew | SS | May occur for foraging only; suitable habitat for winter forage; no potentially suitable nesting habitat. |
| *Pooecetes gramineus*<br>vesper sparrow | SS | Observed during surveys; suitable foraging habitat; breeds outside region. |
| *Sialia currucoides*<br>mountain bluebird | SS | May occur for foraging only; no potentially suitable nesting habitat. |
| *Sturnella neglecta*<br>western meadowlark | SS | Observed during surveys; suitable foraging habitat and potentially suitable nesting habitat. |
| *Toxostoma lecontei*<br>Le Conte's thrasher | SSC | Not expected to occur; no potentially suitable habitat. |
| *Agelaius tricolor*<br>tricolored blackbird | SSC | May occur for foraging only: no potentially suitable foraging habitat. |
| *Xanthocephalus xanthocephalus*<br>yellow-headed blackbird | SSC | Not expected to occur; no potentially suitable habitat. |

**TABLE 4-8**
**SPECIAL STATUS WILDLIFE SPECIES KNOWN TO OCCUR IN THE PROJECT VICINITY**

| Species | Status | Likelihood to Occur on the Project Site |
|---|---|---|
| **Mammals** | | |
| *Antrozous pallidus*<br>pallid bat | SSC | Not expected to occur; no potentially suitable habitat. |
| *Corynorhinus townsendii*<br>Townsend's big-eared bat | SSC | Not expected to occur; no potentially suitable habitat. |
| *Xerospermophilus mohavensis*<br>Mohave ground squirrel | ST | Not expected to occur; no potentially suitable habitat. |
| *Taxidea taxus*<br>American badger | SSC | May occur; occasional use of the Project site as it moves between nearby areas of more appropriate habitat. |

USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife

**LEGEND:**

| **Federal (USFWS)** | | **State (CDFW)** | | **Los Angeles Audubon (LAA)** | |
|---|---|---|---|---|---|
| FT | Threatened | ST | Threatened | SS | Sensitive Species |
| FP | Fully Protected | SSC | Species of Special Concern | | |

Notes:
**Boldface** type indicates species found on site.

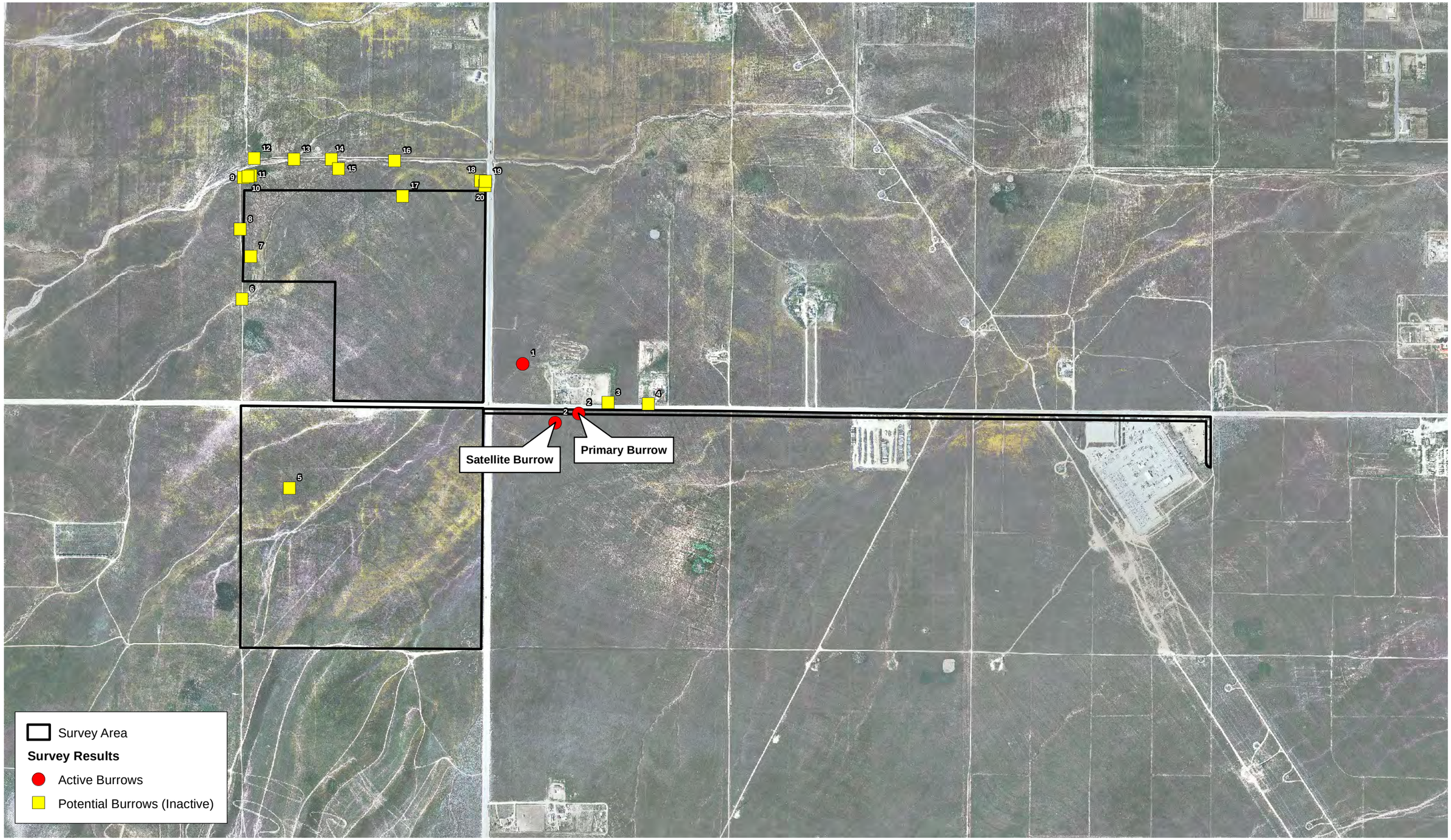
Source: BonTerra Consulting 2012d, 2012e.

Based on initial site visits and previous studies conducted by BonTerra Consulting in the Project area, only two special status wildlife species with potential to occur would require mitigation or minimization measures, if present. Focused surveys for western burrowing owl and Swainson's hawk were conducted, following the currently accepted guidelines for each species (i.e., California Burrowing Owl Consortium; California Energy Commission [CEC] and California Department of Fish and Wildlife [CDFW]; and Swainson's Hawk Technical Advisory Committee [SWTAC]).

### *Western Burrowing Owl*

For the burrowing owl, a total of four 3-hour-long surveys were conducted, with two at sunrise (approximately between 4:45 AM and 7:45 AM) and two at sunset (approximately between 6:00 PM and 9:00 PM) on April 15; May 7 and 29; and June 18, 2012. During the first survey, it was determined that several potentially suitable burrows were present on the Project site. After the discovery of potentially suitable burrows on the site, the initial burrowing owl habitat assessment and burrow surveys were conducted concurrently with the first focused burrowing owl survey; surveys concentrated on potential habitat and occupied burrows on the Project Site as well as a 50-foot buffer south of West Avenue J that would serve as the transmission corridor (BonTerra Consulting 2012d).

The focused burrow survey resulted in the identification of a total of 20 burrows, burrow clusters, or shelters that showed evidence of current, historic, or potential burrowing owl occupation. The locations of these burrows are shown in Exhibit 4-7, Location of Burrowing Owl Burrows. Most of these sites were located within or at the edges of roads, drainages, and swales. Two of these burrows/burrow complexes were found to be active during the surveys. These two burrow complexes had evidence of recent activity and supported breeding owls during these surveys. These burrows are described below.

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## Location of Burrowing Owl Burrows

Exhibit 4-7

*West Antelope Solar Energy Project*

N W E S

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(Rev 8/29/2013 MMD) Projects\TAAC\J001\Graphics\IS-MND\Ex_BUOW.pdf

***Active Burrow Complex 1:*** This burrow complex had a minimum of four active burrows within 500 feet north of West Avenue J, just east of 110th Street West. This complex of burrows supported two pairs of adult burrowing owls that successfully fledged at least four juvenile burrowing owls. This burrow complex was also part of a larger complex of occupied burrowing owl burrows that extended to the north and northeast in an area composed of non-native and some native grasslands. At least 15 burrowing owls, including several juvenile owls, were observed in this larger complex of burrows during another BonTerra Consulting biological survey on the Project site on July 3, 2012.

***Active Burrow Complex 2:*** This active burrow complex was likely created by California ground squirrels (*Otospermophilus beecheyi*) and was occupied by one pair of adult burrowing owls that successfully fledged three juvenile burrowing owls. The adults and juvenile burrowing owls were most often observed at the primary burrow located 75 feet south of West Avenue J. The satellite burrow was west of the primary burrow, located about 100 feet south of West Avenue J.

While Active Burrow Complex 1 is located outside the Project boundaries, Active Burrow Complex 2 lies within the transmission corridor to the Antelope Substation. The loss of an active nest for burrowing owl would be a violation of the Migratory Bird Treaty Act (MBTA) and would result in a significant impact. Project implementation has the potential to result in the loss of an active burrowing owl nest or other native bird nests. As required by MM BIO-1, a pre-construction survey prior to ground-disturbing activities and protection of active nests would serve to reduce these impacts to a less than significant level for any burrowing owl potentially nesting on the Project site and for the active nest lying within the transmission corridor. If burrows occupied by burrowing owls are detected on the Project site, the Project Applicant shall notify the CDFW and shall implement the appropriate actions, which may include creating a no-work buffer or relocating the burrow. If burrows occupied by burrowing owls are detected within 500 feet of the off-site Grid-Tie disturbance areas, the Project Biologist shall monitor the owl(s) to ensure that the Project does not negatively impact breeding. If negative indirect impacts are suspected, the Project Biologist shall propose measures to reduce indirect impacts to the owl(s) during construction. If impacts to burrowing owl cannot be avoided, preservation of suitable habitat as described in MM BIO-1 shall reduce such impacts to less than significant.

### *Swainson's Hawk*

As prescribed by the CEC and CDFW and SWTAC survey guidelines, a circular survey area with an approximate ten-mile diameter was surveyed. As recommended by both sets of survey guidelines, these surveys were conducted by car while driving at reduced speeds (approximately 5 miles per hour [mph]) where appropriate. Binoculars and spotting scopes were used to identify raptors (CEC 2012).

Habitats within this survey area are diverse and include the western fringes of Lancaster; the unincorporated communities of Antelope Acres and Del Sur; the Antelope Valley California Poppy Reserve; fallow and active farmland; Elizabeth Lake; and the Angeles National Forest. The northern edge of the survey area (Avenue D-8) is approximately three miles south of the Kern County line. The southern approximate third of the survey area extended into mountainous areas that do not provide suitable Swainson's hawk breeding habitat and, as a result, were excluded from the survey area.

Swainson's hawks were observed in the survey area during surveys on April 12, 19, and 27 and May 9 and 15, 2012. Exhibit 4-8, Survey Results for Swainson's Hawk, shows the location of these observations. None of these hawks exhibited any breeding or nesting behaviors and are presumed to have been migrants. As would be expected of migrants in the Antelope Valley, the

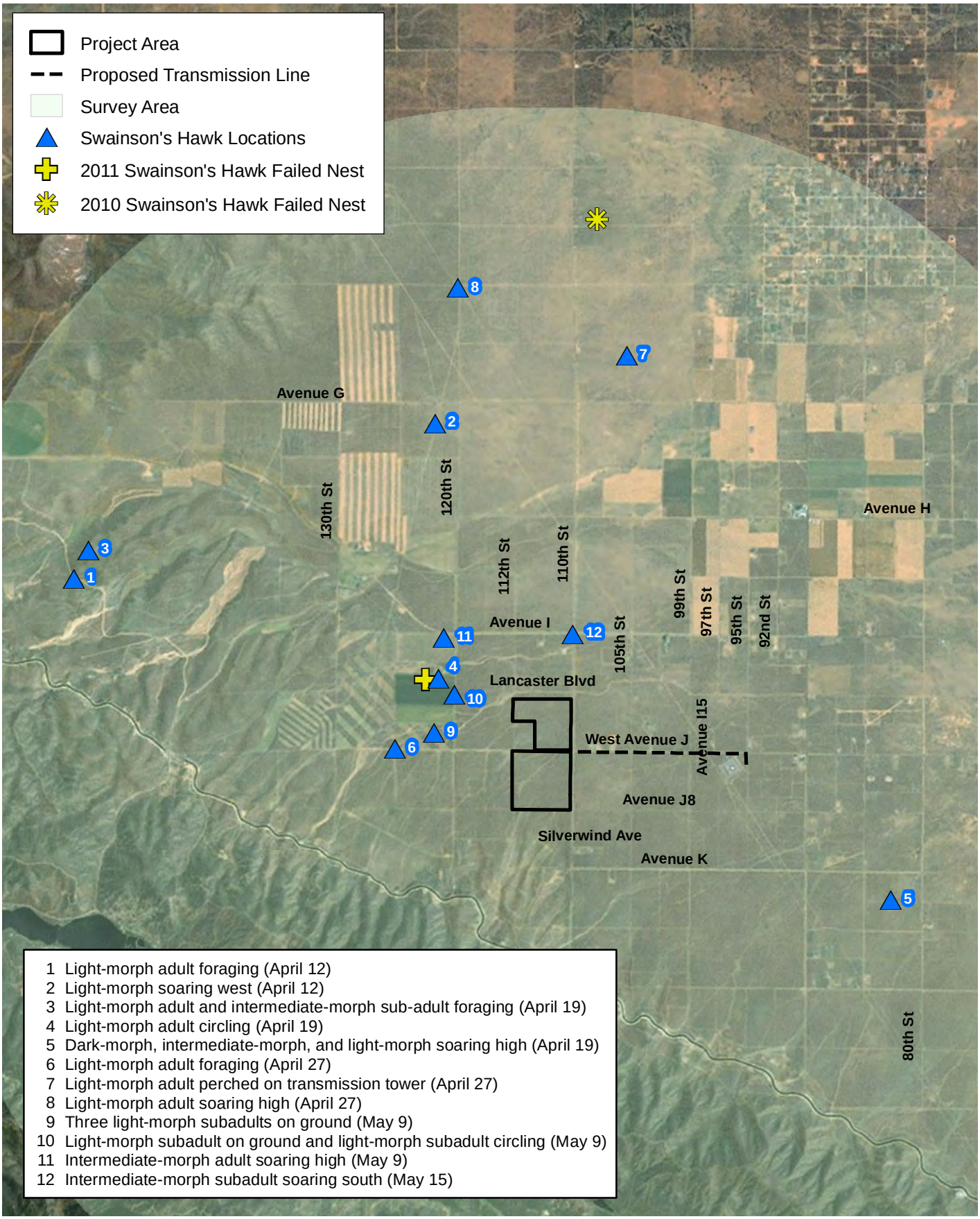
April sightings were all or mostly adults, while the May sightings were almost all sub-adults (second year birds still retaining some juvenile feathers). The light-morph adult observed on April 12, 2012, was still present in the same area (Myrick Canyon) on April 19, 2012, and is the only Swainson's hawk known to have remained more than one day in the survey area. The photographs of the light-morph adult observed foraging south of the alfalfa field near 120th Street West and West Avenue I on April 27, 2012, showed it to be a different individual than the light-morph adult Swainson's hawk at Myrick Canyon (BonTerra Consulting 2012e).

While it is acknowledged that Swainson's hawk is present in the area, the Project would not result in a "take" of Swainson's hawks, as defined by Section 86 of the California Fish and Game Code. While suitable nesting habitat is not available on the Project site, the Project site contains relatively low quality potential foraging habitat that is expected to be used, if used at all, by only non-breeding Swainson's hawks. Although most of the site would not be graded, the Project components, including PV panels and appurtenant facilities, have the potential to hinder the Swainson's hawk access to the foraging habitat at the Project site. The Project site shows evidence of scarring from historical uses, most likely agricultural, as well occasional tilling and or other type of linear mechanical disturbance to the soils. Consequently, no native scrub or woodland persists on the Project site and the more common annual species dominate the site, as is true for most of the region. Evidently due to the level of disturbance, indicators of small mammal presence were extremely limited based on the biologist's observations. As a result, small mammal prey, a primary food source when breeding, are likely to be available on the Project site in low densities relative to regional sites that support nesting Swainson's hawks.

Although Swainson's hawks may forage in a wide variety of habitats, especially in the non-breeding season, nest records in the Antelope Valley appear to indicate a correlation with active agricultural fields. The bulk of nests have been concentrated within close proximity to alfalfa fields that support multiple nesting pairs of Swainson's hawks along Avenue A and Rosamond Boulevard at the Los Angeles/Kern County line. Loss of active agricultural fields is likely to represent the greatest potential threat to the region's population. Although the population trend for Swainson's hawk appears to have been positive in recent years in the State, there has not been evidence of successful breeding season expansion into areas away from active alfalfa or similar agricultural fields in the Antelope Valley. Therefore, the Project site represents potentially suitable foraging habitat for non-breeding Swainson's hawks, but it is highly unlikely to represent suitable foraging habitat for breeding Swainson's hawks.

Potentially suitable habitat for non-breeding Swainson's hawks is expansive throughout the region and loss or reduced suitability of a portion of the Project site would not represent a substantial impact on the species and is considered to be a less than significant impact. Other projects in the region that would impact breeding Swainson's hawk foraging habitat have been typically required to mitigate through preservation of similar suitable habitat for breeding hawks. Therefore, the cumulative impact of this and other projects in the vicinity would not result in a substantial loss of foraging ground or result in genetic isolation and is considered to be a less than significant impact. However, a pre-construction survey, as identified in MM BIO-2, would be conducted prior to the start of Project construction activities to ensure any potential impacts remain less than significant.

Further, as part of the Project, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). Therefore, the reduction in habitat value would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

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# Survey Results for Swainson's Hawk

Exhibit 4-8

*West Antelope Solar Project*

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(Rev: 9-04-2012 CJS) Projects\TAAC\J001\Graphics\SwainsonsHawk\Ex_HawkLocations.pdf

**b) Would the project have a substantial adverse effect on any sensitive natural communities (e.g., riparian habitat, coastal sage scrub, oak woodlands, non-jurisdictional wetlands) identified in local or regional plans, policies, regulations or by CDFW or USFWS?**

**c) Would the project have a substantial adverse effect on federally or state protected wetlands (including, but not limited to, marshes, vernal pools, coastal wetlands, and drainages) or waters of the United States, as defined by Section 404 of the federal Clean Water Act or California Fish & Game code Section 1600, et seq. through direct removal, filling, hydrological interruption, or other means?**

***Less Than Significant With Mitigation.*** As mentioned above, the Project survey area contains ephemeral drainage features that may be considered jurisdictional by regulatory agencies. The CDFW regulates all work (including initial construction and ongoing operation and maintenance) that may substantially divert or obstruct the natural flow of or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake through its Streambed Alteration Program. An Applicant must enter into an agreement with the CDFW to ensure no net loss of wetland values and acreages.

As previously indicated, the extent of potential CDFW jurisdiction in the Project survey area has been identified as 0.04 acre (0.02 hectare). It is anticipated that the on-site drainage would be entirely avoided by Project implementation, and no impact would result (BonTerra Consulting 2012a).

However, the off-site drain features may be impacted by trenching associated with installation of the Grid-Tie line connecting the Project to the Antelope Substation. If avoidance of these drainages is not feasible through underground tunneling or other means, then pursuant to MM BIO-3, the Project Applicant will need to consult with applicable agencies to get the appropriate permits. If jurisdictional waters cannot be avoided, impacts resulting from Project implementation would require Section 401 clearance from the RWCQB and a Section 1602 Streambed Alteration Agreement (SAA) from CDFW. The SAA must address the initial construction and long-term operation and maintenance of any structures in areas identified as "Waters of the State" (such as a culvert or desilting basin) that may require periodic maintenance if these are included in the Project design. As required by MM BIO-3, the Project Applicant must obtain permit approval from the RWQCB and CDFW and ensure no net loss of wetlands through avoidance and/or compensatory mitigation.

Grasslands within the Project site contain wildflowers as previously described. The distribution of patches of wildflowers typically varies from year to year, sometimes widely, so mapping of such features for any one season is not considered to be meaningful. It can be generally said that patches of varying densities of wildflowers are likely to occur in many areas of grasslands on the site. This can also be said generally for most of the Antelope Valley that is undeveloped within the region. Therefore, although wildflower fields can be considered present to some degree, the grading of the roads on the site and installation and operation of the solar panels would not constitute a substantial impact to the wildflowers fields due to the prevalence of similar habitat throughout much of the region.

To ensure avoidance, MM BIO-4 requires that all areas containing jurisdictional resources be staked by a qualified Regulatory Specialist prior to the initiation of any construction-related activities that involve ground disturbance. Also, ground-disturbing construction activities within these areas would be monitored by a qualified Regulatory Specialist/Biologist. Implementation of MMs BIO-3 and BIO-4 would ensure that impacts to jurisdictional features are less than significant.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its original state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). Therefore, any impacts to drainage features would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?**

***Less Than Significant With Mitigation.*** Wildlife movement typically consists of (1) dispersal (e.g., juvenile animals from natal areas or individuals extending range distributions); (2) seasonal migration; and (3) movements related to home range activities (e.g., foraging for food or water, defending territories, or searching for mates, breeding areas, or cover). This movement is necessary in order to maintain healthy wildlife populations, especially where open space is limited in size or otherwise isolated from other open space areas. A number of terms such as “wildlife corridor”, “travel route”, “habitat linkage”, and “wildlife crossing” have been used in various wildlife movement studies to refer to areas where wildlife move from one area to another.

The Project site is currently open for the passage of wildlife, other than minimal restrictions of the SCE power line corridor on the western and southern edges and 110$^{th}$ Street West along the eastern edge. Project implementation would include the installation of chain-link fencing around the perimeter of the Project site (see Exhibit 3-3A). Incorporation of MM BIO-5, which requires the perimeter fencing to be raised above the ground at regular intervals, would ensure that small and medium sized wildlife would continue to be able to pass through the Project site unimpeded. Although the California aqueduct crossing at Johnson Road is within relatively close proximity to the Project site, the site itself offers no greater value for wildlife movement when compared most of the landscape in the vicinity. There is no indication of concentrated movement through the Project site or adjacent lands. The Project would not affect regional wildlife movement or interfere substantially with the movement of any native resident or migratory fish and wildlife species in areas surrounding the site, nor would it impede the use of native wildlife nursery sites. Impacts would be less than significant, and no mitigation is required.

The proposed Grid-Tie route is located along West Avenue J, and the presence of this road may limit wildlife movement to some extent under existing conditions. However, the proposed Grid-Tie would be placed underground and would not lessen the permeability of this area for travelling wildlife. Therefore, impacts of the Grid-Tie on wildlife movement would be less than significant.

Bird species have potential to nest in native and non-native vegetation on the Project site. Active nests of birds and raptors are protected by the MBTA and *California Fish and Game Code.* Suitable habitat for ground-nesting birds is present throughout the Project site, and suitable habitat for tree and shrub-nesting species is present within 500 feet. Implementation of MM BIO-6 would reduce potential impacts to less than significant.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its original state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). Therefore, any impacts to

wildlife movement would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**e) Would the project convert oak woodlands (as defined by the state, oak woodlands are oak stands with greater than 10% canopy cover with oaks at least 5 inches in diameter measured at 4.5 feet above mean natural grade) or otherwise contain oak or other unique native trees (junipers, Joshuas, southern California black walnut, etc.)?**

***No Impact.*** There are no oak trees or other unique native trees on the Project site. The Project would not conflict with any local policies or ordinances protecting biological resources, such as the City of Lancaster's ordinance preventing removal of Joshua trees (*Yucca brevifolia*), since there are no Joshua trees on the Project site.

**f) Would the project conflict with any local policies or ordinances protecting biological resources, including Wildflower Reserve Areas (L.A. County Code, Title 12, Ch. 12.36), the Los Angeles County Oak Tree Ordinance (L.A. County Code, Title 22, Ch. 22.56, Part 16), the Significant Ecological Areas (SEAs) (L.A. County Code, Title 22, § 22.56.215), and Sensitive Environmental Resource Areas (SERAs) (L.A. County Code, Title 22, Ch. 22.44, Part 6)?**

**g) Would the project conflict with the provisions of an adopted state, regional or local habitat conservation plan?**

***No Impact.*** The proposed Project does not contain or conflict with any Significant Ecological Areas (SEAs), Wildflower Reserve Areas, or Sensitive Environmental Resource Areas (SERAs). The nearest SEA is the San Andreas SEA, located approximately 4 miles to the west (LACDRP 1980). The Angeles National Forest is located approximately four miles to the south and the Antelope Valley California Poppy Preserve is located approximately four miles to the northwest. Therefore, the Project would not conflict with any local policies or ordinances protecting biological resources.

The Project site is located within the *West Mojave Plan,* which is a Habitat Conservation Plan (HCP) that encompasses most of the Antelope Valley and aims to conserve and protect habitat for the desert tortoise, the Mohave ground squirrel, and over 100 other special status species throughout a 9.3-million-acre planning area (BLM 2006). The Project site was not included in one of the proposed conservation areas. Further, as the HCP has not yet been adopted, there would be no impact to, nor would the Project conflict with an adopted HCP.

### 4.4.3 MITIGATION MEASURES

**MM BIO-1** A pre-construction survey for the burrowing owl shall be conducted within 14 days prior to start of construction/ground-breaking activities. For those burrows located along the Grid-Tie transmission route off the Project site, a second survey will be conducted within 24 hours of any ground-breaking activities. If these surveys do not detect occupied burrowing owls, then no further mitigation is required. If burrows occupied by burrowing owls are detected on the Project site, the Project Applicant shall notify the California Department of Fish and Wildlife (CDFW)[9] and shall implement the following actions prior to construction (either Set A for breeding burrowing owls [March to July] or Set B for non-breeding burrowing owls [August to February]).

<u>Set A Measures (for Breeding Burrowing Owls, between March and July)</u>

A1) No work shall occur within 500 feet of the active nesting burrow; the CDFW may be consulted to determine whether a reduced buffer is acceptable.

A2) Provide weekly monitoring of the burrowing owl nesting burrow to determine nesting outcome.

A3) Provide CDFW with monthly updates of burrowing owl nesting success.

A4) Resume construction at the burrow site once the Biologist determines that fledglings have left the nest.

If burrows occupied by burrowing owls are detected within 500 feet of the off-site Grid-Tie disturbance areas, the Project Biologist shall monitor the owl(s) to ensure that the Project does not negatively impact breeding. If negative indirect impacts are suspected, the Project Biologist shall propose measures to reduce indirect impacts to the owl(s) during construction.

<u>Set B Measures (for Non-Breeding Burrowing Owls, between August and February)</u>

B1) A qualified Biologist shall notify the CDFW of the occupied burrow location and that either passive or active relocation measures will be implemented.

B2) The Biologist shall remove the burrow.

If impacts to burrowing owl occupied burrows are unavoidable, preservation of lands containing potentially suitable burrowing owl habitat shall be preserved at a 1:1 ratio. Impacted lands shall be defined as the directly impacted occupied burrows and immediately adjacent habitat areas. Replacement lands shall be within the Project region (i.e. western Antelope Valley) and shall be located as close to the Project site as feasible. Vegetation types present and condition of mitigation lands shall be similar to those found on the impacted occupied burrowing owl lands. If suitable natural burrows are not present within the Project

[9] The California Department of Fish and Game (CDFG) changed its name to the California Department of Fish and Wildlife (CDFW) effective January 1, 2013.

site, artificial burrows shall be constructed in accordance with California Burrowing Owl Consortium (1993) Guidelines. Maintenance of such lands shall be the responsibility of the Project Applicant and shall ensure that conditions and general biological value remain consistent over time. Mitigation lands shall be preserved in perpetuity, or for the length of project impacts if temporal, with a conservation easement or other form of legal dedication. Lands may be deeded to a land management-conservation entity with prior approval from the County. Mitigation lands and deeds or conservation easements proposed shall be approved by the County prior to issuance of grading permits.

Within 60 days of recordation of the permanent deed restriction(s) or conservation easement(s), a Maintenance Plan for the off-site mitigation lands shall be submitted to the County for review and approval. The plan shall include the maintenance requirements for the mitigation area, based on the characteristics of the mitigation land and the mitigation requirements described above. The Maintenance Plan shall also describe the performance standards for determining that mitigation requirements for the lands have been met.

**MM BIO-2** If construction activities on the Project site and along the Grid-Tie alignment are completed between September 16, 2013 and March 31, 2014 (i.e., non-nesting season), then additional surveys for Swainson's hawk are not required.

If new or ongoing construction activities (i.e., additional removal of potential foraging habitat through ground-disturbing activities) would occur on the Project site and along the Grid-Tie alignment after April 1, 2014, surveys for Swainson's hawk shall be conducted following the 2010 CDFG survey protocol for the Antelope Valley prior to or concurrent with construction activities. If no active nests are detected, then no further mitigation is necessary.

If the survey detects an active Swainson's hawk nest within a 5-mile radius of the Project site, all construction activities must fully and immediately cease and the CDFW shall be notified. If the nest is determined to be unsuccessful by a qualified Biologist, the Project Applicant may resume construction activities as long as no other active nests are located within the 5-mile radius of the Project site. If Swainson's hawk nests are determined to be successful, the Project Applicant shall consult with CDFW to determine if a "take" authorization of a State-listed species (per the California Endangered Species Act) is warranted. If warranted, the Project Applicant shall pursue a CDFW permit, which will include conditions requiring impact minimization to the Swainson's hawk, including establishment of an avoidance buffer, as well as identification of mitigation lands for purchase that are within the known Antelope Valley breeding range of Swainson's hawk and that provide comparable habitat value to the Project site; the purchased lands will be at a minimum 2:1 ratio and subject to CDFW approval.

**MM BIO-3** If jurisdictional waters cannot be avoided, the Project Applicant shall apply for a Section 401 permit from the Regional Water Quality Control Board (RWQCB) and a 1602 Streambed Alteration Agreement from CDFW. These permits shall be obtained prior to approval of improvement plans; issuance of grading permits; and/or any clearing, grading, or excavation work on the Project site. The Project Applicant shall ensure that the Project would result in no net loss of "Waters of the State" by providing mitigation through impact avoidance; impact minimization; and/or compensatory mitigation for the impact, as determined in the Streambed

Alteration Agreement. Compensatory mitigation may consist of (a) obtaining credits from a mitigation bank; (b) making a payment to an in-lieu fee program that would conduct wetland, stream, or other aquatic resource restoration, creation, enhancement, or preservation activities (these programs are generally administered by government agencies or nonprofit organizations that have established an agreement with the regulatory agencies to use in-lieu fee payments collected from permit Applicants); and/or (c) providing compensatory mitigation through an aquatic resource restoration, establishment, enhancement, and/or preservation activity. This last type of compensatory mitigation may be provided at or adjacent to the impact site (i.e., on-site mitigation) or at another location, usually within the same watershed as the permitted impact (i.e., off-site mitigation). The Project Applicant retains responsibility for the implementation and success of the mitigation project. Evidence of secured permits shall be provided prior to approval of improvement plans; issuance of grading permits; and/or any clearing, grading, or excavation work on the Project site.

**MM BIO-4** Temporary construction staking or fencing shall be erected under the supervision of a qualified Biologist at or outside the edge of the impact areas where they interface with jurisdictional features. This fencing shall be erected prior to commencement of grading activities and shall demarcate areas where human and equipment access and disturbance from grading are prohibited. A qualified Biologist shall monitor all site preparation and grading activities near these interfaces during construction. Staging areas shall be restricted to approved impact areas only.

**MM BIO-5** The perimeter fencing surrounding the Project site will be raised at regular intervals above ground level to allow for the passage of wildlife to the lesser of either: one foot above grade or to the maximum height allowed by the PUC.

**MM BIO-6** To ensure compliance with the Migratory Bird Treaty Act (MBTA) and Section 3503.5 of the *California Fish and Game Code,* construction activities shall be conducted during the non-nesting season (September 1–January 31) to avoid any potential disturbance of avian breeding activities. Project-related activities with the potential to disturb suitable bird nesting habitat shall be prohibited from February 1 through August 31, unless a Project Biologist acceptable to the Director of Regional Planning surveys the Project area prior to disturbance to confirm the absence of active nests or nesting habitat. Disturbance shall be defined as any activity that physically removes or damages vegetation or habitat or any action that may cause disruption of nesting behavior such as loud noise from equipment or artificial night lighting. If site clearing, construction or other ground disturbance would be conducted within the general nesting season (February 1–August 31), then a pre-construction nesting bird survey shall be conducted by a qualified Biologist within three days prior to disturbance. If an active nest is located within or adjacent to the construction area and the Biologist determines that work activities may impact nesting, the Biologist shall demarcate an appropriate buffer zone around the nest, generally prohibiting construction activities within 300 feet (500 feet for raptors) of the active nest. The size of the buffer may vary (depending on site features, the sensitivity of the species, and the type of construction activity), but will be designed to prevent disruption of nesting activity. If construction activities must occur within the buffer zone of an active bird nest, the Biologist must monitor the construction activities to avoid undue disturbance to the nesting activities. The buffer zone restrictions will be eliminated once the Biologist determines that

nesting activity has ceased. Surveys shall be conducted weekly, beginning no earlier than 30 days and ending no later than 3 days prior to the commencement of disturbance. The Project Applicant shall record the results of the recommended protective measures described above and submit the records to the Department of Regional Planning to document compliance with applicable State and Federal laws pertaining to the protection of native birds.

Implementation of these mitigation measures would reduce impacts to biological resources to a less than significant level.

| **4.5 CULTURAL RESOURCES** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5? | ☐ | ☒ | ☐ | ☐ |
| b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? | ☐ | ☒ | ☐ | ☐ |
| c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, or contain rock formations indicating potential paleontological resources? | ☐ | ☒ | ☐ | ☐ |
| d) Disturb any human resources, including those interred outside of formal cemeteries? | ☐ | ☒ | ☐ | ☐ |

### 4.5.1 ENVIRONMENTAL SETTING

A Cultural Resources Technical Report (August 2012) has been prepared for the Project by BonTerra Consulting and is provided in Appendix D. The findings of the report are summarized, where relevant, in this section.

BonTerra Consulting Archaeologist Patrick Maxon, a Registered Professional Archaeologist (RPA), conducted a California Historical Resources Information System (CHRIS) records search and literature review for the Project at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton on July 7, 2011, for a site immediately to the east of, but which encompasses the current Project site. The SCCIC houses records for archaeological and historical resources in Orange, Los Angeles, and Ventura Counties.

Native American consultation was initiated with the Native American Heritage Commission (NAHC) by Mr. Maxon with a request for a Sacred Lands File Search and contact list. A response was received from the NAHC on June 20, 2012. Informational letters were mailed to tribes and individuals on June 22, 2012. The results of the CHRIS records search and Native American consultation (i.e., those that do not indicate the location of identified sites and can therefore be released to the public) are provided in Appendix D. Government-to-government consultation under Senate Bill (SB) 18 is not required for this Project as it does not require a General Plan amendment.

A paleontological resources records search was requested from the Los Angeles County Natural History Museum (LACM). A response was received from Samuel McLeod, Vertebrate Paleontologist, on July 23, 2012, and the results of the LACM records search for the Project site are provided in Appendix D. A cultural resources survey of the Project site was conducted on July 15 and 16, 2012, by Mr. Albert Knight of BonTerra Consulting.

As there are no structures on the site, historic resources were not analyzed.

**Ethnographic Background**

The western Mohave Desert and Antelope Valley were occupied by at least four groups of Native Americans: the Vanyume/Serrano, the Kawaiisu, the Tataviam, and the Kitanemuk. A fifth group, the Haminot, that lived in the Lancaster and Palmdale area likely was a name given to the Kitanemuk by their Native American neighbors. The languages of the Vanyume, Tataviam, and Kitanemuk appear to have been dialects of Serrano or Serran (BonTerra Consulting 2012b).

Little is known about the ethnographic period in the Antelope Valley region. Local groups continued to live in large, semi-permanent villages during the winter and, during the spring, summer, and fall, would separate into smaller groups to hunt and gather the locally available resources including, among others, piñon nuts, mesquite, and yucca. Most of the ethnographic groups of the area shared similar cultural traits and practices and, for the most part, maintained friendly relations with each other (BonTerra Consulting 2012b).

**Historic Background**

In 1772, Lieutenant Pedro Fages and a small force of Spanish soldiers became the first Europeans to enter the Antelope Valley. Other explorers passed through the valley over the next century, but little change to the pattern of life of the local populations of the valley was evident until 1876 when the Southern Pacific Railroad completed its line between the Los Angeles Basin and the San Joaquin Valley (BonTerra Consulting 2012b).

At the beginning of the 20$^{th}$ Century, after a long drought, much of the Antelope Valley was considered worthless, and ownership largely reverted back to the State of California. However, technological innovations in the new century, such as gasoline engines to pump well water, construction of aqueducts and improved irrigation techniques, among other advances, brought people back into the valley. The needs of World War I brought continued agricultural expansion, and World War II caused radical changes with the completion of Edwards Air Force Base and the development of the aerospace industry (BonTerra Consulting 2012b).

**Local History**

The history of the City of Lancaster, immediately to the east of the Project site, began when Moses Landley Wicks, a real estate developer, bought 640 acres of land from the Southern Pacific Railroad and laid out the town of Lancaster in 1884. The new town boomed during the 1880s and early 1890s; however, several years of drought beginning in 1895 forced most residents to leave the area. The City began to recover after the turn of the century with the turning point being the completion of the Los Angeles Aqueduct through the region in 1914, which permitted the expansion of agriculture. After World War II, the aerospace and defense industry became the largest business sector in the area with the construction of several aeronautical plants and the resulting influx of workers. Lancaster was incorporated in 1977 and has experienced a steady population increase since that time (BonTerra Consulting 2012b).

**Cultural Resources Literature Review**

The SCCIC literature review undertaken on July 7, 2011, for a project site immediately to the east of, but which encompasses the current Project site, revealed that two cultural resources studies have been completed that include at least a portion of the Project site and two cultural resources sites have been recorded within one mile of the Project site. None have been recorded within the Project site itself. Table 4-9, Cultural Resources Sites Within One Mile of the Project Site, lists the resources.

As described in the table below, one of these sites is a historic refuse deposit consisting chiefly of tin cans, bottles, glass and metal fragments, ceramics, lumber, and animal bone, ranging in age from the 1890s to the 1950s. The SCE Transmission Line Corridor is also listed as a cultural resource.

**TABLE 4-9**
**CULTURAL RESOURCES SITES WITHIN ONE MILE OF THE PROJECT SITE**

| Site Number | Recorder/Year | Comment |
|---|---|---|
| 19-186876 | Ahmet/2005 | SCE Transmission Line Corridor |
| 19-003479 | Ahmet et al./2005 | Historic Trash Deposit |
| Source: BonTerra Consulting 2012b. | | |

Table 4-10, Cultural Resources Studies on the Project Site, lists the surveys.

Tang and Hogan (2006) completed a cultural resources study for the *City of Lancaster General Plan Update,* which identified more than 700 recorded cultural resources within the City. Most of the prehistoric sites are recorded north (over 14 miles) of the Project site along the margins of Rosamond Dry Lake. Nearly all the historic-period buildings are concentrated in downtown Lancaster near the City's historic core area and east of the Project site. Applied Earthworks surveyed an elongated, north-south transmission line in 2009 and recorded 62 cultural resources. One of the resources, 19-003479, a historic trash deposit, lies approximately 3,300 feet southeast of the property.

**TABLE 4-10**
**CULTURAL RESOURCES STUDIES ON THE PROJECT SITE**

| Report Number | Author(s)/Year | Type of Study/Comments |
|---|---|---|
| LA-07991 | Tang and Hogan 2006 | City of Lancaster General Plan Update |
| LA-10175 | Applied Earthworks 2009 | Confidential Resource Report; Tehachapi Transmission Project |
| Source: BonTerra Consulting 2012b. | | |

**Paleontological Resources Literature Review**

A paleontological resources records search for the proposed Project was requested from the LACM. A response was received on July 23, 2012, from Samuel McLeod, Vertebrate Paleontologist (see Appendix D). McLeod's response indicates that no vertebrate fossil localities are recorded on the Project site, but there are nearby localities in some of the same sedimentary units that occur in the Project site.

The very southern portion of the Project site contains surficial deposits of Older Quaternary Alluvial fan deposits. The remainder of the Project site has surficial deposits of Younger Quaternary Alluvium (also derived as alluvial fan deposits) and soils. Younger Alluvium typically does not contain significant fossil deposits.

**Sacred Lands File Search**

The NAHC Search of the Sacred Lands File on June 20, 2012, did not indicate the presence of Native American cultural resources on the Project site. In addition, the NAHC provided a list of Native American groups and individuals that may have knowledge of the religious and/or cultural significance of resources that may be on and near the Project site. Each of these groups

and individuals were mailed informational letters on June 22, 2012, describing the Project and requesting any information regarding resources that may exist on or near the Project site. All Native American correspondence can be seen in Appendix D.

**Pedestrian Survey**

A cultural resources survey of the Project site and proposed transmission interconnection was conducted on July 15 and 16, 2012, by Mr. Albert Knight, Archaeologist, of BonTerra Consulting. The entire 263-acre Project site was surveyed via parallel transects spaced approximately 10 to 15 meters apart where possible.

No items or features were observed on the site that were determined to be worthy of additional research to determine historic significance. The survey area has been completely cleared of native vegetation in the past, probably for dry farming. The survey area is mostly trash-free, and what little trash there is, is obviously recent. No items or specimens of any kind were observed that might have been prehistoric or historic in origin. No lithic material types used by the local Native American groups were observed, nor were any historic materials (e.g., metal, amethyst glass or any other kinds of glass, pieces of porcelain, house or structure foundations, wind-mills, and well-heads) other than the tin cans. Occasional small animal bones, free of flesh, bleached white, and obviously recent were noted.

### 4.5.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?**

***Less Than Significant With Mitigation.*** CEQA requires a lead agency to determine whether a project may have a significant effect on one or more historical resources. A “historical resource” is defined as a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR) (*California Public Resources Code* [PRC], Section 21084.1); a resource included in a local register of historical resources (*California Code of Regulations* [CCR], Title 14, Section 15064.5[a][2]); or any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant (14 CCR 15064.5[a][3]).

While no historical resources were found on the Project site, there is a possibility that historical materials could be uncovered during necessary subsurface excavations for the construction of the proposed Project. Therefore, implementation of MM CUL-1, which describes procedures to be followed in the event that cultural resources are discovered, is required. Implementation of MM CUL-1 would reduce this potentially significant impact to a less than significant level.

**b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?**

***Less Than Significant With Mitigation.*** As previously mentioned, an NAHC Search of the Sacred Lands File did not indicate the presence of Native American cultural resources on the Project site. A response to the information letter sent to the NAHC providing a list of Native American groups and individuals was received from Beverly Salazar-Folkes (tribal representative) via telephone on July 17, 2011. Ms. Salazar-Folkes asked that the Project proceed with caution because of the possibility of unforeseen resources and recommended

that archaeological and Native American monitoring be undertaken during ground-disturbing activities.

Although the likelihood of encountering archaeological resources on the site is considered low, this impact is potentially significant. Therefore, implementation of MM CUL-1, which describes procedures to be followed in the event that cultural resources are discovered, is required. Implementation of MM CUL-1 would reduce this potentially significant impact to a less than significant level.

**c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, or contain rock formations indicating potential paleontological resources?**

***Less Than Significant With Mitigation.*** The LACM reports that there are no known fossil localities within the Project site or nearby areas (BonTerra Consulting 2012b). Although the possibility of discovering fossil resources is considered low, it is possible that significant vertebrate and invertebrate fossils could be encountered during subsurface disturbance. This could result in a significant impact to unique paleontological resources. Therefore, implementation of MM CUL-2, which describes procedures to be followed in the event that paleontological resources are discovered, is required. Implementation of MM CUL-2 would reduce this potentially significant impact to a less than significant level.

**d) Would the project disturb any human resources, including those interred outside of formal cemeteries?**

***Less Than Significant Impact With Mitigation.*** There is no indication that human remains are present on the Project site, and Native American tribes were given an opportunity to reveal the existence of any remains; background research, including the literature review, failed to find any potential for remains, and the Project site was previously disturbed. Project-related earth disturbance has the potential to unearth previously undiscovered remains, resulting in a potentially significant impact. However, implementation of MM CUL-3 would ensure that impacts are reduced to a less than significant level.

### 4.5.3 MITIGATION MEASURES

**MM CUL-1** In the event of the discovery of potential cultural resources during ground-disturbing activities, ground-disturbing activities within 50 feet of the discovery shall be halted and diverted until a qualified Archaeologist assesses the resource for significance. The qualified Archaeologist will assess the resource pursuant to Section 21083.2(g) of the *California Public Resources Code* and Section 15064.5(a) of the State CEQA Guidelines to make recommendations of significance. The Archaeologist shall provide their recommendations to the County for a determination of significance. If the County determines the resource to be a significant resource, a “unique archaeological resource”, or a “historical resource”, the Archaeologist shall formulate a mitigation plan in consultation with the County that will mitigate impacts to the resource to a less than significant level. Potential mitigation could include planning construction to avoid the resource; protection and preservation in place; and/or data recovery excavation of a representative sample of the site’s constituents.

The Archaeologist shall prepare a report of the results of any study prepared as part of a testing or mitigation plan, following accepted professional practice. The report shall follow guidelines of the California Office of Historic Preservation. Copies of the report shall be submitted to the County of Los Angeles and to the California Historic Resources Information System at the South Central Coastal Information Center (SCCIC).

**MM CUL-2** Should fossils/paleontological resources be found during ground-disturbing activities for the Project, ground-disturbing activities within 50 feet of the discovery shall be halted or diverted until a qualified Paleontologist inspects the find and evaluates it for significance. Work may proceed in other areas of the site, subject to the direction of the Paleontologist. If determined significant, the Paleontologist shall be authorized to quickly and efficiently salvage and remove the fossil from its locality, as appropriate, before ground-disturbing activities resume in the area. These actions, as well as final disposition of the resources, shall be subject to the approval of the County of Los Angeles. These would include identification and evaluation of the discovery and curation of the fossil in perpetuity in an accredited scientific institution approved by the County.

**MM CUL-3** In accordance with Section 7050.5 of the *California Health and Safety Code,* if human remains are found during ground-disturbing activities, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur. The County Coroner shall be notified within 24 hours of the discovery. If the County Coroner determines that the remains are or believed to be Native American, s/he shall notify the NAHC in Sacramento within 24 hours of the discovery. In accordance with Section 5097.98 of the *California Public Resources Code,* the NAHC must immediately notify those persons it believes to be the most likely descended from the deceased Native American. The descendents shall complete their inspection within 48 hours of being granted access to the site by the Property Owner. The property owner would then determine, in consultation with a designated Native American representative, the final disposition of the human remains (14 *California Code of Regulations* §15064.5[e]).

| **4.6 ENERGY** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Conflict with Los Angeles County Green Building Ordinance (L.A. County Code Title 22, Ch. 22.52, Part 20 and Title 21, § 21.24.440) or Drought Tolerant Landscaping Ordinance (L.A. County Code, Title 21, § 21.24.430 and Title 22, Ch. 22.52, Part 21)? | ☐ | ☐ | ☒ | ☐ |
| b) Involve the inefficient use of energy resources (see Appendix F of the CEQA Guidelines)? | ☐ | ☐ | ☒ | ☐ |

### 4.6.1 ENVIRONMENTAL SETTING

The Project proposes to increase electricity generated from renewable technology by generating up to 20 MWac of electrical energy from the sun. Employing a series of PV module arrays to convert sunlight into electrical energy without the use of heat transfer fluid or cooling water, the facility would deliver the electrical output to the existing regional transmission system. The PV modules would convert sunlight into low-voltage DC power, which is subsequently transformed by an inverter into AC power. The PV modules are made of a semiconductor material through which electrons flow to convert light (photons) to electricity.

Recent legislation enacted in California encourages the development of renewable energy resources to reduce reliance on fossil fuels; to diversify energy portfolios; to reduce greenhouse gas emissions; and to assist creation of “green” jobs within the state of California. The Project would assist California in meeting the Renewable Energy Portfolio Standards (RPS). Executive Orders S-14-08 (issued on November 17, 2008) and S-21-09 (issued on September 15, 2009) established RPS targets for California, stating that “all retail sellers of electricity shall serve 33 percent of their load with renewable energy by 2020”. State government agencies have been directed to take all appropriate actions to implement this target in all regulatory proceedings, including siting, permitting, and procuring renewable energy power plants and transmission lines. The Project qualifies as an eligible renewable energy resource as defined by the *California Public Resources Code.*

### 4.6.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project conflict with Los Angeles County Green Building Ordinance (L.A. County Code Title 22, Ch. 22.52, Part 20 and Title 21, § 21.24.440) or Drought Tolerant Landscaping Ordinance (L.A. County Code, Title 21, § 21.24.430 and Title 22, Ch. 22.52, Part 21)?**

***Less Than Significant Impact.*** The Los Angeles County Code (Title 21, Section 21.24.440) requires compliance with applicable requirements of Title 22 (specifically, Chapter 22.52, Part 20) for green building. These standards are applicable to construction of buildings and are designed to reduce energy consumption; save water and other natural resources; and divert waste from landfills when new buildings are constructed. The Project is for renewable energy electricity generation and does not include the construction of habitable buildings. Therefore, the Title 22 Green Building standards are not applicable.

This Project has been designed to minimize disturbed areas by keeping grading to a minimum and is expected to comply with the Drought Tolerant Landscaping Ordinance. Per MM AES-1, the Project will incorporate landscaping with drought-tolerant vegetation for the exterior of the Project site, along the portions of the perimeter fence facing 110th Street West, West Avenue J, and along the northern boundary of the Project site, in compliance with the Drought Tolerant Landscaping Ordinance. A Landscape Plan shall be prepared, subject to the review and approval of the County of Los Angeles. Irrigation via water trucks would be conducted until the landscaping is established. No long-term irrigation infrastructure would be constructed.

Therefore, the Project would not conflict with these two ordinances and impacts would be less than significant.

**b) Would the project involve the inefficient use of energy resources (see Appendix F of the CEQA Guidelines)?**

***Less Than Significant Impact.*** The Project would generate renewable energy, decreasing California's reliance on fossil fuel energy and increasing its reliance on renewable energy. Both of these are identified in Attachment F of the CEQA Guidelines as ways to accomplish the CEQA energy conservation goal.

Non-renewable resources, including fossil fuels (i.e., energy), would be used in the construction of the proposed Project. The Project's construction would use typical equipment, as listed previously in Table 3-5, and would be completed within a single phase six-month phase. The daily vehicle trips during construction would generally include construction worker trips and truck trips for equipment deliveries and water for dust suppression. Construction of the proposed solar array is not unusually wasteful or excessive in terms of construction materials or fossil fuel use due to the lack of demolition and other waste products generated by typical construction projects (e.g. discarded woody debris). In addition, construction of these types of facilities is not energy-intensive since minimal grading is required for construction. Since the facilities would be unmanned and would not generate significant operational vehicle trips; and since minimal use of water is required for operations.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its original state use upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). It is assumed that decommissioning of the site would require the same construction scenario (activities, equipment, duration) as the initial development of the site; however, future energy impacts would be less than those currently projected due to anticipated advancements in technology for a more efficient and cleaner-burning construction equipment fleet mix. Therefore, the Project would not involve the inefficient use of energy resources and impacts would be less than significant.

### 4.6.3 MITIGATION MEASURES

Project implementation would not result in significant impacts related to energy; therefore, no mitigation is required.

| **4.7 GEOLOGY AND SOILS** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: | | | | |
| i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. | ☐ | ☐ | ☐ | ☒ |
| ii) Strong seismic ground shaking? | ☐ | ☐ | ☒ | ☐ |
| iii) Seismic-related ground failure, including liquefaction? | ☐ | ☐ | ☒ | ☐ |
| iv) Landslides? | ☐ | ☐ | ☐ | ☒ |
| b) Result in substantial soil erosion or the loss of topsoil? | ☐ | ☐ | ☒ | ☐ |
| c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse? | ☐ | ☐ | ☒ | ☐ |
| d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? | ☐ | ☐ | ☒ | ☐ |
| e) Have soils incapable of adequately supporting the use of onsite wastewater treatment systems where sewers are not available for the disposal of wastewater? | ☐ | ☐ | ☐ | ☒ |
| f) Conflict with the Hillside Management Area Ordinance (L.A. County Code, Title 22, § 22.56.215) or hillside design standards in the County General Plan Conservation and Open Space Element? | ☐ | ☐ | ☐ | ☒ |

### 4.7.1 ENVIRONMENTAL SETTING

A Geotechnical Investigation Report (June 2012) has been prepared for the Project by Leighton Consulting and is provided in Appendix E. The findings of the report are summarized, where relevant, in this section.

The Antelope Valley is located at the western edge of the Mojave Desert, which is bound by the San Andreas Fault Zone on the southwest, the Garlock Fault Zone on the northwest, and the Colorado River on the east. The Tehachapi Mountain range defines the northern and northwestern boundary of the Valley, and the San Gabriel, Sierra Pelona, and Liebre Mountains define the southern and southwestern boundaries. The Valley is relatively flat, except for Quartz Hill to the south and Fairmont and Antelope Buttes to the west (Lancaster 2009a). The Project site is undeveloped and has a relatively flat topography.

The Project site is located within the Antelope Valley portion of the Mojave Desert Geomorphic Province of California. The Antelope Valley lies within a wedge-shaped part of the Mojave Desert bound by the San Andreas Fault to the southwest; the Garlock Fault to the northwest; and the Cottonwood-Rosamond Fault to the northeast. On-site terrain slopes gently to the north, and is underlain by Quaternary alluvium to a thickness of several hundred feet which, in turn, is underlain by plutonic quartz monzonite bedrock. The majority of the site is mapped with alluvial soil at the surface, consisting of gravel, sand, and silt. The far southwest portion of the site is mapped with older alluvium at the surface (Leighton 2012a).

Exhibit 4-9, Soil Types, depicts the soil types and liquefaction hazards associated with the Project site. Soils in the Antelope Valley come from erosion of the San Gabriel Mountains. Alluvial deposits in the foothill areas consist of coarse-grained sediment intermingled with organic matter, while finer-grained silts and clays are found in areas farther from the mountains. The Project site is underlain by alluvial deposits and overlain by the Pond-Tray soil association. These soils are very deep and moderately well-drained. They contain slight to moderate amounts of soluble salts and alkali. They have slow permeability; high water-holding capacity for irrigation; and low to high shrink-swell potential (Lancaster 2009a).

As part of the Geotechnical Investigation Report, subsurface conditions were evaluated by nine borings taken on the site. The borings were drilled to depths of approximately 11.5 to 51.5 feet below the existing grade. Alluvial soils encountered in the borings generally consist of medium dense to dense granular soils, including silty sand and clayey sand, and medium stiff to very stiff cohesive soils, including sandy lean clay and silt. Thin layers of clean sand were encountered at depths greater than 30 feet. The soil encountered was generally visually described as dry to slightly moist. More detailed descriptions of the subsurface conditions are presented on the boring logs in Appendix E (Leighton 2012a).

### 4.7.2 PROJECT IMPACTS

**a) Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:**

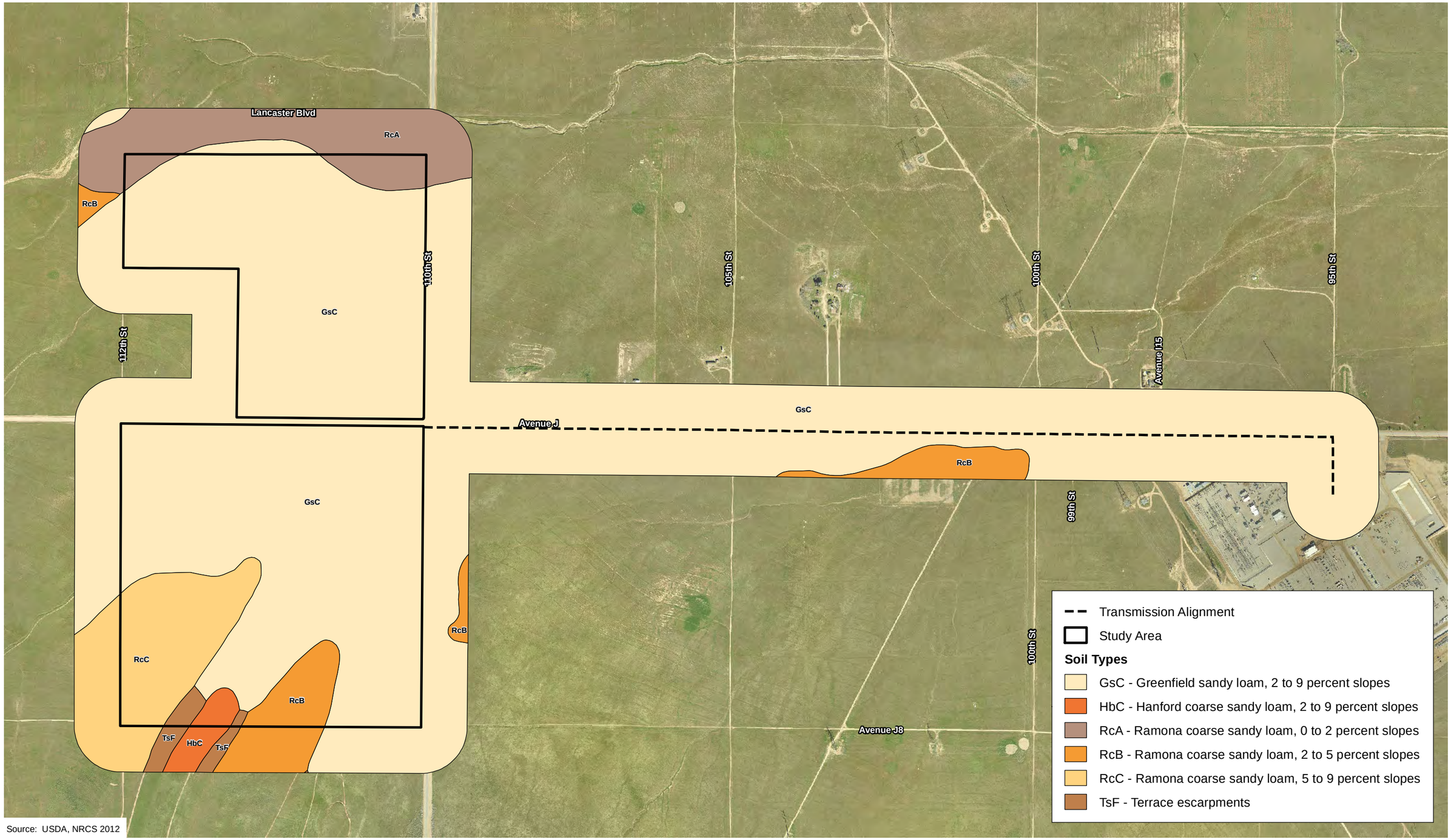
**i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.**

***No Impact.*** The impact analysis and conclusions in this section apply to both on-site and off-site activities. There are no known active faults traversing the Project site, and the site is not located within an Alquist-Priolo Earthquake Fault Zone or any fault zones established by Los Angeles County. The San Andreas Fault is the nearest earthquake fault to the site, and is located approximately 3.25 miles south of the site. Thus, the proposed Project would not be exposed to fault rupture hazards along the San Andreas Fault. No mitigation is required.

**a) Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:**

**ii) Strong seismic ground shaking?**

***Less Than Significant Impact.*** The impact analysis and conclusions in this section apply to both on-site and off-site activities. The primary seismic hazard for the Project site, as with most of the Southern California region, is the susceptibility to ground shaking due to the presence of major active or potentially active faults in the region. The following faults are capable of producing strong ground shaking at the Project site (in order of increasing distance): the




Source: USDA, NRCS 2012

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# Soil Types

Exhibit 4–9

*West Antelope Solar Project*

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San Andreas Fault, the Garlock Fault, the White Wolf Fault, the South Lockhart-Helendale Fault System, the San Gabriel Fault, and the Sierra Madre Fault. The proposed Project would be exposed to strong ground shaking during a seismic event, which may pose hazards to employees or contractors who may be on site during an earthquake (e.g., maintenance services) due to structural damage to the PV panels, mounting structures, equipment, equipment buildings, fencing, lighting, and/or electrical connections.

As required by the County, the proposed Project would be designed and constructed in compliance with the County Building Code, which incorporates, by reference, the 2010 California Building Code (CBC) (or the most recent County building and seismic codes in effect at the time the grading plans are approved) for ensuring the structural integrity of proposed site improvements against seismic shaking. In addition, the Project will include the geotechnical recommendations for the Project as defined in the *Geotechnical Investigation, Proposed West Antelope Project (20-MWAC Photovoltaic Array), West of 110th Street West, North and South of Avenue K, in the Lancaster Area of Los Angeles County, California* (Leighton 2012a) and any other geotechnical reports completed for the Project. Therefore, impacts related to seismic groundshaking would be less than significant.

**a) Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:**

**iii) Seismic-related ground failure, including liquefaction?**

***Less Than Significant Impact.*** The impact analysis and conclusions in this section apply to both on-site and off-site activities. Potential secondary seismic effects of strong seismic ground shaking include liquefaction, lateral spreading, and seismically induced settlement/differential compaction. Liquefaction occurs when loose, cohesionless, water-saturated soils (generally fine-grained sand and silt) are subjected to strong seismic ground motion of significant duration. These soils essentially behave similar to liquids, losing bearing strength. Structures built on these soils may tilt or sink when the soils liquefy. The Project site is not mapped in an area considered to have a potential for liquefaction on the Seismic Hazards Zones Map for the Del Sur Quadrangle (CGS 2006). Groundwater data indicate that groundwater levels are deep in the region currently and historically. In addition, the granular soils encountered at depth were found to range in consistency from dense to very dense. Based on these findings, the potential for liquefaction on site (including effects of liquefaction, such as lateral spreading) is considered low. Therefore, impacts would be less than significant and no mitigation is required.

Seismically induced settlement consists of dry dynamic settlement (above groundwater) and liquefaction-induced settlement (below groundwater). During a strong seismic event, seismically induced settlement can occur within loose to moderately dense sandy soil due to reduction in volume during, and shortly after, an earthquake event. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement. The Geotechnical Investigation Report analyzes the potential for seismically induced settlement. The results of the analysis suggest that the on-site soils are susceptible to less than 1 inch of seismic settlement based on the design earthquake. Due to the laterally uniform nature of soils, differential settlement due to seismic loading is assumed to be less than ½ inch over a horizontal distance of 40 feet (Leighton 2012a). Therefore, the risk of settlement and differential compaction was concluded to be low, and impacts would be less than significant.

**a) Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:**

**iv) Landslides?**

***No Impact.*** The impact analysis and conclusions in this section apply to both on-site and off-site activities. No natural or artificial slopes exist on or near the Project site. The Geotechnical Investigation Report indicates that the potential for an earthquake-induced landslide to occur at the site is not an issue (Leighton 2012a). Therefore, the risk of seismically induced landslides is considered to be very low, and no impact would occur.

**b) Would the project result in substantial soil erosion or the loss of topsoil?**

***Less Than Significant Impact.*** The largest source of erosion and topsoil loss, particularly in a suburban or urban environment, is uncontrolled drainage during construction. Construction of the Project would involve the clearing and grubbing of vegetation in only those areas that would be developed (approximately 30 acres of the 263–acre Project site), including access roads, equipment foundations, retention basins, fence posts, electrical conduit trenching, utility pole excavation, recreational trail, and mounting structure foundations. As discussed in more detail in Section 4.10, Hydrology and Water Quality, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into "Waters of the U.S.". As required by the County, construction activities would be conducted in compliance with the statewide NPDES General Permit for Storm Water Discharges Associated with the Construction and Land Disturbance Activities (Order No 2009-009-DWQ as amended by Order No. 2010-0014-DWQ [NPDES No. CAS000002]), issued by the State Water Resources Control Board (SWRCB) on September 2, 2009, and effective for all Project sites on July 1, 2010.

In compliance with the NPDES permit, erosion potential during construction of the proposed Project would be managed with Best Management Practices (BMPs) implemented on the Project site as part of a Storm Water Pollution Prevention Plan (SWPPP) during construction activities to minimize erosion impacts in accordance with NPDES requirements. Implementation of the BMPs would reduce construction-related erosion impacts to less than significant levels.

Concrete pads, footings, and access roads (which would be compacted to 90 percent) would result in the creation of minor amounts of impervious surfaces on the Project site, which would result in the long-term loss of accessible top soil. Soil erosion currently occurs on the site due to high winds in the region and would continue to be an issue even after Project implementation. However, erosion would be reduced in areas that would be improved with the equipment buildings; mounting structure foundations; and internal roadway. Thus, a minor reduction in erosion potential would occur.

As discussed in more detail in Section 4.10, Hydrology and Water Quality, the Project shall be designed and constructed in compliance with the water quality plan/hydrology requirements of the adopted Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit (Order No. R4-2012-0175, NPDES No. CAS004001) and *Los Angeles County Department of Public Works' 2009 Low Impact Development (LID) Standard Manual* (LACDPW 2009,). The Water Quality Plan/Hydrology will be based on calculations contained in a Drainage Analysis prepared by the Project Engineer in accordance with the *Los Angeles County Department of Public Works' Hydrology Manual* (LACDPW 2006a). As required by the County, appropriate post-construction treatment-control BMPs pursuant to the water quality plan/hydrology requirements would be incorporated into the Project design Compliance with this requirement would ensure that impacts related erosion would be less than significant.

**c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?**

**d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?**

***Less Than Significant Impact.*** The Geotechnical Investigation Report for the Project indicates that there are no zones of potentially liquefiable soil on the site and the exposed soils have a low to medium expansion potential. In addition, the report does not identify hazards related to landslide, lateral spreading, subsidence, or soil collapse (Leighton 2012a). Structural design and construction of proposed site improvements would need to implement the recommendations in the Geotechnical Investigation Report to comply with applicable regulatory requirements and to ensure that geologic hazards remain less than significant.

**e) Would the project have soils incapable of adequately supporting the use of onsite wastewater treatment systems where sewers are not available for the disposal of wastewater?**

***No Impact.*** The proposed Project would not include toilets, kitchens, or bathrooms that would generate wastewater requiring disposal into the sewer system or a septic tank. Thus, the on-site soils would not pose limitations to septic tanks or alternative waste water disposal systems since none are proposed as part of the Project. No impact would occur.

**f) Would the project conflict with the Hillside Management Area Ordinance (L.A. County Code, Title 22, § 22.56.215) or hillside design standards in the County General Plan Conservation and Open Space Element?**

***No Impact.*** The Project site is located on the floor of the Antelope Valley where the terrain is nearly flat. It is not in or near any hillside area and is not affected by Hillside Management Areas. Therefore, no impact would occur.

### 4.7.3 MITIGATION MEASURES

Project implementation would not result in significant impacts related to geology and soils; therefore, no mitigation is required.

| **4.8 GREENHOUSE GAS EMISSIONS** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | ☐ | ☐ | ☒ | ☐ |
| b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | ☐ | ☐ | ☒ | ☐ |

### 4.8.1 ENVIRONMENTAL SETTING

Climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. Climate change may result from natural factors, natural processes, and human activities that change the composition of the atmosphere and alter the surface and features of the land. Significant changes in global climate patterns have recently been associated with global warming, which is an average increase in the temperature of the atmosphere near the Earth's surface; this is attributed to an accumulation of greenhouse gas (GHG) emissions in the atmosphere. GHGs trap heat in the atmosphere, which, in turn, increase the Earth's surface temperature. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The emission of GHGs through fossil fuel combustion in conjunction with other human activities appears to be closely associated with global warming (OPR 2008).

GHGs, as defined under California's Assembly Bill (AB) 32, include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$). General discussions on climate change often include water vapor, ozone, and aerosols in the GHG category. Water vapor and atmospheric ozone are not gases that are formed directly in the construction or operation of development projects, nor can they be controlled in these projects. Aerosols are not gases. While these elements have a role in climate change, they are not considered by either regulatory bodies, such as CARB, or climate change groups, such as the California Climate Action Registry (CCAR), as gases to be reported or analyzed for control. Therefore, no further discussion of water vapor, ozone, or aerosols is provided.

GHGs vary widely in the power of their climatic effects; therefore, climate scientists have established a unit called global warming potential (GWP). The GWP of a gas is a measure of both potency and lifespan in the atmosphere as compared to $CO_2$. For example, since $CH_4$ and $N_2O$ are approximately 21 and 310 times more powerful than $CO_2$, respectively, in their ability to trap heat in the atmosphere, they have GWPs of 21 and 310, respectively ($CO_2$ has a GWP of 1). Carbon dioxide equivalent ($CO_2e$) is a quantity that enables all GHG emissions to be considered as a group despite their varying GWP. The GWP of each GHG is multiplied by the prevalence of that gas to produce $CO_2e$. The atmospheric lifetime and the GWP of selected GHGs are summarized in Table 4-11, Global Warming Potentials and Atmospheric Lifetimes.

**TABLE 4-11**
**GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIMES**

| Greenhouse Gas | Atmospheric Lifetime (years) | Global Warming Potential (100-year time horizon) |
|---|---|---|
| Carbon Dioxide ($CO_2$) | 50.0–200.0 | 1 |
| Methane ($CH_4$) | 12.0 | 21 |
| Nitrous Oxide ($N_2O$) | 114.0 | 310 |
| HFC-134a | 48.3 | 1,300 |
| PFC: Tetrafluoromethane ($CF_4$) | 50,000.0 | 6,500 |
| PFC: Hexafluoroethane ($C_2F_6$) | 10,000.0 | 9,200 |
| Sulfur Hexafluoride ($SF_6$) | 3,200.0 | 23,900 |
| Source: CCAR 2009. | | |

AB 32, the California Global Warming Solutions Act of 2006, recognizes that California is the source of substantial amounts of GHG emissions. The statute states that:

> Global warming poses a serious threat to the economic well being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.

In order to avert these consequences, AB 32 establishes a State goal of reducing GHG emissions to 1990 levels by the year 2020, which is a reduction of approximately 16 percent from forecasted emission levels, with further reductions to follow (CARB 2012).

The Project site is currently undeveloped and does not directly generate GHG emissions due to the absence of on-site water use, energy use, and vehicle trip generation.

### 4.8.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

***Less Than Significant Impact.*** The AVAQMD's *CEQA and Federal Conformity Guidelines* (2011) establish significance thresholds to assess the impact of Project-related GHG emissions in the AVAQMD. The AVAQMD GHG Significance Threshold is 100,000 tons of $CO_2e$ per year for long-term operational and short-term construction emissions. A project with emissions rates below this threshold is considered to have a less than significant effect on climate change.

**Construction**

The principal source of GHG emissions during construction of the proposed Project would be the internal combustion engines of construction equipment, on-road construction vehicles, and workers' commuting vehicles. Following the same methodology as the Air Quality analysis, the proposed Project's construction emissions were estimated using the assumptions provided by the Project Applicant and emission factors from EMFAC2011 and OFFROAD2007. Project-specific input was based on the factors described above; general information known about the Project description; engineering judgment; and standard practices. For the proposed Project, GHG emissions during construction are estimated at 1,550 tons $CO_2e$, which would be below the AVAQMD threshold of 100,000 tons $CO_2e$/yr and would be less than significant. The emissions calculations data sheets showing equipment assumptions and detailed emissions are included in Appendix B.

**Operations**

As discussed in Section 4.3, Air Quality, the workforce performing ongoing O&M would be relatively small and would typically be off site. General landscape labor would perform vegetation maintenance at some interval to maintain ground coverage and to remove unwanted vegetation. Skilled operations monitoring personnel would review the information provided by the SCADA system to determine when actions would be needed. In most cases with PV systems, the fault is auto-correctable and does not require reactive repair at the site.

With the conservative assumption of 50 annual trips at a one-way distance of 50 miles for O&M personnel, 100 annual trips for O&M water trucks, and an additional 195 water truck trips during the first three years of operations for irrigation to establish the landscaping, annual GHG emissions from maintenance visits were calculated with emissions factors from EMFAC2011. Annual GHG emissions would be 19.2 tons of $CO_2e$ per year, which would be below the AVAQMD threshold of 100,000 tons $CO_2e$/yr and would be considered less than significant.

The proposed solar facility would be capable of generating up to 20 MWac of electricity under peak solar conditions. The energy generated by the proposed Project would replace the energy consumption provided by burning fossil fuels and using water at central power generation plants, thereby resulting in an indirect reduction of GHG emissions. Using PG&E emission factors, as detailed in Appendix B, it has been calculated that the Project would result in the offset of up to 9,823 tons $CO_2e$/yr. Therefore, the implementation of the Project would result in a net regional or global reduction of GHG emissions compared with existing conditions.

As stated, a total of 19.2 tons of $CO_2e$/yr would be generated by the proposed Project from operational activities. With the reduction of approximately 9,823 tons of $CO_2e$/yr from a 20 MWac facility, the Project would have a net benefit of approximately 9,781 tons of $CO_2e$/yr in GHG emissions by replacing electrical energy use with solar energy.

GHG emissions from the Project would not be cumulatively considerable; the Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

**Decommissioning**

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). It is assumed that

decommissioning of the site would require the same construction scenario (activities, equipment, duration) as the initial development of the site; however, future GHG impacts would be less than those currently projected due to anticipated advancements in technology and a cleaner-burning construction equipment fleet mix. Therefore, future air quality impacts related to decommissioning would also be less than significant.

**b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?**

***Less Than Significant Impact.*** The Countywide Energy and Environmental Policy, adopted by the Board of Supervisors of the County of Los Angeles on January 16, 2007, sets forth guidelines and programs for the development and enhancement of energy conservation and environmental programs within County departments. This County Policy consists of the following programs:

- Energy and Water Efficiency Program,
- Environmental Stewardship Program,
- Public Outreach and Education Program, and
- Sustainable Design Program.

Under the Energy and Water Efficiency Program, the County has set forth the goal of reducing energy (electricity and natural gas) and water consumption in County facilities by 20 percent by the year 2015. Under the Environmental Stewardship Program, the County seeks to reduce its environmental footprint, including a reduction in greenhouse gases produced through the direct and indirect operations (Los Angeles County 2013).

By providing a new source of renewable energy, the Project would reduce air pollution and GHG emissions generated by the burning of fossil fuels and/or the use of water at central power generation plants, and thus, would be consistent with the objectives and programs of the Countywide Energy and Environmental Policy.

AB 32 requires CARB to develop a Scoping Plan to lower the State's GHG emissions to meet the 2020 limit (*California Health and Safety Code,* Sections 38500 et seq.). The Scoping Plan was approved at the December 2008 CARB meeting. In August 2011, the Scoping Plan was re-approved by the Board, and includes the *Final Supplement to the Scoping Plan Functional Equivalent Document* (FED). A key element of the Scoping Plan is achievement of a statewide renewable energy mix of 33 percent (CARB 2008). By providing a new source of renewable energy, the proposed Project would be consistent with the renewable energy measure of the CARB Scoping Plan. The overall goal of AB 32 is to reduce GHG emissions. As demonstrated above, the proposed Project would result in a net reduction of GHG emissions, consistent with AB 32. Therefore, the Project would not conflict with the applicable plans or policies to reduce GHG emissions and impacts would be less than significant.

### 4.8.3 MITIGATION MEASURES

Project implementation would not result in significant impacts related to greenhouse gas emissions; therefore, no mitigation is required.

| **4.9 HAZARDS/HAZARDOUS MATERIALS** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Create a significant hazard to the public or the environment through the routine transport, storage, production, use, or disposal of hazardous materials? | ☐ | ☒ | ☐ | ☐ |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials or waste into the environment? | ☐ | ☒ | ☐ | ☐ |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of sensitive land uses? | ☐ | ☐ | ☒ | ☐ |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | ☐ | ☐ | ☒ | ☐ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or people residing or working in the project area? | ☐ | ☒ | ☐ | ☐ |
| f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? | ☐ | ☒ | ☐ | ☐ |
| g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ☒ | ☐ |
| h) Expose people or structures to a significant risk of loss, injury or death involving fires, because the project is located: | | | | |
| i) within a Very High Fire Hazard Severity Zones | ☐ | ☐ | ☐ | ☒ |
| ii) within a high fire hazard area with inadequate access? | ☐ | ☐ | ☒ | ☐ |
| iii) within an area with inadequate water and pressure to meet fire flow standards? | ☐ | ☐ | ☒ | ☐ |
| iv) within proximity to land uses that have the potential for dangerous fire hazard? | ☐ | ☐ | ☒ | ☐ |
| i) Does the proposed use constitute a potentially dangerous fire hazard? | ☐ | ☐ | ☒ | ☐ |

### 4.9.1 ENVIRONMENTAL SETTING

The discussion of past and current hazardous material users on and near the site is based on the Phase I Environmental Site Assessment (ESA) prepared by Leighton Consulting in July 2012. The Phase I ESA is located in Appendix F.

***On-Site Hazardous Material Use.*** The site is currently vacant, but was previously used as agricultural land. Because the Project site is currently vacant, the site does not utilize hazardous materials or generate hazardous wastes. There are no known hazardous materials, petroleum products, hazardous wastes, or petroleum wastes on the site. Obvious signs of soil contamination from hazardous materials and petroleum products were not observed on the Project site during site reconnaissance performed as part of the Phase I ESA.

***Adjacent Hazardous Material Users.*** Review of government databases indicates that there are no adjacent users of hazardous materials or generators of hazardous wastes in the vicinity of the Project site.

***Nearby Airports.*** The nearest airports to the site are Bohunk's Airpark, a private airstrip approximately two miles west of the Project site and the General William J. Fox Airfield, which is located approximately six miles northeast. As the Los Angeles County Airport Land Use Plan does not identify Bohunk's Airpark, it is not regulated by Los Angeles County Airport Land Use Commission (ALUC) policies and procedures. However, it is recognized as an airfield by the Federal Aviation Administration (AirNav 2013a).

Fox Airfield is a general aviation airport that is owned by the County of Los Angeles and serves as a flight training facility for aircraft and pilots from the Los Angeles Basin and as an air attack base for U.S. Forest Service firefighting aircraft (ALUC 2004). It handles an average of 224 flight operations per day (AirNav 2013b). The *General William J. Fox Airfield Land Use Compatibility Plan*, adopted by the ALUC in December 2004, sets forth land use compatibility policies applicable to future development in the vicinity of the airport. The Project site is located outside the airport's Area of Influence (ALUC 2004).

***Wildfire Hazards.*** The Project site is located in neither State nor Local Responsibility areas designated as Very High or High Fire Hard Severity Zones, as mapped by the California Department of Forestry and Fire Protection (CAL FIRE 2007). As shown in Exhibit 4-10, Fire Hazard Severity Zone Map, the high risk zones closest to the Project site are located in the San Gabriel Mountains, approximately four miles to the south.

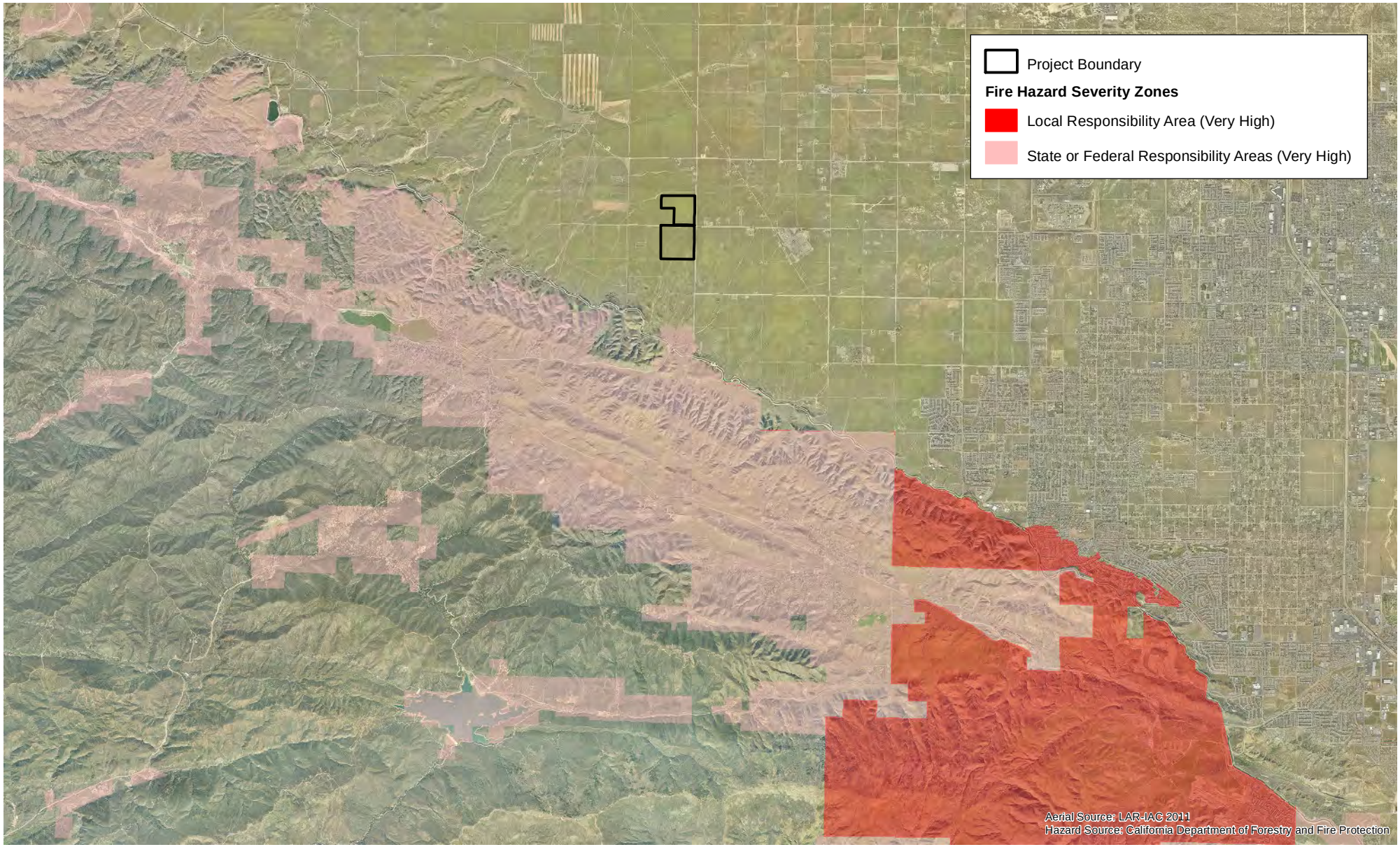
### 4.9.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project create a significant hazard to the public or the environment through the routine transport, storage, production, use, or disposal of hazardous materials?**

**b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials or waste into the environment?**

***Less Than Significant With Mitigation.*** The proposed Project would not utilize, store, or produce hazardous materials or wastes that may pose a significant hazard to the public. Hazardous waste would not be generated on site. However, construction activities associated




# Fire Hazard Severity Zone Map

Exhibit 4-10

*West Antelope Solar Energy Project*

N W E S

2 1 0 2 Miles

BonTerra CONSULTING

(Rev: 8-29-2013 MMD) Projects\TAAC\J001\Graphics\IS-MND\Ex_fire_hazard.pdf

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with the Project would involve the use of common hazardous materials for construction, such as chemical and petroleum-related products for heavy equipment and machinery. Other common hazardous materials that may be used in construction activities include paints, sealants, solvents, detergents, glues, acids, lime, plaster, grease, oils, cleaning agents, and heavy metals from equipment; these materials could pose risks to people or the environment, if not properly stored, used, and disposed. Compliance with existing hazardous material regulations would ensure that the use of common hazardous materials during construction activities would be less than significant. These include the Hazardous Material Transportation Act (MM HAZ-1) and the Certified Unified Program Agency (CUPA) (MM HAZ-2).

The Phase I ESA reveals no evidence of recognized hazardous materials or conditions on site, except for its former use as agricultural land, as identified in the 1954 and 1968 aerial photos (Leighton 2012b). Persistent fertilizers, pesticides, and arsenic may have been applied to the land during this activity. Construction activities such as site clearing, grubbing, and grading could potentially expose workers to contaminated soil, if present, during construction activities. In order to ensure less than significant impacts related to exposure of the construction workers to residual hazardous chemicals, MM HAZ-3 requires the testing of surface soils for the presence of organochlorine pesticides and arsenic. If chemical levels are above regulatory standards, remediation and/or removal of contaminated soils in compliance with applicable local, State, and federal standards and requirements shall be conducted prior to Project construction. Additionally, if any unexpected abnormal soil staining and/or odors are encountered during grading and excavation activities that could indicate the presence of petroleum hydrocarbons, heavy metals, or other contamination, MM HAZ-4 requires that construction activities shall be halted and an assessment of the soils shall be conducted prior to the continuation of grading or excavation activities. Disposal of any contaminated soils would be conducted in compliance with existing hazardous material regulations, including the Hazardous Material Transportation Act (MM HAZ-1) and CUPA (MM HAZ-2). Compliance with MM HAZ-1, MM HAZ-2, MM HAZ-3, and MM HAZ-4 would ensure that potential hazards during construction activities would be less than significant.

Construction activities associated with the Project have the potential increase risks associated with valley fever (coccidioidomycosis). Valley fever is caused by a fungus recognized to be endemic in areas with dry, alkaline soil conditions and can cause pneumonia when inhaled with wind-borne dust. Both workers and local residents may be exposed to valley fever during construction. In order to prevent exacerbating the existing windblown dust issues in the Project area, all construction activity for the Project (including decommissioning activities) would be conducted under a rigorous Dust Control Plan prepared in accordance with AVAQMD Rule 403. As set forth in MM AQ-1, the Project Applicant shall prepare a Dust Control Plan that includes requirements for minimal grading, vehicle use, construction scheduling, water application, soil binders/wood mulch, stock piles stabilization, final stabilization, and monitoring. Implementation of MM AQ-1 would prevent the Project from substantially increasing windblown dust concentrations compared to background levels and would reduce potential impacts to sensitive receptors to levels less than significant.

Cleaning of the PV panels would primarily involve spraying of the panels with demineralized water to remove dust buildup, grime, bird droppings, and/or soot from the PV panels. Cleaning water would be allowed to infiltrate into the ground or evaporate as it drips off the PV modules. MM HAZ-5 requires that only water is used for cleaning PV panels and no other cleaning agents or additives can be used. Incorporation of these mitigation measures would ensure that impacts would remain less than significant.

**c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of sensitive land uses?**

***Less Than Significant Impact.*** The closest sensitive land use to the Project site is the single-family residence located 0.14 mile to the east. The nearest school is Del Sur Elementary School located at 9023 West Avenue H, approximately 2.4 miles northeast of the Project site. While the proposed Project would not lead to hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste, limited use of common hazardous materials would occur during construction, as discussed under Threshold 4.9(a) above. Although there are no significant impacts related to this issue, MM HAZ-1 and MM HAZ-2 would ensure that these materials would be handled and disposed of in accordance with applicable regulatory standards and would not affect nearby residences or schools. Therefore, impacts to nearby sensitive land uses would be less than significant.

**d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?**

***Less Than Significant Impact.*** The Phase I ESA prepared for the Project includes a database review of potential environmental concerns in the vicinity of the Project site (i.e., "listed sites"); review of records, aerial photographs and other documentation that illustrates the history of site use and site reconnaissance. The Phase I ESA determines that listed historical and current land uses in the Project vicinity would be unlikely to adversely affect site development (Leighton 2012b). Specific on- and off-site land uses discussed in the Phase I ESA are described below.

A search of selected government databases was conducted as part of the Phase I ESA for potential environmental concerns on and in the vicinity of the Project site. Regulatory database lists were reviewed for cases pertaining to leaking underground storage tanks (LUSTs), aboveground storage tanks (ASTs), hazardous waste sites, and abandoned sites within the specified radii of standards established by the ASTM E 1527-05. Details of the databases searched, along with descriptions of each database researched, are provided in Appendix F.

**On-Site**

The Project site was not identified on a list of hazardous materials sites compiled pursuant to Section 65962.5 of the *California Government Code.* However, the GeoSearch™ GeoPlus Water Well Report identified a National Water Information System (NWIS) well and a California Department of Water Resources (DWR) well in the north portion of the Project site (Leighton 2012b). The two wells were not found during the site reconnaissance. Although there are no significant impacts related to this issue, the Project would ensure that if these wells are found during construction of the Project, they would need to be properly abandoned per applicable local, State and federal regulations.

**Off-Site**

Off-site areas were not identified on a list of hazardous materials sites compiled pursuant to Section 65962.5 of the *California Government Code;* however, two off-site Recognized

Environmental Conditions (RECs) were identified in the vicinity of the Project and are described below.[10]

***Abandoned Oil Well***

The California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) Online Mapping System identifies a plugged and abandoned dry well approximately 0.3 mile to the southwest of the Project site. Based on review of records from DOGGR, the oil well was abandoned with appropriate notice provided to DOGGR and no seepage or hazardous conditions are present. Therefore, there would be no impact on the Project site related to the presence of a historic dry well.

***Radon***

The California Department of Health Services maintains a database of indoor radon levels that are sorted by zip code. According to the most recent update prepared on May 4, 2010, of the 32 tests that were completed in the Project site's zip code of 93536, one test (or 3.13 percent) exceeded 4 picocuries per liter (pCi/L) (Leighton 2012b). In addition, the GeoSearch™ identifies the subject property to be within Radon Zone 2, a U.S. Environmental Protection Agency (USEPA) designated, geographically specific zone designed to demonstrate potential radon exposure levels to national, State, and local organizations. In Radon Zone 2, radon exposure potential is considered to be moderate, and has a predicted average indoor radon screening level between 2 and 4 pCi/L (Leighton 2012b). Based on this information, the potential for elevated radon levels at the Project site appears to be low to moderate. Further, the Project does not include any habitable enclosed structures, where radon exposure would be the highest. Therefore, this nearby environmental condition would have a less than significant impact on the Project site.

**e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or people residing or working in the project area?**

**f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?**

***Less Than Significant With Mitigation.*** As discussed above, the nearest airports to the site are Bohunk's Airpark, a private air strip with dirt runways, located approximately two miles to the east, and the General William J. Fox Airfield, a public airfield with asphalt runways, located approximately six miles northeast of the site. As the Project site is located outside the airport Area of Influence of Fox Airfield, no impact would occur (ALUC 2004).

While Bohunk's Airpart is a private airfield and not regulated by ALUC policies and procedures, it is recognized as an airfield by the FAA and therefore subject to adopted safety standards and guidelines for airfields and airports. The proposed 75-foot switch poles and 70-foot-tall riser pole connecting the Grid-Tie to the Antelope Substation could have a potential height conflict with the flight patterns for aircraft using Bohunk's Airpark. According to aerial maps, the primary dirt runway (Runway 27) at Bohunk's Airpark is approximately 1,900 feet long, runs from east to

[10] One location was listed within the GeoSearch™ Geoplus Radius Report as "unlocatable". Unlocatable listings are properties without a complete street address (and therefore cannot be located on a map) or are not geocoded. The listing, a Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) site, was identified in the Radius Report to be 0.5 mile from the subject property (Leighton 2012b). However, since the CERCLIS site could not be located, its impact on the subject site could not be evaluated.

west, and is located approximately 1.24 miles (6,540 feet) northeast of the nearest proposed riser pole. These poles would be shorter in height compared to the adjacent SCE TRTP transmission towers, which are over 100 feet tall and located closer to the airstrip. Additionally, aircraft using Bohunk's Airpark would typically take-off or approach Runway 27 from the east, meaning they would avoid conflict with the proposed rise poles that are over one mile to the west (AirNav 2013a). Therefore, potential safety impacts related to tall structures in the vicinity of a private airstrip would be less than significant.

Private aircraft may fly over the Project area and potentially experience short-term glint and glare from the proposed solar operations. These occurrences are dependent on altitude, relationship to the Project area, direction of flight, and panel position. As required by MM AES-3, the proposed solar array would consist of flat-plate PV panels, which have a transparent glass cover to protect the solar cells. The glass used for the panels would be "high-transmission, low-iron" tempered glass. This type of glass absorbs more light, while producing less glare and reflectance than normal glass, having a reflectance value of 8 percent or less. In recent years, several large-scale solar projects have been completed and constructed at or near major airports without incident. In 2010, the second large-scale solar project was completed at the Denver International Airport. The 1.6-MW system at the airport's fuel facility was comprised of more than 7,300 Sharp Solar Panels. Since 2005, FedEx has been operating at the Oakland FedEx International Airport Hub with more than 5,700 solar panels generating over 900 kW of peak energy to help power their facility (Power Engineers 2010). Therefore, impacts related to glare to aircraft would be less than significant with mitigation.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). Therefore, any impacts related to the proximity of Bohunk's Airpark created by the Project would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**g) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?**

***Less Than Significant Impact.*** There are no known adopted Los Angeles County emergency response or evacuation plans in place for the area surrounding the Project site. The City of Lancaster has an adopted Emergency Operations Plan (EOP) that details the responsibilities of private organizations and federal, State, and local agencies in the event of disaster. West Avenue I has been identified as an evacuation route (Lancaster 2009a). However, no improvements are proposed on West Avenue I in association with the proposed Project.

Construction activities would be staged on the Project site and would not obstruct evacuation procedures or implementation of the City's EOP. The proposed Project may temporarily impact adjacent roadways during construction, in particular West Avenue J where two new driveway improvements are proposed. In addition, the construction envelope to underground or erect the transmission lines/poles for the Gen-Tie line would require work on public ROW. If there is insufficient area, the construction may encroach beyond the roadway shoulders into the traveled way requiring limited closures of roadway segments in the construction zones causing short-duration traffic impacts.

As required by the County, should erection of the poles require work near or on the roadway, construction work warning signs would be placed in advance according to the *California Manual on Uniform Traffic Control Devices* and applicable City of Lancaster requirements to limit roadway obstruction and the need for temporary detours. Additionally, flagmen would be used

as required during construction to ensure traffic safety and uninterrupted flow. As such, roadways that provide access to the Project site and the surrounding areas would not be impacted during Project construction in such a way that would physically impair or impede emergency response or evacuation. Future decommissioning activities would also be expected to comply with the same or equivalent traffic control requirements. Therefore, potential impacts to emergency evacuation plans would be less than significant.

**h) Would the project expose people or structures to a significant risk of loss, injury or death involving fires, because the project is located:**

**i) within a Very High Fire Hazard Severity Zones (Zone 4)?**

***No Impact.*** The Project site is not in or near areas designated as a Very High or High Fire Hazard Severity Zone (CAL FIRE 2007). In addition, the proposed Project would also not bring in permanent residents. As shown in Exhibit 4-10, the high risk zones closest to the Project site are located in the San Gabriel Mountains, approximately four miles to the south. Therefore, the proposed Project would not result in a significant risk of loss, injury, or death involving wildland fires due to proximity to a designated Fire Hazard Zone. No impact would occur.

**h) Would the project expose people or structures to a significant risk of loss, injury or death involving fires, because the project is located:**

**ii) within a high fire hazard area with inadequate access?**

**iii) within an area with inadequate water and pressure to meet fire flow standards?**

**iv) within proximity to land uses that have the potential for dangerous fire hazard?**

**i) Does the proposed use constitute a potentially dangerous fire hazard?**

***Less Than Significant Impact.*** The Project site and surrounding area primarily consists of open space with annual grasslands, which remain dry for most of the year and has the potential to burn. The introduction of general human activity, including maintenance workers smoking on site or the driving of combustion engine vehicles, increases the potential risk for dangerous fire hazard. Construction activities, such as welding during installation of PV panels and support structures, could also potentially result in the combustion of native materials. Transmission lines may pose a fire hazard when a conducting object, comes in close proximity of a line or when a live-phase conductor falls to the ground.

As discussed in Section 4.15, Public Services, the Project would be required to comply with Los Angeles County Code's Title 32, Fire Code, which includes various requirements for fire safety and prevention. In compliance with Title 32, vegetation be trimmed to a maximum height of six inches within the Project site boundaries and cleared to mineral soil for a distance of 50 feet around all electrical transformer vaults or structures as part of regular O&M activities. As the Project is located in an undeveloped area, there are no fire hydrants or other piped water supplies to the site. The Project would include a network of internal access roads which would provide emergency access to remote portions of the site, as well as two water tanks with a minimum capacity of 10,000 gallons each for use by the LACFD for fire control. Compliance with the County's Fire Code would ensure that impacts related to fire control would be less than significant.

Further, as required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). Therefore, the increase in

potential for fire hazards would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

### 4.9.3 MITIGATION MEASURES

**MM HAZ-1** During construction activities, any hazardous materials encountered on the Project site requiring off-site disposal shall be transported off site by a properly licensed hazardous waste hauler who shall comply with all applicable State and federal requirements, including California Department of Transportation (Caltrans) regulations under Title 49 of the *Code of Federal Regulations* (CFR). Hazardous materials that may be encountered during proposed Project implementation would be handled, treated, and/or disposed of in accordance with applicable regulations and/or the requirements of the local oversight agency(ies).

**MM HAZ-2** The Contractor shall conduct construction activities in compliance with the regulations of the Los Angeles County Fire Department, which serves as the designated Certified Unified Program Agency (CUPA), and shall implement the State and federal regulations related to (1) the Hazardous Waste Generator Program; (2) Hazardous Materials Release Response Plans and Inventory Program; (3) California Accidental Release Prevention Program (Cal-ARP); (4) the aboveground storage tank (AST) Program; and (5) the underground storage tank (UST) Program.

**MM HAZ-3** Prior to commencement of on-site ground-disturbing activities, the Project Applicant shall obtain a statistically valid number of soil samples from the identified areas and analyze for the presence of organochlorine pesticides and arsenic. The results of testing shall be made available to the County for review and confirmation. If the results of the soil testing show the presence of chemicals below regulatory levels, grading or excavation may proceed accordingly. If chemical levels are above regulatory standards, remediation and/or removal of contaminated soils in compliance with applicable local, State, and federal standards and requirements shall be conducted prior to Project construction.

**MM HAZ-4** If abnormal soil staining and/or odors are encountered during grading and excavation activities that could indicate the presence of petroleum hydrocarbons, heavy metals, or other contamination, construction activities shall be halted and an assessment of the soils shall be conducted prior to the continuation of grading or excavation activities. If the results of the soil testing show the presence of chemicals below regulatory levels, grading or excavation may proceed accordingly. If chemical levels are above regulatory standards, remediation and/or removal of contaminated soils in compliance with applicable local, State, and federal standards and requirements shall be conducted prior to Project construction.

**MM HAZ-5** During operation, the County shall require the use of demineralized water in all photovoltaic (PV) panel cleaning activities. No other cleaning agents or additives shall be used.

Implementation of these mitigation measures would ensure that impacts to hazards and hazardous materials would be less than significant.

| **4.10 HYDROLOGY AND WATER QUALITY** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Violate any water quality standards or waste discharge requirements? | ☐ | ☐ | ☒ | ☐ |
| b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)? | ☐ | ☐ | ☒ | ☐ |
| c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? | ☐ | ☐ | ☒ | ☐ |
| d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? | ☐ | ☐ | ☒ | ☐ |
| e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? | ☐ | ☐ | ☒ | ☐ |
| f) Generate construction or post-construction runoff that would violate applicable stormwater NPDES permits or otherwise significantly affect surface water or groundwater quality? | ☐ | ☐ | ☒ | ☐ |
| g) Conflict with the Los Angeles County Low Impact Development_Ordinance (L.A. County Code, Title 12, Ch. 12.84 and Title 22, Ch. 22.52)? | ☐ | ☐ | ☒ | ☐ |
| h) Result in point or nonpoint source pollutant discharges into State Water Resources Control Board-designated Areas of Special Biological Significance? | ☐ | ☐ | ☐ | ☒ |
| i) Use onsite wastewater treatment systems in areas with known geological limitations (e.g. high groundwater) or in close proximity to surface water (including, but not limited to, streams, lakes, and drainage course)? | ☐ | ☐ | ☐ | ☒ |
| j) Otherwise substantially degrade water quality? | ☐ | ☐ | ☒ | ☐ |
| k) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, or within a floodway or floodplain? | ☐ | ☐ | ☐ | ☒ |
| l) Place structures, which would impede or redirect flood flows, within a 100-year flood hazard area, floodway, or floodplain? | ☐ | ☐ | ☒ | ☐ |

| **4.10 HYDROLOGY AND WATER QUALITY** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| m) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam? | ☐ | ☐ | ☐ | ☒ |
| n) Place structures in areas subject to inundation by seiche, tsunami, or mudflow? | ☐ | ☐ | ☐ | ☒ |

### 4.10.1 ENVIRONMENTAL SETTING

The discussion of site hydrology and water quality is based on the Preliminary Drainage Report dated July 10, 2012 (revised March 2013), a Low Impact Development/Water Quality Report (LID/WQR) dated May 2013, and a Draft Stormwater Pollution Prevention Plan (SWPPP) dated July 6, 2012. All documents were prepared by AEI-CASC Consulting. The reports are located in Appendices G-1, G-2, and G-3 of this document respectively.

The Project site is located at the southern end of the South Lahontan Hydrologic Basin Planning area, part of the Antelope Hydrologic Unit (626.5 – Lancaster Hydrologic Area), and within the jurisdiction of the Lahontan Regional Water Quality Control Board (RWQCB). Surface waters in this area flow into three major surface water systems, including the Mono Lake, Owens River, and Mojave River Watersheds, as well as a number of separate closed groundwater basins (Lahontan RWQCB 2005). The site is underlain by alluvial fan deposits consisting primarily of sandy loam and coarse sandy loam soils.

*The Water Quality Control Plan for the Lahontan Region* (Basin Plan) contains policies that the RWQCB uses with other laws and regulations to protect the quality of waters of the State within the Lahontan Region (Lahontan RWQCB 2005). The Basin Plan sets forth water quality standards for surface water and groundwater of the Region, which include designated beneficial uses as well as narrative and numerical objectives which must be maintained or attained to protect those uses. According to the Basin Plan, the surface waters on the Project site are considered "minor surface waters" and "minor wetlands" and assigned the following beneficial uses:

- Municipal supply (MUN)
- Agricultural supply (AGR)
- Groundwater recharge (GWR)
- Freshwater replenishment (FRSH)
- Contact and non-contact recreational uses (REC-1, REC-2)
- Commercial and sportfishing (COMM)
- Warm freshwater habitat (WARM)
- Wildlife habitat (WLD)
- Water quality enhancement (WQE)
- Flood peak attenuation and storage (FLD)

The Project is in the Antelope Valley, which is underlain by the Antelope Valley Groundwater Basin ("Basin"). The Basin is located in the western portion of the Mojave Desert within the South Lahontan Hydrologic Region, and is designated as Groundwater Basin Number 6-44. The surface of the entire Antelope Valley Groundwater Basin is over 1 million acres (1,580 square miles) and is topographically closed on the north and northwest by the Garlock Fault at the base of the Tehachapi Mountains, and on the south and southwest by the San Andreas Fault at the base of the Transverse Ranges, including the San Gabriel Mountains. The Basin consists of the deep (confined) aquifer and the upper (unconfined) aquifer, the latter of which serves as the primary water source. The California Geological Survey considers the historically highest groundwater level at the site to be deeper than 250 feet below the ground surface (Leighton 2012a).

The Project site is relatively flat. The elevation ranges from 2,620 feet to 2,480 feet above msl. The site generally drains from southwest to northeast at a gradient of approximately 2 percent towards an existing ephemeral stream located approximately 330 feet north of the Project site. This ephemeral stream terminates approximately 3.8 miles downstream of the site at a small depressed open area prior to reaching additional water bodies. However, due to the site topography and implementation of BMPs, flows are not anticipated to reach this ephemeral stream. The east edge of the site is delineated by 110$^{th}$ Street West, which also directs the on-site flows north towards the downstream corner of the site. West Avenue J cuts through the middle of the Project site and directs a portion of the on-site flows east to 110$^{th}$ Street West where they are routed north to the downstream corner of the Project site. None of these ephemeral streams are listed as impaired water bodies (AEI-CASC 2012a).

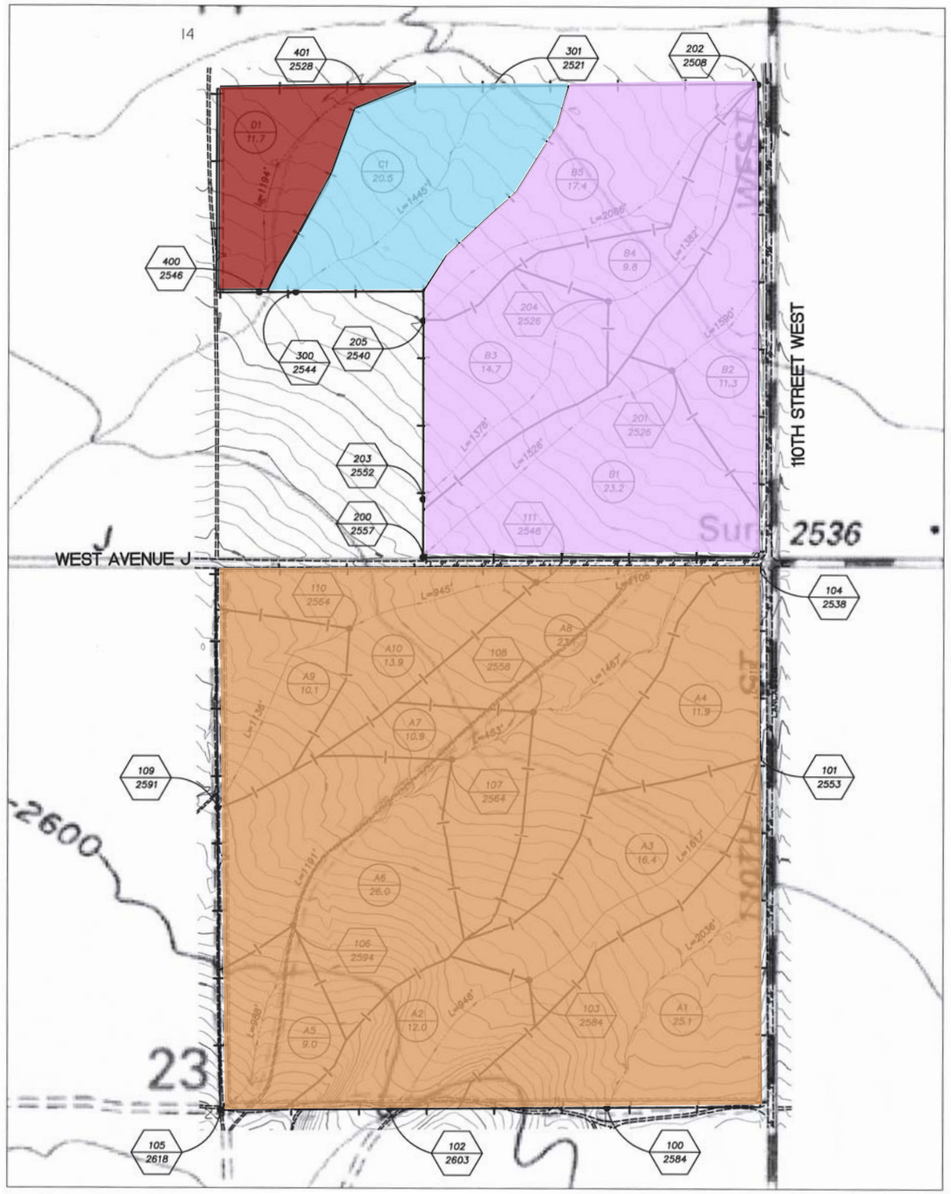
The Project site is divided up into four primary drainage areas. These drainage areas are shown in Exhibit 4-11, Hydrology Map. On-site flows drain toward four primary "nodal points". As shown on Exhibit 4-10, Drainage Area A encompasses the entire Southern Portion of the Project site and drains to the northeast towards a point located at the intersection of West Avenue J and 110$^{th}$ Street West (nodal point 104). The Northern Portion of the Project site is divided among Drainage Areas B, C, and D and drains to the north edge of the Project site (nodal points 202, 301 and 401, respectively).

Portions of the proposed Project site are located within 100-year flood hazard areas as determined by the Federal Emergency Management Agency (FEMA). The FEMA flood hazard is categorized as a Zone "A", meaning this area is subject to a one percent annual chance flood, also known as a 100-year storm event (FEMA 2008). The flood hazard areas are shown in Exhibit 4-12, Flood Hazard Map.

A Floodplain Management Path has been established in conjunction with the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation. According to the LACDPW, this path is reserved for the construction of a future regional drainage facility. Since the layout of the proposed Project does not impact the 50-foot Floodplain Management Path as established in the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation, there would be no need to perform an additional feasibility analysis to determine an alternate path (AEI-CASC 2012a).

LEGEND

- NODE/CONCENTRATION POINT (XXX / XXXX — ELEVATION)
- SUB AREA (XX / XX.X — ACRES)
- L=XXX' MAIN FLOW PATH LENGTH
- FLOW PATH
- WATERSHED BOUNDARY
- PROJECT BOUNDARY




## EXISTING CONDITION HYDROLOGY SUMMARY TABLE

| CONCENTRATION POINT | AREA (AC) | Q50(CFS) | V50(CF) | Q25(CFS) | V25(CF) | Q10(CFS) | V10(CF) | Q5(CFS) | V5(CF) |
|---|---|---|---|---|---|---|---|---|---|
| NODAL 104 | 158.5 | 46.8 | 386,377 | 26.4 | 327,571 | 19.0 | 265,280 | 15.5 | 215,622 |
| NODAL 202 | 76.4 | 12.3 | 158,558 | 10.0 | 138,956 | 8.1 | 112,820 | 6.6 | 92,783 |
| NODAL 301 | 20.5 | 3.0 | 42,253 | 2.7 | 37,026 | 2.2 | 30,056 | 1.8 | 24,829 |
| NODAL 401 | 11.7 | 1.8 | 24,394 | 1.6 | 21,780 | 1.3 | 17,424 | 1.0 | 14,375 |

| CONCENTRATION POINT | Q2(CFS) | V2(CF) | Q1(CFS) | V1(CF) | SUSMP(CFS) | VSUSMP(CF) |
|---|---|---|---|---|---|---|
| NODAL 104 | 10.3 | 143,312 | 7.5 | 105,415 | 3.6 | 50,965 |
| NODAL 202 | 4.4 | 60,984 | 3.2 | 44,867 | 1.8 | 24,394 |
| NODAL 301 | 1.2 | 16,553 | 0.9 | 12,197 | 0.5 | 6,534 |
| NODAL 401 | 0.7 | 9,583 | 0.5 | 6,970 | 0.3 | 3,920 |

## PROPOSED CONDITION HYDROLOGY SUMMARY TABLE

| CONCENTRATION POINT | AREA (AC) | Q50(CFS) | ΔV50(CF) | Q25(CFS) | ΔV25(CF) | Q10(CFS) | ΔV10(CF) | Q5(CFS) | ΔV5(CF) |
|---|---|---|---|---|---|---|---|---|---|
| NODAL 104 | 158.5 | 68.2 | 190,357 | 41.8 | 163,350 | 28.5 | 131,116 | 23.3 | 108,464 |
| NODAL 202 | 76.4 | 18.0 | 78,408 | 14.9 | 68,825 | 12.1 | 55,757 | 10.0 | 45,302 |
| NODAL 301 | 20.5 | 4.5 | 21,344 | 4.0 | 18,731 | 3.2 | 15,246 | 2.7 | 12,197 |
| NODAL 401 | 11.7 | 2.6 | 12,632 | 2.3 | 10,454 | 1.9 | 8,712 | 1.6 | 6,970 |

| CONCENTRATION POINT | Q2(CFS) | ΔV2(CF) | Q1(CFS) | ΔV1(CF) | SUSMP(CFS) | ΔVSUSMP(CF) |
|---|---|---|---|---|---|---|
| NODAL 104 | 15.5 | 71,874 | 11.3 | 51,836 | 5.4 | 25,265 |
| NODAL 202 | 6.6 | 30,056 | 4.8 | 21,780 | 2.6 | 12,632 |
| NODAL 301 | 1.8 | 7,841 | 1.3 | 5,663 | 0.7 | 3,485 |
| NODAL 401 | 1.0 | 4,792 | 0.8 | 3,485 | 0.4 | 1,742 |

## EXISTING CONDITION HYDROLOGIC DATA

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 1,095,287 | 25.1 | 0.02 | 50 | 134 | 2,285 | 0.0136 | 5.4 | 30 | 1.39 | 0.16 | 0.17 |
| A2 | 522,233 | 12.0 | 0.02 | 50 | 134 | 948 | 0.0200 | 5.7 | 22 | 1.69 | 0.25 | 0.26 |
| A3 | 715,877 | 16.4 | 0.02 | 50 | 134 | 1,617 | 0.0192 | 5.4 | 30 | 1.39 | 0.16 | 0.17 |
| A4 | 517,947 | 11.9 | 0.02 | 50 | 134 | 919 | 0.0163 | 5.1 | 30 | 1.34 | 0.14 | 0.16 |
| A5 | 392,335 | 9.0 | 0.02 | 50 | 134 | 988 | 0.0243 | 5.8 | 21 | 1.76 | 0.27 | 0.28 |
| A6 | 1,134,501 | 26.0 | 0.02 | 50 | 134 | 1,365 | 0.0212 | 5.6 | 30 | 1.44 | 0.17 | 0.18 |
| A7 | 475,310 | 10.9 | 0.02 | 50 | 134 | 463 | 0.0130 | 5.4 | 13 | 2.06 | 0.32 | 0.33 |
| A8 | 1,004,776 | 23.1 | 0.02 | 50 | 134 | 1,467 | 0.0136 | 5.2 | 30 | 1.34 | 0.14 | 0.16 |
| A9 | 440,838 | 10.1 | 0.02 | 50 | 134 | 1,136 | 0.0238 | 5.5 | 30 | 1.41 | 0.16 | 0.17 |
| A10 | 606,228 | 13.9 | 0.02 | 50 | 134 | 945 | 0.0169 | 5.3 | 30 | 1.36 | 0.15 | 0.17 |
| B1 | 1,011,362 | 23.2 | 0.02 | 50 | 134 | 1,526 | 0.0203 | 4.9 | 30 | 1.26 | 0.12 | 0.14 |
| B2 | 493,197 | 11.3 | 0.02 | 50 | 134 | 1,590 | 0.0113 | 4.7 | 30 | 1.21 | 0.10 | 0.12 |
| B3 | 641,930 | 14.7 | 0.02 | 50 | 134 | 1,378 | 0.0189 | 4.9 | 30 | 1.26 | 0.12 | 0.14 |
| B4 | 427,115 | 9.8 | 0.02 | 50 | 134 | 1,382 | 0.0130 | 4.7 | 30 | 1.21 | 0.10 | 0.12 |
| B5 | 756,357 | 17.4 | 0.02 | 50 | 131 | 2,066 | 0.0155 | 4.7 | 30 | 1.21 | 0.10 | 0.12 |
| C1 | 893,828 | 20.5 | 0.02 | 50 | 128 | 1,445 | 0.0159 | 4.8 | 30 | 1.23 | 0.10 | 0.12 |
| D1 | 508,393 | 11.7 | 0.02 | 50 | 127 | 1,194 | 0.0151 | 4.9 | 30 | 1.26 | 0.10 | 0.12 |

## PROPOSED CONDITION HYDROLOGIC DATA

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 1,095,287 | 25.1 | 0.10 | 50 | 134 | 2,285 | 0.0136 | 5.4 | 30 | 1.39 | 0.16 | 0.23 |
| A2 | 522,233 | 12.0 | 0.10 | 50 | 134 | 948 | 0.0200 | 5.7 | 18 | 1.86 | 0.28 | 0.34 |
| A3 | 715,877 | 16.4 | 0.10 | 50 | 134 | 1,617 | 0.0192 | 5.4 | 30 | 1.39 | 0.16 | 0.23 |
| A4 | 517,947 | 11.9 | 0.10 | 50 | 134 | 919 | 0.0163 | 5.2 | 25 | 1.46 | 0.18 | 0.25 |
| A5 | 392,335 | 9.0 | 0.10 | 50 | 134 | 988 | 0.0243 | 5.8 | 17 | 1.95 | 0.30 | 0.36 |
| A6 | 1,134,501 | 26.0 | 0.10 | 50 | 134 | 1,365 | 0.0212 | 5.6 | 28 | 1.49 | 0.19 | 0.26 |
| A7 | 475,310 | 10.9 | 0.10 | 50 | 134 | 463 | 0.0130 | 5.4 | 12 | 2.13 | 0.33 | 0.39 |
| A8 | 1,004,776 | 23.1 | 0.10 | 50 | 134 | 1,467 | 0.0136 | 5.2 | 30 | 1.34 | 0.14 | 0.22 |
| A9 | 440,838 | 10.1 | 0.10 | 50 | 134 | 1,136 | 0.0238 | 5.5 | 22 | 1.64 | 0.23 | 0.30 |
| A10 | 606,228 | 13.9 | 0.10 | 50 | 134 | 945 | 0.0169 | 5.3 | 23 | 1.54 | 0.20 | 0.27 |
| B1 | 1,011,362 | 23.2 | 0.10 | 50 | 134 | 1,526 | 0.0203 | 4.9 | 30 | 1.26 | 0.12 | 0.20 |
| B2 | 493,197 | 11.3 | 0.10 | 50 | 134 | 1,590 | 0.0113 | 4.7 | 30 | 1.21 | 0.10 | 0.18 |
| B3 | 641,930 | 14.7 | 0.10 | 50 | 134 | 1,378 | 0.0189 | 4.9 | 30 | 1.26 | 0.12 | 0.20 |
| B4 | 427,115 | 9.8 | 0.10 | 50 | 134 | 1,382 | 0.0130 | 4.7 | 30 | 1.21 | 0.10 | 0.18 |
| B5 | 756,357 | 17.4 | 0.10 | 50 | 131 | 2,066 | 0.0155 | 4.7 | 30 | 1.21 | 0.10 | 0.18 |
| C1 | 893,828 | 20.5 | 0.10 | 50 | 128 | 1,445 | 0.0159 | 4.8 | 30 | 1.23 | 0.10 | 0.18 |
| D1 | 508,393 | 11.7 | 0.10 | 50 | 127 | 1,194 | 0.0151 | 4.9 | 30 | 1.26 | 0.10 | 0.18 |

**Drainage Area**

- Area A
- Area B
- Area C
- Area D

Source: AEI CASC ENGINEERING, 2013

# Hydrology Map

Exhibit 4-11

*West Antelope Solar Energy Project*

N W E S

BonTerra CONSULTING

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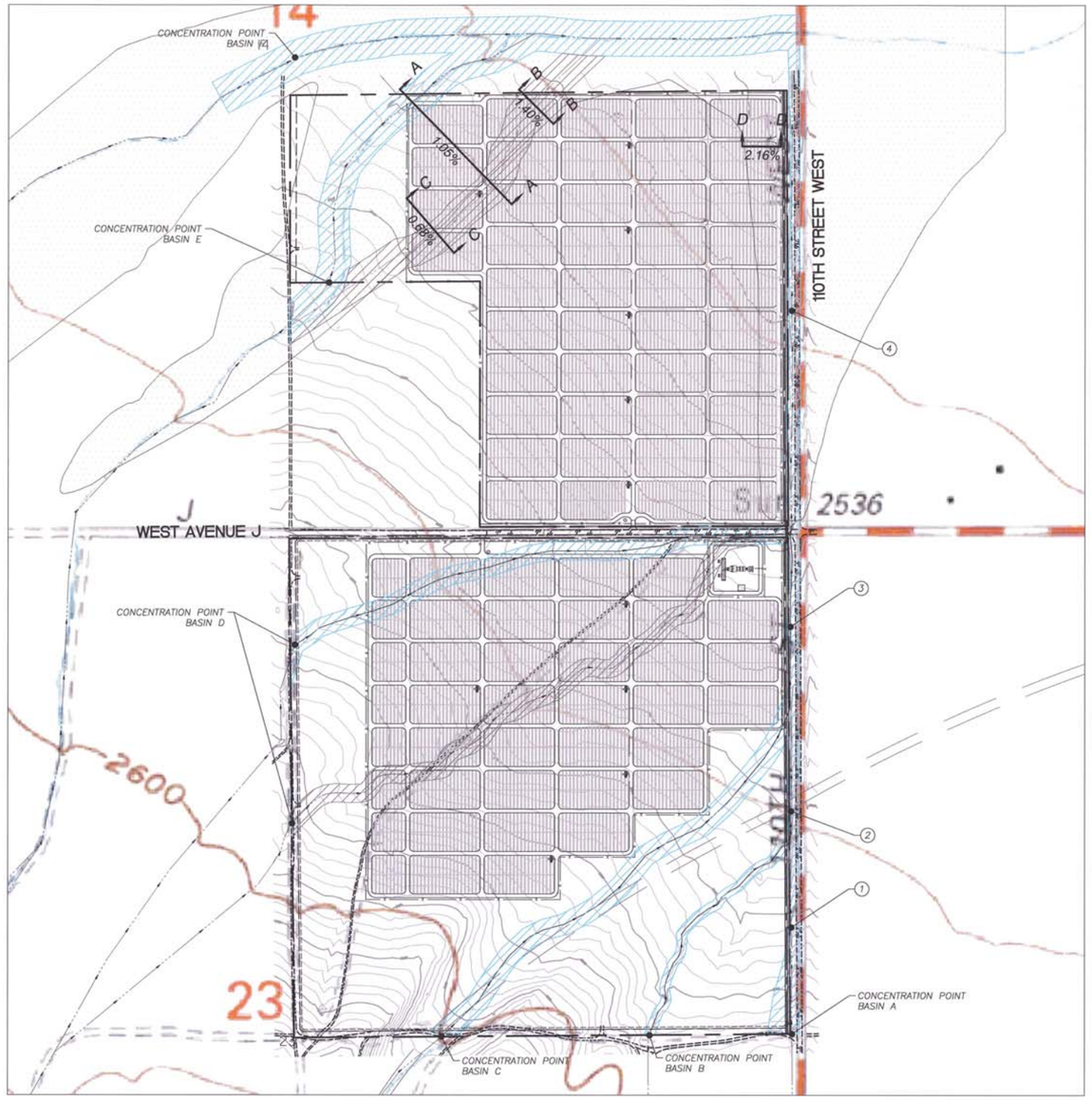


## HYDRAULIC SUMMARY TABLE (CLEAR FLOW)

| CONCENTRATION POINT | Q100(CFS) | W100(FT) | D100(FT) | V100(FT) | Q50(CFS) | W50(FT) | D50(FT) | V50(FT) |
|---|---|---|---|---|---|---|---|---|
| BASIN A | 1523 | 170 | 1.43 | 6.93 | 1213 | 156 | 1.31 | 6.54 |
| BASIN B | 60 | 52 | 0.43 | 2.95 | 47 | 47 | 0.40 | 2.78 |
| BASIN C | 443 | 110 | 0.92 | 4.87 | 347 | 100 | 0.84 | 4.58 |
| BASIN D | 320 | 96 | 0.81 | 4.54 | 255 | 89 | 0.74 | 4.29 |
| BASIN E | 1138 | 165 | 1.38 | 5.53 | 825 | 146 | 1.22 | 5.10 |
| BASIN F | 1725 | 185 | 1.56 | 6.61 | 1360 | 170 | 1.42 | 6.22 |

## HYDRAULIC SUMMARY TABLE (BULK FLOW)

| CONCENTRATION POINT | Q100(CFS) | W100(FT) | D100(FT) | V100(FT) | Q50(CFS) | W50(FT) | D50(FT) | V50(FT) |
|---|---|---|---|---|---|---|---|---|
| BASIN A | 1889 | 184 | 1.55 | 7.31 | 1504 | 169 | 1.42 | 6.90 |
| BASIN B | 64 | 53 | 0.45 | 3.00 | 50 | 48 | 0.41 | 2.82 |
| BASIN C | 558 | 119 | 1.00 | 5.16 | 437 | 109 | 0.91 | 4.85 |
| BASIN D | 378 | 103 | 0.86 | 4.73 | 301 | 94 | 0.79 | 4.47 |
| BASIN E | 1400 | 178 | 1.49 | 5.82 | 1015 | 158 | 1.32 | 5.37 |
| BASIN F | 2053 | 198 | 1.66 | 6.90 | 1618 | 181 | 1.52 | 6.50 |

## HYDRAULIC SUMMARY TABLE

| CROSS-SECTION # | Q100(CFS) | W100(FT) | D100(FT) | V100(FT) |
|---|---|---|---|---|
| 1 | 311 | 54 | 1.7 | 6.8 |
| 2 | 927 | 108 | 2.4 | 6.1 |
| 3 | 1046 | 108 | 2.5 | 6.8 |
| 4 | 1242 | 107 | 2.3 | 7.4 |

## LEGEND:

FLOOD HAZARD LIMITS BULK FLOW

POTENTIAL FLOOD HAZARD

FEMA FLOODPLAIN ZONE A

FLOW PATH

PROJECT BOUNDARY

FLOODPLAIN MANAGEMENT PATH PER PER 373-ML16, DEL SUR DRAINAGE CORRIDOR NO.4

A — A: CROSS SECTION CUTS OF SOLAR PANEL ALIGNMENTS SHOWING DEPTH OF WATER FROM FEMA FLOOD PLAIN MAPS (SEE SHEET 2)

SCALED 1" = 300'

0 150 300 600 1200

SCALE IN FEET

## CONVEYANCE AREA SUMMARY TABLE

| CROSS-SECTION CUT | TOTAL FLOW CONVEYANCE AREA (FEET SQUARED) | TOTAL SOLAR PANEL POST AREA (FEET SQUARED) | TOTAL SOLAR PANEL POST AREA AS A PERCENTAGE OF TOTAL FLOW CONVEYANCE AREA (%) |
|---|---|---|---|
| A | 683.48 | 7.19 | 1.05% |
| B | 305.25 | 4.26 | 1.40% |
| C | 670.52 | 4.55 | 0.68% |
| D | 152.69 | 3.30 | 2.16% |

REGISTERED PROFESSIONAL ENGINEER ERNESTO J. RIVERA No. 67550 Exp: 06-30-15 CIVIL STATE OF CALIFORNIA

**DRAINAGE CONCEPT / HYDROLOGY STUDY / LID**

APPROVED BY: Ernesto Rivera RCE NO.: 67550 DATE: 09/19/13

CHECKED BY: DATE: 09/19/13

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

Source: AEI CASC ENGINEERING, 2013

# Flood Hazard Map

Exhibit 4-12

*West Antelope Solar Energy Project*

N W E S

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### 4.10.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project violate any water quality standards or waste discharge requirements?**

**f) Would the project generate construction or post-construction runoff that would violate applicable stormwater NPDES permits or otherwise significantly affect surface water or groundwater quality?**

**j) Would the project otherwise substantially degrade water quality?**

***Less Than Significant Impact.*** This section is divided into analyses for Short-Term (Construction) Impacts and Long-Term (Operational) Impacts.

**Short-term Construction**

Implementation of the Project has the potential to generate storm water pollutants during the construction phase. Storm water runoff from the Project site could contain pollutants such as soils and sediments that are released during grading and excavation activities, as well as chemical and petroleum-related pollutants due to spills or leaks from heavy equipment and machinery. Other common pollutants that may result from construction activities include solid or liquid chemical spills; concrete and related cutting or curing residues; wastes from paints, sealants, solvents, detergents, glues, acids, lime, plaster, and cleaning agents; and heavy metals from equipment.

Hazardous materials (such as fuels, solvents, and coatings, among others) associated with construction activities would be stored and used in accordance with manufacturer's specifications and applicable hazardous material regulations. However, soil disturbance (from construction activities associated with site grading, mounting of the solar panels, equipment installation, electrical conduit trenching, and scraping for the access roads) could cause soil erosion and the eventual release of sediment into storm water runoff.

The NPDES permit program was established to control water pollution by regulating point sources that discharge pollutants into "Waters of the U.S.". Pursuant to Section 402(p) of the Clean Water Act (CWA), which requires regulations for permitting of certain storm water discharges, the SWRCB has issued the statewide NPDES General Permit for Storm Water Discharges Associated with the Construction and Land Disturbance Activities (Order No 2009-009-DWQb as amended by Order No. 2010-0014-DWQ [NPDES No. CAS000002]) on September 2, 2009, which became effective for all project sites on July 1, 2010.

Under this Construction General Permit, individual NPDES permits or Construction General Permit coverage must be obtained for discharges of storm water from construction sites with a disturbed area of one or more acres and are required to either obtain individual NPDES permits for storm water discharges or be covered by the Construction General Permit.

Coverage under the Construction General Permit is accomplished by completing and filing Permit Registration Documents (PRDs) with the SWRCB prior to commencement of construction activities. The PRDs consist of a Notice of Intent (NOI); a Risk Assessment; a Site Map; a Storm Water Pollution Prevention Plan (SWPPP); an annual fee; and a signed certification statement. The primary objective of the SWPPP is to identify, construct, implement, and maintain BMPs to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the construction site during construction. The Construction

General Permit requires dischargers to assess the risk level of a Project based on both sediment transport and receiving water risk, and each project would then be categorized into Risk Level 1, 2, or 3. For all Risk Level 3 and for some Risk Level 2 sites, the Construction General Permit requires effluent and receiving water monitoring for potential hydrogen (pH) and turbidity. AEI-CASC has prepared a preliminary SWPPP for the Project that categorizes the Project as Risk Level 1, but has not yet been approved by the SWRCB (AEI-CASC 2012b). A copy of the preliminary SWPPP can be found in Appendix G-3 of this document.

Prior to the issuance of a grading permit, the Legally Responsible Person (LRP) shall electronically file Permit Registration Documents (PRDs) with the State Water Resources Control Board (SWRCB) in order to obtain coverage under National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with the Construction and Land Disturbance Activities (Order No 2009-009-DWQ as amended by Order No. 2010-0014-DWQ and 2012-0006-DWQ [NPDES No. CAS000002]) or the latest approved general permit. This permit is required for construction activities, including demolition, clearing, grading, and excavation, and other land disturbance activities that result in the disturbance of one acre or more of total land area. The PRDs consists of a Notice of Intent (NOI); a Risk Assessment; a Site Map; a Storm Water Pollution Prevention Plan (SWPPP); an annual fee; and a signed certification statement. Pursuant to permit requirements, the Contractor shall develop and incorporate Best Management Practices (BMPs) for reducing or eliminating construction-related pollutants in site runoff. Compliance with this requirement would ensure that temporary water quality impacts associated with construction activities would be less than significant.

**Long-Term Operation**

Operation of the proposed Project would include infrequent site visits for inspection and maintenance. Maintenance activities would include washing the PV panels to remove accumulated airborne dust and debris using a truck with a water tank and sprayer; this would occur between one and four times per year, depending on the accumulation of dust on the surfaces.

Table 4-12, Potential Project Pollutants, presents a summary of typical pollutants associated with commercial developments and their likelihood of being generated at the Project site. As shown, due to annual maintenance activities, pollutants such as pesticides, trash, and oil/grease are anticipated to be generated due to Project implementation. However, because the Project site would be an unmanned site and would only be subject to maintenance a couple times per year, the potential for pollutants would be greatly reduced when compared to a typical commercial or industrial land use.

**TABLE 4-12**
**POTENTIAL PROJECT POLLUTANTS**

| Discharge Point | Associated Project Pollutants | | | Is Pollutant? | |
|---|---|---|---|---|---|
| | Pollutants | Status | Notes | 303(d) listed* | Total Maximum Daily Load |
| Northeast Boundary | Sediment/Turbidity | Potential | Open areas | No | No |
| | Nutrients | Potential | Open areas | No | No |
| | Organic Compounds | Expected | Pesticides and hydrocarbons | No | No |
| | Trash and Debris | Expected | Windblown litter | No | No |
| | Oxygen Demanding Substances | Potential | Open areas | No | No |
| | Bacteria and Viruses | No | No paved parking areas | No | No |
| | Oil and Grease | Expected | Petroleum hydrocarbons | No | No |
| | Pesticides | Potential | Open areas | No | No |
| | Metals | No | Materials at the site are designed to be exposed to the elements | No | No |

* Under section 303(d) of the Clean Water Act, States are required to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by states, territories, or authorized tribes. The law requires that States establish priority rankings for waters on the lists and develop Total Maximum Daily Load (TMDL) for these waters. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

Source: AEI-CASC 2013.

As shown in Table 4-12, no Project-generated pollutants are expected to impact downstream receiving waters, and Project flows would not discharge to any receiving water body that is listed for water quality impairment (Lahontan RWQCB 2005).

The LACDPW guidance document for storm water management stipulates that the project-specific Water Quality Plan/Hydrology identify a project's potential pollutant sources and to select post-construction BMPs to prevent the further water quality impairment of the receiving water bodies (LACDPW 2002). As the Project would not generate any pollutants of concern, impacts would be less than significant. However, BMPs are incorporated into the Project to address water quality impacts on site and at downstream receiving waters (AEI-CASC 2013).

As required by the County, the Project shall be designed and constructed in compliance with the water quality plan/hydrology requirements of the adopted Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit (Order No. R4-2012-0175, NPDES No. CAS004001) and *Los Angeles County Department of Public Works' 2009 Low Impact Development (LID) Standard Manual* (LACDPW 2009,). The Water Quality Plan/Hydrology will be based on calculations contained in a Drainage Analysis prepared by the Project Engineer in accordance with the *Los Angeles County Department of Public Works' Hydrology Manual* (LACDPW 2006a). Appropriate BMPs prescribed by the Water Quality Plan/Hydrology and the 2009 LID Standard Manual are incorporated as part of the Project. The proposed Project includes structural treatment-control BMPs (i.e., retention basins[11]) to reduce and control post-development runoff rates and volumes, and to capture and infiltrate storm water runoff from the Project site, thereby minimizing potential pollutants in discharges from the Project. By reducing

[11] Also referred to as "infiltration trenches" in the technical reports.

and controlling site runoff, the transport mechanism for pollutants is reduced. The Project will provide the appropriate amount of infiltration volume necessary to treat the runoff for the area within the panel arrays, as discussed further under Thresholds 4.10(c) through 4.10(e) below.

Other water quality BMPs include (1) protecting slopes and channels through the preservation of existing site drainage patterns; (2) the absence of chemical storage on site; (3) maintaining BMPs and Water Quality Plan/Hydrology devices regularly, which includes annual inspections of the entire site, and maintenance of inspection records; and (4) training for substation operators and contractors, and the provision of educational materials for Project personnel, regarding housekeeping practices that prevent pollutant loading in on-site runoff and BMP maintenance. Inclusion of appropriate BMPs in compliance with the Water Quality Plan/Hydrology and LID would ensure that site development would result in a less than significant impact on surface water and groundwater quality.

Further, compliance with MM HAZ-5 in Section 4.9, Hazards and Hazardous Materials, requires that only water is used for cleaning PV panels and no other cleaning agents or additives can be used. Therefore, compliance with MM HAZ-5 would ensure the use of water on the PV panels would have a less than significant impact on surface water and groundwater quality.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest), including restoration of all drainage features. Therefore, any impacts related to surface run-off would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**b) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?**

***Less Than Significant Impact.*** The proposed Project would include the creation of minimal amounts of impervious surfaces. Most of the impervious surfaces would be associated with the ancillary facilities, including the footings for the PV panels, inverter enclosures, water tanks, and a substation, totaling approximately 0.20 acre. Site access driveways, roads, and solar panels are treated as effectively 10 percent impervious and would add another 19.4 acres in effectively impervious area to the Project (AEI-CASC 2013).

The PV panels themselves would not create an impervious surface; however, the smooth surface and downward slope would create a “sheet flow” off the bottom edge of the panels. Rainfall that sheet-flows off the solar panels would be collected in the retention basins. The proposed configuration and design of these retention basins are depicted in Exhibits 3-3A and 3-3B, and are discussed further under Thresholds 4.10(c) and 4.10(l) below. Runoff not collected in the retention basins, including runoff along the edges of the site and the northernmost block of PV panels would continue northeasterly along the existing drainage path toward the existing ephemeral stream, but are not expected to reach it due to site topography. Storm water runoff would still infiltrate the Project site and would have a negligible impact on groundwater recharge given the size of the Project site; relatively small amount of impervious surface required for implementation; and the presence of retention basins designed to satisfy LID requirements. As such, potential impacts to groundwater recharge would be less than significant, and no mitigation is required.

Project implementation would not require the use of on-site groundwater supplies. As required by Los Angeles County Department of Public Health regulations and discussed in Section 4.18, Utilities and Service Systems, a Mobile Sanitation Facility Plan shall be submitted for review prior to issuance of a grading permit. The mobile sanitation facility would be maintained in a safe and sanitary condition so as not to constitute a public hazard or nuisance. Domestic wastewater would be treated using existing facilities per County regulations. In addition, the County shall require that water used for site watering and panel washing shall utilize water from sources outside of the Antelope Valley Groundwater Basin. Compliance with these requirements ensures that impacts on groundwater supplies would remain less than significant.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). Therefore, any impacts related to groundwater would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?**

**l) Would the project place structures, which would impede or redirect flood flows, within a 100-year flood hazard area, floodway, or floodplain?**

***Less Than Significant Impact.*** The Preliminary Drainage Report, which can be found in Appendix G-1 of this document, compares the existing and proposed Project site conditions to determine the increase in on-site peak storm flows and volumes due to the proposed site improvements (AEI-CASC 2012a). Drainage calculations follow the methodology prescribed by the Los Angeles County Department of Public Works Hydrology Manual and the *2009 Low Impact Development (LID) Standards Manual* (LACDPW 2006a, 2009).

According to the drainage analysis, development of the site would not substantially alter the existing drainage pattern of the area. As the terrain on the Project site is generally flat, grading and ground disturbance for the Project would be minimal and would be primarily limited to access roads and the retention basins, but would also include the Project Substation, inverter pads, water tank pads, and trail areas. The solar arrays would be installed using pile-driving techniques, rather than grading, to minimize soil disturbance. This reduced grading would help maintain existing hydrologic features and patterns on the Project site to the maximum extent feasible. Post-development drainage patterns would remain as shown on Exhibit 4-10. As depicted on Exhibit 4-10, the main drainage that runs through the South Portion of the site would remain undeveloped, and existing flows would continue unimpeded by the Project. The majority of the site is relatively flat, which usually results in relatively slow moving flows with low erosion potential, and the topography of the site would not be substantially altered through Project implementation. No paved roads, storm drain infrastructure, or other structural re-routing of on-site flows would result from Project implementation.

The Project would involve the placement of numerous PV panel mounting poles into the ground, some of which would be constructed within the delineated FEMA 100-year floodplain. The Project site would be graded to generally follow the existing terrain (thus avoiding re-direction or diversion of flow), and no major site grading is proposed (significant cut and fill) that could adversely impact the floodplain depth, velocity, or top width. Since the solar panels are elevated about 3 to 5 feet above the ground based upon a maximum rotation of 45 degrees and since the computed maximum floodplain depth is approximately 1.5 feet, the panels would not pose an

obstruction to flow. The solar panels would be supported by 6-inch diameter posts, intermittently spaced approximately 19 feet apart along the east-west alignment. The average percentage of the total accumulated cross-sectional area of the posts relative to the overall flow conveyance area is only about 1.32 percent (AEI-CASC 2012a). Therefore, it is anticipated that that these mounting poles would not pose an obstruction to flow and would have a less than significant impact to the existing floodplain; no mitigation is required.

However, the proposed PV panel mounting poles have the potential to result in scour, which involves the removal of sediment from around the piers during large rain events that sheet-flow around the mounted poles. Scour, caused by swiftly moving water, can scoop out “scour holes”, which can compromise the integrity of a structure and impede flood flows.

The Preliminary Drainage Report examines the potential for flood hazards and scour. The flood hazard analysis includes flood hazard widths, maximum flood depths, maximum flow velocities, and the 100-year flow rates for the six off-site flow concentration points shown on Exhibit 4-11 (Basins A, B, C, D, E, and F). Using this flood hazard information, potential scour depths were determined based on the LACDPW’s *2006 Sedimentation Manual* methodology (LACDPW 2006b). In order to protect the foundation of these panels against scour, the depth of the foundation is required to have minimum depths as well as a factor of safety of 18 inches, which have been computed in the Preliminary Drainage Report.

The Project shall be designed and constructed in compliance with the requirements of the Los Angeles County Department of Public Works’ *2006 Sedimentation Manual* (LACDPW 2006b). The Project Engineer shall incorporate this requirement into the Project design, and compliance with this requirement shall be performed to the satisfaction of the County of Los Angeles Department of Public Works prior to approval of the site improvement plans.

As required by the County, the Project would be designed and constructed in compliance with the requirements of the Los Angeles County Department of Public Works’ *2006 Sedimentation Manual* (LACDPW 2006b). The incorporation of recommended design features, such as deep foundations for the PV panels, would ensure that structures placed in the floodplain would not impede or redirect flood flows, resulting in a less than significant impact related to flood hazard areas. Therefore, the potential for erosion due to changes in on-site drainage patterns would be less than significant.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest), including restoration of all drainage features. Therefore, any impacts related to drainage and flood hazards would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**d) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?**

***Less Than Significant Impact.*** The proposed Project would include the creation of minimal amounts of impervious surfaces. Most of the impervious surfaces would be associated with the ancillary facilities, including the footings for the PV panels, inverter enclosures, water tanks, and a substation, totaling approximately 0.20 acre. Site-access driveways, roads, and solar panels are treated as effectively 10 percent impervious and would add another 19.4 acres in effectively impervious area to the Project (AEI-CASC 2013).

According to the drainage analysis, development of the site would not substantially alter the existing drainage pattern of the area. Post-development drainage patterns would remain as shown on Exhibit 4-10. As depicted on Exhibit 4-10, the main drainage that runs through the South Portion of the site would remain undeveloped, and existing flows would continue unimpeded by the Project.

The incorporation of the retention basins would ensure that any increase in surface runoff due to the Project would be maintained at pre-development levels. As shown in the drainage analysis, the maximum change in the flow volume generated on site between existing and proposed conditions was determined for 50-year, 25-year, 10-year, 5-year, 2-year, and 1-year peak storm flows. The analysis indicates that the 50-year storm event would produce the largest change in volume. In accordance with the County LID requirements, the 50-year storm volume would be retained through a series of “small” retention basins located throughout the Project site, as depicted on Exhibit 3-3A. The proposed retention basins would be sized to store and infiltrate these on-site flood volumes. The County LID Ordinance is summarized in 4.10(g) below.

As required by the County, the LACDPW shall ensure that appropriate hydrology and hydraulic analyses for the Water Quality Plan/Hydrology and *2009 Low Impact Development (LID) Standard Manual* compliance have been satisfied. Therefore, construction of appropriate BMPs in compliance with the Water Quality Plan/Hydrology and LID would be implemented to ensure that storm water runoff is retained and infiltrated on site per County standards to ensure that no on-site or off-site flooding would occur. Compliance with this requirement would also ensure that Project implementation would result in a less than significant impact related to flooding.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest), including restoration of all drainage features. Therefore, any impacts related to drainage patterns would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**e) Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?**

***Less Than Significant Impact.*** The Project would not generate additional storm flows that would leave the Project site. As previously discussed above, the Project includes the development of retention basins designed to accommodate the 50-year storm event, which is anticipated to produce the largest change in volume in accordance with the County LID requirements. As such, no runoff would leave the Project site that could exceed the capacity of

existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff and impacts would be less than significant.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest), including restoration of all drainage features. Therefore, any impacts related to surface run-off would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**g) Would the project conflict with the Los Angeles County Low Impact Development Ordinance (L.A. County Code, Title 12, Ch. 12.84 and Title 22, Ch. 22.52)?**

***Less Than Significant Impact.*** The design of the Project is consistent with the Low Impact Development Ordinance (LID). As required by the LID Ordinance:

> BMPs are placed throughout the site in many small, discrete units and are distributed in a small portion of each lot or site near the source of impacts, virtually eliminating the need for a centralized facility, such as a regional stormwater management basin. By this process, a developed site can be designed as an integral part of the environment, maintaining undeveloped hydrologic functions through the careful use of LID BMPs.

The Preliminary Drainage Report examines the pre- and post-construction hydrology for storm events up to the 50-year event, including the ¾-inch rainfall event; the Analysis then determines the difference between the pre-development and post-development storm flows and volumes for each event. The event that produced the largest differential was used to determine the volume to be retained. The largest differential was determined to be the 50-year event. As required above, multiple "small" retention basins would be used to capture the ¾-inch event, which would comply with LID requirements and would maintain the post-construction runoff volume at the pre-construction level.

The final grading and drainage plans would be subject to review and approval by the LACDPW in conjunction with grading permit issuance providing assurance that LID standards are adhered to. Therefore, there is no conflict with the LID development ordinance and impacts would be less than significant.

**h) Would the project result in point or nonpoint source pollutant discharges into State Water Resources Control Board-designated Areas of Special Biological Significance?**

***No Impact.*** The Project is not located in an SWRCB-designated Area of Special Biological Significance (ASBS). The nearest ASBS is the Laguna Point to Latigo Point ASBS, located approximately 50 miles away along the Los Angeles/Ventura County coastline. Therefore, no impact would occur.

**i) Would the project use onsite wastewater treatment systems in areas with known geological limitations (e.g. high groundwater) or in close proximity to surface water (including, but not limited to, streams, lakes, and drainage course)?**

***No Impact.*** The proposed land use would not generate the need for disposing of any liquids that would negatively impact on-site wastewater treatment facilities with known geological limitations or in close proximity to surface water. As required by the Los Angeles County

Department of Public Health regulations and described in Section 4.18, Utilities and Service Systems, the Project would provide a mobile sanitation facility for use by workers during the construction period and during O&M activities. Per Los Angeles County Department of Public Health regulations, a Mobile Sanitation Facility Plan would be submitted for review prior to construction (LACDPH 2012). The mobile sanitation facility would be maintained in a safe and sanitary condition so as not to constitute a public hazard or nuisance. Domestic wastewater would be treated using existing facilities per County regulations. Therefore, no impact would occur.

**k) Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, or within a floodway or floodplain?**

***No Impact.*** No housing units would be developed on the site. Thus, the proposed Project would not place housing within the 100-year floodplain and no mitigation is required.

**m) Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?**

***No Impact.*** The Project site is not located within an inundation area. The nearest dam is at the Fairmont Reservoir, located approximately 5.8 miles to the northwest of the Project site (LACDRP 1980). The proposed Project does not include any habitable structures and would not expose people to potential injury or death since the facility would not be manned, and maintenance personnel would only be on site an estimated 8 to 12 times per year. No impact related to flooding as result of the failure of a levee or dam would occur.

**n) Would the project place structures in areas subject to inundation by seiche, tsunami, or mudflow?**

***No Impact.*** The site is located more than 30 miles from the ocean and is outside the tsunami inundation areas along the coast (DOC 2007). Additionally, there are no hillside areas within 3 miles of the Project site that would generate mudflow at the site. Impacts related to dam inundation would be less than significant. No impact related to seiche, tsunami, or mudflow would occur.

### 4.10.3 MITIGATION MEASURES

Project implementation would not result in significant impacts related to hydrology and water quality; therefore, no mitigation is required.

| **4.11 LAND USE AND PLANNING** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project**: | | | | |
| a) Physically divide an established community? | ☐ | ☐ | ☐ | ☒ |
| b) Be inconsistent with the applicable County plans for the subject property including, but not limited to, the General Plan, specific plans, local coastal plans, area plans, and community/neighborhood plans? | ☐ | ☐ | ☒ | ☐ |
| c) Be inconsistent with the County zoning ordinance as applicable to the subject property? | ☐ | ☐ | ☒ | ☐ |
| d) Conflict with Hillside Management criteria, Significant Ecological Areas conformance criteria, or other applicable land use criteria? | ☐ | ☐ | ☐ | ☒ |

### 4.11.1 ENVIRONMENTAL SETTING

The entire 263-acre Project site is located in unincorporated Los Angeles County; however, it is immediately adjacent to the western boundary of the City of Lancaster. The Grid-Tie from the Project site to the Antelope Substation would extend through the City of Lancaster's right-of-way. As depicted on Exhibit 3-2, the Project site is composed of and surrounded by undeveloped land, with the exception of the SCE TRTP transmission lines, agricultural fields to the northwest, and sparse rural development. There are approximately 15 single-family residential properties located within an approximate 1-mile radius of the Project boundaries. The nearest residential property is located 0.14 mile east of the Project site along West Avenue J. A small alfalfa farm is located approximately 0.5 mile to the northwest from the Project site's western boundary. There are no industrial or manufacturing land uses in the Project vicinity, with the exception of the Antelope Substation, which is located approximately 1.5 miles to the east of the Project site. Table 4-13, Surrounding Land Uses Near the Project Site, summarizes the surrounding land uses and zoning for parcels near the Project site.

**TABLE 4-13**
**SURROUNDING LAND USES NEAR THE PROJECT SITE**

| Property Location | Zoning | Observed Land Use |
|---|---|---|
| Project Site | A-2-5 | Vacant land; SCE Transmission Line Easement. |
| North | A-1-2 | Vacant land; very sparse rural residential. |
| Northeast | A-2-2 | Vacant land; very sparse rural residential. |
| East | A-2-2/RR-2.5 | Vacant land; very sparse rural residential; SCE substation. |
| Southeast | RR-2.5 | Vacant land; very sparse rural residential. |
| South | A-2-5 | Vacant land; very sparse rural residential; San Gabriel Mountains. |
| Southwest | A-2-5 | Vacant land; very sparse rural residential; San Gabriel Mountains. |
| West | A-2-5 | Vacant land. |
| Northwest | A-2-5 | Vacant land; small agricultural farm; agricultural fields. |

Notes: Los Angeles County Zones
A-1-2 Light Agricultural Zone (2-Acre Minimum Lot Size)
A-2-2 Heavy Agricultural Zone (2-Acre Minimum Lot Size)
A-2-5 Heavy Agricultural Zone (5-Acre Minimum Lot Size)
City of Lancaster Zones
RR-2.5 Rural Residential (2½-Acre Minimum Lot Size)

Sources: LACDRP 1980.

The Project site's adjacent parcels are designated as "Non-Urban 1" (N-1; 0.5 dwelling unit per acre [du/acre]) in the Los Angeles County Antelope Valley Area Land Use Policy Map (LACDRP 1986). The area immediately to the southeast of the site, on the other side of 110th Street West is located in the City of Lancaster and is designated a mix of "Non-Urban Residential" and "Urban Residential" by the City of Lancaster Land Use Map (Lancaster 2009b). Exhibit 4-13, Project Land Use Designations, shows the land use designations for the Project site and surrounding areas. The Project is located in the Antelope Valley Area General Plan area (also referred to as "Town & Country").

The Project site is zoned "Heavy Agricultural" (A-2-5; five-acre minimum lot size) on the Los Angeles County Zoning Map. The area to the north is zoned "Light Agricultural" (A-1-2; Two Acre Minimum Required Lot Area). The area immediately to the southeast of the site is located in the City of Lancaster and is zoned a mix of "Rural Residential" (RR-2.5; 2.5-acre minimum lot size) and "Specific Plan" (SP). Exhibit 4-14, Project Zoning, shows the zoning for the Project site and surrounding areas.

Per the Los Angeles County Code, electric generating plants are a conditionally allowed use in the Heavy Agricultural (A-2-5) zone upon obtaining a Conditional Use Permit (CUP). The Project is also consistent with Los Angeles County's Non-Urban 1 land use designation as it meets the definition of a "utility installation" referenced in the listing of non-urban non-residential land uses allowed in remote areas designated Non-Urban 1 (LACDRP 1986).

It is important to note that the Antelope Valley Area Plan is in the process of being updated by the Los Angeles County Department of Regional Planning. The update is not expected to be adopted until late 2014. Therefore, for the purposes of this document, the standards of the adopted Antelope Valley Areawide General Plan (LACDRP 1986) are being used.

### 4.11.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

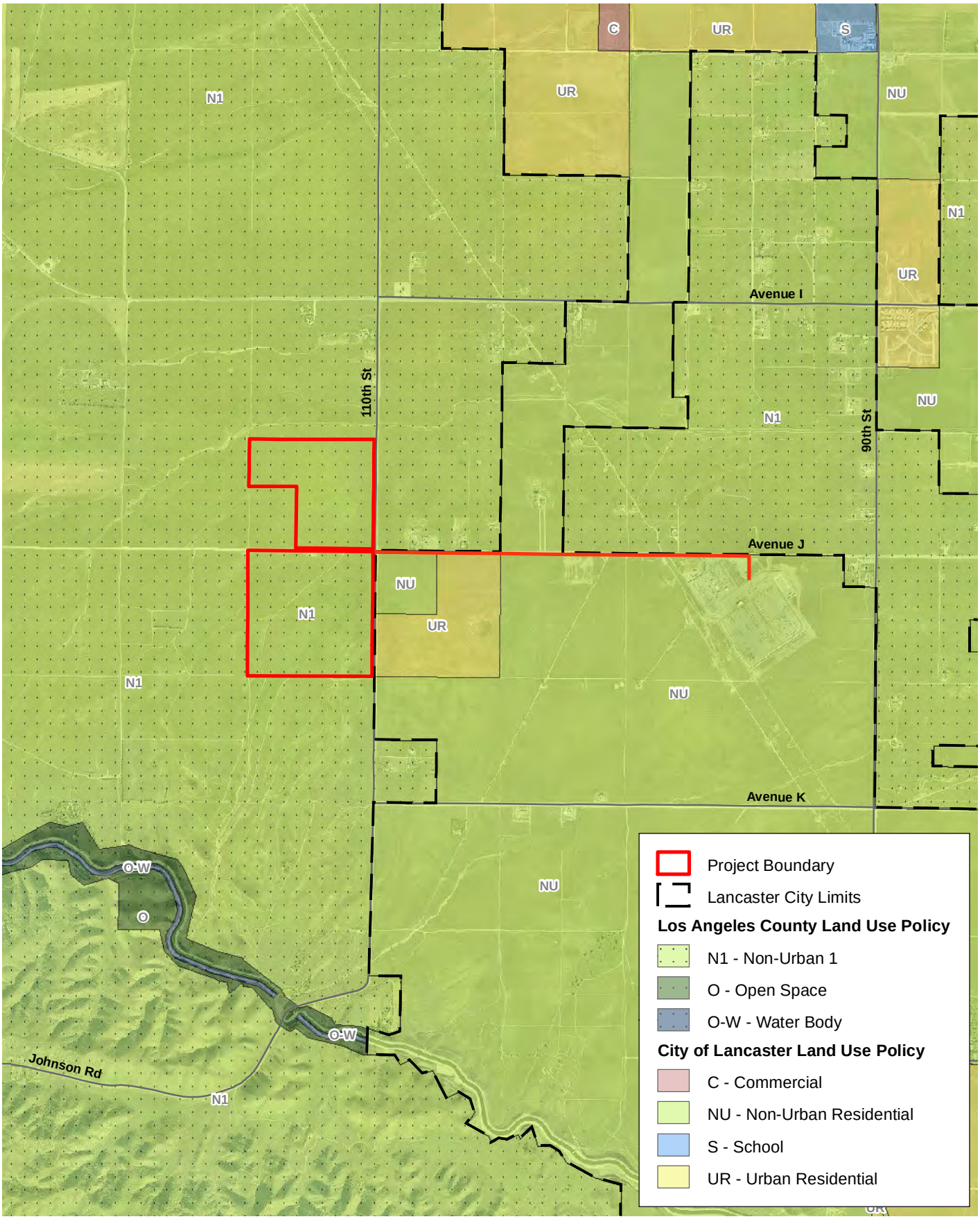
**a) Would the project physically divide an established community?**

***No Impact.*** The Project site is not located within a residential area, nor is it surrounded by residential uses that make up an established community. Therefore, the Project would not divide an established neighborhood, and no mitigation is required.

**b) Would the project be inconsistent with the applicable County plans for the subject property including, but not limited to, the General Plan, specific plans, local coastal plans, area plans, and community/neighborhood plans?**

***Less Than Significant Impact.*** The Project would comply with the plan designations and applicable provisions of the Los Angeles County General Plan and associated *Antelope Valley Areawide General Plan* (LACDRP 1986, 1980). The Project is not located within the boundaries of a Community Standards District; therefore, there are no standards to apply.

The Antelope Valley Area Plan designates the Project site as "Non-Urban 1". This designation states that development of "non-residential uses requiring, or appropriate for, remote locations may be allowed in Non-urban areas" if the proposed use follows general guidelines and development standards outlined in the *Antelope Valley Areawide General Plan* for non-residential uses within the Non-Urban 1 land use classification. "Utility and communication installations" are uses allowed in the Non-Urban 1 classification. Development of the Project would be consistent with permissible uses associated with the land use designations and the




# Project Land Use Designations

Exhibit 4-13

*West Antelope Solar Energy Project*

N W E S

2,800 1,400 0 2,800 Feet

BonTerra CONSULTING

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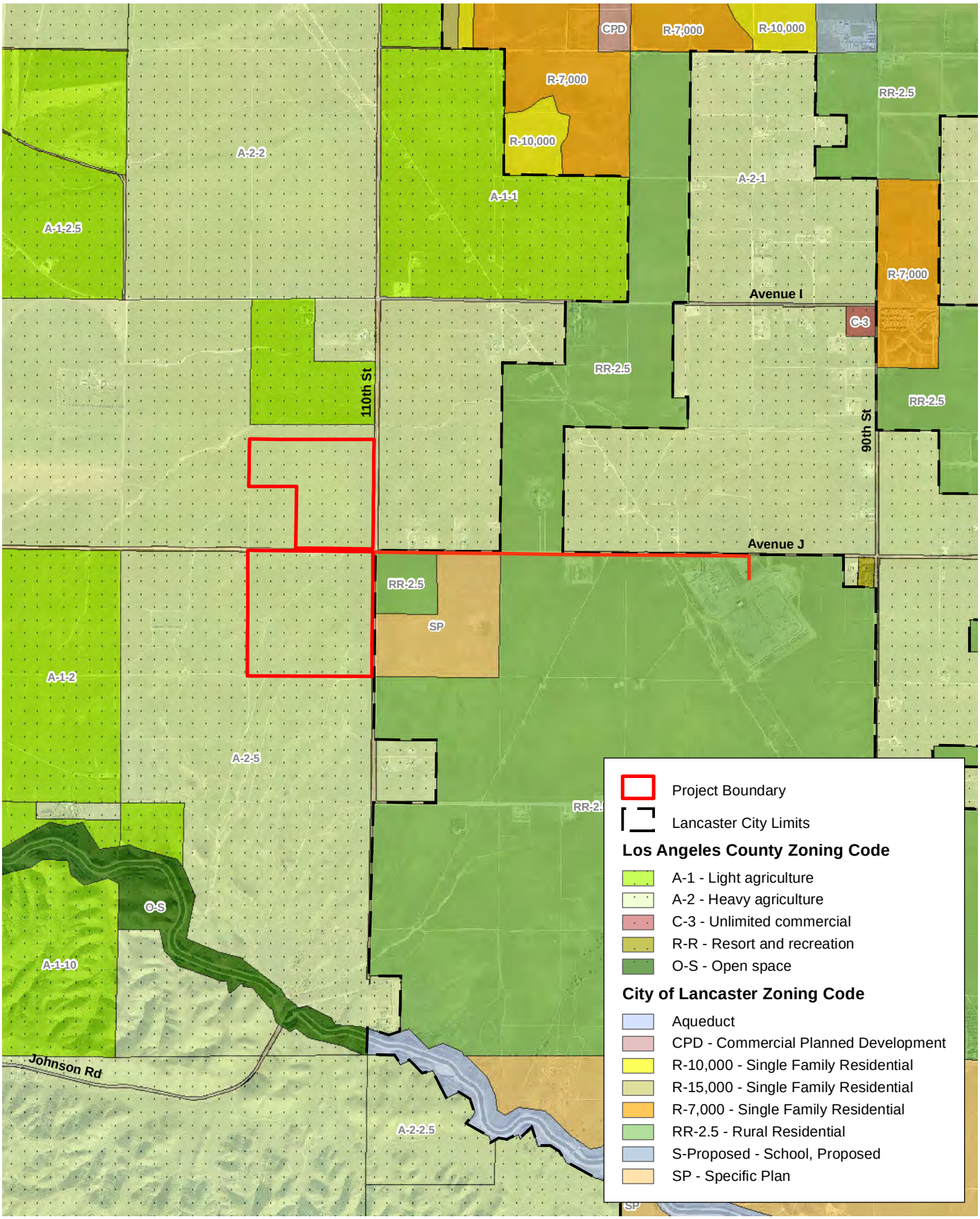


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# Project Zoning

Exhibit 4-14

*West Antelope Solar Energy Project*

N W E S

2,800 1,400 0 2,800 Feet

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applicable policies, goals, and objectives outlined in the Los Angeles County General Plan and the *Antelope Valley Areawide General Plan,* as shown in Table 4-14.

**TABLE 4-14**
**ANTELOPE VALLEY AREAWIDE GENERAL PLAN AND LOS ANGELES COUNTY GENERAL PLAN CONSISTENCY ANALYSIS**

| Policy | Relationship of Project to Policy |
|---|---|
| **Los Angeles County General Plan** | |
| **Conservation, Open Space and Recreation** | |
| 2. Support the conservation of energy and encourage the development and utilization of new energy sources including geothermal, thermal waste, solar, wind and ocean-related sources. | **Consistent** – The Project would produce 20 MWac of solar power. Therefore, the Project supports the utilization of new energy sources. |
| 3. Promote the use of solar energy to the extent possible. | **Consistent** – The Project consists of PV solar facilities totaling 20 MWac. |
| **Antelope Valley Areawide General Plan** | |
| **Resource Conservation** | |
| 40. Encourage efficient utilization of resources in the allocation of land to various uses, and incorporate energy conservation measures into the design and implementation of public and private projects. | **Consistent** – The Project proposes use of PV solar panels to generate power, thereby off-setting demand for fossil fuels. The Project is located on previously disturbed agricultural lands, and facilities would require modest quantities of water compared with other traditional power generation technologies. |
| **Energy Consumption** | |
| 217. Promote use of alternative energy sources (including solar and wind) for heating and cooling. | **Consistent** – The Project would produce 20 MWac of solar power. |
| **Environmental Sensitivities** | |
| 19. Minimize disruption and degradation of the environment as land use development occurs, integrating land uses so that they are compatible with natural environmental systems. | **Consistent** – Grading and ground disturbance would be minimal and would be primarily limited to access roads and retention basins. Project design avoids impacts to potential jurisdictional features. Please refer to Section 4.4, Biological Resources. |
| 20. Prohibit expansion of urban uses into areas of rare and endangered species. | **Consistent** – As analyzed in Section 4.3, Biological Resources, Swainson's hawk and Western burrowing owl were observed in the Project area. The Project would implement mitigation measures identified in Section 4.3 such that construction and operation of the proposed Project would ensure that threatened or endangered plant and wildlife species, if present, are protected in accordance with State and federal laws. |
| 22. Minimize environmental degradation by enforcing controls on sources of pollutants (including visual pollution) and noise. | **Consistent** – The Project is located in an area of generally low population density and surrounding areas consist of agricultural and undeveloped land. No neighborhoods are located adjacent to the Project area. As analyzed in Sections 4.1, Aesthetics, 4.3, Air Quality, and 4.13, Noise, the Project would result in less than significant impacts following implementation of prescribed mitigation measures. |
| 23. Protect underground water supplies by enforcing controls on sources of pollutants. | **Consistent** –Implementation of mitigation measures described in Section 4.9 (Hazards and Hazardous Materials) will ensure that underground water supplies are protected |

# TABLE 4-14
# ANTELOPE VALLEY AREAWIDE GENERAL PLAN AND LOS ANGELES COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

| Policy | Relationship of Project to Policy |
|---|---|
| **Non-Residential Uses In Non-Urban Areas** | |
| a) Location<br>(1) The proposed use should be located and designed so as not to conflict with established community land use and circulation patterns.<br>(2) The necessary public services and infrastructure should be readily available.<br>(3) The proposed use should be located and designed so as to provide an appropriate buffer between potentially disruptive, polluting or hazardous uses and other existing development.<br>(4) The proposed use shall be located and designed so as to minimize the scenic, noise, and odor impacts on adjacent neighborhoods and other adjacent land uses.<br>(5) The proposed use shall be located in areas deemed suitable from ecologic, geologic and topographic standpoint. | **Consistent** – The current land use pattern in the Project area is vacant agricultural lands. The proposed Project is consistent with surrounding agricultural land uses and will not affect existing circulation patterns.<br><br>As analyzed in Sections 4.15, Public Services, and 4.17, Transportation/Traffic, adequate public services and infrastructure are readily available, and the Project would result in less than significant impacts to these resources.<br><br>The proposed Project site will be surrounded by a six-foot-high chain link fence (with one additional foot of barbed wire). In addition, a landscape buffer would be planted around the perimeter of the site to lessen visual impacts.<br><br>The Project is located in an area of generally low population density and surrounding areas consist of agricultural and undeveloped land. As analyzed in Sections 4.1, Aesthetics, 4.3, Air Quality, and 4.13, Noise, the Project would result in less than significant impacts following implementation of prescribed mitigation measures.<br><br>The proposed Project is considered to be suitable with on-site and surrounding ecological resources (refer to Section 4.3, Biological Resources) and geologic resources (refer to Section 4.6, Geology and Soils). The Project will generate minimal air emissions and noise during operations. Human activity will be light, most of the activity will occur in and around the relatively small area of the on-site operations and maintenance building. |
| b) Access<br>(1) Access, egress and on-site parking should be provided in a manner which maximizes safety and convenience, and minimizes adverse impacts on surrounding land use patterns.<br>(2) The design and location of the project should insure that the transport of toxic, explosive, or hazardous substances will avoid existing residential communities. | **Consistent** – The proposed Project will provide adequate on-site parking. Implementation of mitigation measures described in Section 4.17 (Transportation/Traffic) will ensure that demands of the proposed Project will not overburden existing roadways. The proposed Project does not include the use of hazardous or special conditions that can be detrimental to the public health and safety (refer to Section 4.7, Hazards and Hazardous Materials). |
| c) Design<br>(1) The proposed site should be appropriately landscaped such that the development blends into the surrounding landscape as much as possible. Appropriate landscaping should include, whenever practical, materials appropriate to desert environs.<br>(2) The proposed site should be appropriately fenced, if necessary.<br>(3) Consideration should be given to appropriate hours of operation.<br>(4) Outdoor advertising should be designed in | **Consistent** – The proposed Project site will be surrounded by a six-foot-high chain link fence (with one additional foot of barbed wire). In addition, a landscape buffer would be planted around the perimeter of the site to lessen visual impacts.<br><br>Human activity will be light, most of the activity will occur in and around the relatively small area of the on-site operations, with occasional O&M activities (cleaning of PV panels, trimming of vegetation). |

**TABLE 4-14**
**ANTELOPE VALLEY AREAWIDE GENERAL PLAN AND LOS ANGELES COUNTY GENERAL PLAN CONSISTENCY ANALYSIS**

| Policy | Relationship of Project to Policy |
|---|---|
| such a way as to minimize negative impacts on adjacent properties. | No outdoor advertising will be necessary as part of the proposed Project. |
| (5) If located in a hillside area, the proposed site should be designed so as to minimize necessary grading and to take advantage of existing hillside contours. The design should also minimize the scenic and geologic impacts of the project, particularly erosion and land slippage. | The proposed Project is not located within a hillside area. |
| Sources: LACDRP 1986, 1980. | |

Development of the Project would be consistent with permissible uses associated with the land use designations and the policies, goals, and objectives outlined in the Los Angeles County General Plan and the Antelope Valley Areawide General Plan.

The proposed Project would also not conflict with regional plans, policies, or regulations related to land use, including the Southern California Association of Governments' (SCAG's) Regional Comprehensive Plan (RCP), the Regional Housing Needs Assessment (RHNA), and the Regional Transportation Plan (RTP), since the proposed Project would not require a general plan amendment or zone change, and would not generate additional population, housing, or employment for the area. The Project is consistent with the energy goals of the RCP relating to off-setting demand for fossil fuels and increasing renewable energy supplies.

Although impacts related to consistency with adopted land use plans would be less than significant, as required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). Therefore, any impacts created by the Project would exist only for the life of the proposed Project, and the site would be restored to its pre-developed conditions.

**c) Would the project be inconsistent with the County zoning ordinance as applicable to the subject property?**

***Less Than Significant Impact.*** As mentioned above, electric generating plants are a conditionally allowed use in the Heavy Agricultural (A-2-5) zone upon obtaining a Conditional Use Permit (CUP). The Project would follow all applicable requirements of Sections 22.24.150, 22.32.080 and 22.24.170 of the Los Angeles County Code regulating CUPs; therefore, they would be consistent with the County zoning ordinance. By obtaining a CUP for the Project site, a solar PV facility is a conditionally allowed use and impacts would be less than significant.

**d) Would the project conflict with Hillside Management criteria, Significant Ecological Areas conformance criteria, or other applicable land use criteria?**

***No Impact.*** The Project is not within the boundaries of a designated Hillside Management Area, Significant Ecological Area (SEA), or Natural Community Conservation Plan (NCCP) area. The nearest SEA is the San Andreas SEA, located approximately 4 miles to the west (LACDRP 1980). The Project site is located within the *West Mojave Plan,* a Habitat Conservation Plan (HCP) encompassing most of the Antelope Valley and aiming to conserve and protect habitat

for the desert tortoise, the Mohave ground squirrel, and over 100 other special status species throughout a 9.3 million-acre planning area (BLM 2006). The Project site was not included in one of the proposed conservation areas. Further, since the HCP has not yet been adopted, there would be no impact to or conflict with an adopted HCP and no mitigation is required.

### 4.11.3 MITIGATION MEASURES

Project implementation would not result in significant impacts related to land use and planning; therefore, no mitigation is required.

| **4.12 MINERAL RESOURCES** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | ☐ | ☐ | ☐ | ☒ |
| b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan? | ☐ | ☐ | ☐ | ☒ |

### 4.12.1 ENVIRONMENTAL SETTING

Mineral resources are naturally occurring chemicals, elements, or compounds formed by inorganic processes or organic substances. These resources include bituminous rock, gold, sand, gravel, clay, crushed stone, limestone, diatomite, salt, borate, potash, geothermal, petroleum, and natural gas resources. Construction aggregate refers to sand and gravel (natural aggregates) and crushed stone (rock) that are used as Portland-cement-concrete aggregate, asphaltic-concrete aggregate, road base, railroad ballast, riprap, and fill for the production of other construction materials.

The State of California's Geological Survey (California Department of Conservation, Division of Mines and Geology) identifies deposits of regionally significant aggregate resources. According to state geological survey, the Project is not located within a Mineral Resources Zone (CGS 2006). Review of maps prepared by the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources shows that the Project site does not contain oil, gas, or geothermal resources (DOGGR 2001), and there are no oil wells or mining activities in or near the site (DOGGR 2010). Additionally, according to Map 3-1 of the Antelope Valley General Plan Update-Background Report, the County has not designated Project site as a mineral resource area (LACDRP 2009).

### 4.12.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?**

**b) Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?**

***No Impact.*** As discussed above, the Project is not designated as a mineral resource area by the County or the State. According to the State Department of Conservation, the Project site has never been used for mineral recovery or mining activities, and no designated, regionally significant mineral resources are on or near the Project site (CGS 2006). Therefore, the Project would not result in an impact to a known mineral source that would be of value to the region and residents of the state.

### 4.12.3 MITIGATION MEASURES

Project implementation would not result in significant impacts related to mineral resources; therefore, no mitigation is required.

| **4.13 NOISE** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project result in:** | | | | |
| a) Exposure of persons to, or generation of, noise levels in excess of standards established in the County General Plan or noise ordinance (Los Angeles County Code, Title 12, Chapter 12.08), or applicable standards of other agencies? | ☐ | ☐ | ☒ | ☐ |
| b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? | ☐ | ☐ | ☒ | ☐ |
| c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from parking areas? | ☐ | ☐ | ☒ | ☐ |
| d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from amplified sound systems? | ☐ | ☐ | ☒ | ☐ |
| e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |
| f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? | ☐ | ☐ | ☐ | ☒ |

### 4.13.1 ENVIRONMENTAL SETTING

The ambient noise levels at the Project site and in the vicinity are typical of rural areas, ranging from the mid 40s to low 60s A-weighted decibels (dBA) during the daytime and 40 to 50 dBA average hourly noise level ($L_{eq}$) at night. The dominant sources of noise in the Project area are traffic on West Avenue J and 110$^{th}$ Street West. Traffic volumes on these streets in the area are relatively light; approximately 1,500 vehicles per day (ADT) on 100$^{th}$ Street West and less than 1,000 ADT on West Avenue J (Lancaster 2010a).

Noise-sensitive receptors and land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals and places where quiet is an essential element of the intended purpose. Residential dwellings, hospitals, schools, places of worship, libraries, and other places where low interior noise levels are essential are considered noise-sensitive land uses.

The Project site is composed of and surrounded by undeveloped open space, with the exception of the SCE TRTP transmission lines, agricultural fields to the northwest, and sparse rural development. There are approximately 15 single-family residential properties located within an approximate 1-mile radius of the Project boundaries. The nearest residential property is located approximately 700 feet east of the Project site on the north side of West Avenue J in unincorporated Los Angeles County. A small alfalfa farm is located approximately 0.5 mile to the northwest from the Project site's western boundary. There are no industrial or manufacturing land uses in the Project vicinity, with the exception of the Antelope Substation, which is located

approximately 1.5 miles to the east of the Project site. The nearest general use airport is General Fox Airfield, approximately six miles northeast of the Project site. Bohunk's Airpark, a private airstrip, is located approximately 2.3 miles east of the Project site.

There are no noise-sensitive land uses on the Project site.

**County of Los Angeles Noise Ordinance**

Section 12.08 of the County of Los Angeles Code (County Code) contains the County's Noise Ordinance. The County of Los Angeles Noise Ordinance prohibits unnecessary, excessive, and annoying sounds from sources on private properties by setting limits that cannot be exceeded at adjacent properties.

***Construction***

Section 12.08.440 of the County Code prohibits construction noise between the hours of 7:00 PM and 7:00 AM on weekdays (including Saturday), and at any time on Sunday or a federal holiday if it creates a disturbance across a residential or commercial property line. The County also sets maximum noise levels from mobile construction equipment (nonscheduled, intermittent, short-term operations for less than 10 days), as summarized in Table 4-15, County of Los Angeles Mobile Equipment Noise Limits.

**TABLE 4-15**
**COUNTY OF LOS ANGELES MOBILE EQUIPMENT NOISE LIMITS**

| Time Interval | Single-Family Residential (dBA) | Multi-Family Residential (dBA) | Semi-Residential or Commercial (dBA) |
|---|---|---|---|
| Daily (7:00 AM to 8:00 PM), except Sundays and legal holidays | 75 | 80 | 85 |
| Daily (8:00 PM to 7:00 AM), and all day Sunday and legal holidays | 60 | 64 | 70 |
| dBA: A-weighted decibels<br>Source: County of Los Angeles Code, Section 12.08. | | | |

Maximum noise levels from stationary equipment (repetitively scheduled and relatively long-term operations of ten days or more) are summarized in Table 4-16, County of Los Angeles Stationary Equipment Noise Limits.

**TABLE 4-16**
**COUNTY OF LOS ANGELES STATIONARY EQUIPMENT NOISE LIMITS**

| Time Interval | Single-Family Residential (dBA) | Multi-Family Residential (dBA) | Semi-Residential or Commercial (dBA) |
|---|---|---|---|
| Daily, except Sundays and legal holidays, 7:00 AM to 8:00 PM | 60 | 65 | 70 |
| Daily, 8:00 PM to 7:00 AM, and all day Sunday and legal holidays | 50 | 55 | 60 |
| dBA: A-weighted decibels<br>Source: County of Los Angeles Code, Section 12.08. | | | |

### *Operation*

The County of Los Angeles Noise Ordinance also specifies exterior noise levels that cannot be exceeded at the receiving properties for a specified time period. These standards generally apply to noise made from one property to another. As stated in the ordinance,

> Unless otherwise herein provided, no person shall operate or cause to be operated, any source of sound at any location within the unincorporated county, or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level, when measured on any other property either incorporated or unincorporated, to exceed any of the following exterior noise standards.

Exceptions to the exterior standards include, but are not limited to, construction and residential air conditioning or refrigeration equipment. These two cases are regulated separately, as described below. The County-specified noise standards are listed in Table 4-17, County of Los Angeles Exterior Noise Standards. It should be noted that these standards do not apply to the assessment of land use compatibility for transportation noise.

**TABLE 4-17**
**COUNTY OF LOS ANGELES EXTERIOR NOISE STANDARDS**

| Noise Zone | Designated Noise Zone Land Use | Time Interval | Exterior Noise Level (dBA) |
|---|---|---|---|
| I | Noise-Sensitive Area* | Anytime | 45 |
| II | Residential Area | 10:00 PM to 7:00 AM<br>7:00 AM to 10:00 PM | 45<br>50 |
| III | Commercial Area | 10:00 PM to 7:00 AM<br>7:00 AM to 10:00 PM | 55<br>60 |
| IV | Industrial Area | Anytime | 70 |

dBA: A-weighted decibels

* Noise Zone I, Noise-Sensitive Area, is an area designated by the health officer for the purpose of ensuring exceptional quiet. These areas must be indicated by the display of conspicuous signs in at least 3 separate locations within 164 meters (0.1 mile) of the institution or facility.

Source: County of Los Angeles Code, Section 12.08.

There are no known designated Noise Zone I (noise-sensitive) areas in the Project site vicinity. There is a Zone II (residential) receptor approximately 700 feet to the east of the site.

The applicable standards listed in Table 4-17 should not be exceeded at the property line of a noise-sensitive use for a cumulative period of more than 30 minutes in any hour. If the ambient $L_{50}$ exceeds the foregoing level, then the ambient $L_{50}$ becomes this standard.

### 4.13.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project result in exposure of persons to, or generation of, noise levels in excess of standards established in the County General Plan or noise ordinance (Los Angeles County Code, Title 12, Chapter 12.08), or applicable standards of other agencies?**

**d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from amplified sound systems?**

***Less Than Significant Impact.*** Both construction and operation of the Project would be conducted in compliance with the Los Angeles County Noise Control Ordinance, as contained in Chapter 12.08 of the Los Angeles County Code. Construction noise is related primarily to the use of heavy equipment. Noise levels generated by heavy equipment can range from approximately 68 dBA to an excess of 100 dBA when measured at 50 feet. Typical duty cycles and noise levels generated by representative pieces of construction equipment operating individually are listed in Table 4-18, Typical Maximum Construction Noise Levels. The distance from the noise source to a receptor is a primary consideration in determining the actual noise level experienced at the receptor. Construction equipment noise is analyzed as a point source. Noise from a point source is attenuated at a rate of 6 dBA per doubling of distance. For example, a noise level of 85 dBA measured at 50 feet from the source to the receptor would be reduced to 79 dBA at 100 feet, and 73 dBA at 200 feet.

**TABLE 4-18**
**TYPICAL MAXIMUM CONSTRUCTION NOISE LEVELS**

| Equipment | Noise Level (dBA) at 50 feet | Typical Duty Cycle |
|---|---|---|
| Auger Drill Rig | 85 | 20% |
| Backhoe | 80 | 40% |
| Blasting | 94 | 1% |
| Chain Saw | 85 | 20% |
| Clam Shovel | 93 | 20% |
| Compactor (ground) | 80 | 20% |
| Compressor (air) | 80 | 40% |
| Concrete Mixer Truck | 85 | 40% |
| Concrete Pump | 82 | 20% |
| Concrete Saw | 90 | 20% |
| Crane (mobile or stationary) | 85 | 20% |
| Dozer | 85 | 40% |
| Dump Truck | 84 | 40% |
| Excavator | 85 | 40% |
| Front End Loader | 80 | 40% |
| Generator (25 KVA or less) | 70 | 50% |
| Generator (more than 25 KVA) | 82 | 50% |
| Grader | 85 | 40% |
| Hydra Break Ram | 90 | 10% |
| In situ Soil Sampling Rig | 84 | 20% |
| Jackhammer | 85 | 20% |

**TABLE 4-18**
**TYPICAL MAXIMUM CONSTRUCTION NOISE LEVELS**

| Equipment | Noise Level (dBA) at 50 feet | Typical Duty Cycle |
|---|---|---|
| Mounted Impact Hammer (hoe ram) | 90 | 20% |
| Paver | 85 | 50% |
| Pile Driver, Impact (diesel or pneumatic) | 95 | 20% |
| Pile Driver, Vibratory | 95 | 20% |
| Pneumatic Tools | 85 | 50% |
| Pumps | 77 | 50% |
| Rock Drill | 85 | 20% |
| Scraper | 85 | 40% |
| Tractor | 84 | 40% |
| Vacuum Excavator (vac-truck) | 85 | 40% |
| Vibratory Concrete Mixer | 80 | 20% |

dBA: A-weighted decibel; KVA: kilovolt amps

Source: Thalheimer 2000.

Anticipated equipment to be used during construction of the proposed Project is shown in Table 3-4. The highest anticipated noise levels from mobile equipment would occur during pile driving for the solar structure posts. As shown in Table 4-18, pile driver maximum noise levels ($L_{max}$) at a distance of 50 feet can be 95 dBA. The nearest residential receptor is approximately 700 feet east of the Project site. When pile driving would occur at the eastern boundary of the Project site, the noise attenuation from the equipment to the residence would be approximately 29 dBA and the $L_{max}$ at the residence would be 66 dBA. The $L_{max}$ would be less than the County's noise ordinance limit of 75 dBA for mobile equipment, and the impact would be less than significant.

Stationary equipment to be used for the proposed Project would include generators with an $L_{max}$ up to 82 dBA. The noise attenuation of 29 dBA to the nearest residence would reduce stationary source noise to 53 dBA $L_{max}$ at the residence. The $L_{max}$ would be less than the 60 dBA stationary equipment noise limit of the County Noise Ordinance, and the impact would be less than significant.

Mobile equipment would also be used for trenching and paving in West Avenue J as required for the cable connection from the Project site to the substation. The equipment would be near the residence adjacent to the roadway for a few hours on a few separate occasions. The noise from these activities would be typical of road and utility maintenance and would not be substantial in duration. The impact would be less than significant.

On the highest intensity day for truck traffic, equipment delivery trucks are estimated to average 51 round trips (100 one-way trips) per day (see Section 3.2.1 of this IS/MND) and commuter worker vehicle trips would average approximately 54 trips per day. If it is conservatively assumed that all these trips used West Avenue J, worker trips would occur at the beginning and ending of typical workday hours and would result in an increase in the average ambient noise of less than 3 dBA, which is barely discernible to the average ear and less than significant. The truck trips that would occur during the workday would result in an average hourly noise level increase of approximately 5 dBA during the work hours and would remain below 60 dBA at the adjacent residences. This increase in vehicular noise along West Avenue J would be temporary (i.e. construction phase only), short-term (i.e. over approximately 10 days), and would be in the

vicinity of only two residential properties along West Avenue J. This temporary increase in noise would be less than significant.

The operation of heavy construction equipment would cause temporary increases in ambient noise levels in the vicinity of the Project site and would cease when construction is over. Construction activities would occur for approximately six months and would be conducted in compliance with the County's construction noise standards, which prohibits non-emergency construction activities that generate substantial noise between the hours of 7:00 PM and 7:00 AM on weekdays and Saturdays, and at any time on Sunday or a federal holiday. Therefore, construction noise impacts would be less than significant.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). It is assumed that decommissioning of the site would require the same construction scenario (activities, equipment, duration) as the initial development of the site; however, noise impacts would be less than those currently projected due to anticipated advancements in technology and a cleaner-burning construction equipment fleet mix. Future decommissioning activities would also be expected to comply with the same or equivalent noise mitigation requirements. Therefore, future noise impacts related to decommissioning would be less than significant.

**b) Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?**

***Less Than Significant Impact.*** Groundborne vibration, expressed as peak particle velocity (ppv), consists of oscillatory waves that propagate from the source through the ground to adjacent structures. Vibration of building components can also take the form of an audible, low-frequency rumbling noise, which is referred to as groundborne noise. As with most forms of energy, vibration energy spreads out as it travels through the ground, causing the vibration level to decrease with the distance from the source.

Groundborne vibration can be generated by construction activities and is generally highest during impact pile driving, blasting, and demolition-related activities. There are no applicable federal, State, or local regulatory standards for construction vibration. The Caltrans Transportation- and Construction-Induced Vibration Guidance Manual suggests criteria for potential structural damage to older residential structures of 0.3 ppv inch per second (in/sec) and 0.5 ppv in/sec for potential damage to newer residential structures (Caltrans 2004). For human annoyance from frequent intermittent sources, the Caltrans Guidance indicates that 0.01 ppv in/sec is barely perceptible and that 0.04 ppv in/sec is distinctly perceptible.

Vibration level at a receptor, ppv in/sec, is calculated by the following equation:

$PPV_D = PPV_{25} – 20 \log (D/25)^n$, where

$PPV_D$ is the vibration level at a distance D from the vibration source,

$PPV_{25}$ is the vibration level at a distance of 25 feet from the source, and

n is a factor for the vibration attenuation characteristics of the soil.

Pile driving would be the source of the strongest vibrations for the proposed Project. The vibration level for a typical impact pile driver at a distance of 25 feet is 0.65 ppv in/sec.

Soil attenuation factors from 1.1 to 1.5 are suggested in the Caltrans Transportation- and Construction-Induced Vibration Guidance Manual and the Federal Transit Administration Noise and Vibration Manual (Caltrans 2004; FTA 2006). The following calculations use a value of 1.3, which is suggested for competent soils, including most sands, sandy clays, silty clays, gravel, silts, and weathered rock.

Using the above data, the proposed Project's pile driving vibration levels from the nearest point on the Project site to the nearest residence would be 0.0085 ppv in/sec at a distance of 500 feet. This level is well below the 0.3 ppv in/sec level for potential structural damage and less than the 0.01 ppv in/sec level of perceptibility.

If the pile driver selected for the project causes greater than "typical" vibration or the soil is substantially denser than assumed for the above calculations, vibration levels may be greater than estimated but would not approach the level for structural damage and would be unlikely to be perceived. The impact would be less than significant and no mitigation measures would be required.

**c) Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from parking areas?**

***Less Than Significant Impact.*** Potential long-term operational noise impacts would be related to the operation of electrical equipment such as transformers and inverters and to on-site O&M activities.

**Electrical Equipment**

The Project substation would include a 25 megavolt Ampere (MVA) 34.5 to 66 kilovolt (kV) transformer. Although the Project-specific transformer has not been identified, the National Electrical Manufacturers' Association (NEMA) standard publication TR-1 1993 (NEMA 2000) includes audible sound level performance requirements for transformers. Data in publication TR-1 indicates that audible noise from 25 MVA transformers would not exceed 75 dBA at a distance of 5 feet. At a distance of 700 feet (i.e., the distance to the nearest residence), the transformer noise level would be approximately 32 dBA.

There would be approximately ten 2-MW solar block inverter-transformer units. An acoustic test report for the Sungrow SG800MX inverter indicates an average noise level of 69.4 dBA at 5 meters (16.4 feet) and a maximum noise level of 71.7 dBA at 5 meters[12]. If one inverter was located at a distance of 700 feet from the residence, the maximum noise level at the residence would be 39 dBA. The inverter-transformer units would be located at varying distances from the nearest residence. It is estimated that the combined noise level from the 10 inverter-transformer units at the residence would be 43 dBA.

There would be approximately 1,600 solar trackers. Solar tracker motor and bearing noise was measured at an existing solar generation site. Noise levels were 70 to 80 dBA at a distance of 1 inch. It was noted that noise levels may increase to 80 to 90 dBA in hot weather (Williamson 2013). The noise from 1,600 solar trackers, all at 90 dBA at 1 inch, located at an average distance of 1,700 feet from the nearest residence would be approximately 36 dBA.

[12] This data was provided in an *Acoustic Test Report* of the Sungrow SG800MX 800kW Photovoltaic Inverter Noise Emission Measurement Grid-Tie Inverter as tested on June 8, 2013 (Sungrow 2013).

The combined noise level at the residence from the substation transformer, the solar trackers, and the inverter-transformers would be approximately 44 dBA, which is less than the 50 dBA daytime and 45 dBA nighttime County noise limits shown in Table 4-17. It is noted that the Project would not generate power at night when there is no sun and therefore electrical equipment would be inactive and noise levels would be less than described above. The impact would be less than significant. No mitigation is required.

**Operations and Maintenance**

The workforce performing on-site O&M would be comprised of general labor for cleaning purposes; skilled electricians for visual inspections and performance testing; and skilled mechanics to inspect and maintain the mechanical portions of the tracking system. Because the entire facility would be monitored remotely in real time, as described in Section 3 of this IS/MND, it is anticipated that four to five O&M personnel would make about two to three visits per year to conduct the on-site O&M functions. These occasional activities would not result in any noticeable noise and the impact would be less than significant. No mitigation is required.

**e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?**

**f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?**

***No Impact.*** The Project site is located approximately six miles southwest of the General Fox Airfield and more than two miles west of Bohunk's Airpark. The Project would not place persons in a location where they would be exposed to substantial aircraft noise, nor would the Project generate aircraft noise. No impacts would occur.

### 4.13.3 MITIGATION MEASURES

Project implementation would not result in significant impacts related to noise; therefore, no mitigation is required.

| **4.14 POPULATION AND HOUSING** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through the extension of roads or other infrastructure)? | ☐ | ☐ | ☒ | ☐ |
| b) Displace substantial numbers of existing housing, especially affordable housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |
| c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |
| d) Cumulatively exceed official regional or local population projections? | ☐ | ☐ | ☐ | ☒ |

### 4.14.1 ENVIRONMENTAL SETTING

Los Angeles County had a January 2012 population of 9,884,632 persons and a housing stock consisting of 3,454,092 dwelling units (EDD 2012). The California Employment Development Department estimates the County's July 2012 labor force for the City of Lancaster at 56,000 persons, of which 9,300 persons (16.6 percent) are unemployed (EDD 2012). The February 2011 employment figures show a labor force of 56,600 and an unemployment rate of 17.1 percent (EDD 2011). The Project site is vacant and there are no residents, housing units, or employees at the site.

### 4.14.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through the extension of roads or other infrastructure)?**

***Less Than Significant Impact.*** The Project would not induce substantial population growth. It does not propose any housing or commercial development, nor does it propose any significant extension of roads or infrastructure. No change in the Los Angeles County or City of Lancaster's population or housing would occur with Project implementation. Construction jobs would be short term and are expected to be filled mostly by the existing workforce and sourced from the surrounding communities. During operations, the Project would typically be unmanned, with the exception of periodic on-site personnel visitations for security, maintenance, and system monitoring. These intermittent site visits would not create any permanent or substantial demand for housing, goods, or services in the area and would not induce substantial population growth in Los Angeles County or surrounding communities. Therefore, impacts to population growth would be less than significant.

**b) Would the project displace substantial numbers of existing housing, especially affordable housing, necessitating the construction of replacement housing elsewhere?**

**c) Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?**

***No Impact.*** The Project site is vacant; therefore, the proposed Project would not displace existing housing units, households, businesses, or employees. No impacts would occur.

**d) Would the project cumulatively exceed official regional or local population projections?**

***No Impact.*** As described above, the Project does not propose any housing or commercial development, nor does it propose any significant extension of roads or infrastructure. No change in the Los Angeles County or City of Lancaster's population or housing would occur with Project implementation. Therefore, the Project would not materially affect local or regional population projections.

### 4.14.3 MITIGATION MEASURES

Project implementation would not result in significant impacts related to population or housing; therefore, no mitigation is required.

| **4.15 PUBLIC SERVICES** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Would the project create capacity or service level problems, or result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: | | | | |
| i) Fire protection? | ☐ | ☐ | ☒ | ☐ |
| ii) Sheriff protection? | ☐ | ☐ | ☒ | ☐ |
| iii) Schools? | ☐ | ☐ | ☐ | ☒ |
| iv) Parks? | ☐ | ☐ | ☐ | ☒ |
| v) Libraries? | ☐ | ☐ | ☐ | ☒ |
| vi) Other public facilities? | ☐ | ☐ | ☐ | ☒ |

### 4.15.1 ENVIRONMENTAL SETTING

Fire protection services for the Project site are provided by the LACFD North Region, Battalion 11. The nearest fire station to the site is Fire Station 130, which is located at 44558 40th Street West, approximately 7 miles east of the site. This station is staffed by a three-person engine company and a three-person Urban Search and Rescue team, which when combined create an Urban Search and Rescue Task Force.

Police protection services at the Project site are provided by the Los Angeles County Sheriff's Department (LACSD), with a station at 501 West Lancaster Boulevard in the City of Lancaster. In 2009, this station was staffed by 205 sworn officers and 61 civilian staff members (Lancaster 2009a).

The Project site is located within the service boundaries of the Westside Union School District (Lancaster 2009a). The nearest school is Del Sur Elementary located at 9023 West Avenue H, approximately 2.4 miles northeast of the Project site. The Project site is currently undeveloped and does not generate a demand for schools, libraries, or parks. The nearest library is the Quartz Hill Public Library located at 42018 50th Street West, approximately 6.5 miles to the southeast of the Project site. The nearest park is George Lane Park, located at 5520 West Avenue L-8, approximately 5.8 miles southeast of the Project site.

### 4.15.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project create capacity or service level problems, or result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:**

**i) Fire protection?**

***Less Than Significant Impact.*** The proposed Project would not involve the creation of new habitable structures or new population growth that could generate increased demand for fire protection services. However, the Project has the potential to require fire protection services in the highly unlikely event that any of the structures or Project site vegetation were to catch fire. During construction, there would be workers, machinery, construction supplies, and hazardous materials such as hydraulic oil, diesel fuel, grease, lubricants, solvents, adhesives, paints, and other petroleum-based products contained in construction vehicles on site. There is a possibility that construction activities could accidentally ignite a fire that could require assistance from the LACFD. The nearest fire station is located approximately seven miles east of the Project site, and no new or physically altered fire protection facilities would be required to provide service to the Project site; no environmental impacts would result. A comment letter received from LACFD on August 7, 2012, regarding the CUP application states that they are satisfied with the preliminary design (LACFD 2012).

As required by the County, the Project would be designed and constructed in compliance with Title 32, Fire Code, of the Los Angeles County Code. Under Title 32, new construction, rehabilitation, alteration, or expansion on any site must comply with requirements for construction materials and methods; fire protection systems; emergency access; fire flow; and other fire safety issues. The Code addresses construction in fire hazard areas; the storage, use, handling, and transportation of hazardous materials; and the use of equipment and activities involving fire. The two water tanks proposed as part of the Project would be subject to this code. In addition, vegetation at the Project site would be required to be trimmed to a maximum height of 6 inches, or as directed by the Fire Official, and cleared to mineral soil for a distance of 50 feet around all electrical transformer vaults or structures.

To ensure that no fire hazards are created by the Project, building plans would be subject to review and approval by the LACFD; annual inspections of the buildings and premises for compliance and to correct conditions which may cause fire or contribute to its spread would also be required. Compliance with these regulations would ensure that Project impacts would remain less than significant.

**ii) Sheriff protection?**

***Less Than Significant Impact.*** The proposed Project would not generate additional demand for police protection services associated with the proposed improvements on the site. The LACSD recommends an officer-to-population ratio of 1 officer per 1,000 residents, and the City of Lancaster had a ratio of 1 officer per 931 residents in 2009 (Lancaster 2009a). The proposed Project would not lead to a resident population on the site and thus, would not change the officer-to-population ratio in Lancaster. No new or physically altered police protection facilities would be required, and no environmental impacts would result.

Operation of the unmanned facilities is generally passive and would require limited LACSD protection services. The proposed solar facilities would be surrounded by a six-foot-tall fence with one additional foot of three-string barbed wire to prevent unauthorized access or trespassing. Perimeter, motion-activated fence lighting would be provided for nighttime security

of the solar facility. Patrol services around the solar facilities are expected to continue to be provided by the LACSD personnel. Therefore, construction and operations of the Project would have a less than significant impact on Sheriff protection services and their staffing or response times.

**iii) Schools?**

**iv) Parks?**

**v) Libraries?**

**vi) Other public facilities?**

***No Impact.*** The proposed solar array would not include the development of housing units, nor would it introduce residents into the site or induce population growth. Thus, no impact on capacities, service levels or performance objectives for schools, parks, libraries, or other public facilities would be generated by the Project. No impact would occur.

### 4.15.3 MITIGATION MEASURES

Project implementation would not result in significant impacts related to public services; therefore, no mitigation is required.

| **4.16 RECREATION** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would/does the project:** | | | | |
| a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☐ | ☒ |
| b) Does the project include neighborhood and regional parks or other recreational facilities or require the construction or expansion of such facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☐ | ☒ |
| c) Would the project interfere with regional open space connectivity? | ☐ | ☒ | ☐ | ☐ |

### 4.16.1 ENVIRONMENTAL SETTING

There are various State, County, and City parks and recreational facilities in the Project area, with the nearest park (George Lane Park), approximately 5.8 miles southeast of the Project site. The Project site and surrounding areas are not used for recreational purposes, with the exception of a portion of the proposed California Poppy Trail, which skirts the eastern boundary of the Project along 110th Street West (LACDRP 2007) and loops westward to encompass the Antelope Valley California Poppy State Natural Reserve (SNR), approximately four miles northwest of the Project site. The proposed trail route is shown in Exhibit 4-15, Los Angeles County Trail Map.

The Project surroundings are typical of the western Antelope Valley in an area that has been primarily used for agriculture. Land uses include undeveloped land with varying degrees of disturbance due to previous agricultural activities. Land adjacent to the Project is also former farmland that is currently undeveloped. While these areas are open space, they do not currently support any recreational activities.

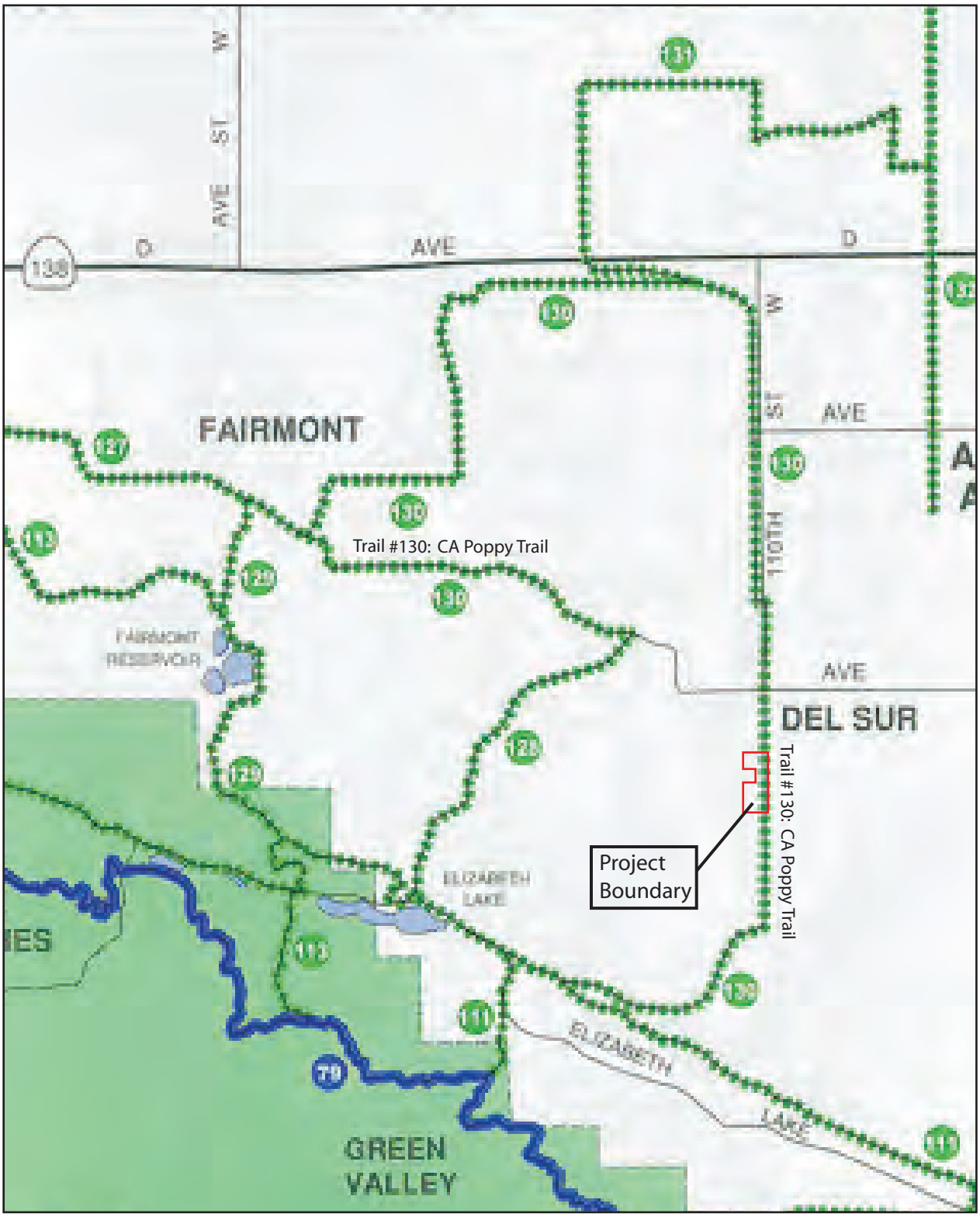
### 4.16.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?**

**b) Does the project include neighborhood and regional parks or other recreational facilities or require the construction or expansion of such facilities which might have an adverse physical effect on the environment?**

***No Impact.*** As previously discussed in Section 4.14, Population and Housing, the proposed Project would not directly or indirectly result in housing development or population growth on the site or in the Project area. With no new households or residents, the Project would not increase the use of local parks, and it would not create a demand for local or regional recreational facilities. As stated in MM REC-1, the Project would include build out of a portion of the California Poppy Trail. No impact would occur.




Source: Los Angeles County Department of Parks and Recreation, 2001

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Los Angeles County Trail Map

Exhibit 4-15

*West Antelope Solar Energy Project*

BonTerra CONSULTING

(Rev 08/07/12 MMD) Projects\TAAC\J001\Graphics\IS-MND\Ex_poppytrail.pdf

### c) Would the project interfere with regional open space connectivity?

***Less Than Significant With Mitigation.*** The Project site includes a portion of the Los Angeles County Trail Number 130 (California Poppy Trail) on the Los Angeles County Trails Map. If the site were to be developed without ensuring an appropriate easement for the implementation of this trail, a significant impact to regional connectivity with regard to the County's proposed trail system would occur. This trail has been adopted as part of the County Department of Parks and Recreation trail map, but has not yet been completely constructed.

As stated in MM REC-1, part of the Project would be to dedicate and construct a trail along the eastern boundary of the site, adjacent to 110th Street West, for the California Poppy Trail. Buildout of this trail would promote connectivity with regional open spaces, primarily the Antelope Valley California Poppy SNR. The trail would be dedicated to the Department of Recreation and Parks, who would manage the trail even after decommissioning. While the Project would reduce the amount of connected open space by fencing off approximately 230 acres for solar power, due to the vast amount of surrounding open space, the Project would not interfere with recreational connectivity. Therefore, impacts would be less than significant.

## 4.16.3 MITIGATION MEASURES

**MM REC-1** The Project Applicant shall design and construct an eight-foot (8') wide trail along the eastern boundary of the Project site, in a manner consistent with the *County of Los Angeles Trails Manual* (Trails Manual), to form part of Los Angeles County Trail Number 130 (California Poppy Trail) on the Los Angeles County Trails Map. The trail shall be constructed within a twelve-foot (12') wide multi-use (hiking, mountain biking, and equestrian) trail easement that shall be dedicated and recorded as a separate document.

Prior to issuance of Building Permits, the Project Applicant shall submit detailed grading information for the trail construction to the Department of Parks and Recreation and include all pertinent information required in the Trails Manual.

Implementation of MM REC-1 would reduce impacts related to recreation to a less than significant level.

| **4.17 TRANSPORTATION/TRAFFIC** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit? | ☐ | ☐ | ☒ | ☐ |
| b) Conflict with an applicable congestion management program (CMP), including, but not limited to, level of service standards and travel demand measures, or other standards established by the CMP for designated roads or highways? | ☐ | ☐ | ☒ | ☐ |
| c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks? | ☐ | ☐ | ☐ | ☒ |
| d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | ☐ | ☐ | ☒ | ☐ |
| e) Result in inadequate emergency access? | ☐ | ☐ | ☒ | ☐ |
| f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities? | ☐ | ☐ | ☒ | ☐ |

### 4.17.1 ENVIRONMENTAL SETTING

Regional access to the Project site is provided from either (1) the Golden Gate Freeway (Interstate 5), merging onto the Antelope Valley Freeway (SR-14) northbound, and exiting 20th Street and traveling westward to connect with West Avenue J or (2) from the Mojave Freeway (I-15), merging onto SR-138, which transitions into SR-14. The regional and local vicinity of the Project site is depicted in Exhibit 3-1.The traffic data analyzed in this section was taken from the *City of Lancaster General Plan 2030 Master Environmental Assessment* (Lancaster 2009a).

SR-14, which runs in a north-south direction, is located approximately three miles east of the Project site. This freeway carried approximately 51,000 vehicles per day in 2008, with 4,350 vehicles during the peak hour (Caltrans 2010b). This freeway is part of the Highway and Roadway System in the County's Congestion Management Program (CMP) (MTA 2010).

Vehicular access to the site is provided by West Avenue J at 110th Street West. West Avenue J is a two-lane "Major Arterial" roadway with soft shoulders (Lancaster 2009a). Traffic count data from 2005 indicated approximately 5,700 vehicles used the section of roadway between 70th Street West and 60th Street West each day (Lancaster 2009a). With capacity for 24,000 vehicles, it had a volume-to-capacity ratio of 0.238 in 2005, which translates to a

Level of Service (LOS) A (Lancaster 2009a). LOS A is defined as free-flow traffic, where vehicles are almost unimpeded in their ability to maneuver within the traffic stream. As of 2010, traffic volumes on 100th Street West were approximately 1,500 vehicles per day (ADT) and less than 1,000 ADT on West Avenue J (Lancaster 2010a). As the section of West Avenue J near the Project site (at 110th Street West) is even less developed, the volume-to-capacity ratio should be even lower. There have been no notable changes in traffic conditions since 2010; therefore, it is expected that the street continues to operate at LOS A.

The Project site is undeveloped and does not generate vehicle trips on the freeway or area roadways. As previously mentioned, the California Poppy Trail runs along the eastern boundary of the Project. There is also a proposed Class III bicycle lane that would also run along 110th Street West (LACDPW 2012). The nearest public transit stop is the Antelope Valley Transit Authority's (AVTA) Quartz Hill Route (Route 7), located at 60th Street West and West Avenue J. This route connects to the Palmdale Transportation Center and the Lancaster Metrolink Station. This route makes 12 round trips with 65-minute headways on weekdays and 10 trips with 65-minute headways on weekends between the Lancaster Senior Center and the Palmdale Transfer Center (AVTA 2011).

### 4.17.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?**

**b) Would the project conflict with an applicable congestion management program (CMP), including, but not limited to, level of service standards and travel demand measures, or other standards established by the CMP for designated roads or highways?**

***Less Than Significant Impact.*** This section discusses both construction and operational traffic.

**<u>Construction Traffic</u>**

Trip generation for employees and delivery trucks would vary depending on the phase of construction. During the peak of construction, a typical day would include the transportation of workers, movement of heavy equipment, and transportation of materials. The anticipated peak traffic day, which would occur when grading and equipment delivery trucks overlap with worker trips for panel installations, would involve approximately 51 round-trip truck trips (including 17 trips for water delivery trucks)[13] and 54 round-trip worker trips per day. This peak activity is estimated to occur over approximately 10 working days, but may be more or less depending on the actual timing of construction phase overlap. A detailed breakdown of the estimated number of trucks being operated for each construction task is found in Appendix B.

[13] As required by the AVAQMD, when water is used as fugitive dust control, watering is required three times a day and increased to a minimum of four times a day if there is evidence of visible wind-driven fugitive dust.

The limited amount of construction activity for the grading and vehicle trips by the construction crew for delivery of building materials (i.e., to be used for PV panels, mounting structures and poles/foundations, the equipment buildings, conduit trenching, fencing, and lighting) is not expected to cause traffic congestion on area roadways and intersections. There is capacity on local intersections and streets near the site, which are all operating at Level of Service (LOS) A, to handle traffic volume increases due to construction traffic. This impact would also be temporary and less than significant.

**Operational Traffic**

Long-term operation of the solar array would generate only 8 to 15 maintenance vehicle trips (4 to 5 personnel making 2 to 3 site visits) per year, which translates to no more than 2 vehicle trips every month. Additionally, approximately 115 water truck trips per year (or an average of 29 trips per quarter) would be necessary to wash the panels and reapply the soil binder to the access roads, plus 195 water truck trips during the first year for irrigation water to establish the landscape buffer.

The nearest CMP-designated highway to the site is SR-14 (MTA 2010). This long-term trip generation would not affect roadway or intersection operations in the Project area, nor would it affect pedestrian and bicycle paths or bus transit services in Lancaster. Additionally, these trips are not expected to have any measurable impact on SR-14, which carried 51,000 vehicles per day between Avenue I and Avenue J in 2009 (Caltrans 2010b). Impacts would be less than significant.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). It is assumed that decommissioning of the site would require the same construction scenario (activities, equipment, duration) as the initial development of the site. While it is unknown what the future baseline traffic conditions will be, future decommissioning activities would also be expected to comply with the same or equivalent traffic control mitigation requirements. Therefore, future traffic impacts related to decommissioning would be less than significant.

**c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?**

***No Impact.*** The Project site is not located within an airport land use plan, but is located approximately two miles west of Bohunk's Airpark and six miles northeast of the General William J. Fox Airfield. Bohunk's Airpark is a private airstrip used by single-engine airplanes and helicopters. There are 21 aircraft based at this facility. Daily operations information at Bohunk's Airpark is not available (AirNav 2013a). Fox Airfield is owned by the County of Los Angeles and is used by single and multi-engine airplanes, jet airplanes, and helicopters. There are 156 aircraft based at this facility, with an average of 224 aircraft operations per day (AirNav 2013b). The proposed Project would not generate or require air transportation. Also, the Project would not change air traffic levels or change the location of air traffic to cause substantial safety risks or impact air travel in any way. The PV panels and associated equipment would not exceed single-story height. Therefore, no impacts would occur.

**d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?**

***Less Than Significant Impact.*** The proposed Project does not include any significant construction or realignment of any existing road facilities; however, the Project does have the potential to result in hazardous traffic conditions during construction. As discussed above, the limited amount of construction activity for the grading and vehicle trips by the construction crew for delivery of building materials is not expected to cause traffic congestion on area roadways and intersections. As discussed in the environmental setting above, there is capacity on local streets near the site, which are all operating at Level of Service (LOS) A, to handle traffic volume increases due to construction traffic (Lancaster 2009a).

Grading and ground disturbance activities would primarily occur during the first 1½ months of construction, including the establishment of staging areas and access roads throughout the site. Construction staging and material lay-down areas for on-site activities would be set up for each section of the Project site to allow for efficient distribution of components to different parts of the Project. These staging and lay-down areas would be located within the Project site boundaries and would not create a potential traffic hazard on public right-of-ways.

The construction envelope to underground or erect the transmission lines/poles for the Gen-Tie line would require work on public ROW. If there is insufficient area, the construction may encroach beyond the roadway shoulders into the traveled way requiring limited closures of roadway segments in the construction zones causing short-duration traffic impacts. As required by the County, should erection of the poles require work near or on the roadway, construction work warning signs would be placed in advance according to the *California Manual on Uniform Traffic Control Devices* and applicable City of Lancaster requirements to limit roadway obstruction and the need for temporary detours. Additionally, flagmen would be used as required during construction to ensure traffic safety and uninterrupted flow.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). It is assumed that decommissioning of the site would require the same construction scenario (activities, equipment, duration) as the initial development of the site. It is expected that future decommissioning activities would also be expected to comply with the same or equivalent traffic control mitigation requirements. Therefore, future traffic impacts related to decommissioning would be less than significant.

**e) Would the project result in inadequate emergency access?**

***Less Than Significant Impact.*** The site would not result in inadequate emergency access. The proposed Project would not obstruct any existing access route, and on-site access roads would be provided in accordance with LACFD requirements. The Project would provide access through driveways onto West Avenue J, but would otherwise be fenced-off. The driveways on West Avenue J would have automatic gates approximately 20 feet long and would be setback 50 feet from the road edge to allow for LACFD and maintenance access and turnaround. An approved “Fire Department Knox Lock” would be provided at both gates.

Two water tanks would be installed on the Project site, with each tank providing water for both fire suppression, 3-years of landscaping establishment, and O&M activities. Each water tank would be designed in accordance with the Los Angeles County Fire Code requirements. The internal access roads would be installed according to Los Angeles County Code prior to operating the facilities and would be maintained in a drivable condition throughout the operation of the Project to allow for emergency access. Therefore, no impact on emergency access would occur.

**f) Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?**

***Less Than Significant Impact.*** The Project is located in a rural area of Los Angeles County where alternative transportation facilities are not readily available. Development of the Project would utilize the existing road network and would not impact or conflict with bike trails, pedestrian access, transit services, or other modes of alternative transportation. Vehicle trips to the Project would be limited to maintenance personnel, estimated at 12 to 15 times per year.

The span of 110$^{th}$ Street West adjacent to the Project site is a proposed Class III bike route under the Los Angeles County Bicycle Master Plan (LACDPW 2012). Implementation of the Project would not impede or prevent the future development of a bike route along this stretch. Additional programs regarding public transit or pedestrian facilities would occur in the Los Angeles County right-of-way and are not within Project site boundaries. Thus, impacts on or conflicts with alternative transportation policies, plans, or programs would be less than significant.

### 4.17.3 MITIGATION MEASURES

Project implementation would not result in significant impacts related to transportation/traffic; therefore, no mitigation is required.

| **4.18 UTILITIES AND SERVICE SYSTEMS** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Would the project:** | | | | |
| a) Exceed wastewater treatment requirements of either the Los Angeles or Lahontan Regional Water Quality Control Boards? | ☐ | ☐ | ☒ | ☐ |
| b) Create water or wastewater system capacity problems, or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☒ | ☐ |
| c) Create drainage system capacity problems, or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☒ | ☐ |
| d) Have sufficient reliable water supplies available to serve the project demands from existing entitlements and resources, considering existing and projected water demands from other land uses? | ☐ | ☐ | ☒ | ☐ |
| e) Create energy utility (electricity, natural gas, propane) system capacity problems, or result in the construction of new energy facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ☒ | ☐ |
| f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? | ☐ | ☒ | ☐ | ☐ |
| g) Comply with federal, state, and local statutes and regulations related to solid waste? | ☐ | ☒ | ☐ | ☐ |

### 4.18.1 ENVIRONMENTAL SETTING

The Project is in the Antelope Valley, which is underlain by the Antelope Valley Groundwater Basin ("Basin"). The Basin is located in the western portion of the Mojave Desert within the South Lahontan Hydrologic Region, and is designated as Groundwater Basin Number 6-44. The surface of the entire Antelope Valley Groundwater Basin is over 1 million acres (1,580 square miles) and is topographically closed on the north and northwest by the Garlock Fault at the base of the Tehachapi Mountains, and on the south and southwest by the San Andreas Fault at the base of the Transverse Ranges, including the San Gabriel Mountains. The Basin consists of the deep (confined) aquifer and the upper (unconfined) aquifer serving as the primary water sources. The California Geological Survey considers the historically highest groundwater level at the site to be deeper than 250 feet below the ground surface (Leighton 2012a).

Planert and Williams (1995) and the DWR (1975) report that the total storage capacity of the Basin is between 68 million acre-feet (maf) and 70 maf (DWR 2004). Agricultural and urban uses have been the primary sources of discharge from the groundwater system. According to the U.S. Geological Survey (USGS), groundwater extractions have exceeded the estimated natural recharge of the basin since the 1920s, which has resulted in declining water levels and land subsidence (primarily in the eastern portion of the Antelope Valley Groundwater Basin), as simulated by the USGS (USGS 2003). The average annual native recharge plus local return

flows is currently estimated as approximately 82,300 acre-feet per year (afy) (LACDPW 2010). Coupled with return flows from imported water, the total sustainable yield of the Basin is estimated to be 110,500 afy (LACDPW 2010).

**Adjudication**

Several property owners and public water suppliers initiated legal proceedings asking the Superior Court of California to determine the relative rights of users and potential users of the Antelope Valley Groundwater Basin (1-05-CV-049053: Antelope Valley Groundwater Cases, Consolidated Proceeding 4408). The case involves many complex legal issues and hundreds of parties; it may take years to be resolved.

The underlying dispute among the parties is the priority/superior right to pump the groundwater and the protection of the Basin. According to the Court's Order After Phase Two Trial on the Hydrologic Nature of Antelope Valley, there are multiple claims to be adjudicated, including "declaratory relief, claims of prescription, claims of overlying owners to quiet title to water rights, claims that portions of the [B]asin should be treated as a separate area for management purposes in the event a physical solution to water use is established", among other issues and claims. At the conclusion of the Adjudication, the Basin would be in a state of balance for groundwater supply. On May 6, 2011, the Court provided a tentative ruling that the safe yield of the Basin is 110,000 afy.

There are no water, sewer, or solid waste disposal services at the Project site. The undeveloped site also does not generate solid wastes requiring collection and disposal. The site is located just outside the service boundaries of the Los Angeles County Waterworks District No. 40, but portions of the site are located within the District's sphere of influence.

### 4.18.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Would the project exceed wastewater treatment requirements of either the Los Angeles or Lahontan Regional Water Quality Control Boards?**

***Less Than Significant Impact.*** No domestic wastewater would be generated as part of Project as no habitable structures would be constructed; no restroom, bathroom, toilet, or kitchen facilities would be constructed. The Project would provide a mobile sanitation facility for use by workers during the construction period and O&M activities. Although no significant impacts would result from the use of mobile sanitation facilities, the Los Angeles County Department of Public Health requires the preparation of a mobile sanitation facility plan for project sites with no permanent facilities. The mobile sanitation facility would be maintained in a safe and sanitary condition so as not to constitute a public hazard or nuisance, and would be consistent with the Department of Public Health's "Sanitation Facilities at Remote Worksite Locations". Domestic wastewater would be treated using existing facilities per County regulations. The Plan would include the following:

- The projected number of employees that will use the proposed mobile sanitation facility.
- A Site Plan showing the proposed location(s) the facility.
- A service and maintenance schedule for the facility.
- A description of how potable drinking water will be provided in a manner as to be readily accessible to employees. Identification of potable water source and method of

dispensing (container and single-use cups or bottled water). Description of how drinking water containers are maintained, including methods to prevent contamination of drinking water.

- A copy of a service agreement with a permitted toilet rental agency to provide a mobile sanitation facility approved by the Department. If the applicant proposes to design and construct the mobile sanitation facility, design drawings and specifications shall be included.
- The mobile sanitation facility shall be maintained in a safe and sanitary condition so as to not constitute a public health hazard or nuisance
- The mobile sanitation facility must be removed from the work site at the end of each work day and be returned to an approved storage site.

During operations, the mobile sanitation facility would be provided on-site whenever O&M activities are scheduled to take place. Domestic wastewater generated by the mobile sanitation facility would be treated using existing facilities per County regulations. Therefore, no wastewater treatment is required that may exceed RWQCB requirements and impacts would be less than significant.

**b) Would the project create water or wastewater system capacity problems, or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?**

***Less Than Significant Impact.*** No water or wastewater services or connections to existing facilities are required by the Project. There would be no demand for potable water or generation of wastewater as there would be no habitable structures on site.

Water required by the Project is detailed in Table 3-9. Construction would require approximately 47.87 acre-feet; landscape establishment would require approximately 11.43 acre-feet; O&M activities would require approximately 51.29 acre-feet; and decommissioning would require approximately 89.19 acre-feet, for a total water demand of approximately 201 acre-feet for the life of the Project. As required by the County, water would be obtained from commercial water sources outside the Antelope Valley Groundwater Basin. Water would be trucked in and stored in on-site water tanks, with each tank providing water for fire suppression, three years of landscaping establishment, and O&M activities. The water tanks would be refilled as necessary.

No wastewater generation would occur with the Project, and no demand for sewage treatment would be generated. No new water or wastewater treatment facilities or expansion of existing facilities is needed to serve the proposed solar array. The Project would provide a mobile sanitation facility for use by workers during the construction period and O&M activities. Although no significant impacts would result from the use of mobile sanitation facilities, the Los Angeles County Department of Public Health requires the preparation of a mobile sanitation facility plan for project sites with no permanent facilities. The mobile sanitation facility plan would be submitted to the Los Angeles County Department of Public Health for review prior to issuance of a grading permit and would require that the facility be maintained in a safe and sanitary condition so as not to constitute a public hazard or nuisance. Waste generated by the mobile sanitation facility would be disposed and treated per County regulations. Compliance with these requirements would ensure that impacts to water or wastewater system capacity would be less than significant.

**c) Would the project create drainage system capacity problems, or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?**

***Less Than Significant Impact.*** The proposed Project would not require construction of a storm drainage system or expansion of an existing storm water drainage or treatment facility. As previously discussed in Section 4.10, Hydrology and Water Quality, the Project would comply with the water quality plan/hydrology requirements of the adopted MS4 permit and the LACDPW *2009 Low Impact Development (LID) Standard Manual*. The design of the Project is consistent with the LID Ordinance as retention basins are placed throughout the site in many small, discrete units and distributed in a small portion of each lot or site near the source of impacts, virtually eliminating the need for a centralized facility, such as a regional stormwater management basin.

Therefore, the proposed Project would be designed and constructed with appropriate BMPs to ensure that adjacent storm drain facilities are not negatively impacted by the proposed Project. Any structural BMPs would be located within the Project boundaries and the impact area addressed throughout this IS/MND.

**d) Would the project have sufficient reliable water supplies available to serve the project demands from existing entitlements and resources, considering existing and projected water demands from other land uses?**

***Less Than Significant Impact.*** The proposed Project would require minimal water supply during construction activities and for the washing of the PV panels during long-term maintenance. Section 3, Project Description, contains a summary of water supplies required during construction. Water would be used throughout the entire six month construction period, but would be primarily used for fugitive dust control during grading and ground disturbance activities that would occur during the first 1½ months of construction. As shown in Table 3-9, the Project would require approximately 47.87 acre-feet of water during construction. Establishment of landscaping is estimated to require 3.81 acre-feet per year over three years, which totals 11.41 acre-feet. Water usage for long-term O&M activities (including PV panel washing and reapplication of the soil binder) is estimated at 2.63 acre-feet per year over the anticipated 20-year life of the Project, for a total of 51.29 acre-feet. Decommissioning of the site, including deconstruction of equipment and decommissioning, is estimated to require 90.37 acre-feet.

The demand for approximately 201 acre-feet of water over the life of the Project would be a relatively minimal amount of water for the construction and operation of a 263-acre Project site. However, due to the ongoing adjudication of the Antelope Valley Groundwater Basin, any new demands for groundwater have the potential to result in a cumulatively significant impact on groundwater supplies.

Due to concerns on overdrafting the Basin and ongoing Adjudication proceedings, the County requires that site watering during construction utilize water obtained from commercial water sources outside the Antelope Valley Groundwater Basin. As previously discussed, the Applicant has an agreement with the Cawelo Water District to provide banked water to the District (via AVEK, the District's wholesaler), which would be then provided to the Project (Cawelo 2013). Cawelo has agreed to sell up to 250 acre feet of water for the proposed Project from a water bank located outside of the Antelope Valley Groundwater Basin.[14] The water would be delivered

[14] Cawelo has already completed an environmental analysis under CEQA for its sale of the water, and delivery via the California Aqueduct (Cawelo 2009).

to AVEK via the California Aqueduct. Once transferred to the District, the water would be accessed from an existing District-owned hydrant and transferred to the Project site via water trucks.

Further, the water used on the site would infiltrate into the aquifer, thus being a beneficial use, rather than an impact to groundwater. The County also requires that no landscaped areas or planting requiring a permanent supply of irrigation water be included as part of the Project. Compliance with these requirements would prevent increased groundwater pumping within the Antelope Valley Groundwater Basin and avoid the need for a permanent demand for water at the site. Therefore, impacts would be less than significant.

**e) Would the project create energy utility (electricity, natural gas, propane) system capacity problems, or result in the construction of new energy facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?**

***Less Than Significant Impact.*** The proposed Project would not require natural gas or propane; however, it would require the use of local SCE facilities to deliver electricity for construction and on-going maintenance operations. The proposed solar facility would be capable of generating up to 20 MWac of electricity under peak solar conditions. The power generated by the proposed Project would be delivered to the existing grid via the Grid-Tie and the voltage transformation equipment and system safety equipment constructed on site. The Project would not result in system capacity problems, but would rather help alleviate the demand for traditional sources of electricity. Therefore, impacts to energy utility system capacity would be less than significant.

**f) Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?**

**g) Would the project comply with federal, state, and local statutes and regulations related to solid waste?**

***Less Than Significant With Mitigation.*** The proposed Project would result in the generation of minor amounts of construction wastes, which would require disposal at the Lancaster Landfill. A CUP was recently adopted that increased the landfill's maximum permitted daily capacity of 3,000 tons per day (tpd) (LACDRP 2011a).

The County adopted an ordinance, effective March 6, 2005, that requires all construction projects to recycle a portion of the generated construction wastes. The ordinance amends Title 20 of the Los Angeles County Code by adding Chapter 20.87 (Construction and Demolition [C&D] Debris Recycling and Reuse), which requires all construction projects to recycle or reuse a portion of all C&D debris, soil, rock, and gravel removed from a Project site unless a lower percentage is approved by the Director of LACDPW. The Project shall comply with the standards that are in effect at the time of the permit issuance (either grading permit or building permit, whichever occurs first). All waste generated during construction of the proposed Project would be handled and disposed of in compliance with all applicable federal, State, and local statutes and regulations related to solid waste. MM UTIL-1 requires that the Project Applicant prepare a Recycling and Reuse Plan (RRP) and submit the document for review and approval with the Los Angeles County Department of Public Works Environmental Programs Director. In addition, MM HAZ-1 (from Section 4.9, Hazards and Hazardous Materials) requires that hazardous materials encountered on site be handled and disposed of in accordance with applicable laws. Therefore, with implementation of MM UTIL-1 and MM HAZ-1, there would be less than significant impacts related to landfill capacity and solid waste regulations.

Solid wastes generated by employees and other on-site activities during long-term Project O&M activities (i.e., panel cleaning and vegetation management) would be minimal. The long-term solid waste stream would not be large enough to require any measurable landfill capacity. Impacts would be limited and temporary during construction and are considered less than significant.

As required by the County, a Decommissioning Plan would be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan would ensure the land is returned to its pre-developed state upon termination of the use of the land as a solar site (which would be in 20 years at the earliest). It would include details regarding equipment removal and disposal. It is anticipated that most of the equipment, including solar modules, mounting poles, beams, fencing, conduit, and other electrical equipment would have value and could be sold or recycled. Any remaining construction waste would be disposed of in accordance with applicable policies and regulations at that time.

### 4.18.3 MITIGATION MEASURES

**MM UTIL-1** Construction activities on the Project site shall be conducted in compliance with Chapter 20.87 (Construction and Demolition Debris Recycling and Reuse) of the Los Angeles County Code. Therefore, a Recycling and Reuse Plan (RRP) must be submitted to the Los Angeles County Department of Public Works, Environmental Programs Division, prior to permits (grading or building, whichever comes first) being issued for the Project.

Implementation of this mitigation measure would reduce impacts to less than significant levels.

| **4.19 MANDATORY FINDINGS OF SIGNIFICANCE** | **Potentially Significant Impact** | **Less Than Significant With Mitigation** | **Less Than Significant Impact** | **No Impact** |
|---|---|---|---|---|
| **Does the project:** | | | | |
| a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? | ☐ | ☒ | ☐ | ☐ |
| b. Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals? | ☐ | ☐ | ☐ | ☒ |
| c. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? | ☐ | ☒ | ☐ | ☐ |
| d. Does the project have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ☐ | ☒ | ☐ |

### 4.19.1 EXISTING CONDITIONS

The Project site is undeveloped, with the exception of the SCE TRTP transmission lines, and does not generate any environmental impacts aside from nuisance dust during high winds.

### 4.19.2 PROJECT IMPACTS

The impact analysis and conclusions in this section apply to both on-site and off-site activities.

**a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?**

***Less Than Significant with Mitigation.*** As discussed in Section 4.4, Biological Resources, only two special status wildlife species are expected to occur on the Project site, including the western burrowing owl and Swainson's hawk. The Project has the potential to impact these species, but with implementation of MM BIO-1 and MM BIO-2, impacts on these sensitive biological resources would be reduced to less than significant levels. Project implementation would not substantially affect regional wildlife or interfere substantially with the movement of any native resident or migratory fish or wildlife species in open areas surrounding the site, nor would it impede the use of native wildlife nursery sites. Any potential impacts to jurisdictional features

would be mitigated to a level considered less than significant with implementation of MM BIO-3 and MM BIO-4. There are no oak trees or other unique native trees on the Project site. Active nests of birds and raptors are protected by the MBTA and *California Fish and Game Code.* Implementation of MM BIO-6 would reduce potential impacts to nesting birds to less than significant levels. Therefore, with the incorporation of mitigation measures, the Project does not have the potential to degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of Rare or Endangered plants or animals.

As discussed in Section 4.5, Cultural Resources, there would be no impacts to known historic, archaeological, or paleontological resources. Potential impacts to unknown cultural resources and potential impacts to human remains from implementation of the proposed Project would be mitigated to less than significant levels with the implementation of MM CUL-1, MM CUL-2, and MM CUL-3. Therefore, with the incorporation of mitigation measures, the Project does not have the potential to eliminate important examples of the major periods of California history or prehistory.

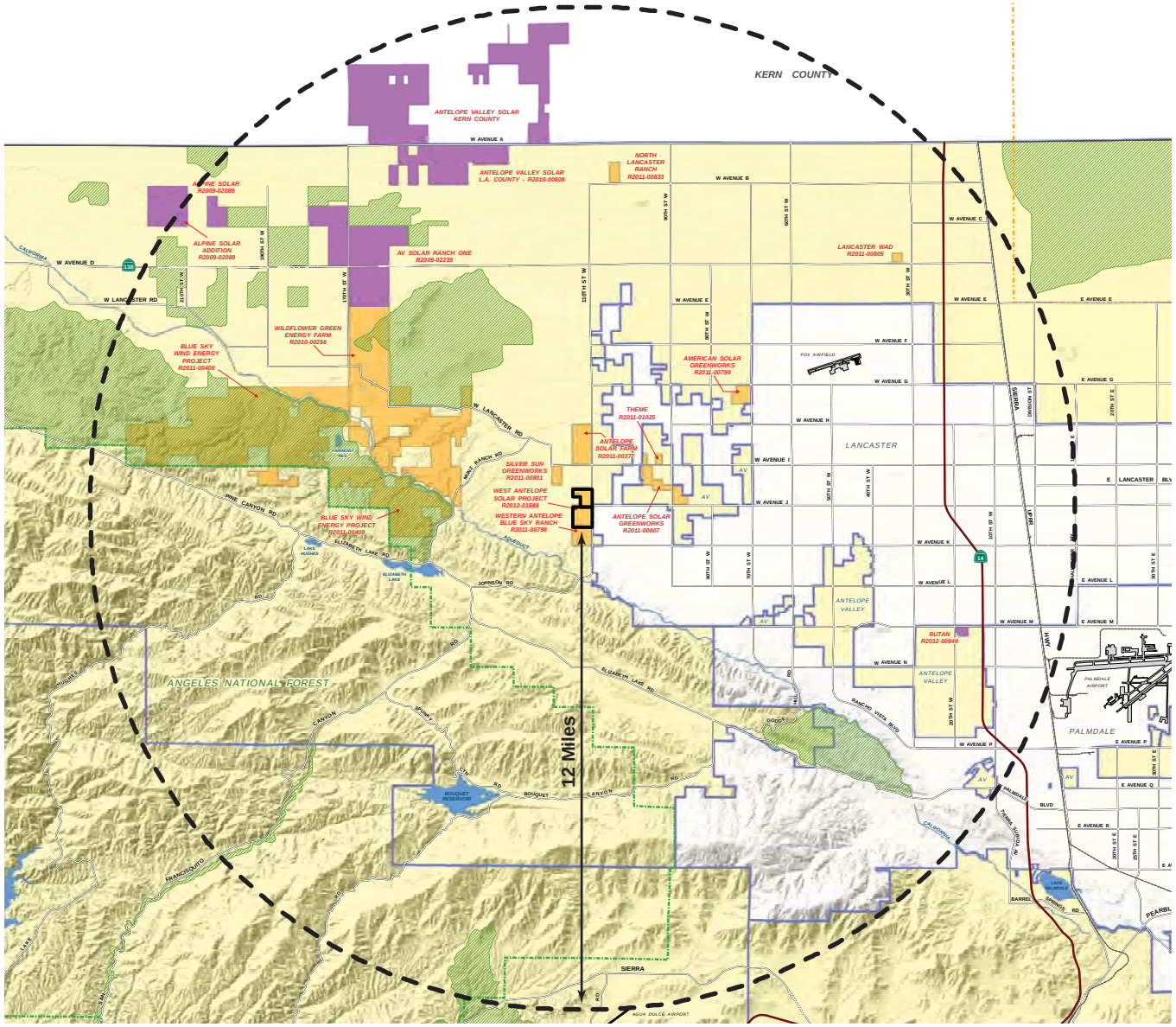
**b) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?**

***No Impact.*** The proposed Project would achieve short-term environmental goals related to the creation of renewable energy and the offset of demands for fossil fuels, in support of local and State policy. As a part of the Project, a Decommissioning Plan will be prepared and submitted for approval to Los Angeles County prior to the issuance of a grading permit for the Project. The Plan will ensure the land is returned to a beneficial use upon termination of the use of the land as a solar site. Therefore, the Project would not result in any negative impacts to long-term environmental goals.

**c) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?**

***Less Than Significant with Mitigation.*** For the purposes of the cumulative analysis related to the majority of environmental topics, a 3-mile radius from the center of the Project site was chosen to encompass the area of impact for residents near the Project site. As summarized in Table 4-19, Cumulative Project Within 3 Miles of the Project Site, a total of 11 solar energy projects are currently proposed within a 3-mile radius of the proposed Project. Three of these projects are located within the unincorporated County of Los Angeles and are associated with the Silverado Power Solar Project. The remaining eight are located within the City of Lancaster.

Exhibit 4-16, Cumulative Projects - Unincorporated Los Angeles County, includes a graphic that depicts planned and approved solar energy projects within an approximately 12-mile radius of the Project site. As shown, there are numerous projects under consideration in the region, as well as projects that have been approved.




PROJECT BOUNDARY

12 MILE BUFFER OF PROJECT

FREEWAY

MAJOR ROAD

RAILROAD

AIRPORT

MAJOR LAKE, AQUEDUCT

MAJOR RIVER BED, WASH

INCORPORATED CITY

UNINCORPORATED COMMUNITY

OTHER COUNTIES

EDWARDS AIR FORCE BASE

NATIONAL FOREST

ADOPTED SEA

**APPROVED PROJECTS (5); GROSS ACRES: 4,218 ***

| | |
|---|---|
| R2009-02089 | ALPINE SOLAR |
| R2009-02089 | ALPINE SOLAR ADDITION |
| R2009-02239 | AV SOLAR RANCH ONE |
| R2010-00808 | ANTELOPE VALLEY SOLAR - LACO |
| R2012-00849 | RUTAN |

**PENDING PROJECTS (18); GROSS ACRES: 13,442**

| | |
|---|---|
| R2010-00256 | WILDFLOWER GREEN ENERGY FARM |
| R2011-00377 | ANTELOPE SOLAR FARM |
| R2011-00408 | BLUE SKY WIND ENERGY |
| R2011-00798 | WESTERN ANTELOPE BLUE SKY RANCH |
| R2011-00799 | AMERICAN SOLAR GREENWORKS |
| R2011-00801 | SILVER SUN GREENWORKS |
| R2011-00804 | EAST LANCASTER RANCH |
| R2011-00805 | LANCASTER WAD |
| R2011-00807 | ANTELOPE SOLAR GREENWORKS |
| R2011-00833 | NORTH LANCASTER RANCH |
| R2011-01025 | THEME |
| R2011-01027 | VANDIVER |
| R2011-01029 | BEAZEL |
| R2011-01030 | OWEN |
| R2011-01033 | RUSSELL |
| R2012-00024 | QUAIL LAKE PHOTOVOLTAIC SOLAR |
| R2012-01559 | CHAHIN |
| R2012-01589 | WEST ANTELOPE SOLAR PROJECT |

* ACREAGE TOTAL DOES NOT INCLUDE APPROVED PROJECT IN KERN COUNTY.

HILLSHADE: LOS ANGELES REGION IMAGERY ACQUISITION CONSORTIUM (LAR-IAC), 2006

MILES 0 1 2 3 4

Source: County of Los Angeles, Department of Regional Planning

D:\Projects\TAAC\J001\Graphics\Ex_energy_projects.ai

# Cumulative Projects– Unincorporated Los Angeles County

Exhibit 4–16

*West Antelope Solar Energy Project*

N W E S

BonTerra CONSULTING

(CJS 07/29/13) R:\PAS\Projects\TAAC\J001\Graphics\IS-MND\Ex_energy_projects.pdf

**TABLE 4-19**
**CUMULATIVE PROJECTS WITHIN THREE MILES OF THE PROJECT SITE**

| No. | Project Name (Case Number) | Location | Acres | MW |
|---|---|---|---|---|
| **County of Los Angeles Projects** | | | | |
| 1 | Western Antelope Blue Sky Ranch* (R2011-00798) | 110th St West and W. Ave K | 157 | 40 |
| 2 | Antelope Solar Greenworks* (R2011-00807) | 97th St West and W. Ave I | 256 | 52 |
| 3 | Silver Sun Greenworks* (R2011-00801) | 120th St West and W. Ave I | 80 | 20 |
| **City of Lancaster Projects** | | | | |
| 4 | CUP 10-22 | Bound by Ave H, Ave H-8, 80th St West and 90th St West | 180 | 38 |
| 5 | CUP 11-02 | East side of 90th St West between Ave K-8 and Ave K-12 | 17.74 | 3.4 |
| 6 | CUP 11-03 | Southwest corner of Ave H and 90th St West | 67 | 10 |
| 7 | CUP 11-05 | East side of 80th St West between Ave J-4 and Ave J-8 | 80 | 20 |
| 8 | CUP 11-07 | Southeast corner of Avenue J and 110th St West | 40 | 10 |
| 9 | CUP 12-08 | Bound by Ave H, Ave G, 90th St West and 95th St West | 135 | 20 |
| 10 | CUP 12-09 | Southwest corner of Ave H and 100th St West | 158 | 40 |
| 11 | CUP 12-15 | Roughly bound by Ave F, Ave H, 95th St West, and 110th St West | ±1000 | 330 |

MW: megawatts

* Associated with the Silverado Power Solar Project.

Source: LACDRP 2012a; Lancaster 2013.

Project No. 1 is located directly south of and adjacent to the southern boundary of the proposed Project site. Project No. 2 is located to the northeast of the Project site. Project No. 3 is located northwest of the Project site on West Avenue I. According to the Notice of Preparation issued for the Silverado Power West Los Angeles County projects, construction of their projects under review are anticipated to be providing power to the electrical grid in late 2013 (LACDRP 2012a). Therefore, construction-related impacts associated with the Silverado Power related-projects, including Projects Nos. 1, 2, and 3, are not anticipated to occur at the same time as the proposed Project, which is scheduled to begin construction in the fall of 2013. However, if the Silverado Power projects are delayed, construction schedules may overlap.

As discussed in *Section 4.1, Aesthetics*, no mitigation was required for short-term impacts due to Project construction; however, mitigation was required for long-term impacts associated with the operation of the Project. With mitigation, all direct Project-related impacts would be less than significant. However, as shown on Exhibit 4-16 and listed in Table 4-19, the western Antelope Valley has a considerable number of proposed or approved solar and wind energy projects in the vicinity of the proposed Project. Residents near of the Project site (e.g. within 3 miles) would be most affected by visual impacts, but residents of the western Antelope Valley could also be affected by cumulative changes to the aesthetics of the region. If the projects shown on Exhibit 4-16 and listed in Table 4-19 were to be approved and constructed, these cumulative solar and wind energy projects would alter the visual character of the area by increasing the amount of

developed land with utility-related uses. The determination of whether the addition of solar developments in the western Antelope Valley would result in detrimental, neutral, or positive effects to aesthetics and visual character is subjective. Some viewers of the cumulative projects may determine that they would contribute to and/or help define the Antelope Valley as being on the forefront of the nation's clean energy initiative, while other viewers may determine that the change from rural open space to development would be a detrimental alteration to the visual qualities of the area. Under either opinion, it can be stated that the open space character of the area would be visually altered.

Currently, the portion of the western Antelope Valley area that includes the Project site is very sparsely populated; therefore, relatively few residents would see these facilities on a daily basis. There are no nearby destinations, with the exception of the unbuilt Poppy Trail, that could attract people to the area. Therefore, the cumulative change from rural open space to solar and wind energy development would be experienced by relatively few individuals. Additionally, per the Los Angeles County Code, electric generating plants are a conditionally allowed use in the Heavy Agricultural (A-2-5) zone upon obtaining a CUP, which shows that the County considers it to be a conditionally compatible use in the zone. A typical electric generating plant that would have been developed at the time of the Antelope Valley Area Plan's adoption in 1986 would have been more industrial in character than the typical solar array. Further, "utility and communication installations" are allowed uses in the Non-Urban 1 land use category of the Antelope Valley Areawide General Plan (LACDRP 1986). There is existing electrical infrastructure in the area, including the SCE TRTP transmission lines and the Antelope Substation. As it is a sparsely developed rural area that has appropriate weather patterns and temperatures for this type of project, the western Antelope Valley has been determined to be an appropriate location for operation of solar facilities and the utility-related function and aesthetic of the proposed Project. This part of the High Desert is characterized as a cold semi-arid steppe climate (Köppen climate classification *BSh*), which is less hot and more rainy than a typical arid climate classification. On average, there are between 281-300 sunny days per year in the Lancaster-Palmdale area (WeatherSpark 2013).

However, the cumulative loss of open space and conversion to industrial uses in the western Antelope Valley could be considered to be a cumulatively considerable aesthetic impact and/or a significant degradation to the character of the Project's surrounding area. As discussed below, MM CML-1 mandates that areas disturbed by Project implementation, including graded areas and areas covered by the solar arrays, shall be replaced at a minimum 1:1 ratio with open space land within the western Antelope Valley of a comparable biological value. The replacement lands must be preserved as open space in perpetuity. Compliance with MM CML-1 would ensure that the Project's contribution to the cumulative loss of open space in the western Antelope Valley would be less than significant.

As discussed in <u>*Section 4.2, Agriculture and Forestry Resources*</u>, no mitigation was required for either short-term or long-term impacts due to Project implementation. Implementation of the Project would not have a cumulatively considerable effect on the conversion of agricultural land to non-agricultural uses because (1) there are no active agricultural activities on the Project site; (2) the site does not contain FMMP-designated Farmland; and (3) is not under a Williamson Act contract. Conversion of Other Land or Grazing Land to non-agricultural uses is not considered a significant impact under CEQA. Even with implementation of the Project and the related projects listed in Table 4-19, there would only be a reduction of 0.44 percent of the total Grazing Land in Los Angeles County. As identified in the draft *Antelope Valley Areawide General Plan Update*, Policy COS 7.3 supports the use of alternative and renewable energy systems in conjunction with agricultural activities (LACDRP 2011b).

As discussed in *Section 4.3, Air Quality*, no mitigation was required for long-term impacts; however, mitigation was required for short-term construction impacts due to soil disturbance and dust generation. The study area for cumulative impacts related to air quality is the larger Mojave Desert Air Basin. According to the Notice of Preparation issued for the Silverado Power West Los Angeles County projects, construction of their projects are anticipated to be providing power to the electrical grid in late 2013, but if delays occur, those projects have the potential to overlap with the proposed Project's construction. The Project's contribution of NOx during construction, which is the highest pollutant emission (as shown in Table 4-4), is less than half of the AVAQMD threshold, and all other emissions (e.g., VOC, CO, SOx, PM10, and PM2.5) are negligible when compared to the AVAQMD thresholds. Additionally, construction activities would be short-term (i.e., approximately six months in duration). Cumulative construction particulate (PM10 and PM2.5) impacts are considered when projects may be within a few hundred yards of each other because of (1) the combination of the short range (distance) of particulate dispersion (especially when compared to gaseous pollutants) and (2) the AVAQMD's required dust control measures, which further limit particulate dispersion from a project site. The Silverado Power West Los Angeles County projects have multiple sites within close proximity to the proposed Project site. Compliance with AVAQMD Rule 403, Fugitive Dust, for controlling fugitive dust is mandatory for all projects, including the Silverado Power West Los Angeles County projects. Additionally, AVAQMD Rule 403 requires the Project Applicant to prepare a Dust Control Plan that includes requirements for minimal grading, vehicle use, construction scheduling, water application, soil binders/wood mulch, stock piles stabilization, final stabilization, and monitoring. Therefore, due to mandatory compliance with AVAQMD Rule 403 for all projects, the Project's dust generation and emissions would not be cumulatively considerable when considered in combination with other proposed projects in the Project vicinity. Long-term operations would generate a negligible amount of air pollutants, as shown in Table 4-5 and would not be cumulatively considerable. Emissions would not be cumulatively considerable.

As discussed in *Section 4.4, Biological Resources*, potential impacts related to western burrowing owl would be mitigated through implementation of MM BIO-1; potential impacts related to Swainson's hawk would be mitigated through implementation of MM BIO-2; potential impacts related jurisdictional features would be mitigated through implementation of MM BIO-3 and MM BIO-4; and potential impacts related to migratory and/or nesting birds would be mitigated through implementation of MM BIO-6.

The study area for cumulative impacts on Biological Resources includes the western Antelope Valley, which could be impacted by changes in plant and animal habitats in due to increasing urbanization and population growth in the region. Although project level impacts are considered less than significant, the County of Los Angeles generally considers the cumulative loss of lands potentially utilized by common and special status bird species to be a potentially significant cumulative impact. The Project contributes to the general loss of potential habitat for a variety of bird species; therefore, impacts on biological resources are considered to be cumulatively considerable prior to mitigation. MM CML-1 mandates that areas disturbed by Project implementation, including graded areas and areas covered by the solar arrays, shall be replaced at a minimum 2:1 ratio with open space land within the western Antelope Valley of a comparable biological value.

A Memorandum prepared by BonTerra Consulting and included in Appendix C-5 of this document provides a detailed analysis of the post-construction biological value of the Project site and assesses the appropriate amount of mitigation land required for Project impacts. Mitigation lands may occur on-site and off-site, must be located within the Project region (i.e. western Antelope Valley), and must be located as close to the Project site as feasible. Based on the assessment provided in the Memorandum, 16.27 acres of off-site mitigation land, in addition to the on-site open space areas to be preserved, is required. Mitigation lands must be preserved

with a conservation easement or other form of legal dedication in perpetuity, or until the Project site is restored to its pre-developed conditions per the requirements of the approved Decommissioning Plan. Lands may be deeded to a land management-conservation entity with prior approval from the County. Mitigation lands and deeds or conservation easements proposed shall be approved by the County prior to issuance of grading permits.

Although the Project site would be subjected to minimal grading, the installation of the arrays would still require the use of vehicles, intense foot traffic, and the possible use of dust palliatives, all of which could result in a decreased potential for vegetative recovery through changes in soil structure and trampling of vegetation. As such, the continued presence of on-site vegetation within the fenced area after construction is key to ensure that cumulative impacts will be less than significant. MM CML-2 requires the approval of a Habitat Mitigation and Monitoring Plan (HMMP) that details the steps for the restoration of any disturbed areas after construction, and a Construction Staging Plan (CSP) that details access routes, storage areas, and panel installation methods. A biological monitor will be present for documenting adherence to the CSP during construction.

Other new developments within the western Antelope Valley would also need to conduct biological surveys and provide the required on-site preservation or off-site mitigation in coordination with the CDFW, the USFWS, the USACE, and the RWQCB. Thus, while changes in the biological diversity of the western Antelope Valley could occur with future growth and development, with the implementation of MM CML-1, MM CML-2, and compliance with applicable programs and regulations, cumulative impacts would be less than significant.

As discussed in *Section 4.5, Cultural Resources*, potential impacts related to archaeological resources would be mitigated through implementation of MM CUL-1; potential impacts related to paleontological resources would be mitigated through implementation of MM CUL-2; potential impacts related to human remains would be mitigated through implementation of MM CUL-3. Due to the site-specific nature of cultural resources, it is difficult to determine if significant cumulative impacts to cultural resources would occur on other individual development sites in the region. Since cultural resources are site-specific, and the Project site is not located within a historic zone and has no historic resources, no cumulative significant adverse impacts are expected from future developments with implementation of site-level surveys and mitigation outlined as part of cultural resource studies for individual development projects. The implementation of the proposed Project and the mitigation measures outlined above would prevent adverse impacts on cultural resources on the site. Thus, the Project would not have a cumulative contribution to the disturbance and/or destruction of cultural resources in the Antelope Valley.

As discussed in *Section 4.6, Energy*, operation of the Project would generate renewable energy, decreasing California's reliance on fossil fuel energy as a function of total energy demand. The other renewable energy projects listed in Table 4-19 above would also achieve this objective. Renewable energy projects are not wasteful or excessive in terms of fossil fuel consumption needed for land development because their installation and decommissioning generally requires only typical equipment, involves minimal grading, and has a relatively short construction/demolition period. Because the long-term generation of renewable energy would be expected to exceed the equivalent fossil fuel energy consumed in its construction and operations, there would be a net beneficial impact on energy. Further, the use of fossil fuels during the Project's construction and decommissioning periods, in combination with the same periods for the cumulative projects in the Antelope Valley, would not result in a significant cumulative impact on energy, such as interfering with the availability of fuel and/or requiring the development of new or expanded fossil fuel refining facilities. Therefore, Project construction,

operation, and decommissioning would result in a net beneficial impact to energy and would not be cumulatively considerable.

As discussed in *Section 4.7, Geology and Soils*, no mitigation was required for and long-term impacts due to Project implementation. As required by the County, the Project would be designed and built in compliance with the CBC, as well as any recommendation contained in the site-specific geotechnical report. Geology and soils impacts are generally site specific and there is typically little, if any, cumulative relationship between the development of a proposed Project and development within a larger cumulative area. For example, development at the Project site would not alter geologic events or soil features/characteristics (such as ground shaking, seismic intensity, or soil expansion) at other locations; therefore, the Project would not result in cumulatively considerable impacts.

As discussed in *Section 4.8, Greenhouse Gas Emissions*, no mitigation was required for either short-term or long-term impacts due to Project implementation. Construction-related emissions would be negligible and the implementation of the Project would result in a long-term operational net regional or global reduction of GHG emissions compared with the existing conditions. The cumulative projects would also be achieving these reductions and together with the proposed Project would help achieve the goals set forth by the Renewable Portfolio Standard and result in the displacement of GHG emissions from fossil fuel power plants. Potential cumulative impacts of the proposed Project with other renewable energy projects proposed in the Project region would be considered to be beneficial and result in a combined reduction in GHG emissions. The proposed Project alone would be expected to reduce $CO_2e$ emissions by approximately 9,680 tons of $CO_2e$/yr. Therefore, impacts to GHG emissions would be beneficial and not cumulatively considerable.

As discussed in *Section 4.9, Hazards and Hazardous Materials*, potential impacts related to the handling of hazardous materials would be mitigated through MM HAZ-1 and MM HAZ-2; potential impacts related to soil contaminants would be mitigated through implementation of MM HAZ-3 and MM HAZ-4; restrictions on the use of on-site cleaning agents would be mitigated through implementation of MM HAZ-5; potential impacts to airport safety would be mitigated though implementation of MM AES-3. As required by the County, construction traffic would be managed in compliance with Caltrans 2010 *California Manual on Uniform Traffic Control Devices* and applicable City of Lancaster requirements to limit roadway obstruction and the need for temporary detours. Although the cumulative projects listed also have potential impacts associated with hazardous materials, the environmental concerns associated with hazardous materials are site specific. Each project is required to address any issues related to hazardous materials or wastes. Federal, State, and local regulations require mitigation to protect against site contamination by hazardous materials. Therefore, there would be no cumulative hazards and hazardous materials impacts.

As discussed in *Section 4.10, Hydrology and Water Quality*, no mitigation was required for either short-term or long-term impacts due to Project implementation. As required by the County, the Project would implement surface runoff water quality BMPs, both during construction and post-development, to comply with adopted regulatory requirements that are designed by the RWQCB to ensure that regional development does not adversely affect water quality and hydromodification in receiving streams, including the water quality plan/hydrology requirements of the adopted MS4 permit and the LACDPW *2009 Low Impact Development (LID) Standard Manual* and LACDPW *2006 Sedimentation Manual* requirements. Therefore, the Project's incremental contribution to cumulative surface water quality impacts is not significant. The Project would have no impact on the Antelope Valley Groundwater Basin. All new developments within the County are required to provide on-site BMPs and storm drainage systems and/or upgrades to prevent the creation of flood hazards on each project site and to

downstream areas. The County's LID Requirements also mandate on-site retention of storm water runoff from the Project over existing conditions. Any future development occurring in the area must also comply with these requirements. Therefore, no cumulatively considerable adverse effects would occur related to alteration of a course of a stream, substantial erosion or siltation, creation of flooding, or the need for storm drain system upgrades would occur.

As discussed in *Section 4.11, Land Use and Planning*, no mitigation was required for either short-term or long-term impacts due to Project implementation. The Project is consistent with the Antelope Valley Areawide Plan and would not require a general plan amendment or zone change. As with the proposed Project, previously approved and future development within the County is required to comply with the adopted land use plans, policies, and ordinances set forth in the General Plan and the Zoning Ordinance, as well as any other applicable planning documents, and be compatible with surrounding land uses. Considering the mix of existing surrounding land uses (i.e., open space, rural development, agriculture, utility infrastructure) and the potential for approvals of future solar facilities in the Project vicinity, implementation of the Project would be generally compatible with the character of the existing surrounding land uses. The utility-related function and aesthetic of the proposed Project would not substantially degrade the character of the surrounding area.

Implementation of the proposed Project would not divide an established community; would be in compliance with the County land use standards, including policies related to non-residential uses in non-urban areas; and is considered to be compatible with the land uses in the vicinity of the Project site. However, the County of Los Angeles generally considers the cumulative loss of open space lands potentially utilized by common and special status bird species to be a potentially significant cumulative impact. The Project contributes to the general loss of open space in the western Antelope Valley; therefore, cumulative impacts related to the reduction in compatible land uses and the losses of open space are considered to be cumulatively considerable prior to mitigation. MM CML-1 mandates that areas disturbed by Project implementation, including graded areas and areas covered by the solar arrays, shall be replaced at a minimum 1:1 ratio with open space land within the western Antelope Valley of a comparable biological value. The replacement lands must be preserved as open space in perpetuity. Other new developments within the western Antelope Valley would also need to account for a loss of open space. Thus, while changes in the quantity of open space within the western Antelope Valley could occur with future growth and development, with the implementation of MM CML-1, this cumulative impact would be less than significant.

As discussed in *Section 4.12, Mineral Resources*, no mitigation was required for either short-term or long-term impacts due to Project implementation. The Project is not designated as a mineral resource area by the County or the State. According to the State Department of Conservation, the Project site has never been used for mineral recovery or mining activities and no designated, regionally significant mineral resources are on or near the Project site. Therefore, there would be no cumulative mineral resource impacts.

As discussed in *Section 4.13, Noise*, no mitigation was required for either short-term impacts or long-term impacts due to Project implementation. As required by the County, Project construction activities be conducted in compliance with the County's construction noise standards. As previously discussed, construction activities of other cumulative projects have the potential to overlap with the proposed Project's construction. Overlapping construction activities could increase noise in the Project vicinity, but this increase would not be cumulatively considerable due to the distance between the cumulative Projects and the nearest sensitive receptors. The nearest residential receptor is approximately 700 feet east of the Project site. When pile driving would occur at the eastern boundary of the Project site, the noise attenuation from the equipment to the residence would be approximately 29 dBA, and the $L_{max}$ at the

residence would be 66 dBA, which is less than the 75 dBA threshold of significance. Any cumulative project construction activity would be hundreds of feet further away, would be temporary in nature, and would not result in cumulatively considerable construction noise. Operational noise associated with the Project is negligible and would not be cumulatively considerable.

As discussed in *Section 4.14, Population and Housing*, no mitigation is required for either short-term or long-term impacts due to Project implementation. The Project would have no residential uses and would not materially affect local or regional population projections, similar to the cumulative solar projects. Therefore, there would be no cumulative impacts related to population or housing.

As discussed in *Section 4.15, Public Services*, no mitigation is required for short-term and long-term impacts due to Project implementation. The Project would comply with the Los Angeles County Code's Title 32, Fire Code, and regulations of the Los Angeles County Fire Department, which include standards for building construction, emergency access, fire flow, water mains, and fire hydrants. In general, cumulative impacts on Public Services occur with increasing demands for police and fire protection services from the Project; from cumulative projects; and from other planned developments in the service areas of the LACFD and the LACSD. All other cumulative projects are required to comply with pertinent provisions of the County Fire Code to prevent the creation of fire hazards, to promote fire safety, and to facilitate emergency response. The LACFD and the LACSD, which also serve Lancaster, regularly review their services and the needed increases in staffing, fire stations, and equipment, as necessary, to keep response times acceptable and to adequately serve their service areas. Additionally, the proposed Project would not involve the creation of new habitable structures or new population growth that could generate increased demand for fire or police protection services; therefore, project implementation would not result in cumulatively considerable impacts.

As discussed in *Section 4.16, Recreation*, mitigation was required for long-term impacts due to Project implementation. MM REC-1 requires the Project Applicant shall design and construct an eight foot (8') wide trail along the eastern boundary of the Project site, in a manner consistent with the *County of Los Angeles Trails Manual*, to form part of Los Angeles County Trail Number 130 (California Poppy Trail) on the Los Angeles County Trails Map, which would be a benefit to recreation. The proposed Project would not directly or indirectly result in housing development or population growth on the site or in the Project area that could impact recreation amenities. With the creation of a portion of the Poppy Trail, Project implementation would have a positive impact on cumulative recreational resources in the region. With no new households or residents, the Project would not increase the use of local parks, nor would it create a demand for local or regional recreational facilities and there would be no cumulative impacts.

As discussed in *Section 4.17, Transportation and Traffic*, no mitigation was required for either short-term or long-term impacts due to Project implementation. Primary vehicular access to the site is provided via West Avenue J from the City of Lancaster to the east. There is capacity on local streets near the site, which are all operating at LOS A, to handle the traffic volume increases due to Project construction traffic, as well as cumulative solar project construction traffic, as it is anticipated that the proposed Project will be fully constructed and operational (by mid-2014) before the cumulative projects break ground. While it is unknown what the future traffic conditions will be, the long-term operation of the Project, as well as nearby cumulative solar projects, would result in negligible traffic generation, and impacts would not be cumulatively considerable.

As discussed in *Section 4.18, Utilities and Service Systems*, the Project would comply with County requirements for "Sanitation Facilities at Remote Worksite Locations"; that the Project utilizes water derived from sources outside of the Antelope Valley Groundwater Basin, ensuring no cumulative impacts related to water supply; and that no permanent irrigation system is installed to maintain landscaping, further reducing water demand. Additionally, MM UTIL-1 requires construction activities on the Project site to be conducted in compliance with Chapter 20.87 (Construction and Demolition Debris Recycling and Reuse) of the Los Angeles County Code, which requires at least 50 percent of all Collection and Demolition (C&D) debris, soil, rock, and gravel removed from the Project site to be recycled or reused.

Other cumulative projects in the region would have the same long-term O&M activities as the proposed Project, which is expected to general minimal amounts of waste and wastewater. All projects would be required to implement the same measures related to workplace sanitation and water-sourcing restrictions, as well as waste disposal requirements. The proposed Project would not result in new households or habitable structures that could generate long-term demands for utilities, and because all cumulative projects would be required to implement similar measures and comply with water use restrictions, impacts to utilities and service systems would not be cumulatively considerable.

**d) Does the project have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly?**

***Less Than Significant Impact.*** Project construction and operation does not have the potential to generate significant adverse impacts on human beings and no mitigation would be required for the topical issues related to human health, including air quality, hydrology and water quality, noise, or transportation and traffic. Mitigation measures were required for potential impacts associated with hazards and hazardous materials, which would be mitigated to a less than significant level.

### 4.19.3 MITIGATION MEASURES

**MM CML-1** Prior to the issuance of a grading permit, Project Applicant shall provide dedicated open-space lands at a minimum 2:1 ratio of replacement for the lands disturbed by Project implementation. The acreage of impacted lands requiring mitigation was calculated to include all graded areas, as well as areas covered by the solar array panels and appurtenant facilities. A total of 152.02 acres of mitigation land shall be provided by the Project Applicant, with 135.75 acres to be provided on-site and 16.27 acres to be acquired off-site. Off-site mitigation lands must be located within the Project region (i.e. western Antelope Valley) and shall be located as close to the Project site as feasible. The vegetation types, overall biological value, and the condition of mitigation lands shall be comparable to those found on the impacted lands on the Project site. Maintenance of such lands shall be the responsibility of the Project Applicant and the mitigation lands must be maintained to ensure conditions and general biological value remain consistent over time. Mitigation lands shall be preserved with a conservation easement or other form of legal dedication in perpetuity, or until the Project site is restored to its pre-developed conditions per the requirements of the approved Decommissioning Plan. Lands may be deeded to a land management-conservation entity with prior approval from the County. Mitigation lands and deeds or conservation easements proposed shall be approved by the County prior to issuance of grading permits.

Within 60 days of recordation of the permanent deed restriction(s) or conservation easement(s), a Maintenance Plan for the off-site mitigation lands shall be submitted to the County for review and approval. The plan shall include the maintenance requirements for the mitigation area, based on the characteristics of the mitigation land and the mitigation requirements described above. The Maintenance Plan shall also describe the performance standards for determining that mitigation requirements for the lands have been met.

**MM CML-2** Prior to CUP approval, an approved Habitat Mitigation and Monitoring Plan (HMMP) shall be submitted for review and approval to the County. Prior to the issuance of a grading permit, a Construction Staging Plan (CSP) shall be submitted for review and approval to the County.

The HMMP will detail steps proposed for the restoration of disturbed areas in the event that the as-built plan reveals the need for restoration after construction. Criteria upon which the MND's biological impacts analysis was based shall form the basis for the formulation of performance goals in the HMMP. The HMMP shall include a five-year annual reporting program to document the site's recovery towards these expected criteria, and shall include provisions for adaptive management contingencies if adequate re-vegetation has not occurred within a three year period from energization. The CSP will detail access routes, storage areas, high-traffic areas, and methods for the installation of the panels and other equipment in non-graded areas.

The biological monitor will be responsible for documenting adherence to the CSP during the construction phase of the project. A post-construction "as-built" plan will be required prior to energization of the project, which shall detail areas of disturbance needing further restorative work in order to meet the expected criteria upon which the biological and cumulative impacts analyses were based.

After the five year monitoring period has elapsed, the mitigation may be deemed complete if the performance goals have been satisfied. Further mitigation may be required, subject to enforcement penalties, if the performance goals have not been met. If after the five-year monitoring period has elapsed, it is determined that revegetation of the site or portions thereof is not possible, mitigation in the form of off-site land acquisition shall be provided at a 2:1 ratio for the unrestorable area.

Maintenance of the site in keeping with performance goal criteria shall be a condition of the CUP, subject to enforcement penalties, and shall be confirmed through a requirement in the project MMRP that annual reporting shall continue for the life of the project.

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# APPENDIX A

# AIR QUALITY AND GREENHOUSE GAS WORKSHEETS

# West Antelope Solar
IS/MND

Appendix A
AQ Worksheets
August 2012


A.1 Construction Impacts

A.2 AVAQMD Rule 403 (Fugitive Dust) Control Requirements

A.3 Operation Impacts

A.4 Greenhouse Gas Emissions Displacement Calculations

# Appendix A.1

## Construction Impacts

- Regional Construction Emissions
- Detailed Construction Assumptions
- Offroad Emissions Calculations
- Onroad Emissions Calculations
    - Delivery Truck Trips
    - Haul Truck Trips
    - Worker Commute Trips
- On-Site $PM_{10}$ Calculations

## 2013 CONSERVATIVE ESTIMATE OF UNMITIGATED CONSTRUCTION EMISSIONS (tons per year)

| | ROC | $NO_X$ | CO | $SO_X$ | $PM_{10}$[a] | $PM_{2.5}$[a] | $CO_2e$ |
|---|---|---|---|---|---|---|---|
| **Grading Emissions** | | | | | | | |
| On-site Total | 0.16 | 1.30 | 0.80 | 0.00 | 0.26 | 0.10 | 140.87 |
| Fugitive Dust | - | - | - | - | 0.20 | 0.04 | - |
| Off-Road Diesel | 0.16 | 1.30 | 0.80 | 0.00 | 0.07 | 0.06 | 140.87 |
| Off-site Total | 0.02 | 0.43 | 0.11 | 0.00 | 0.02 | 0.02 | 98.49 |
| On-Road Diesel | 0.02 | 0.43 | 0.11 | 0.00 | 0.02 | 0.02 | 98.49 |
| **Grand Total** | **0.19** | **1.74** | **0.90** | **0.00** | **0.28** | **0.12** | **239.35** |
| **Truck Delivery Emissions** | | | | | | | |
| On-site Total | - | - | - | - | 0.06 | 0.01 | - |
| Fugitive Dust | - | - | - | - | 0.06 | 0.01 | - |
| Off-Road Diesel | - | - | - | - | - | - | - |
| Off-site Total | 0.03 | 0.25 | 0.13 | 0.00 | 0.01 | 0.01 | 51.02 |
| On-Road Diesel | 0.03 | 0.25 | 0.13 | 0.00 | 0.01 | 0.01 | 51.02 |
| **Grand Total** | **0.03** | **0.25** | **0.13** | **0.00** | **0.07** | **0.02** | **51.02** |
| **Switchyard Emissions** | | | | | | | |
| On-site Total | 0.11 | 1.12 | 0.41 | 0.00 | 0.04 | 0.04 | 153.79 |
| Fugitive Dust | - | - | - | - | | - | - |
| Off-Road Diesel | 0.11 | 1.12 | 0.41 | 0.00 | 0.04 | 0.04 | 153.79 |
| Off-site Total | - | - | - | - | - | - | - |
| On-Road Diesel | - | - | - | - | - | - | - |
| **Grand Total** | **0.11** | **1.12** | **0.41** | **0.00** | **0.04** | **0.04** | **153.79** |
| **Unit Erection Emissions** | | | | | | | |
| On-site Total | 0.84 | 8.51 | 3.53 | 0.01 | 0.33 | 0.30 | 1,020.15 |
| Fugitive Dust | - | - | - | - | - | - | - |
| Off-Road Diesel | 0.84 | 8.51 | 3.53 | 0.01 | 0.33 | 0.30 | 1,020.15 |
| Off-site Total | - | - | - | - | - | - | - |
| On-Road Diesel | - | - | - | - | - | - | - |
| **Grand Total** | **0.84** | **8.51** | **3.53** | **0.01** | **0.33** | **0.30** | **1,020.15** |
| **Worker Commute** | | | | | | | |
| On-site Total | - | - | - | - | - | - | - |
| Fugitive Dust | - | - | - | - | - | - | - |
| Off-Road Diesel | - | - | - | - | - | - | - |
| Off-site Total | 0.11 | 0.13 | 1.45 | 0.00 | 0.01 | 0.01 | 85.44 |
| On-Road VMT | 0.11 | 0.13 | 1.45 | 0.00 | 0.01 | 0.01 | 85.44 |
| **Grand Total** | **0.11** | **0.13** | **1.45** | **0.00** | **0.01** | **0.01** | **85.44** |
| **Regional Emissions Totals** | | | | | | | |
| Grading Emissions | 0.2 | 1.7 | 0.9 | 0.0 | 0.3 | 0.1 | 239.4 |
| Truck Delivery Emissions | 0.0 | 0.3 | 0.1 | 0.0 | 0.1 | 0.0 | 51.0 |
| Switchyard Emissions | 0.1 | 1.1 | 0.4 | 0.0 | 0.0 | 0.0 | 153.8 |
| Unit Erection Emissions | 0.8 | 8.5 | 3.5 | 0.0 | 0.3 | 0.3 | 1,020.1 |
| Worker Commute | 0.1 | 0.1 | 1.4 | 0.0 | 0.0 | 0.0 | 85.4 |
| **2013 Total Regional Emissions** | **1** | **12** | **6** | **0** | **1** | **0** | **1,550** |
| Regional Significance Threshold | 25 | 25 | 100 | 25 | 15 | 15 | 100,000 |
| **Exceed Threshold?** | **No** | **No** | **No** | **No** | **No** | **No** | **No** |

Notes:

[a] Fugitive dust emissions include AVAPCD Rule 403 efficiency standards

**Project Title:** **West Antelope Solar**

**Project Description**

| | |
|---|---|
| Construction Start Date | 5/1/2013 |
| Construction End Date | 10/15/2013 |
| Construction Calendar Days | 167 |
| Construction Working Days | 143 |
| Total MW | 20 |
| 10MW Blocks | 2 |
| Acres | 263 |

**Phases**

| | Phase Start Date | Phase End Date | Calendar Days | Working Days | Acres / Day | Total Truck Trips |
|---|---|---|---|---|---|---|
| **Grading** | 5/1/2013 | 6/14/2013 | 44 | 38 | 3 | 20 |

Equipment

2 Graders
2 Dozers
2 Excavators
1 Tractors/Loaders/Backhoes
1 Water Trucks

| | Phase Start Date | Phase End Date | Calendar Days | Working Days | Truck Trips per Day | Total Truck Trips |
|---|---|---|---|---|---|---|
| **Truck Deliveries** | 5/23/2013 | 6/12/2013 | 20.5 | 18 | 50 | 879 |

| | Phase Start Date | Phase End Date | Calendar Days | Working Days | Worker Trips per Day | Total Worker Trips |
|---|---|---|---|---|---|---|
| **Switchyard** | 5/23/2013 | 6/22/2013 | 30 | 26 | 10 | 257 |

Equipment

1 Cranes
1 Forklifts
2 Generator Sets
2 Off Highway Trucks
1 Tractors/Loaders/Backhoes
1 Water Trucks

| | Phase Start Date | Phase End Date | Calendar Days | Working Days | Worker Trips per Day | Total Worker Trips |
|---|---|---|---|---|---|---|
| **Unit Erection** | 6/2/2013 | 10/15/2013 | 135 | 96 | 89 | 5700 |
| **Block 1** | 6/2/2013 | 8/31/2013 | 90 | 64 | 44 | 2850 |
| **Block 2** | 7/17/2013 | 10/15/2013 | 90 | 64 | 44 | 2850 |

Equipment per Block

1 Cranes
2 Generator Sets
2 Off Highway Tractors
2 Other Material Handling Equipment
3 Tractors/Loaders/Backhoes
1 Water Trucks

# EmissionCalcs

Grading

| Number | Type | Hours | HP | LF | Activity | Emission Factors (g/hp-hr) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O |
| 2 | Graders | 7 | 162 | 0.61 | 1383.48 | 0.672827 | 5.133706 | 3.368559 | 0.006394 | 0.289596 | 0.266428 | 568.2998 | 0.032474 | 0.014557 |
| 2 | Dozers | 6 | 358 | 0.59 | 2534.64 | 0.688998 | 5.858432 | 3.052354 | 0.005578 | 0.243116 | 0.223667 | 568.2998 | 0.032474 | 0.014557 |
| 0 | Scrapers | 6 | 356 | 0.72 | 0 | 0.563345 | 5.001453 | 2.141463 | 0.005578 | 0.194328 | 0.178782 | 568.2999 | 0.032474 | 0.014557 |
| 2 | Excavators | 7 | 157 | 0.57 | 1252.86 | 0.611848 | 4.523427 | 3.376956 | 0.006394 | 0.259442 | 0.238687 | 568.3 | 0.032474 | 0.014557 |
| 1 | Tractors/Loaders/Backhoes | 6 | 75 | 0.55 | 247.5 | 0.76292 | 5.015335 | 3.876738 | 0.006666 | 0.420778 | 0.387116 | 568.3 | 0.032474 | 0.014557 |
| 1 | Water Trucks | 4 | 175 | 0.7 | 490 | 0.608812 | 5.108611 | 3.141713 | 0.006394 | 0.272776 | 0.250954 | 568.2998 | 0.032474 | 0.014557 |

Switchyard

| Number | Type | Hours | HP | LF | Activity | Emission Factors (g/hp-hr) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O |
| 1 | Cranes | 4 | 334 | 0.43 | 574.48 | 0.489362 | 4.490414 | 1.669797 | 0.005578 | 0.163558 | 0.150473 | 568.3 | 0.032474 | 0.014557 |
| 1 | Forklifts | 6 | 83 | 0.6 | 298.8 | 0.869314 | 5.455792 | 3.937244 | 0.006666 | 0.481854 | 0.443306 | 568.2999 | 0.032474 | 0.014557 |
| 2 | Generator Sets | 7 | 586 | 0.74 | 6070.96 | 0.312576 | 4.113035 | 1.211155 | 0.005714 | 0.116888 | 0.107537 | 568.2995 | 0.032474 | 0.014557 |
| 2 | Off Highway Trucks | 4 | 381 | 0.57 | 1737.36 | 0.45274 | 3.728204 | 1.327553 | 0.005578 | 0.132201 | 0.121625 | 568.2997 | 0.032474 | 0.014557 |
| 1 | Tractors/Loaders/Backhoes | 7 | 75 | 0.55 | 288.75 | 0.76292 | 5.015335 | 3.876738 | 0.006666 | 0.420778 | 0.387116 | 568.3 | 0.032474 | 0.014557 |
| 1 | Water Trucks | 4 | 175 | 0.7 | 490 | 0.608812 | 5.108611 | 3.141713 | 0.006394 | 0.272776 | 0.250954 | 568.2998 | 0.032474 | 0.014557 |

Unit Erection

| Number | Type | Hours | HP | LF | Activity | Emission Factors (g/hp-hr) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O |
| 1 | Cranes | 4 | 334 | 0.43 | 574.48 | 0.489362 | 4.490414 | 1.669797 | 0.005578 | 0.163558 | 0.150473 | 568.3 | 0.032474 | 0.014557 |
| 2 | Generator Sets | 7 | 586 | 0.74 | 6070.96 | 0.312576 | 4.113035 | 1.211155 | 0.005714 | 0.116888 | 0.107537 | 568.2995 | 0.032474 | 0.014557 |
| 2 | Off Highway Tractors | 4 | 697 | 0.65 | 3624.4 | 0.65466 | 5.810429 | 2.890929 | 0.005714 | 0.235622 | 0.216772 | 568.2995 | 0.032474 | 0.014557 |
| 2 | Other Material Handling Equipı | 4 | 196 | 0.59 | 925.12 | 0.480186 | 4.957374 | 1.318119 | 0.006394 | 0.156116 | 0.143627 | 568.2999 | 0.032474 | 0.014557 |
| 3 | Tractors/Loaders/Backhoes | 7 | 75 | 0.55 | 866.25 | 0.76292 | 5.015335 | 3.876738 | 0.006666 | 0.420778 | 0.387116 | 568.3 | 0.032474 | 0.014557 |
| 1 | Water Trucks | 4 | 175 | 0.7 | 490 | 0.608812 | 5.108611 | 3.141713 | 0.006394 | 0.272776 | 0.250954 | 568.2998 | 0.032474 | 0.014557 |

# EmissionCalcs

Grading

| Number | Type | Emissions (lbs/day) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O |
| 2 | Graders | 2.05 | 15.66 | 10.27 | 0.02 | 0.88 | 0.81 | 1733.34 | 0.10 | 0.04 |
| 2 | Dozers | 3.85 | 32.74 | 17.06 | 0.03 | 1.36 | 1.25 | 3175.62 | 0.18 | 0.08 |
| 0 | Scrapers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | Excavators | 1.69 | 12.49 | 9.33 | 0.02 | 0.72 | 0.66 | 1569.69 | 0.09 | 0.04 |
| 1 | Tractors/Loaders/Backhoes | 0.42 | 2.74 | 2.12 | 0.00 | 0.23 | 0.21 | 310.09 | 0.02 | 0.01 |
| 1 | Water Trucks | 0.66 | 5.52 | 3.39 | 0.01 | 0.29 | 0.27 | 613.91 | 0.04 | 0.02 |
| | | 8.67 | 69.14 | 42.17 | 0.08 | 3.48 | 3.20 | 7402.66 | 0.42 | 0.19 |

Switchyard

| Number | Type | Emissions (lbs/day) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O |
| 1 | Cranes | 0.62 | 5.69 | 2.11 | 0.01 | 0.21 | 0.19 | 719.76 | 0.04 | 0.02 |
| 1 | Forklifts | 0.57 | 3.59 | 2.59 | 0.00 | 0.32 | 0.29 | 374.36 | 0.02 | 0.01 |
| 2 | Generator Sets | 4.18 | 55.05 | 16.21 | 0.08 | 1.56 | 1.44 | 7606.22 | 0.43 | 0.19 |
| 2 | Off Highway Trucks | 1.73 | 14.28 | 5.08 | 0.02 | 0.51 | 0.47 | 2176.71 | 0.12 | 0.06 |
| 1 | Tractors/Loaders/Backhoes | 0.49 | 3.19 | 2.47 | 0.00 | 0.27 | 0.25 | 361.77 | 0.02 | 0.01 |
| 1 | Water Trucks | 0.66 | 5.52 | 3.39 | 0.01 | 0.29 | 0.27 | 613.91 | 0.04 | 0.02 |
| | | 8.25 | 87.32 | 31.87 | 0.12 | 3.16 | 2.91 | 11852.74 | 0.68 | 0.30 |

Unit Erection

| Number | Type | Emissions (lbs/day) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2 | CH4 | N2O |
| 1 | Cranes | 0.62 | 5.69 | 2.11 | 0.01 | 0.21 | 0.19 | 719.76 | 0.04 | 0.02 |
| 2 | Generator Sets | 4.18 | 55.05 | 16.21 | 0.08 | 1.56 | 1.44 | 7606.22 | 0.43 | 0.19 |
| 2 | Off Highway Tractors | 5.23 | 46.43 | 23.10 | 0.05 | 1.88 | 1.73 | 4540.96 | 0.26 | 0.12 |
| 2 | Other Material Handling Equip | 0.98 | 10.11 | 2.69 | 0.01 | 0.32 | 0.29 | 1159.07 | 0.07 | 0.03 |
| 3 | Tractors/Loaders/Backhoes | 1.46 | 9.58 | 7.40 | 0.01 | 0.80 | 0.74 | 1085.31 | 0.06 | 0.03 |
| 1 | Water Trucks | 0.66 | 5.52 | 3.39 | 0.01 | 0.29 | 0.27 | 613.91 | 0.04 | 0.02 |
| | | 13.13 | 132.37 | 54.91 | 0.16 | 5.07 | 4.67 | 15725.24 | 0.90 | 0.40 |

# EmissionCalcs

Grading

| Number | Type | Emissions (tons/phase) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2e | CO2 | CH4 | N2O |
| 2 | Graders | 0.04 | 0.30 | 0.19 | 0.00 | 0.02 | 0.02 | 32.98 | 32.69 | 0.00 | 0.00 |
| 2 | Dozers | 0.07 | 0.62 | 0.32 | 0.00 | 0.03 | 0.02 | 60.43 | 59.88 | 0.00 | 0.00 |
| 0 | Scrapers | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | Excavators | 0.03 | 0.24 | 0.18 | 0.00 | 0.01 | 0.01 | 29.87 | 29.60 | 0.00 | 0.00 |
| 1 | Tractors/Loaders/Backhoes | 0.01 | 0.05 | 0.04 | 0.00 | 0.00 | 0.00 | 5.90 | 5.85 | 0.00 | 0.00 |
| 1 | Water Trucks | 0.01 | 0.10 | 0.06 | 0.00 | 0.01 | 0.01 | 11.68 | 11.58 | 0.00 | 0.00 |
| | | 0.16 | 1.30 | 0.80 | 0.00 | 0.07 | 0.06 | 140.87 | 139.59 | 0.01 | 0.00 |

Switchyard

| Number | Type | Emissions (tons/phase) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2e | CO2 | CH4 | N2O |
| 1 | Cranes | 0.01 | 0.07 | 0.03 | 0.00 | 0.00 | 0.00 | 9.34 | 9.25 | 0.00 | 0.00 |
| 1 | Forklifts | 0.01 | 0.05 | 0.03 | 0.00 | 0.00 | 0.00 | 4.86 | 4.81 | 0.00 | 0.00 |
| 2 | Generator Sets | 0.05 | 0.71 | 0.21 | 0.00 | 0.02 | 0.02 | 98.69 | 97.79 | 0.01 | 0.00 |
| 2 | Off Highway Trucks | 0.02 | 0.18 | 0.07 | 0.00 | 0.01 | 0.01 | 28.24 | 27.99 | 0.00 | 0.00 |
| 1 | Tractors/Loaders/Backhoes | 0.01 | 0.04 | 0.03 | 0.00 | 0.00 | 0.00 | 4.69 | 4.65 | 0.00 | 0.00 |
| 1 | Water Trucks | 0.01 | 0.07 | 0.04 | 0.00 | 0.00 | 0.00 | 7.97 | 7.89 | 0.00 | 0.00 |
| | | 0.11 | 1.12 | 0.41 | 0.00 | 0.04 | 0.04 | 153.79 | 152.39 | 0.01 | 0.00 |

Unit Erection

| Number | Type | Emissions (tons/phase) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ROG | NOX | CO | SO2 | PM10 | PM2.5 | CO2e | CO2 | CH4 | N2O |
| 1 | Cranes | 0.02 | 0.18 | 0.07 | 0.00 | 0.01 | 0.01 | 23.35 | 23.14 | 0.00 | 0.00 |
| 2 | Generator Sets | 0.13 | 1.77 | 0.52 | 0.00 | 0.05 | 0.05 | 246.72 | 244.49 | 0.01 | 0.01 |
| 2 | Off Highway Tractors | 0.17 | 1.49 | 0.74 | 0.00 | 0.06 | 0.06 | 147.29 | 145.96 | 0.01 | 0.00 |
| 2 | Other Material Handling Equip | 0.03 | 0.32 | 0.09 | 0.00 | 0.01 | 0.01 | 37.60 | 37.26 | 0.00 | 0.00 |
| 3 | Tractors/Loaders/Backhoes | 0.05 | 0.31 | 0.24 | 0.00 | 0.03 | 0.02 | 35.20 | 34.89 | 0.00 | 0.00 |
| 1 | Water Trucks | 0.02 | 0.18 | 0.11 | 0.00 | 0.01 | 0.01 | 19.91 | 19.73 | 0.00 | 0.00 |
| | | 0.42 | 4.25 | 1.76 | 0.01 | 0.16 | 0.15 | 510.07 | 505.45 | 0.03 | 0.01 |

**West Antelope Solar**
**Delivery Truck Emissions**

| | |
|---|---|
| Year | 2013 |
| Trips/Day | 50 |
| Working Days | 18 |
| Roundtrip Distance | 20 |
| Daily VMT | 1,000 |
| Total VMT | 17,571 |

Grams per Trip Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 21.48 | 113.29 | 96.08 | 0.18 | 1.61 | 1.48 | 18,686.73 |

Grams per Mile Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.37 | 7.46 | 1.84 | 0.02 | 0.35 | 0.27 | 1,699.93 |

Trip Emissions (lbs/day)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 2.37 | 12.49 | 10.59 | 0.02 | 0.18 | 0.16 | 2,059.86 |

VMT Emissions (lbs/day)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.83 | 16.45 | 4.06 | 0.04 | 0.78 | 0.60 | 3,747.69 |

Total Delivery Truck-Related Emissions (lbs/day)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 3.19 | 28.94 | 14.65 | 0.06 | 0.96 | 0.76 | 5,807.55 |

Total Delivery Truck-Related Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.03 | 0.25 | 0.13 | 0.00 | 0.01 | 0.01 | 51.02 |

**West Antelope Solar**
**Hauling Truck Emissions**

| | |
|---|---|
| Year | 2013 |
| Total Trips | 20 |
| Roundtrip Distance | 26 |
| Total VMT | 52,338 |

Grams per Trip Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 21.48 | 113.29 | 96.08 | 0.18 | 1.61 | 1.48 | 18,686.73 |

Grams per Mile Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.37 | 7.46 | 1.84 | 0.02 | 0.35 | 0.27 | 1,699.93 |

Trip Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.41 |

VMT Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.02 | 0.43 | 0.11 | 0.00 | 0.02 | 0.02 | 98.07 |

Total Delivery Truck-Related Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.02 | 0.43 | 0.11 | 0.00 | 0.02 | 0.02 | 98.49 |

**West Antelope Solar**
**Annual Worker Commute Emissions**

| | |
|---|---|
| Year | 2013 |
| Total Trips | 5,957 |
| Roundtrip Distance | 34 |
| Total VMT | 200,160 |

Grams per Trip Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 7.39 | 2.92 | 53.74 | 0.01 | 0.04 | 0.03 | 483.11 |

Grams per Mile Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.28 | 0.49 | 4.96 | 0.00 | 0.05 | 0.02 | 372.88 |

Trip Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.05 | 0.02 | 0.35 | 0.00 | 0.00 | 0.00 | 3.17 |

VMT Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.06 | 0.11 | 1.09 | 0.00 | 0.01 | 0.01 | 82.27 |

Total Worker Commute Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.11 | 0.13 | 1.45 | 0.00 | 0.01 | 0.01 | 85.44 |

**West Antelope Solar**
**On-site Construction PM10 Emissions**

**Prepared by BonTerra Consulting**

**Summary of On-Site Fugitive $PM_{10}$ Emissions**

| | |
|---|---|
| 3.8 | Dirt pushing emissions |
| - | Dirt/materials handling emissions |
| 6.6 | Unpaved surface travel emissions |
| **10.4** | **On-site Emissions Total** |

**Estimating Emissions from Dirt Pushing or Bulldozing Operations** [a]

$E = ([0.45 \times (\{[G]^{1.5}\}/\{[H]^{1.4}\})] \times I) \times J$

Where,

E = $PM_{10}$ emissions from dirt pushing
G = Silt content of aggregate in percent
H = Moisture content of the surface material
I = 2.2046; a conversion factor to convert kilograms per hour to pounds per hour
J = Hours of dirt pushing

| | | | |
|---|---|---|---|
| G = | 7.5 | I = | 2.2046 |
| H = | 12.0 | J = | 6.0 |
| **E =** | **3.77** | | |

[a] SCAQMD 1993; CEQA Air Quality Handbook, Table A9-9-F

**Estimating Emissions from Dirt Piling or Material Handling** [b]

$E = [0.00112 \times (\{[G/5]^{1.3}\}/\{[H/2]^{1.4}\})] \times [I/J]$

Where,

E = $PM_{10}$ emissions from dirt piling or materials handling
G = Mean wind speed in miles per hour
H = Moisture content of the surface material
I = Pounds of dirt handled per day
J = 2,000; a conversion factor to convert pounds to tons

| | | | |
|---|---|---|---|
| G = | 3.4 | I = | - |
| H = | 12% | J = | 2,000 |
| **E =** | **-** | | |

[b] SCAQMD 1993; CEQA Air Quality Handbook, Table A9-9-G

**Estimating Emissions from Vehicle Travel on Unpaved Roads** [c]

E = V x F

Where,

E = Emissions for vehicles on unpaved roads
V = Vehicle miles traveled
F = Emissions factor for vehicle travel on unpaved roads.
2.1 x [G/12] x H/30] x {[J/3]0.7} x {[I/4]0.5} x {[365 - K]/365} in pounds per miles traveled

Where,

G = Surface silt loading in percent
H = Mean vehicle speed in miles per hour
I = Mean number of wheels on vehicles
J = Mean vehicle weight in tons
K = Mean number of days per year with at least 0.01 inch of precipitation

| | | | |
|---|---|---|---|
| G = | 7.5 | J = | 15 |
| H = | 5.0 | K = | 34 |
| I = | 6 | | |
| F = | 0.75 | Uncontroled emissions factor | |
| | (0.51) | Rule 403 control efficency (68 percent) | |
| | 0.24 | Controlled emissions factor | |
| | 27.67 | On-site VMT | |
| **E =** | **6.64** | | |

[c] SCAQMD 1993; CEQA Air Quality Handbook, Table A9-9-D

# Appendix A.2

## AVAQMD Rule 403 (Fugitive Dust) Control Requirements

(**Adopted**: 02/07/76; **Amended**: 11/06/92; **Amended**: 07/09/93; **Amended**: 02/14/97: **Amended**: 04/20/10)

# RULE 403
# Fugitive Dust

## (A) General

(1) Purpose

(a) The purpose of this rule is to reduce the amount of Particulate Matter entrained in the ambient air as a result of anthropogenic (man-made) Fugitive Dust sources by requiring actions to prevent, reduce or mitigate Fugitive Dust emissions.

(2) Applicability

(a) The provisions of this rule shall apply to any activity or man-made condition capable of generating Fugitive Dust.

## (B) Definitions

(1) "Active Operations" – Any activity capable of generating Fugitive Dust, including, but not limited to, Earth-Moving Activities, Construction/Demolition Activities, or heavy- and light-duty vehicular movement.

(2) "Agricultural Operation" – The growing and harvesting of crops or the raising of fowl or animals for the primary purpose of making a profit, providing a livelihood, or conducting agricultural research or instruction by an educational institution. Agricultural Operations do not include activities involving the processing or distribution of crops or fowl.

(3) "Air Pollution Control Officer (APCO)" – The person appointed to the position of Air Pollution Control Officer pursuant to the provisions of Health and Safety Code §40750 and his or her designee.

(4) "Anemometers" – Devices used to measure wind speed and direction.

(5) "Bulk Material" – Sand, gravel, soil, aggregate material less than two inches in length or diameter, and other organic or inorganic Particulate Matter.

(6) "Chemical Stabilizers" – Any non-toxic chemical Dust Suppressant which must not be used if prohibited for use by the Regional Water Quality Control Boards, the California Air Resources Board, the United States Environmental Protection Agency, or any applicable law, rule or regulation; and should meet any specifications, criteria, or tests required by any federal, state, or local water agency. Unless otherwise indicated, the use of a non-toxic Chemical Stabilizer shall be of sufficient concentration and application frequency to maintain a Stabilized Surface.

(7) "Construction/Demolition Activities" – Any on-site mechanical activities preparatory to or related to the building, alteration, rehabilitation, demolition or improvement of property, including, but not limited to the following activities; grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.

(8) "Contractor" – Any person who has a contractual arrangement to conduct an active operation for another person.

(9) "Disturbed Surface Area" – A portion of the earth's surface which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emission of Fugitive Dust. This definition excludes those areas which have:

(a) Been restored to a natural state, such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;

(b) Been paved or otherwise covered by a permanent structure; or

(c) Sustained a vegetative ground cover over at least 70 percent of an area for a period of at least six months.

(10) "Dust Control Plan (DCP)" – A District-approved document that describes what measures will be taken at a location to comply with this rule, prepared in accordance with section (D).

(11) "Dust Suppressants" – Water, hygroscopic materials, or non-toxic Chemical Stabilizers used as a treatment material to reduce Fugitive Dust emissions.

(12) "Earth-Moving Activities" – The use of any equipment for any activity where soil is being moved or uncovered, and shall include, but not be limited to the following: grading, earth cutting and filling operations, loading or unloading of dirt or Bulk Materials, adding to or removing from Open Storage Piles of Bulk Materials, landfill operations, weed abatement through disking, and soil mulching.

(13) "Fugitive Dust" – Any solid Particulate Matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of man.

(14) "High Wind Conditions" – Instantaneous wind speeds (gusts) which exceed 25 miles per hour.

(15) "Inactive Disturbed Surface Area" – Any Disturbed Surface Area upon which Active Operations have not occurred or are not expected to occur for a period of 20 consecutive days.

(16) "Non-Routine" – Any non-periodic active operation which occurs no more than three times per year, lasts less than 30 cumulative days per year, and is scheduled less than 30 days in advance.

(17) "Open Storage Pile" – Any accumulation of Bulk Material with five percent or greater Silt content which is not fully enclosed, covered or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 or more square feet. Silt content level is assumed to be five percent or greater unless a person can show, by sampling and analysis in accordance with ASTM Method C-136 or other equivalent method approved in writing by the APCO and the California Air Resources Board, that the Silt content is less than five percent. The results of ASTM Method C-136 or equivalent method are valid for 60 days from the date the sample was taken.

(18) "Particulate Matter" – Any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions.

(19) "Paved Road" – An improved street, highway, alley, public way, or easement that is covered by typical roadway materials excluding access roadways that connect a facility with a public Paved Road and are not open to through traffic. Public Paved Roads are those open to public access and that are owned by any federal, state, county, municipal or any other governmental or quasi-governmental agencies. Private Paved Roads are any Paved Roads not defined as public.

(20) "$PM_{10}$" – Particulate Matter with an aerodynamic diameter smaller than or equal to ten microns as measured by the applicable state and federal reference test methods.

(21) "Property Line" – The boundaries of an area in which either a person causing the emission or a person allowing the emission has the legal use or possession of the property. Where such property is divided into one or more sub-tenancies, the Property Line(s) shall refer to the boundaries dividing the areas of all sub-tenancies.

(22) "Silt" – Any aggregate material with a particle size less than 74 micrometers in diameter which passes through a No. 200 sieve.

(23) "Simultaneous Sampling" – The operation of two $PM_{10}$ samplers in such a manner that one sampler is started within five minutes of the other, and each sampler is operated for a consecutive period which must be not less than 290 minutes and not more than 310 minutes.

(24) "Stabilized Surface" – Any previously Disturbed Surface Area or Open Storage Pile which, through the application of Dust Suppressants, shows visual or other evidence of surface crusting and is resistant to Wind-Driven Fugitive Dust and is demonstrated to be stabilized and where Visible Dust Emissions are limited to 20 percent opacity. Chemical treatment must be performed with a substance not disapproved for such use by the applicable Regional Water Quality Control Board.

(25) "Track-out" – Any Bulk Material that adheres to and agglomerates on the exterior surface of motor vehicles, haul trucks, and equipment (including tires) that have been released onto a paved road and can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(26) "Unpaved Roads" – Any unsealed or earthen roads, equipment paths, or travel ways that are not covered by one of the following: concrete, asphaltic concrete, recycled asphalt, or asphalt.

(27) "United States Environmental Protection Agency (USEPA)" – Refers to the Administrator or the appropriate designee of the United States Environmental Protection Agency.

(28) "Visible Dust Emissions (VDE)" – Any dust emissions that are visible to an observer.

(29) "Wind-Driven Fugitive Dust" – Visible emissions from any Disturbed Surface Area which is generated by wind action alone.

(30) "Wind Gust" – The maximum instantaneous wind speed as measured by an Anemometer.

## (C) Requirements

(1) A person shall not cause or allow the emissions of Fugitive Dust from:

(a) Any Active Operation, Open Storage Pile, or Disturbed Surface Area such that the presence of such dust remains visible in the atmosphere beyond the Property Line of the emission source; or

(b) Any applicable source such that the dust causes 20 percent opacity or greater during each observation and the total duration of such observations (not necessarily consecutive) is a cumulative three minutes or more in any one hour. Only opacity readings from a single source shall be included in the cumulative total used to determine compliance.

(2) A person shall not cause or allow $PM_{10}$ levels to exceed 50 micrograms per cubic meter when determined, by Simultaneous Sampling, as the difference between upwind and downwind samples collected on high-volume Particulate Matter samplers or other USEPA-approved equivalent method for $PM_{10}$ monitoring. If sampling is conducted, samplers shall be:

(a) Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate USEPA-published documents for USEPA-approved equivalent method(s) for $PM_{10}$.

(b) Reasonably placed upwind and downwind of key activity areas and as close to the Property Line as feasible, such that other sources of Fugitive Dust between the sampler and the Property Line are minimized.

(3) Track-out Operations

(a) A person shall not allow Track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation.

Notwithstanding the preceding, all Track-out from an active operation shall be removed at the conclusion of each workday or evening shift.

(b) A person shall not conduct an Active Operation with a Disturbed Surface Area of five or more acres, or with a daily import or export of 100 cubic yards or more of Bulk Material without utilizing at least one of the measures listed in subparagraphs (C)(3)(b)(i) through (C)(3)(b)(v) at each vehicle egress from the site to a paved public road.

(i) Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long;

(ii) Pave or apply chemical stabilization at sufficient concentration and frequency to maintain a Stabilized Surface starting from the point of intersection with the public paved surface, and extending at least 100 feet and at least 20 feet wide;

(iii) Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and ten feet wide to remove Bulk Material from tires and vehicle undercarriages before vehicles exit the site;

(iv) Install and utilize a wheel washing system to remove Bulk Material from tires and vehicle undercarriages before vehicles exit the site; or

(v) Any other control measure approved by the APCO and the USEPA as equivalent to the methods specified in subparagraphs (C)(3)(b)(i) through (C)(3)(b)(iv).

(4) Earth-Moving Operations

(a) A person shall not conduct an Active Operation of Construction, excavation, extraction and other Earth-Moving Activities with a Disturbed Surface Area of five or more acres, or with a daily import or export of 100 cubic yards or more of Bulk Material without utilizing at least one of the measures listed for each of the operation stages specified in subparagraphs (C)(4)(a)(i) through (C)(4)(a)(iv).

(i) Pre-activity:

a. Pre-water site sufficient to limit VDE to 20 percent opacity; and
b. Phase work to reduce the amount of Disturbed Surface Area at any one time

(ii) During Active Operations:

a. Apply water or chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity;
b. Construct and maintain wind barriers sufficient to limit VDE to 20 percent opacity. If utilizing wind barriers, control measure (a) above shall also be implemented; or
c. Apply water or chemical/organic stabilizers/suppressants to unpaved haul/access roads and unpaved vehicle/equipment traffic areas sufficient to limit VDE to 20 percent opacity and meet the requirements of section (C)(9).

(iii) Temporary Stabilization During Periods of Inactivity:

a. Restrict vehicular access to the area; and
b. Apply water or chemical/organic stabilizers/suppressants, sufficient to limit VDE to 20 percent opacity, or to comply with the conditions of a Stabilized Surface. If an area having one-half acres or more of Disturbed Surface Area remains unused for seven or more days, the area must comply with the conditions for a Stabilized Surface area.

(iv) Any other control measures approved by the APCO and the USEPA as equivalent to the methods specified in subparagraphs (C)(4)(a)(i) through(C)(4)(a)(iii).

(5) Demolition Operations

(a) A person shall implement the requirements of (C)(5)(a)(i) through (C)(5)(a)(v) when using wrecking balls or other wrecking equipment to raze or demolish buildings:

(i) Apply sufficient water to building exterior surfaces and razed building materials to limit VDE to 20 percent opacity throughout the duration of razing and demolition activities;
(ii) Apply sufficient Dust Suppressants to unpaved surface areas where materials from razing or demolition activities will fall, or where wrecking or hauling equipment will be operated, in order to limit VDE to 20 percent opacity;
(iii) Handling, storage, and transport of Bulk Materials on-site or off-site resulting from the demolition or razing of buildings shall comply with the requirements specified in section (C)(6);
(iv) Prevention and removal of carryout or Track-out on paved public access roads from demolition operations shall be performed in accordance with (C)(3); or
(v) Any other control measures approved by the APCO and the USEPA as equivalent to the methods specified in subparagraphs (C)(5)(a)(i) through (C)(5)(a)(iv).

(6) Bulk Material Operations

(a) No person shall conduct an active operation of handling Bulk Material with a daily import or export of 100 cubic yards or more of Bulk Material without utilizing at least one of the measures listed for each of the operation stages specified in subparagraphs (C)(6)(a)(i) through (C)(6)(a)(vi):

(i) Handling of Bulk Materials:

a. When handling Bulk Materials, apply water or chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity; or
b. Construct and maintain wind barriers sufficient to limit VDE to 20 percent opacity and with less than 50 percent porosity. If utilizing fences or wind barriers, control measure (C)(6)(a)(i)[a.] shall also be implemented.

(ii) Storage of Bulk Materials:

a. When storing Bulk Materials, comply with the conditions for a Stabilized Surface;
b. Cover Bulk Materials stored outdoors with tarps, plastic, or other suitable material and anchor in such a manner that prevents the cover from being removed by wind action;
c. Construct and maintain wind barriers sufficient to limit VDE to 20 percent opacity and with less than 50 percent porosity. If utilizing fences or wind barriers, apply water or chemical/organic stabilizers/suppressants to limit VDE to 20 percent opacity;
d. Utilize a three-sided structure with a height at least equal to the height of the storage pile and with less than 50 percent porosity; or
e. Installation of wind breaks of such design so as to reduce maximum Wind Gusts to less than 25 miles per hour in the area of the Bulk Material deposits.

(iii) On-site Transporting of Bulk Materials:

a. Limit vehicular speed while traveling on the work site sufficient to limit VDE to 20 percent opacity;
b. Load all haul trucks such that the freeboard is not less than six inches when material is transported across any paved public access road sufficient to limit VDE to 20 percent opacity;
c. Apply water to the top of the load sufficient to limit VDE to 20 percent opacity; or
d. Cover haul trucks with a tarp or other suitable cover.

(iv) Off-site Transporting of Bulk Materials:

a. Clean the interior of the cargo compartment or cover the cargo compartment before the empty truck leaves the site;
b. Prevent spillage or loss of Bulk Material from holes or other openings in the cargo compartment's floor, sides, and/or tailgate; and
c. Load all haul trucks such that the freeboard is not less than six inches when material is transported on any paved public access road, and apply water to the top of the load sufficient to limit VDE to 20 percent opacity; or cover haul trucks with a tarp or other suitable cover.

(v) Outdoor Transport of Bulk Materials With a Chute or Conveyor:

a. Fully enclose the chute or conveyor;
b. Operate water spray equipment that sufficiently wets materials to limit VDE to 20 percent opacity; or
c. Wash separated or screened materials to remove conveyed materials having an aerodynamic diameter of ten microns or less sufficient to limit VDE to 20 percent opacity.

(vi) Any other control measures approved by the APCO and USEPA as equivalent to the methods specified in subparagraphs (C)(6)(a)(i) through(C)(6)(a)(v).

(7) Disturbed Open Area of Three or More Acres

(a) An owner/operator of an open area with a Disturbed Surface of three or more acres that has remained undeveloped, unoccupied, unused, or vacant for more than seven days shall do at least one of the following:

(i) Apply and maintain water or Dust Suppressant(s) to all unvegetated areas sufficient to limit VDE to 20 percent opacity;
(ii) Establish vegetation on all previously disturbed areas sufficient to limit VDE to 20 percent opacity;
(iii) Pave, apply and maintain gravel, or apply and maintain chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity;
(iv) Upon evidence of trespass, prevent unauthorized vehicle access by posting "No Trespassing" signs or installing physical barriers such as fences, gates, posts, and/or other appropriate barriers to effectively prevent access to the area; or
(v) Any other control measures approved by the APCO and the USEPA as equivalent to the methods specified in subparagraphs (C)(7)(a)(i) through(C)(7)(a)(iv).

(8) Unpaved Roads at Industrial or Commercial Facilities

(a) An owner/operator of an Unpaved Road at an industrial or commercial facility shall limit VDE to 20 percent opacity from the Unpaved Road segment by application and/or maintenance of at least one of the following control measures, or shall implement an APCO approved Dust Control Plan:

(i) Apply and maintain water or Dust Suppressant(s) sufficient to limit VDE to 20 percent opacity;
(ii) Pave, apply and maintain gravel, or apply and maintain chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity;
(iii) Restrict vehicle speed to 15 miles per hour; or
(iv) Any other method that effectively limits VDE to 20 percent opacity and results in a stabilized Unpaved Road surface.

(9) Unpaved Vehicle/Equipment Traffic Area

(a) An owner/operator of an unpaved vehicle/equipment traffic area shall limit VDE to 20 percent opacity from the unpaved vehicle/equipment traffic area by application and/or maintenance of at least one of the following control measures, or shall implement an APCO approved Dust Control Plan:

(i) Apply and maintain water or Dust Suppressant(s) sufficient to limit VDE to 20 percent opacity;
(ii) Pave, apply and maintain gravel, or apply and maintain chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity;
(iii) Restrict vehicle speed to 15 miles per hour;
(iv) An owner/operator shall restrict access and periodically stabilize a Disturbed Surface Area whenever a site becomes an Inactive Disturbed Surface Area to comply with the conditions for a Stabilized Surface; or
(v) Any other method that effectively limits VDE to 20 percent opacity and results in a Stabilized Surface.

(10) A person performing Earth-Moving Activities during High Wind Conditions shall:

(a) Cease all Active Operations; or

(b) Apply water to soil not more than 15 minutes prior to moving such soil to limit VDE to 20 percent opacity.

(11) The owner/operator of Disturbed Surface Areas during High Wind Conditions shall:

(a) Apply water with a mixture of Chemical Stabilizer diluted to not less than 1/20 of the concentration required to maintain a Stabilized Surface for a period of six months only on the last day of Active Operations prior to a weekend, holiday, or any other period when Active Operations will not occur for not more than four consecutive days;

(b) Apply Chemical Stabilizers prior to high wind event;

(c) Apply water to all unstabilized Disturbed Areas three times per day. Watering frequency should be increased to a minimum of four times per day if there is any evidence of visible Wind-Driven Fugitive Dust;

(d) Establish a vegetative ground cover within 30 days after Active Operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter;

(e) Apply Chemical Stabilizers within seven working days of grading completion; or

(f) Utilize any combination of control actions listed such that, in total, these actions apply to all Disturbed Surface Areas.

(12) Owners/operators of Unpaved Roads during high winds shall:

(a) Apply Chemical Stabilizers prior to wind event;

(b) Apply water once per hour during active operation; or

(c) Stop all vehicular traffic.

(13) Owners/operators of Open Storage Piles during high winds shall:

(a) Apply Chemical Stabilizers;

(b) Apply water to at lest 70 percent of the surface area of all Open Storage Piles on a daily basis when there is evidence of Wind-Driven Fugitive Dust;

(c) Install temporary coverings; or

(d) Install a three sided enclosure which will extend, at a minimum, to the top of the pile.

(14) Owners/operators of all categories during high winds shall:

(a) Use any other control measures approved by the APCO and the USEPA as equivalent to the methods specified in section (C).

## (D) Dust Control Plan

(1) An owner/operator shall submit a Dust Control Plan (DCP) to the APCO prior to the start of any construction activity on any site that will include ten acres or more of Disturbed Surface Area for residential developments, or five acres or more of Disturbed Surface Area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of Bulk Materials on at least three days. Construction activities shall not commence until the APCO has approved or conditionally approved the DCP. An owner/operator shall provide written notification to the APCO within ten days prior to the commencement of Earth-Moving Activities via fax or mail. The requirement to submit a DCP shall apply to all such activities conducted for residential and non-residential (e.g., commercial, industrial, or institutional) purposes or conducted by any governmental entity.

(a) Install and maintain project signage with project contact prior to initiating any Earth-Moving Activities that;

(i) Identifies phone numbers for dust complaints; and
(ii) Meets minimum standards of Rule 403, Appendix "A".

(b) An owner/operator may submit one DCP covering multiple projects at different sites where construction will commence within the next 12 months provided the DCP includes each project size, location, and types of activities to be performed. The DCP shall specify the expected start and completion date of each project.

(c) The DCP shall describe all Fugitive Dust control measures to be implemented before, during, and after any dust generating activity.

(d) A DCP shall contain all the information described in section (D)(1)(h)(i) through (D)(1)(h)(viii). The APCO shall approve, disapprove, or conditionally approve the DCP within ten days of DCP submittal. A DCP is deemed automatically approved if, after ten days following receipt by the District, the District does not provide any comments to the owner/operator regarding the DCP.

(e) An owner/operator shall submit a copy of a DCP approval letter to the building and safety authority prior to issuance of a grading permit.

(f) An owner/operator shall retain a copy of an approved DCP at the project site. The approved DCP shall remain valid until the termination of all dust generating activities. Failure to comply with the provisions of an approved DCP is deemed to be a violation of this rule. Regardless of whether an approved DCP is in place or not, or even when the owner/operator responsible for the DCP is complying with an approved DCP, the owner/operator is still subject to comply with all requirements of Rule 403 at all times.

(g) An owner/operator shall maintain daily records to document the specific dust control actions taken, maintain such records for a period of not less than three years; and make such records available to the APCO upon request.

(h) A DCP shall contain all of the following information:

(i) Name(s), address(es), and phone number(s) of person(s) and owner(s)/operator(s) responsible for the preparation, submittal, and implementation of the DCP and responsible for the dust generating operation and the application of dust control measures.

(ii) A plot plan which shows the type and location of each project.

(iii) The total area of land surface to be disturbed, daily throughput volume of earthmoving in cubic yards, and total area in acres of the entire project site.

(iv) The expected start and completion dates of dust generating and soil disturbance activities to be performed on the site.

(v) The actual and potential sources of Fugitive Dust emissions on the site and the location of Bulk Material handling and storage areas, paved and Unpaved Roads; entrances and exits where carryout/Track-out may occur; and traffic areas.

(vi) Dust Suppressants to be applied, including: product specifications; manufacturer's usage instructions (method, frequency, and intensity of application); type, number, and capacity of application equipment; and information on environmental impacts and approvals or certifications related to appropriate and safe use for ground application.

(vii) Specific surface treatment(s) and/or control measures utilized to control material carryout, Track-out, and sedimentation where unpaved and/or access points join paved public access roads.

(viii) Identify a dust control supervisor that:

a. Is employed by or contracted with the property owner or developer;
b. Is on the site or available on-site within 30 minutes during working hours;
c. Has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with Rule requirements; and
d. Has completed the AVAQMD Fugitive Dust Control Class and has been issued a valid Certification of Completion for the class.

(i) Notify the APCO in writing within 30 days after the site no longer qualifies as an active operation.

(j) Any approved DCP shall be valid for a period of one year from the date of approval or conditional approval of the DCP. DCPs must be resubmitted annually, at least 60 days prior to the expiration date, or the DCP shall become disapproved as of the expiration date. If all Fugitive Dust sources and corresponding control measures or special circumstances remain identical to those identified in the previously approved DCP, the resubmittal may contain a simple statement of no-change. Otherwise, a resubmittal must contain all the items specified in subparagraphs (D)(1)(h).

## (E) Compliance Schedule

All the newly amended provisions of this rule shall become effective upon adoption of this rule amendment.

## (F) Exemptions

(1) The provisions of this rule shall not apply to:

(a) Agricultural Operations.

(b) Unpaved Roads not part of an industrial or commercial facility.

(c) Any Disturbed Surface Area less than one-half acre on property zoned for residential uses.

(d) Active Operations conducted during emergency life-threatening situations, or in conjunction with any officially declared disaster or state of emergency.

(e) Active Operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions.

(f) Any Contractor subsequent to the time the contract ends, provided that such Contractor implemented the required control measures during the contractual period.

(g) Any grading Contractor, for a phase of Active Operations, subsequent to the contractual completion of that phase of Earth-Moving Activities, provided that the required control measures have been implemented during the entire phase of Earth-Moving Activities, through and including five days after the final grading inspection.

(h) Weed abatement operations ordered by a county agricultural commissioner or any state, county, or municipal fire department, provided that:

(i) Mowing, cutting or other similar process is used which maintains weed stubble at least three inches above the soil; and

(ii) Any disking or similar operation which cuts into and disturbs the soil, where watering is used prior to initiation of these activities, and a determination is made by the agency issuing the weed abatement order that, due to fire hazard conditions, rocks, or other physical obstructions, it is not practical to meet the conditions specified in (F)(1)(h)(i). The provisions of this clause shall not exempt the owner of any property from stabilizing Disturbed Surface Areas which have been created as a result of the weed abatement actions.

(i) Blasting operations which have been permitted by the California Division of Industrial Safety.

(j) Motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this exemption, the APCO must receive notification in writing at least 72 hours in advance of any such activity and no nuisance results from such activity.

(2) The provisions of paragraphs (C)(1) through (C)(14) shall not apply:

(a) When high winds exceed 25 miles per hour, provided that:

(i) The required control measures for High Wind Conditions are implemented for each applicable Fugitive Dust source type, as specified in section (C)(10) through (C)(14);

(ii) Maintain daily records to document the specific actions taken;

(iii) Maintain such records for a period of not less than six months; and

(iv) Make such records available to the APCO upon request.

(b) To Unpaved Roads, provided such roads:

(i) Are used solely for the maintenance of wind-generating equipment; or

(ii) Meet all of the following criteria:

a. Are less than 50 feet in width at all points along the road;

b. Are within 25 feet of the Property Line; and

c. Have a traffic volume less than 20 vehicle-trips per day.

(c) To any Active Operation, Open Storage Pile, or Disturbed Surface Area for which necessary Fugitive Dust preventive or mitigative actions are in conflict with the federal Endangered Species Act.

(d) To Non-routine or emergency maintenance of flood control channels and water spreading basins.

(4) The provisions of section (C)(3) shall not apply to earth coverings of public Paved Roads where such coverings are approved by a local government agency for the protection of the roadway, and where such coverings are used as roadway crossings for haul vehicles.

(5) The provisions of section (D) shall not apply to:

(a) Officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and county regional parks.

## (G) Fees

(1) Any person subject to a Dust Control Plan submittal pursuant to section (D) shall be assessed applicable filing and evaluation fees pursuant to Rule 306.

(2) The submittal of an annual statement of no-change, pursuant to section (D)(1)(i), shall not be considered as an annual review, and therefore shall not be subject to annual review fees, pursuant to Rule 306.

(3) The owner/operator of any facility for which the APCO conducts upwind/downwind monitoring for $PM_{10}$ pursuant to section (C)(2) shall be assessed applicable Ambient Air Analysis Fees pursuant to Rule 304.1.

[SIP: Submitted as amended mm/dd/yy on mm/dd/yy; Submitted as amended 2/14/97 on 8/1/97; Submitted as amended 7/9/93 on 7/13/94; Approved 9/8/78, 43 FR 40011, 40 CFR 52.220(c)(39)(iii)(C); Approved 6/14/78, 43 FR 25684, 40 CFR 52.220(c)(32)(iv)(A)]

Appendix "A"

# CONSTRUCTION SITE SIGNAGE GUIDELINES
(Minimum Requirements)

The purpose of this signage is to allow the public to contact the responsible party if Visible Dust Emissions or Track-out of material is observed from a construction site.

| | |
|---|---|
| Project size | ≥ Ten Acres |
| Sign size | 48" x 96" |

## Sign Template

| | |
|---|---|
| Permit # ( if applicable) | 4" |
| Site Name | 4" |
| Project Name / Tract # # # # | 4" |
| IF YOU SEE DUST COMING<br>FROM THIS PROJECT CALL | 4" |
| Name, Phone Number(XXX) XXX-XXXX | 6" |
| If you do not receive a response, Please call<br>The Antelope Valley AQMD at 1-877-723-8070 | 3" |

Notes:

Signage must be located within 50 feet of each project site entrance.

No more than four signs are required per site/facility.

One sign is sufficient for multiple site entrances located within 300 yards of each other.

Text height shall be at a minimum as shown on right side of sign template above.

Sign background must contrast with lettering, typically black text with white background.

Sign should be one inch AC laminated plywood board.

The lower edge of the sign board must be a minimum of six feet and a maximum of seven feet above grade.

The telephone number listed for the contact must be a local or a toll-free number and shall be accessible 24 hours per day.

# Appendix A.3

## Operation Impacts

- Onroad Emissions Calculations

**West Antelope Solar**
**Operational Emissions**

| | |
|---|---|
| Year | 2013 |
| Total Trips | 50 |
| Roundtrip Distance | 100 |
| Total VMT | 5,000 |

Grams per Trip Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 7.39 | 2.92 | 53.74 | 0.01 | 0.04 | 0.03 | 483.11 |

Grams per Mile Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.28 | 0.49 | 4.96 | 0.00 | 0.05 | 0.02 | 372.88 |

Trip Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 |

VMT Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 2.06 |

Total Worker Commute Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.0020 | 0.0029 | 0.0303 | 0.0000 | 0.0003 | 0.0001 | 2.0818 |

**West Antelope Solar**
**Water Truck Emissions**

| | |
|---|---|
| Year | 2013 |
| Total Trips | 100 |
| Roundtrip Distance | 20 |
| Total VMT | 2,000 |

Grams per Trip Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 21.48 | 113.29 | 96.08 | 0.18 | 1.61 | 1.48 | 18,686.73 |

Grams per Mile Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.37 | 7.46 | 1.84 | 0.02 | 0.35 | 0.27 | 1,699.93 |

Trip Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 2.06 |

VMT Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 3.75 |

Total Water Truck-Related Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.0032 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 5.81 |

**West Antelope Solar**
**Additional Water Truck Emissions (1st Year)**

| | |
|---|---|
| Year | 2013 |
| Total Trips | 195 |
| Roundtrip Distance | 20 |
| Total VMT | 3,900 |

Grams per Trip Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 21.48 | 113.29 | 96.08 | 0.18 | 1.61 | 1.48 | 18,686.73 |

Grams per Mile Emission Factors

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.37 | 7.46 | 1.84 | 0.02 | 0.35 | 0.27 | 1,699.93 |

Trip Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.00 | 0.02 | 0.02 | 0.00 | 0.00 | 0.00 | 4.02 |

VMT Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.00 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 7.31 |

Total Water Truck-Related Emissions (tpy)

| ROC | NOX | CO | SOX | PM10 | PM2.5 | CO2 |
|---|---|---|---|---|---|---|
| 0.0062 | 0.06 | 0.03 | 0.00 | 0.00 | 0.00 | 11.32 |

# Appendix A.4

## Greenhouse Gas Emissions Displacement Calculations

**West Antelope Solar**
**Emission Displacement Calculations**

**Assumptions**

| | | |
|---|---|---|
| Capacity Factor | 26% | |
| Conversion | 8,766 | Hours/Year |
| Conversion | 2,000 | pounds/US short ton |

| | **Project Scenario** |
|---|---|
| Project Capacity (MW) | 20 |
| Project Energy (MWh) | 45,582 |

**Power Supply Emissions**

| | Emission Factor[1] (lbs/MWh) | Short Ton |
|---|---|---|
| Carbon Dioxide (CO2) | 4.31E+02 | 9,823 |

**Total Emissions: Carbon Dioxide Equivalents**

| | Global Warming Potential[1] | Short Ton |
|---|---|---|
| CO2 | 1 | 9,823 |
| **CO2e Displacement (short tons)** | | **9,823** |

**References**

[1] http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_fa

# APPENDIX B-1

# JURISDICTIONAL DELINEATION REPORT

# JURISDICTIONAL DELINEATION REPORT

## WEST ANTELOPE SOLAR PROJECT, UNINCORPORATED LOS ANGELES COUNTY, CALIFORNIA

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August 2012

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# 1.0 INTRODUCTION

This Jurisdictional Delineation Report (report) was prepared for TUUSSO/TA – Acacia to provide baseline data concerning the type and extent of resources under the jurisdiction of the U.S. Army Corps of Engineers (USACE), the California Department of Fish and Game (CDFG), and the Regional Water Quality Control Board (RWQCB) for the West Antelope Solar Project (hereinafter referred to as the "Proposed Project"). This Jurisdictional Delineation Report is based on the jurisdictional delineation survey performed on May 22, 2012.

## 1.1 PROJECT LOCATION AND DESCRIPTION

A jurisdictional delineation was completed within the existing limits of the Proposed Project (hereinafter referred to as "the Project Site"). The Site is located in unincorporated Los Angeles County, just outside the western boundaries of the City of Lancaster (Exhibit 1). The Site is located on the U.S. Geological Survey's (USGS') Del Sur 7.5-minute quadrangle of the San Bernardino Meridian (Exhibit 2). The northern boundary of the Project site is approximately 330 feet south of and parallel with West Avenue I-8 (also referred to as Lancaster Blvd.). The Project site is further bordered by 110th Street West to the east, West Avenue J-8 to the south, and 115th Street West to the west. The Project site is bisected by West Avenue J, dividing it into a "North Portion" (comprising ±110 acres) and a "South Portion" (comprising ±153 acres). The Gen-Tie Line will run parallel with West Avenue J approximately 1.5 miles to the Antelope Substation, located at 95th Street West and West Avenue J. At 95th Street West and West Avenue J, the Gen-Tie Line would enter the Antelope Substation in order to electrically interconnect the Project to the existing transmission infrastructure. Land uses in the Project Site's immediate vicinity consist of mostly disturbed vacant land that has been used for agricultural production and a public road. The topography of the Project Site is relatively flat.

## 1.2 REGULATORY AUTHORITY

### 1.2.1 Summary of Regulations

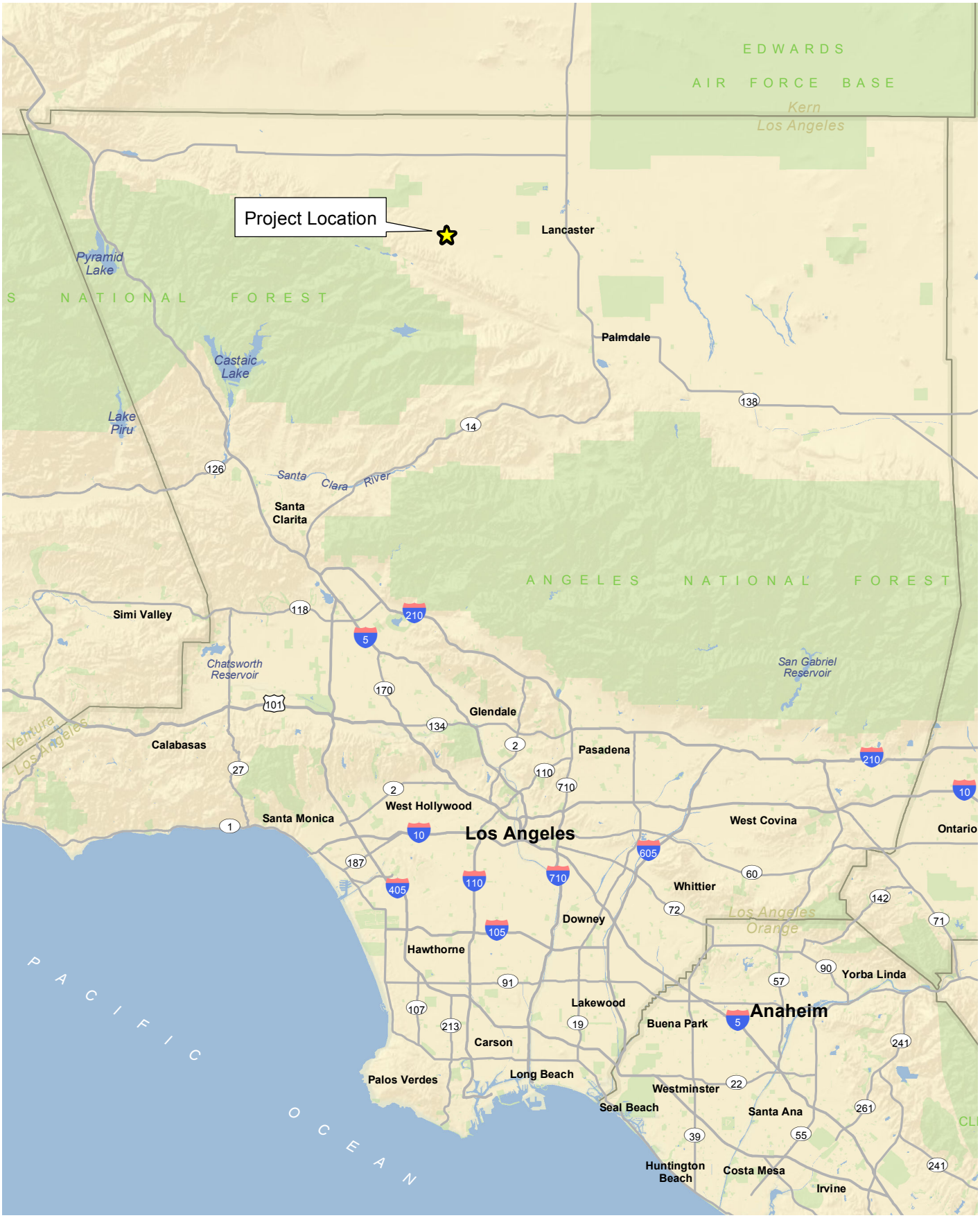
***U.S. Army Corps of Engineers***

The USACE Regulatory Branch regulates activities that discharge dredged, or fill materials into "Waters of the U.S." under Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. This permitting authority applies to all "Waters of the U.S." where the material (1) replaces any portion of "Waters of the U.S." with dry land or (2) changes the bottom elevation of any portion of any "Waters of the U.S.". These fill materials would include sand, rock, clay, construction debris, wood chips, and materials used to create any structure or infrastructure in these Waters. The selection of disposal sites for dredged or fill material is done in accordance with Section 404(b)(1) CWA guidelines, which were developed by the U.S. Environmental Protection Agency (USEPA).

Waters of the United States

"Waters of the U.S." can be divided into three categories: territorial seas, tidal waters, or non-tidal waters. The term "Waters of the U.S." is defined by the *Code of Federal Regulations* (CFR, Title 33, Navigation and Navigable Waters; Part 328, Definition of Waters of the United States; Section 328.3, Definitions) and includes:

1. All waters that have, are, or may be used in interstate or foreign commerce (including sightseeing or hunting), including all waters subject to the ebb and flow of the tide;
2. All interstate waters, including interstate wetlands;

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# Project Location

Exhibit 1

*West Antelope Solar Project*

N W E S

10 5 0 10 Miles

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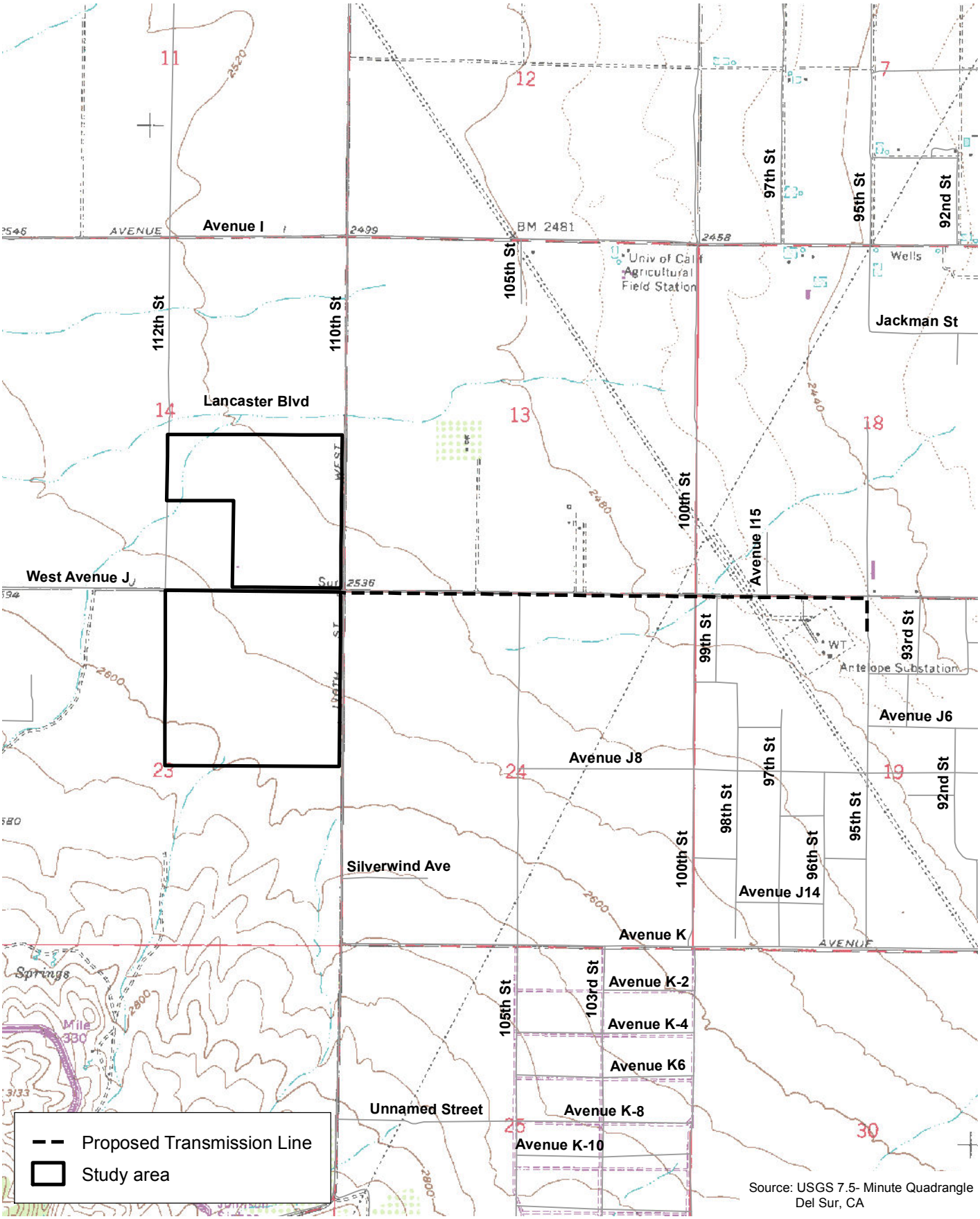


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# U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

*West Antelope Solar Project*

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

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3. All other waters such as intrastate lakes, rivers, or streams (including intermittent streams); mudflats; sand flats; wetlands; sloughs; prairie potholes; wet meadows; playa lakes; or natural ponds where the use, degradation, or destruction of which could affect interstate or foreign commerce;
4. All impoundments of waters otherwise defined as "Waters of the U.S." under the definition;
5. All tributaries of waters identified above;
6. The territorial seas; and
7. All wetlands adjacent to waters (other than waters that are themselves wetlands) identified above.

Ordinary High Water Mark

The landward limit of tidal "Waters of the U.S." is the high-tide line. In non-tidal waters where adjacent wetlands are absent, jurisdiction extends to the ordinary high water mark (OHWM). In the absence of wetlands in non-tidal waters, the extent of jurisdictional limits is determined by the OHWM. The OHWM is defined as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" (33 CFR §328.3[e]).

Wetlands

A wetland is a subset of jurisdictional waters and is defined by the USACE and the USEPA as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR §328.3[b]). Wetlands generally include swamps, marshes, bogs, and areas containing similar features. The definition and methodology for identifying wetland resources can be found in the USACE's *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (2008b), a supplement to the USACE's *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). The methodology contained in this supplement was used to identify the type and extent of wetland resources within the boundaries of the survey area.

On June 19, 2006, a majority of the U.S. Supreme Court overturned two Sixth Circuit Court of Appeals decisions, finding that certain wetlands constituted "Waters of the U.S." under the CWA. Justice Scalia argued that "Waters of the U.S." should not include channels through which water flows intermittently or ephemerally, or channels that periodically provide drainage for rainfall. He also stated that a wetland may not be considered "adjacent to" remote "Waters of the U.S." based on a mere hydrologic connection. On June 5, 2007, the USACE published a memorandum that provides guidance to both the USEPA regions and the USACE districts that implement the Supreme Court's decision in the Rapanos cases[1] (which address the jurisdiction over "Waters of the U.S." under the CWA). The memorandum includes a chart that summarizes its key points, which is intended to be used as a reference tool along with a complete discussion of issues and guidance furnished throughout the memorandum.

In summary, the USACE and the USEPA will assert jurisdiction over the following waters: (1) traditional navigable waters (TNW); (2) wetlands adjacent to a TNW; (3) relatively

[1] Consolidated cases: *Rapanos v. United States* & *Carabell v. United States* refer to the U.S. Supreme Court's decision concerning USACE jurisdiction over "Waters of the U.S." under the Clean Water Act.

permanent, non-navigable tributaries of a TNW that typically flow year-round or have continuous flow at least seasonally (e.g., typically three months); and (4) wetlands that directly abut such tributaries.

The USACE and the USEPA will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a TNW: (1) non-navigable tributaries that are not relatively permanent; (2) wetlands adjacent to non-navigable tributaries that are not relatively permanent; and (3) wetlands adjacent to but that do not directly abut a relatively permanent, non-navigable tributary.

The USACE and the USEPA generally will not assert jurisdiction over the following features: (1) swales or erosional features (e.g., gullies or small washes characterized by low volume, infrequent, or short duration flow) and (2) ditches (including roadside ditches) excavated wholly within and draining only uplands and that do not carry a relatively permanent flow of water.

The USACE and the USEPA will apply the significant nexus standard defined as follows:

1. A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of downstream TNWs.
2. A significant nexus includes consideration of hydrologic and ecological factors.

***Regional Water Quality Control Board***

The RWQCB is the primary agency responsible for protecting water quality within California through the regulation of discharges to surface waters under the CWA and the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The RWQCB's jurisdiction extends to all "Waters of the State" and to all "Waters of the U.S.", including wetlands (isolated and non-isolated).

Section 401 of the CWA provides the RWQCB with the authority to regulate, through a Water Quality Certification, any proposed, federally permitted activity that may affect water quality. Among such activities are discharges of dredged or fill material permitted by the USACE pursuant to Section 404 of the CWA. Section 401 requires the RWQCB to provide "certification that there is reasonable assurance that an activity which may result in the discharge to 'Waters of the U.S.' will not violate water quality standards". Water Quality Certification must be based on a finding that the proposed discharge will comply with water quality standards, which contain numeric and narrative objectives that can be found in each of the nine RWQCBs' Basin Plans.

The Porter-Cologne Act provides the State with very broad authority to regulate "Waters of the State" (which are defined as any surface water or groundwater, including saline waters). The Porter-Cologne Act has become an important tool in the post-SWANCC (*Solid Waste Agency of Northern Cook Counties vs. Unites States Corps of Engineers*) and Rapanos era with respect to the State's authority over isolated waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a "Report of Waste Discharge" (WDR) when there is no federal nexus, such as under Section 404(b)(1) of the CWA. Although "waste" is partially defined as any waste substance associated with human habitation, the RWQCB interprets this to include fill discharge into water bodies.

### *California Department of Fish and Game*

The CDFG has jurisdictional authority over wetland resources associated with rivers, streams, and lakes pursuant to the *California Fish and Game Code* (§§1600–1616). Activities of State and local agencies as well as public utilities that are project proponents are regulated by the CDFG under Section 1602 of the *California Fish and Game Code;* this section regulates any work that will (1) substantially divert or obstruct the natural flow of any river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

Because the CDFG includes streamside habitats under its jurisdiction that, under the federal definition, may not qualify as wetlands on a particular project site, its jurisdiction may be broader than that of the USACE. Riparian forests in California often lie outside the plain of ordinary high water regulated under Section 404 of the CWA, and often do not have all three parameters (wetland hydrology, hydrophytic vegetation, and hydric soils) sufficiently present to be regulated as a wetland. However, riparian forests are frequently within CDFG regulatory jurisdiction under Section 1602 of the *California Fish and Game Code.*

The CDFG enters into a Lake or Streambed Alteration Agreement (SAA) with a project proponent and can impose conditions on the agreement. The notification process involves the completion of the applications that will serve as the basis for the CDFG's issuance of a Section 1602 SAA. Section 1602 of the *California Fish and Game Code* applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State.

The CDFG jurisdictional limits are not as clearly defined by regulation as those of the USACE. While they closely resemble the limits described by USACE regulations, they include riparian habitat supported by a river, stream, or lake regardless of the presence or absence of hydric and saturated soils conditions. In general, the CDFG takes jurisdiction from the top of a stream bank or to the outer limits of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place within or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish and other aquatic plant and/or wildlife species, and watercourses that have a surface or subsurface flow that support or have supported riparian vegetation.

## 2.0 METHODOLOGY

The three-parameter approach used to identify USACE wetlands is summarized in Sections 2.1 through 2.3; literature reviewed for the preparation of the delineation is outlined in Section 2.4; and the field delineation is outlined in Section 2.5. Methodologies for identifying USACE and RWQCB jurisdictions are contained in Sections 4.1 and 4.2, respectively. Methodologies for identifying CDFG jurisdiction is contained in Section 4.3.

### 2.1 VEGETATION

Hydrophytic vegetation (or hydrophytes) is defined as any macrophytic plant that is typically adapted to and subsequently grows within water or that is on a substrate at least periodically deficient in oxygen; this oxygen deficiency can be a result of excessive saturation conditions that range from open water to periodically saturated soils. Specifically, these plant species are specialized and can survive in permanently saturated to periodically saturated soils where oxygen levels are very low or the soils are anaerobic. The U.S. Fish and Wildlife Service (USFWS) has identified approximately 2,000 plant species of this type within the State of California (i.e., Zone 0) and nearly 5,000 species throughout the U.S. (Reed 1988). The wetland

indicator categories reflect the range of estimated probabilities (expressed as a frequency of occurrence) that a species occurs in wetlands versus non-wetlands. Therefore, a frequency of 67 percent to 99 percent means that 67 percent to 99 percent of sample plots containing the species randomly selected across the range of the species are a wetland. A positive (+) or negative (-) sign is used with the wetland indicator categories to more specifically define the regional frequency of a species' occurrence in wetlands (Reed 1988). The positive sign indicates a frequency toward the higher end of the category (i.e., more frequently found in wetlands), and a negative sign indicates a frequency toward the lower end of the category (less frequently found in wetlands). The positive and negative modifiers are eliminated from the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* when determining if an area meets the hydrophytic plant criterion for a wetland. Species not listed by Reed (1988) are considered to be upland (UPL).

Plant indicator status categories are as follows:

- ***Obligate Wetland (OBL):*** Plants that occur almost always (estimated probability 99 percent) in wetlands under natural conditions, but which may also occur rarely (estimated probability one percent) in non-wetlands (e.g., cattails [*Typha* spp.] or common water hyacinth [*Eichhornia crassipes*]).
- ***Facultative Wetlands (FACW):*** Plants that occur usually (estimated probability 67-99 percent) in wetlands, but also occur (estimated probability 1–33 percent) in non-wetlands (e.g., mule fat [*Baccharis salicifolia*] or arroyo willow [*Salix lasiolepis*]).
- ***Facultative (FAC):*** Plants with similar likelihood (estimated probability 34–66 percent) of occurring in both wetlands and non-wetlands (e.g., California saltbush [*Atriplex californica*]).
- ***Facultative Upland (FACU):*** Plants that occur sometimes (estimated probability 1-33 percent) in wetlands, but occur more often (estimated probability 67–99 percent) in non-wetlands (e.g., giant wild rye [*Leymus condensatus*]).
- ***Obligate Upland (UPL):*** Plants that occur rarely (estimated probability 1 percent) in wetlands, but occur almost always (estimated probability 99 percent) in non-wetlands under natural conditions (e.g., coast live oak [*Quercus agrifolia*]).

The following are three procedures for determining hydrophytic vegetation, as identified in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008b): Indicator 1, "Dominance Test", using the "50/20 Rule"; Indicator 2, "Prevalence Index"; or Indicator 3, "Morphological Adaptation". Hydrophytic vegetation is present if any indicator is satisfied. If none of the indicators are satisfied, then hydrophytic vegetation is absent unless (1) indicators of hydric soil and wetland hydrology are present and (2) the site meets the requirements for a problematic wetland situation.

- ***Dominance Test:*** Vegetative cover is estimated and is ranked according to its dominance. Dominant species are the most abundant species for each stratum of the community (i.e., tree, sapling/shrub, herb, or woody vine) that individually or collectively amount to 50 percent of the total coverage of vegetation plus any other species that, by itself, accounts for 20 percent of the total vegetation cover (also known as the "50/20 Rule"). These species are recorded on the "Wetland Determination Data Form – Arid West Region". The wetlands indicator status of each species is also recorded on the data forms based on the *National List of Plant Species that Occur in Wetlands* (Reed 1988). If greater than 50 percent of the dominant species across all strata are OBL, FACW, or FAC species, the criterion for wetland vegetation is considered to be met.

- ***Prevalence Index:*** The prevalence index considers all plant species in a community, not just the dominant ones. The prevalence index is the average of the wetland indicator status of all plant species in a sampling plot. Each indicator status category is given a numeric code (OBL=1, FACW=2, FAC=3, FACU=4, and UPL=5) and is weighted by the species' abundance (percent cover). Hydrophytic vegetation is present if the prevalence index is 3.0 or less.
- ***Morphological Adaptation:*** Morphological adaptations, such as adventitious roots (i.e., roots that take advantage of the wet conditions) and shallow root systems must be observed on more than 50 percent of the individuals of a FACU species for the hydrophytic vegetation wetland criterion to be met.

## 2.2 SOILS

The National Technical Committee for Hydric Soils (NTCHS) defines a hydric soil as a soil that is formed under conditions of saturation, flooding, or ponding that occurs long enough during the growing season to develop anaerobic conditions (or conditions of limited oxygen) at or near the soil surface and that favor the establishment of hydrophytic vegetation. It should be noted that hydric soils created under artificial conditions of flooding and inundation sufficient for the establishment of hydrophytic vegetation would also meet this hydric soils indicator.

The soil conditions are verified by digging test pits along each transect to a depth of at least 20 inches (except where a restrictive layer occurs in areas containing hard pan, cobble, or solid rock). It should be noted that at some sites, it may be necessary to make exploratory soil test pits up to 40 inches deep to more accurately document and understand the variability in soil properties and hydrologic relationships on the site. Soil test pit locations are usually dug within the drainage invert or at the edge of a drainage course within vegetated areas. Soil extracted from each soil test pit is then examined for texture and color using the standard plates within the Munsell Soil Color Chart (1994) and recorded on the Data Form. The Munsell Soil Color Chart aids in designating soils by color labels based on gradations of three simple variables: hue, value, and chroma. Any indicators of hydric soils such as redoximorphic features (i.e., areas where iron is reduced under anaerobic conditions and oxidized following a return to aerobic conditions); buried organic matter; organic streaking; reduced soil conditions; gleyed (i.e., soils having a characteristic bluish-gray or greenish-gray in color) or low-chroma soils; or sulfuric odor are also recorded on the Data Form. If hydric soils are found, progressive pits are dug along the transect moving laterally away from the active channel area until hydric soil features are no longer present within the top 20 inches of the soil.

## 2.3 HYDROLOGY

Wetlands hydrology is represented by either (1) all of the hydrological elements or characteristics of areas permanently or periodically inundated or (2) areas containing soils that are saturated for a sufficient duration of time to create hydric soils suitable for the establishment of plant species that are typically adapted to anaerobic soil conditions. The presence of wetland hydrology is evaluated at each intersect by recording the extent of observed surface flows; the depth of inundation; the depth to saturated soils; and the depth to free water in soil test pits. In instances where stream flow is divided into multiple channels with intervening sandbars, the entire area between the channels is considered within the OHWM. Therefore, an area containing these features would meet the indicator requirements for wetland hydrology.

## 2.4 LITERATURE

Prior to conducting the delineation, BonTerra Consulting reviewed the following documents to identify areas that may fall under agency jurisdiction: the USGS Del Sur 7.5-minute topographic

quadrangle; color aerial photography provided by Aerials Express (2009); the Report and General Soil Map, Los Angeles County, Antelope Valley part, California (USDA NRCS 2012); the National Hydric Soils List (USDA NRCS 2012); and the National Wetlands Inventory's Wetland Mapper (USFWS 2012). A description of this literature is provided below.

***USGS Topographic Quadrangle:*** USGS quadrangle maps show geological formations and their characteristics; they describe the physical settings of an area through topographic contour lines and other major surface features. These features include lakes, streams, rivers, buildings, roadways, landmarks, and other features that may fall under the jurisdiction of one or more regulatory agencies. In addition, the USGS maps provide topographic information that is useful in determining elevations, latitude and longitude, and Universal Transverse Mercator Grid coordinates for a project site.

The Del Sur quadrangle reflects two blueline stream within the boundary of the Site.

***Color Aerial Photography:*** BonTerra Consulting reviewed an existing color aerial photograph prior to the May 22, 2012, site visit to identify the extent of any drainages and riparian vegetation occurring on the Project Site.

The Project Site currently consists of mostly disturbed vacant land that has been used for agricultural production. The Project Site is bordered by Lancaster Boulevard to the north, an unnamed dirt road to the south, 110$^{th}$ Street West to the east, and 115$^{th}$ Street West to the west. The paved roads include 110$^{th}$ Street West and West Avenue J.

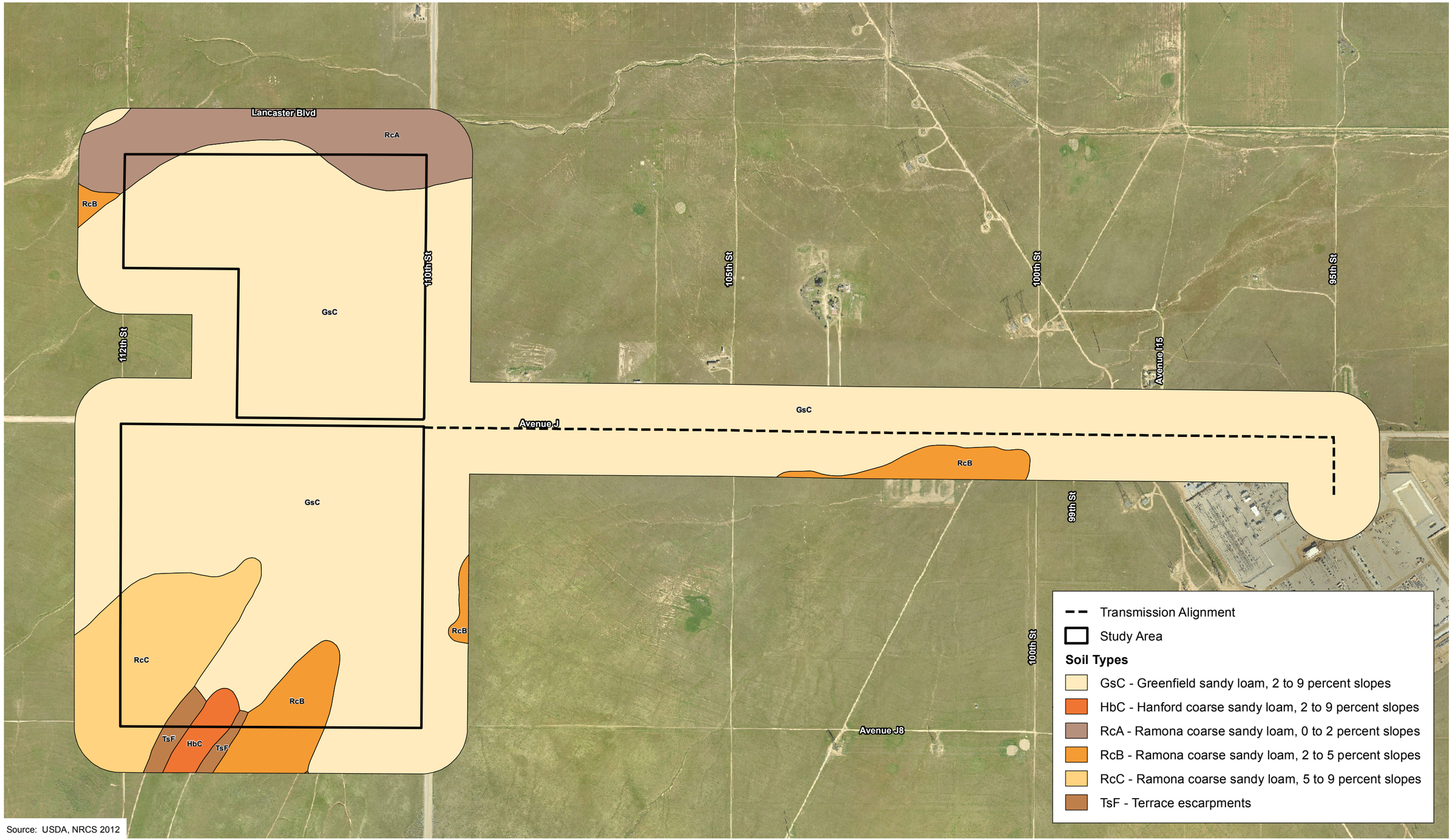
***U.S. Department of Agriculture, Natural Resources Conservation Service:*** The presence of hydric soil is one of the chief indicators of jurisdictional wetlands. BonTerra Consulting reviewed U.S. Department of Agriculture (USDA) soil data for the survey area and determined that, as shown on Exhibit 3, the soils were mapped as Greenfield sandy loam (2 to 9 percent slopes), Hanford coarse sandy loam (2 to 9 percent slopes), Ramona coarse sandy loam (0 to 2 percent slopes), Ramona coarse sandy loam (2 to 5 percent slopes), Ramona coarse sandy loam (5 to 9 percent slopes) and Terrace escarpments (USDA NRCS 2012). Of these soils, Ramona coarse sandy loam (0 to 2 percent slopes) is listed as "hydric" on the National Hydric Soils List for Antelope Valley Area, California (USDA NRCS 2012).

***U.S. Fish and Wildlife Service, National Wetlands Inventory:*** The Wetlands Mapper shows wetland resources available from the Wetlands Spatial Data Layer of the National Spatial Data Infrastructure (USFWS 2012). This resource provides the classification of known wetlands following the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). This classification system is arranged in a hierarchy of (1) Systems that share the influence of similar hydrologic, geomorphologic, chemical, or biological factors (i.e., Marine, Estuarine, Riverine, Lacustrine, and Palustrine); (2) Subsystems (i.e., Subtidal and Intertidal; Tidal, Lower Perennial, Upper Perennial, and Intermittent; or Littoral and Limnetic); (3) Classes, which are based on substrate material and flooding regime or on vegetative life forms; (4) Subclasses; and (5) Dominance Types, which are named for the dominant plant or wildlife forms. In addition, there are modifying terms applied to Classes or Subclasses.

The National Wetlands Inventory does not identify any wetlands resources within the Project Site.

## 2.5 JURISDICTIONAL DELINEATION

In September 2008, the USACE issued the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region.* This regional supplement is designed for use with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). Both the 1987 Wetlands Manual and the Arid West Supplement to the manual provide technical




Source: USDA, NRCS 2012

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# Soil Types

Exhibit 3

*West Antelope Solar Project*

N W E S

800 400 0 800 Feet

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methods and guidelines for determining the presence of "Waters of the U.S." and wetland resources. A three-parameter approach is used to identify wetlands and requires evidence of wetland hydrology, hydrophytic vegetation, and hydric soils. Wetlands generally include swamps, marshes, bogs, and similar areas. In order to be considered a wetland, an area must exhibit at least minimal hydric characteristics within the three parameters. However, problem areas may periodically or permanently lack certain indicators due to seasonal or annual variability of the nature of the soils or plant species on site. Atypical wetlands lack certain indicators due to recent human activities or natural events. Guidance for determining the presence of wetlands in these situations is presented in the regional supplement. Non-wetland "Waters of the U.S." are delineated based on the limits of the OHWM, which can be determined by a number of factors, including erosion, the deposition of vegetation or debris, and changes in vegetation.

It should be noted that the RWQCB shares the USACE jurisdiction unless isolated conditions are present. If isolated waters conditions are present, the RWQCB takes jurisdiction using the USACE's definition of the OHWM and/or the three-parameter wetlands methodology pursuant to the 1987 Wetlands Manual. The CDFG's jurisdiction is defined as the top of the bank to the top of the bank of the stream, channel, or basin or to the outer limit of riparian vegetation located within or immediately adjacent to the river, stream, creek, pond, or lake.

The analysis contained in this report uses the results of one field survey conducted by Mr. Jonas Winbolt and Ms. Kristin Smith on May 22, 2012. Photographs of the Site are included in Exhibit 4. The field survey included the collection of vegetation and data regarding the lengths and widths of potential features. This information was recorded on a 1 inch equals 200 feet (1″=200′) scale aerial photograph (Exhibit 5).

## 3.0 RESULTS

### 3.1 VEGETATION

Vegetation was not formally analyzed due to lack of USACE jurisdiction. The vegetation within the Project Site consists of native annual grassland with small patches of native perennial grasses.

### 3.2 SOIL

Soil pits were not dug due to the absence of hydrophytic vegetative resources necessary to identify the limits of USACE jurisdictional wetlands.

### 3.3 HYDROLOGY

The Site contains two ephemeral drainage features. The drainage feature located on the northeastern boundary of the Project Site occurs along the west side of 110$^{th}$ Street West. This feature flows north, and join an offsite ephemeral drainage that drains easterly into 24-inch corrugated steel pipe culverts located at Lancaster Boulevard and 110$^{th}$ Street West. The second drainage consists of two tributaries that flow north to south. The easterly tributary crosses over Avenue J and terminates south of the road. Both of the tributaries are modified portions of the blueline drainage feature shown on the Del Sur 7.5 minute quadrangle map.

All drainage features within the West Antelope Valley Watershed ultimately flow into dry lakebeds, and consequently do not ultimately connect to traditional navigable waters; therefore, these drainage features which are within the West Antelope Valley Watershed would be considered "isolated waters". Therefore, the drainage features do not meet the requirements for USACE jurisdiction. The USACE would need to concur in this finding as part the submittal of a Preliminary Jurisdictional Determination request.

Photo 1 - Ave J and 110th, facing north.

Photo 2 - Lancaster and 110th, facing south.

Photo 3 - Southern USGS designated blueline feature does not contain evidence of a OHWM or bed and back and therefore was determined to be non-jurisdictional. Photo facing northeast.

Photo 4 - Representative photo of Features north of Avenue J, facing north.

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# Site Photographs

Exhibit 4

*West Antelope Solar Project*

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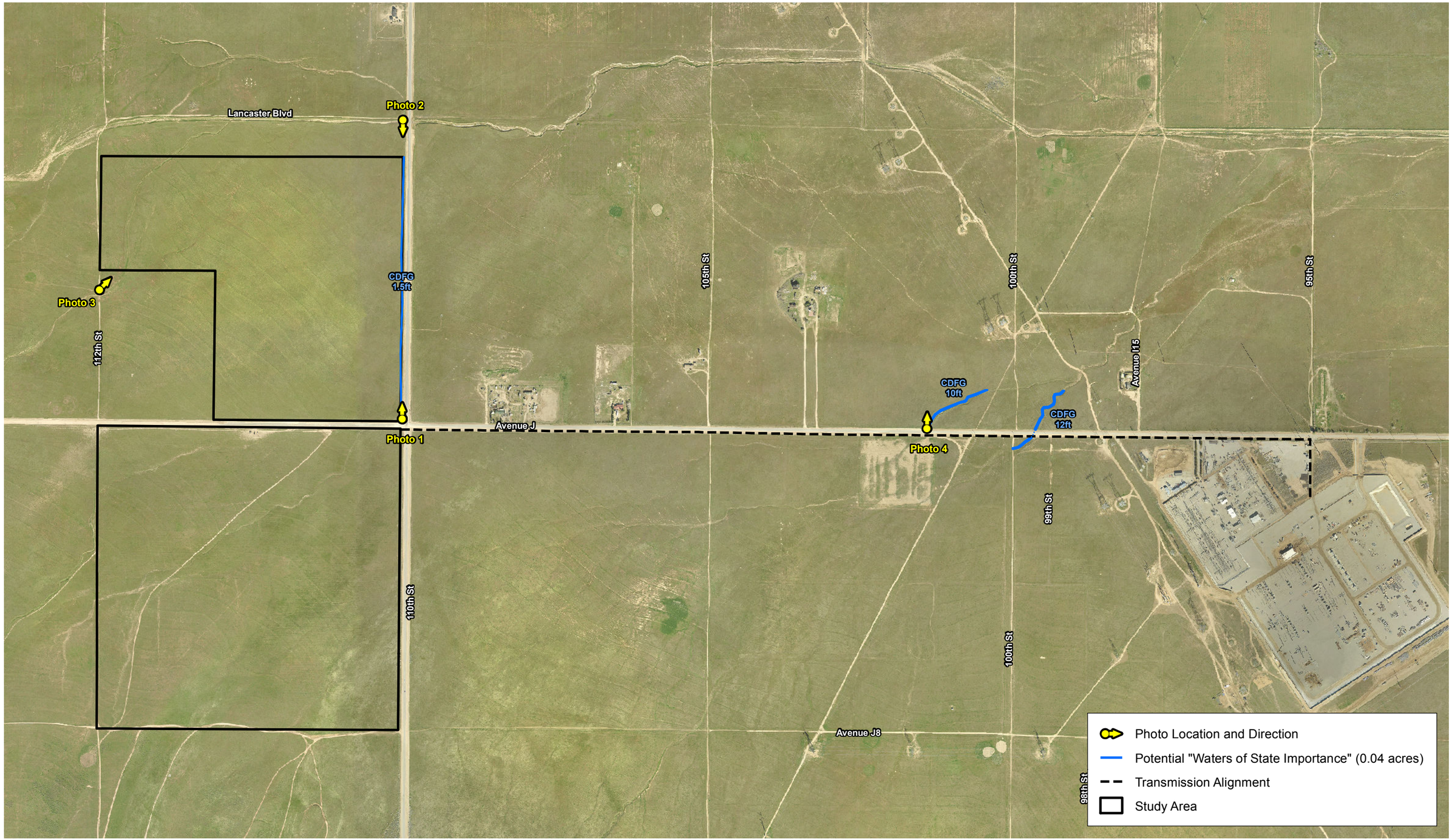


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California Department of Fish and Game

Exhibit 5

*West Antelope Solar Project*

N W E S

800 400 0 800 Feet

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# 4.0 JURISDICTIONAL DELINEATION

## 4.1 U.S. ARMY CORPS OF ENGINEERS DETERMINATION

***Wetlands Determination:*** As previously described in Section 2.0 of this report, an area must exhibit all three wetland parameters, as described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008b) and the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) in order to be considered a jurisdictional wetland. Due to the lack of the required wetlands components, there are no wetlands were detected within the boundaries of the Project Site.

***"Waters of the U.S." (Non-Wetland) Determination:*** Due to the lack of a nexus with a navigable water, there are no USACE jurisdictional waters within the Project Site. That is, the drainage features within the Project Site are located within the West Antelope Valley Watershed. Drainage features within this watershed do not ultimately connect to TNW or to waters that provide for interstate commerce. Therefore, all drainage features including those within the Project Site would be considered "isolated waters" (see Table 1).

The RWQCB jurisdictional boundaries are defined as those determined for the USACE under "Waters of the U.S.". However, the RWQCB takes jurisdiction over both connected and isolated waters. The two drainage features within Project Site are isolated. Therefore, these drainage features could be considered "jurisdictional waters" based on the presence and extent of an OHWM. Based on field observations and data collection, 0.04 (0.02 hectare) of potential jurisdiction of the RWQCB are located within the Project Site boundaries.

**TABLE 1**
**US ARMY CORPS OF ENGINEERS**
**ISOLATED WATERS**

| USACE Isolated Waters within West Antelope Solar Project | Isolated Waters Acres (Hectares) |
|---|---|
| **Total Area** | **0.04 (0.02)** |
| USACE: U.S. Army Corps of Engineers | |

## 4.2 CALIFORNIA DEPARTMENT OF FISH AND GAME DETERMINATION

The CDFG jurisdiction within the drainages extends from the top of the bank to the top of the bank and to the outer drip line in areas containing riparian vegetation. Based on the field observations and data collection, a total of approximately 0.04 (0.02 hectare) of potential jurisdiction of CDFG pursuant to the Section 1602 of the *California Fish and Game Code* are located within the Project Site boundaries (Exhibit 5; Table 2).

**TABLE 2**
**CALIFORNIA DEPARTMENT OF FISH AND GAME**
**JURISDICTIONAL RESOURCES**

| CDFG Jurisdiction within West Antelope Solar Project | Potential Jurisdictional Resources Acres (Hectares) |
|---|---|
| **Total Jurisdictional Area** | **0.04(0.02)** |
| CDFG: California Department of Fish and Game | |

# 5.0 CONCLUSION OF REGULATORY APPROVAL PROCESS

## 5.1 REGULATORY PERMIT REQUIREMENTS

It is the finding of this report that the Project Site does not contain resources that would be considered jurisdictional by the USACE. The USACE would need to concur in this finding. Once the findings of the delineation report have been concurred in by the appropriate agencies, the following permits, agreements, and certifications will be required prior to initiation of Project activities that involve impacts to these areas. A summary of the regulatory permit requirements is as follows:

- RWQCB WDR; and
- CDFG Section 1602 Streambed Alteration Agreement.

The Section 401 Water Quality Certification filing fee has a $640 base fee with additional fees based on the size of the dredge or fill unless the Project qualifies for a flat fee. For low impact discharges (e.g., discharge of less than 0.1 acre, 200 linear feet, and 25 cubic yards), there is no charge above the base fee. For fill and excavation discharges, there is a rate of $2,752 per acre of discharge. For dredging discharges, there is a rate of $0.102 per cubic yard of dredge volume.

The Streambed Alteration Agreement filing fee is based on project cost and length of permit authorization (i.e., maintenance permit for greater than five years). For projects lasting 5 years or less, the maximum fee is $4,482.75 for projects costing $500,000 or more; the fee decreases as cost decreases. For projects lasting longer than 5 years, there is a base fee of $2,689.50 plus a maximum of $4,482.75. The CDFG application submittal will not be deemed complete until the application fees have been paid and the agency is provided with a certified California Environmental Quality Act (CEQA) document and a signed copy of the receipt of County Clerk filing fees for the Notice of Determination (NOD). In addition, land use jurisdictions can no longer make “de minimis” findings if they determine that the project will not impact resources under the CDFG’s jurisdiction. Therefore, the finding of “No Impact” to the CDFG jurisdictional resources must now be made by the CDFG prior to the payment of CDFG fees.

A detailed explanation of the regulatory permitting requirements for impacts to jurisdictional resources is provided in Sections 5.2 through 5.4.

## 5.2 U.S. ARMY CORPS OF ENGINEERS

Regulatory authorization in the form of an NWP is provided for certain categories of activities (e.g., repair, rehabilitation, or replacement of a structure or fill which was previously authorized; utility line placement; bank stabilization). These permits are valid only if the conditions applicable to the permits are met. If the USACE does not concur with the findings of this Jurisdictional Delineation Report that all drainage features located within the Project Site are “isolated waters” and takes jurisdiction, the USACE would likely authorize project discharges into “Waters of the U.S.” through the issuance of a Nationwide Permit (NWP) 12 (Utility Line Activities). If the conditions for this NWP cannot be met, an Individual Permit (IP) will be required. For some NWPs, the loss of “Waters of the U.S.” is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP or must be authorized under an IP. “Waters of the U.S.” temporarily filled, flooded, excavated, or drained but restored to pre-construction contours and elevations after construction are not included in the measurement of loss of “Waters of the U.S.”. Based on the current conditions, a total of approximately 1.21 acres (0.49 hectare) of “Waters of the U.S.” would be impacted by the Proposed Project.

Pursuant to USACE Regulatory Guidance Letter (RGL) 08-02 (dated June 26, 2008), the USACE can issue two types of jurisdictional determinations to implement Section 404 of the CWA: Approved Jurisdictional Determinations and Preliminary Jurisdictional Delineations. An Approved Jurisdictional Delineation is an official USACE determination that jurisdictional "Waters of the U.S.", "Navigable Waters of the U.S.", or both are either present or absent on a site. An Approved Jurisdictional Delineation also identifies the precise limits of jurisdictional waters within a project site (USACE 2008a).

The USACE will provide an Approved Jurisdictional Determination when (1) an applicant requests an official jurisdictional determination; (2) an applicant contests jurisdiction over a particular water body or wetland; or (3) when the USACE determines that jurisdiction does not exist over a particular water body or wetland. The Approved Jurisdictional Determination then becomes the USACE's official determination, which can then be relied upon over a five-year period to request regulatory authorization as part of the permit application.

In addition, an Applicant may decline to request an Approved Jurisdictional Determination and instead obtain a USACE IP or General Permit authorization based on a Preliminary Jurisdictional Determination or, in certain circumstances (e.g., authorizations by non-reporting nationwide general permits), with no Jurisdictional Determination.

Preliminary Jurisdictional Determinations are non-binding, advisory in nature, and may not be appealed. They indicate that there may be "Waters of the U.S." on a project site. An applicant may elect to use a Preliminary Jurisdictional Determination to voluntarily waive or set aside questions regarding CWA jurisdiction over a site, usually in the interest of allowing the applicant to move ahead expeditiously with the permitting process. The USACE will determine what form of Jurisdictional Determination is appropriate for a particular project site.

On January 31, 2007, the USACE published a memorandum clarifying the Interim Guidance for amendments to the National Historic Preservation Act and the Advisory Council on Historic Preservation (ACHP) implementing regulations. The Interim Guidance applies to all Department of the Army requests for authorization/verification, including Individual Permits (standard permits and letters of permission) and all Regional General Permits (RGPs) and NWPs. The State or Tribal Historic Preservation Officer (SHPO/THPO) has 30 days to respond to a determination that a proposed activity, that otherwise qualifies for an NWP or RGP, has no effect or no adverse effect on a historic property. If the SHPO/THPO does not respond within 30 days of notification, the Los Angeles District may proceed with verification. If the SHPO/THPO disagrees with the District's determination, the District may work with the SHPO/THPO to resolve the disagreement or request an opinion from the ACHP. The USACE will submit the Draft Jurisdictional Delineation Report to the SHPO/THPO for review prior to initiating the actual regulatory process.

The USACE Regulatory Branch Offices will coordinate with the USEPA Regional Office and USACE Headquarters (HQ), as outlined in its January 28, 2008, memorandum entitled *Memorandum for Commandor, Major Subordinate Commands and District Commands: Process for Coordinating Jurisdictional Delineations Conducted Pursuant to Section 404 of the Clean Water Act in Light of the Rapanos and SWANCC Supreme Court Decisions* (USACE 2008a). The guidance provided in this memorandum is quoted as follows:

1. Effective immediately, unless and until paragraph 5(b) of the June 5, 2007, Rapanos guidance coordination memorandum is modified by a joint memorandum from Army and EPA, we will follow these procedures:

a. For jurisdictional determinations involving significant nexus determinations, USACE districts will send copies of draft jurisdictional delineations via e-mail to appropriate EPA regional offices. The EPA regional office will have 15 calendar days to decide whether to take the draft jurisdictional delineation as a special case under the January 19, 1989, "Memorandum of Agreement Between the Department of the Army and the USEPA Concerning the Determination of the Section 404 Program and the Application of the Exceptions under Section 404(f) of the Clean Water Act." If the EPA regional office does not respond to the district within 15 days, the district will finalize the jurisdictional determination.

b. For jurisdictional determinations involving isolated waters determinations, the agencies will continue to follow the procedure in paragraph 5(b) of June 5, 2007, coordination memorandum, until a new coordination memorandum is signed by USACE and EPA. (In accordance with paragraph 6 of the June 5, 2007, coordination memorandum, this is a 21-day timeline that can only be changed through a joint memorandum between agencies).

2. Approved JDs are not required for non-reporting NWPs, unless the project proponent specifically requests an approved JD. For proposed activities that may qualify for authorization under a State Programmatic General Permit (SPGP) or RGP, an approved JD is not required unless requested by the project proponent.
3. The USACE will continue to work with EPA to resolve the JDs involving significant nexus and isolated waters determinations that are currently in the elevation process.
4. USACE districts will continue posting completed Approved JD Forms on their web pages.

Please note that if the USACE determines that the drainages are jurisdictional and would be impacted by project implementation, the Applicant will be required to obtain a CWA Section 401 Water Quality Certification from the RWQCB before the USACE will issue the Section 404 permit. That is, the USACE may issue a "Denial Without Prejudice" as part of the issuance of the Section 404 permit that makes the permit valid once the Section 401 Water Quality Certification is issued. If the USACE determines that the impacted drainages are not jurisdictional, the Applicant will be required to obtain RWQCB authorization under the provisions of a Report of Wastewater Discharge (WDR).

## 5.3 REGIONAL WATER QUALITY CONTROL BOARD

As noted above, issuance of the USACE Section 404 permit may not be required due to presence of "isolated waters". Should the USACE concur in these findings, a WDR would then be required. It should be noted that the RWQCB requires certification of the project's CEQA documentation before it will approve the Section 401 Water Quality Certification or WDR. The RWQCB, as a responsible agency, will use the project's CEQA document to satisfy its own CEQA compliance requirements.

Upon acceptance of a complete permit application, the RWQCB has between 60 days and 1 year to make a decision regarding the permit request. That is, USACE regulations indicate that the RWQCB has 60 days from the date of receipt of a completed application that requests water quality certification to make a decision (33 CFR §325.2[b][1][ii]). The USACE District Engineer may specify a longer time (up to one year) or shorter time based on his/her determination of a reasonable processing time (33 CFR §325.2[b][1][ii]). If the RWQCB determines that more than 60 days are needed to process the request, it has the option of

requesting additional time from the USACE. Also, the RWQCB has the option of issuing a "Denial Without Prejudice", which does not mean that the request is denied, but that it requires more information in order to make a decision. This effectively stops the processing clock until this information is provided.

The RWQCB is required under *California Code of Regulations* (CCR) (Title 23, §3858[a]) to have a "minimum 21 day public comment period" before any action can be taken on the Section 401 application. This period closes when the RWQCB acts on the application. Since projects often change or are revised during the Section 401 permit process, the comment period can remain open. The public comment period starts as soon as an application has been received. Generally, the RWQCB Section 401, USACE Section 404, and CDFG Section 1602 permit applications are submitted at the same time. However, the RWQCB Section 401 Water Quality Certifications may take longer to process. If the USACE concurs in the findings of the report that all drainage features within the Project Site are "isolated waters", discharges within these drainage features would be authorized under WDR.

The RWQCB requires the Applicant to address urban storm water runoff during and after construction in the form of Best Management Practices (BMPs). These BMPs are intended to address the treatment of pollutants carried by storm water runoff and are required in all complete applications. Please note that the application would also require the payment of an WDR Application Fee based upon the most current RWQCB fee schedule (California Code of Regulations, Title 23, Section 2200(a)(3). Please note that the RWQCB could authorize project impacts to "isolated waters" through a General WDR if the discharge of dredged or fill materials is restricted to not more than two-tenths (0.2) of an acre and 400 linear feet for fill and excavation discharges, and of not more than 50 cubic yards for dredging discharges. The General WDR is a much shorter process.

## 5.4 CALIFORNIA DEPARTMENT OF FISH AND GAME

The CDFG regulates all work (including initial construction and ongoing operation and maintenance) that may substantially divert or obstruct the natural flow of or substantially change or use any material from the bed, channel, or bank of any river, stream, or lake through its Streambed Alteration Program. An Applicant must enter into an agreement with the CDFG to ensure no net loss of wetland values and acreages.

As previously indicated, the extent of potential CDFG jurisdiction on the Project Site has been identified as 0.04 (0.02 hectare). Impacts resulting from Project implementation will require a Section 1602 SAA. The SAA must address the initial construction and long-term operation and maintenance of any structures in areas identified as "Waters of the State" (such as a culvert or desilting basin) that may require periodic maintenance if these are included in the project design.

Prior to construction, a notification (SAA application) must be submitted to the CDFG that describes any proposed streambed alteration contemplated by the proposed project. In addition to the formal application materials and the fee, a copy of the appropriate environmental document (e.g., Mitigated Negative Declaration [MND]) should be included in the submittal, consistent with CEQA requirements. The CDFG will prepare a draft SAA, which will include standard measures to protect sensitive plant and wildlife resources during project construction and during ongoing operation and maintenance of any project element that occurs in a CDFG jurisdictional area.

If an SAA is required, the CDFG may want to conduct an on-site inspection. The CDFG then prepares a draft agreement, which will include measures to protect fish and wildlife resources that will be directly or indirectly impacted by project construction. The draft agreement will be

transmitted to the Applicant within 60 calendar days of the CDFG's determination that the notification is complete. It should be noted that the 60-day timeframe may not apply to long-range agreements.

The Applicant has 30 calendar days to notify the CDFG concerning the acceptability of the proposed terms, conditions, and measures. If the Applicant agrees with these terms, conditions, and measures, the agreement must be signed and returned to the CDFG. The agreement becomes final once the CDFG executes it and an SAA is issued. Please note that all application fees must be paid and the final certified CEQA documentation must be provided prior to the CDFG's execution of the agreement.

If the CDFG does not respond in writing concerning the completeness of the Notification within 30 days of its submittal, the Notification automatically becomes complete. If the CDFG does not submit a draft SAA to the Applicant within 60 days of the determination of a completed Notification package, the CDFG will issue a letter that either (1) identifies the final date to transmit a draft SAA or (2) indicates that an SAA was not required. The CDFG will also indicate that it was unable to meet this date and that, by law, the Applicant must complete the project without an SAA and must comply with all avoidance, minimization, and mitigation measures described in the submitted Notification package.

## 5.5 RECOMMENDATIONS

Based on the conclusions of this Jurisdictional Delineation Report, the following recommendations are identified:

1. Schedule a pre-application meeting with USACE, RWQCB, and CDFG staff to discuss (1) site conditions, biological and jurisdictional resources, the Proposed Project, impacts to these resources resulting from the Proposed Project, proposed minimization measures, and the mitigation program to offset these impacts and (2) the regulatory permit process.
2. Prepare a Preliminary Jurisdictional Determination Form to obtain the USACE's official written approval of the Jurisdictional Delineation Report and its findings.

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# APPENDIX B-2

# BURROWING OWL LETTER REPORT

BonTerra CONSULTING
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September 6, 2012

Mr. Erik Haugen
Canadian Solar (USA) Inc.
12657 Alcosta Boulevard, Suite 130
San Ramon, California 97583
c/o Jason Evans, TUUSSO Energy, LLC

**VIA EMAIL AND MAIL**
**jason.evans@tuusso.com**

Subject: Results of Western Burrowing Owl Surveys at the West Antelope Solar Project Site near the City of Lancaster, Unincorporated Los Angeles County, California

Dear Mr. Haugen:

This Letter Report presents the results of focused surveys conducted for the western burrowing owl (*Athene cunicularia hypugea*) on the West Antelope Solar Project Site (hereinafter referred to as the "Project Site") located near the City of Lancaster in unincorporated Los Angeles County, California (Exhibit 1). The purpose of the survey was to determine the presence or absence of the western burrowing owl on the Project Site in accordance with the guidelines provided by the California Burrowing Owl Consortium survey protocol for this species.

## PROJECT LOCATION AND DESCRIPTION

The Project Site is located in northern unincorporated Los Angeles County (the Antelope Valley) near the western limits of the City of Lancaster (Exhibit 2). The Los Padres National Forest is located to the south and the Tehachapi Mountains are located to the north and west. The Project Site is 263 acres divided by West Avenue J and bordered by 115$^{th}$ Street West to the west and 95$^{th}$ Street West to the east. The Project Site is located on the U.S. Geologic Survey's (USGS') Del Sur 7.5-minute quadrangle map, within portions of Township 7 North, Range 13 West and Range 14 West, and includes portions of Sections 13, 14, 18, 19, 23, and 24. The Project Site elevation ranges from approximately 2,480 to 2,620 feet above mean sea level (msl).

The Project Site contains a generally flat topography with a north-trending two percent slope. There are also some low rises in the southern portion of the Project Site. Vegetation types on the Project Site consist of native annual grassland with small patches of native perennial grass, ruderal grassland, desert scrub, and disturbed vacant agricultural land. The annual grassland is dominated by Pacific fescue (*Festuca microstachys*) with common goldfields (*Lasthenia gracilis*), red-stem filaree (*Erodium cicutarium*), red brome (*Bromus madritensis* ssp. *rubens*), cheat grass (*Bromus tectorum*), and doveweed (*Croton setiger*). Native and non-native grassland communities vary in the degree of dominance throughout the site. Sheep grazing occurs on most of the grasslands on the Project Site concentrating on the area of the Project Site west of 110$^{th}$ Street West.

The burrowing owl survey area consists of the Project Site west of 110$^{th}$ Street West and north and south of West Avenue J, but also the transmission line component, which leads to the Antelope Substation along West Avenue J (see Exhibit 3). A 50-foot buffer south of West Avenue J was surveyed for the transmission line component of the project.

## SPECIES BACKGROUND

The western burrowing owl is a grassland specialist distributed throughout western North America, where it occupies open areas with short vegetation and bare ground within shrub, desert, and grassland habitats. Burrowing owls use a wide variety of arid and semi-arid environments, with well-drained, level to gently-sloping areas characterized by sparse vegetation and bare ground (Haug et al. 1993; Dechant et al. 2003). Burrowing owls in Florida excavate their own burrows, but western burrowing owls are dependent upon the presence of burrowing mammals, such as the California ground squirrel (*Otospermophilus beecheyi*), whose burrows are used by the burrowing owl for roosting and nesting (Haug et al. 1993). The presence or absence of colonial mammal burrows is often a major factor that limits the presence or absence of western burrowing owls. Where mammal burrows are scarce, burrowing owls have been found occupying man-made cavities, such as buried and non-functioning drain pipes, stand-pipes, and dry culverts. Burrowing mammals may burrow beneath rocks, debris, or large, heavy objects such as abandoned cars, concrete blocks, or concrete pads. Large, hard objects at burrow entrances stabilize the entrance from collapse, and may inhibit excavation by predators.

Burrowing owls often use “satellite”, or non-nesting burrows, moving chicks into them from the nesting burrow, presumably to reduce the risk of predation (Desmond and Savidge 1998) and possibly to avoid nest parasites (Dechant et al. 2003). One pair may use up to ten satellite burrows (James and Seabloom 1968). Individual burrowing owls have a moderate to high site fidelity to previously-used burrow complexes, often using the same burrows for nesting year after year.

A widespread species throughout the western United States, the burrowing owl has declined due to habitat modification, poisoning of its prey items, shooting, and human disturbance (Remsen 1978).

The western burrowing owl was once abundant and widely distributed within coastal Southern California, but it has declined precipitously in counties such as Los Angeles, Orange, San Diego, Riverside, and San Bernardino. A petition to list the California population of the western burrowing owl as a California Endangered or Threatened species was submitted (Center for Biological Diversity et al. 2003); however, the California Department of Fish and Game (CDFG) determined that the species did not warrant listing in consideration of its overall population in California. In particular, the burrowing owl is still considered to be common in the Imperial Valley where nearly 70 percent of its California population resides (Patten et al. 2003). Elsewhere in California, this species has declined dramatically and is considered a species of Local Concern in many regions. The burrowing owl is a California Species of Special Concern.

## REGIONAL BACKGROUND

Within Los Angeles County, historical records confirm widespread breeding of burrowing owls throughout the entire region of what is now the urbanized Los Angeles area from the 1880s through the 1930s (Center for Biological Diversity et al. 2003). The burrowing owl was once an extremely abundant resident in the Los Angeles region (e.g., Willett 1912). With the spread of urbanization, burrowing owl numbers had decreased in the Los Angeles region by the 1970s (Remsen 1978).

Breeding burrowing owls have most likely been nearly extirpated from southern Los Angeles County; the only known recent observation of a burrowing owl during the breeding season in Los Angeles County was in 1994 (Center for Biological Diversity et al. 2003). Recent raptor surveys throughout most of the Santa Monica Mountains National Recreation Area have located no nesting burrowing owls, although owls winter there (Center for Biological Diversity et al. 2003). Small

numbers of breeding burrowing owls persist in the Antelope Valley, in northeastern Los Angeles County (Center for Biological Diversity et al. 2003). It is conservatively estimated that a minimum of ten breeding territories have been active in Antelope Valley most years between 1970 and 2000 (Center for Biological Diversity et al. 2003) and small numbers of breeding owls persist around Lancaster and Palmdale; however, burrowing owls in northeastern Los Angeles County are declining and threatened by development pressure (Center for Biological Diversity et al. 2003).

**SURVEY METHODOLOGY**

The Burrowing Owl Survey Protocol and Mitigation Guidelines prepared by the California Burrowing Owl Consortium (CBOC 1993), which has been adopted by the CDFG, details a sequence of surveys based on the findings of each previous level of survey. The sequence begins with a habitat assessment, is followed by a burrow survey, and then crepuscular (dawn or dusk) surveys for owls.

A habitat assessment and thorough burrow survey were conducted on April 15, 2012. The habitat assessment and burrow survey covered all potentially suitable habitat in the direct impact area for the proposed project and the 50-foot buffer south of West Avenue J. Essentially the entire Project Site is potentially suitable habitat for the burrowing owl. Any natural or man-made cavities large enough to allow entry to a burrowing owl were inspected for evidence of occupation, such as prey remains, cast pellets, whitewash, feathers, or observations of owls adjacent to burrows. During the burrow survey, any sign of owl occupation was described and the location of the evidence was collected using a global positioning system (GPS) unit. The burrow surveys were conducted by walking transects through potential habitat and were spaced to allow 100 percent visual coverage of the ground surface; transects were spaced no more than 100 feet apart, and were more closely spaced if vegetation or topography reduced visibility. Burrow surveys were conducted during appropriate weather conditions, and were conducted more than five days after rain events (which may wash away potential sign).

As owls and potentially occupied burrows or cavities were located, further surveys were conducted to determine the number of owls present and the extent of use of the Project Site. These surveys were conducted by BonTerra Consulting Biologists Brian Daniels, Steve Morris, Reanne Murphy, and Kristin Smith. Surveys were conducted during the daylight hours, and only when there was enough light to follow the flights of burrowing owls. Surveys were not conducted in true darkness because this methodology may underestimate the number of nesting owls because owls may be foraging away from the nest burrows (Haug and Didiuk 1993). Individual owls are known to react differently to the presence of an observer, and great care was taken not to flush owls or startle them down into the burrows before they were observed by the biologist.

After the burrow surveys were completed, each burrow was visited by a biologist, who was familiar with the location of each burrow. An inspection of the burrow mouth was made from a distance with binoculars from an angle where the burrow opening could be viewed. Extreme care on the approach, coupled with repeated visits were sometimes needed to determine burrow occupancy. If an owl was observed, the biologist left the vicinity of the burrow immediately without flushing the owl away from the burrow, and moved quickly to the next burrow to be inspected. If no owls were observed at a burrow, the biologist approached the burrow to look for recent evidence of occupation such as whitewash that may have been deposited after the prior visit. Field notes of previous observations were used to determine if the evidence observed was old or new (deposited after the prior visit). Care was taken not to flush owls away from burrows; however, if an owl was flushed, the biologist waited a short while to see if it returned. If the owl returned to the

burrow, the biologist could then move to the next burrow with less concern about double counting owls. All of the burrows on the Project Site were surveyed during each visit.

The initial burrows and owls were located on April 15, 2012, during the burrowing owl habitat assessment, burrow surveys, and the first focused burrowing owl survey. After the discovery of owls on site, the initial burrowing owl habitat assessment and burrow surveys were conducted concurrently with the first focused burrowing owl survey, and concentrated on potential habitat and occupied burrows within the Project Site as well as the 50-foot buffer south of West Avenue J. Mr. Daniels, Mr. Morris, Ms. Murphy, and Ms. Smith conducted focused burrowing owl surveys on April 15; May 7 and 29; and June 18, 2012.

## SURVEY RESULTS

The focused burrow survey identified a total of 20 burrows, burrow clusters, or shelters that showed evidence of current, historic, or potential burrowing owl occupation (Exhibit 3). Most of these sites were located within or at the edges of roads, drainages, and swales. Two of these burrows/burrow complexes were found to be active during the surveys. These two burrow complexes had evidence of recent activity and supported breeding owls during these surveys. All burrows identified in the surveys are discussed below.

### Active Burrows

***Burrow Complex 1:*** This burrow complex has a minimum of four active burrows within 500 feet north of West Avenue J (see Exhibit 3). This complex of burrows supports two pairs of adult burrowing owls that successfully fledged at least four juvenile burrowing owls. This burrow complex is also part of a larger complex of occupied burrowing owl burrows that extend to the north and northeast in an area composed of non-native and some native grasslands (see Attachment A photographs). At least 15 burrowing owls, including several juvenile owls, were observed in this larger complex of burrows during another BonTerra Consulting biological survey of the Project Site on July 3, 2012.

***Burrow Complex 2:*** This active burrow complex was likely created by California ground squirrels and is occupied by one pair of adult burrowing owls that successfully fledged three juvenile burrowing owls. The adults and juvenile burrowing owls were most often observed at the primary burrow located 75 feet south of West Avenue J. The satellite burrow is west of the primary burrow and is located about 100 feet south of West Avenue J (see Exhibit 3).

### *Inactive Burrows*

***Burrow 3:*** This potential burrow is located at the southeast corner of a residential area approximately ten feet from the roadside and was likely created by a California ground squirrel. The area around this potential burrow is composed of bare soil with no vegetation. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrow during the surveys.

***Burrow 4:*** This potential burrow is located approximately 375 feet east of Burrow 3 near the southwest corner of a residence along a chain-link fence. The area around this potential burrow is composed of bare soil with no vegetation and was likely created by a California ground squirrel. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrow during the surveys.

***Burrow 5:*** This potential burrow is located approximately 2,000 feet east of 110th Street West and approximately 1,000 feet south of West Avenue J. The area around this potential burrow is composed of native and non-native grassland and was likely created by a California ground squirrel or other small animal. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrow during the surveys.

***Burrow 6:*** This marginally suitable, potential burrow is located at the western edge of the Project Site boundary approximately 1,000 feet north of West Avenue J. The area around this potential burrow is composed of native and non-native grassland and was likely created by a California ground squirrel or small mammal. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrow during the surveys.

***Burrow 7:*** This potential burrow is located approximately 500 feet northeast of Burrow 6. The area around this potential burrow is composed of native and non-native grassland and was likely created by a California ground squirrel or small mammal. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrow during the surveys.

***Burrow 8:*** This potential burrow is located approximately 375 feet northwest of Burrow 7. The area around this potential burrow is composed of native and non-native grassland and was likely created by a California ground squirrel or small mammal. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrow during the surveys.

***Burrows 9, 10, and 11:*** These potential burrows are located approximately 500 feet northeast of Burrow 8. The area around these potential burrows is composed of native and non-native grassland and was likely created by a California ground squirrel. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrows during the surveys.

***Burrow 12:*** This marginally suitable burrow is located approximately 125 feet north of Burrow 10. The area around this potential burrow is composed of native and non-native grassland and was likely created by a California ground squirrel or small mammal. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrow during the surveys.

***Burrow 13:*** This potential burrow is located approximately 500 feet east of Burrow 12. The area around this potential burrow is composed of native and non-native grassland and was likely created by a California ground squirrel. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrow during the surveys.

***Burrows 14 and 15:*** These potential burrows are located approximately 500 feet east of Burrow 13. The area around these potential burrows is composed of native and non-native grassland and was likely created by a California ground squirrel. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrows during the surveys.

***Burrow 16:*** This potential burrow is located approximately 600 feet east of Burrow 14. The area around this potential burrow is composed of native and non-native grassland and was likely created by a California ground squirrel. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrow during the surveys.

***Burrow 17:*** This marginally suitable, potential burrow is located approximately 400 feet southeast of Burrow 16. The area around this potential burrow is composed of native and non-native grassland and was likely created by a California ground squirrel or small mammal. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrow during the surveys.

***Burrows 18, 19, and 20:*** These marginally suitable, potential burrows are located approximately 900 feet east of Burrow 17. The area around these potential burrows is composed of native and non-native grassland, and these burrows were likely created by a California ground squirrel or small mammal. No owls or evidence of current or historic occupation were found at or in the vicinity of the burrows during the surveys.

**SURVEY RESULTS SUMMARY**

No active burrows were identified on the Project Site west of 110th Street West during these surveys, but active burrows were identified north and south of West Avenue J along the transmission line component of the Project Site. Burrow Complex 1 is just east of 110th Street West and within 500 feet of West Avenue J (Exhibit 3). None of these active burrows, however, were in the 50-foot buffer identified for the Project Site on the south side of West Avenue J. North and east of this complex (Burrow Complex 1) was a semi-colonial complex with several more burrows and burrowing owls (see Attachment A photographs). Three fledglings with one adult pair of burrowing owls were present at Burrow Complex 1 on May 29 and June 18, 2012. An additional fledgling with a second pair of adult burrowing owls were in the same Burrow Complex 1on June 18, 2012. South of West Avenue J, one active burrow complex (Burrow Complex 2), which included a satellite burrow was identified on April 15; May 7 and 29; and June 18, 2012. Two adults and three fledgling burrowing owls were present at the primary burrow of Burrow Complex 2 on June 18, 2012.

Please feel free to contact Marc Blain or Brian Daniels at (626) 351-2000 if there are any questions or comments.

Sincerely,

BONTERRA CONSULTING

Marc T. Blain
Associate, Biological Resources Manager

Brian E. Daniels
Senior Biologist/Ornithologist

Enclosures: Exhibit 1 – Regional Location
Exhibit 2 – Local Vicinity
Exhibit 3 – Burrowing Owl Burrow Locations
Attachment A – Burrowing Owl Burrow Photographs

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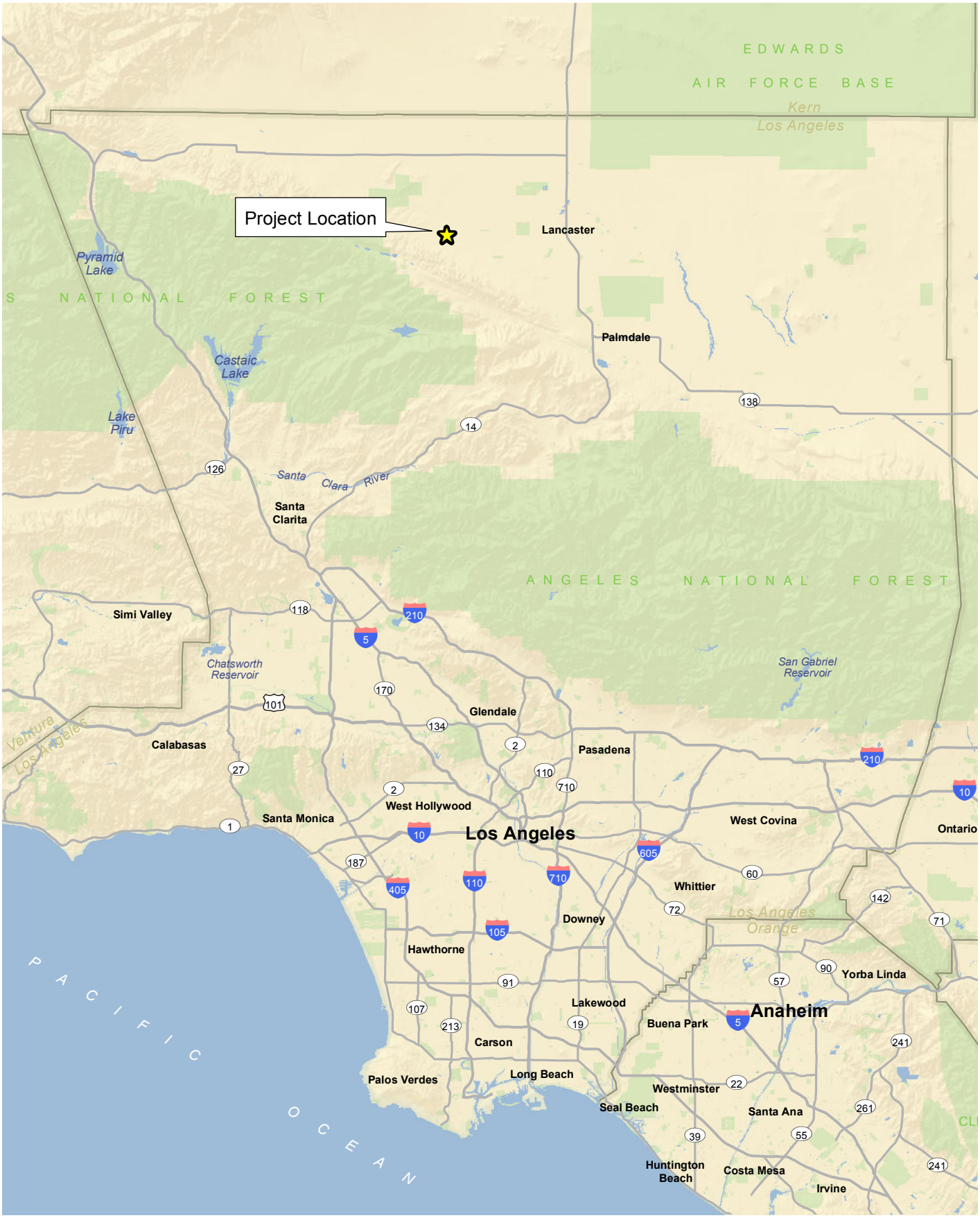


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# Project Location

Exhibit 1

*West Antelope Solar Project*

N W E S

10 5 0 10 Miles

BonTerra CONSULTING

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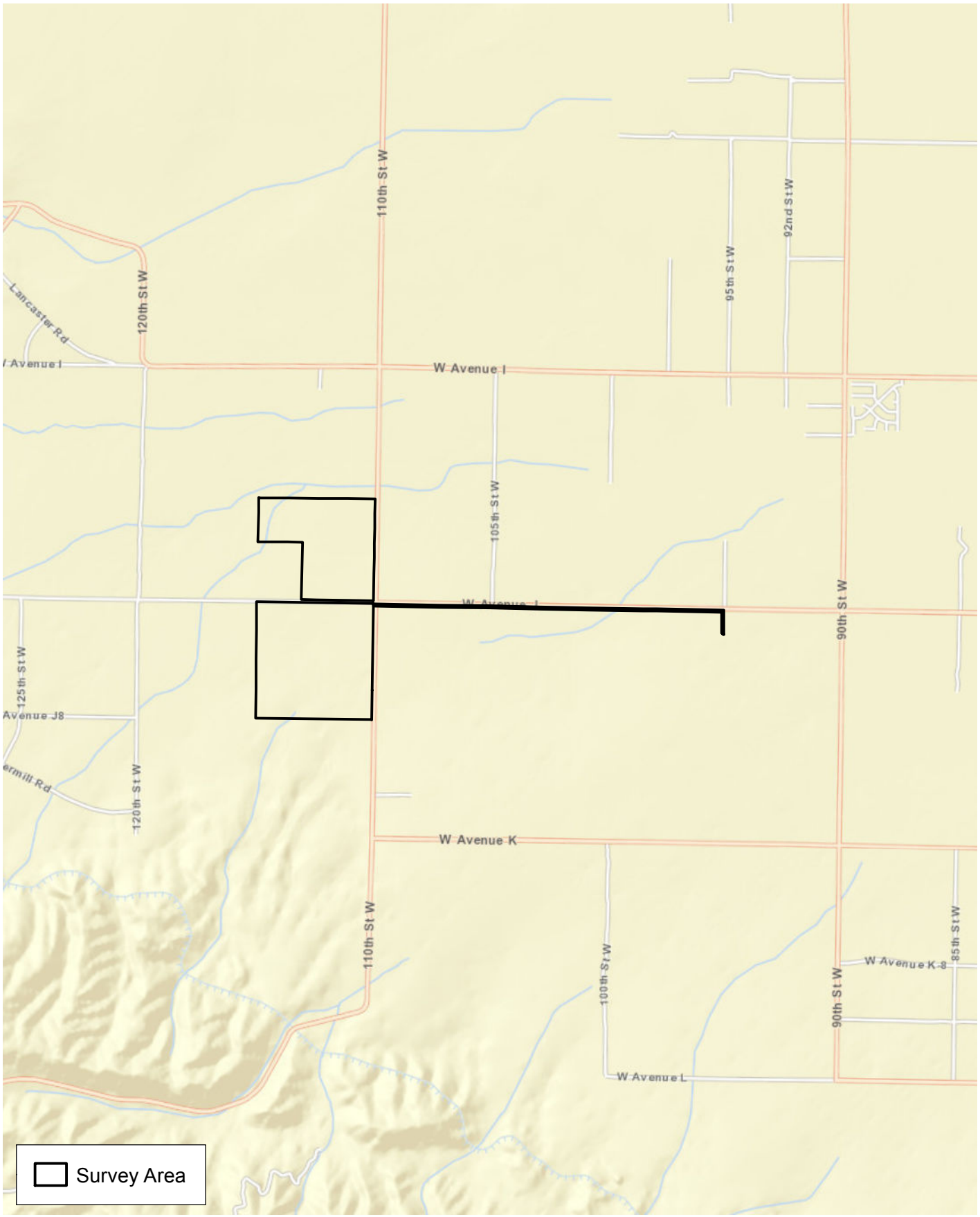


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# Local Vicinity

Exhibit 2

*West Antelope Solar Project*

N W E S

2,000 1,000 0 2,000 Feet

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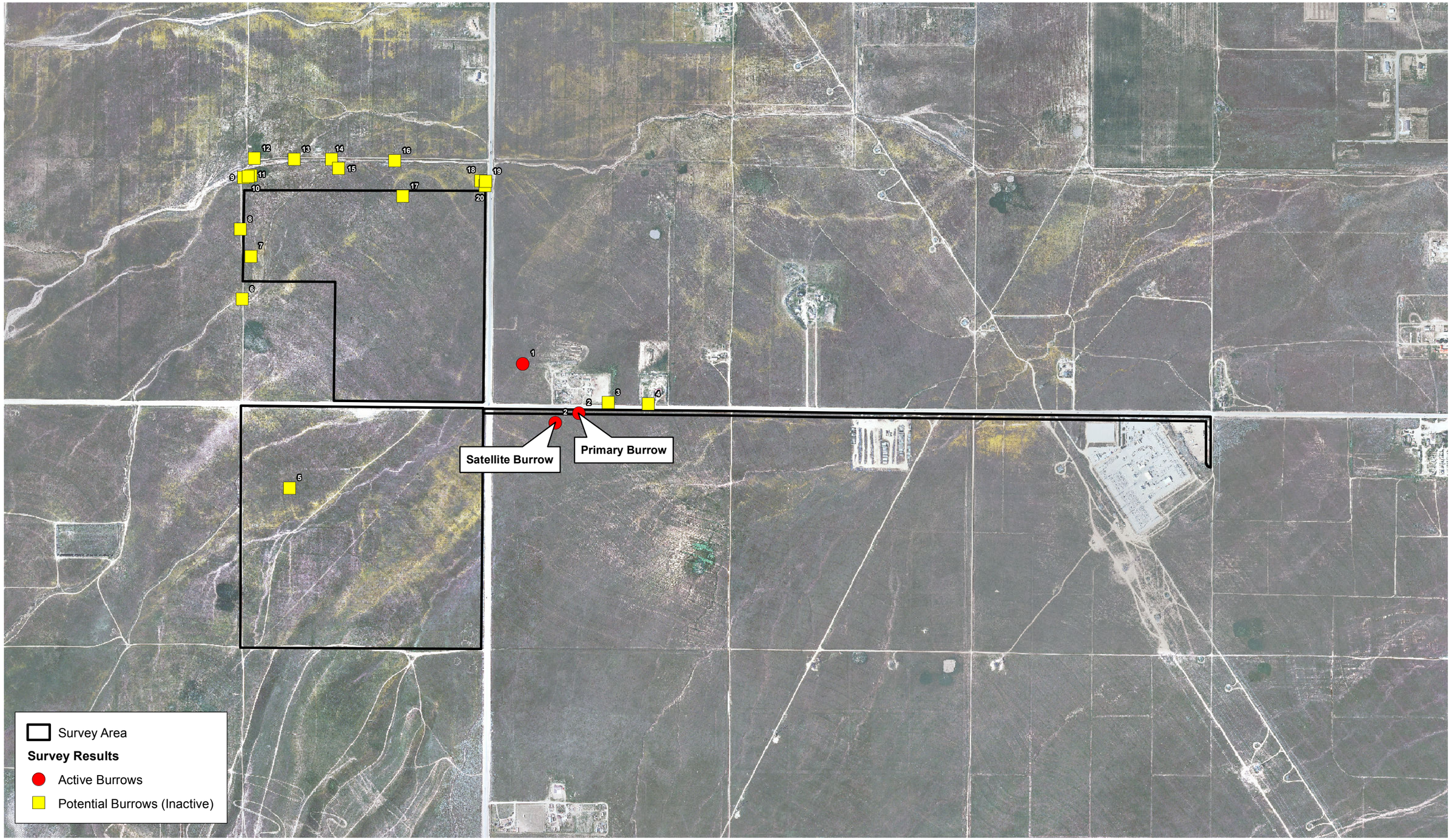


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# Burrowing Owl Burrow Locations

Exhibit 3

*West Antelope Solar Project*

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**ATTACHMENT A**

**BURROWING OWL BURROW PHOTOGRAPHS**

**Facing east on 110th Street West.** Representative active burrows and native annual grassland. View of Burrow Complex 1 and more occupied burrows to the northeast. May 29, 2012.

**Facing south from northeast corner of Project Site.** Representative potential burrows (inactive). Potential burrows #9, #10, and #11. April 15, 2012.

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Burrowing Owl Burrow Photographs

Appendix A

*West Antelope Solar Project*

BonTerra CONSULTING

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# APPENDIX B-3

# SWAINSON'S HAWK LETTER REPORT

BonTerra CONSULTING
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September 6, 2012

Mr. Erik Haugen
Canadian Solar (USA) Inc.
12657 Alcosta Boulevard, Suite 130
San Ramon, California 97583
c/o Jason Evans, TUUSSO Energy, LLC

**VIA EMAIL AND MAIL**
**jason.evans@tuusso.com**

Subject: Results of Swainson's Hawk Surveys for the West Antelope Solar Project near the City of Lancaster, Unincorporated Los Angeles County, California

Dear Mr. Haugen:

This Letter Report presents the results of focused surveys for the Swainson's hawk (*Buteo swainsoni*) for the West Antelope Solar Project (hereinafter referred to as the "Project") located near the City of Lancaster in unincorporated Los Angeles County, California (Exhibit 1). The purpose of the survey was to determine the presence or absence of the Swainson's hawk in the survey area in accordance with recommendations provided by the California Energy Commission (CEC) and California Department of Fish and Game (CDFG) for this species in the Antelope Valley of Los Angeles and Kern Counties, California (CEC and CDFG 2010).

## Project Location and Description

The project site is located in northern unincorporated Los Angeles County (the Antelope Valley) near the western limits of the City of Lancaster (Exhibit 2). The Los Padres National Forest is located to the south and the Tehachapi Mountains are located to the north and west. The project site consists of 263 acres divided by West Avenue J and bordered by 115th Street West to the west and 95th Street West to the east. The project site is located on the Del Sur U.S. Geologic Survey (USGS) 7.5-minute quadrangle map, within portions of Township 7 North, Range 13 West and Range 14 West, and includes portions of Sections 13, 14, 18, 19, 23, and 24. The project site elevation ranges from approximately 2,480 to 2,620 feet above mean sea level (msl).

The project site consists of a generally flat topography with a two percent slope upward toward the north. There are also some low rises in the southern portion of the project site. Vegetation types on the project site consist of native annual grassland with small patches of native perennial grass, ruderal grassland, desert scrub, and disturbed vacant agricultural land. The annual grassland is dominated by Pacific fescue (*Festuca microstachys*) with common goldfields (*Lasthenia gracilis*), red-stem filaree (*Erodium cicutarium*), red brome (*Bromus madritensis* subsp. *rubens*), cheat grass (*Bromus tectorum*), and doveweed (*Croton setiger*). Native and non-native grassland communities vary in the degree of dominance throughout the site. Sheep grazing occurs on most of the grasslands on the project site concentrating on the area west of 110th Street West.

The CEC and CDFG (2010) consider impacts to suitable habitat or individual birds within a five-mile radius of an active nest to be significant. As a result, the Swainson's hawk surveys for the Project required a circular survey area with an approximate 10-mile diameter (Exhibit 3). Habitats within this survey area

were diverse and included the western fringes of the City of Lancaster, the unincorporated communities of Antelope Acres and Del Sur, the Antelope Valley California Poppy State Reserve, fallow and active farmland, Elizabeth Lake, and the Angeles National Forest. The northern edge of the survey area (Avenue D8) was approximately three miles south of the Kern County line. The southern approximate third of the survey area extended into mountainous areas that do not provide suitable Swainson's hawk breeding habitat and, as a result, were excluded from the survey area.

**Species Background**

The Swainson's hawk is a Neotropical migrant that breeds in grassland and savannah habitats of western North America east to the Great Plains and from southwest Alaska and southern Canada south to northern Mexico (AOU 1998). It is one of four or five raptor species of North American that mostly vacate their North American breeding ranges during the winter season. The primary spring and fall migration route is over land through Central America to South America (AOU 1998). The Swainson's hawk migrates a greater distance than any other North American raptor, except for the Arctic race of the Peregrine Falcon (*Falco peregrinus tundrius*) (England et al. 1997). This is a highly gregarious species that is often observed in migrating flocks, sometimes numbering in the thousands (England et al. 1997). It winters in the pampas grass regions of South America primarily in Argentina and Uruguay (England et al. 1997). Although the total population has been conservatively estimated at 40,000 to 55,000 breeding pairs, the Swainson's hawk has experienced serious local declines within its breeding range such as in Oregon and California (del Hoyo et al. 1994).

In California, the Swainson's hawk is considered to be a locally common to rare breeder with the majority of breeding territories located in the Central Valley and Great Basin regions (Woodbridge 1998). Most breeding pairs are located in the middle of the Central Valley between Sacramento and Modesto, and in the northern San Joaquin Valley (Woodbridge 1998). Swainson's hawks are now absent from most of their historic range in the central and southern parts of California (Woodbridge 1998). Bloom (1980) estimated the California breeding population to be 375 pairs and found this to represent a 91 percent decline from historical population estimates. More recent surveys have shown an increase with estimates as high as 1,000 pairs (Woodbridge 1998) and 1,912 pairs (CDFG 2005).

Although not considered to be an obligate riparian species, nest sites in the Central Valley of California are strongly associated with riparian forest vegetation (Woodbridge 1998). Nests are typically located in a solitary tree, shrub, and small grove of trees or a line of trees along a stream course, but can also be on human-built structures such as power poles (England et al. 1997). Eight Swainson's hawk nests monitored at a 2012 BonTerra Consulting project site in farm land near Hanford, Kings County, were in ornamental ranch trees (two nests in conifers and two nests in eucalyptus), windbreak (one nest in non-native deciduous tree), orchards (two nests in walnut trees), and an isolated native oak (one nest in *Quercus* sp.) (BonTerra Consulting 2012). Swainson's hawk nests are open platforms structures typical of the genus, but are less dense and less sturdy than red-tailed hawk (*Buteo jamaicensis*) nests and do not persist through the winter (Woodbridge 1998).

When breeding, Swainson's hawks feeds on rodents, rabbits, and reptiles, but unlike other North American raptors, its diet when not breeding consists almost entirely of insects (England et al. 1997). Foraging habitats consist of open grasslands, sparse shrublands, open woodlands, and agriculture areas such as wheat and alfalfa fields (Englands et al. 1997). In the Central Valley, breeding territories include riparian forest or remnant riparian trees in combination with high-quality foraging habitats such as fallow fields and alfalfa fields (Woodbridge 1998).

**Regional Background**

Swainson's hawks were historically more numerous and widespread breeders in southern California, even nesting on the coast as far south as San Diego County (Bloom 1980; Unitt 2004). Previously a scarce summer resident in the Mojave and Colorado deserts (Grinnell and Miller 1986), Bloom (1980) found this species to still be rather scarce in this region and restricted to desert woodland habitats of Joshua tree (*Yucca brevifolia*) and Mojave yucca (*Yucca schidigera*), and possibly desert riparian habitats. Garrett and Dunn (1981) considered it a very rare summer resident in the region and listed known nesting sites such as the Lanfair Valley in San Bernardino County, Owens Valley in Inyo County, and the Antelope Valley in Los Angeles County.

Migrant Swainson's hawks have been increasing in the region since the mid-1980s (Patten et al. 2003), but this may be related to changes in migration patterns rather than an actual increase in overall population numbers (Unitt 2004). There has also been recent evidence of renewed nesting or recolonization of historic habitats in the Antelope Valley (Woodbridge 1998). The Bureau of Land Management's West Mojave Plan (BLM 2005) found that all recent nest sites for the West Mojave Planning Area (WMPA) are in the Antelope, Victor, and Apple Valleys from near Palmdale and Lancaster, Los Angeles County, east to Adelanto and Victorville in San Bernardino County. In the WMPA, breeding habitat is provided by Joshua tree woodland, riparian woodland, and ornamental vegetation in the vicinity of suitable foraging habitats that include native as well as agricultural habitats (BLM 2005). Primary trees selected for nest sites in the WMPA are Joshua trees, Fremont cottonwoods (*Populus fremontii*), and other large trees used in agricultural windbreaks (BLM 2005).

**Survey Methodology**

The surveys followed the recommendations provided by the CEC and CDFG (2010) that generally follow the Swainson's Hawk Technical Advisory Committee (SWTAC) survey guidelines for the Central Valley of California (SWTAC 2000). The extent of the survey area is the primary difference between the two sets of guidelines, as the SWTAC (2000) recommends surveys of up to ½ mile away from the proposed project while the CEC and CDFG (2010) guidelines use a buffer of five miles to determine potential impacts.

As recommended by both sets of survey guidelines, these surveys were conducted by car while driving at reduced speeds (approximately 5 mph). Binocular and spotting scopes were used to identify raptors. Field notes were taken on each survey date and included recording of all bird species encountered during the survey. As indicated above under the project location and description section of this report, the survey excluded the southern approximate third of the survey area as it does not provide suitable breeding habitat for the Swainson's hawk. Approximately 40,000 acres remained within the survey area. Since the survey area contained numerous dirt roads through open habitats with mostly uninterrupted viewing vistas, the survey area could be covered in one day. In addition, the Tehachapi Renewable Transmission Project (TRTP) Right of Way essentially bisected the survey area in half, allowing excellent access of much of the survey area. Furthermore, TRTP published survey information for the Swainson's hawk was accessed prior to these surveys.

The CEC and CDFG (2010) guidelines outline the following sequence and number of surveys, with the first survey period being optional: (1) January 1 – March 31: one survey; (2) April 1 – April 30: three surveys; (3) May 1 – May 30: three surveys; and (4) June 1 – July 15: three surveys. Swainson's hawks are migratory and not expected to be present during the 1$^{st}$ survey period, so this survey is optional, but a survey in this time period can provide helpful information with regards to potential nest sites and the presence of other raptor species that may compete for available nest sites. Surveys in the 2$^{nd}$ survey period should be looking for arrival of Swainson's hawks and nest building activities. Egg laying and incubation occurs during the 3$^{rd}$ survey period, so the hawks are

less visible and can be difficult to observe during this time period. The 4th and last survey period is when the young fledge with relatively high levels of activity at the nest site.

The surveys were conducted by BonTerra Consulting biologists Brian Daniels and Jonathan Feenstra. Table 1 below provides survey data and conditions for each of the nine Swainson's hawk surveys conducted in 2012 for the project site. Appendix A of this report provides a list of all incidental wildlife species recorded during the surveys. Photographs of the project site and some of the Swainson's hawks observed during the survey are provided in Appendix B.

**TABLE 1**
**SUMMARY OF SURVEY DATA AND CONDITIONS**
**FOR SWAINSON'S HAWK SURVEYS**

| Survey Dates | Surveyor | Time | Air Temperature (°F) | | Cloud Cover | Wind (mph) |
|---|---|---|---|---|---|---|
| | | | Start | End | | |
| April 12 | BED | 7:00AM–4:00PM | 43 | 57 | 0% → 40% | 20–40 |
| April 19 | BED | 6:30AM–4:45PM | 59 | 82 | 0% | 5–40 |
| April 27 | BED | 6:15AM–5:40PM | 46 | 73 | 0% | 10–30 |
| May 9 | JSF | 6:15AM–14:15PM | 70 | 95 | 0% | 2–8 |
| May 15 | JSF | 9:00AM–5:00PM | 76 | 86 | 0% | 10–10 |
| May 30 | BED | 7:00AM–12:00PM | 66 | 84 | 0% | 10–15 |
| June 13 | BED | 6:15AM–12:00PM | 72 | 92 | 0% | 5–10 |
| July 3 | BED | 6:00AM–12:30PM | 66 | 90 | 0% | 10–15 |
| July 13 | BED | 6:00AM–11:45AM | 77 | 86 | 100% | 0–5 |

°F: degrees Fahrenheit; mph: miles per hour.

## Survey Results

Swainson's hawks were observed in the survey area during the April 12, 19, and 27; and May 9 and 15, 2012 surveys (Exhibit 4). None of these hawks exhibited any breeding or nesting behaviors and are presumed to have been migrants. As would be expected of migrants in the Antelope Valley, the April sightings were all or mostly of adults while the May sightings were almost all of subadults (second year birds still retaining some juvenile feathers). The light-morph adult observed on April 12, 2012, was still present in the same area (Myrick Canyon) on April 19, 2012, and is the only Swainson's hawk known to have remained more than one day in the survey area. The photographs of the light-morph adult observed foraging south of the alfalfa field near 120th Street West and West Avenue I on April 27, 2012, showed it to be a different individual than the light-morph adult Swainson's hawk at Myrick Canyon (see Appendix B photographs).

Nesting Swainson's hawks are seasonally known to occur in the Antelope Valley west of Rosamond in the vicinity of alfalfa fields that generally concentrate between Avenue A (the Kern County-Los Angeles County line) and Rosamond Blvd in Kern County. A search of the CDFG's California Natural Diversity Database (CNDDB) (CDFG 2012) confirms this information. In addition, recent TRTP surveys have also found nesting Swainson's hawks in the same area, but also further south in Los Angeles County: two Swainson's hawk nests are located in the survey area for the Project Site (Exhibit 4). The northern most of these two TRTP nests was found during 2010 surveys and was located in an ornamental tree (Aleppo pine) at an isolated ranch on 110th Street West that is surrounded by non-native grasslands, disturbed desert scrub, and fallow agricultural

fields (see Exhibit 4). The nest was constructed in 2010, but failed for unknown reasons (ICF and Bloom 2010). The second TRTP nest was found during 2011 surveys and located in a cottonwood tree at an isolated alfalfa ranch located at 120th Street West and West Avenue I (see Exhibit 4). Several sightings of Swainson's hawk during these surveys are in the vicinity of this alfalfa ranch (see Exhibit 4) and it attracted other foraging raptors as well. This nest produced two Swainson's hawk nestling, but also failed for unknown reasons (ICF and Bloom 2011).

If you have any comments or questions, please call Marc Blain or Brian Daniels at (626) 351-2000.

Sincerely,

BONTERRA CONSULTING

Marc T. Blain
Associate, Biological Resources Manager

Brian E. Daniels
Senior Biologist/Ornithologist

Enclosures: Exhibit 1 – Regional Location
Exhibit 2 – Local Vicinity
Exhibit 3 – Survey Area
Exhibit 4 – Survey Results for Swainson's Hawk
Appendix A – Wildlife Compendium
Appendix B – Swainson's Hawk Survey Photographs

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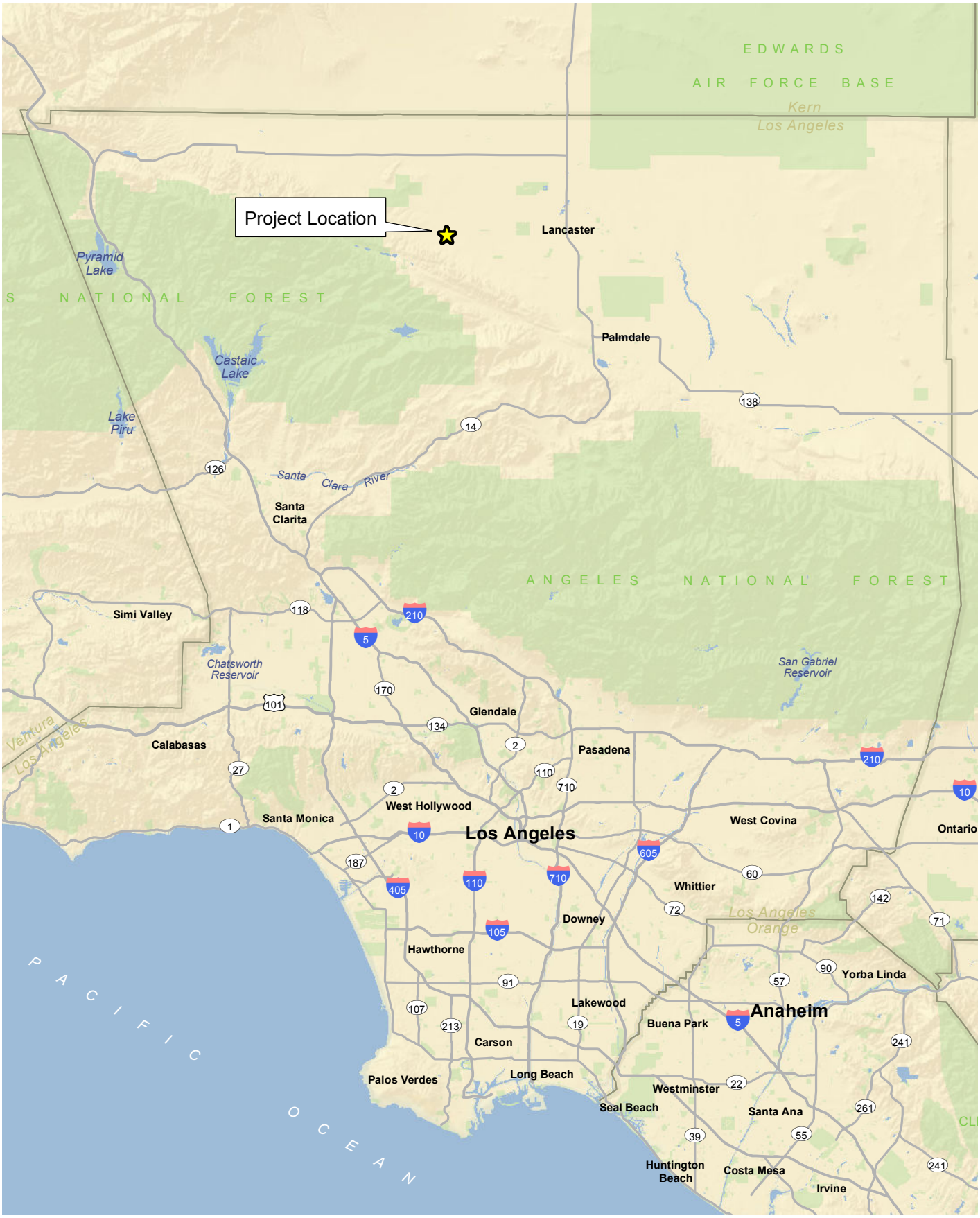


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# Project Location

Exhibit 1

*West Antelope Solar Project*

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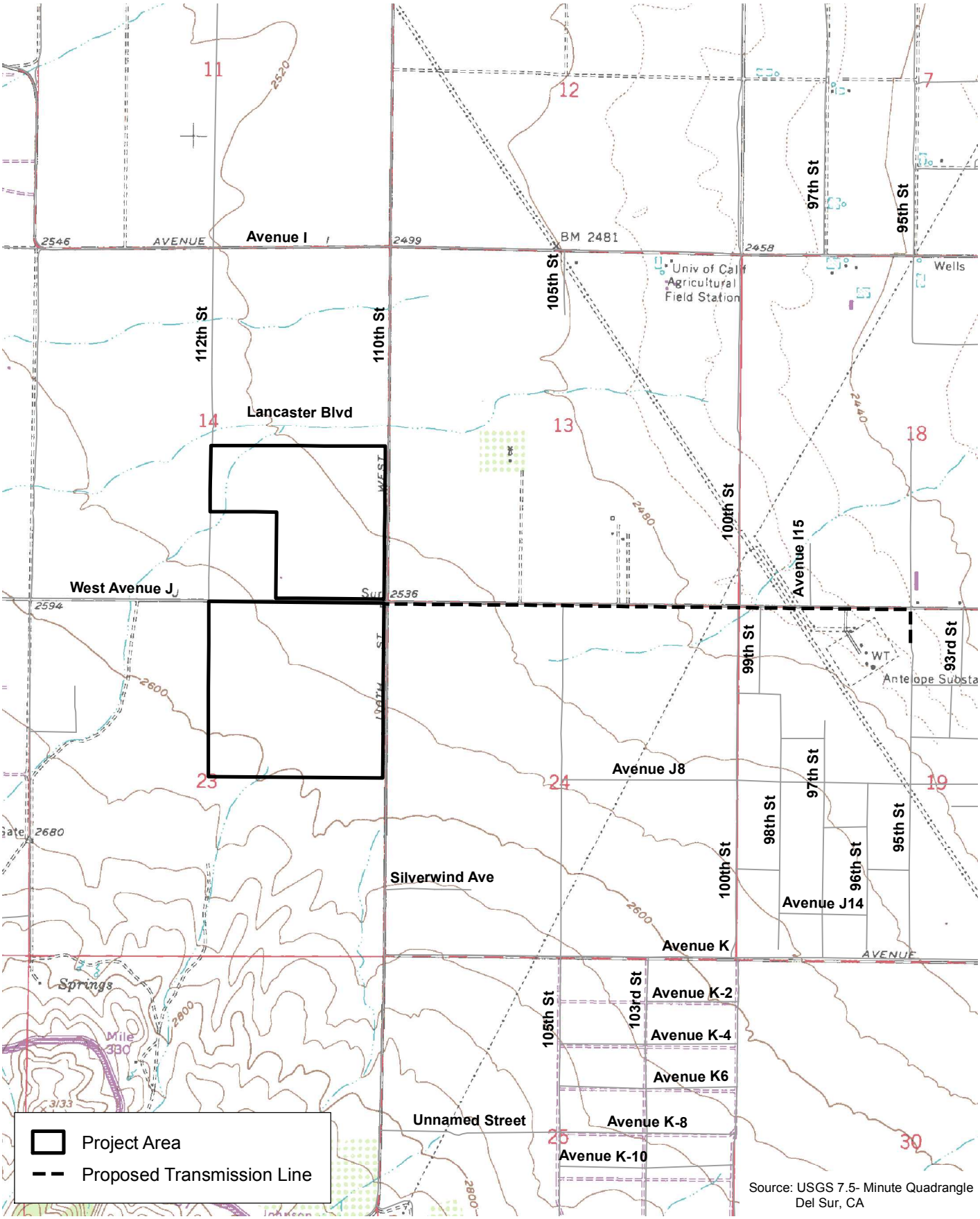
(Rev: 8-17-2012 JAZ) Projects\TAAC\J001\Graphics\SwainsonsHawk\Ex1_RL.pdf

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# U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

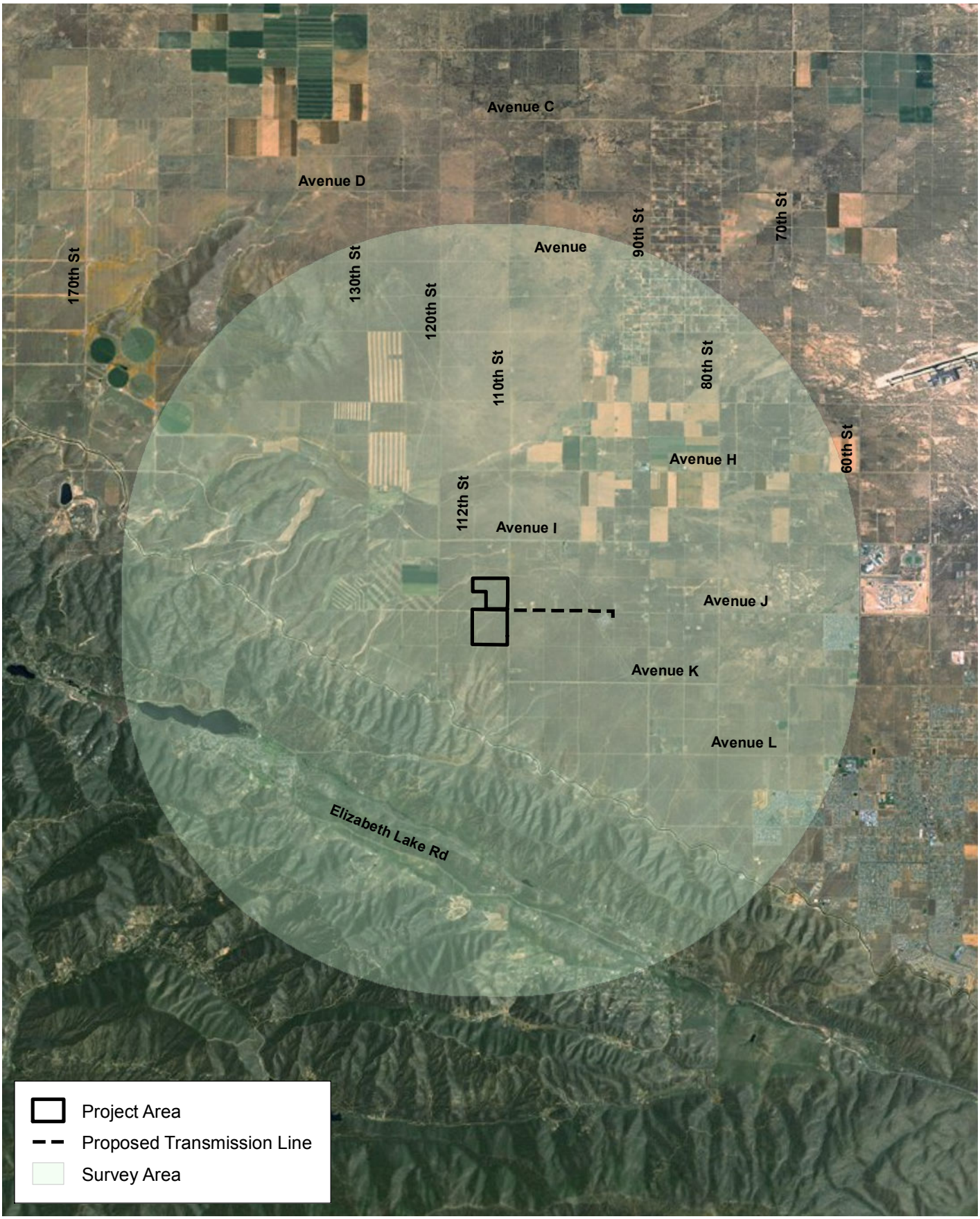
*West Antelope Solar Project*

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

(Rev: 9-04-2012 JAZ) Projects\TAAC\J001\Graphics\SwainsonsHawk\Ex2_LV_usgs.pdf

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# Survey Area

Exhibit 3

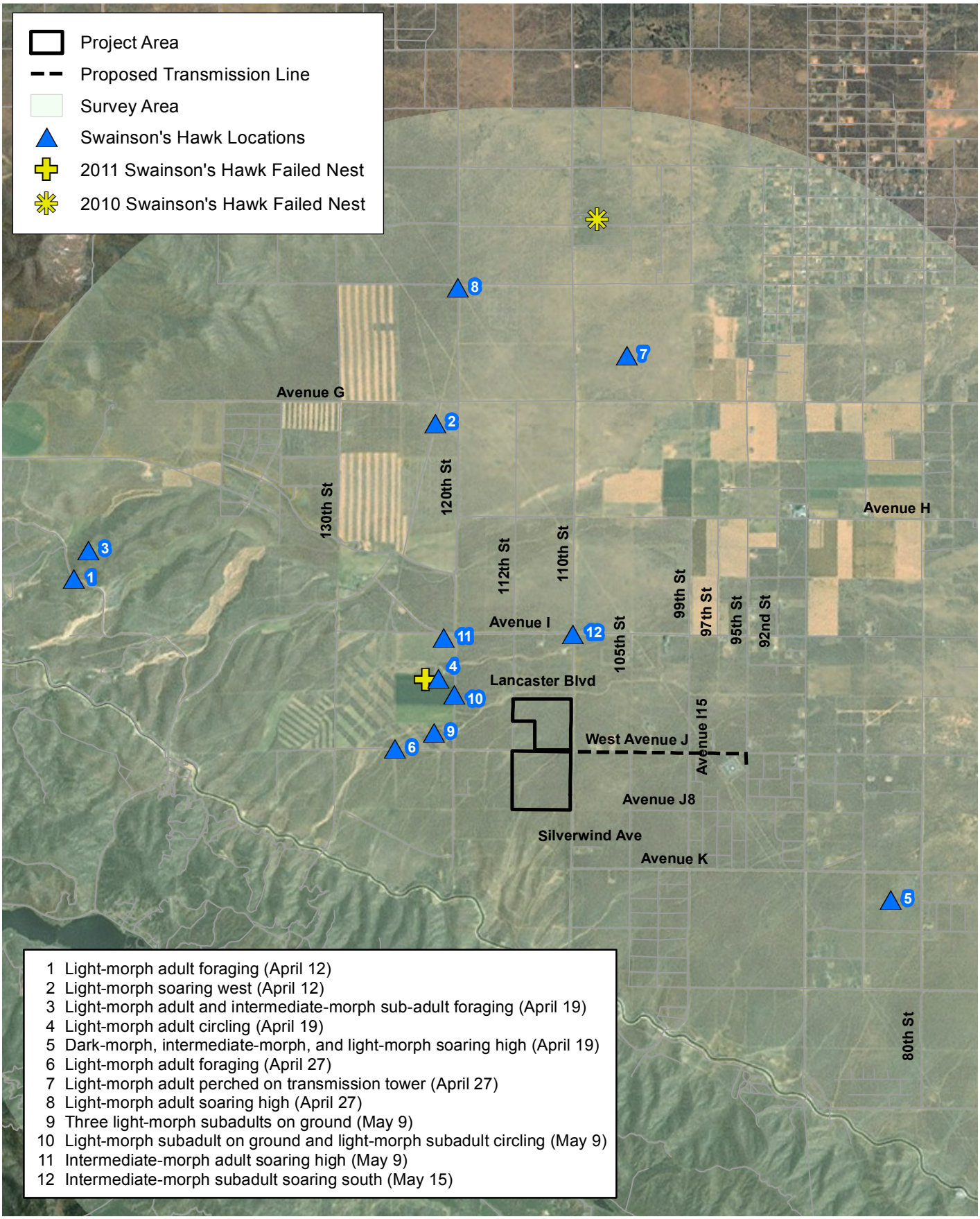
*West Antelope Solar Project*

N W E S

10,000 5,000 0 10,000 Feet

BonTerra CONSULTING

(Rev: 8-20-2012 JAZ) Projects\TAAC\J001\Graphics\SwainsonsHawk\Ex3_SurveyArea.pdf

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# Survey Results for Swainson's Hawk

Exhibit 4

*West Antelope Solar Project*

N W E S

6,000 3,000 0 6,000 Feet

BonTerra CONSULTING

(Rev: 8-31-2012 CJS) Projects\TAAC\J001\Graphics\SwainsonsHawk\Ex4_HawkLocations.pdf

# APPENDIX A

# WILDLIFE COMPENDIUM

# WILDLIFE COMPENDIUM

| SPECIES | |
|---|---|
| **REPTILES** | |
| ***LEPIDOSAURIA* - LIZARDS & SNAKES** | |
| *Dipsosaurus dorsalis* | desert iguana |
| *Sceloporus occidentalis* | western fence lizard |
| *Uta stansburiana* | side-blotched lizard |
| *VIPERIDAE* - VIPERS | |
| *Crotalus scutulatus* | Mojave green rattlesnake |
| **BIRDS** | |
| ***AVES* - BIRDS** | |
| *ODONTOPHORIDAE* - QUAILS | |
| *Callipepla californica* | California quail |
| *ARDEIDAE* - HERONS, BITTERNS, & ALLIES | |
| *Ardea alba* | great egret |
| *CATHARTIDAE* - NEW WORLD VULTURES | |
| *Cathartes aura* | turkey vulture |
| *ACCIPITRIDAE* - HAWKS, KITES, EAGLES, & ALLIES | |
| *Circus cyaneus* | northern harrier |
| *Accipiter cooperii* | Cooper's hawk |
| *Buteo swainsoni* | Swainson's hawk |
| *Buteo jamaicensis* | red-tailed hawk |
| *Buteo regalis* | ferruginous hawk |
| *Aquila chrysaetos* | golden eagle |
| *FALCONIDAE* - FALCONS | |
| *Falco sparverius* | American kestrel |
| *Falco mexicanus* | prairie falcon |
| *CHARADRIIDAE* - PLOVERS | |
| *Charadrius vociferus* | killdeer |
| *SCOLOPACIDAE* - SANDPIPERS & PHALAROPES | |
| *Numenius phaeopus* | whimbrel |
| *COLUMBIDAE* - PIGEONS & DOVES | |
| *Columba livia* * | rock pigeon |
| *Streptopelia decaocto* * | Eurasian collared-dove |
| *Zenaida macroura* | mourning dove |
| *CUCULIDAE* - CUCKOOS & ROADRUNNERS | |
| *Geococcyx californianus* | greater roadrunner |
| *STRIGIDAE* - TRUE OWLS | |
| *Athene cunicularia* | burrowing owl |
| *APODIDAE* - SWIFTS | |
| *Chaetura vauxi* | Vaux's swift |
| *PICIDAE* - WOODPECKERS | |
| *Picoides nuttallii x scalaris* | hybrid |
| *TYRANNIDAE* - TYRANT FLYCATCHERS | |
| *Sayornis saya* | Say's phoebe |
| *Myiarchus cinerascens* | ash-throated flycatcher |
| *Tyrannus verticalis* | western kingbird |

# WILDLIFE COMPENDIUM
## (Continued)

| SPECIES | |
|---|---|
| *LANIIDAE* - SHRIKES | |
| *Lanius ludovicianus* | loggerhead shrike |
| *CORVIDAE* - CROWS & JAYS | |
| *Aphelocoma californica* | western scrub-jay |
| *Corvus corax* | common raven |
| *ALAUDIDAE* - LARKS | |
| *Eremophila alpestris* | horned lark |
| *HIRUNDINIDAE* - SWALLOWS | |
| *Tachycineta bicolor* | tree swallow |
| *Stelgidopteryx serripennis* | northern rough-winged swallow |
| *Petrochelidon pyrrhonota* | cliff swallow |
| *Hirundo rustica* | barn swallow |
| *MIMIDAE* - THRASHERS | |
| *Mimus polyglottos* | northern mockingbird |
| *Oreoscoptes montanus* | Sage thrasher |
| *STURNIDAE* - STARLINGS | |
| *Sturnus vulgaris ** | European starling |
| *EMBERIZIDAE* - SPARROWS & JUNCOS | |
| *Spizella breweri* | Brewer's sparrow |
| *Pooecetes gramineus* | vesper sparrow |
| *Chondestes grammacus* | lark sparrow |
| *Passerculus sandwichensis* | savannah sparrow |
| *Zonotrichia leucophrys* | white-crowned sparrow |
| *CARDINALIDAE* - CARDINALS & ALLIES | |
| *Piranga ludoviciana* | western tanager |
| *Passerina caerulea* | blue grosbeak |
| *ICTERIDAE* - BLACKBIRDS | |
| *Agelaius tricolor* | tricolored blackbird |
| *Sturnella neglecta* | western meadowlark |
| *Euphagus cyanocephalus* | Brewer's blackbird |
| *Molothrus ater* | brown-headed cowbird |
| *Icterus bullockii* | Bullock's oriole |
| *FRINGILLIDAE* - FINCHES | |
| *Carpodacus mexicanus* | house finch |
| *Spinus [Carduelis] lawrencei* | Lawrence's goldfinch |
| *PASSERIDAE* - OLD WORLD SPARROWS | |
| *Passer domesticus ** | house sparrow |
| **MAMMALS** | |
| ***MAMMALIA* - MAMMALS** | |
| *LEPORIDAE* - HARES & RABBITS | |
| *Lepus californicus bennettii* | San Diego black-tailed jackrabbit |
| *Spermophilus beecheyi* | California ground squirrel |
| *HETEROMYIDAE* - POCKET MICE & KANGAROO RATS | |
| *Dipodomys merriami* | Merriam's kangaroo rat |

# WILDLIFE COMPENDIUM
# (Continued)

| SPECIES | |
|---|---|
| *MURIDAE* - MICE, RATS, & VOLES | |
| *Reithrodontomys megalotis* | western harvest mouse |
| *CANIDAE* - WOLVES & FOXES | |
| *Canis latrans* | coyote |
| *MUSTELIDAE* - WEASELS, OTTERS, & BADGERS | |
| *Mustela frenata* | long-tailed weasel |
| * introduced species | |

# APPENDIX B

# SWAINSON'S HAWK SURVEY PHOTOGRAPHS

View southwest of project site at intersection of 110th St. West and West Ave J. April 15, 2012.

View northwest of project site at intersection of 110th St. West and West Ave. J. April 15, 2012.

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# Swainson's Hawk Survey Photographs

Appendix B

*West Antelope Valley Solar Project*

BonTerra CONSULTING

(08/31/12 MMD) PAS R: Projects\TAAC\J001\Graphics\SwainsonsHawk\app_hawk_photos.pdf

Light-morph adult foraging (Point 1 on Exhibit 4). April 12, 2012.

Light-morph adult foraging (Point 6 on Exhibit 4). April 27, 2012.

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# Swainson's Hawk Survey Photographs

Appendix B

*West Antelope Valley Solar Project*

BonTerra CONSULTING

(08/31/12 MMD) PAS R: Projects\TAAC\J001\Graphics\SwainsonsHawk\app_hawk_photos.pdf

Light-morph subadult on ground (Point 9 on Exhibit 4) May 9, 2012.

Light-morph subadult circling (Point 10 on Exhibit 4). May 9, 2012.

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# Swainson's Hawk Survey Photographs

Appendix B

*West Antelope Valley Solar Project*

BonTerra CONSULTING

(08/31/12 MMD) PAS R: Projects\TAAC\J001\Graphics\SwainsonsHawk\app_hawk_photos.pdf

# APPENDIX B-4

# PLANT LETTER REPORT

BonTerra CONSULTING
2 Executive Circle, Suite 175 Irvine, CA 92614
T: (714) 444-9199 F: (714) 444-9599 | www.BonTerraConsulting.com

August 28, 2012

Mr. Erik Haugen
Senior Manager, Project & Utility Sales
Canadian Solar (USA) Inc.
12657 Alcosta Boulevard, Suite 130
San Ramon, California 94583

**VIA EMAIL AND MAIL**
**Erik.Haugen@canadiansolar.com**

Subject: Results of Focused Rare Plant Surveys for the Antelope West PV Solar Project, Lancaster, Los Angeles County, California

Dear Mr. Haugen:

This Letter Report presents the findings of focused rare plant surveys conducted for the Antelope West PV Solar Project (hereafter referred to as the "Proposed Project") in Lancaster, Los Angeles County, California (Exhibit 1).

## PROJECT LOCATION AND DESCRIPTION

The Proposed Project consists of two parts, a 300 acre parcel (Primary Project Area) and a transmission line corridor (Transmission Corridor). The Primary Project Area is located on the West side of 110th Street, forming a rectangle with a north-south axis with Lancaster Boulevard on the north, 115th Street on the west, and an unnamed dirt road following an existing Southern California Edison transmission line on the south. The Transmission Corridor follows West Avenue J from 110th Street east along the south side of the road to 95th Street West and the entrance to a Southern California Edison substation.

The Proposed Project is located on the U.S. Geological Survey's (USGS') Del Sur 7.5 minute quadrangle (Exhibit 2). The topography within the Primary Project Area is generally flat with a gentle sloping upward toward the south. There are some low rises in the southern portion of the Proposed Project area. The elevation ranges from 2,480 to 2,620 feet above mean sea level (msl). The Transmission Corridor is on relatively flat ground and is situated at about 2,535 feet above msl at the west end, and 2,490 feet above msl at the east end.

The majority of the soils within Proposed Project area are mapped as Greenfield sandy loam (2 to 9 percent slope) (USDA, NRCS 2012) (Exhibit 3). The northern border is mapped as Ramona coarse sandy loam (0 to 2 percent slopes), and the southeastern corner is mapped as Ramona coarse sandy loam (2 to 5 percent or 5 to 9 percent slope). Small units of Hanford coarse sandy loam just barely enter the site in the southwest corner.

The vegetation within the Primary Project Area consists of native annual grassland with small patches of native perennial grasses. The annual grassland is dominated by Pacific fescue (*Festuca microstachys*) with common goldfields (*Lasthenia gracilis*), red-stem filaree (*Erodium cicutarium*), red brome (*Bromus madritensis* subsp. *rubens*), cheat grass (*Bromus tectorum*), and doveweed (*Croton setiger*). The character of the grassland oscillates somewhat between the native and

non-native elements in dominance. The distribution and density of dried stalks from last year indicate that small fescue dominated the vegetation in 2011 but in 2012, the distribution of non-native species was more prevalent. Overall, the species composition within the Primary Project Area was very coastal-like in its make-up with very few desert elements. Associated species include rattlesnake weed (*Chamaecyce albomarginata*), valley popcornflower (*Plagiobothrys canescens*), California poppy (*Eschscholzia californica*), and tumble mustard (*Sisymbrium altissimum*). Small patches of nodding needlegrass (*Stipa cernua*) and big squirreltail (*Elymus multisetus*) were scattered over the Primary Project Area, especially on the eastern and southern portions.

The Transmission Corridor is very similar in terms of vegetation to the Primary Project Area, except that the approximately 25 feet adjacent West Avenue J is cleared, presumably for fire protection and road maintenance. The cleared area supported a fair diversity of weeds including red-stemmed filaree, Russian thistle (*Salsola tragus*), red brome, tumble mustard, and western tansy mustard (*Descurainia pinnata*) in addition to some forbs including rattlesnake weed and miniature lupine (*Lupinus bicolor*).

Small patches of native grassland dominated by big squirreltail and a small patch of rubber rabbitbush (*Ericameria nauseosus*) are situated within the grasslands at the west end of the Transmission Corridor.

## METHODS

Botanical surveys were floristic in nature and conducted following the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009). A literature search was conducted to identify special status plants and habitats known to occur in the vicinity of the Proposed Project. Sources reviewed included the USGS' Del Sur 7.5-minute quadrangle in the California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2012), the California Department of Fish and Game's (CDFG'S) California Natural Diversity Database (CNDDB) (CDFG 2012), and the Consortium of California Herbaria (CCH) (CCH 2012.) Species from the eight adjacent USGS 7.5-minute quadrangles were also considered.

The entire Proposed Project Area was systematically surveyed by BonTerra Botanist Fred Roberts on April 17 and 18, 2012. Photographs of the Proposed Project site were taken during the surveys and are included as Attachment A. All plant species observed were recorded in field notes. Plants were identified to the level necessary to determine whether or not they are a special status species. Plants were identified in the field or collected for later identification, using taxonomic keys, descriptions and illustrations in Baldwin et al. (2012) or the Jepson Flora Project (2012), and occasionally with the assistance of locational data provided by the California Consortium of Herbaria (2012). Taxonomy and nomenclature follows Baldwin et al. (2012). All voucher specimens collected will be deposited with the herbarium at Rancho Santa Ana Botanic Garden in Claremont, California.

Conditions in 2012 were not ideal for surveying sensitive species due to relatively dry conditions. According to the Los Angeles County Department of Water and Power (LADWP), the normal seasonal rainfall for Lancaster, situated about 9 miles east of the Proposed Project, is 5.19 inches (LADWP 2012) and Quartz Hill, about 6.5 miles southeast of the Proposed Project, 7.97 inches. By mid April, the season total was 2.09 inches in Lancaster and 2.30 inches in Quartz Hill, less than 50 percent of normal. About 0.67 inches (30 percent) fell on April 13, 2012, which would have had little impact at the time of the surveys.

However, the diversity of blooming species on the project site suggests that sensitive species, while likely diminished as compared to a normal or favorable year in terms of abundance and density, would be found on the Proposed Project site if present.

## SURVEY RESULTS

Table 1 identifies the special status plants known to occur in the vicinity of the Proposed Project site and the survey results.

**TABLE 1**
**SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE VICINITY OF THE PROJECT STUDY AREA***

| Species | Status | | | Potential to Occur in the Survey Area. Results of Focused Survey |
|---|---|---|---|---|
| | USFWS | CDFG | CRPR | |
| *Astragaulus preussii* var. *laxiflorus* Lancaster milk-vetch | — | — | 1B.1 | Suitable habitat (alkaline flats) not present . Not observed during focused surveys. |
| *Boechera lincolnensis* Darwin rockcress | — | — | 2.3 | Suitable habitat (rocky slopes, carbonate substrates) lacking. Not observed during focused surveys. Reports for western Los Angeles USGS quadrangles apparently unverified. Appears to be confined mostly to desert mountains. |
| *California macrophylla* Round-leaved filaree | — | — | 1B.1 | Suitable habitat (mesic grasslands) lacking. Known locally only from old collection in Elizabeth Lakes region (1884) where moister conditions prevail. Not observed during focused surveys. |
| *Calochortus clavatus* var. *gracilis* slender mariposa lily | — | — | 1B.2 | Suitable habitat lacking (too dry). Not known to occur on north side of San Gabriel Mtns. Not observed during focused surveys. |
| *Calochortus striatus* alkali mariposa lily | — | — | 1B.2 | Suitable habitat (alkaline flats, meadows, and springy areas) lacking. Not observed during focused surveys. |
| *Calystegia peirsonii* Peirson's morning-glory | — | — | 4.2 | Suitable habitat present. **One site located during the focused surveys.** |
| *Canbya candida* white pygmy-poppy | — | — | 4.2 | Suitable habitat (sandy soils in desert vegetation) lacking. Found east of Lancaster. Not observed during focused surveys. |
| *Castilleja plagiotoma* Mojave paintbrush | — | — | 4.3 | Suitable habitat (alluvial Great Basin scrub, Joshua Tree woodland, pinon, pine forests) lacking. Found east of Lancaster on the desert floor. Not observed during focused surveys. |
| *Chorizanthe parryi* var. *fernandina* San Fernando Valley Spineflower | FC | CE | 1B.2 | Suitable habitat (sandy soils) limited. Old records (1920's) for the Elizabeth Lake region about 3 miles to SW. However, not known in the Antelope Valley proper. No *Chorizanthe* species observed during focused surveys. |
| *Chorizanthe parryi* var. *parryi* Parry's spineflower | — | — | 2.1 | Suitable habitat (sandy soils) limited. One old collection for Lancaster area (June 1896). No *Chorizanthe* species observed during focused surveys. |

**TABLE 1 (Continued)**
**SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE VICINITY OF THE PROJECT STUDY AREA***

| Species | Status | | | Potential to Occur in the Survey Area. Results of Focused Survey |
|---|---|---|---|---|
| | USFWS | CDFG | CRPR | |
| *Chorizanthe spinosa* Mojave spineflower | — | — | 4.2 | Suitable habitat (alluvial fan scrub, Mojavean desert scrub, pinyon-juniper woodlands; little sand) lacking. Not observed during focused surveys. |
| *Chorizanthe xanti* var. *leucotheca* white-bracted spineflower | — | — | 1B.2 | Suitable habitat (Chenopod scrub, Joshua tree woodland, Mojavean desert scrub; little sand) lacking. Generally east of Lancaster. Not observed during focused surveys. |
| *Cryptantha clokeyi* Clokey's cryptantha | — | — | 1B.2 | Suitable habitat present. Nearest location about 4 miles to NW (Poppy Preserve in similar habitat). Not observed during focused surveys. |
| *Goodmania luteola* golden goodmania | — | — | 4.2 | Suitable habitat (alkaline or clay soils) lacking. Found primarily east of Lancaster in desert. Not observed during focused surveys. |
| *Layia heterotricha* pale-yellow layia | — | — | 1B.1 | Suitable habitat (alkaline or clay soils) lacking. Only known in area by single old collection near Lancaster (May 1895). Not observed during focused surveys. |
| *Lepechinia rossii* Ross' pitcher sage | — | — | 1B.2 | Suitable habitat (chaparral, mountains) lacking. Not observed during focused surveys. |
| *Loeflingia squarrosa var. artemisiarum* sagebrush loeflingia | — | — | 2.2 | Suitable habitat (sandy soils) lacking. Not observed during focused surveys. |

**LEGEND:**

| **Federal (USFWS)** | | **State (CDFG)** | |
|---|---|---|---|
| FE | Endangered | CE | Endangered |
| FC | Candidate | CT | Threatened |

**California Rare Plant Rank (CRPR) Categories**

| | |
|---|---|
| 1A | Plants Presumed Extinct in California |
| 1B | Plants Rare, Threatened, or Endangered in California and Elsewhere |
| 2 | Plants Rare, Threatened, or Endangered in California But More Common Elsewhere |
| 4 | Plants of Limited Distribution – A Watch List |

**California Native Plant Society (CNPS) Threat Code Extensions**

| | |
|---|---|
| None | Plants lacking any threat information |
| .1 | Seriously Endangered in California (over 80% of occurrences threatened; high degree and immediacy of threat) |
| .2 | Fairly Endangered in California (20–80% of occurrences threatened) |
| .3 | Not Very Threatened in California (low degree/immediacy of threat or no current threats known) |
| * | USGS' Del Sur and surrounding 7.5-minute quadrangles |

A single special status (CRPR 4.2) species was observed during the focused surveys, Peirson's morning-glory (*Calystegia peirsonii*). The single site was found about 330 feet northwest of the intersection of West Avenue J and 110th Street West (Exhibit 4). A total of 30 individuals were found.

A list of all plants observed within the Proposed Project site during the focused surveys is presented in Attachment B. Due to conditions at the project site (30 percent of normal rainfall), there is a possibility that species could be present on site but not detectable at the time of the surveys.

If you have any comments or questions, please call Ann Johnston at (714) 444-9199.

Sincerely,

BONTERRA CONSULTING

Ann M. Johnston
Principal

Enclosures: Exhibit 1 – Project Location
Exhibit 2 – USGS Quadrangle
Exhibit 3 – Soils Types
Exhibit 4 – Sensitive Plant Species
Attachment A – Site Photographs
Attachment B – Plant Compendium

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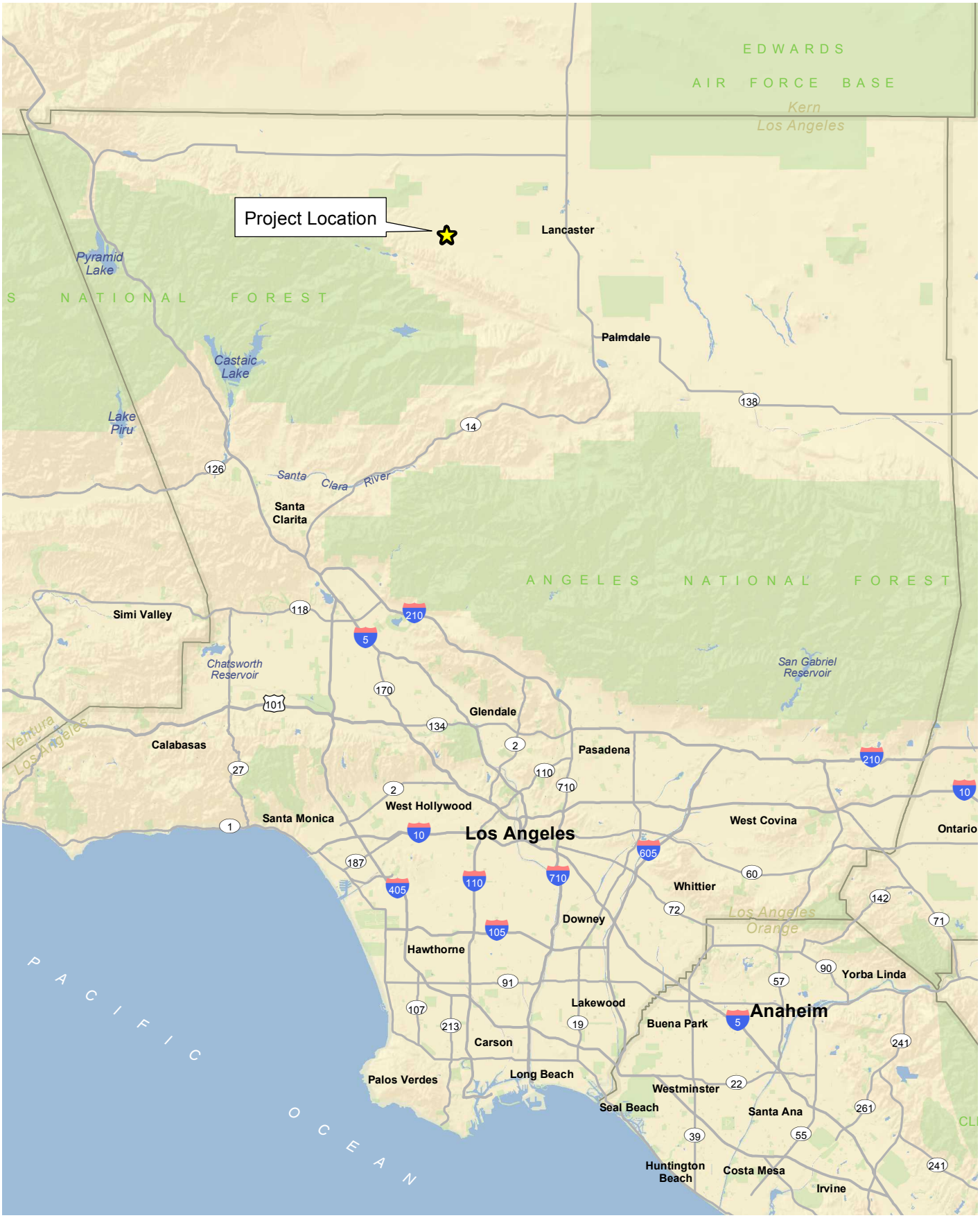


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# Project Location

Exhibit 1

*West Antelope Solar Project*

N W E S

10 5 0 10 Miles

BonTerra CONSULTING

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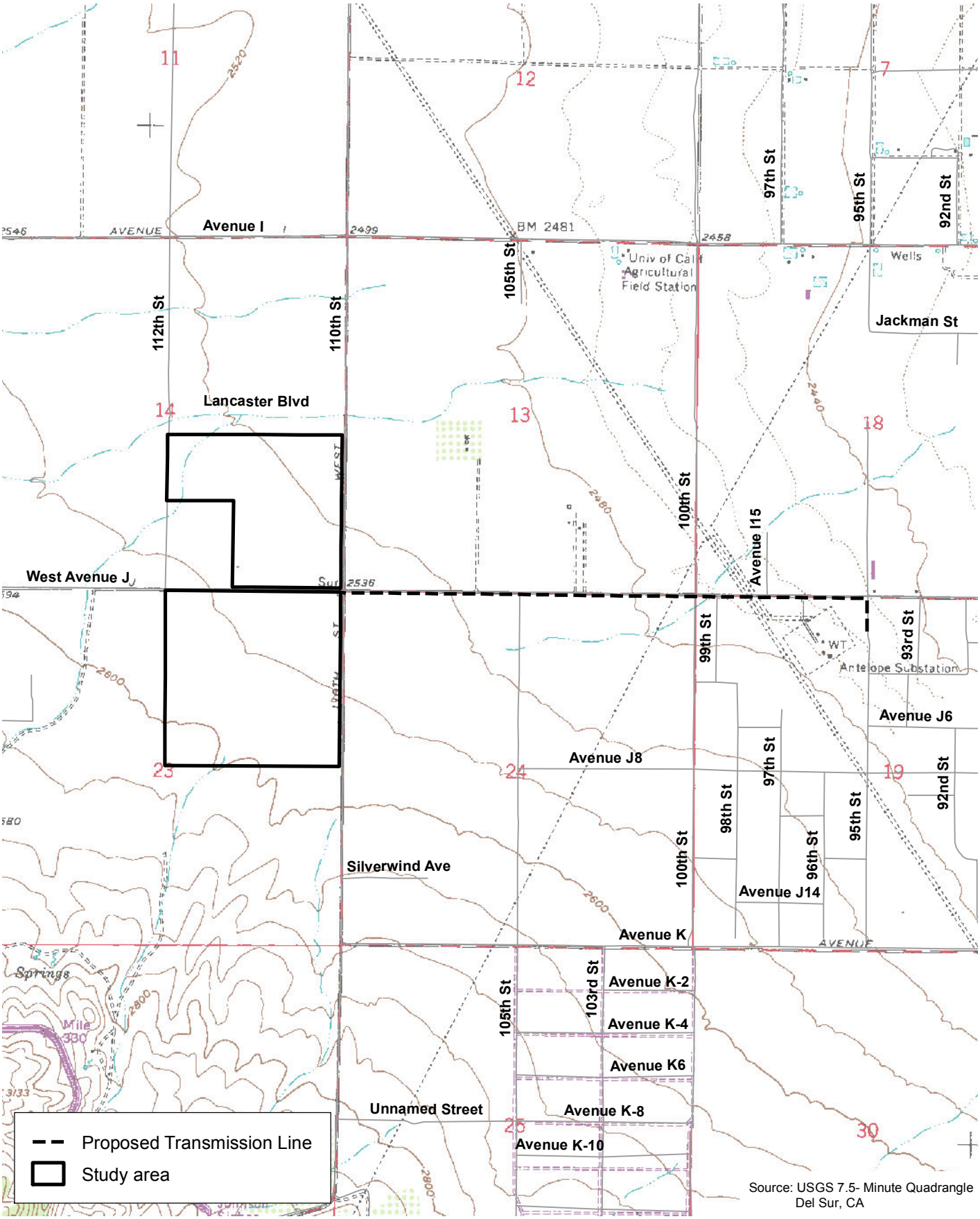


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# U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

*West Antelope Solar Project*

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

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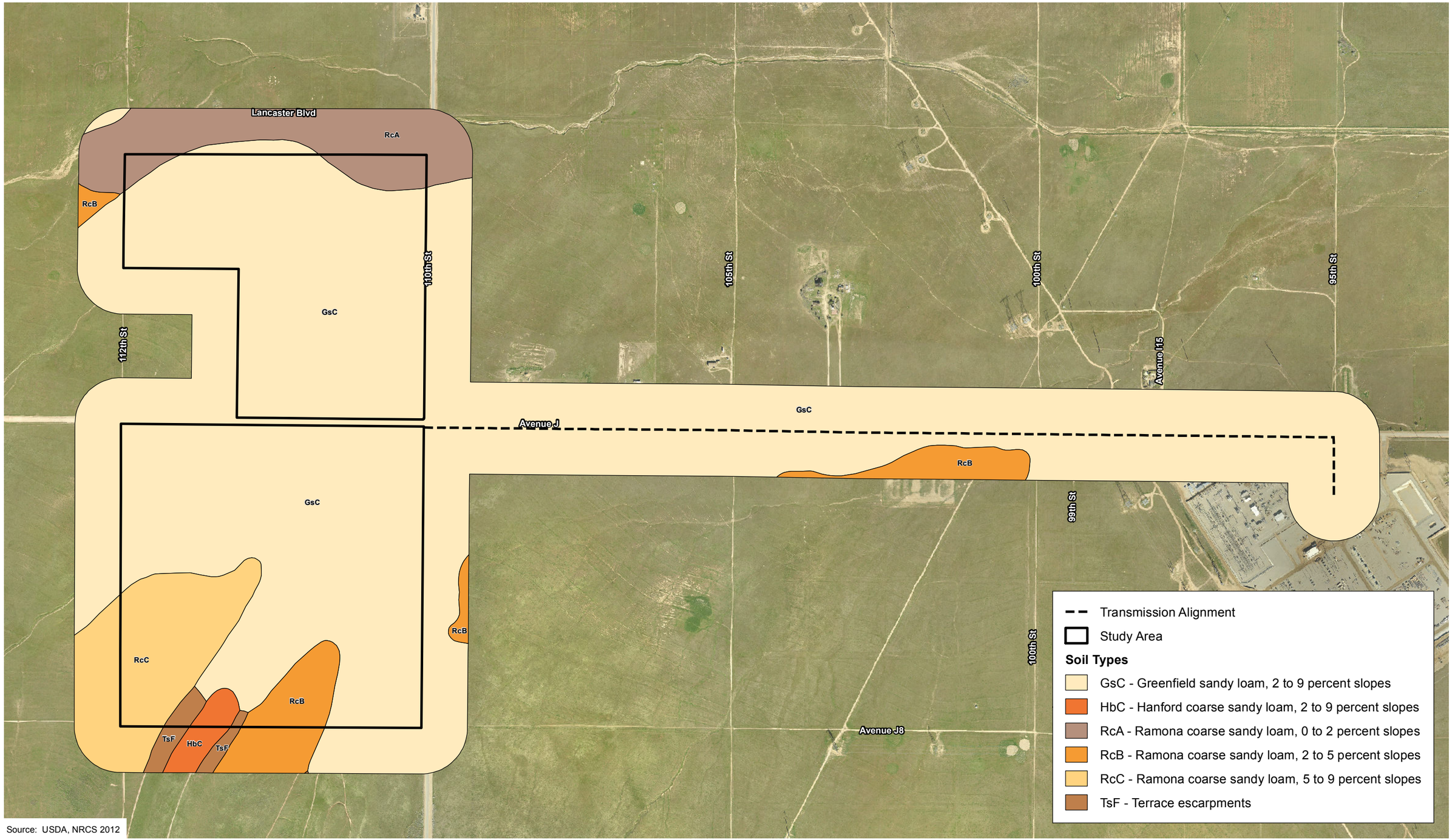


Source: USDA, NRCS 2012

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# Soil Types

Exhibit 3

*West Antelope Solar Project*

N W E S

800 400 0 800 Feet

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(Rev: 7-12-2012 CJS) PAS\Projects\TAAC\J001\Graphics\Plant Report\Ex_soils.pdf

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Sensitive Plant Species: *(Calystegia piersonii)*

Exhibit 4

*West Antelope Solar Project*

N W E S

800 400 0 800 Feet

BonTerra CONSULTING

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# ATTACHMENT A

# SITE PHOTOGRAPHS

**Looking southwest.** View of the Primary Project Site from the northeast corner at the intersection of 110th Street and Lancaster Road. The area is dominated by a form of native annual grassland with a fairly high non-native component. Stalks of Pacific fescue *(Festuca microstachys)* from the 2011 spring season are visible as low brown stalks in a horizontal band through the middle of the photograph.

**Looking east.** View of the Transmission  Line Corridor from near 110th Street West showing the undisturbed south side. The cleared portion adjacent to West Avenue J is visible in the background. Perennial bunch grasses are visible in the foreground.

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# Site Photographs

Attachment A

*Antelope West Solar Project*

BonTerra CONSULTING

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# ATTACHMENT B

# PLANT COMPENDIUM

# PLANT SPECIES OBSERVED WITHIN THE SURVEY AREA DURING FOCUSED SURVEYS

| Species | |
|---|---|
| ***ANGIOSPERMAE – FLOWERING PLANTS*** | |
| **EUDICOTS** | |
| ASTERACEAE – SUNFLOWER FAMILY | |
| *Ambrosia acanthocarpa* | sandbur |
| *Corethrogyne filaginifolia* | sand aster |
| *Ericameria nauseosa [Chrysothamnus n.]* | rubber rabbitbush |
| *Erigeron canadensis [Conyza c.]* | Canadian horseweed |
| *Lasthenia gracilis* | common goldfields |
| *Matricaria discoidea** | pineapple weed |
| *Stephanomeria exigua* | wreath plant |
| *Uropappus lindleyi* | silverpuffs |
| BORAGINACEAE – BORAGE FAMILY | |
| *Amsinckia intermedia* | common fiddleneck |
| *Cryptantha nevadensis* var. *rigida* | rigid cryptantha |
| *Pectocarya linearis* | narrow-tooth pectocarya |
| *Pectocarya penicillata* | northern pectocarya |
| *Plagiobothrys arizonicus* | Arizona popcorn flower |
| *Plagiobothrys canescens* | valley popcornflower |
| BRASSICACEAE – MUSTARD FAMILY | |
| *Descurainia pinnata** | tansy mustard |
| *Lepidium nitidum* | shining peppergrass |
| *Sisymbrium altissimum** | tumble mustard |
| *Tropocarpum gracile* | slender dobiepod |
| CARYOPHYLLACEAE – PINK FAMILY | |
| *Achyronychia cooperi* | onyx flower |
| CHENOPODIACEAE – GOOSEFOOT FAMILY | |
| *Salsola tragus** | Russian thistle |
| CONVOLVULACEAE – MORNING-GLORY FAMILY | |
| *Calystegia peirsonii* | Peirson's morning-glory |
| CUCURBITACEAE – GOURD FAMILY | |
| *Cucurbita foetidissima* | calabazilla |
| EUPHORBIACEAE – SPURGE FAMILY | |
| *Chamaecyce albomargniata* [*Euphorbia a.*] | rattlesnake weed |
| *Croton setiger* | dove weed |
| FABACEAE – PEA FAMILY | |
| *Lupinus bicolor* | miniature lupine |
| GERANIACEAE – GERANIUM FAMILY | |
| *Erodium botrys** | long-beaked filaree |
| *Erodium cicutarium** | red-stemmed filaree |
| LAMIACEAE – MINT FAMILY | |
| *Marrubium vulgare** | horehound |
| MONTIACEAE – MINER'S LETTUCE FAMILY | |
| *Calandrinia ciliata* | redmaids |

# PLANT SPECIES OBSERVED WITHIN THE SURVEY AREA DURING FOCUSED SURVEYS (Continued)

| Species | |
|---|---|
| ONAGRACEAE – EVENING PRIMROSE FAMILY | |
| *Camissonia strigulosa* | strigulose evening primrose |
| PAPAVERACEAE – POPPY FAMILY | |
| *Escscholzia californica* | California poppy |
| POLEMONIACAE – PHLOX FAMILY | |
| *Gilia brecciarum* subsp. *brecciarum* | Nevada gilia |
| POLYGONACEAE – BUCKWHEAT FAMILY | |
| *Eriogonum davidsonii* | Davidson's wild buckwheat |
| *Rumex hymenosepalus* | wild rhubarb |
| SOLANACEAE – NIGHTSHADE FAMILY | |
| *Datura wrightii* | Jimpson weed |
| **MONOCOTS** | |
| POACEAE – GRASS FAMILY | |
| *Avena fatua** | wild oats |
| *Bromus hordaceus** | soft chess |
| *Bromus madritensis* subsp. *rubens** | red brome |
| *Bromus tectorum** | cheat grass |
| *Elymus multisetus* | big squirreltail |
| *Festuca microstachys [Vulpia microstachys]* | Pacific fescue |
| *Festuca myuros [Vulpia myuros]* | foxtail fescue |
| *Hordeum murinum* subsp. *leporinum** | hare barely |
| *Poa bulbosa* subsp. *vivipera** | bulbous bluegrass |
| *Schismus barbartus** | Mediterranean Grass |
| *Stipa cernua* | nodding needlegrass |
| *introduced species | |

# APPENDIX C

# CULTURAL RESOURCES TECHNICAL REPORT

# Phase I Cultural Resources Assessment

## West Antelope Solar Project

Prepared for

TA – Acacia, LLC
12657 Alcosta Boulevard, Suite 130
San Ramon, California 92614

USGS Del Sur, CA 7.5-Minute Quadrangle in Township 7 North; Range 14 West, Sections 14 and 23 (S.B.B.M).

Prepared by

Patrick O. Maxon, M.A., RPA
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August 2012

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D Site Photographs
E Personnel Qualifications

# PHASE I CULTURAL RESOURCES ASSESSMENT FOR THE WEST ANTELOPE SOLAR PROJECT LOS ANGELES COUNTY, CALIFORNIA

by

**Patrick Maxon, M.A., RPA**
**Albert Knight**

**August 2012**

Submitted by:

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Submitted to:

TA – Acacia, LLC
12657 Alcosta Boulevard, Suite 130
San Ramon, California 92614

USGS Del Sur, CA 7.5 Minute Quadrangle in Township 7 North; Range 14 West, Sections 14 and 23 (S.B.B.M); 270 acres

**BonTerra Consulting**
Project Number: TAAC J001

Key Words: West Avenue J, 110th Street West, USGS Del Sur 7.5-minute Quadrangle

# MANAGEMENT SUMMARY

## PURPOSE AND SCOPE

BonTerra Consulting undertook this project as part of California Environmental Quality Act (CEQA) requirements for the proposed West Antelope Solar Project located in the County of Los Angeles, California. The format of this report follows *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* (Office of Historic Preservation 1990).

## DATES OF INVESTIGATION

A cultural resources literature review was completed at the South Central Coastal Information Center (SCCIC) at the California State University, Fullerton on July 7, 2011 (Appendix A). Native American consultation was initiated on June 19, 2012, with a Sacred Lands File search request to the Native American Heritage Commission (NAHC). Letters were sent to Native American tribes and individuals on June 22, 2012 (Appendix B). A paleontological resources records search was received from the Natural History Museum of Los Angeles County (LACM) on July 23, 2012 (Appendix C).

A cultural resources survey of the 270-acre project site was conducted by BonTerra Consulting Archaeologist Albert Knight on July 15 and 16, 2012. Site photographs taken during the survey are located in Appendix D. Patrick Maxon, RPA and Mr. Knight prepared and completed this technical report in August 2012.

## FINDINGS OF THE INVESTIGATION

No significant cultural resources were discovered on the project site during the survey.

## INVESTIGATION CONSTRAINTS

Introduced grasses cover much of the project area. Little native vegetation remains on site. The property has also been subject to past ranching and farming activities (e.g., agricultural plowing) in the past.

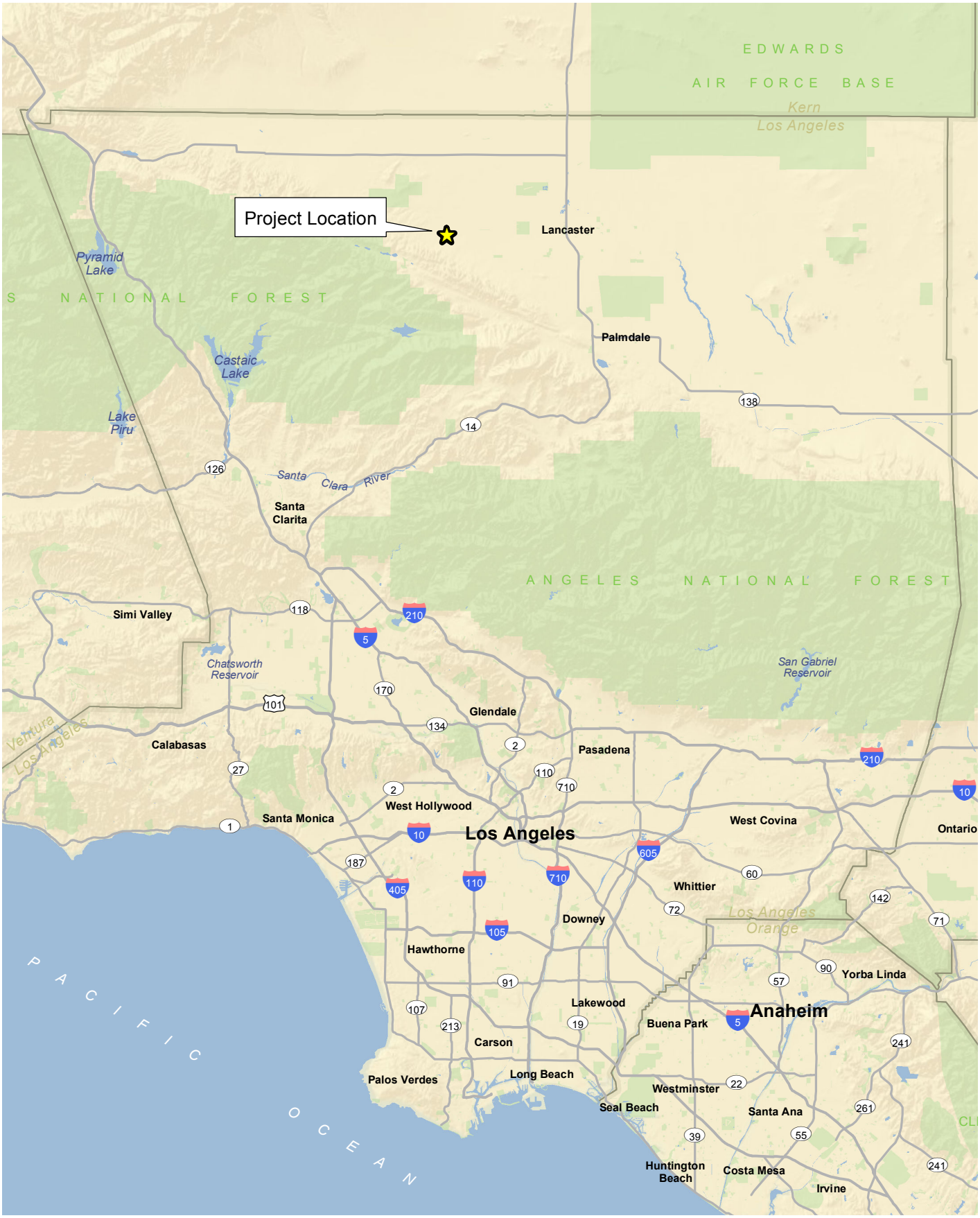
## RECOMMENDATIONS

Should eventual grading of the property occur, Mitigation Measure (MM) 1 and MM 2 require a qualified archaeologist and/or paleontologist to be retained to evaluate any discoveries. If deemed significant, additional mitigation measures must be developed to reduce the impact on the resource to below a level of significance. Potential mitigation for archaeological sites could include planning construction to avoid a resource, protection and preservation in place, and/or data recovery excavation of a representative sample of the site's constituents. For paleontological resources mitigation would include identification and evaluation of the discovery and curation of the fossil in perpetuity in an accredited scientific institution.

There is no indication as a result of this study that human remains are present within the project site. The records search and the field survey indicate that there is no evidence of human remains on or near the site. Project-related earth disturbance, however, has the potential to unearth previously undiscovered remains, resulting in a potentially significant impact. However, implementation of MM 3 would ensure that impacts would be reduced to a less than significant level.

## DISPOSITION OF DATA

This report will be filed with TA – Acacia, LLC, BonTerra Consulting, and the SCCIC. All field notes and other documentation related to the study are on file at BonTerra Consulting.

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# Project Location

Exhibit 1

*West Antelope Solar Project*

N W E S

10 5 0 10 Miles

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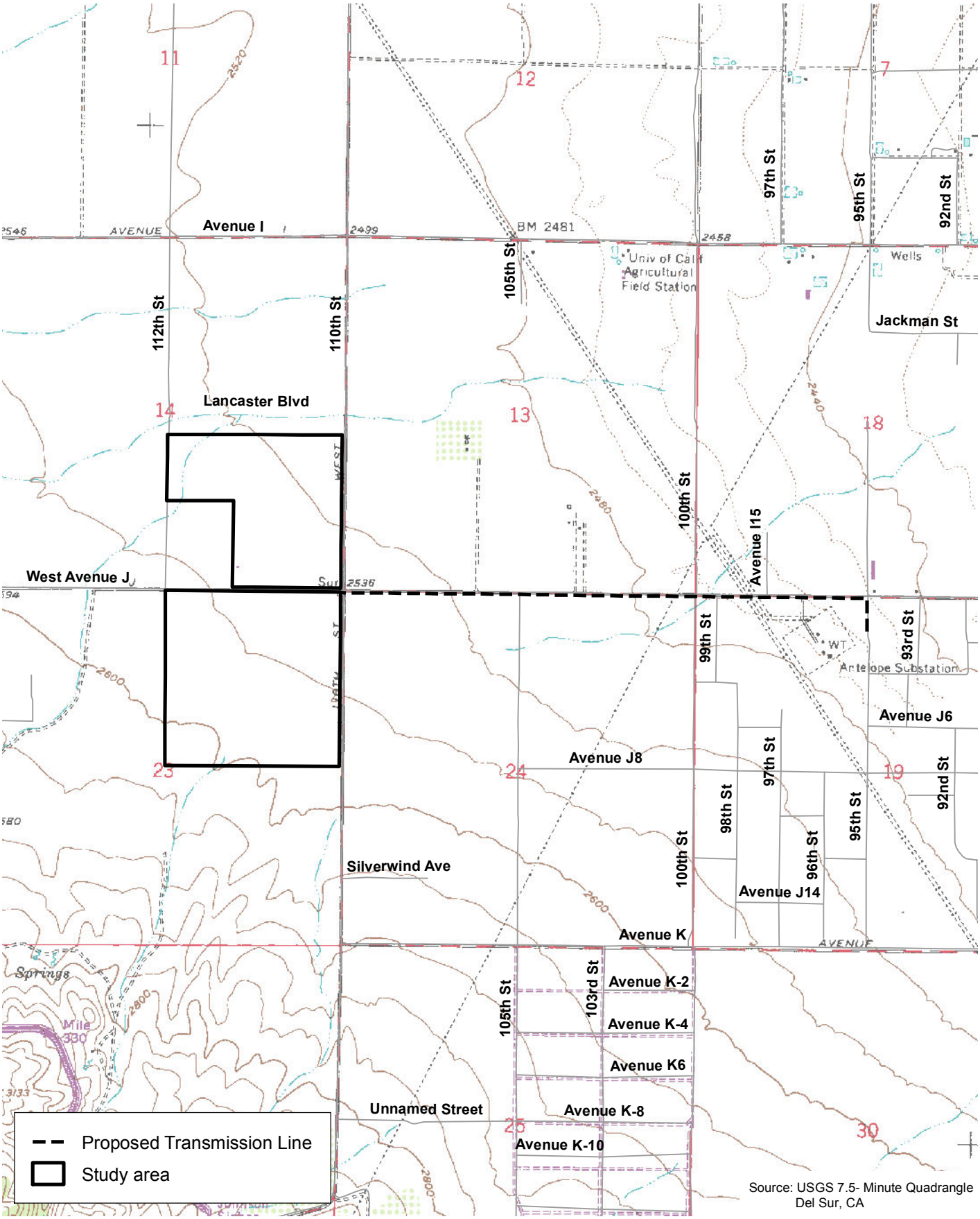


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# U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 2

*West Antelope Solar Project*

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

(Rev: 7-19-2012 CJS) Projects\TAAC\J001\Graphics\JD_Report\Ex_LV_usgs.pdf

# 1.0 UNDERTAKING INFORMATION/INTRODUCTION

## 1.1 CONTRACTING DATA

TA – Acacia, LLC retained BonTerra Consulting to conduct a Phase I cultural resources study for the proposed West Antelope Solar Project located in the County of Los Angeles, California. This report details the findings of the investigation and offers management recommendations and mitigation measures to reduce the impact of the project to a less than significant level.

## 1.2 UNDERTAKING

TA – Acacia, LLC proposes to develop, own, and operate a 20 megawatt photovoltaic project, the West Antelope Solar project. This Project is located in unincorporated Los Angeles County, at 110th Street West and West Avenue J, just outside of the western boundaries of the City of Lancaster, on currently vacant land zoned for heavy agricultural development. The Project would operate year-round, producing up to 20 megawatts of renewable electric power during daytime hours. TA – Acacia, LLC has secured a 20-year agreement with Pacific Gas & Electric to supply electricity generated by the Project to this nearby utility.

The facility would consist of:

- a solar field of rows of polycrystalline PV panels, mounted on single-axis tracking systems on steel support structures;
- an electrical collection and inverter system that aggregates the output from the PV panels and converts the electricity from direct current to alternating current;
- a switchyard where all of the facility output is combined and transformed to a voltage of 66 kV;
- an underground 66 kV generation-tie line of approximately 1.5 miles running from the east boundary of the Project site to the Antelope substation along West Avenue J;
- a meteorological data collection system configured to collect meteorological information at the height of the PV panels; and
- civil infrastructure including driveways, drainage design, and fencing.

## 1.3 EXHIBITS

Exhibit 1 depicts the regional project location. Exhibit 2 depicts the specific location of the project site on a portion of the U.S. Geological Survey (USGS) Del Sur 7.5-minute quadrangle, Township 7 North, Range 14 West, Sections 14 and 23 (S.B.B.M).

## 1.4 PROJECT PERSONNEL

The cultural resources study was completed by Patrick Maxon, RPA and Albert Knight; Mr. Knight performed the cultural resources survey and Mr. Maxon reviewed the South Central Coastal Information Center (SCCIC) and Natural History Museum of Los Angeles County (LACM) records searches, conducted the Native American consultation, and authored this report.

# 2.0 REGULATORY SETTING

This section contains a discussion of the applicable laws, ordinances, regulations, and standards that govern cultural resources and must be adhered to both prior to and during project implementation. The report is intended to satisfy California Environmental Quality Act (CEQA) requirements (14 California Code of Regulations [CCR] §15064.5 and Public Resources Code [PRC] §21083.2). It is understood that there is no federal action under the National Environmental Policy Act (NEPA), and thus no cultural resources analysis under Section 106 of the National Historic Preservation Act (16 *United States Code* [USC] 470f) and its implementing regulations (at 36 *Code of Federal Regulations* [CFR] 800, Protection of Historic Properties) is required.

## 2.1 CALIFORNIA REGISTER OF HISTORICAL RESOURCES

CEQA requires a lead agency to determine whether a project would have a significant effect on one or more historical resources. According to Section 15064.5(a) of the CEQA Guidelines, a "historical resource" is defined as a resource listed in or determined to be eligible for listing in the California Register of Historical Resources (CRHR) (PRC Section 21084.1); a resource included in a local register of historical resources (14 CCR 15064.5[a][2]); or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (14 CCR 15064.5[a][3]).

Section 5024.1 of the PRC, Section 15064.5 of the State CEQA Guidelines (14 CCR), and Sections 21083.2 and 21084.1 of the CEQA Statutes were used as the basic guidelines for the cultural resources study. PRC 5024.1 requires evaluation of historical resources to determine their eligibility for listing on the CRHR. The purposes of the CRHR are to maintain listings of the State's historical resources and to indicate which properties are to be protected from substantial adverse change. The criteria for listing resources in the CRHR were expressly developed to be in accordance with previously established criteria developed for listing in the National Register of Historic Places (NRHP) (per the criteria listed at 36 CFR 60.4), but were designed specifically to address resources in California.

According to Section 15064.5(a)(3)(A–D) of the CEQA Guidelines, a resource is considered historically significant if it meets the criteria for listing on the CRHR (PRC 5024.1) including whether the project:

(A) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(B) Is associated with the lives of persons important in our past;

(C) Embodies the distinctive characteristics of a type, period, region, or method of installation, or represents the work of an important creative individual, or possesses high artistic values; or

(D) Has yielded, or may be likely to yield, information important in prehistory or history.

According to Section 15064.5(a)(3)(A–D) of the State CEQA Guidelines (14 CCR), a resource is considered historically significant if it meets the criteria for listing in the NRHP (per the criteria listed at 36 CFR 60.4 as stated above). Impacts that affect those characteristics of the resource that qualify it for the NRHP or that would adversely alter the significance of a resource listed in or eligible for listing in the CRHR are considered to have a significant effect on the environment. Impacts to cultural resources from the proposed project are thus considered significant if the project (1) physically destroys or damages all or part of a resource; (2) changes the character of

the use of the resource or physical feature within the setting of the resource that contributes to its significance; or (3) introduces visual, atmospheric, or audible elements that diminish the integrity of significant features of the resource.

The purpose of a cultural resources investigation is to evaluate whether any cultural resources remain exposed on the surface of the project site, or can reasonably be expected to exist in the subsurface. If resources are discovered, management recommendations would be required for evaluation of the resources for NRHP or CRHR eligibility.

Broad mitigation guidelines for treating historical resources are codified in Section 15126.4(b) of the CEQA Guidelines. To the extent feasible, public agencies should seek to avoid significant effects to historical resources, with preservation in place being the preferred alternative. If not feasible, a Data Recovery Plan shall be prepared to guide subsequent excavation. Mitigation for historical resources such as buildings, bridges, and other structures that are consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties (Weeks and Grimmer 1995) will generally be considered mitigated to below a level of significance.

## 2.2 SENATE BILL 18

Senate Bill (SB) 18 (*California Government Code,* Section 65352.3) incorporates the protection of California traditional tribal cultural places into land use planning for cities, counties, and agencies by establishing responsibilities for local governments to contact, refer plans to, and consult with California Native American tribes as part of the adoption or amendment of any General or Specific Plan proposed on or after March 1, 2005. There is no General Plan amendment or Specific Plan or an amendment to an existing Specific Plan required for this project; therefore, formal consultation under SB 18 will not be necessary.

## 2.3 HUMAN REMAINS

Section 7050.5 of the *California Health and Safety Code* provides for the disposition of accidentally discovered human remains. Section 7050.5 states that if human remains are found, no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined the appropriate treatment and disposition of the human remains.

Section 5097.98 of the PRC states that, if the Coroner determines that the remains are of Native American origin, s/he must notify the NAHC within 24 hours which, in turn, must identify the person or persons it believes to be the most likely descended from the deceased Native American. The descendents shall complete their inspection within 48 hours of being granted access to the site. The designated Native American representative would then determine, in consultation with the property owner, the disposition of the human remains.

# 3.0 ENVIRONMENTAL SETTING

The project site lies in the western Antelope Valley on the western edge of the Mojave Desert. It is located immediately west of 110th Street West and is bisected by Avenue J. It is approximately 13 miles west of State Route (SR) 14. The project site is disturbed by past ranching and farming activities; current site vegetation is almost exclusively non-native grasses. Fauna that could be expected on the project site includes small reptiles, birds, rodents and other small mammals such as deer mouse, gopher, and desert cotton-tail rabbit. Coyotes could also be present. The site is bordered on the north and northwest by the Tehachapi Mountains and on the south and southwest by the San Gabriel Mountains. To the east is the expanse of the Mojave Desert. Rosamond Dry Lake Bed, part of a system of playas that hydrates the western Mojave Desert, is located approximately 14 miles east-northeast of the site. The project site lies approximately 2,550 feet above mean sea level (msl).

# 4.0 CULTURAL BACKGROUND

## 4.1 PREHISTORIC BACKGROUND

The earliest stage of human occupation in California is commonly referred to as the Paleo-Indian period (Chartkoff and Chartkoff 1984:24). The precise start of this period is still a topic of considerable debate. At inland archaeological sites, the surviving material culture of this period is primarily lithic, consisting of large, extremely well made stone projectile points and tools such as scrapers and choppers. Most of the generally accepted early remains indicate a very small, mobile population apparently dependent on hunting of large game animals as the primary subsistence strategy. However, recent evidence suggests that some very early people may have had a more sedentary lifestyle and probably relied upon a variety of resources (see Adovasio and Page 2002). While early populations certainly used other resources, the bulk of the few traces remaining today are related to game hunting. This situation results from the fact that hunting equipment involves many lithic tools, which do not decay, while the rest of the material culture used materials such as wood or leather, which are more subject to attrition through taphonomic factors. Lithic artifacts are the only surviving material from the Paleo-Indian Period. Such an economy, using only a small fraction of the available resources would not have supported a large population. It is probable that the Paleo-Indians lived in groups no larger than extended families and that contact with other such groups was infrequent.

Research into the prehistory of the western Mojave Desert has resulted in the development of a chronological framework for the area based on paleoclimatic variations and the resulting adaptive strategies practiced by local populations (Lloyd 2007). The chronology is divided into the Traditions described below.

### 4.1.1 Lake Mohave Tradition (10,000–7,000 Years Before Present)

The Lake Mohave Tradition of the Archaic Period, which postdates the Paleo-Indian Period, characterized by large game hunting and foraging around lakeshore environments prior to 10,000 years before present [BP],[1] signaled the beginning of a shift away from hunting of large game to the exploitation of a diversity of resources (Chartkoff and Chartkoff 1984). This period, known locally as the Lake Mohave Tradition, occurred within a large, interior geographic area including what is now the City of Lancaster. This tradition reflects adjustments by interior desert peoples to changing environmental conditions, including the desiccation and disappearance of desert lakes such as the former Lake Mohave, which existed as a shallow, Pleistocene body of water that once covered up to 75 square miles near what is now Baker, California (Chartkoff and Chartkoff 1984). The tradition is characterized by a drier climate than during the Paleo-Indian Period, population increases, and a diversified tool kit and subsistence base. Groundstone tools, however, are still rare during this tradition (Wallace 1978; Lloyd 2007).

### 4.1.2 The Pinto Tradition (7,000–4,000 Years Before Present)

The Pinto Tradition developed from the Lake Mohave Tradition in the Late Archaic Period as an adjustment to the final desiccation and disappearance of the interior Pleistocene lakes and their associated fauna (Chartkoff and Chartkoff 1984). Sites tended to be occupied seasonally in an "annual round" system to exploit ripening floral resources in a variety of habitats throughout the year. Large and small desert animals were hunted. A diverse tool kit included Pinto projectile points and many flaked stone tools. The appearance and development of a groundstone tool

[1] "Before Present" assumes that 1950 is "present," so in this case 10,000 years BP would be 8,050 BCE (Before the Common Era).

technology suggests an increased reliance on seeds and other resources from the scrub and chaparral communities that replaced the formerly extensive wetlands (Lloyd 2007).

The Pinto Period lithic technology would seem to indicate a subsistence system directly related to Lake Mojave (Warren and Crabtree 1986:184); however, it is worth noting that several authors have suggested a cultural hiatus or abandonment of the Mojave Desert during this period (Wallace 1962:175; c.f. Hall and Barker 1975:44). Chronologically, this period represents an era following the desiccation of the Pleistocene lake formed in the Mojave Desert. The idea of cultural abandonment during this time [ca. 4,000–6,000 B.C.E. (before the common era)] stems, in part, from Antevs' initial concept of a climatic Altithermal in which conditions were thought to be more arid than today (Antevs 1955). Although it is presently conceded that such conditions may have occurred on a large scale, the effect on localized populations may have been nonexistent (Bettinger and Taylor 1974:14; Hall and Barker 1975:55-6; Elston 1976). Others have suggested the possibility that the supposed hiatus reflects a subsistence shift or a material culture "transitional stage" (Davis 1968:15). While major climatic changes did occur, which required cultural adjustments that left few sites near the Pleistocene lakebeds of the eastern Mojave Desert, Pinto occupation may reflect a wetter period with sites frequently associated with streams or washes (Warren and Crabtree 1986:184). Warren and Crabtree (1986:185) point out discrepancies of definitions and dating of Pinto projectiles, but assign a span of 5,000 to 2,000 BCE for the Pinto Period, which is in agreement with a wet period suggested by Mehringer (1979) at 4,500−3,500 BCE. The termination of this period is clearly indicated by sites at 2,000 BCE, which include Elko, Humboldt, and Gypsum points but lack Pinto projectiles (Warren and Crabtree 1986:185).

Jennings' Desert Culture describes the earlier concept of the "Desert Archaic" as a widespread uniform "culture" that exists with no significant change between 3,000 and 8,000 BCE (Jennings 1962:50). On the other hand, Swanson (1966:144-5) suggests that changes have occurred in the environment causing one-time big-game hunters to be more reliant on plant foods, thus creating the "Desert Culture" (cf. Warren and Ranere 1965; Ranere 1968). Regardless of the cause of inception, it would appear that similarities in material culture become more widespread during the Archaic period in the desert west, including "...basketry, netting, fur cloth, woven sandals, the spear thrower, hardwood dart points, stone tools preferably of basalt and quartzite in the early stages (with a shift toward obsidian and other glassy materials later), flat milling stone, many specialized stone tools, scrapers, choppers, pulping planes of crude appearance, digging stick, curved wooden clubs, fire drill and hearth, tubular pipes, and imported shells from California for ornaments" (Jennings 1962:85).

The use of the atlatl is inferred for the Pinto projectiles (Wallace 1962:175; cf. Fenenga 1953). For a further discussion of projectile varieties and relationships, see Bettinger and Taylor (1974) and Hall and Barker (1975). Besides the distinctive forms of projectiles, the Archaic period can also be characterized by the appearance of other chipped stone articles such as leaf-shaped points, knife blades, drills, and scrapers. Warren and Crabree (1986) suggest the following:

> …large and small leaf-shaped points and knives, domed and elongated keeled scrapers, and several forms of well made flake scrapers similar to those of the Lake Mohave Period…Drills and engraving tools occur, as do occasional Lake Mohave and Silver Lake points…Simple flat milling stones occur in Pinto sites as do occasional shallow basined specimens and hand stones…The Stahl site is the only Pinto site in which milling stones with well-developed circular basins are common (1986:187).

Warren and Crabtree (1986) note that, while the emphasis of seed grinding is far less significant in the Mojave Desert than in coastal regions, the use of seed processing tools in Pinto sites is

interesting given that the latter half of the Pinto Period is considered mostly arid (1986:187). Fort Irwin Pinto sites are well represented at the Flood Pond Site (CA-SBR-5251) and the Rodgers Ridge Site (CA-SBR-5250) in the Tiefort Basin. As noted earlier, both Lake Mohave and Pinto components exist at the latter site, which suggests a continuation of earlier traits and adaptive strategies (Foster, Hess, and Woodman 2001:3-4). Hall (1993) recovered fresh water mussel (Anodonta) from features near the above sites as well as from another Pinto Period site (Goldstone, CA-SBR-2348), suggesting the procurement of these specimens from ephemeral freshwater lakes in the Mojave Sink (see Drover 1979).

The Pinto Period assemblage is commonly described as being related to, or a remnant of, the Lake Mohave Period technology (Warren and Crabtree 1986:185). If such a relationship exists, the scant assemblage of the Pinto Period may reflect environmental changes vastly different than the past Lake Mohave Period environment of Pleistocene fauna and lacustrine environments.

### 4.1.3 Gypsum Tradition (4,000–1,500 Years Before Present)

The Gypsum Period is distinctively different from prior periods in that it is recognizably widespread and has a diversity of projectile types and tools as well as clear indications of external influences from the southwest. The artifactual assemblage is diverse at single sites as well as having localized variants. This tradition is an outgrowth of the Pinto Tradition in the California deserts and is marked by an increase in precipitation and subsequent growth of modern vegetation communities including mesquite, oak, and piñon. Larger populations are characteristic of this tradition with more connections to other regions through long distance trade. The presence of marine shellfish indicates contact with the Pacific Coast (Gibbon et al. 1998), and the presence of Coso obsidian artifacts indicates contact with the eastern Sierra Nevada. An increase in groundstone tools, including the mortar and pestle, reflects exploitation of mesquite pods, acorns, yucca, and other fleshy resources. Diagnostic tools include the Gypsum and Rose Springs projectile points. Larger, permanent villages are seen, suggesting a change from the annual round system to one of permanent or semi-permanent habitation of sites (Lloyd 2007). A number of authors have claimed a southwestern influence during the Gypsum Period (Schroeder 1961). The influences include ceramics characteristic of Basketmaker II−III (such as the Lino Series) and pithouse architecture in eastern Mojave-western Arizona, such as the Muddy River Phase of the Lost City cultural sequence (Schroeder 1958 1961; Shutler 1967:306) and the split-twig figurines of Newberry Cave. The figurines, more common to archaeological sites of the same period in Arizona (Warren and Crabtree 1986:188), are often associated with presumed hunting magic due to the remote locations of caches and evidence of their being ritualistically “killed” with small projectiles.

### 4.1.4 Rose Springs/Saratoga Springs Tradition (1,500–800 Years Before Present)

As in the Gypsum Tradition, the Rose Springs/Saratoga Tradition was characterized by large village sites with deep middens (dark, highly organic soils containing a high concentration of human food waste remains). While apparent contact with the greater southwest occurs in the late Gypsum Period, the Saratoga Springs Period has been characterized as “…the major period of Basketmaker III-Pueblo development and influence on the eastern Mojave Desert” (Warren and Crabtree 1986:189). While the clearest example of southwestern architectural and ceramic influence is the Muddy River Phase of the Lost City sequence (Shutler 1967), the similarities of burial types, projectiles, and ceramics of Death Valley III sites (Hunt 1960) and the ceramics and stone axes of the Halloran Springs turquoise mining industry emphasize the southwestern influences (Leonard and Drover 1980; Drover 1980). The Saratoga Period is better represented by sites east and northeast of Fort Irwin (such as Cronise Basin, Halloran Springs and the Saratoga Springs Site in Death Valley).

The most intensive "southwestern" utilization of the Mojave Desert occurs at the turquoise mining areas near Halloran Springs (Eisen 1898; Rogers 1929). Hunting and gathering as a subsistence strategy and long-distance trade with the Pacific Coast continued into this period as well (Lloyd 2007). Bow and arrow technology was developed during this time using Rose Springs and Cottonwood projectile points. A drought episode near the end of this period appears to have led to a change in trade networks, signaled by a reduction in obsidian and increased use of local chert and chalcedony (Lloyd 2007). Ceramics, usually described as characteristic of the onset of the Saratoga Period, probably appear earlier than 1000 CE (common era). Three, possibly four separate ceramic wares were manufactured in eastern California by at least 800 CE (Schroeder 1958). These technologies eventually become the historic pottery of the southern Paiute, riverine Yuman, and coastal Yuman groups.

### 4.1.5 Late Prehistoric Period

Changes in material culture around 1200 CE suggest population movement. While it is widely believed that Shoshonean speakers (Southern Paiute) intrude into the north during Late Prehistoric times bringing Owen Valley Brown Ware ceramics, the antiquity of the Shoshonean language family in Southern California is thought to be earlier (Hall 1976: Koerper 1976). New technology also includes Desert Side-notched and Cottonwood Triangular points. The following are characteristic of this period: population increases; more intensive exploitation of local resources; increases in coastal trade; and the use of Rose Springs, Cottonwood, and Desert Side-notched projectile points (Lloyd 2007).

## 4.2 ETHNOGRAPHIC BACKGROUND

The western Mohave Desert and Antelope Valley were occupied by at least four groups of Native Americans: the Vanyume/Serrano, the Kawaiisu, the Tataviam, and the Kitanemuk (AVIM n.d.). A fifth group, the Haminot, that lived in the Lancaster and Palmdale area (Lloyd 2007) likely was a name given to the Kitanemuk by their Native American neighbors (Blackburn and Bean 1978). The languages of the Vanyume, Tataviam, and Kitanemuk appear to have been dialects of Serrano or Serran (Bean and Smith 1978).

Little is known about the ethnographic period in the Antelope Valley region. Local groups continued to live in large, semi-permanent villages during the winter and, during the spring, summer, and fall, would separate into smaller groups to hunt and gather the locally available resources including, among others, piñon nuts, mesquite, and yucca. Most of the ethnographic groups of the area shared similar cultural traits and practices and, for the most part, maintained friendly relations with each other (Lloyd 2007).

## 4.3 HISTORIC BACKGROUND

In 1772, Lieutenant Pedro Fages and a small force of Spanish soldiers became the first Europeans to enter the Antelope Valley. Other explorers passed through the valley over the next century, but little change to the pattern of life of the local populations of the valley was evident until 1876 when the Southern Pacific Railroad completed its line between the Los Angeles Basin and the San Joaquin Valley (Norwood 1995; Tang et al. 2004).

At the beginning of the 20$^{th}$ Century, after a long drought, much of the Antelope Valley was considered worthless and ownership largely reverted back to the State of California. However, technological innovations in the new century, such as gasoline engines to pump well water, construction of aqueducts and improved irrigation techniques, among other advances, brought people back into the valley. The needs of World War I brought continued agricultural expansion, and World War II caused radical changes with the completion of Edwards Air Force Base and the development of the aerospace industry (Norwood 2005).

## 4.4 LOCAL HISTORY

The history of the City of Lancaster, immediately to the east of the project site, began when Moses Landley Wicks, a real estate developer, bought 640 acres of land from the Southern Pacific Railroad and laid out the town of Lancaster in 1884 (Tang et al. 2004). The new town boomed during the 1880s and early 1890s; however, several years of drought beginning in 1895 forced most residents to leave the area (Tang et al. 2004). The City began to recover after the turn of the century with the turning point being the completion of the Los Angeles Aqueduct through the region in 1914, which permitted the expansion of agriculture (Norwood 1995). After World War II, the aerospace and defense industry became the largest business sector in the area with the construction of several aeronautical plants and the resulting influx of workers (Tang et al. 2004). Lancaster was incorporated in 1977 and has experienced a steady population increase since that time.

# 5.0 METHODOLOGY

## 5.1 ARCHAEOLOGICAL RESOURCES RECORDS SEARCH

A literature review of documents on file at the SCCIC at the California State University, Fullerton was completed on July 7, 2011, for a project site immediately to the east of, but which encompasses the current project site (Appendix A). It was examined by BonTerra Consulting staff for the current study. The review consisted of an examination of the USGS Del Sur, California 7.5-minute quadrangle to evaluate the project area for any sites recorded or cultural resources studies conducted in the parcel and within a one-mile radius. The SCCIC is the designated branch of the California Historical Resources Information System (CHRIS) and houses records concerning archaeological and historic resources in Los Angeles, Orange, and Ventura Counties. The records search provided data on known archaeological and built environment resources as well as previous studies within one mile of the project site. Data sources consulted at the SCCIC included archaeological records, Archaeological Determinations of Eligibility (DOE), historic maps, and the Historic Property Data File (HPDF) maintained by the California Office of Historic Preservation (OHP). The HPDF contains listings for the CRHR and/or NRHP, California Historical Landmarks (CHL), and California Points of Historical Interest (CPHI).

## 5.2 PALEONTOLOGICAL RESOURCES RECORDS SEARCH

A paleontological records search for the proposed West Antelope Solar Project was requested from the LACM. A response was received from Samuel McLeod, Vertebrate Paleontologist, on July 23, 2012 (refer to Appendix B).

## 5.3 NATIVE AMERICAN SACRED LANDS FILE REVIEW

An inquiry was made of the NAHC located in Sacramento to request a review of the Sacred Lands File database regarding the possibility of Native American cultural resources and/or sacred places in the project vicinity that are not documented on other databases. The NAHC responded on June 20, 2012, and provided a list of Native American groups and individuals who may have knowledge regarding Native American cultural resources not formally listed on any database. Tribes and individuals were mailed informational letters on June 22, 2012. The letters describe the project and request any information regarding resources that may exist on or near the project site. Information regarding the results of the Native American coordination/consultation is provided in Appendix C. Government-to-government consultation under SB 18 is not required for this project.

## 5.4 ARCHAEOLOGICAL FIELD SURVEY

A systematic archaeological survey of the project site was conducted by BonTerra Consulting Archaeologist Albert Knight under the supervision of Patrick Maxon, RPA, on July 15 and 16, 2012. The entirety of the project site (270 acres) was surveyed via either parallel transects spaced approximately 10 to 15 meters apart where possible; through focused surveys in areas of concentrated cultural material; and through a windshield survey by automobile.

# 6.0 RESULTS

## 6.1 ARCHAEOLOGICAL RECORDS SEARCH

In summary, 11 archaeological surveys have been conducted within a 1-mile radius of the project site, 2 of which included the project site. There are two recorded resources within one mile of the subject parcel (Refer to Appendix A).

Table 1 lists and briefly describes the two known cultural resources within one mile of the project site. Both are east of the project site and will not be impacted by the proposed project.

**TABLE 1**
**CULTURAL RESOURCES WITHIN ONE-MILE OF THE PROJECT SITE**

| Site Number | Recorder/Year | Comment |
|---|---|---|
| 19-186876 | Ahmet/2005 | SCE Transmission Line Corridor |
| 19-003479 | Ahmet et al./2005 | Historic Trash Deposit |

Table 2 identifies the previous cultural resources study that included a portion of the project site.

**TABLE 2**
**CULTURAL RESOURCES STUDIES ON THE PROJECT SITE**

| Report Number | Author(s)/Year | Type of Study/Comments |
|---|---|---|
| LA-07991 | Tang and Hogan 2006 | City of Lancaster General Plan Update |
| LA-10175 | Applied Earthworks 2009 | Confidential Resource Report; Tehachapi Transmission Project |

Tang and Hogan (2006) completed a cultural resources study for the *City of Lancaster General Plan Update,* which identified more than 700 recorded cultural resources within the City. Most of the prehistoric sites are recorded north (over 14 miles) of the project site along the margins of Rosamond Dry Lake. Nearly all the historic-period buildings are concentrated in downtown Lancaster near the City's historic core area and east of the project site. Applied Earthworks surveyed an elongated, north-south transmission line in 2009 and recorded 62 cultural resources. One of the resources, 19-003479, a historic trash deposit, lies approximately 3,300 feet southeast of the property.

## 6.2 PALEONTOLOGICAL RECORDS SEARCH

A paleontological resources records search for the proposed project was requested from the LACM. A response was received on July 23, 2012, from Samuel McLeod, Vertebrate Paleontologist (see Appendix B). McLeod's response indicates that no vertebrate fossil localities are recorded on the project site, but there are nearby localities in some of the same sedimentary units that occur in the project site.

The very southern portion of the project site contains surficial deposits of Older Quaternary Alluvial fan deposits. The remainder of the project site has surficial deposits of Younger Quaternary Alluvium (also derived as alluvial fan deposits) and soils. Younger Alluvium typically does not contain significant fossil deposits.

Surface grading or shallow excavations are unlikely to encounter vertebrate fossils. If deeper excavations are planned, McLeod recommends monitoring below the Younger Quaternary Alluvium. Because very small vertebrate and invertebrate fossils may be present in the older

Quaternary Alluvium, McLeod recommends that sediment samples be collected to determine the small fossil potential of the unit (McLeod 2012).

## 6.3 NATIVE AMERICAN SACRED LANDS FILE REVIEW

The NAHC Search of the Sacred Lands File on June 20, 2012, did not identify the presence of Native American cultural resources on the project site. In addition, the NAHC provided a list of Native American groups and individuals that may have knowledge of the religious and/or cultural significance of resources that may be on and near the project site. The NAHC listed the following groups and individuals:

- Beverly Salazar Folkes
- Ronnie Salas – Fernandeño Tataviam Band of Mission Indians
- Ron Andrade – Los Angeles City/County Native American Indian Commission
- Cindi Alvitre – Ti'At Society/Inter-Tribal Council of Pimu
- Ron Wermuth
- Delia Dominguez – Kitanemuk and Yowlumne Tejon Indians
- John Valenzuela – San Fernando Band of Mission Indians
- Randy Guzman-Folkes
- Ann Brierty – Policy/Cultural Resources Department, San Manuel Band of Mission Indians

Each of these groups and individuals were mailed informational letters on June 22, 2012, describing the project and requesting any information regarding resources that may exist on or near the project site. Two responses have been received to date. The first response came via telephone and followed up with a letter, from Randy Folkes on July 5, 2012. He stated that there could be cultural resources on the project site. Should Native American monitoring occur on the project, Mr. Folkes offered to provide the work through his consulting firm. The letter consisted of a letter describing his company, R. Indigenous Consultants Tribal Monitoring, LLC. The second response was received via telephone on July 17, 2012, from Beverly Salazar Folkes. Ms. Folkes stated that the area is sensitive for cultural resources and Native American and Archaeological Monitors should be retained during ground disturbance. No additional responses have been received to date from the tribes and individuals contacted. All Native American correspondence can be seen in Appendix C.

## 6.4 ARCHAEOLOGICAL FIELD SURVEY

On Sunday July 15 and Monday July 16, 2012, BonTerra Consulting archaeologist Albert Knight conducted a pedestrian survey of the project site. The survey area south of Avenue J consists of all of the northeast quarter of Section 23, while the survey area north of Avenue J consists of most of the southeast quarter of Section 14 (refer to Exhibit 1). In the field, the location of the survey areas was established by using a satellite photograph and a portion of the USGS Del Sur 7.5-minute quadrangle topographic map.

The survey area has been completely cleared of native vegetation in the past, probably for dry farming. All soil is coarse sand and some small rocks, derived from the Sierra Pelona series of schist(s), which outcrop extensively to the south of the survey area. Some small pieces of quartz were also seen; this rock type is also common in the Sierra Pelona series. No Joshua Trees or Junipers are present, as seen elsewhere in the general area; even Rabbit Brush—

often seen in areas that have been cleared some years ago—is absent. Current vegetation consists of introduced grasses, possible native grasses, Vinegar Weed, and other small now-dry forbs.

Ground visibility was varied, with the poorest visibility in the southern part of the survey area, and the best visibility in the northern part of the survey area. There were only a very few areas with evidence of rodent activity; one large, active ant hill was observed, and there were no obvious rabbit runs. It would seem that loss of floral habitat has inhibited the reestablishment of fauna.

The only places with good visibility are (1) around the six transmission-line towers (in the south and the west parts of the survey area), where all of the vegetation has been lightly graded away; (2) in and adjacent to the dirt roads around the edges of and on the project site; and (3) in the west center part of the southeast quarter of Section 14, where there is very little vegetation over a three-acre to four-acre area. Visibility was fair in the western part of the project site, south of Avenue J, and was also fair to good in most of the project site north of Avenue J. It was especially good along the northern edge of the survey area, where a small drainage channel and a small berm to check run-off cross the entire survey area east to west, as does a dirt access road. Visibility was very poor in the southeast corner of Section 14, and was non-existent in approximately the eastern third of Section 23.

The survey area is non-descript generally flat desert terrain, with no obvious distinguishing geographic features. The land falls gradually from south to north, with only a couple of very small, shallow drainages crossing the area southwest to northeast. The highest point in the survey area is at the southwestern corner of the northeastern quarter of Section 23. A small area at the very southwestern corner of the survey area is marked off as an Environmentally Sensitive Area (ESA), probably because of recent Southern California Edison work there. Again, vegetation is minimal across much of the survey area, and it was possible to drive across almost all of the survey area. All transects were either driven or walked from north to south and then south to north until the entire area was examined. Area of possible interest would be examined more closely for resources.

The survey area is mostly trash-free, and what little trash there is, is obviously recent. Four individual old rusty tin cans were seen, in widely spaced places, during the survey. All four cans were sitting on the surface of the ground, and did not appear to be in situ, and they were not associated with any other trash. With that exception, no items or specimens of any kind were observed that might have been prehistoric or historic in origin. No rock types used by the local Indians were observed, nor were any historic materials (e.g., metal, purple glass or any other kinds of glass, pieces of porcelain, house or structure foundations, wind-mills, and well-heads) other than the tin cans, were observed. Occasional small animal bones, free of flesh, bleached white, and obviously recent were noted.

# 7.0 CEQA IMPACT ANALYSIS

This impact analysis is provided to assist in the preparation of an environmental document for the proposed project and provides discussion regarding each significance cultural resources criterion.

## 7.1 SIGNIFICANCE CRITERIA

Appendix G of the State CEQA Guidelines contains the Initial Study Environmental Checklist form, which includes questions relating to cultural resources. The issues presented in the Initial Study Checklist have been used as significance criteria. Accordingly, a project may result in a significant environmental impact if:

- The Project would cause a substantial adverse change in the significance of a historical resource as defined in §15064.5.
- The Project would cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5.
- The Project would directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.
- The Project would disturb any human remains, including those interred outside of formal cemeteries.

## 7.2 PROJECT IMPACT ANALYSIS

***Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?***

***Would the project cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?***

There is a possibility that historical and/or archaeological materials would be uncovered during necessary subsurface excavations for the construction of the proposed project. Although the likelihood of encountering archaeological resources on the site is considered low, this impact is potentially significant. Therefore, implementation of Mitigation Measure (MM) 1, which describes procedures to be followed in the event that cultural resources are discovered, is required. Implementation of MM 1 would reduce this potentially significant impact to a less than significant level.

***Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?***

Although the possibility of discovering fossil resources is considered low, it is possible that significant vertebrate and invertebrate fossils could be encountered during subsurface disturbance. This could result in a significant impact to unique paleontological resources. Therefore, implementation of MM 2, which describes procedures to be followed in the event that paleontological resources are discovered, is required. Implementation of MM 2 would reduce this potentially significant impact to a less than significant level.

***Would the project disturb any human remains, including those interred outside of formal cemeteries?***

There is no indication as a result of this study that human remains are present within the project site. Project-related earth disturbance, however, has the potential to unearth previously undiscovered remains, resulting in a potentially significant impact. However, implementation of MM 3 would ensure that impacts are reduced to a less than significant level.

# 8.0 RECOMMENDATIONS AND MITIGATION

**MM 1**

Should archaeological resources be found during ground-disturbing activities for the project, a qualified Archaeologist shall be retained to first determine whether an archaeological resource uncovered during construction is a "unique archaeological resource" pursuant to Section 21083.2(g) of the *California Public Resources Code* or a "historical resource" pursuant to Section 15064.5(a) of the CEQA Guidelines. If the archaeological resource is determined to be a "unique archaeological resource" or a "historical resource", the Archaeologist shall formulate a mitigation plan in consultation with the County of Los Angeles that satisfies the requirements of Section 21083.2 and 15064.5. Potential mitigation could include planning construction to avoid the resource, protection and preservation in place, and/or data recovery excavation of a representative sample of the site's constituents.

If the Archaeologist determines that the archaeological resource is not a "unique archaeological resource" or "historical resource", s/he may record the site and submit the recordation form to the California Historic Resources Information System at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton.

The Archaeologist shall prepare a report of the results of any study prepared as part of a testing or mitigation plan, following accepted professional practice. The report shall follow guidelines of the California Office of Historic Preservation. Copies of the report shall be submitted to the County of Los Angeles and to the California Historic Resources Information System at the SCCIC.

**MM 2**

If, during project grading, fossil resources are discovered, ground-disturbing activities in the vicinity of the discovery shall be halted or diverted until a qualified Paleontologist inspects the find and evaluates it for significance. Work may proceed in other areas of the site, subject to the direction of the Paleontologist. If determined significant, the Paleontologist shall be authorized to quickly and efficiently salvage and remove the fossil from its locality, as appropriate, before ground-disturbing activities resume in the area. These actions, as well as final disposition of the resources, shall be subject to the approval of the County of Los Angeles. These would include identification and evaluation of the discovery and curation of the fossil in perpetuity in an accredited scientific institution.

**MM 3**

If human remains are encountered during excavation activities, all work shall halt and the County Coroner shall be notified (PRC §5097.98). The Coroner will determine whether the remains are of forensic interest. If the Coroner, with the aid of the County-approved Archaeologist, determines that the remains are prehistoric, s/he will contact the Native American Heritage Commission (NAHC). The NAHC will be responsible for designating the most likely descendant (MLD), who will be responsible for the ultimate disposition of the remains, as required by Section 7050.5 of the *California Health and Safety Code*. The MLD shall make his/her recommendation within 48 hours of being granted access to the site. The recommendation of the MLD shall be followed if feasible, and may include scientific removal and non-destructive analysis of the human remains and any items associated with Native American burials (*California Health and Safety Code* §7050.5). If the landowner rejects the recommendations of the MLD, the landowner shall rebury the remains with appropriate dignity on the property in a location that will not be subject to further subsurface disturbance (PRC §5097.98).

## 9.0 CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this cultural resources report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

DATE: August 2012 SIGNED: _____

Patrick Maxon, RPA
Director, Cultural Resources

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1967 Cultural Chronology in Southern Nevada, Part 6. In Pleistocene Studies in Southern Nevada. Carson City: Nevada State Museum Anthropological Papers No. 13.

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1966 The Archaeology of the Shoup Rockshelters in East Central Idaho. Occasional Papers of the Idaho State University Museum 17. Birch Creek Papers 3 Pocatello

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# APPENDIX A

# CULTURAL RESOURCES RECORDS SEARCH (SCCIC)

**South Central Coastal Information Center**
California State University, Fullerton
Department of Anthropology MH-426
800 North State College Boulevard
Fullerton, CA 92834-6846
657.278.5395 / FAX 657.278.5542
anthro.fullerton.edu/sccic.html - sccic@fullerton.edu
*California Historical Resources Information System*
*Orange, Los Angeles, and Ventura Counties*

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July 7, 2011 SCCIC #11617.8398

Ms. Jenna Farrell
Tetra Tech
2969 Prospect Park Dr., Suite 100
Rancho Cordova, CA 95670
916.853.4575

RE: Records Search for CUP5 – Western Antelope Dry Ranch Project

Dear Ms. Farrell,

As per your request received on June 30, 2011, an expedited records search was conducted for the above referenced project. The search includes a review of all recorded archaeological sites within a 1-mile radius of the project site as well as a review of cultural resource reports on file. In addition, the California Points of Historical Interest (PHI), the California Historical Landmarks (CHL), the California Register of Historical Resources (CR), the National Register of Historic Places (NR), and the California State Historic Resources Inventory (HRI) listings were reviewed for the above referenced project. The following is a discussion of the findings.

***Del Sur, CA. USGS 7.5' Quadrangle***

**ARCHAEOLOGICAL RESOURCES:**

Two archaeological sites (19-003477, and 19-003479) have been identified within a 1-mile radius of the project site. No archaeological sites are located within the project site. No sites are listed on the Archaeological Determination of Eligibility (DOE) list. No isolates have been identified within a 1-mile radius of the project site. No isolates are located within the project site.

**HISTORIC RESOURCES:**

One additional cultural resource (19-186876) has been identified within a 1-mile radius of the project site. No cultural resources are located within the project site.

Copies of our historic maps – Bouquet Reservoir (1932, 1958) 15' USGS - are enclosed for your review.

(X) Bibliography – 3 pages
(X) Bibliography of Unmappable Reports – 1 page
(X) HRI – 2 pages
(X) National Register Status Codes – 1 page
(X) Site Records – (19-003477, 19-003479, 19-186876) – 28 pages
(X) Confidentiality Form
(X) Invoice #11617.8398

The California Point of Historical Interest of the Office of Historic Preservation, Department of Parks and Recreation, lists no properties within a 1-mile radius of the project site.

The California Historical Landmarks of the Office of Historic Preservation, Department of Parks and Recreation, lists no properties within a 1-mile radius of the project site.

The California Register of Historical Resources lists one property possibly within a 1-mile radius of the project site (see enclosed HRI list for property marked with a +). These are properties determined to have a National Register of Historic Places Status of 1 or 2, a California Historical Landmark numbering 770 and higher, or a Point of Historical Interest listed after 1/1/1998.

The National Register of Historic Places lists one property possibly within a 1-mile radius of the project site (see enclosed HRI list for property marked with an *).

The California Historic Resources Inventory lists four properties that have been evaluated for historical significance possibly within a 1-mile radius of the project site (see enclosed list).

**PREVIOUS CULTURAL RESOURCES INVESTIGATIONS:**

Eleven studies (LA-02987, LA-07287, LA-07991*, LA-08179, LA-08934, LA-09763, LA-09792, LA-10175*, LA-10210, LA-10211, and LA-10490) have been conducted within a 1-mile radius of the project site. Of these, two are located within the project site. There is one additional investigation located on the Del Sur, CA. 7.5' USGS Quadrangle that is potentially within a 1-mile radius of the project site. These reports are not mapped due to insufficient locational information.
*(* = Located within the project site)*

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you **do not include** resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at 714.278.5395 Monday through Thursday 9:00 am to 3:30 pm.

Should you require any additional information for the above referenced project, reference the SCCIC number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Sincerely,
SCCIC

Michelle Galaz
Lead Staff Researcher

Enclosures:

(X) Maps – 7.5' USGS Quadrangle, 15' USGS Quadrangle – 7 pages

# SCCIC Bibliography: CUP5-Western Antelope Dry Ranch

**LA-02987**

*Author(s):* Woods, Clyde M., Andrew York, Rebecca Apple, Tirzo Gonzalez, Stephen Van Wormer, Tom Demere, and James H. Cleland
*Year:* 1987
*Title:* Bicep Transmission Project Magunden to Vincent/pardee Alternative Corridor Study Archaeology, Ethnology, History and Paleontology Technical Reports (draft)
*Affiliation:* Dames & Moore
*Resources:* 19-000405, 19-000676, 19-000806, 19-000947, 19-000951, 19-000952, 19-000954, 19-000955
*Quads:* BLACK MTN, DEL SUR, FRAZIER MOUNTAIN, GREEN VALLEY, LA LIEBRE RANCH, LEBEC, LIEBRE MTN, LITTLE BUTTES, NEWHALL, RITTER RIDGE, WARM SPRINGS MOUNTAIN, WHITAKER PEAK
*Pages:*
*Notes:* Same as VN1285

**LA-07287**

*Author(s):* Getchell, Barbie Stevenson and John E. Atwood
*Year:* 2004
*Title:* Phase I Cultural Resources Survey of APN 3248-003-015, a 9.15 Acre Parcel Located East of 110th Street West, Between Avenue K and Avenue K-4, in the City of Lancaster, Los Angeles County, California
*Affiliation:* Pacific Archaeological Sciences Team, CSUF
*Resources:*
*Quads:* DEL SUR
*Pages:*
*Notes:*

**LA-07991**

*Author(s):* Tang, Bai "Tom", Michael Hogan, and Josh Smallwood
*Year:* 2006
*Title:* Cultural Resources Technical Report City of Lancaster General Plan Update
*Affiliation:* CRM Tech
*Resources:* 19-186543
*Quads:* ALPINE BUTTE, DEL SUR, LANCASTER EAST, LANCASTER WEST, LITTLE BUTTES, REDMAN, ROSAMOND, ROSAMOND LAKE
*Pages:*
*Notes:*

**LA-08179**

*Author(s):* Ahmet, Koral, Mason, Roger, and Bholat, Sara
*Year:* 2006
*Title:* Cultural Resources Survey Report for Antelope Transmission Project: Segments 2 & 3, Los Angeles and Kern Counties
*Affiliation:* ECORP Consulting, Inc.
*Resources:* 19-000806, 19-001636, 19-001644, 19-001762, 19-001763, 19-001764, 19-001840, 19-001956, 19-003385, 19-003477, 19-003654, 19-003655, 19-003656, 19-186876
*Quads:* DEL SUR, LITTLE BUTTES, PACIFICO MOUNTAIN, PALMDALE, RITTER RIDGE
*Pages:*
*Notes:*

# SCCIC Bibliography: CUP5-Western Antelope Dry Ranch

**LA-08934**

*Author(s):* Sanka, Jennifer M.
*Year:* 2006
*Title:* Phase I Cultural Resource Assessment and Paleontological Records Review Ttm 060610 and 060620, Lancaster, Los Angeles County, California
*Affiliation:* Michael Brandman Associates
*Resources:* 19-003657
*Quads:* DEL SUR
*Pages:*
*Notes:*

**LA-09763**

*Author(s):* Harper, Veronica
*Year:* 2008
*Title:* Supplemental Archaeological Assessment, Segment 3A of Tehachapi Renewable Transmission Project, Wreck Out 25-5 Variance, Los Angeles County, California
*Affiliation:* Cogstone Resource Management, Inc.
*Resources:*
*Quads:* DEL SUR
*Pages:* 8
*Notes:*

**LA-09792**

*Author(s):* Veromica Harper
*Year:* 2008
*Title:* Supplemental Archaeological Assessment, Segment 3A of Tehachapi Renewable Transmission Project, Wreck out 25-5 Variance, Los Angeles County, CA
*Affiliation:* Cogstone Resource Management Inc.
*Resources:* 19-003477
*Quads:* DEL SUR
*Pages:* 8
*Notes:*

**LA-10175**

*Author(s):* Unknown
*Year:* 2009
*Title:* Confidential Cultural Resources Specialist Report for the Tehachapi Transmission Project
*Affiliation:* Applied Earthworks, Aspen Environmental Group
*Resources:* 19-000806, 19-001128, 19-001299, 19-001300, 19-001315, 19-001357, 19-001382, 19-001636, 19-001770, 19-001771, 19-001783, 19-001956, 19-001957, 19-002206, 19-002212, 19-002343, 19-002350, 19-002363, 19-002411, 19-002412, 19-003009, 19-003018, 19-003025, 19-003031, 19-003032, 19-003037, 19-003090, 19-003099, 19-003136, 19-003152, 19-003295, 19-003385, 19-003477, 19-003606, 19-003638, 19-003795, 19-003852, 19-003853, 19-003854, 19-100277, 19-100439, 19-100496, 19-100644, 19-120031, 19-120032, 19-120072, 19-120074, 19-180689, 19-186545, 19-186860, 19-186870, 19-186871, 19-186872, 19-186873, 19-186875, 19-186876, 19-186877, 19-186917, 19-186921, 19-186923, 19-186925, 19-187713
*Quads:* ACTON, AZUSA, BALDWIN PARK, CHILAO FLAT, CONDOR PEAK, DEL SUR, EL MONTE, FAIRMONT BUTTE, LA HABRA, LAKE HUGHES, LANCASTER WEST, LITTLE BUTTES, LOS ANGELES, MT WILSON, PACIFICO MOUNTAIN, PALMDALE, PASADENA, RITTER RIDGE, SLEEPY VALLEY, WATERMAN MTN, WHITTIER, YORBA LINDA
*Pages:* 234
*Notes:* Also OR 3777

# SCCIC Bibliography: CUP5-Western Antelope Dry Ranch

**LA-10210**

*Author(s):* Ahmet, Koral and Roger D. Mason
*Year:* 2006
*Title:* Cultural Resources Survey Report for Antelope-Pardee 500-kV Transmission Project
*Affiliation:* ECORP Consulting, Inc.
*Resources:* 19-001334, 19-003329, 19-003474, 19-003475, 19-003476, 19-003477, 19-003478, 19-003479, 19-003480, 19-120077
*Quads:* DEL SUR, GREEN VALLEY, MINT CANYON, NEWHALL, SLEEPY VALLEY
*Pages:* 69
*Notes:*

**LA-10211**

*Author(s):* Harper, Veronica and Nancy Sikes
*Year:* 2009
*Title:* Supplemental Cultural and Paleontological Resources Assessment, Segment 9, Tehachapi Renewable Transmission Project, Variance for Antelope Substation Expansion and 66kV Relocation, Los Angeles County, California
*Affiliation:* Cogstone Resource Management Inc.
*Resources:* 19-003477, 19-003735, 19-003821, 19-003848, 19-003938, 19-003983, 19-100727, 19-100758, 19-100759, 19-186857
*Quads:* DEL SUR
*Pages:* 22
*Notes:*

**LA-10490**

*Author(s):* Orfila, Rebecca
*Year:* 2010
*Title:* Archaeological Survey for the Southern California Edison Company: Replacement of Four Deteriorated Power Poles on the Roosevelt 12kV, Pronghorn 12kV, Hovey 12kV, and Hughes Lake 12kV Circuits Near lancaster, Los Angeles County, California
*Affiliation:* RSO Consulting
*Resources:*
*Quads:* ALPINE BUTTE, DEL SUR, ROSAMOND LAKE
*Pages:* 8
*Notes:*

# SCCIC Bibliography: Unmappables - CUP5 Western Antelope

**LA-02125**

*Author(s):* King, Thomas F.
*Year:* 1968
*Title:* Ucla-archaeological Survey Field Project Number Ucas-215: the Route Designation: 7-la-138 Between Rte. 48 Freeway and the San Bernardino County Line
*Affiliation:* University of California, Los Angeles Archaeological Survey
*Resources:*
*Quads:* DEL SUR, FAIRMONT BUTTE
*Pages:*
*Notes:* Missing Report Updated: 11/6/02

| OPERTY-NUMBER | PRIMARY-# | STREET.ADDRESS..... | NAMES..... | CITY.NAME..... | OWN | YR-C | OHP-PROG.. | PRG-REFERENCE-NUMBER | STAT-DAT | NRS | CRIT |
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| | | | | | | | PROJ.REVW. | HUD060414F | 04/18/06 | 6Y | |
| 083108 | | 5922 COLDBROOK AVE | | LAKEWOOD | P | 1943 | PROJ.REVW. | HUD930518A | 07/23/93 | 6Y | |
| 029352 | 19-178672 | 3101 E CARSON ST | LAKEWOOD COUNTRY CL. CLUBHOUSE | LAKEWOOD | C | 1933 | HIST.SURV. | 0714-0001-0000 | | 7N | |
| 099957 | | 6138 PREMIERE AVE | | LAKEWOOD | P | 1945 | PROJ.REVW. | HUD951208J | 01/05/96 | 6Y | |
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| 178263 | | | QUARTZ HILL WATER TANKS | LANCASTER | P | | PROJ.REVW. | FCC091012F | 11/30/09 | 6Y | |
| 148634 | | 44738 10TH ST W | | LANCASTER | P | 1948 | HIST.RES. | DOE-19-04-0125-0000 | 03/25/04 | 6Y | |
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| 177504 | | 43054 36TH ST W | | LANCASTER | P | 1970 | PROJ.REVW. | HUD091223M | 01/21/10 | 6Y | |
| 065206 | | 5TH ST | RESIDENCE | LANCASTER | U | | PROJ.REVW. | HUD870420C | 06/18/87 | 6Y | |
| 177506 | | 42836 ALEP ST | | LANCASTER | P | 1971 | PROJ.REVW. | HUD091223O | 01/21/10 | 6Y | |
| 177507 | | 3622 AVE K-12 | | LANCASTER | P | 1971 | PROJ.REVW. | HUD091223P | 01/21/10 | 6Y | |
| 177500 | | 3603 BALMONT ST | | LANCASTER | P | 1971 | PROJ.REVW. | HUD091223J | 01/21/10 | 6Y | |
| 177501 | | 3640 BALMONT ST | | LANCASTER | P | 1971 | PROJ.REVW. | HUD091223K | 01/21/10 | 6Y | |
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| 085061 | | CEDAR AVE | SHERIFF'S SUBSTATION | LANCASTER | M | 1938 | HIST.SURV. | 3534-0003-0002 | 09/30/93 | 1D | AC |
| 085063 | | CEDAR AVE | SHERIFF'S GARAGE | LANCASTER | M | 1938 | HIST.SURV. | 3534-0003-0003 | 09/30/93 | 6X | AC |
| 035410 | | 44855 CEDAR AVE | CEDAR AVENUE BUILDINGS, MEMORIAL H | LANCASTER | M | 1938 | HIST.RES. | NPS-93001017-0000 | 09/30/93 | 1S | AC |
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| 065455 | | 45109 CEDAR AVE | | LANCASTER | U | 1915 | PROJ.REVW. | HUD900331dd | 08/16/93 | 6Y | |
| | | | | | | | PROJ.REVW. | HUD880829q | 10/21/88 | 6Y | |
| 178996 | | 44665 CEDAR ST | JUDY GARLAND HOME / FRANK GUMM HOM | LANCASTER | P | 1931 | NAT.REG. | 19-0575 | 06/14/10 | 7W | |
| 119493 | | 155 E AVE I | ANTELOPE VALLEY FAIRGROUNDS HISTOR | LANCASTER | S | 1941 | HIST.RES. | DOE-19-99-0015-9999 | 01/25/99 | 2S2 | A |
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| 119499 | | 155 E AVE I | GRANDSTAND, ANTELOPE VALLEY FAIRGR | LANCASTER | S | 1939 | HIST.RES. | DOE-19-99-0015-0006 | 01/25/99 | 2D2 | A |
| | | | | | | | PROJ.REVW. | HUD981005H | 01/25/99 | 2D2 | A |
| 119496 | | 155 E AVE I | CHRIS SHERRI BUILDING, ANTELOPE VA | LANCASTER | S | 1941 | HIST.RES. | DOE-19-99-0015-0003 | 01/25/99 | 2D2 | A |
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| 119502 | | 155 E AVE I | HORSE BARN 38-2, ANTELOPE VALLEY F | LANCASTER | S | | HIST.RES. | DOE-19-99-0015-0008 | 01/25/99 | 2D2 | A |
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| 119501 | | 155 E AVE I | HORSE BARN 38-1, ANTELOPE VALLEY F | LANCASTER | S | | HIST.RES. | DOE-19-99-0015-0007 | 01/25/99 | 2D2 | A |
| | | | | | | | PROJ.REVW. | HUD981005H | 01/25/99 | 2D2 | A |
| 119498 | | 155 E AVE I | DIRECTOR'S COTTAGE, ANTELOPE VALLE | LANCASTER | S | | HIST.RES. | DOE-19-99-0015-0005 | 01/25/99 | 2D2 | A |
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| 119497 | | 155 E AVE I | ALFALFA FESTIVAL BUILDING, ANTELOP | LANCASTER | S | | HIST.RES. | DOE-19-99-0015-0004 | 01/25/99 | 2D2 | A |
| | | | | | | | PROJ.REVW. | HUD981005H | 01/25/99 | 2D2 | A |
| 119495 | | 155 E AVE I | TELECOMMUTE CENTER, ANTELOPE VALLE | LANCASTER | S | | HIST.RES. | DOE-19-99-0015-0002 | 01/25/99 | 2D2 | A |
| | | | | | | | PROJ.REVW. | HUD981005H | 01/25/99 | 2D2 | A |
| 119494 | | 155 E AVE I | SAGE PAVILION, ANTELOPE VALLEY FAI | LANCASTER | S | | HIST.RES. | DOE-19-99-0015-0001 | 01/25/99 | 2D2 | A |
| | | | | | | | PROJ.REVW. | HUD981005H | 01/25/99 | 2D2 | A |
| 035407 | | 15701 EAST AVE | ANTELOPE VALLEY INDIAN MUSEUM | LANCASTER | S | 1928 | HIST.RES. | NPS-87000509-0000 | 02/26/87 | 1S | |
| | | | | | | | HIST.SURV. | 3534-0001-9999 | 02/26/87 | 1S | |
| | | | | | | | HIST.SURV. | 3534-0002-9999 | | 6 | |
| | | | | | | | HIST.RES. | SPHI-LAN-033 | 03/01/82 | 7L | |
| 181270 | | 4445 FOXTON AVE | | LANCASTER | P | | PROJ.REVW. | HUD100628K | 08/09/10 | 6Y | |
| 148636 | | 44821 GENOA AVE | | LANCASTER | P | 1947 | HIST.RES. | DOE-19-04-0127-0000 | 03/25/04 | 6Y | |

| ROPERTY-NUMBER | PRIMARY-# | STREET.ADDRESS..... | NAMES..... | CITY.NAME..... | OWN | YR-C | OHP-PROG.. | PRG-REFERENCE-NUMBER | STAT-DAT | NRS | CRIT |
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| 148635 | | 44839 GENOA AVE | | LANCASTER | P | 1942 | HIST.RES. | DOE-19-04-0126-0000 | 03/25/04 | 6Y | |
| | | | | | | | PROJ.REVW. | FCC040317A | 03/25/04 | 6Y | |
| + * 085066 | | LANCASTER BLVD | HEALTH CENTER | LANCASTER | M | 1930 | HIST.SURV. | 3534-0003-0005 | 09/30/93 | 1D | AC |
| 160591 | | 44219 SIERRA HWY | DESERT INN | LANCASTER | P | 1948 | PROJ.REVW. | FCC060207SS | 02/27/06 | 6Y | |
| 120026 | | 42115 W 45TH ST | | LANCASTER | U | 1939 | HIST.RES. | DOE-19-97-0171-0000 | 10/23/97 | 6U | |
| | | | | | | | PROJ.REVW. | HUD980109K | 10/23/97 | 6U | |
| 134435 | | 45133 W 60TH ST | | LANCASTER | | 1950 | HIST.RES. | DOE-19-02-1025-0000 | 10/09/02 | 6U | |
| | | | | | | | PROJ.REVW. | HUD021009N | 10/09/02 | 6U | |
| 181273 | | 1132 W AVE H 5 | | LANCASTER | P | | PROJ.REVW. | HUD100628H | 08/09/10 | 6Y | |
| 181275 | | 701 W AVE H-13 | | LANCASTER | P | | PROJ.REVW. | HUD100628I | 08/09/10 | 6Y | |
| 181272 | | 1157 W AVE J 15 | | LANCASTER | P | | PROJ.REVW. | HUD100628J | 08/09/10 | 6Y | |
| 177492 | | 1062 W AVE J-12 | | LANCASTER | P | 1954 | PROJ.REVW. | HUD091223F | 01/21/10 | 6Y | |
| 177503 | | 1003 W AVE J-13 | | LANCASTER | P | 1955 | PROJ.REVW. | HUD091223L | 01/21/10 | 6Y | |
| 177505 | | 3528 W AVE K-10 | | LANCASTER | P | 1970 | PROJ.REVW. | HUD091223N | 01/21/10 | 6Y | |
| 177496 | | 3623 W AVE K-10 | | LANCASTER | P | 1970 | PROJ.REVW. | HUD091223H | 01/21/10 | 6Y | |
| 177498 | | 3660 W AVE K-10 | | LANCASTER | P | 1970 | PROJ.REVW. | HUD091223I | 01/21/10 | 6Y | |
| 177495 | | 3701 W AVE K-11 | | LANCASTER | P | 1970 | PROJ.REVW. | HUD091223G | 01/21/10 | 6Y | |
| 065541 | | 326 W LANCASTER BLVD | | LANCASTER | U | | PROJ.REVW. | HUD881116Z | 11/28/88 | 6Y | |
| 105588 | | 539 W LANCASTER BLVD | | LANCASTER | | 1924 | PROJ.REVW. | FDIC961021A | 11/25/96 | 6Y | |
| 035408 | | 557 W LANCASTER BLVD | GILROY HOTEL; WESTERN HOTEL | LANCASTER | P | 1874 | HIST.SURV. | 3534-0002-0000 | | 3S | |
| | | | | | | | HIST.RES. | SHL-0658-0000 | 09/26/58 | 7L | |
| 180863 | | 809 W NEWGROVE ST | | LANCASTER | P | 1902 | ST.HS.LDMK | 19-0605 | 02/07/11 | 7W | |
| 067701 | | 716 W OLDFIELD ST | JANE REYNOLDS PARK | LANCASTER | U | | PROJ.REVW. | HUD890714E | 01/17/90 | 6Y | |
| 180083 | | | ANTELOPE-VINCENT NO.1 220KV TRANSI | (VIC) LANCASTER | P | 1949 | PROJ.REVW. | USFS100913A | 09/28/10 | 6Y | |
| 125563 | | 14717 BURIN AVE | | LAWNDALE | U | 1923 | HIST.RES. | DOE-19-97-0264-0000 | 10/06/97 | 6Y | |
| | | | | | | | PROJ.REVW. | HUD971006F | 10/06/97 | 6Y | |
| 029222 | 19-178543 | 16713 FIRMONA AVE | | LAWNDALE | P | 1927 | HIST.SURV. | 0606-0001-0000 | | 7R | |
| 136785 | | 3850 MANHATTAN BEACH BLVD | | LAWNDALE | P | | HIST.RES. | DOE-19-03-0033-0000 | 01/21/03 | 6Y | |
| | | | | | | | PROJ.REVW. | FCC030123G | 01/21/03 | 6Y | |
| 083137 | | 4724 W 159TH ST | | LAWNDALE | P | 1935 | PROJ.REVW. | HUD930219A | 07/29/93 | 6Y | |
| 081543 | | 4523 W 167TH ST | | LAWNDALE | U | 1941 | PROJ.REVW. | HUD871027C | 01/13/93 | 6Y | |
| 084773 | | 4609 W 167TH ST | | LAWNDALE | P | 1939 | PROJ.REVW. | HUD930920f | 11/22/93 | 6Y | |
| 085042 | | 4726 W 167TH ST | | LAWNDALE | P | 1936 | PROJ.REVW. | HUD931119C | 12/24/93 | 6Y | |
| 083287 | | 4562 W 172ND ST | | LAWNDALE | U | 1935 | PROJ.REVW. | HUD891231H | 08/04/93 | 6Y | |
| 097884 | | 4118 W ROSECRANS AVE | LEUZINGER HIGH SCHOOL-SEVEN BUILDI | LAWNDALE | D | | HIST.RES. | DOE-19-94-0296-0000 | 06/24/94 | 6Y | |
| | | | | | | | PROJ.REVW. | HRG940202Z | 06/24/94 | 6Y | |
| 083883 | | 11109 CONDON AVE | | LENNOX | U | 1939 | PROJ.REVW. | HUD911015O | 08/26/93 | 6Y | |
| 153861 | | 10536 FIRMONA AVE | | LENNOX | | 1931 | PROJ.REVW. | HUD040329B | 04/21/04 | 6U | |
| 125309 | | 4814 W 104TH ST | 4814-4814 1/2 WEST 104TH STREET | LENNOX | Y | 1939 | HIST.RES. | DOE-19-00-0134-0000 | 02/16/00 | 6Y | |
| | | | | | | | PROJ.REVW. | HUD000216G | 02/16/00 | 6Y | |
| 122885 | | 8367 W ELIZABETH LAKE RD | OLD LEONA SCHOOLHOUSE | LEONA VALLEY | | 1914 | ST.PT.INT. | 19-0282 | 08/31/99 | 7W | |
| 141637 | | 35149 77TH ST | | LITTLEROCK | P | 1908 | HIST.RES. | DOE-19-00-0386-0000 | 04/21/00 | 6Y | |
| | | | | | | | PROJ.REVW. | FHWA000324A | 04/21/00 | 6Y | |
| 141638 | | 7800 PEARBLOSSOM HWY | | LITTLEROCK | P | 1946 | HIST.RES. | DOE-19-00-0387-0000 | 04/21/00 | 6Y | |
| | | | | | | | PROJ.REVW. | FHWA000324A | 04/21/00 | 6Y | |
| 141639 | | 7804 PEARBLOSSOM HWY | | LITTLEROCK | P | 1946 | HIST.RES. | DOE-19-00-0388-0000 | 04/21/00 | 6Y | |
| | | | | | | | PROJ.REVW. | FHWA000324A | 04/21/00 | 6Y | |

# APPENDIX B

# PALEONTOLOGICAL RESOURCES RECORDS SEARCH (LACM)

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Vertebrate Paleontology Section
Telephone: (213) 763-3325
Fax: (213) 746-7431
e-mail: smcleod@nhm.org

23 July 2012

BonTerra Consulting
2 Executive Circle, Suite 175
Irvine, CA 92614

Attn: Patrick O. Maxon, Director, Cultural Resources

re: Paleontological Resources for the proposed West Antelope Solar Project, near Del Sur, Los Angeles County, project area

Dear Patrick:

I have conducted a thorough search of our Vertebrate Paleontology records for the proposed West Antelope Solar Project, near Del Sur, Los Angeles County, project area as outlined on the portion of the Del Sur USGS topographic quadrangle map that you sent to me via e-mail on 18 June 2012. We do not have any vertebrate fossil localities that lie directly within the project boundaries, but we do have localities nearby from the same sedimentary deposits that occur in the proposed project area.

In the very southern part of the proposed project area there are older Quaternary alluvial fan deposits exposed at the surface. Otherwise, surficial deposits in the proposed project area are composed of younger Quaternary Alluvium, also derived as alluvial fan deposits, beneath soil. These types of sedimentary deposits usually do not contain significant vertebrate fossils, at least in the uppermost layers. Some miles to the east- southeast of the proposed project area, however, along Avenue S from Little Rock east, we have localities LACM 5942-5953 from pipeline excavations in the Quaternary Alluvium and older Quaternary sediments that produced a fauna of small vertebrates including gopher snake, *Pituophis*, kingsnake, *Lampropeltis*, leopard lizard, *Gambelia wislizenii*, cottontail rabbit, *Sylvilagus*, pocket mouse, *Chaetodipus*, kangaroo rat, *Dipodomys*, and pocket gopher, *Thomomys*.

Surface grading or shallow excavations in the proposed project area are unlikely to encounter significant vertebrate fossils in the younger Quaternary Alluvium. Deeper excavations that extend into older deposits, however, may well uncover significant fossil vertebrate remains. Any substantial excavations in the proposed project area below the uppermost layers, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Because some of the localities from similar sedimentary deposits have produced only very small fossils that would be missed in paleontological monitoring of typical construction projects, it is recommended that sediment samples be collected to determine the small vertebrate fossil potential in these rock units. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice

# APPENDIX C

# NATIVE AMERICAN CONSULTATION
# (NAHC)

BonTerra CONSULTING

# TRANSMITTAL

**DATE:** June 19, 2012

| | | | |
|---|---|---|---|
| **TO:** | Mr. Dave Singleton | **FAX NUMBER:** | (916) 657-5390 |
| | Program Analyst | **TEL NUMBER:** | (916) 653-6251 |
| | Native American Heritage Comm. | **PROJECT:** | **Antelope West PV Solar Project** |
| | 915 Capitol Mall, Rm. 364 | | |
| | Sacramento, CA 95814 | **FROM:** | Patrick Maxon, RPA |

☒ Fax / Pages__ ☐ E-Mail ☐ Fed Ex / Overnite Express ☐ Delivery / Courier

**REGARDING:** Sacred Lands File Search and Contact List Request

Dear Mr. Singleton:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed **Antelope West PV Solar Project** located in northern Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines).

At your earliest convenience, please conduct a search of the Sacred Lands File for the proposed project, which is located within Sections 14 and 23 (Township 7 North; Range 14 West) of the USGS **Del Sur, CA** 7.5 Minute Quadrangle. Refer to attached exhibit.

The proposed Solar Energy Project is located in northern Los Angeles County (southwest corner or the Antelope Valley) near the western limits of the City of Lancaster. The project site is composed of two parcels, comprising over 265 acres, divided by West Avenue J. The project site is bordered by 115th Street West to the west, and 110th Street West to the east, and Lancaster Boulevard to the north.

Please fax the results to me at (714) 444-9599, or e-mail to p.maxon@bonterraconsulting.com, referencing your letter to the "**Antelope West PV Solar Project** ".

If you have any questions or require any additional information, please do not hesitate to contact me at (714) 444-9199 or via email.

Sincerely,

BONTERRA CONSULTING

Patrick Maxon, RPA
Director, Cultural Resources

**2 Executive Circle, Suite 175 Irvine, CA 92614 (714) 444-9199 (714) 444-9599 Fax**

Edmund G. Brown, Jr., Governor

STATE OF CALIFORNIA

**NATIVE AMERICAN HERITAGE COMMISSION**
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

June 20, 2012

Mr. Patrick Maxon, RPA, Director – Cultural Resources
**BonTerra Consulting**
2 Executive Circle, Suite 175
Irvine, CA 92614

Sent by FAX to: 714-444-9599
No. of Pages: 4

Re: Sacred Lands File Search and Native American Contacts list for the proposed **"Antelope West PV Solar Project;"** located in the Antelope Valley ;northeastern Los Angeles County, California

Dear Mr. Maxon:

The Native American Heritage Commission (NAHC) conducted a Sacred Lands File searches of the 'area of potential effect,' (APE) based on the USGS coordinates provided and **Native American cultural resources were not identified** in the project area of potential effect (e.g. APE): you specified. Also, please note; the NAHC Sacred Lands Inventory is not exhaustive and does not preclude the discovery of cultural resources during any project groundbreaking activity.

California Public Resources Code §§5097.94 (a) and 5097.96 authorize the NAHC to establish a Sacred Land Inventory to record Native American sacred sites and burial sites. These records are exempt from the provisions of the California Public Records Act pursuant to. California Government Code §6254 (r). The purpose of this code is to protect such sites from vandalism, theft and destruction.

In the 1985 Appellate Court decision (170 Cal App 3rd 604), the court held that the NAHC has jurisdiction and special expertise, as a state agency, over affected Native American resources, impacted by proposed projects including archaeological, places of religious significance to Native Americans and burial sites

The California Environmental Quality Act (CEQA – CA Public Resources Code §§ 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. CA Government Code §65040.12(e) defines "environmental justice" provisions and is applicable to the environmental review processes.

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Local Native Americans may have knowledge of the religious and cultural significance of the historic properties of the proposed project for the area (e.g. APE). Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). We urge consultation with those tribes and interested Native Americans on the list that the NAHC has provided in order to see if your proposed project might impact Native American cultural resources. Lead agencies should consider avoidance as defined in §15370 of the CEQA Guidelines when significant cultural resources as defined by the CEQA Guidelines §15064.5 (b)(c)(f) may be affected by a proposed project. If so, Section 15382 of the CEQA Guidelines defines a significant impact on the environment as "substantial," and Section 2183.2 which requires documentation, data recovery of cultural resources.

The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The aforementioned Secretary of the Interior's *Standards* include recommendations for all 'lead agencies' to consider the historic context of proposed projects and to "research" the cultural landscape that might include the 'area of potential effect.'

Partnering with local tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA (42 U.S.C 4321-43351) and Section 106 4(f), Section 110 and (k) of the federal NHPA (16 U.S.C. 470 *et seq*), Section 4(f) of the Department of Transportation Act of 1966 (23 CFR 774); 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The NAHC remains concerned about the limitations and methods employed for NHPA Section 106 Consultation.

Also, California Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery', another important reason to have Native American Monitors on board with the project.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. An excellent way to reinforce the relationship between a project and local tribes is to employ Native American Monitors in all phases of proposed projects including the planning phases.

Confidentiality of "historic properties of religious and cultural significance" may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision

on whether or not to disclose items of religious and/or cultural significance identified in or near the APE and possibility threatened by proposed project activity.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton

Attachment: Native American Contact List

**Native American Contacts**
Los Angeles County
June 20, 2012

Beverly Salazar Folkes
1931 Shadybrook Drive
Thousand Oaks, CA 91362
folkes@msn.com
805 492-7255
(805) 558-1154 - cell

Chumash
Tataviam
Ferrnandeño

Kitanemuk & Yowlumne Tejon Indians
Delia Dominguez, Chairperson
115 Radio Street
Bakersfield , CA 93305
deedominguez@juno.com
(626) 339-6785

Yowlumne
Kitanemuk

Fernandeno Tataviam Band of Mission Indians
Ronnie Salas, Cultural Preservation Department
601 South Brand Boulevard, Suite 102
San Fernando CA 91340
rsalas@tataviam-nsn.gov
(818) 837-0794 Office
(818) 837-0796 Fax

Fernandeno
Tataviam

S an Fernando Band of Mission Indians
John Valenzuela, Chairperson
P.O. Box 221838
Newhall , CA 91322
tsen2u@hotmail.com
(661) 753-9833 Office
(760) 885-0955 Cell
(760) 949-1604 Fax

Fernandeño
Tataviam
Serrano
Vanyume
Kitanemuk

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th St, Rm. 403
Los Angeles , CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Randy Guzman - Folkes
6471 Cornell Circle
Moorpark , CA 93021
**ndnRandy@yahoo.com**
(805) 905-1675 - cell

Chumash
Fernandeño
Tataviam
Shoshone Paiute
Yaqui

Ron Wermuth
P.O. Box 168
Kernville , CA 93238
warmoose@earthlink.net
(760) 376-4240 - Home
(916) 717-1176 - Cell

Tubatulabal
Kawaiisu
Koso
Yokuts

San Manuel Band of Mission Indians
Ann Brierty, Policy/Cultural Resources Departmen
26569 Community Center. Drive
Highland , CA 92346
(909) 864-8933, Ext 3250
abrierty@sanmanuel-nsn.gov
(909) 862-5152 Fax

Serrano

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed Antelope West PV Solar Project; located in the Antelope Valley; northeast Los Angeles County, California for which a Sacred Lands File search and Native American Contacts list were requested.

BonTerra CONSULTING
2 Executive Circle, Suite 175 Irvine, CA 92614
T: (714) 444-9199 F: (714) 444-9599 | www.BonTerraConsulting.com

June 22, 2012

Mr. Ron Wermuth
P.O. Box 168
Kernville, California 93238

Subject: West Antelope Solar Project

Dear Mr. Wermuth:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed West Antelope Solar Project located in unincorporated Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

***Location***

The project location is shown on the USGS *Del Sur, CA* 7.5 Minute Quadrangle in Township 7 North; Range 14 West, Sections 14 and 23 (*S.B.B.M*). Refer to attached exhibit.

***Project***

The project site is located in unincorporated Los Angeles County, just outside of the western boundaries of the City of Lancaster. The project site consists of 15 contiguous parcels totaling approximately 270 acres. The project site is bound by (but does not include) parcels 3267-004-014, -015, -030, and -031 (just south of West Avenue I-8/Lancaster Blvd.) to the north, 110th Street East to the east, West Avenue J-8 to the south, and 115th Street West to the west. The project site is bisected by West Avenue J, dividing it into a North Portion and South Portion.

The project would develop this currently undeveloped site with a solar energy facility that could produce up to 20 megawatts (MW) of renewable electric power during daytime hours. The electricity generated by the project would be transmitted to a nearby Southern California Edison (SCE) substation. The transmission line would run parallel with West Avenue J approximately 1.5 miles to the Antelope substation, located at 95th Street West and West Avenue J. The transmission line would enter the Antelope substation in order to connect the project to the existing transmission infrastructure.

***NAHC Notification***

A Sacred Lands File Search conducted by the Native American Heritage Commission (NAHC) did not identify the presence of Native American cultural resources on the project site. The NAHC also provided BonTerra Consulting with a list of Native American individuals/organizations that may have knowledge of cultural resources in the project area. Your name and contact information was included on the list and serves as the basis for this letter.

***Records Search***

An archaeological/historic records search will be conducted at the South Central Costal Information Center (SCCIC) at California State University, Fullerton to evaluate the existing conditions of the project site. A survey of the project site will be completed after the records search to identify any exposed cultural resources.

Your participation in this local planning process is important. If you have any additional knowledge of Native American Sacred Lands or other cultural resources on or near the study area, or any comment on the project, please contact me at your earliest convenience at (714) 444-9199 or via email at pmaxon@bonterraconsulting.com, with a subject line referencing the "West Antelope Solar Project".

Sincerely,

BONTERRA CONSULTING

Patrick O. Maxon, RPA
Director, Cultural Resources

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BonTerra CONSULTING
2 Executive Circle, Suite 175 Irvine, CA 92614
T: (714) 444-9199 F: (714) 444-9599 | www.BonTerraConsulting.com

June 22, 2012

Mr. John Valenzuela, Chairperson
San Fernando Band of Mission Indians
P.O. Box 221838
Newhall, California 91322

Subject: West Antelope Solar Project

Dear Mr. Valenzuela:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed West Antelope Solar Project located in unincorporated Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

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Sincerely,

BONTERRA CONSULTING

Patrick O. Maxon, RPA
Director, Cultural Resources

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BonTerra CONSULTING
2 Executive Circle, Suite 175 Irvine, CA 92614
T: (714) 444-9199 F: (714) 444-9599 | www.BonTerraConsulting.com

June 22, 2012

Ms. Beverly Salazar Folkes
1931 Shadybrook Drive
Thousand Oaks, California 91362

Subject: West Antelope Solar Project

Dear Ms. Salazar Folkes:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed West Antelope Solar Project located in unincorporated Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

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Sincerely,

BONTERRA CONSULTING

Patrick O. Maxon, RPA
Director, Cultural Resources

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BonTerra CONSULTING
2 Executive Circle, Suite 175 Irvine, CA 92614
T: (714) 444-9199 F: (714) 444-9599 | www.BonTerraConsulting.com

June 22, 2012

Mr. Ronnie Salas, Cultural Preservation Department
Fernandeno Tataviam Band of Mission Indians
601 South Brand Blvd., Suite 102
San Fernando, California 91340

Subject: West Antelope Solar Project

Dear Mr. Salas:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed West Antelope Solar Project located in unincorporated Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

***Location***

The project location is shown on the USGS *Del Sur, CA* 7.5 Minute Quadrangle in Township 7 North; Range 14 West, Sections 14 and 23 (*S.B.B.M*). Refer to attached exhibit.

***Project***

The project site is located in unincorporated Los Angeles County, just outside of the western boundaries of the City of Lancaster. The project site consists of 15 contiguous parcels totaling approximately 270 acres. The project site is bound by (but does not include) parcels 3267-004-014, -015, -030, and -031 (just south of West Avenue I-8/Lancaster Blvd.) to the north, 110th Street East to the east, West Avenue J-8 to the south, and 115th Street West to the west. The project site is bisected by West Avenue J, dividing it into a North Portion and South Portion.

The project would develop this currently undeveloped site with a solar energy facility that could produce up to 20 megawatts (MW) of renewable electric power during daytime hours. The electricity generated by the project would be transmitted to a nearby Southern California Edison (SCE) substation. The transmission line would run parallel with West Avenue J approximately 1.5 miles to the Antelope substation, located at 95th Street West and West Avenue J. The transmission line would enter the Antelope substation in order to connect the project to the existing transmission infrastructure.

***NAHC Notification***

A Sacred Lands File Search conducted by the Native American Heritage Commission (NAHC) did not identify the presence of Native American cultural resources on the project site. The NAHC also provided BonTerra Consulting with a list of Native American individuals/organizations that may have knowledge of cultural resources in the project area. Your name and contact information was included on the list and serves as the basis for this letter.

***Records Search***

An archaeological/historic records search will be conducted at the South Central Costal Information Center (SCCIC) at California State University, Fullerton to evaluate the existing conditions of the project site. A survey of the project site will be completed after the records search to identify any exposed cultural resources.

Your participation in this local planning process is important. If you have any additional knowledge of Native American Sacred Lands or other cultural resources on or near the study area, or any comment on the project, please contact me at your earliest convenience at (714) 444-9199 or via email at pmaxon@bonterraconsulting.com, with a subject line referencing the "West Antelope Solar Project".

Sincerely,

BONTERRA CONSULTING

Patrick O. Maxon, RPA
Director, Cultural Resources

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BonTerra CONSULTING
2 Executive Circle, Suite 175 Irvine, CA 92614
T: (714) 444-9199 F: (714) 444-9599 | www.BonTerraConsulting.com

June 22, 2012

Mr. Randy Guzman-Folkes
655 Los Angeles Avenue
Unit E
Moorpark, California 93021

Subject: West Antelope Solar Project

Dear Mr. Guzman-Folkes:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed West Antelope Solar Project located in unincorporated Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

***Location***

The project location is shown on the USGS *Del Sur, CA* 7.5 Minute Quadrangle in Township 7 North; Range 14 West, Sections 14 and 23 (*S.B.B.M*). Refer to attached exhibit.

***Project***

The project site is located in unincorporated Los Angeles County, just outside of the western boundaries of the City of Lancaster. The project site consists of 15 contiguous parcels totaling approximately 270 acres. The project site is bound by (but does not include) parcels 3267-004-014, -015, -030, and -031 (just south of West Avenue I-8/Lancaster Blvd.) to the north, 110th Street East to the east, West Avenue J-8 to the south, and 115th Street West to the west. The project site is bisected by West Avenue J, dividing it into a North Portion and South Portion.

The project would develop this currently undeveloped site with a solar energy facility that could produce up to 20 megawatts (MW) of renewable electric power during daytime hours. The electricity generated by the project would be transmitted to a nearby Southern California Edison (SCE) substation. The transmission line would run parallel with West Avenue J approximately 1.5 miles to the Antelope substation, located at 95th Street West and West Avenue J. The transmission line would enter the Antelope substation in order to connect the project to the existing transmission infrastructure.

***NAHC Notification***

A Sacred Lands File Search conducted by the Native American Heritage Commission (NAHC) did not identify the presence of Native American cultural resources on the project site. The NAHC also provided BonTerra Consulting with a list of Native American individuals/organizations that may have knowledge of cultural resources in the project area. Your name and contact information was included on the list and serves as the basis for this letter.

***Records Search***

An archaeological/historic records search will be conducted at the South Central Costal Information Center (SCCIC) at California State University, Fullerton to evaluate the existing conditions of the project site. A survey of the project site will be completed after the records search to identify any exposed cultural resources.

Your participation in this local planning process is important. If you have any additional knowledge of Native American Sacred Lands or other cultural resources on or near the study area, or any comment on the project, please contact me at your earliest convenience at (714) 444-9199 or via email at pmaxon@bonterraconsulting.com, with a subject line referencing the "West Antelope Solar Project".

Sincerely,

BONTERRA CONSULTING

Patrick O. Maxon, RPA
Director, Cultural Resources

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June 22, 2012

Ms. Delia Dominguez, Chairperson
Kitanemuk & Yowlumne Tejon Indians
981 N. Virginia
Covina, California 91722

Subject: West Antelope Solar Project

Dear Ms. Dominguez:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed West Antelope Solar Project located in unincorporated Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

***Location***

The project location is shown on the USGS *Del Sur, CA* 7.5 Minute Quadrangle in Township 7 North; Range 14 West, Sections 14 and 23 (*S.B.B.M*). Refer to attached exhibit.

***Project***

The project site is located in unincorporated Los Angeles County, just outside of the western boundaries of the City of Lancaster. The project site consists of 15 contiguous parcels totaling approximately 270 acres. The project site is bound by (but does not include) parcels 3267-004-014, -015, -030, and -031 (just south of West Avenue I-8/Lancaster Blvd.) to the north, 110th Street East to the east, West Avenue J-8 to the south, and 115th Street West to the west. The project site is bisected by West Avenue J, dividing it into a North Portion and South Portion.

The project would develop this currently undeveloped site with a solar energy facility that could produce up to 20 megawatts (MW) of renewable electric power during daytime hours. The electricity generated by the project would be transmitted to a nearby Southern California Edison (SCE) substation. The transmission line would run parallel with West Avenue J approximately 1.5 miles to the Antelope substation, located at 95th Street West and West Avenue J. The transmission line would enter the Antelope substation in order to connect the project to the existing transmission infrastructure.

***NAHC Notification***

A Sacred Lands File Search conducted by the Native American Heritage Commission (NAHC) did not identify the presence of Native American cultural resources on the project site. The NAHC also provided BonTerra Consulting with a list of Native American individuals/organizations that may have knowledge of cultural resources in the project area. Your name and contact information was included on the list and serves as the basis for this letter.

***Records Search***

An archaeological/historic records search will be conducted at the South Central Costal Information Center (SCCIC) at California State University, Fullerton to evaluate the existing conditions of the project site. A survey of the project site will be completed after the records search to identify any exposed cultural resources.

Your participation in this local planning process is important. If you have any additional knowledge of Native American Sacred Lands or other cultural resources on or near the study area, or any comment on the project, please contact me at your earliest convenience at (714) 444-9199 or via email at pmaxon@bonterraconsulting.com, with a subject line referencing the "West Antelope Solar Project".

Sincerely,

BONTERRA CONSULTING

for

Patrick O. Maxon, RPA
Director, Cultural Resources

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June 22, 2012

Ms. Ann Brierty, Policy/Cultural Resources Department
San Manuel Band of Mission Indians
26569 Community Center Dr.
Highland, California 92346

Subject: West Antelope Solar Project

Dear Ms. Brierty:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed West Antelope Solar Project located in unincorporated Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

***Location***

The project location is shown on the USGS *Del Sur, CA* 7.5 Minute Quadrangle in Township 7 North; Range 14 West, Sections 14 and 23 (*S.B.B.M*). Refer to attached exhibit.

***Project***

The project site is located in unincorporated Los Angeles County, just outside of the western boundaries of the City of Lancaster. The project site consists of 15 contiguous parcels totaling approximately 270 acres. The project site is bound by (but does not include) parcels 3267-004-014, -015, -030, and -031 (just south of West Avenue I-8/Lancaster Blvd.) to the north, 110th Street East to the east, West Avenue J-8 to the south, and 115th Street West to the west. The project site is bisected by West Avenue J, dividing it into a North Portion and South Portion.

The project would develop this currently undeveloped site with a solar energy facility that could produce up to 20 megawatts (MW) of renewable electric power during daytime hours. The electricity generated by the project would be transmitted to a nearby Southern California Edison (SCE) substation. The transmission line would run parallel with West Avenue J approximately 1.5 miles to the Antelope substation, located at 95th Street West and West Avenue J. The transmission line would enter the Antelope substation in order to connect the project to the existing transmission infrastructure.

***NAHC Notification***

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An archaeological/historic records search will be conducted at the South Central Costal Information Center (SCCIC) at California State University, Fullerton to evaluate the existing conditions of the project site. A survey of the project site will be completed after the records search to identify any exposed cultural resources.

Your participation in this local planning process is important. If you have any additional knowledge of Native American Sacred Lands or other cultural resources on or near the study area, or any comment on the project, please contact me at your earliest convenience at (714) 444-9199 or via email at pmaxon@bonterraconsulting.com, with a subject line referencing the "West Antelope Solar Project".

Sincerely,

BONTERRA CONSULTING

Patrick O. Maxon, RPA
Director, Cultural Resources

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June 22, 2012

Mr. Ron Andrade, Director
LA City/County Native American Indian Comm.
3175 W. 6th Street, Rm. 403
Los Angeles, California 90020

Subject: West Antelope Solar Project

Dear Mr. Andrade:

BonTerra Consulting has been retained to complete a cultural resources study for the proposed West Antelope Solar Project located in unincorporated Los Angeles County, California. This project does not require a General or Specific Plan amendment or adoption; therefore, the project is not subject to the statutory requirements of Senate Bill 18 (Tribal Consultation Guidelines). However, as part of the background cultural resources research being conducted, this letter is to inform you of the proposed project and to request any relevant information you may have regarding cultural resources on or near the project site.

***Location***

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***Project***

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Your participation in this local planning process is important. If you have any additional knowledge of Native American Sacred Lands or other cultural resources on or near the study area, or any comment on the project, please contact me at your earliest convenience at (714) 444-9199 or via email at pmaxon@bonterraconsulting.com, with a subject line referencing the "West Antelope Solar Project".

Sincerely,

BONTERRA CONSULTING

Patrick O. Maxon, RPA
Director, Cultural Resources

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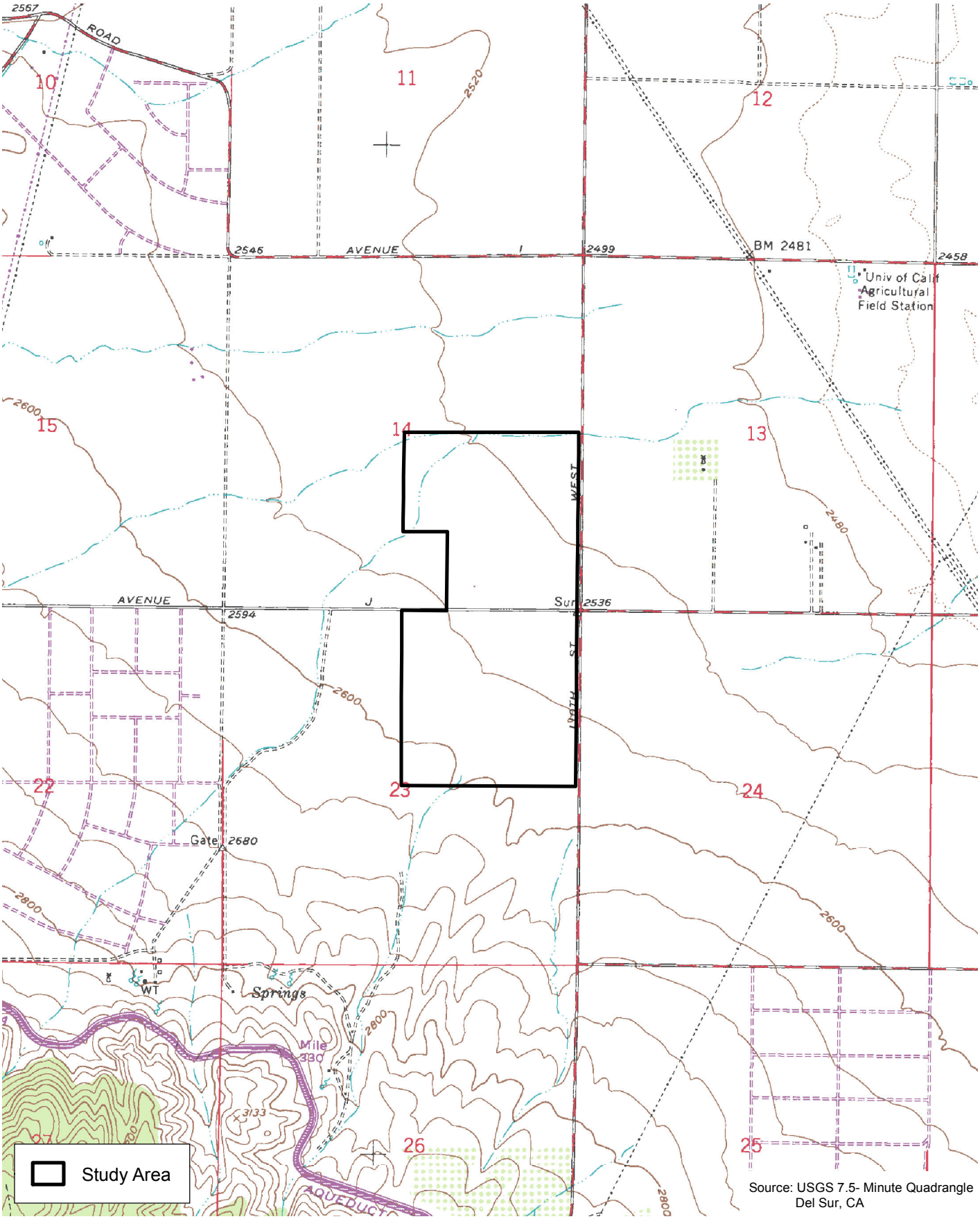


Source: USGS 7.5- Minute Quadrangle
Del Sur, CA

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# U.S. Geological Survey 7.5-Minute Quadrangle

Exhibit 1

*West Antelope Solar Project*

N
W E
S

2,000 1,000 0 2,000
Feet

BonTerra CONSULTING

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R. Indigenous Consultants
Tribal Monitoring LLC
6471 Cornell Cir
Moorpark, CA 93021
Cell (805) 905-1675
ndnrandy@gmail.com
R-indigenousconsultantstribalmonitoring.com

July 5, 2012

Hello, my name is Randy Guzman-Folkes and I am from the Tataviam Band of Mission Indians, Venturano Chumash, and Shone-Paiute. My company is R. Indigenous Consultants Tribal Monitoring LLC. I take pride in providing Native American Monitoring services that protect our sacred sites, cultural resources and ancestors during grading, excavation, and site development.

R. Indigenous Consultants Tribal Monitoring LLC/Randy Guzman-Folkes is listed on the Native American Heritage Commission's Native Monitoring list. The NAHC understands the important relationship between California Indian Communities and the land, which is an Asset for cultural resources. The State and Federal Government has enacted laws that set out to preserve and safeguard theses sites and resources.

As a Native Monitor, I work in consultation with archeologists, geologists, paleontologist, and city planners. We work together to review documents such as Environmental Impact Reports, grading plans, California Environmental Quality Reports, site surveys and National Forestry Reports. However, these documents are not enough to identify sacred sites or areas of concern to tribes. Often these documents do not contain tribal input, cultural knowledge, or accurate historic background. This is why the

Federal, State, and local governments have laws in place that call for consultation and monitoring of development projects.

My family has been recognized by both the State of California and the NAHC as a, Most Likely Descendant (MLD). This means that should any development impact a cultural site or sensitive area, R. Indigenous Consultants Tribal Monitoring can provide an MLD to facilitate the correct handling of the site, artifact or culturally sensitive materials. R. Indigenous Consultants has been in the field of Native American Monitoring for over 30 years. We are eager to work with your company and to educate you about the laws that pertain to the protection and preservation of sacred sites and cultural resources.

We would be honored to work with you on your current or upcoming projects.

In Good Spirit,

Randy Guzman-Folkes

# APPENDIX D

# SITE PHOTOGRAPHS

Middle of Section 23.  Looking NE at NE quarter of Section 23.

Isolated tin can noted in Section 23.

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# Project Site Photographs Section 23

Appendix D-1

*West Antelope Solar Project*

BonTerra CONSULTING

(Rev 08/01/12 JAZ) Projects\TAAC\J001\Graphics\Archeo\Ex_Archeo_photo_A.pdf

From center of SE quarter of Section 14 looking west.

From center of SE quarter of Section 14 looking east.

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# Project Site Photographs Section 14

Appendix D-2

*West Antelope Solar Project*

BonTerra CONSULTING

(Rev 08/01/12 JAZ) Projects\TAAC\J001\Graphics\Archeo\Ex_Archeo_photo_B.pdf

# APPENDIX E

# PERSONNEL QUALIFICATIONS

# Patrick O. Maxon, RPA
## Cultural Resources Manager

## Education

Master of Arts, Anthropology, California State University, Fullerton, CA, 1994

Bachelor of Arts, Psychology/Sociology, Towson State University, Maryland, MD, 1987

## Professional Certifications

Registered Professional Archaeologist (National), 1999 – present

Certified Archaeologist – Riverside County TLMA, 2008 – present

Certified Archaeologist – Orange County Environmental Management Agency, 1998 – present

Cultural Resources Specialist – California Energy Commission, 2004

## Professional Summary

Patrick Maxon is a Registered Professional Archaeologist, is certified by the County of Orange Environmental Management Agency and the Riverside County Transportation and Land Management Agency. He has 18 years of experience in all aspects of cultural resources management, including prehistoric and historic archaeology, paleontology, ethnography, and tribal consultation. He has expertise in compliance with the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act (ARPA), and the Clean Water Act (CWA), among others. Mr. Maxon has been previously certified by the City of San Diego, and meets the Secretary of Interior's standards for historic preservation programs for archaeology. Mr. Maxon has completed hundreds of cultural resources projects that have involved (1) agency, client, Native American, and subcontractor coordination; (2) treatment plans and research design development; (3) archival research; (4) field reconnaissance; (5) site testing; (6) data recovery excavation; (7) construction monitoring; (8) site recordation; (9) site protection/preservation; (10) mapping/cartography; (11) laboratory analysis; and (12) report production. He has managed a number of projects within the jurisdiction of the U.S. Army Corps of Engineers (USACE), the Bureau of Land Management (BLM), the Bureau of Reclamation, and other federal agencies that require compliance with Section 106 of the NHPA. He has also completed projects throughout Southern California under CEQA for State and local governments and municipalities, including the California Department of Transportation (Caltrans), the Department of General Services (DGS), the California Energy Commission (CEC), the California Department of Water Resources, the Los Angeles County Department of Public Works (LADPW), the Los Angeles Department of Water and Power (LADWP), the Los Angeles Unified School District, and others.

## Relevant Project Experience

***Lancaster Solar Farm Initial Study/Mitigated Negative Declaration, Lancaster (CoLACAO).*** BonTerra Consulting is currently preparing an Initial Study/Mitigated Negative Declaration (MND) for the proposed Solar Energy Project to be developed on approximately 63 acres of undeveloped County-owned land within the City of Lancaster. The project site is surrounded on the east and west by several County facilities, and the California State Prison-Los Angeles County (CSP-LAC) is located to the south. The County is proposing to develop the project site with a solar facility capable of generating up to 4 megawatts (MW) of electricity under peak solar conditions, and the energy would be made equally available to the adjacent Mira Loma Detention Center and the Challenger Memorial Youth Center.

The cultural resources investigation at the site included a California Historical Resources Information System (CHRIS) records search and literature review for the project at the South Central Coastal Information Center (SCCIC) at the California State University, Fullerton. Native American consultation was initiated with the Native American Heritage Commission (NAHC) with a request for a Sacred Lands File Search and contact list, and informational letters were mailed to tribes requesting comment. A paleontological resources records search, completed previously by the Los Angeles County Natural History Museum (LACNHM) was reviewed for information on known paleontological resources in the project site and surrounding area. In addition, a current records review of the museum's vertebrate paleontology records for the project site and vicinity was undertaken and reviewed. A cultural resources survey of the project site was conducted and a Historic Resources Assessment involving a pedestrian survey of the project site and research into the historic development of the site and surrounding area, including individual property information available from archival sources, was also completed. The study concluded that five on-site structures of an extant but defunct wastewater treatment and reclamation system are eligible for listing in the National Register of Historic Places and the California Register of Historical Resources. Avoidance or formal documentation via a Historic American Engineering Report (HAER) to document the history of early sewage treatment and water reclamation systems of the type found in the project area, and the physical properties of the system, was recommended. No other significant cultural resources were identified as a result of the study; however, because of the presence of historic and prehistoric resources in the vicinity, and the possibility of significant resources buried under development at the project site, monitoring of grading was recommended.

**Sylmar Ground Return Replacement Return System, City of Los Angeles (MWatson).** BonTerra Consulting has been hired by Montgomery Watson Harza to perform an assessment of biological and cultural resources for the Sylmar Ground Replacement Return System Project in Los Angeles. The northern segment extends from north to south within the utility easement corridor that runs between the Sylmar West Converter Station in Sylmar to the Kenter Canyon Terminal Tower near Brentwood. The southern extension, from the Kenter Canyon Terminal Tower to the ocean, is currently being considered under three alternatives. Cultural resources work included a California Historical Resources Information System (CHRIS) records search and literature review for the project at the South Central Coastal Information Center (SCCIC) at the California State University, Fullerton. Native American consultation was initiated with the Native American Heritage Commission (NAHC) with a request for a Sacred Lands File Search and contact list, and informational letters were mailed to tribes requesting comment. A paleontological resources records search was completed by the Los Angeles County Natural History Museum (LACNHM) to compile information on known paleontological resources in the project site and surrounding area. Brief, one-day field surveys were conducted for the northern segment and memo reports were produced that identified constraints to the construction work. Cultural resources surveys of the southern extension's three alternatives were subsequently conducted.

***Centennial Specific Plan Environmental Impact Report, Cultural Resources Surveys, Los Angeles County.*** BonTerra Consulting is preparing the environmental documentation for the Centennial Specific Plan EIR that involves a new community consisting of residential, commercial, business park, and cultural and civic/institutional uses and encompassing approximately 11,680 acres. Mr. Maxon is managing the review, evaluation, and mitigation of cultural resources for this proposed project. To consider the current status of the project area's cultural and paleontological resources in the environmental analysis, others initially performed a Phase I cultural resources study of the entire project area. Mr. Maxon surveyed an off-site Caltrans right-of-way south of the project site. This included a records search at the South

Central Coastal Information Center at the California State University, Fullerton; a paleontological records search at the Los Angeles County Museum; and an intensive pedestrian survey to evaluate the project area for the presence of cultural and paleontological resources. Numerous cultural resources sites were discovered on the project site, and some were evaluated for significance. Those that were determined eligible and were in the development area were preserved in place. As the project evolves and expands beyond the Phase I area, additional sites must be evaluated for significance. Some may need to undergo data recovery excavations, while one structure must be recorded and evaluated. Consultations with regulatory agencies, County staff, Native American tribes, the interested public, and Clients must be completed and their comments considered, and the monitoring of disturbances around the known sites will be undertaken when construction activities commence.

***Newport Banning Ranch (City of Newport Beach),*** As project manager of the cultural resources portion of this on going project, Mr. Maxon conducted archaeological, historic, and paleontological investigations for resources potentially impacted by the proposed Newport Banning Ranch development. The investigation consisted of (1) a Phase II test level excavation of eight prehistoric and three historic archaeological sites present on the site; (2) an assessment and evaluation of the built environment resources associated with the West Newport Oil Company development on site; and (3) a paleontological assessment of the project site's potential for the presence of sensitive rock formations and fossil resources. Three archaeological sites were deemed significant as a result of the study and the paleontological significance of the project site was deemed as high. However, no historic resources associated with oil extraction operations were identified. Mr. Maxon oversaw the completion of fieldwork, the preparation of archaeological, historical and paleontological technical reports, and subsequently prepared the cultural resources section of the EIR for the project. Future work will include data recovery excavations and/or site protection/preservation of significant cultural and paleontological resources impacted by the proposed project. Archaeological/Paleontological monitoring will be undertaken during grading of the project site.

***Poseidon Desalination Plant, Cultural Resources Services, Huntington Beach and Newport Beach.*** BonTerra Consulting completed cultural and biological resources Phase I and II studies for the proposed Poseidon Resources Desalination Plant project in the City of Huntington Beach and the associated desalination plant pump station in the City of Newport Beach. The project included a Phase I cultural resources reconnaissance study that consisted of a California Historical Resources Information System (CHRIS) records search and literature review for the project at the South Central Coastal Information Center (SCCIC) at the California State University, Fullerton, Native American coordination with the Native American Heritage Commission and local Native American tribes and individuals, a pedestrian survey of both locations, and a cultural resources technical report describing the results of the study and offering management recommendations.

While no archaeological or paleontological resources were discovered, historic structures are present on the property and were evaluated for significance. The proposed desalination plant location in Huntington Beach, currently developed with three defunct fuel oil tanks and their infrastructure, is located within the existing AES Huntington Power Generation Plant facility in Huntington Beach. The second parcel is located in unincorporated County of Orange, immediately adjacent to the City of Newport Beach. It consists of an existing pump station site that will be expanded as part of the current project. Because they are nearly 50 years old, the fuel oil tanks in Huntington Beach were recorded on DPR Series 523 forms and evaluated for eligibility for listing in the California Register of Historical Resources. They were found not eligible. Mitigation for potential project effects included recommendations for the historic

structures present on site and retention of an Archaeologist and/or Paleontologist in the event that cultural resources or fossil resources are discovered during grading.

***Atlanta Ave Widening Project HPSR/ASR/XPI (KOMEX).*** As project manager for the Atlanta Avenue widening project, Mr. Maxon conducted a Phase I cultural resources study to evaluate the potential effects of the project on cultural resources. The initial work included consultation with Caltrans cultural resources specialists regarding the Area of Potential Effects (APE) to cultural resources; a cultural resources literature review; Native American consultation; a field survey of the project area; and submittal to Caltrans of an Archaeological Survey Report (ASR), and a Historic Property Survey Report (HPSR). After further consultation with Caltrans, Mr. Maxon directed the historic evaluation of the Pacific Mobile Home Park south of the site; and completed an Extended Phase I (XPI) study consisting of subsurface archaeological excavation to evaluate the presence of the archaeological site within the APE, An updated ASR, XPI report, DPR 523 site forms, and HPSR was submitted to Caltrans and SHPO for review and comment.

***Wintersburg Channel (OrCo).*** Mr. Maxon performed a Phase I cultural resources study to determine if the proposed widening of the channel would have the potential to impact cultural resources. The study included a literature review at the South Central Coastal Information Center, a paleontological literature review at the Los Angeles County Museum, a pedestrian survey of the Area of Potential Effects, and completion of the CEQA section describing the results of the study. As cultural resources project manager on this contract, Mr. Maxon also consulted with regulators at the US Army Corps of Engineers, Native American tribes and individuals, and with a local archaeologist who has extensive experience working in and around Bolsa Chica. Elements of the defunct Bolsa Chica Gun Club were identified in the wetlands, but it was determined that the channel work would have no impact on them. Recordation of the channel itself and the Slater Bridge to the north was subsequently completed by an architectural historian. Construction monitoring was recommended.

## AFFILIATIONS AND COMMITTEES

Pacific Coast Archaeological Society (PCAS)

Society for California Archaeology (SCA)

Society for American Archaeology (SAA)

Association of Environmental Professionals (AEP) (Board of Directors, 2005 to present)

American Cultural Resources Association (ACRA)

## PROFESSIONAL EXPERIENCE

BonTerra Consulting, Director, Cultural Resources 2008–present

Chambers Group, Director, Cultural Resources 2006–2008

SWCA, Project Manager/Director, Cultural Resources 2001–2006

RMW Paleo Associates, Staff Archaeologist/Senior Project Manager 1994–2001

# Albert Knight
## Archaeologist

## Education

Bachelor of Arts in Anthropology – Dean's Honors List, University of California, Santa Barbara, 1983

Various Archaeology Extension Classes, UCLA 1988-2002

## Current Professional Memberships and Affiliations

Mr. Knight is a member of the Archaeology Conservancy, the Malki Museum, the Autry National Center, the Santa Susana Mountains Park Association (Lifetime), the Little Landers Historical Society (Lifetime), and the Society for California Archaeology (Lifetime).

## Professional Summary

Albert Knight worked on his first student dig in 1975 and has been performing archaeological and anthropological research since 1986. Mr. Knight has worked as a Field Technician, a Crew Chief, and a Field Director on his own and others' projects. He has excavated many units, has performed field surveys at numerous locations across much of Southern and Central California, and has performed some lab work. Mr. Knight has conducted records searches and historical research; has performed construction monitoring on many large and small projects; and has written a variety of papers, including short project reports and professional articles, a few of which have been published. Mr. Knight has also conducted paleontological monitoring and is well informed about the geography, geology, and biology of Southern and Central California.

## Representative Project Experience

***Sylmar-Kenter Electrode Upgrade Project Archaeology Assessment, Encino.*** In 2009, Mr. Knight was the Archaeological Field Surveyor for the County of Los Angeles Department of Public Work's Sylmar-Kenter Electrode Upgrade Project. Mr. Knight conducted an archaeological assessment in Encino and at the Van Norman Reservoir. Mr. Knight examined the proposed project area and prepared a summary of the field notes, the photographs, and a photographic log. Several archaeological sites were identified and visited in the vicinity of the alignment, but all will be avoided with project implementation.

***Big Tujunga Canyon Road Archaeological Surveys, Angeles National Forest.*** From 2009 to 2010, Mr. Knight served as the Archaeological Field Surveyor for this project, which included 450 feet of Big Tujunga Canyon Road in the Angeles National Forest (ANF) for the County of Los Angeles Department of Public Works. He conducted an archaeological assessment, performed a records check at the ANF Headquarters Heritage Resources Office in Arcadia, visited the proposed project location, walked portions of the proposed work area, made notes, photographed the area, and provided a summary of all work completed. No prehistoric resources were discovered as a result of the survey; however, Big Tujunga Canyon Road itself, and a rock wall extending along a portion of the road, were recognized as potentially historic and will be evaluated by an Architectural Historian.

***Mullally Canyon Debris Dam Archaeological Assessment, County of Los Angeles Department of Public Works.*** In 2009, Mr. Knight served as the Archaeological Field Surveyor for an archaeological assessment at the Mullally Canyon Debris Dam. Mr. Knight examined the proposed project area and prepared a summary of the field notes, the photographs, and a photographic log. The Mullally Debris Basin was constructed in 1965 and therefore does not meet the minimum age requirements for evaluation as a historic resource. No other cultural resources were observed.

***Pilot Desalination Plant Project Archaeological Monitoring, Long Beach.*** In 2008, Mr. Knight served as the Archaeological Monitor for the Pilot Desalinization Plant Project. He coordinated with Native American (Gabrielino) and Paleontological Monitors and with project personnel. The monitors observed all excavation work, and monitoring results were reported to the Client. No cultural resources were discovered during monitoring. It was later determined that the project area was an artificial beach, created from dredged sand that was deposited there many years ago, in what had been open ocean.

***Broad Beach Waterline Project, Archaeological Monitoring, Malibu.*** In 2007, Mr. Knight served as an Archaeological Monitor during the installation of a new water line in Broad Beach Road. Mr. Knight recovered around two dozen prehistoric artifacts, which were cleaned and catalogued. All information was properly recorded using California Department of Parks and Recreation (DPR) 523 forms. After the artifacts were recorded and after consultation, Mr. Knight contacted the University of California, Los Angeles (UCLA) Fowler Museum of Cultural History, which curates artifacts from Southern California and which agreed to curate the artifacts recovered from the site. Mr. Knight also personally transferred the artifacts to UCLA.

***Baker Ranch Sites CA-ORA-1004 and CA-ORA-1150 Archaeological Excavations, Orange County.*** In 2009, Mr. Knight worked as an Archaeologist for two sites on Baker Ranch in Orange County. Mr. Knight directed the excavations of test units and shovel test pits, directed the crew, recorded notes pertinent to the excavations, photographed the excavations, produced photographic logs, and monitored equipment. All work produced negative results.

***Irwindale Materials Recovery Facility Archaeological Assessment, Valley County Water District, Irwindale.*** Mr. Knight served as the Archaeological Field Surveyor for this project fp and conducted an archaeological survey at the Irwindale Materials Recovery Facility. Mr. Knight examined the proposed project area and prepared a summary of the field notes, the photographs, and a photographic log. No significant cultural resources were discovered; however, monitoring for paleontological resources was recommended during deeper excavations.

***Thomas Roads Improvement Project Archaeological Assessment, Bakersfield.*** Mr. Knight served as one of two Archaeological Field Surveyors for this project, and conducted an archaeological assessment for the proposed Rosedale Highway (State Route 58)/State Route 99 Interchange Study. Over the course of three days, Mr. Knight examined the proposed project area and prepared a summary of the field notes, the photographs, and a photographic log. Because the vast majority of the project area is developed, no archaeological resources were expected or discovered. Monitoring was recommended in many areas, especially along the Kern River, which courses through the project area.

# APPENDIX D

# GEOTECHNICAL INVESTIGATION REPORT

# GEOTECHNICAL INVESTIGATION, PROPOSED WEST ANTELOPE PROJECT (20-MWAC PHOTOVOLTAIC ARRAY), WEST OF 110TH STREET WEST, NORTH AND SOUTH OF AVENUE J, IN THE LANCASTER AREA OF LOS ANGELES COUNTY, CALIFORNIA

Prepared for:

**TA - ACACIA, LLC**
119 First Avenue. S #100
Seattle, Washington 98104

Project No. 603455-001

June 21, 2012

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

June 21, 2102

Project No. 603455-001

To: TA - Acacia, LLC
119 First Avenue. S #100
Seattle, Washington 98104

Attention: Mr. Antonio Rodriguez
Senior Project Engineer

Subject: Geotechnical Investigation, Proposed West Antelope Project (20-MWAC Photovoltaic Array), West of 110th Street West, North and South of Avenue J, in the Lancaster Area of Unincorporated Los Angeles County, California

Leighton Consulting, Inc. (Leighton) has conducted a geotechnical investigation and geologic hazards review for the proposed West Antelope Project, which will be a 20-MWAC Photovoltaic Array, located west of 110th Street West, and both north and south of Avenue J in the Lancaster Area of unincorporated Los Angeles County, California, California. This study was authorized through our agreement with Canadian Solar (USA) Inc. dated May 18, 2012. The purpose of this study has been to evaluate geologic and geotechnical conditions at the site with respect to the proposed improvements, and to provide preliminary geotechnical recommendations for design and construction of the proposed PV array and associated improvements.

Based upon our geotechnical investigation, the proposed improvements are feasible from a geotechnical viewpoint, provided our recommendations are incorporated into the design and construction of the project. The most significant geotechnical issues at the site are compressible soils and seismic hazards. These and other geotechnical issues are discussed in this report.

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We appreciate the opportunity to work with you on this project. If you have any questions, or if we can be of further service, please call us at your convenience at (909) 484-2205.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

Jason D. Hertzberg, GE 2711
Associate Engineer

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Principal Geologist

MDH/JDH/PB/rsm

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Figure 3 Retaining Wall Backfill and Subdrain Detail
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Appendices

Appendix A References
Appendix B Exploration Logs (Borings, Infiltration Tests, and Field Elect. Resistivity)
Appendix C Geotechnical Laboratory Test Results
Appendix D Summary of Seismic Analysis
Appendix E Earthwork and Grading Guide Specifications

# 1.0 INTRODUCTION

## 1.1 Site Location and Description

The roughly 250-acre site is located just west of the Lancaster city limits in unincorporated Los Angeles County. The project is west of 110th Street West, both north and south of Avenue J. The property is currently vacant and slopes gently downward to the north. The site is bounded by high-voltage power lines to the west and south, vacant land to the north, and 110th Street West to the east. The surrounding properties are also vacant. The site and surroundings have a light covering of seasonal grasses.

The site descends from south to north, ranging from approximately 2,630 to 2,510 feet above mean sea level (msl) (USGS, 1974), for an average gradient of approximately 2 percent from the southwest corner to the northeast corner.

## 1.2 Proposed Improvements

Based on our review of preliminary site plans, including the Photovoltaic Array Site Plan, Sheet G-100, dated March 15, 2012, the West Antelope Project includes construction of 155 acres of PV array, though we understand that the locations of the sub-arrays will likely shift on the site. Each sub-array (372 feet wide) will consist of 20 trackers (each typically 198 feet long), in which PV modules will be attached to torque tubes mounted on bearing beams. The modules will be rotated by a gear box. The project will include a 230/13.8kV substation with total plan dimensions of roughly 115 by 215 feet, located in the northwest corner of the portion of the site south of Avenue J.

We understand that the bearing beams (H beams) for the PV panels will be driven into the ground approximately 5 to 8 feet for foundation support. Grading plans were not available at the time of this study. However, due to the existing topography onsite, we anticipate that minor cuts and fills (generally less than 1 or 2 feet) will be needed to achieve designed grades for the improvements. We anticipate that little or no grading will be conducted for the PV array areas.

## 1.3 Purpose of Investigation

The purpose of our study has been to evaluate the geologic and geotechnical conditions at the site with respect to the proposed improvements, and to provide

preliminary recommendations for design and construction of the proposed PV array and associated improvements.

## 1.4 Scope

The scope of our geotechnical investigation has included the following tasks:

- Geologic Hazards Review - We reviewed pertinent, readily available geologic and geotechnical literature covering the site. Our review included regional geologic maps and reports available from our library covering the site. Documents reviewed are listed in Appendix A, References.

- Pre-field Investigation Activities - We coordinated with Underground Service Alert to have existing underground utilities located and marked prior to our subsurface investigation.

- Field Exploration - Our field investigation included drilling, logging, and sampling nine hollow-stem auger borings (LB-1 through LB-9) throughout the site, within the presumed footprints of the PV arrays and substation. The borings were drilled to depths ranging from 11.5 feet to 51.5 feet below the existing ground surface.

  Encountered soils were logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D 2488). Relatively undisturbed soil samples were obtained at selected intervals within these borings using both a California ring-lined sampler and a Standard Penetration Test (SPT) split-spoon sampler. SPT resistance blow counts were obtained by dropping a 140 pound hammer through a 30-inch free fall. The 2-inch outside diameter SPT sampler was driven 18 inches without an inner liner and the number of blows was recorded for each 6 inches of penetration (ASTM D 1586). Representative bulk soil samples were also collected at shallow depths.

  We performed three double-ring infiltration tests at representative locations on site. The test procedure consisted of driving sets of two test cylinders (“rings”) into in-place soil, filling the rings with water, and measuring the infiltration rates over a period of time.

We also conducted field measurements of ground electrical resistivity using the Wenner 4-pin method with spacings of 5, 10, 15, and 20 feet. This testing was conducted at 6 locations onsite (two orthogonal directions at three points).

Locations of borings and field tests were reviewed by the owner and project civil engineer prior to exploration. Logs of the geotechnical borings, infiltration test results, and results of field electrical resistivity testing are presented in Appendix B. Approximate boring and test locations are shown on the accompanying *Geotechnical Map*, Figure 2.

- Laboratory Tests - Laboratory tests were conducted on selected relatively undisturbed and bulk soil samples obtained during our field investigation. The laboratory testing program was designed to evaluate engineering characteristics of the onsite soil. Laboratory tests conducted during this investigation include:

  - In situ moisture content and dry density
  - Sieve and hydrometer analysis for grain-size distribution
  - Consolidation and collapse potential
  - Expansion index
  - Direct shear
  - Maximum dry density and optimum moisture content
  - Water-soluble sulfate concentration in the soil
  - Resistivity, chloride content and pH
  - Soil thermal resistivity of three relatively undisturbed samples

  Results of the in situ dry density and moisture content tests are shown on the boring logs (Appendix B). Results of the remaining laboratory tests are provided in Appendix C.

- Engineering Analysis - Data obtained from our background review and field exploration was evaluated and analyzed to provide geotechnical conclusions and preliminary recommendations presented in the following sections.

- Report Preparation - Results of our geologic hazards review and geotechnical investigation have been summarized in this report, presenting our findings, conclusions and preliminary recommendations for the project.

# 2.0 FINDINGS

## 2.1 Geologic Hazards Review

We have reviewed pertinent, readily available geologic and geotechnical literature covering the site. Our review included regional geologic maps and reports available from our library. Documents reviewed are listed in Appendix A, References.

## 2.2 Regional Geologic Setting

The site is located within the Antelope Valley portion of the Mojave Desert Geomorphic Province of California. The Antelope Valley lies within a wedge-shaped part of the Mojave Desert bound by the San Andreas Fault to the southwest, the Garlock Fault to the northwest and the Cottonwood-Rosamond Fault to the northeast. Onsite terrain slopes gently to the north and is underlain by Quaternary alluvium to a thickness of several hundred feet, underlain by plutonic quartz monzonite bedrock. The majority of the site is mapped with alluvial soil at the surface, consisting of gravel, sand and silt. The far southwest portion of the site is mapped with older alluvium at the surface (Dibblee, 1961).

## 2.3 Subsurface Soil Conditions

Based upon our review of pertinent geotechnical literature and our current subsurface exploration, the site is underlain by alluvial fan deposits. Alluvial soils encountered in our borings generally consisted of medium dense to dense granular soils, including silty sand and clayey sand, and medium stiff to very stiff cohesive soils, including sandy lean clay and silt. Thin layers of clean sand, were encountered at depths greater than 30 feet. The soil encountered was generally visually described as dry to slightly moist. More detailed descriptions of the subsurface conditions are presented on the boring logs in Appendix B.

### 2.3.1 Compressible and Collapsible Soil

Soil compressibility refers to a soil's potential for settlement when subjected to increased loads as from a new structure or fill surcharge. Based on our investigation, the alluvial soils encountered are considered slightly to moderately compressible.

Collapse potential (moisture sensitivity, sometimes referred to as 'hydrocollapse') refers to the potential settlement of a soil under existing stresses upon being wetted. Samples of the subsurface soil were tested for collapse potential. Test results indicate that the soil onsite has a moderate collapse potential.

2.3.2 Expansive Soils

Expansive soils contain significant amounts of clay particles that swell considerably when wetted and shrink when dried. Structures constructed on these soils are subjected to large uplifting forces caused by the swelling. Without proper measures taken, heaving and cracking of both building foundations and slabs-on-grade could result.

A representative sample of the subsurface soil was tested for expansion index, plus additional relatively undisturbed samples were tested for swell potential. Test results indicate that the onsite near-surface soils are expected to have a low to medium expansion potential.

2.3.3 Sulfate Content

Water-soluble sulfates in soil can react adversely with concrete. However, concrete in contact with soil containing sulfate concentrations of less than 0.1 percent by weight is considered to have negligible sulfate exposure based on the American Concrete Institute (ACI) publication 318-08, Section 4.2 (ACI, 2008), adopted by the 2010 CBC (Section 1904A.2).

Near-surface soil samples were tested during this investigation for soluble sulfate content. Results of these test indicated a sulfate content of less than 0.01 percent by weight, indicating negligible sulfate exposure. As such, the soils exposed at pad grade are not expected to pose a significant potential for sulfate reaction with concrete.

2.3.4 Resistivity, Chloride and pH

Soil corrosivity to ferrous metals can be estimated by the soil's electrical resistivity, chloride content and pH. In general, soil having a minimum resistivity less than 2,000 ohm-cm is considered corrosive. Soil with a chloride content of 500 parts-per-million (ppm) or more is considered corrosive to ferrous metals.

As a screening for potentially corrosive soil, representative soil samples were tested during this investigation to determine their minimum resistivity, chloride content, and pH. These tests indicated a minimum resistivity of approximately 3,400 ohm-cm or more, a maximum chloride content of approximately 55 ppm, and pH as low as 5.9. Based on these results, the onsite soil is considered corrosive to ferrous metals. Past corrosion testing on similar soils in the vicinity has indicated soils aggressive to copper.

2.3.5 Field Electrical Resistivity Testing

Field measurements of ground electrical resistivity were conducted using the Wenner 4-pin method. Testing was conducted at 6 locations onsite (two orthogonal directions at Borings LB-2, LB-5, and LB-8). In general, resistivity in ohms-cm is the average resistivity of soil (electrolyte) to a depth equal to the spacing between adjacent electrodes (soil pins). The results of the testing, including data and graphs, are presented in Appendix B.

2.3.6 Soil Thermal Resistivity Testing

Thermal resistivity testing was conducted on three relatively undisturbed soils samples from Borings LB-2, 5, and 8 at a depth of approximately 5 feet. Samples were tested at the as-received (in situ) moisture content and again after drying the samples to approximately 0 percent moisture content. Results ranged from approximately 0.6 to 0.9 m $^{o}$C W$^{-1}$ at as-received moisture content (approximately 5 to 6 percent moisture content) and approximately 1.7 to 1.8 m $^{o}$C W$^{-1}$ at 0 percent moisture content. Results are presented in Appendix C.

## 2.4 Groundwater

Groundwater was not encountered in our nine borings excavated to a maximum depth of 51.5 feet below existing ground surface. Based on our review of groundwater data from Los Angeles County Department of Public Works, recent groundwater levels at two monitoring wells closest to the site were greater than 150 feet below existing ground surface (Los Angeles County, 2012). The California Geological Survey considers the historically highest groundwater level at the site to be greater than 250 feet below the ground surface (CGS, 2005). We have assumed deep groundwater conditions in excess of 150 feet below existing ground surface in our analysis of the site.

## 2.5 Faulting and Seismicity

In general, the primary seismic hazards for sites in the region could include strong ground shaking and fault rupture. The potential for fault rupture and seismic shaking are discussed below.

### 2.5.1 Surface Faulting

Our review of available in-house literature indicates that there are no known active or potentially active faults that traverse the site, and the site is not located within a currently designated Alquist-Priolo (A-P) Earthquake Fault Zone (CGS, 2000). The closest active fault to the site is the San Andreas fault, located approximately 3¼ miles south of the site.

The site is not known to be located on or near a pressure ridge. Based on our understanding of the current geologic framework, the potential for future surface rupture of active faults onsite is considered low.

### 2.5.2 Seismic Design Parameters

The principal seismic hazard that could affect the site is ground shaking resulting from an earthquake occurring along several major active or potentially active faults in southern California. Design of the proposed improvements in accordance with current CBC requirements is intended to reduce the impact of seismic shaking on the proposed improvements.

Recommended seismic design acceleration parameters in accordance with the 2010 CBC are presented in Table 1 below.

Table 1 - 2010 CBC Seismic Design Parameters

| Description (2010 CBC reference) | Parameter | Design Value |
|---|---|---|
| Site Longitude, degrees | | -118.330 |
| Site Latitude, degrees | | 34.684 |
| Site Class Definition (Table 1613.5.2) | | D |
| Mapped MCE Spect Resp Accel at 0.2s for Site Cls B (Fig 1613.5(3)), using USGS, 2011 | $S_S$ | 1.77 |
| Mapped MCE Spect Resp Accel at 1.0s for Site Cls B (Fig 1613.5(4)) using USGS, 2011 | $S_1$ | 0.88 |
| Short Period Site Coefficient (Table 1613.5.3(1)) | $F_a$ | 1.0 |
| Long Period Site Coefficient (Table 1613.5.3(2)) | $F_v$ | 1.5 |
| Adjusted MCE Spectral Response Acceleration at 0.2s Period [$=F_aS_S$] (1613.5.3) | $S_{MS}$ | 1.77 |
| Adjusted MCE Spectral Response Acceleration at 1s Period [$=F_vS_1$] (1613.5.3) | $S_{M1}$ | 1.32 |
| Design Spectral Response Acceleration at 0.2s Period, 5% damped [$=2/3S_{MS}$] (1613.5.4) | $S_{DS}$ | 1.18 |
| Design Spectral Response Acceleration at 1s Period, 5% damped [$=2/3S_{M1}$] (1613.5.4) | $S_{D1}$ | 0.88 |
| Is $S_1$ greater than or equal to 0.75? | | Yes |
| Seismic Design Category (1613.5.6) | | E or F |

2.5.3 Seismic Parameters for Geotechnical Evaluation

Peak horizontal ground acceleration (PHGA) and hazard deaggregation were estimated using the United States Geological Survey's (USGS) 2011 Interactive Deaggregations utility. The results of this analysis indicate that the predominant modal earthquake has a PHGA of 1.04g with magnitude of approximately 7.8 ($M_W$) at a distance on the order of 5.2 kilometers for the Maximum Considered Earthquake (2% probability of exceedance in 50 years); results are included in Appendix D. Based on this, the corresponding PHGA for the design earthquake (2/3 of the MCE) is 0.69g. This is not an exhaustive site-specific analysis, yet it is useful in evaluating the general seismic potential at the site.

Based on the above, we have selected a design PHGA of 0.69g for seismic analysis of the onsite soils (seismic settlement).

2.5.4 Historic Seismicity

The site has been exposed to relatively significant seismic events. We are unaware of documentation that indicates that past earthquake damage in the site vicinity as the result of liquefaction, lateral spreading, or other related phenomenon.

We performed an evaluation of site historical seismicity with respect to significant past earthquakes (those recorded from the mid 1800's to 2012 with magnitudes 5 or greater) using the EQSEARCH computer program (Blake, 2000). This is a relatively simple analysis, based on epicenters, and does not include more complex characteristics of earthquakes, such as rupture length and direction; however, it gives an idea of past seismicity at the site. This analysis suggests that the largest ground acceleration at the site from historical earthquakes is estimated to have been roughly 0.13g.

## 2.6 Secondary Seismic Hazards

In general, secondary seismic hazards for sites in the region could include soil liquefaction, earthquake-induced settlement, lateral displacement, landsliding, and earthquake induced flooding. The potential for secondary seismic hazards at the site is discussed below.

### 2.6.1 Liquefaction Potential

Liquefaction is the loss of soil strength or stiffness due to a buildup of excess pore-water pressure during strong ground shaking. Liquefaction is associated primarily with loose (low density), granular, saturated soil. Effects of severe liquefaction can include sand boils, excessive settlement, bearing capacity failures, and lateral spreading.

The site is not mapped in an area considered to have a potential for liquefaction on the Seismic Hazards Zones Map for the Del Sur Quadrangle (CGS, 2005). Groundwater data indicate that groundwater levels are deep in the region currently and historically (see Section 2.3, Groundwater). In addition, the granular soils encountered at depth were found to range in consistency from dense to very dense. Based on these findings, the potential for liquefaction onsite (including effects of liquefaction, such as lateral spreading) is considered low.

### 2.6.2 Seismically Induced Settlement

Seismically induced settlement consists of dry dynamic settlement (above groundwater) and liquefaction-induced settlement (below groundwater). During a strong seismic event, seismically induced settlement can occur within loose to moderately dense sandy soil due to reduction in volume during, and shortly after, an earthquake event. Settlement caused by

ground shaking is often nonuniformly distributed, which can result in differential settlement.

We have performed analyses to estimate the seismically induced settlement using the LiquefyPro computer program by CivilTech Software (2008). The results of our analyses suggest that the onsite soils are susceptible to be less than 1 inch of seismic settlement based on the design earthquake. Due to the relatively laterally uniform nature of soils, differential settlement due to seismic loading is assumed to be less than ½ inch over a horizontal distance of 40 feet. A summary of seismic settlement analysis is included in Appendix D.

#### 2.6.3 Seiches and Tsunamis

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. Based on the inland and elevated location of the site and its distance from contained water facilities, seiches and tsunamis are not a hazard to the site.

### 2.7 Slope Stability and Landslides

Since significant slopes are not located on or near the site, slope instability and landslides are not an issue at the site.

### 2.8 Flooding Potential

The northern portion of the site is partially located within a 100-year flood zone (Zone A) on the Federal Emergency Management Agency (FEMA) Flood Map for the area. No base flood elevation has been determined for this area. The remainder of the site is outside of 100-year and 500-year flood zones. Flooding potential should be considered during civil design of the project.

# 3.0 CONCLUSIONS AND RECOMMENDATIONS

## 3.1 General Conclusions

Based on this investigation, construction of the proposed PV array, substation, and related improvements appears feasible from a geotechnical standpoint. The site is not expected to be prone to adverse effects of: liquefaction, slope instability, or adverse differential settlement from cut/fill transitions (significant cuts and fills are not proposed).

The proposed substation can be founded on shallow conventional spread footings bearing on a zone of newly excavated and recompacted fill soils, derived from site soils. The proposed PV array may be founded on driven piles or shallow foundations. Following our recommendations, the proposed improvements are not anticipated to be susceptible to adverse settlement/differential settlement or bearing capacity failures due to weak or compressible soils. Based on the soil conditions encountered during this investigation, conventional grading equipment in good working order is considered appropriate for this project; bedrock or other earth materials difficult to excavate are not anticipated. Observations during excavation of our small-diameter borings do not suggest that significant amounts of oversize rock are present in the shallow subsurface.

## 3.2 Earthwork and Grading

Grading should be performed in accordance with the General Earthwork and Grading Specifications presented in Appendix E, unless specifically revised or amended below or by future recommendations based on final development plans.

### 3.2.1 Site Preparation

Prior to construction, the areas of the proposed improvements should be cleared of vegetation, trash, and debris. Any underground obstructions onsite that interfere with the proposed foundations should be removed. Efforts should be made to locate any existing utility lines. Those lines should be removed or rerouted if they interfere with the proposed construction, and the resulting cavities should be backfilled and compacted as recommended in Sections 3.2.3 and 3.12.

3.2.2 Overexcavation and Recompaction

To reduce the potential for adverse total and differential settlement of the proposed substation, the underlying subgrade soil should be prepared in such a manner that a uniform response to the applied loads is achieved.

For the proposed substation, we recommend that the onsite soils be removed to a minimum depth of 5 feet below the existing ground surface or 3 feet below the bottom of the proposed footings, whichever is deeper. The removal bottom should extend horizontally beyond the proposed structure a minimum of 5 feet from the outside edges of the footings, or distance equal to the depth of overexcavation below the footings, whichever is farther. During overexcavation, the soil conditions should be observed by Leighton to further evaluate these recommendations based on actual field conditions encountered. If additional undocumented artificial fill is encountered, additional overexcavation should be conducted to remove the soil.

A firm removal bottom should be established across the building/equipment footprint to provide uniform foundation support for the proposed structure. Leighton should observe and test the removal bottom prior to placing fill. Deeper overexcavation and recompaction may be recommended locally until a firm removal bottom is achieved.

Areas outside of the proposed structures planned for asphalt or concrete pavement (such as parking areas or fire lanes), flatwork (such as sidewalks), site walls and low retaining walls, and areas to receive fill should be overexcavated to a minimum depth of 24 inches below existing grade or 12 inches below proposed subgrade, whichever is deeper.

Pile foundations do not require overexcavation.

After completion of the overexcavation, and prior to fill placement, the exposed surfaces should be scarified to a minimum depth of 6 inches, moisture conditioned to or slightly above optimum moisture content, and recompacted to a minimum 90 percent relative compaction, relative to the ASTM D 1557 laboratory maximum density.

3.2.3 Fill Placement and Compaction

The onsite soil is suitable for use as compacted structural fill, provided it is free of debris and oversized material (greater than 8 inches in largest

dimension). Any soil to be placed as fill, whether onsite or imported material, should be accepted by Leighton Consulting.

All fill soil should be placed in thin, loose lifts, moisture-conditioned, as necessary, with moisture contents of at least optimum, and compacted to a minimum 90 percent relative compaction as determined by ASTM Test Method D1557. Aggregate base for pavement should be compacted to a minimum of 95 percent relative compaction.

3.2.4 Import Fill Soil

If import soil is to be placed as fill, it should be geotechnically accepted by Leighton. Preferably at least 3 working days prior to proposed import to the site, the contractor should provide Leighton pertinent information of the proposed import soil, such as location of the soil, whether stockpiled or native in place, and pertinent geotechnical reports if available. We recommend that a Leighton representative visit the proposed import site to observe the soil conditions and obtain representative soil samples. Potential issues may include soil that is more expansive than onsite soil, soil that is too wet, soil that is too rocky or too dissimilar to onsite soils, oversize material, organics, debris, etc.

3.2.5 Shrinkage and Subsidence

The change in volume of excavated and recompacted soil varies according to soil type and location. This volume change is represented as a percentage increase (bulking) or decrease (shrinkage) in volume of fill after removal and recompaction. Field and laboratory data used in our calculations included laboratory-measured maximum dry densities for soil types encountered at the subject site and the measured in-place densities of soils encountered. We preliminarily estimate the following earth volume changes will occur during grading. These are rough estimates:

| | |
|---|---|
| Shrinkage (Approximate) | 15 percent |
| Subsidence (Approximate) | 0.15 foot |

These shrinkage estimates do not include any loss due to rock removal. The level of fill compaction, variations in the dry density of the existing soils and other factors influence the amount of volume change.

It should be noted that subsidence, as referred to above, is settlement of in-place earth materials due to heavy equipment processing. It does not refer to potential settlement due to placement of additional loads from new fill (i.e., raising of grades).

These shrinkage values are general guide values. Actual values will vary, due to the varying soil conditions and varying construction techniques. It is not possible to estimate exact values. Therefore, as with any grading project, some earthwork volume adjustments should be anticipated during grading.

#### 3.2.6 Moisture Sensitivity of Site Soils

Based on our experience in the area, the site soils are anticipated to be highly sensitive to overly moist conditions. Grading during wet months of the year is anticipated to experience delays due to wet, soft, pumping soils. Attention should be given during grading and construction to reducing the possibility of ponding, which would allow the soil to become overly moist and unable to be worked. Overly moist soils will require removal and aeration prior to being placed as compacted fill. It is critical that all trench and equipment backfill be properly compacted, since loose backfill is particularly susceptible to becoming moisture sensitive.

## 3.3 Foundations

The proposed substation building may be founded on shallow foundations. Either deep foundations, such as cast-in-drilled-hole (CIDH) piles and driven piles, or shallow foundations may be used to support the proposed solar array structures.

### 3.3.1 Shallow Foundations

Minimum Embedment and Width

Based on our investigation, footings for conventional one- to two-story structures should have a minimum embedment of 12 inches, with a minimum width of 24 and 15 inches for isolated and continuous footings, respectively.

Allowable Bearing

An allowable bearing pressure of 1,800 pounds-per-square-foot (psf) may be used, based on the minimum embedment depth and width above. This allowable bearing value may be increased by 250 psf per foot increase in depth or width to a maximum allowable bearing pressure of 3,500 psf. These allowable bearing pressures are for total dead load and sustained live loads. Footing reinforcement should be designed by the structural engineer.

Lateral Load Resistance

Soil resistance available to withstand lateral loads on a shallow foundation is a function of the frictional resistance along the base of the footing and the passive resistance that may develop as the face of the structure tends to move into the soil. The frictional resistance between the base of the foundation and the subgrade soil may be computed using an allowable coefficient of friction of 0.35. The passive resistance may be computed using an allowable (factor of safety of 1.5 applied) equivalent fluid pressure of 250 pounds per cubic foot (pcf), assuming there is constant contact between the footing and undisturbed soil. Friction and passive pressure may be combined without reduction, provided the footings can move laterally sufficiently to develop passive pressure (approximately ¼ inch); otherwise, friction alone should be assumed.

Increase in Bearing and Friction - Short Duration Loads

For the case of short term loading (seismic and wind loading), an increase of 1/3 would apply to the bearing pressure and friction values. The ultimate bearing pressure is assumed to be roughly three times the allowable bearing pressure. However, this ultimate pressure only considers structural failure/collapse (life safety) and not structural damage or significant cosmetic damage. Excessive settlement may occur before the ultimate bearing pressure is attained.

Settlement Estimates

The recommended overexcavation, relative compaction and allowable bearing pressure are based on a total allowable, post construction settlement of 1 inch. Differential settlement due to static loading is estimated at ½ inch over a horizontal distance of 30 feet between or along similarly loaded footings. Since settlement is a function of footing sustained load, size and contact bearing pressure, differential settlement can be

expected between adjacent columns or walls where a large differential loading condition exists.

## 3.4 Pile Foundations

Driven piles or drilled cast-in-place concrete piles can be used to support the PV array structures. Pile capacities and settlement estimates are discussed in the following subsections.

### 3.4.1 Vertical Capacity

Piles should have a minimum embedment of 8 feet below lowest adjacent final grade. We recommend a skin friction of 250 psf for axial loads, assuming friction piles. These capacities are for combined dead plus live loads with a one-third increase allowed for either transient wind or seismic loading. Resistance to uplift loads will be developed in friction along the piles. An allowable uplift capacity of half the downward capacity can be used. Soil capacities are provided, which are not necessarily the capacities of the piles as a structural element. Piles should have a minimum center-to-center spacing of at least three pile diameters on center. Otherwise, a group action reduction in capacity will be required for piles spaced closer.

### 3.4.2 Lateral Load Capacities

Short duration lateral wind and seismic loads exerted on the PV array components supported on piles may be resisted by passive pressures against both the piles and grade beams. A passive equivalent fluid pressure of 250 pounds-per-square-foot per foot embedment (pcf) acting against the grade beams can be used, not to exceed total passive pressure of 4,500 psf. Sliding fiction under pile caps should not be used in design, since the subgrade may settle below the pile-supported cap. A passive resistance based on an equivalent fluid pressure of 400 pcf acting against the projected area of an individual pile below lowest adjacent grade, can also be used for design, assuming ½-inch lateral deflection of a free pile head. This maximum passive pressure on piles, however, should not exceed 6,000 psf.

For design of pile lateral-load resistance during short duration wind and/or seismic loads, laterally loaded pile design capacities are present in Table 2, below. These capacities are for a ¼-inch deflection at the top of 24- and 30-inch diameter drilled cast-in-place concrete piles, with a 28-day concrete

compressive strength of 3,000 pounds-per-square-inch (psi). Free head (no rotation restriction at the head) lateral capacities are provided. For this analysis, a 20-foot long pile was modeled with level ground around the pile in the direction of loading. A factor of safety has not been applied to these capacities. Individual pile lateral load/deflection criteria can also be developed upon request, based upon the pile stiffness (EI) and sustained vertical load.

Table 2 - Drilled Cast-In-Place Pile Lateral Capacities

| Lateral Load Parameter As A Function Of Pile Diameter (inches) | 24-Inch | 30-Inch |
|---|---|---|
| Maximum Lateral Load for ¼-inch Deflection At Head (kips) | 12 | 18 |
| Maximum Moment (kip-feet) | 60 | 100 |
| Depth To Maximum Moment (feet) | 7.6 | 7.6 |

3.4.3 Settlement Estimates

Total post construction settlement for the recommended pile foundations should not exceed 1 inch.

## 3.5 Recommendations for Slabs-On-Grade

Concrete slabs-on-grade should be designed by the structural engineer in accordance with the current CBC for a soil with a medium expansion potential. Observation and possibly testing to confirm the expansion potential of the near surface soil should be conducted during site grading.

The following minimum slab recommendations should be used. More stringent requirements may be required by agencies, the structural engineer, the architect, or the CBC. Slabs-on-grade should have the following minimum recommended components:

Subgrade Moisture Conditioning: The subgrade soil should be moisture conditioned to at least 2 percentage points above optimum moisture content to a minimum depth of 18 inches prior to placing steel or concrete.

Concrete Thickness and Structural Design: Thickness of slabs-on-grade should be designed by the structural engineer, but should be at least 4 inches thick (this is referring to the actual minimum thickness, not the nominal thickness). Reinforcing steel should be designed by the structural engineer, but as a minimum (for conventionally reinforced slabs) should be No. 4 rebar placed at 18 inches on center, each direction, mid-depth in the slab.

Minor cracking of the concrete as it cures, due to drying and shrinkage is normal and should be expected. However, cracking is often aggravated by a high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, aggregate that is not sufficiently clean, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. Low slump concrete can reduce the potential for shrinkage cracking. Additionally, reinforcement in slabs and foundations can generally reduce the potential for shrinkage cracking. The structural engineer should consider these and other pertinent concrete design and construction considerations in slab design and specifications.

3.5.1 Slab Underlayment for Moisture Vapor Retarding

Because moisture vapor from the underlying soils will be transmitted through slabs-on-grade without preventive measures, slab underlayment for moisture vapor retarding should be designed by qualified professionals (such as the structural engineer and/or architect) where control of moisture vapor transmission through slabs is considered important to this project (such as where moisture-sensitive floor coverings or equipment are planned). Slab underlayment typically includes a moisture vapor retarder membrane (such as 10-mil thick or greater), a capillary break (such as clean sand or crushed stone), and provisions for protection of the vapor retarder during construction (such as sand under and possibly over the vapor retarder). The structural engineer and/or architect should specify pertinent slab and concrete design parameters, such as whether a sand blotter/capillary break layer should be placed over the vapor retarder, and details of a capillary break system.

Moisture retarders can reduce, but not eliminate moisture vapor rise from the underlying soils up through the slab. Moisture retarders should be designed and constructed in accordance with applicable American

Concrete Institute, Portland Cement Association, Post-Tensioning Institute, ASTM International, and California Building Code requirements and guidelines.

Leighton does not practice in the field of moisture vapor transmission evaluation/mitigation, since this does not fall under the geotechnical discipline. Therefore, we recommend that a qualified person, such as the flooring subcontractor, structural engineer, and/or architect, be consulted to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. That person (or persons) should provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structures as deemed appropriate. In addition, the recommendations in this report and our services in general are not intended to address mold prevention, since we, along with geotechnical consultants in general, do not practice in the area of mold prevention. If specific recommendations are desired, a professional mold prevention consultant should be contacted.

## 3.6 Seismic Design Parameters

Seismic parameters presented in this report should be considered during project design. In order to reduce the effects of ground shaking produced by regional seismic events, seismic design should be performed in accordance with the 2010 CBC. The 2010 seismic design parameters listed in Table 1 of Section 2.5.2 of this report should be considered for the seismic analysis of the subject site.

## 3.7 Lateral Earth Pressures

We recommend that retaining walls be backfilled with imported very low expansive soil and constructed with a backdrain in accordance with the recommendations provided on Figure 3, *Retaining Wall Backfill and Subdrain Detail*. Using onsite expansive soil as retaining wall backfill will result in higher lateral earth pressures exerted on the wall and are, therefore, not recommended. Based on these recommendations, the following parameters may be used for the design of conventional retaining walls.

Table 3 - Retaining Wall Design Parameters

| **Static Equivalent Fluid Pressure (pcf)** | |
|---|---|
| Condition | Level Backfill |
| Active | 35 |
| At-Rest | 55 |
| Passive (ultimate) | 375<br>(Maximum 5,000 psf) |

The above values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

Cantilever walls that are designed to yield at least 0.001H, where H is equal to the wall height, may be designed using the active condition. Rigid walls and walls braced at the top should be designed using the at-rest condition.

Passive pressure is used to compute soil resistance to lateral structural movement. In addition, for sliding resistance, a frictional resistance coefficient of 0.35 may be used at the concrete and soil interface. The lateral passive resistance should be taken into account only if it is ensured that the soil providing passive resistance, embedded against the foundation elements, will remain intact with time. A soil unit weight of 120 pcf may be assumed for calculating the actual weight of the soil over the wall footing.

In addition to the above lateral forces due to retained earth, surcharge due to improvements, such as an adjacent structure or traffic loading, should be considered in the design of the retaining wall. Loads applied within a 1:1 projection from the surcharging structure on the stem of the wall should be considered in the design. A third of uniform vertical surcharge-loads should be applied at the surface as a horizontal pressure on cantilever (active) retaining walls, while half of uniform vertical surcharge-loads should be applied as a horizontal pressure on braced (at-rest) retaining walls. To account for automobile parking surcharge, we suggest that a uniform horizontal pressure of 100 psf (for restrained walls) or 70 psf (for cantilever walls) be added for design, where autos are parked within a horizontal distance behind the retaining wall less than the height of the retaining wall stem.

Conventional retaining wall footings should have a minimum width of 24 inches and a minimum embedment of 12 inches below the lowest adjacent grade. An allowable bearing pressure of 2,000 psf may be used for retaining wall footing design, based on the minimum footing width and depth. This bearing value may be increased by 350 psf per foot increase in width or depth to a maximum allowable bearing pressure of 4,500 psf.

## 3.8 Cement Type and Corrosion Protection

Based on the results of laboratory testing, concrete structures in contact with the onsite soil will have negligible exposure to water-soluble sulfates in the soil. Therefore, common Type II cement may be used for concrete construction. Concrete should be designed in accordance with ACI 318-08, Section 4.2 (ACI, 2008), adopted by the 2010 CBC (Section 1904A.2).

The soils are considered corrosive to ferrous metals and aggressive to copper. Corrosion protection of underground ferrous utilities will be required. A corrosion engineer can be consulted if specific recommendations are desired. Corrosion information presented in this report should be provided to your underground utility contractors.

## 3.9 Pavement Design

Based on the design procedures outlined in the current Caltrans Highway Design Manual, our geotechnical experience in the site vicinity, and using an R-value of 14 based on experience with local soils, preliminary flexible pavement sections may consist of the following for the Traffic Indices (TI) indicated. Final pavement design should be based on the Traffic Index determined by the project civil engineer and R-value testing provided near the end of grading.

Table 4 - Asphalt Pavement Section Thickness

| Traffic Index | Asphaltic Concrete (AC) Thickness (inches) | Class 2 Aggregate Base (AB) Thickness (inches) |
|---|---|---|
| 5 (auto access) | 4 | 6 |
| 7 (truck access) | 5.5 | 10 |

If asphalt pavement is to be constructed prior to construction, the full pavement thickness should be placed to support heavy construction traffic.

In areas where rigid concrete pavement is planned and trucks may drive on this pavement, we recommend 7 inches of Portland Cement Concrete (PCC) with a 28-day compressive strength of 4,000 psi over 6 inches of aggregate base placed on prepared subgrade soil (see Section 3.2.2). Reinforcement should be specified by the structural engineer, but should be a minimum of #3 rebar at 18 inches on center each way. The PCC pavement sections should be provided with crack-control joints spaced no more than 14 feet on center each way. If sawcuts are used, they should have a minimum depth of ¼ of the slab thickness and made within 24 hours of concrete placement. We recommend that sections be as nearly square as possible.

PCC sidewalks should be at least 4 inches thick over prepared subgrade soil, with construction joints no more than 8 feet on center each way, with sections as nearly square as possible. Use of reinforcing, such as welded-wire mesh, will help reduce severity of cracking.

All pavement construction should be performed in accordance with the Standard Specifications for Public Works Construction. Field observations and periodic testing, as needed during placement of the base course materials, should be undertaken to ensure that the requirements of the standard specifications are fulfilled. Prior to placement of aggregate base, the subgrade soil should be processed to a minimum depth of 6 inches, moisture-conditioned, as necessary, and recompacted to a minimum of 90 percent relative compaction. Aggregate base should be moisture conditioned, as necessary, and compacted to a minimum of 95 percent relative compaction.

## 3.10 Infiltration Facilities

Based on the results of our in-situ infiltration tests, a generalized infiltration rate of 1.5 inches per hour may be assumed for subgrade soil used to infiltrate storm water, such as in infiltration tanks, infiltration trenches, or a retention basin in undisturbed native soils. This value does not contain a factor of safety. In addition, we recommend that a factor of safety of 3 be applied to that value. Any infiltration facilities must be constructed in native alluvial soil, since compacted fill typically does not infiltrate well. These values are for clean, unsilted infiltration surfaces without significant compaction. These values are expected to reduce over time due to siltation. It should be noted that during periods of prolonged precipitation, the underlying soils tend to become saturated to greater and greater

depths/extents. Therefore, infiltration rates tend to decrease with prolonged rainfall.

Design of proposed infiltration facilities should be reviewed by Leighton prior to construction to evaluate whether these recommendations have been properly implemented in the design.

## 3.11 Temporary Excavations

All temporary excavations, including utility trenches, retaining wall excavations and other excavations should be performed in accordance with project plans, specifications and all OSHA requirements, and the current edition of the California Construction Safety Orders, latest edition.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the slope, unless the cut is shored appropriately. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing site foundation should be properly shored to maintain support of the adjacent structures.

Cantilever shoring should be designed based on the active fluid pressure presented in the retaining wall section. If excavations are braced at the top and at specific design intervals, the active pressure may then be approximated by a rectangular soil pressure distribution with the pressure per foot of width equal to 25H, where H (feet) is equal to the depth of the excavation being shored.

During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor should be responsible for providing the "competent person" required by OSHA, standards to evaluate soil conditions. Close coordination between the competent person and Leighton Consulting should be maintained to facilitate construction while providing safe excavations.

## 3.12 Trench Backfill

Utility-type trenches onsite can be backfilled with onsite material, provided it is free of debris, significant organic material and oversized material (greater than 3 inches for trench backfill within 3 feet of a pipe, and 6 inches for trench backfill above). Prior to backfilling the trench, pipes should be bedded and shaded in a

granular material that has a sand equivalent of 30 or greater. We recommend that open-graded crushed rock or similar material not be used as bedding material, unless special provisions are implemented to limit the migration of surrounding soil into the open-graded material, such as the use of filter fabric around the open-graded material. The bedding material should extend 12 inches above the top of the pipe. The bedding/shading sand should be densified in-place by mechanical means, or in areas where the trench walls and bottom soil have a minimum sand equivalent of 15, the bedding sand may be jetted; this is not anticipated at this site. Bedding sand should be placed in accordance with the Standard Specifications for Public Works Construction – Greenbook (Public Works Standard, Inc., 2009), current edition. The native soil fill should be placed in loose layers, moisture conditioned, as necessary, and mechanically compacted using a minimum standard of 90 percent relative compaction based on ASTM D 1557. The thickness of layers should be based on the compaction equipment used in accordance with the current Greenbook.

### 3.13 Surface Drainage

Positive surface drainage should be provided to direct surface water away from structures and towards suitable collective drainage facilities. Surface drainage should be provided to prevent ponding of water adjacent to the structures. In general, the area around the buildings should slope away from the buildings. Care should be taken to avoid heavy irrigation, and under-irrigation should also be avoided.

### 3.14 Limitations and Additional Geotechnical Services

The geotechnical recommendations presented in this report are based on subsurface conditions as interpreted from limited subsurface explorations and limited laboratory testing. Our geotechnical recommendations provided in this report are based on information available at the time the report was prepared and may change as plans are developed. However, additional geotechnical study and analysis may be required based on final development plans. Leighton Consulting should review the site and grading plans when available and comment further on the geotechnical aspects of the project. Geotechnical observation and testing should be conducted during excavation and all phases of grading operations. Our conclusions and preliminary recommendations should be reviewed and verified by Leighton Consulting during construction and revised accordingly if geotechnical conditions encountered vary from our findings and

interpretations. Changes in subsurface conditions can and do occur over time. Therefore, our findings, conclusions, and recommendations presented in this report are based on the assumption that Leighton Consulting will provide geotechnical observation and testing during construction. Please refer to the ASFE "Important Information about Your Geotechnical Engineering Report" presented at the end of this report.

Environmental services were not included as part of this study. This report was prepared for the sole use of Canadian Solar (USA) Inc. and its design team for application to the design of the proposed project in accordance with generally accepted geotechnical engineering practices at this time in California.

Geotechnical observation and testing should be provided:

- After completion of site clearing.
- During overexcavation of compressible soil.
- During compaction of all fill materials.
- After excavation of all footings and prior to placement of concrete.
- During utility trench backfilling and compaction.
- During pavement subgrade and base preparation.
- When any unusual conditions are encountered.

# Important Information about Your

# Geotechnical Engineering Report

*Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.*

*While you cannot eliminate all such risks, you can manage them. The following information is provided to help.*

## Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

## Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

## A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

## Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

## Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

## A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

## A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

## Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

## Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

## Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

## Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

## Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

## Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH

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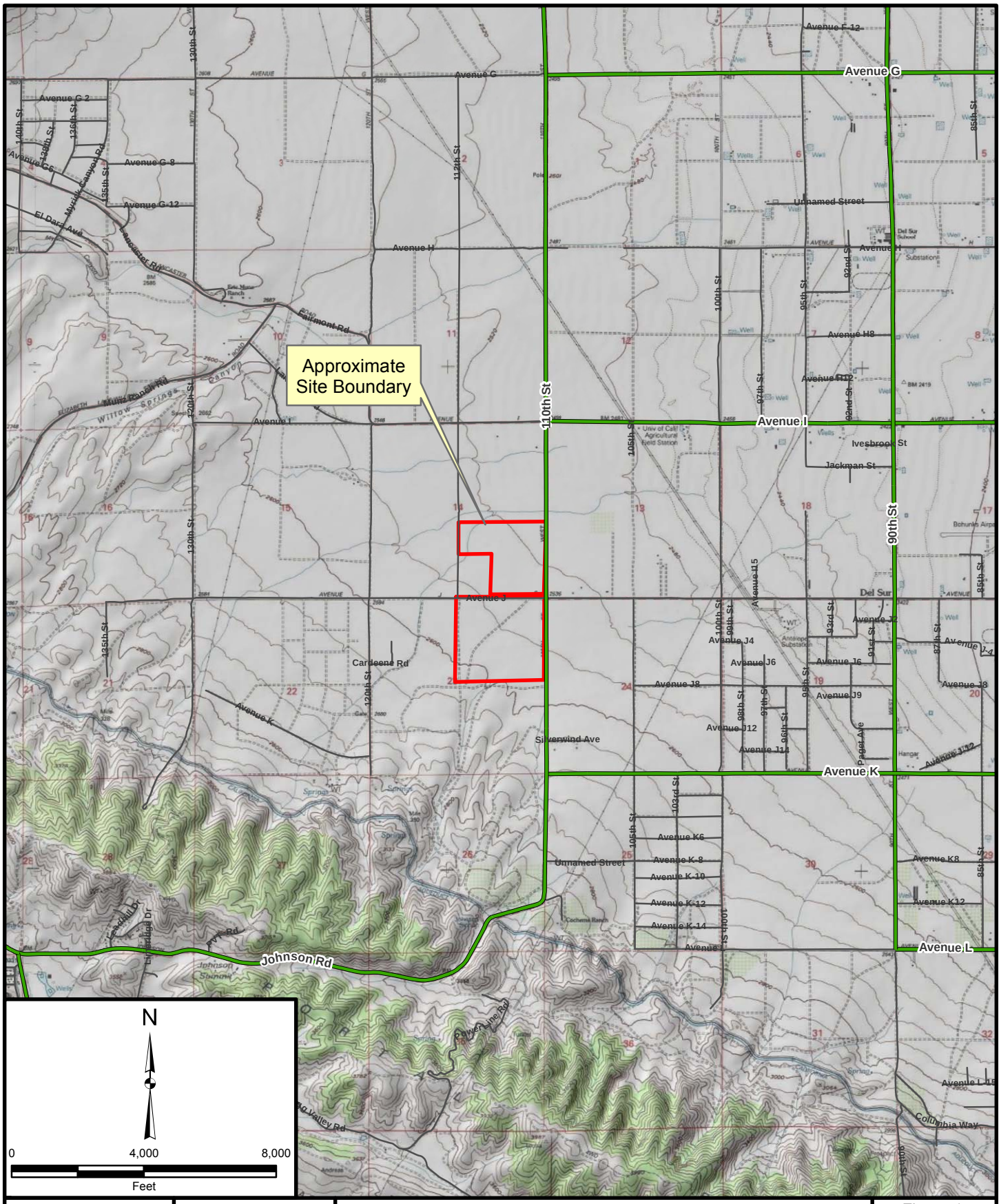



| | |
|---|---|
| Project: 603455-001 | Eng/Geol: JDH/PB |
| Scale: 1 " = 4,000 ' | Date: June, 2012 |

Base Map: ESRI Resource Center, 2012
Thematic Info: Leighton
Author: (kmanchikanti)

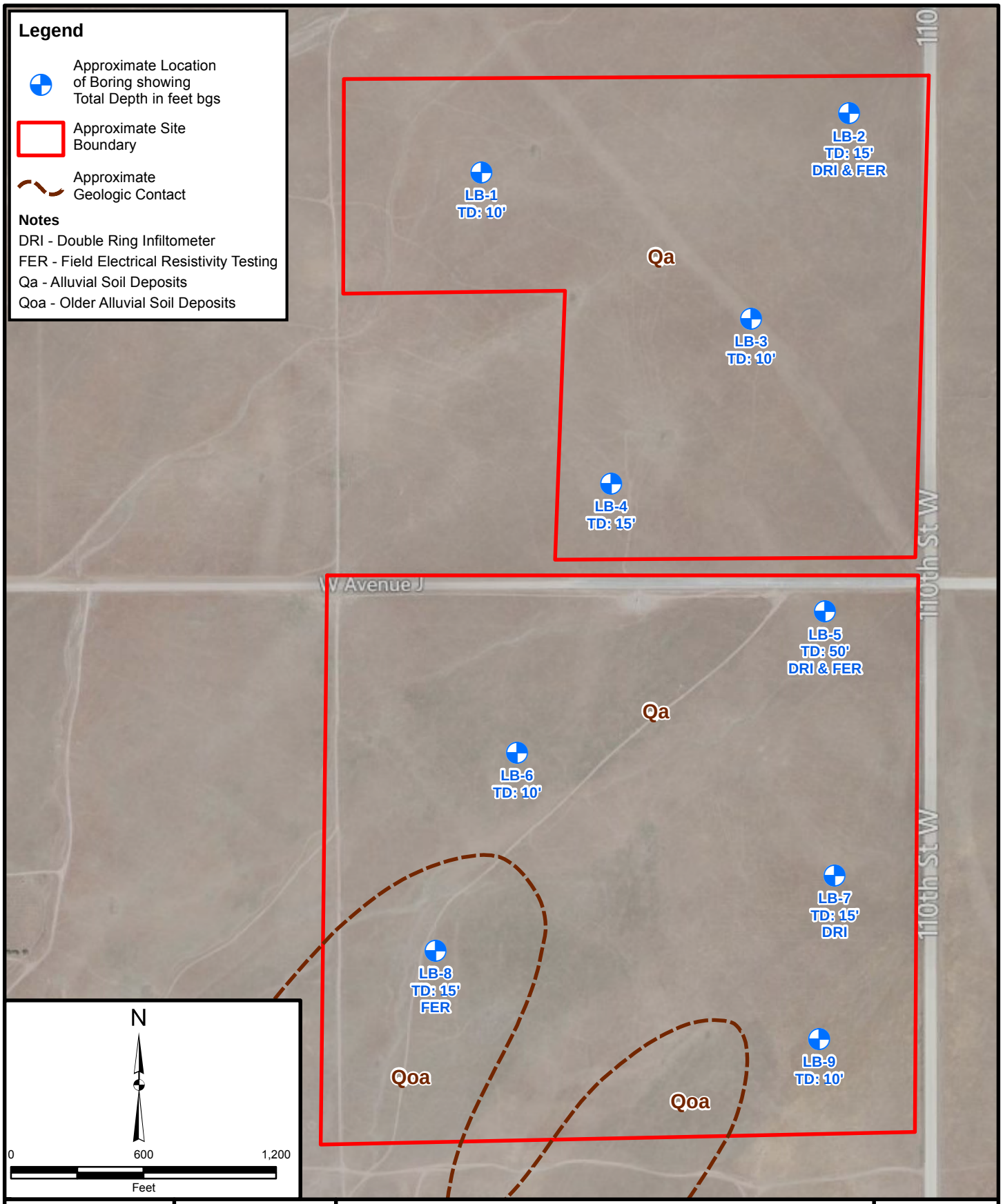
# SITE LOCATION MAP

20-MWAC Photovoltaic Array
West of 110th Street West, North and South of Avenue J
Lancaster Area of Los Angeles County, California

Figure 1

Leighton

Map Saved as V:\Drafting\603455\001\GIS\Figure1_SiteLocationMap.mxd on 6/21/2012 7:40:44 AM




| | |
|---|---|
| Project: 603455-001 | Eng/Geol: JDH/PB |
| Scale: 1 " = 600 ' | Date: June, 2012 |

Base Map: ESRI Resource Center, 2012
Thematic Info: Leighton
Author: (kmanchikanti)

# GEOTECHNICAL MAP

20-MWAC Photovoltaic Array
West of 110th Street West, North and South of Avenue J
Lancaster Area of Los Angeles County, California

Figure 2

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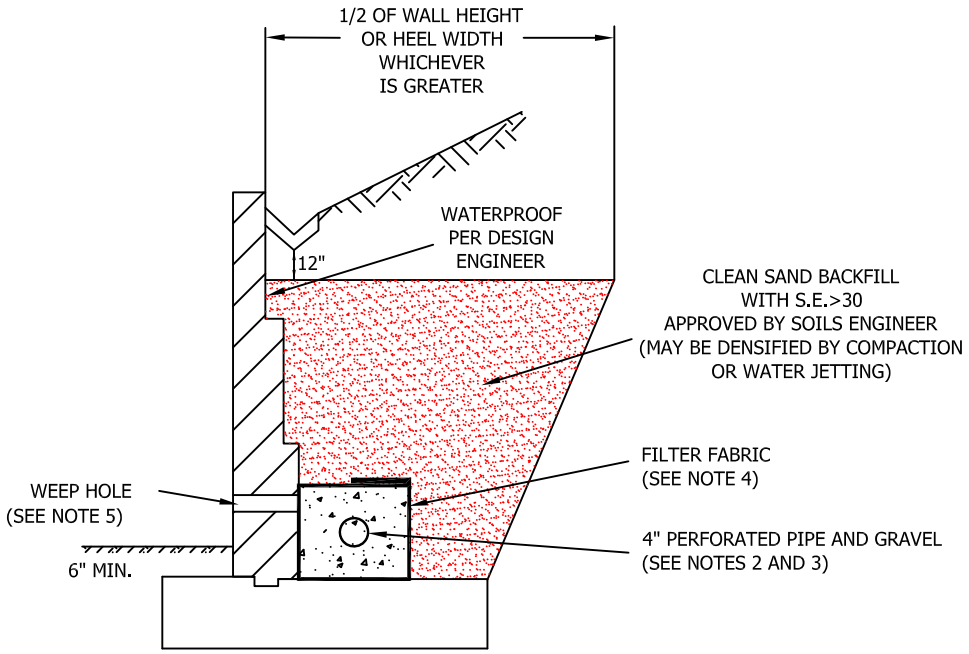
Map Saved as V:\Drafting\603455\001\GIS\Figure2_GeotechnicalMap.mxd on 6/21/2012 8:37:23 AM

## SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF >50




NOTE: AS AN ALTERNATE TO CLEAN SAND BACKFILL, CLEAN GRAVEL MAY BE UTILIZED WITH APPROVED FILTER FABRIC. A SECOND ALTERNATE IS TO UTILIZE AN AGGREGATE BASE MATERIAL COMPACTED TO 90% RELATIVE COMPACTION. A SAMPLE OF THE PROPOSED BASE MUST BE APPROVED BY THE GEOTECHNICAL CONSULTANT PRIOR TO BACKFILL FOR SUITABILITY. COMPACTION SHOULD BE ACHIEVED WITHOUT DAMAGING THE WALL.

GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

# RETAINING WALL BACKFILL AND SUBDRAIN DETAIL

## WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF >50

Leighton

Figure 3

# APPENDIX A

# REFERENCES

# APPENDIX A

## References

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# APPENDIX B

# GEOTECHNICAL EXPLORATION AND FIELD TESTING

# GEOTECHNICAL BORING LOG LB-1

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2532' |
| **Location** | NW quarter of northern half of property (34.6943°, -118.3307°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | B-1 | | | | | **Alluvium** | |
| 2530 | | | | R-1 | 8<br>8<br>8 | 130 | 5 | CL | @2.5': SANDY CLAY, medium stiff, brown to grayish brown, dry, medium dry strength | CO |
| | 5 | | | S-2 | 4<br>6<br>9 | | | CL | @5': SANDY CLAY, stiff, brown to grayish brown, dry, medium dry strength | |
| 2525 | | | | | | | | | | |
| | 10 | | | R-3 | 15<br>17<br>25 | 123 | 10 | CL | @10': SANDY CLAY, stiff, brown to grayish brown, moist | |
| 2520 | | | | | | | | | **Total depth of boring 11.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| | 15 | | | | | | | | | |
| 2515 | | | | | | | | | | |
| | 20 | | | | | | | | | |
| 2510 | | | | | | | | | | |
| | 25 | | | | | | | | | |
| 2505 | | | | | | | | | | |
| | 30 | | | | | | | | | |

*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# GEOTECHNICAL BORING LOG LB-2

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2510' |
| **Location** | NE quarter of northern half of property (34.6952°, -118.3253°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.* | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| 2510 | 0 | | | B-1 | | | | | **Alluvium** | CR |
| | | | | R-1 | 11<br>40<br>50/4" | 121 | 4 | SC | @2.5': CLAYEY SAND, very dense, brown, dry, fine sand, gravel 3%, sand 66%, fines 31% | SA |
| | | | | | | | | SC | @3.5': CLAYEY SAND, fine to medium sand, high dry strength | |
| 2505 | 5 | | | R-2 | 35<br>35<br>30 | | | SC | @5': CLAYEY SAND, dense, brown, dry, fine sand, high dry strength | |
| 2500 | 10 | | | S-3 | 9<br>11<br>10 | | 7 | SC | @10': CLAYEY SAND, dense, brown, slightly moist, fine sand, high dry strength | |
| 2495 | 15 | | | R-4 | 12<br>16<br>17 | 112 | 4 | SW | @15': Well-graded SAND, medium dense, olive brown to brown, moist, fine to coarse sand | |
| | | | | | | | | | **Total depth of boring 16.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| 2490 | 20 | | | | | | | | | |
| 2485 | 25 | | | | | | | | | |
| 2480 | 30 | | | | | | | | | |

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# GEOTECHNICAL BORING LOG LB-3

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2526' |
| **Location** | East side of northern half of property (34.6926°, -118.3261°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.* | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | | **Alluvium** | |
| 2525 | | | | R-1 | 7 7 7 | 100 | 4 | CL | @2.5': SANDY CLAY, medium stiff, brown to grayish brown, dry, fine sand, medium dry strength | DS |
| | 5 | | | S-2 | 5 7 8 | | | SC | @5': CLAYEY SAND, medium dense, olive brown, dry, fine to medium sand, medium dry strength | |
| 2520 | | | | | | | | | | |
| | 10 | | | R-3 | 8 11 12 | 114 | 6 | SC | @10': CLAYEY SAND, medium dense, olive brown, dry, fine to medium sand, low dry strength | CO |
| 2515 | | | | | | | | | **Total depth of boring 11.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| | 15 | | | | | | | | | |
| 2510 | | | | | | | | | | |
| | 20 | | | | | | | | | |
| 2505 | | | | | | | | | | |
| | 25 | | | | | | | | | |
| 2500 | | | | | | | | | | |
| | 30 | | | | | | | | | |

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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# GEOTECHNICAL BORING LOG LB-4

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2542' |
| **Location** | South side of northern half of property (34.6905°, -118.3289°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | B-1 | | | | | **Alluvium** | |
| 2540 | | | | R-1 | 6<br>9<br>14 | 114 | 4 | CL | @2.5': SANDY CLAY, very stiff, grayish brown, dry, fine to medium sand, high dry strength | |
| | 5 | | | R-2 | 16<br>18<br>20 | 116 | 5 | SC | @5': CLAYEY SAND, medium dense, brown, dry, fine sand | |
| 2535 | | | | | | | | | | |
| | 10 | | | S-3 | 6<br>8<br>9 | | | SC | @10': CLAYEY SAND, medium dense, brown, moist, fine sand | |
| 2530 | | | | | | | | | | |
| | 15 | | | R-4 | 9<br>19<br>25 | | | SC | @15': CLAYEY SAND, medium dense, brown, moist, fine sand | |
| 2525 | | | | | | | | | **Total depth of boring 16.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| | 20 | | | | | | | | | |
| 2520 | | | | | | | | | | |
| | 25 | | | | | | | | | |
| 2515 | | | | | | | | | | |
| | 30 | | | | | | | | | |

*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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# GEOTECHNICAL BORING LOG LB-5

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2542' |
| **Location** | NE quarter of southern half of property (34.6888°, -118.3252°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.* | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | B-1 | | | | | **Alluvium** | SA, EI, MD, CR |
| 2540 | | | | R-1 | 10 10 7 | 108 | 9 | SC | @2.5': CLAYEY SAND, medium stiff, brown, dry, fine to medium sand, medium plasticity, medium dry strength, gravel 3%, sand 48%, fines 49% | CN |
| | 5 | | | R-2 | 7 11 23 | | | SC | @5': CLAYEY SAND, medium dense, light reddish brown, dry, fine to coarse sand, trace gravel, fines 45% (field estimate) | |
| 2535 | | | | S-3 | 13 14 13 | | 6 | SC | @7.5': CLAYEY SAND, medium dense, light reddish brown, dry, fine to coarse sand | |
| | 10 | | | R-4 | 16 19 14 | 114 | 7 | SC | @10': CLAYEY SAND, medium dense, light reddish brown, dry, fine to coarse sand | |
| 2530 | | | | S-5 | 10 10 13 | | | SC | @12.5': CLAYEY SAND, medium dense, light reddish brown, dry, fine to coarse sand | |
| | 15 | | | R-6 | 18 23 33 | 123 | 9 | SC | @15': CLAYEY SAND, dense, light reddish brown, slightly moist, fine to coarse sand | |
| 2525 | | | | S-7 | 8 11 18 | | | SM | @17.5': SILTY SAND, medium dense, brown, slightly moist, fine to medium sand | |
| | 20 | | | R-8 | 14 26 33 | | | SM | @20': SILTY SAND, dense, brown, slightly moist, fine to medium sand, fines 15% (field estimate) | |
| 2520 | | | | | | | | | | |
| | 25 | | | S-9 | 8 10 16 | | | SM | @25': SILTY SAND, dense, brown, slightly moist, fine to medium sand, fines 15% (field estimate) | |
| 2515 | | | | | | | | CL | @25.5': SANDY LEAN CLAY, stiff, brown, slightly moist, fine to medium sand, medium plasticity, medium dry strength | |
| | 30 | | | | | | | | | |

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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# GEOTECHNICAL BORING LOG LB-5

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2542' |
| **Location** | NE quarter of southern half of property (34.6888°, -118.3252°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N / S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 30 | | | R-10 | 13<br>24<br>50 | | | SP-SM | @30': Poorly graded SAND with silt, very dense, olive brown, slightly moist, fine to coarse sand | |
| 2510 | | | | | | | | | | |
| | 35 | | | S-11 | 13<br>17<br>18 | | | SP | @35': Poorly graded SAND, dense, light brown, dry, fine sand, trace silt | |
| 2505 | | | | | | | | | | |
| | | | | | | | | ML | @39': SILT, brown, slightly moist | |
| | 40 | | | R-12 | 11<br>40<br>50 | | | SW<br>SM | @40': Well-graded SAND, very dense, light brown, dry<br>@41': SILTY SAND, very dense, olive brown, slightly moist, fine to coarse sand | |
| 2500 | | | | | | | | | | |
| | 45 | | | S-13 | 15<br>15<br>16 | | | SP-SM | @45': Poorly graded SAND with silt, dense, light brown, dry, fine to coarse sand, trace gravel | |
| 2495 | | | | | | | | | | |
| | 50 | | | R-14 | 16<br>37<br>40 | | | SW<br>SM | @50': Well-graded SAND, reddish brown, slightly moist<br>@50.5': SILTY SAND, very dense, reddish brown, slightly moist, fine to coarse sand | |
| 2490 | | | | | | | | | **Total depth of boring 51.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| | 55 | | | | | | | | | |
| 2485 | | | | | | | | | | |
| | 60 | | | | | | | | | |

*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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# GEOTECHNICAL BORING LOG LB-6

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2567' |
| **Location** | NW quarter of southern half of property (34.6870°, -118.3298) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N / S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | | **Alluvium** | |
| 2565 | | | | R-1 | 50/6" | 108 | 4 | SM | @2.5': SILTY SAND, very dense, light brown, dry, fine sand, trace roots | |
| | 5 | | | S-2 | 9<br>11<br>12 | | | CL | @5': SANDY CLAY, very stiff, grayish brown, dry, fine to medium sand, medium dry strength, fines 60% (field estimate) | |
| 2560 | | | | | | | | | | |
| | 10 | | | R-3 | 10<br>30<br>35 | 126 | 8 | SC | @10': CLAYEY SAND, dense, grayish brown, slightly moist, fine to coarse sand, medium dry strength | |
| 2555 | | | | | | | | | **Total depth of boring 11.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| | 15 | | | | | | | | | |
| 2550 | | | | | | | | | | |
| | 20 | | | | | | | | | |
| 2545 | | | | | | | | | | |
| | 25 | | | | | | | | | |
| 2540 | | | | | | | | | | |
| | 30 | | | | | | | | | |

*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# GEOTECHNICAL BORING LOG LB-7

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2560' |
| **Location** | East side of southern half of property (34.6853°, -118.3253°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.* | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| 2560 | 0 | | | B-1 | | | | | **Alluvium** | |
| | | | | R-1 | 30<br>50/5" | 124 | 5 | SC | @2.5': CLAYEY SAND, very dense, grayish brown, dry, fine to coarse sand, gravel 3%, sand 69%, fines 28% | SA |
| 2555 | 5 | | | R-2 | 14<br>15<br>16 | 117 | 8 | SC | @5': CLAYEY SAND, medium dense, grayish brown, slightly moist, fine to coarse sand, trace gravel | |
| 2550 | 10 | | | S-3 | 4<br>5<br>6 | | 5 | SW-SC | @10': Well-graded SAND with clay, medium dense, reddish brown, slightly moist, interbedded layers of clayey sand | |
| 2545 | 15 | | | R-4 | 50/6" | 100 | 5 | SC | @15': CLAYEY SAND, very dense, reddish brown, slightly moist, fine to coarse sand, fines 45% (field estimate) | |
| 2540 | 20 | | | | | | | | **Total depth of boring 15.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| 2535 | 25 | | | | | | | | | |
| 2530 | 30 | | | | | | | | | |

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# GEOTECHNICAL BORING LOG LB-8

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2595' |
| **Location** | SW side of southern half of property (34.6841°, -118.3320°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N / S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.* | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| 2595 | 0 | | | B-1 | | | | | **Alluvium** | |
| | | | | R-1 | 10<br>15<br>10 | 113 | 5 | SM | @2.5': SILTY SAND, medium dense, brown to reddish brown, dry, fine to medium sand | |
| 2590 | 5 | | | R-2 | 8<br>12<br>20 | | | SC | @5': CLAYEY SAND, medium dense, brown, dry, fine sand, medium dry strength | |
| 2585 | 10 | | | S-3 | 6<br>8<br>8 | | 7 | SC | @10': CLAYEY SAND, brown, dry, fine sand, medium dry strength | |
| | | | | | | | | SM | @11': SILTY SAND, medium dense, brown, moist, fine to medium sand | |
| 2580 | 15 | | | R-4 | 16<br>18<br>18 | | | SC | @15': CLAYEY SAND, medium dense, olive brown, moist, less fines than above | |
| | | | | | | | | | **Total depth of boring 16.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| 2575 | 20 | | | | | | | | | |
| 2570 | 25 | | | | | | | | | |
| 2565 | 30 | | | | | | | | | |

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# GEOTECHNICAL BORING LOG LB-9

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2574' |
| **Location** | SE side of southern half of property (34.6833°, -118.3259°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N–S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | B-1 | | | | | **Alluvium** | |
| | | | | R-1 | 9<br>13<br>15 | 129 | 7 | CL | @2.5': SANDY CLAY, stiff, grayish brown, dry, high dry strength | CO |
| 2570 | | | | | | | | | | |
| | 5 | | | S-2 | 10<br>12<br>17 | | 5 | SC | @5': CLAYEY SAND, medium dense, grayish brown, dry, medium dry strength | |
| 2565 | | | | | | | | | | |
| | 10 | | | R-3 | 50/6" | 111 | 6 | SM | @10': SILTY SAND, very dense, olive brown, dry, fine to medium sand | |
| | | | | | | | | | **Total depth of boring 10.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| 2560 | | | | | | | | | | |
| | 15 | | | | | | | | | |
| 2555 | | | | | | | | | | |
| | 20 | | | | | | | | | |
| 2550 | | | | | | | | | | |
| | 25 | | | | | | | | | |
| 2545 | | | | | | | | | | |
| | 30 | | | | | | | | | |

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# APPENDIX C

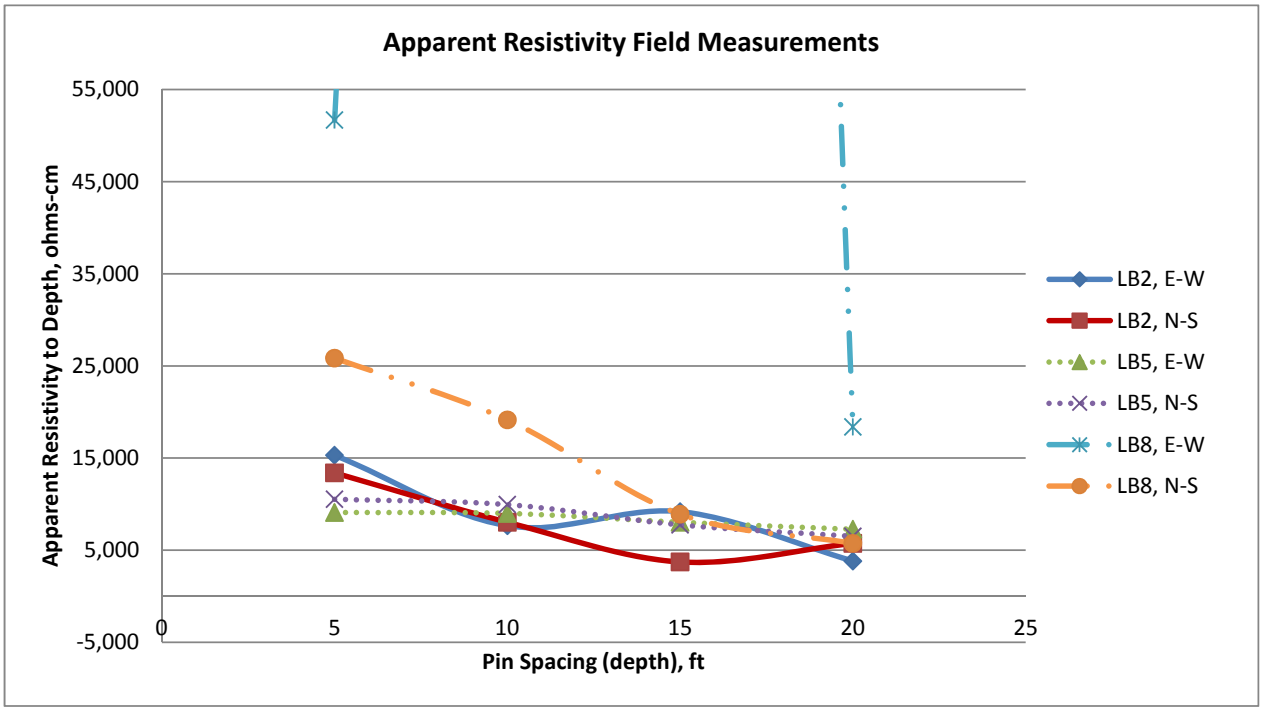
# GEOTECHNICAL LABORATORY TEST RESULTS

## ***Results of Field Electrical Resistivity Testing Using Wenner 4-Pin Method***

***Canadian Solar, Lancaster; 603455-001*** ***5/24/2012***

| Location | Orientation | Test Spacing (ft) | Guage Reading | Spacing Factor | Ohms-cm |
|---|---|---|---|---|---|
| LB-2 | East-West | 5 | 16 | 957.5 | 15,320 |
| LB-2 | East-West | 10 | 4 | 1915 | 7,660 |
| LB-2 | East-West | 15 | 3.2 | 2872 | 9,190 |
| LB-2 | East-West | 20 | 1 | 3830 | 3,830 |
| LB-2 | North-South | 5 | 14 | 957.5 | 13,405 |
| LB-2 | North-South | 10 | 4.2 | 1915 | 8,043 |
| LB-2 | North-South | 15 | 1.3 | 2872 | 3,734 |
| LB-2 | North-South | 20 | 1.5 | 3830 | 5,745 |
| LB-5 | East-West | 5 | 9.5 | 957.5 | 9,096 |
| LB-5 | East-West | 10 | 4.7 | 1915 | 9,001 |
| LB-5 | East-West | 15 | 2.8 | 2872 | 8,042 |
| LB-5 | East-West | 20 | 1.9 | 3830 | 7,277 |
| LB-5 | North-South | 5 | 11 | 957.5 | 10,533 |
| LB-5 | North-South | 10 | 5.2 | 1915 | 9,958 |
| LB-5 | North-South | 15 | 2.7 | 2872 | 7,754 |
| LB-5 | North-South | 20 | 1.7 | 3830 | 6,511 |
| LB-8 | East-West | 5 | 54 | 957.5 | 51,705 |
| LB-8 | East-West | 10 | 210 | 1915 | 402,150 |
| LB-8 | East-West | 15 | 170 | 2872 | 488,240 |
| LB-8 | East-West | 20 | 4.8 | 3830 | 18,384 |
| LB-8 | North-South | 5 | 27 | 957.5 | 25,853 |
| LB-8 | North-South | 10 | 10 | 1915 | 19,150 |
| LB-8 | North-South | 15 | 3.1 | 2872 | 8,903 |
| LB-8 | North-South | 20 | 1.5 | 3830 | 5,745 |

Equipment: Nilsson Model 400, solid state, 4-pin soil resistance meter (low voltage 97 Hz sq wave current)



Location: LB-2

Depth to Water Table:

Date Tested, start: 5/24/2012 Date Finished: 5/24/2012

Tested by: M. Hintz

Soil Description: Clayey sand

USCS Soil Type: SC

Inner Ring Height (in.): 18 * Outer Ring Height (in.): 18

Inner Ring Penetration (in.): 2 * Outer Ring Penetration: 2

*(inner ring height and penetration used for depth of water calculation for both inner and outer rings)*

Liquid Used/pH: 7

Diam. Inner Ring, in.: 12 (113 in.$^2$area) (Beaker for inner ring is 3.5" ID, so 11.8" drop in beaker = 1" drop in ring; 1000mL=6.3" high)

Diam. Outer Ring, in.: 24 (339 in.$^2$ area of annular space, subtracting inner ring area)

Weather (start to finish): Fair, windy

Temperature of air, soil, and water (start to finish): 70 F

| Field Data | | | | | Calculations | | | | Inner Ring | | | | | | | Outer Ring (Annluar Space) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | ***Inner*** Beaker Vol. Reading (cm^3)* | ***Outer*** Beaker Vol. Reading (cm^3)* | Dist top of ring to water, ***Inner*** Ring (in.) | Dist top of ring to water, ***Outer*** Ring (in.) | Depth of Water in Inner Ring (in.) | Depth of Water in Outer Ring (in.) | Total Elasped Time (h:m) | Δt (min) | Beaker Vol Change (vol. added) (in.^3) | Infiltr rate from beaker (in./hr) | Average Depth of Water (in.) | Change of Depth (in.) | Infiltr rate from Δ depth (in./hr) | ***Combined Infiltr rate (in./hr)*** | Ratio of Infiltr Rate to Depth Water | Beaker Vol Change (vol. added) (in.^3) | Infiltr rate from beaker (in./hr) | Average Depth of Water (in.) | Change of Depth (in.) | Infiltr rate from Δ depth (in./hr) | Combined Infiltr rate (in./hr) | Remarks |
| A | B | C | D | E | | | F | G | H | J | K | L | M | N | | P | Q | R | S | T | U | |
| 17:20 | Presoak | | | | 16.00 | 16.00 | 0 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| 17:40 | 0 | 500 | 15.00 | 15.00 | 1.00 | 1.00 | 0:20 | | | | | | | | | | | | | | | |
| 17:42 | 600 | 2100 | 15.00 | 15.00 | 1.00 | 1.00 | 0:22 | ***2*** | 37 | 9.7 | 1.0 | 0.00 | 0.0 | ***9.71*** | 9.71 | 98 | 8.6 | 1.0 | 0.00 | 0.0 | 8.6 | |
| 17:44 | 800 | 3750 | 15.00 | 15.00 | 1.00 | 1.00 | 0:24 | ***2*** | 12 | 3.2 | 1.0 | 0.00 | 0.0 | ***3.24*** | 3.24 | 101 | 8.9 | 1.0 | 0.00 | 0.0 | 8.9 | |
| 18:02 | 2300 | 5000 | 15.00 | 15.00 | 1.00 | 1.00 | 0:42 | ***18*** | 92 | 2.7 | 1.0 | 0.00 | 0.0 | ***2.70*** | 2.70 | 76 | 0.7 | 1.0 | 0.00 | 0.0 | 0.7 | |
| 18:16 | 3150 | 5000 | 15.00 | 15.75 | 1.00 | 0.25 | 0:56 | ***14*** | 52 | 2.0 | 1.0 | 0.00 | 0.0 | ***1.97*** | 1.97 | 0 | 0.0 | 0.6 | 0.75 | 3.2 | 3.2 | |
| 18:26 | 3650 | 5000 | 15.00 | 16.00 | 1.00 | 0.00 | 1:06 | ***10*** | 31 | 1.6 | 1.0 | 0.00 | 0.0 | ***1.62*** | 1.62 | 0 | 0.0 | 0.1 | 0.25 | 1.5 | 1.5 | |
| 18:40 | 4400 | 5000 | 15.00 | 16.00 | 1.00 | 0.00 | 1:20 | ***14*** | 46 | 1.7 | 1.0 | 0.00 | 0.0 | ***1.73*** | 1.73 | 0 | 0.0 | 0.0 | 0.00 | 0.0 | 0.0 | |

*Constant-head test only

***Results of Double Ring Infiltrometer, Falling Head Method or Constant Head Method***
***ASTM D 3385***

Project Number 603455-001

Project Name Canadian Solar Lancaster

***Leighton***

Location: LB-5

Depth to Water Table:

Date Tested, start: 5/24/2012 Date Finished: 5/24/2012

Tested by: M. Hintz / J. Hertzberg

Soil Description: Clayey sand

USCS Soil Type: SC

Inner Ring Height (in.): 20 * Outer Ring Height (in.): 20

Inner Ring Penetration (in.): 2 * Outer Ring Penetration: 2

*(inner ring height and penetration used for depth of water calculation for both inner and outer rings)*

Liquid Used/pH: 7

Diam. Inner Ring, in.: 12 (113 in.$^2$area) (Beaker for inner ring is 3.5" ID, so 11.8" drop in beaker = 1" drop in ring; 1000mL=6.3" high)

Diam. Outer Ring, in.: 24 (339 in.$^2$ area of annular space, subtracting inner ring area)

Weather (start to finish): Windy

Temperature of air, soil, and water (start to finish): 70 F

| Field Data | | | | | Calculations | | | | Inner Ring | | | | | | | Outer Ring (Annluar Space) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | ***Inner*** Beaker Vol. Reading (cm^3)* | ***Outer*** Beaker Vol. Reading (cm^3)* | Dist top of ring to water, ***Inner*** Ring (in.) | Dist top of ring to water, ***Outer*** Ring (in.) | Depth of Water in Inner Ring (in.) | Depth of Water in Outer Ring (in.) | Total Elasped Time (h:m) | Δt (min) | Beaker Vol Change (vol. added) (in.^3) | Infiltr rate from beaker (in./hr) | Average Depth of Water (in.) | Change of Depth (in.) | Infiltr rate from Δ depth (in./hr) | ***Combined Infiltr rate (in./hr)*** | Ratio of Infiltr Rate to Depth Water | Beaker Vol Change (vol. added) (in.^3) | Infiltr rate from beaker (in./hr) | Average Depth of Water (in.) | Change of Depth (in.) | Infiltr rate from Δ depth (in./hr) | Combined Infiltr rate (in./hr) | Remarks |
| A | B | C | D | E | | | F | G | H | I | K | L | M | N | | P | Q | R | S | T | U | |
| 10:30 | | | 8.50 | 8.50 | 9.50 | 9.50 | 0 | | | | | | | | | | | | | | | |
| 10:35 | | | 9.50 | 9.75 | 8.50 | 8.25 | 0:05 | ***5*** | 0 | 0.0 | 9.0 | 1.00 | 12.0 | ***12.00*** | 1.33 | 0 | 0.0 | 8.9 | 1.25 | 15.0 | 15.0 | |
| 10:42 | | | 10.50 | 11.00 | 7.50 | 7.00 | 0:12 | ***7*** | 0 | 0.0 | 8.0 | 1.00 | 8.6 | ***8.57*** | 1.07 | 0 | 0.0 | 7.6 | 1.25 | 10.7 | 10.7 | |
| 10:48 | | | 11.00 | 12.00 | 7.00 | 6.00 | 0:18 | ***6*** | 0 | 0.0 | 7.3 | 0.50 | 5.0 | ***5.00*** | 0.69 | 0 | 0.0 | 6.5 | 1.00 | 10.0 | 10.0 | |
| 10:58 | | | 12.00 | 13.25 | 6.00 | 4.75 | 0:28 | ***10*** | 0 | 0.0 | 6.5 | 1.00 | 6.0 | ***6.00*** | 0.92 | 0 | 0.0 | 5.4 | 1.25 | 7.5 | 7.5 | |
| 11:07 | | | 12.75 | 14.25 | 5.25 | 3.75 | 0:37 | ***9*** | 0 | 0.0 | 5.6 | 0.75 | 5.0 | ***5.00*** | 0.89 | 0 | 0.0 | 4.3 | 1.00 | 6.7 | 6.7 | |
| 11:13 | | | 13.25 | 14.75 | 4.75 | 3.25 | 0:43 | ***6*** | 0 | 0.0 | 5.0 | 0.50 | 5.0 | ***5.00*** | 1.00 | 0 | 0.0 | 3.5 | 0.50 | 5.0 | 5.0 | |
| 11:19 | | | 13.50 | 15.50 | 4.50 | 2.50 | 0:49 | ***6*** | 0 | 0.0 | 4.6 | 0.25 | 2.5 | ***2.50*** | 0.54 | 0 | 0.0 | 2.9 | 0.75 | 7.5 | 7.5 | |
| 11:23 | | | 13.75 | 15.75 | 4.25 | 2.25 | 0:53 | ***4*** | 0 | 0.0 | 4.4 | 0.25 | 3.8 | ***3.75*** | 0.86 | 0 | 0.0 | 2.4 | 0.25 | 3.8 | 3.8 | |
| 11:30 | | | 14.00 | 16.25 | 4.00 | 1.75 | 1:00 | ***7*** | 0 | 0.0 | 4.1 | 0.25 | 2.1 | ***2.14*** | 0.52 | 0 | 0.0 | 2.0 | 0.50 | 4.3 | 4.3 | |
| | | | | | | | | | | | | | | | | | | | | | | |
| 17:46 | | | 5.00 | 6.00 | 13.00 | 12.00 | 7:16 | | | | | | | | | | | | | | | |
| 18:03 | | | 5.75 | 6.50 | 12.25 | 11.50 | 7:33 | ***17*** | 0 | 0.0 | 12.6 | 0.75 | 2.6 | ***2.65*** | 0.21 | 0 | 0.0 | 11.8 | 0.50 | 1.8 | 1.8 | |
| 18:22 | | | 7.00 | 7.25 | 11.00 | 10.75 | 7:52 | ***19*** | 0 | 0.0 | 11.6 | 1.25 | 3.9 | ***3.95*** | 0.34 | 0 | 0.0 | 11.1 | 0.75 | 2.4 | 2.4 | |
| 18:36 | | | 7.75 | 8.25 | 10.25 | 9.75 | 8:06 | ***14*** | 0 | 0.0 | 10.6 | 0.75 | 3.2 | ***3.21*** | 0.30 | 0 | 0.0 | 10.3 | 1.00 | 4.3 | 4.3 | |

**Constant-head test only*

***Results of Double Ring Infiltrometer, Falling Head Method or Constant Head Method***
***ASTM D 3385***

Project Number 603455-001

Project Name Canadian Solar Lancaster

***Leighton***

# *Results of Double Ring Infiltrometer, Falling Head Method or Constant Head Method, ASTM 3385*

***Project:*** **Oakville Reserve, Chino**

***LEIGHTON***

| | | | |
|---|---|---|---|
| Exploration #/Location: | LB-7 | | |
| | | Depth to Water Table: | |
| Date Tested, start: | 5/24/2012 | Date Finished: | 5/24/2012 |
| Tested by: | M. Hintz; JDH | | |
| Soil Description: | Clayey sand | | |
| USCS Soil Type: | SC | | |
| Surface Preparation: | | | |

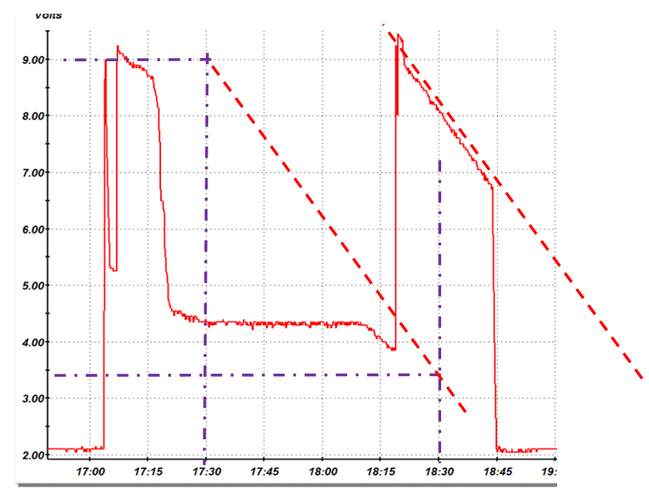
| | | | |
|---|---|---|---|
| Inner Ring Height (in.): | 20 | Outer Ring Height (in.): | 20 |
| Inner Ring Penetration (in.): | 2 | Outer Ring Penetration: | 2 |

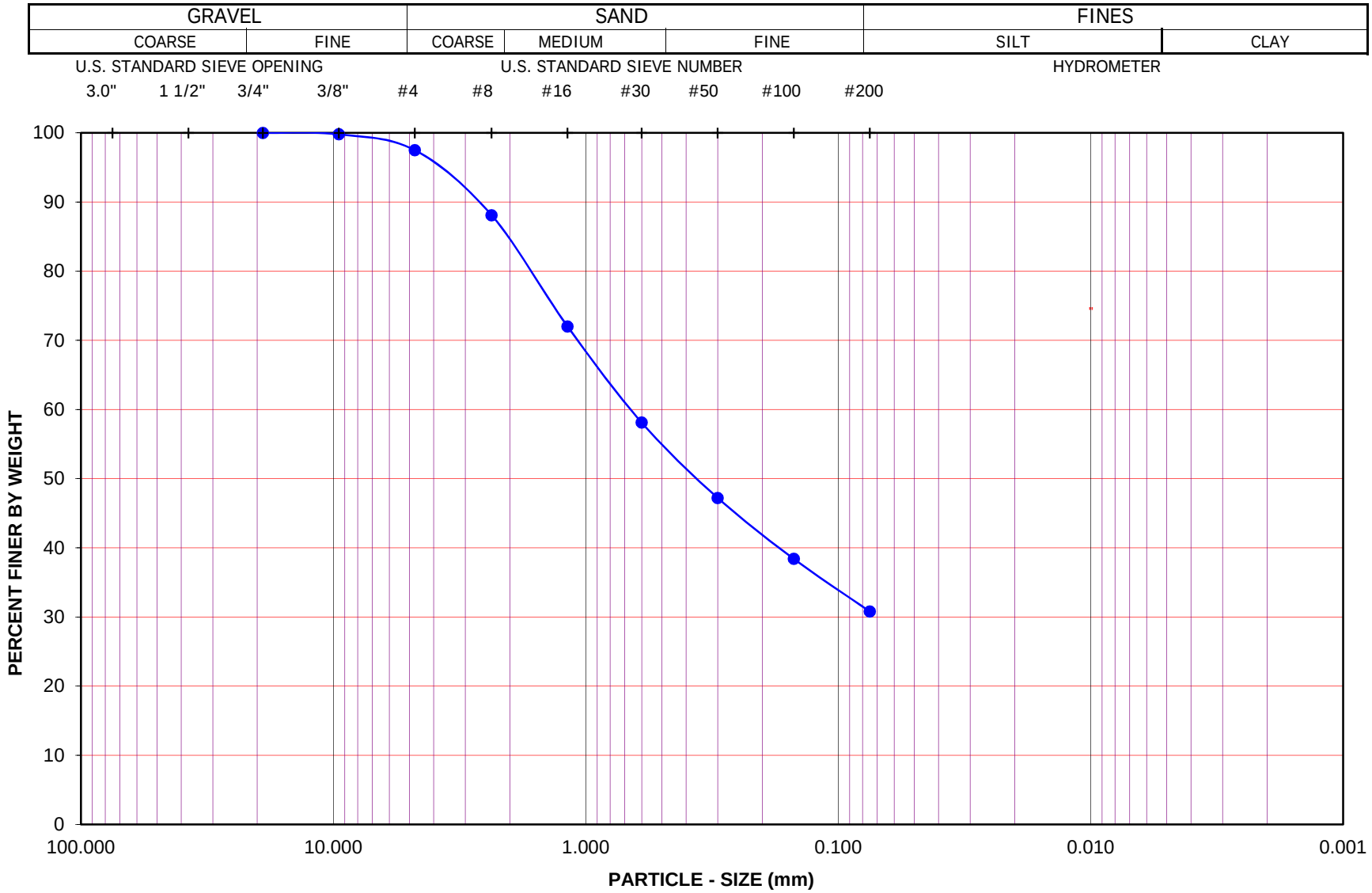
*(inner ring height and penetration used for depth of water calculation for both inner and outer rings)*

| | | |
|---|---|---|
| Liquid Used/pH: | 7 | |
| Diam. Inner Ring, in.: | 12.3 | (119 in.$^2$ area) (Beaker for inner ring is 3.5" ID, so 11.8" drop in beaker = 1" drop in ring; 1000mL=6.3" high) |
| Diam. Outer Ring, in.: | 24 | (333 in.$^2$ area of annular space, subtracting inner ring area) |
| Weather (start to finish): | Windy | |
| Tempure of air, soil, and water (start to finish): | 70 F | |

| **Calculation of Infiltration Rate from Graphs:** | **Inner** | Outer | |
|---|---|---|---|
| Color of depth data line on graph to right: | red | | |
| Data Logger: | EL-USB-3 | | |
| Sensor: | S1 | | |
| Diameter of each supply cylinder: | 5.8 | | in. |
| Number of Supply cylinders for the ring: | 1 | | in. |
| Density of H2O used: | 62.4 | | pcf |
| Seletected time period on graph for slope calc: | 1 | | hour |
| Reading, start of selected period (red line): | 9 | | (volts or reading units) |
| Reading, end of selected period (red line): | 3.4 | | (volts or reading units) |
| Slope of red dashed line: | 5.6 | #DIV/0! | reading units/hr |
| Conversion of data logger reading units to volts: | 0.0765 | #N/A | |
| Slope of red dashed line: | 0.4284 | #DIV/0! | change in volts/hr |
| Conversion of sensor volts to ft H2O: | 3.8 | #N/A | ftH2O/volts |
| Change in depth/hr in cylinders: | 1.628 | #DIV/0! | |
| Change in depth/hr in cylinders: | 19.54 | #DIV/0! | in.H2O/hr |
| Cross sectional area of supply cyl.: | 26.4 | 0.0 | in.^2 |
| Cross sectional area of ring: | 119 | 333 | in.^2 |
| Ratio of Ring area to supply cylinders area: | 4.5 | #DIV/0! | |
| **Raw Infiltration Rate:** | **4.34** | #DIV/0! | in./hr |

**Data graphs from data logger(s) (data proportional to depth):**






Project Name: Canadian Solar/Lancaster Geo Inv

Project No.: 603455-001

Exploration No.: LB-2 Sample No.: R-1

Depth (feet): 2.5 Soil Type : SC

Soil Identification: Brown clayey sand (SC)

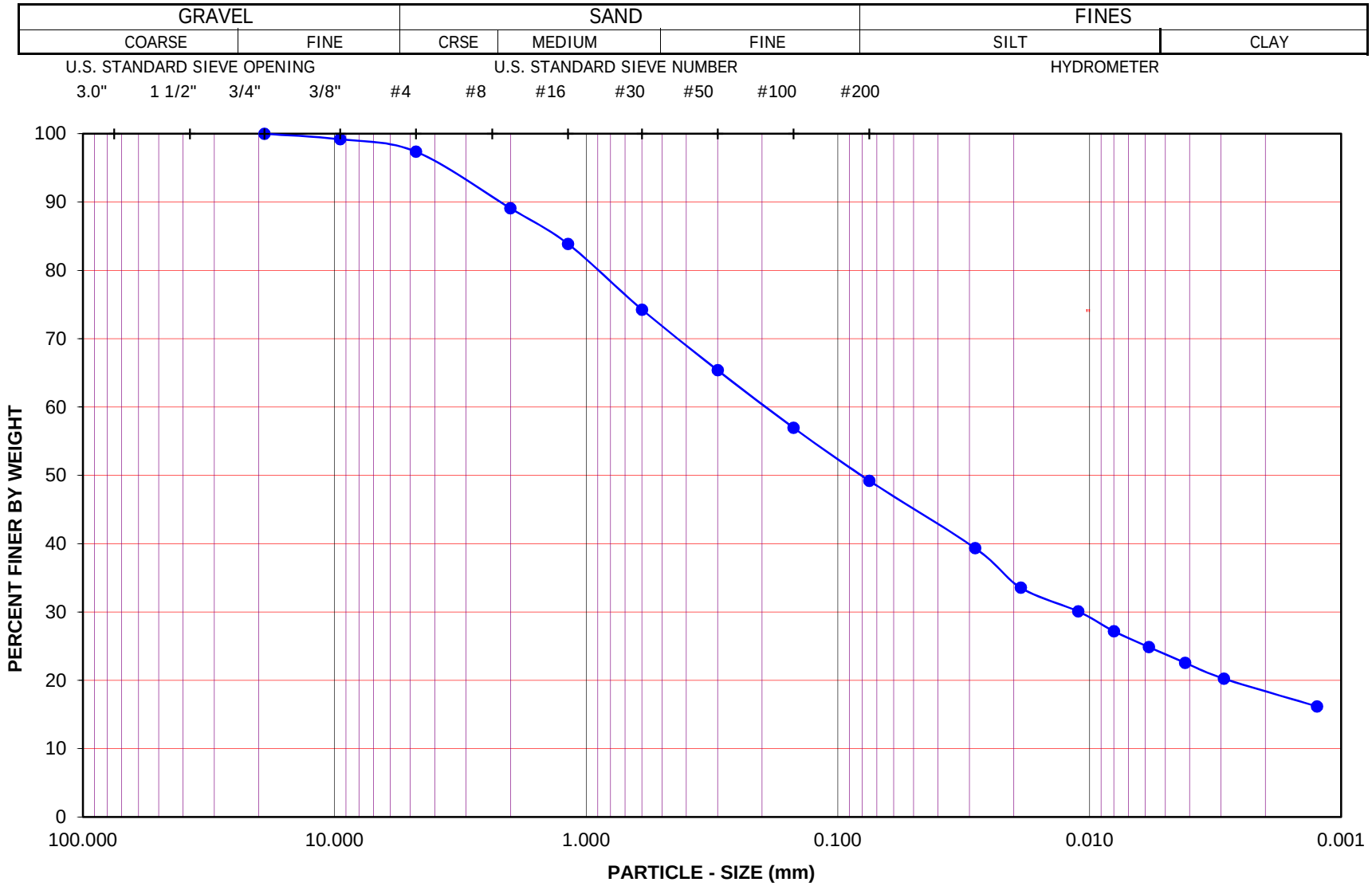
**GR:SA:FI : (%) 3 : 66 : 31**

Leighton

**PARTICLE - SIZE DISTRIBUTION ASTM D 6913**

Jun-12

*SA LB-2, R-1 @ 2.5*




Project Name: Canadian Solar/Lancaster Geo Inv

Project No.: 603455-001

Exploration No.: LB-5 Sample No.: B-1

Depth (feet) : 0.0 Soil Type : SC

Soil Identification: Olive brown clayey sand (SC)

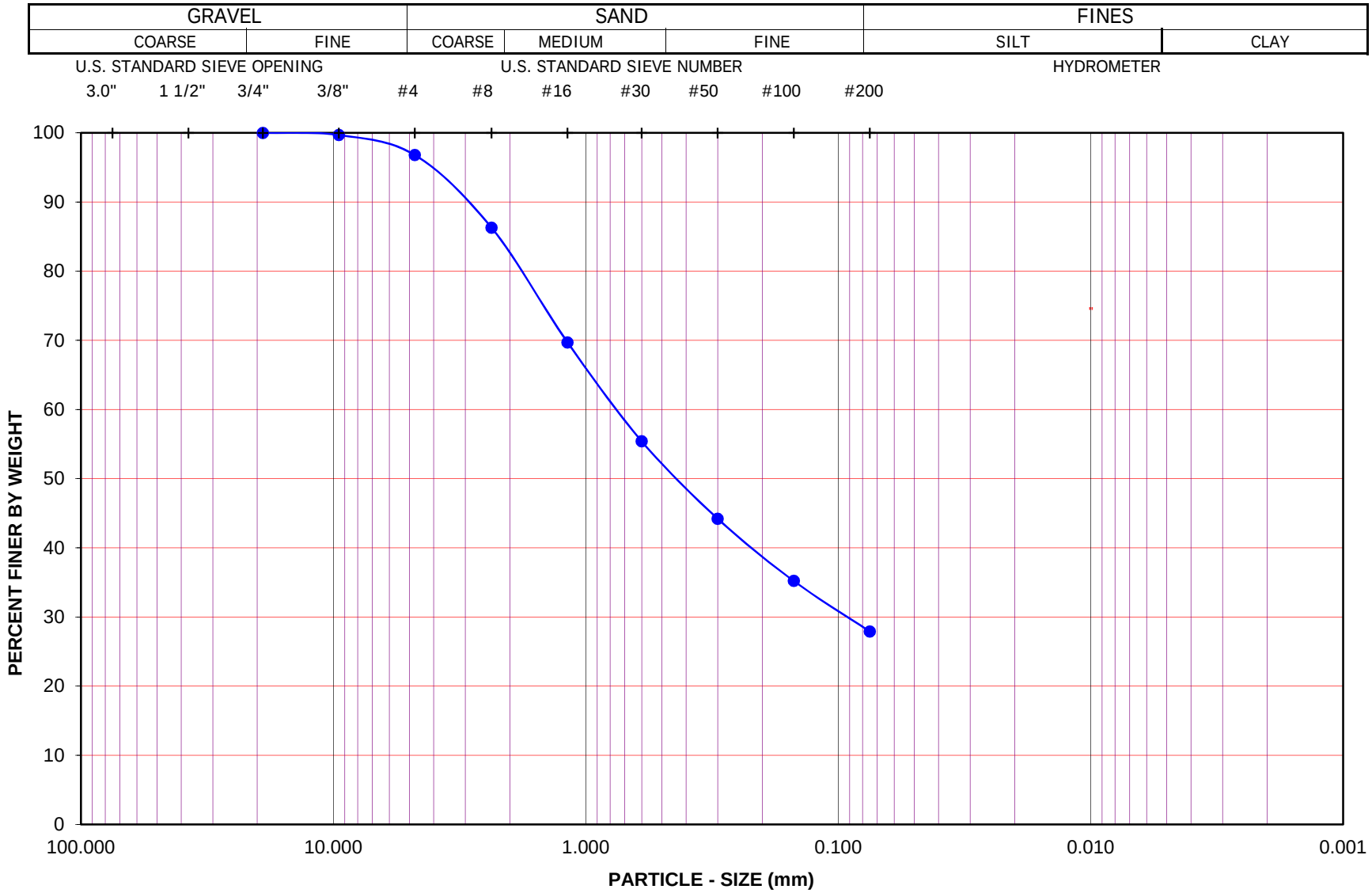
**GR:SA:FI : (%) 3 : 48 : 49**

Leighton

**PARTICLE - SIZE DISTRIBUTION ASTM D 422**

Jun-12

*SA & Hyd LB-5, B-1 @ 0*




Project Name: Canadian Solar/Lancaster Geo Inv

Project No.: 603455-001

Exploration No.: LB-7 Sample No.: R-1

Depth (feet): 2.5 Soil Type : SC

Soil Identification: Brown clayey sand (SC)

**GR:SA:FI : (%) 3 : 69 : 28**

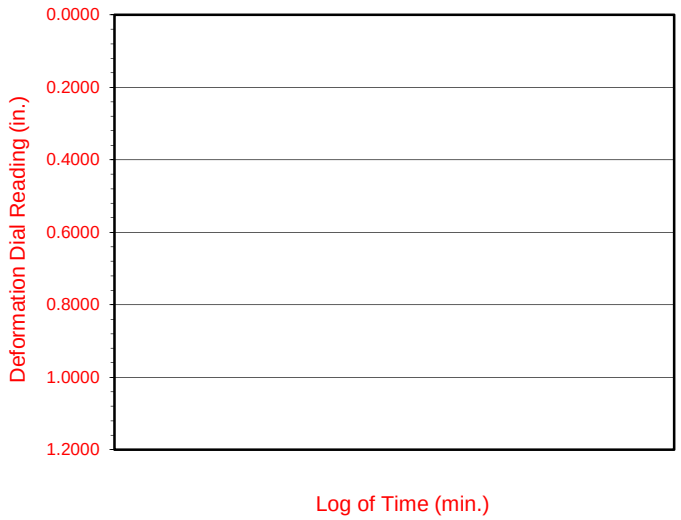
Leighton

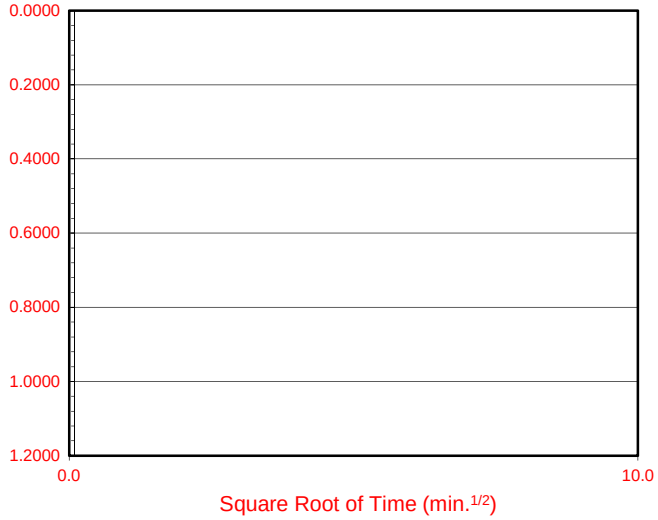
**PARTICLE - SIZE DISTRIBUTION ASTM D 6913**

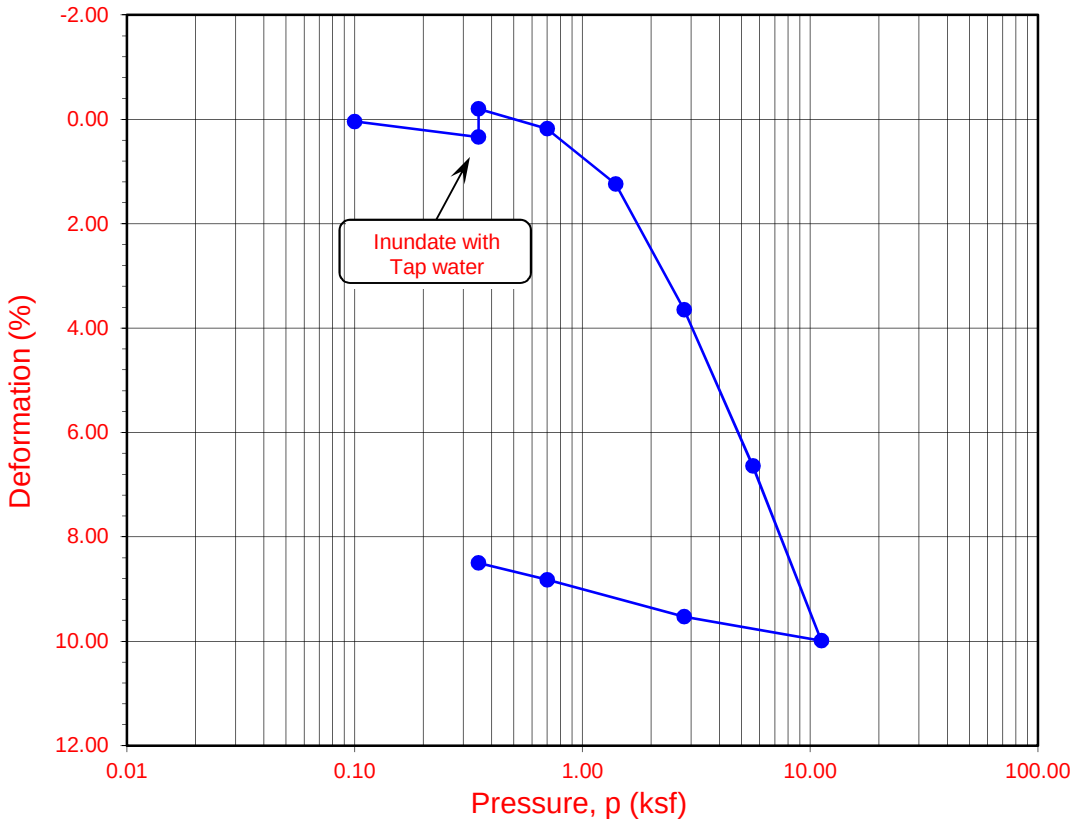
Jun-12

*SA LB-7, R-1 @ 2.5*

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **LB-5** | **R-1** | **2.5** | **8.8** | **14.2** | **108.9** | **118.7** | **0.548** | **0.416** | **43** | **91** |

Soil Identification: Brown clayey sand (SC)

Leighton

**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

Project No.: 603455-001

Canadian Solar/Lancaster Geo Inv

06-12

# One-Dimensional Swell or Settlement Potential of Cohesive Soils

**(ASTM D 4546)**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Canadian Solar/Lancaster Geo Inv | Tested By: | F. Tabibkhoei | Date: | 06/04/12 |
| Project No.: | 603455-001 | Checked By: | J. Ward | Date: | 06/07/12 |
| Boring No.: | LB-1 | Sample Type: | Drive | | |
| Sample No.: | R-1 | Depth (ft.) | 2.5 | | |
| Sample Description: | Brown sandy lean clay/clayey sand s(CL)/SC | | | | |

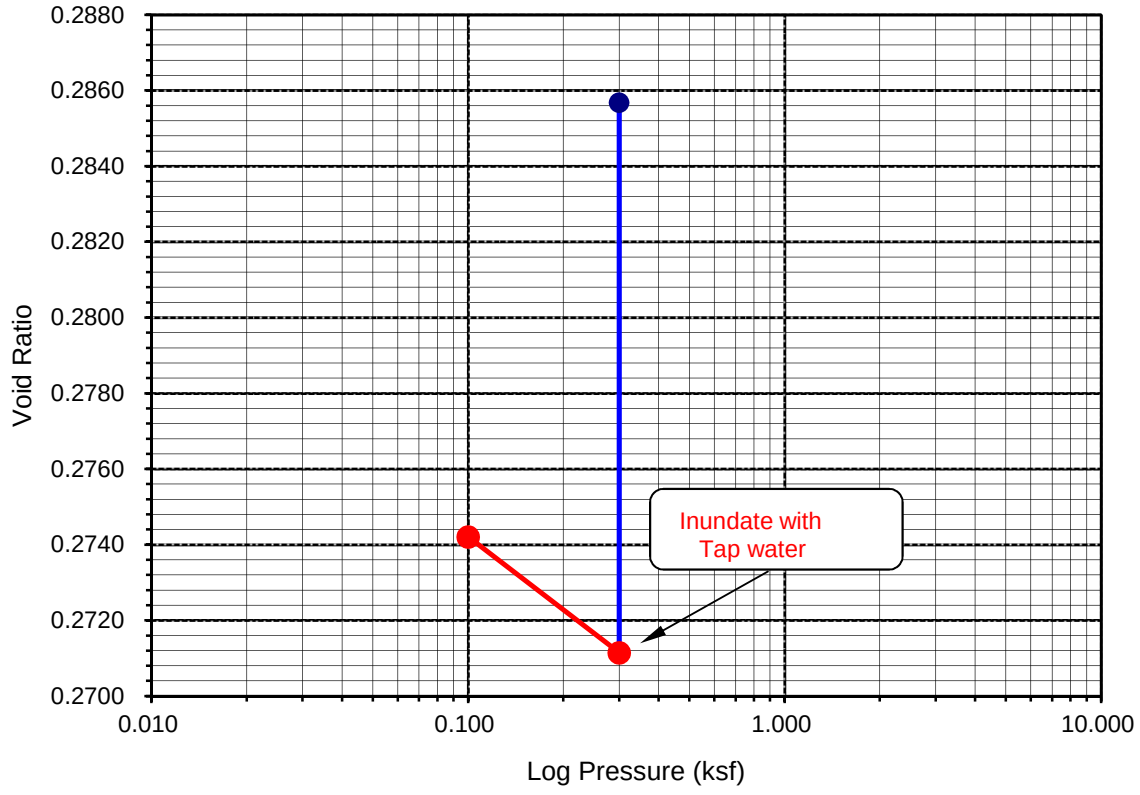
| | |
|---|---|
| Initial Dry Density (pcf): | 132.2 |
| Initial Moisture (%): | 4.55 |
| Initial Length (in.): | 1.0000 |
| Initial Dial Reading: | 0.1197 |
| Diameter(in): | 2.416 |

| | |
|---|---|
| Final Dry Density (pcf): | 131.1 |
| Final Moisture (%) : | 14.3 |
| Initial Void ratio: | 0.2746 |
| Specific Gravity(assumed): | 2.70 |
| Initial Saturation (%) | 44.7 |

| Pressure (p) (ksf) | Final Reading (in) | Apparent Thickness (in) | Load Compliance (%) | Swell (+) Settlement (-) % of Sample Thickness | Void Ratio | Corrected Deformation (%) |
|---|---|---|---|---|---|---|
| 0.100 | 0.1200 | 0.9997 | 0.00 | -0.03 | 0.2742 | -0.03 |
| 0.300 | 0.1224 | 0.9973 | 0.00 | -0.27 | 0.2711 | -0.27 |
| H2O | 0.1110 | 1.0087 | 0.00 | 0.87 | 0.2857 | 0.87 |

**Percent Swell (+) / Settlement (-) After Inundation = 1.14**

Void Ratio - Log Pressure Curve



# One-Dimensional Swell or Settlement Potential of Cohesive Soils

**(ASTM D 4546)**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Canadian Solar/Lancaster Geo Inv | Tested By: | F. Tabibkhoei | Date: | 06/04/12 |
| Project No.: | 603455-001 | Checked By: | J. Ward | Date: | 06/07/12 |
| Boring No.: | LB-3 | Sample Type: | Drive | | |
| Sample No.: | R-3 | Depth (ft.) | 10.0 | | |
| Sample Description: | Brown clayey sand (SC) | | | | |

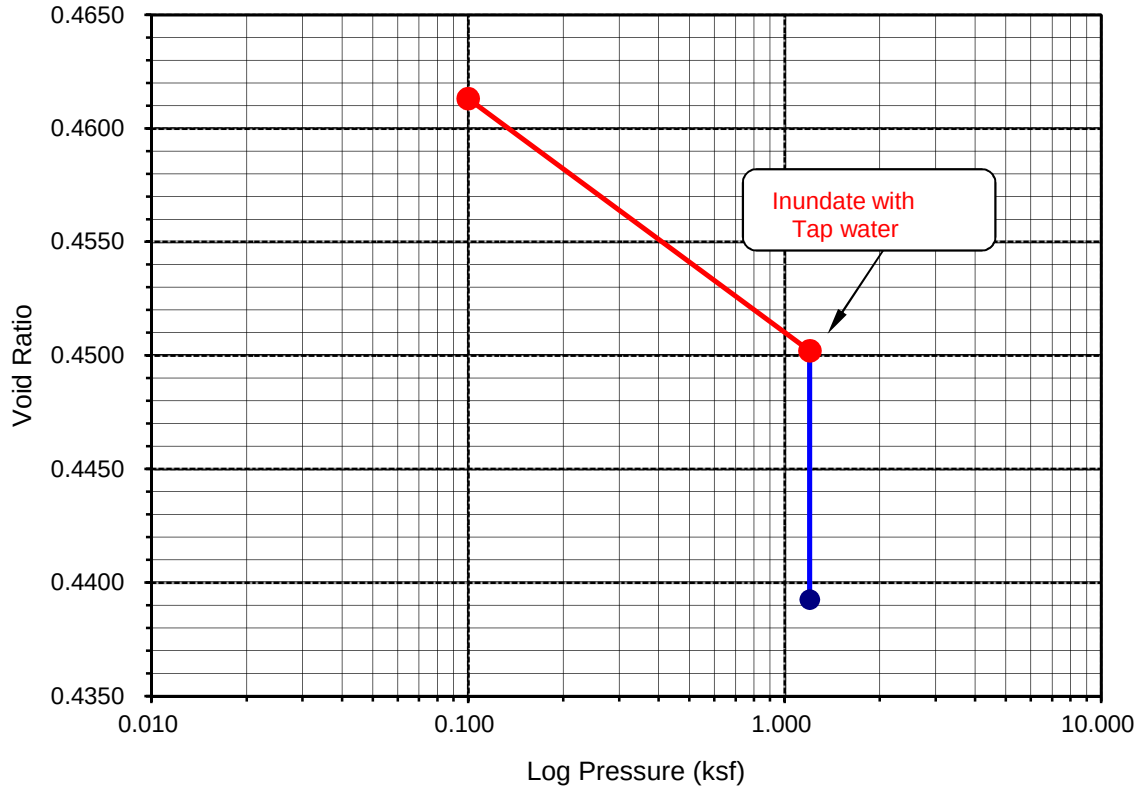
| | |
|---|---|
| Initial Dry Density (pcf): | 115.3 |
| Initial Moisture (%): | 5.69 |
| Initial Length (in.): | 1.0000 |
| Initial Dial Reading: | 0.1093 |
| Diameter(in): | 2.416 |

| | |
|---|---|
| Final Dry Density (pcf): | 117.1 |
| Final Moisture (%) : | 15.1 |
| Initial Void ratio: | 0.4615 |
| Specific Gravity(assumed): | 2.70 |
| Initial Saturation (%) | 33.3 |

| Pressure (p) (ksf) | Final Reading (in) | Apparent Thickness (in) | Load Compliance (%) | Swell (+) Settlement (-) % of Sample Thickness | Void Ratio | Corrected Deformation (%) |
|---|---|---|---|---|---|---|
| 0.100 | 0.1094 | 0.9999 | 0.00 | -0.01 | 0.4613 | -0.01 |
| 1.200 | 0.1170 | 0.9923 | 0.00 | -0.77 | 0.4502 | -0.77 |
| H2O | 0.1245 | 0.9848 | 0.00 | -1.52 | 0.4392 | -1.52 |

**Percent Swell (+) / Settlement (-) After Inundation = -0.76**

Void Ratio - Log Pressure Curve



# One-Dimensional Swell or Settlement Potential of Cohesive Soils

**(ASTM D 4546)**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Canadian Solar/Lancaster Geo Inv | Tested By: | F. Tabibkhoei | Date: | 06/04/12 |
| Project No.: | 603455-001 | Checked By: | J. Ward | Date: | 06/07/12 |
| Boring No.: | LB-9 | Sample Type: | Drive | | |
| Sample No.: | R-1 | Depth (ft.) | 2.5 | | |
| Sample Description: | Brown lean clay with sand (CL)s | | | | |

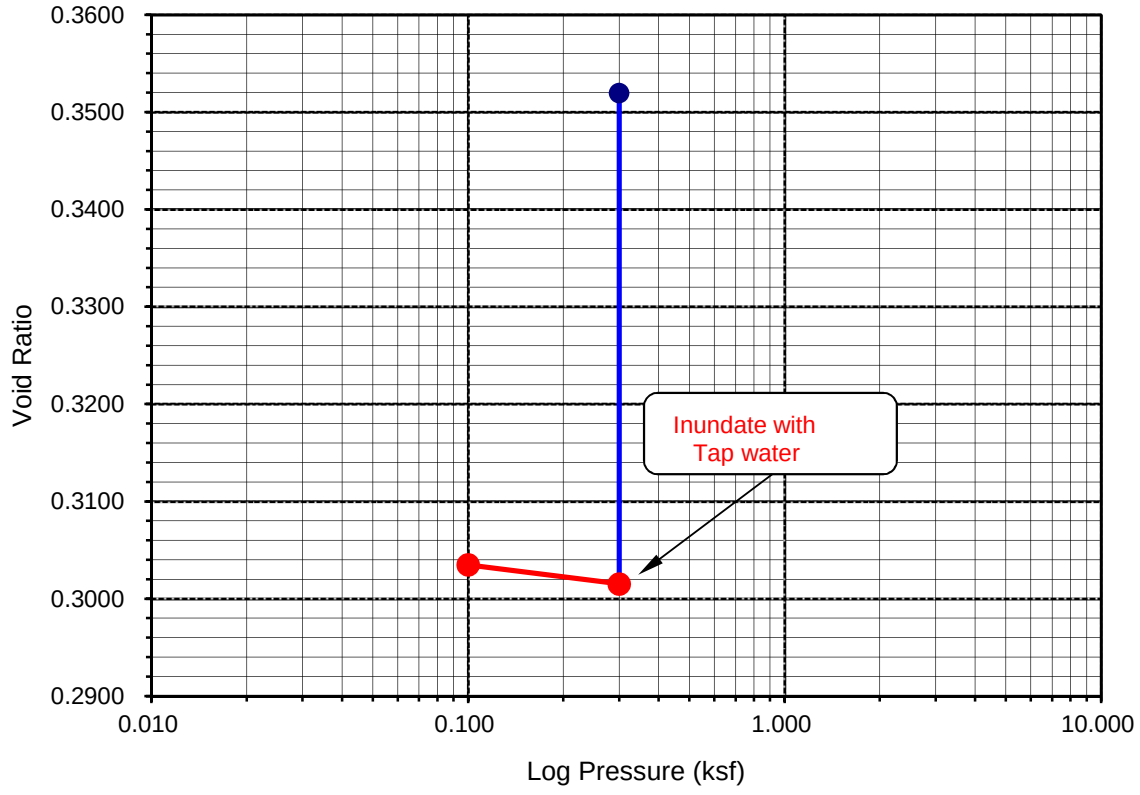
| | |
|---|---|
| Initial Dry Density (pcf): | 129.3 |
| Initial Moisture (%): | 7.15 |
| Initial Length (in.): | 1.0000 |
| Initial Dial Reading: | 0.1148 |
| Diameter(in): | 2.416 |

| | |
|---|---|
| Final Dry Density (pcf): | 124.7 |
| Final Moisture (%) : | 15.1 |
| Initial Void ratio: | 0.3036 |
| Specific Gravity(assumed): | 2.70 |
| Initial Saturation (%) | 63.6 |

| Pressure (p) (ksf) | Final Reading (in) | Apparent Thickness (in) | Load Compliance (%) | Swell (+) Settlement (-) % of Sample Thickness | Void Ratio | Corrected Deformation (%) |
|---|---|---|---|---|---|---|
| 0.100 | 0.1149 | 0.9999 | 0.00 | -0.01 | 0.3035 | -0.01 |
| 0.300 | 0.1164 | 0.9984 | 0.00 | -0.16 | 0.3015 | -0.16 |
| H2O | 0.0777 | 1.0371 | 0.00 | 3.71 | 0.3520 | 3.71 |

**Percent Swell (+) / Settlement (-) After Inundation = 3.88**

Void Ratio - Log Pressure Curve



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# EXPANSION INDEX of SOILS

**ASTM D 4829**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Canadian Solar/Lancaster Geo Inv | Tested By: | G. Berdy | Date: | 06/04/12 |
| Project No. : | 603455-001 | Checked By: | J. Ward | Date: | 06/08/12 |
| Boring No.: | LB-5 | Depth (ft.) | 0.0 | | |
| Sample No. : | B-1 | | | | |
| Soil Identification: | Olive brown clayey sand (SC) | | | | |

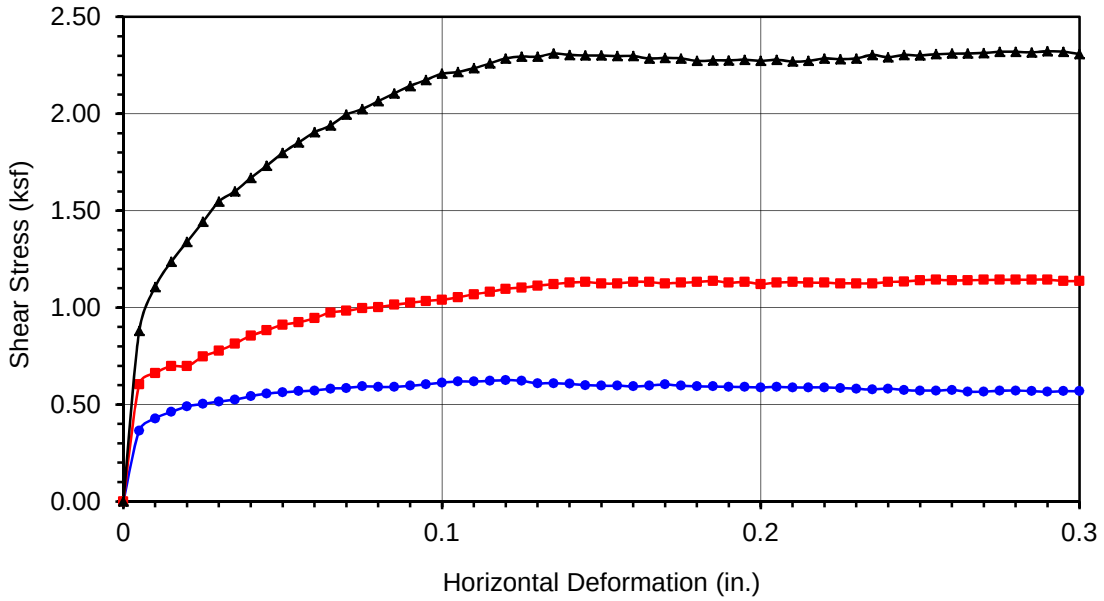
| | | |
|---|---|---|
| Dry Wt. of Soil + Cont. | (g) | 1000.00 |
| Wt. of Container No. | (g) | 0.00 |
| Dry Wt. of Soil | (g) | 1000.00 |
| Weight Soil Retained on #4 Sieve | | 0.00 |
| Percent Passing # 4 | | 100.00 |

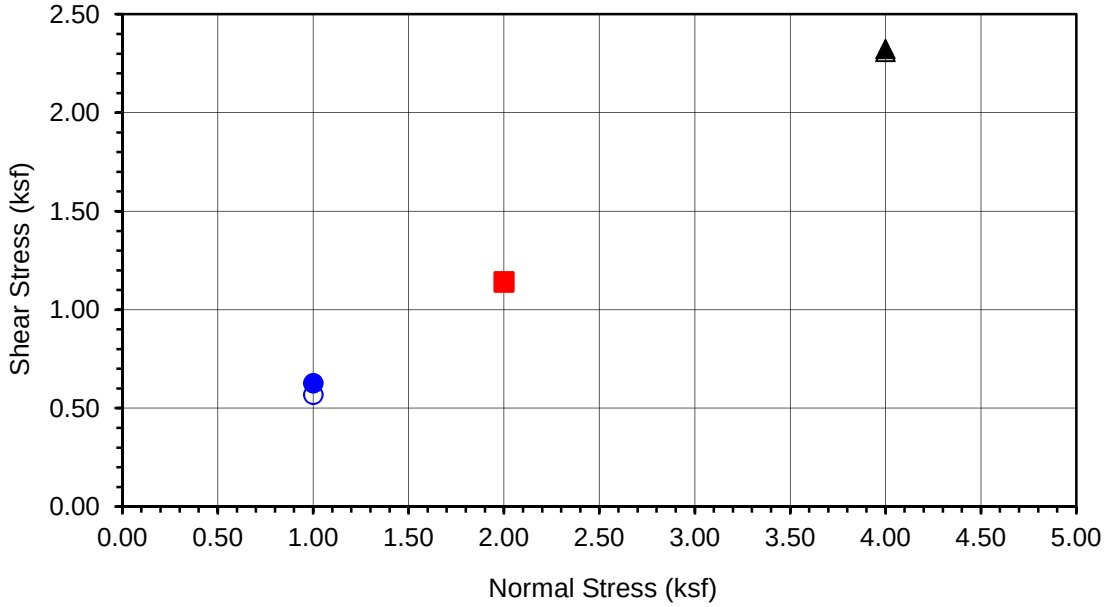
| **MOLDED SPECIMEN** | | Before Test | After Test |
|---|---|---|---|
| Specimen Diameter | (in.) | 4.01 | 4.01 |
| Specimen Height | (in.) | 1.0000 | 1.0225 |
| Wt. Comp. Soil + Mold | (g) | 592.50 | 437.71 |
| Wt. of Mold | (g) | 181.30 | 0.00 |
| Specific Gravity (Assumed) | | 2.70 | 2.70 |
| Container No. | | O | O |
| Wet Wt. of Soil + Cont. | (g) | 815.20 | 619.01 |
| Dry Wt. of Soil + Cont. | (g) | 746.50 | 557.86 |
| Wt. of Container | (g) | 0.00 | 181.30 |
| Moisture Content | (%) | 9.20 | 16.24 |
| Wet Density | (pcf) | 124.0 | 129.1 |
| Dry Density | (pcf) | 113.6 | 111.1 |
| Void Ratio | | 0.484 | 0.518 |
| Total Porosity | | 0.326 | 0.341 |
| Pore Volume | (cc) | 67.5 | 72.2 |
| Degree of Saturation (%) [ $S_{meas}$] | | **51.3** | 84.7 |

**SPECIMEN INUNDATION** in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

| Date | Time | Pressure (psi) | Elapsed Time (min.) | Dial Readings (in.) |
|---|---|---|---|---|
| 06/04/12 | 11:37 | 1.0 | 0 | 0.1210 |
| 06/04/12 | 11:47 | 1.0 | 10 | 0.1200 |
| Add Distilled Water to the Specimen | | | | |
| 06/04/12 | 12:38 | 1.0 | 51 | 0.1370 |
| 06/05/12 | 7:32 | 1.0 | 1185 | 0.1435 |
| 06/05/12 | 8:55 | 1.0 | 1268 | 0.1435 |
| | | | | |

| | |
|---|---|
| Expansion Index ($EI_{meas}$) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000 | **24** |




| | |
|---|---|
| **Boring No.** | **LB-3** |
| **Sample No.** | **R-1** |
| **Depth (ft)** | **2.5** |

Sample Type:

Drive

Soil Identification:
Brown clayey sand (SC)

| Normal Stress (kip/ft²) | 1.000 | 2.000 | 4.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 0.626 | ■ 1.144 | ▲ 2.323 |
| Shear Stress @ End of Test (ksf) | ○ 0.569 | □ 1.138 | △ 2.308 |
| Deformation Rate (in./min.) | 0.0500 | 0.0500 | 0.0500 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 4.21 | 4.21 | 4.21 |
| Dry Density (pcf) | 103.2 | 105.3 | 108.6 |
| Saturation (%) | 18.0 | 18.9 | 20.6 |
| Soil Height Before Shearing (in.) | 0.9210 | 0.9045 | 0.8903 |
| Final Moisture Content (%) | 16.4 | 16.0 | 14.2 |

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**DIRECT SHEAR TEST RESULTS**
**Consolidated Undrained**

Project No.: 603455-001

Canadian Solar/Lancaster Geo Inv

06-12

Leighton

# MODIFIED PROCTOR COMPACTION TEST

**ASTM D 1557**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Canadian Solar/Lancaster Geo Inv | Tested By : | G. Berdy | Date: | 06/04/12 |
| Project No.: | 603455-001 | Input By : | J. Ward | Date: | 06/08/12 |
| Boring No.: | LB-5 | Depth (ft.) | 0.0 | | |
| Sample No. : | B-1 | | | | |
| Soil Identification: | Olive brown clayey sand (SC) | | | | |

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

**Mold Volume (ft³)** 0.03340

*Ram Weight = 10 lb.; Drop = 18 in.*

| TEST NO. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Compacted Soil + Mold (g) | 3856.0 | 3968.0 | 3971.0 | | | |
| Weight of Mold (g) | 1894.0 | 1894.0 | 1894.0 | | | |
| Net Weight of Soil (g) | 1962.0 | 2074.0 | 2077.0 | | | |
| Wet Weight of Soil + Cont. (g) | 519.10 | 459.80 | 528.10 | | | |
| Dry Weight of Soil + Cont. (g) | 493.60 | 429.50 | 481.00 | | | |
| Weight of Container (g) | 50.90 | 51.10 | 51.30 | | | |
| Moisture Content (%) | 5.76 | 8.01 | 10.96 | | | |
| Wet Density (pcf) | 129.5 | 136.9 | 137.1 | | | |
| Dry Density (pcf) | 122.4 | 126.7 | 123.6 | | | |

**Maximum Dry Density (pcf)** 127.0 **Optimum Moisture Content (%)** 8.5

**PROCEDURE USED**

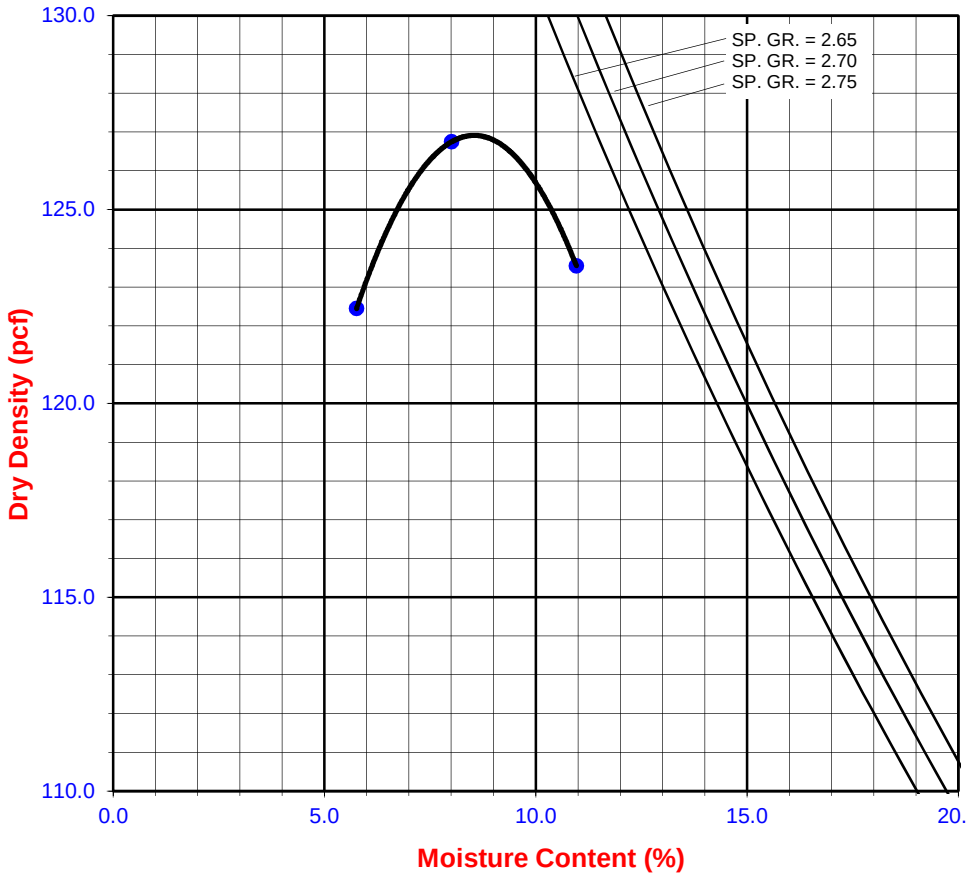
[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

**Particle-Size Distribution:**
3:48:49
GR:SA:FI

**Atterberg Limits:**
LL,PL,PI



Leighton

# SOIL RESISTIVITY TEST

## DOT CA TEST 532 / 643

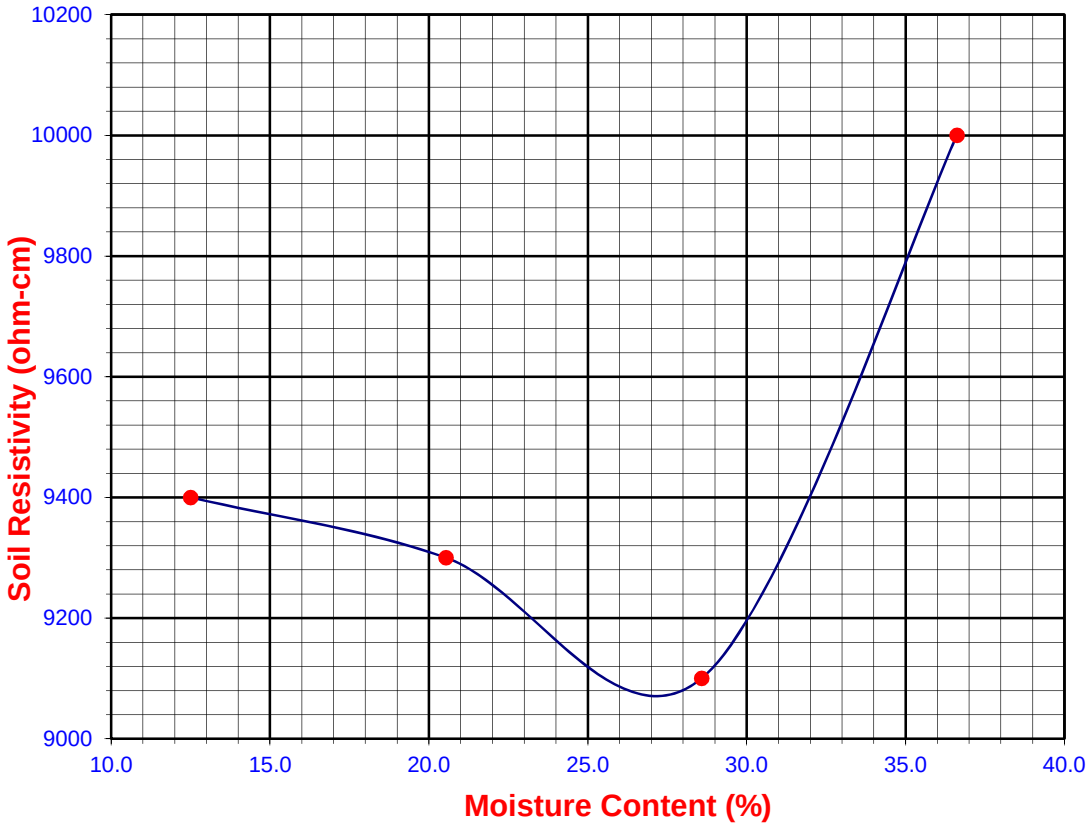
| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Canadian Solar/Lancaster Geo Inv | Tested By : | V. Juliano | Date: | 06/06/12 |
| Project No. : | 603455-001 | Data Input By: | J. Ward | Date: | 06/08/12 |
| Boring No.: | LB-2 | Depth (ft.) : | 0.0 | | |
| Sample No. : | B-1 | | | | |
| Soil Identification:* | Brown SM | | | | |

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

| Specimen No. | Water Added (ml) (Wa) | Adjusted Moisture Content (MC) | Resistance Reading (ohm) | Soil Resistivity (ohm-cm) |
|---|---|---|---|---|
| 1 | 10 | 12.51 | 9400 | 9400 |
| 2 | 20 | 20.54 | 9300 | 9300 |
| 3 | 30 | 28.58 | 9100 | 9100 |
| 4 | 40 | 36.62 | 10000 | 10000 |
| 5 | | | | |

| | |
|---|---|
| Moisture Content (%) (MCi) | 4.47 |
| Wet Wt. of Soil + Cont. (g) | 190.87 |
| Dry Wt. of Soil + Cont. (g) | 185.60 |
| Wt. of Container (g) | 67.74 |
| Container No. | |
| Initial Soil Wt. (g) (Wt) | 130.00 |
| Box Constant | 1.000 |
| MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100 | |

| Min. Resistivity (ohm-cm) | Moisture Content (%) | Sulfate Content (ppm) | Chloride Content (ppm) | Soil pH | |
|---|---|---|---|---|---|
| | | | | pH | Temp. (°C) |
| DOT CA Test 532 / 643 | | DOT CA Test 417 Part II | DOT CA Test 422 | DOT CA Test 532 / 643 | |
| **9070** | **27.2** | **60** | **52** | **6.20** | **20.4** |



Leighton

# SOIL RESISTIVITY TEST

## DOT CA TEST 532 / 643

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Canadian Solar/Lancaster Geo Inv | Tested By : | V. Juliano | Date: | 06/06/12 |
| Project No. : | 603455-001 | Data Input By: | J. Ward | Date: | 06/08/12 |
| Boring No.: | LB-5 | Depth (ft.) : | 0.0 | | |
| Sample No. : | B-1 | | | | |

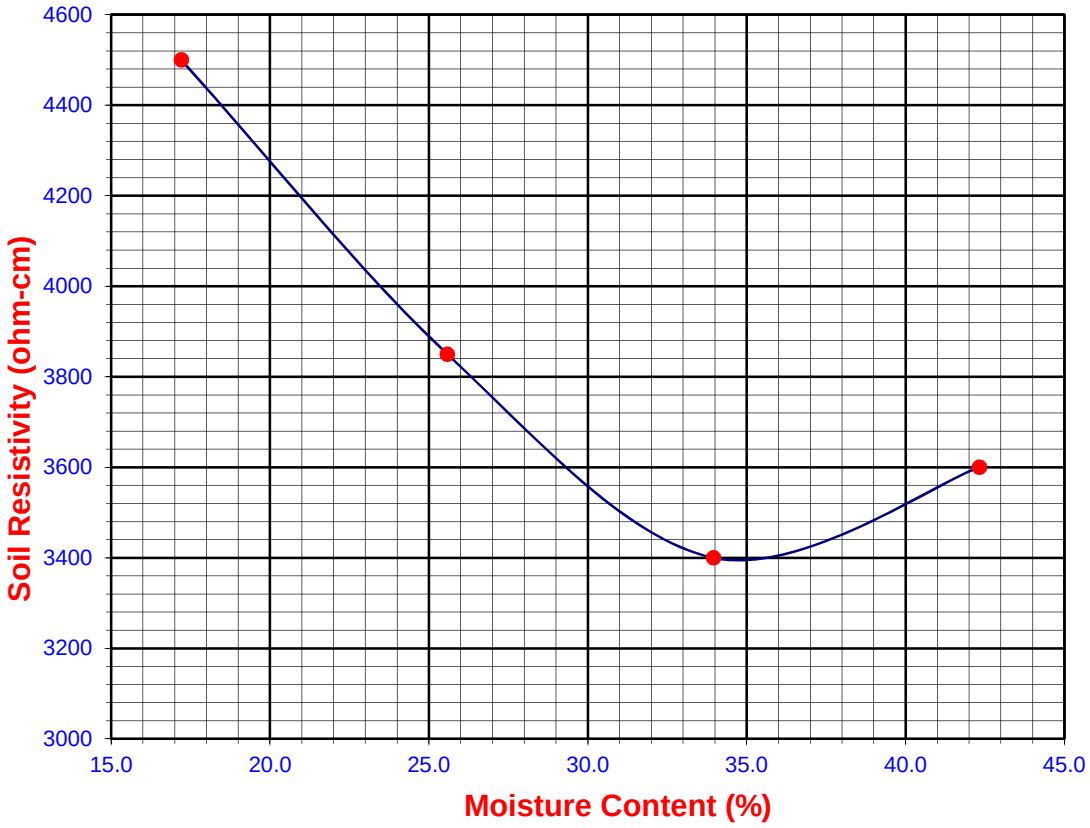
Soil Identification:* Brown SC

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

| Specimen No. | Water Added (ml) (Wa) | Adjusted Moisture Content (MC) | Resistance Reading (ohm) | Soil Resistivity (ohm-cm) |
|---|---|---|---|---|
| 1 | 10 | 17.21 | 4500 | 4500 |
| 2 | 20 | 25.58 | 3850 | 3850 |
| 3 | 30 | 33.95 | 3400 | 3400 |
| 4 | 40 | 42.33 | 3600 | 3600 |
| 5 | | | | |

| | |
|---|---|
| Moisture Content (%) (MCi) | 8.84 |
| Wet Wt. of Soil + Cont. (g) | 164.50 |
| Dry Wt. of Soil + Cont. (g) | 157.17 |
| Wt. of Container (g) | 74.23 |
| Container No. | |
| Initial Soil Wt. (g) (Wt) | 130.00 |
| Box Constant | 1.000 |
| MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100 | |

| Min. Resistivity (ohm-cm) | Moisture Content (%) | Sulfate Content (ppm) | Chloride Content (ppm) | Soil pH | |
|---|---|---|---|---|---|
| | | | | pH | Temp. (°C) |
| DOT CA Test 532 / 643 | | DOT CA Test 417 Part II | DOT CA Test 422 | DOT CA Test 532 / 643 | |
| **3395** | **34.8** | **54** | **55** | **5.88** | **21.2** |



# APPENDIX D

# SUMMARY OF SEISMIC ANALYSIS

# Table 4 - Thermal Resistivity Tests on Soil Sample(s)

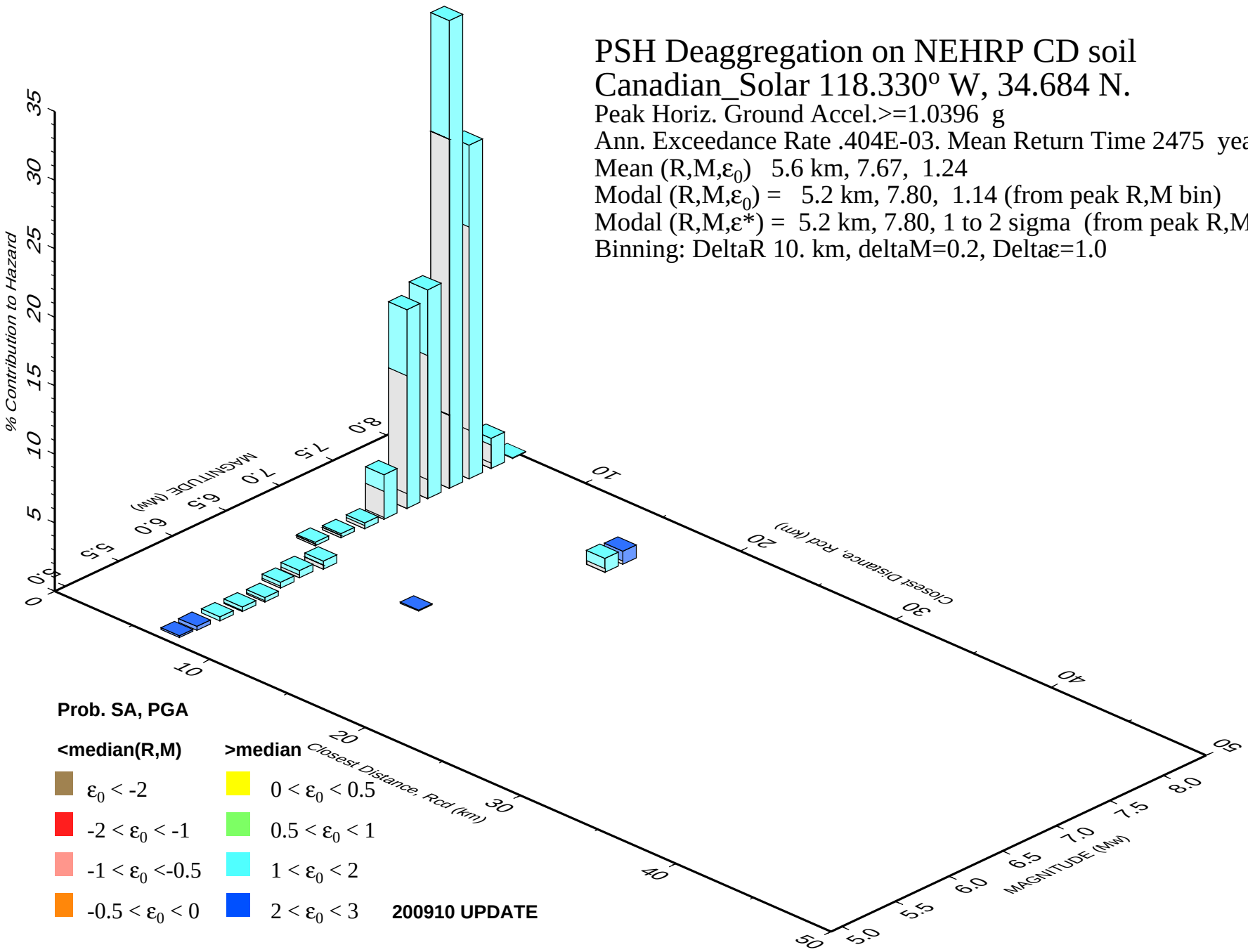
***Leighton Consulting, Inc.***
***Lancaster Solar***
***Your #603455-001, HDR|Schiff #12-0475LAB***
***1-Jun-12***

| **Sample ID** | | | LB-2 R-2 @ 5' Ring | LB-5 R-2 @ 5' Ring | LB-8 R-2 @ 5' Ring |
|---|---|---|---|---|---|
| **Thermal Resistivity** | | **Units** | | | |
| | as-received | m °C $W^{-1}$ | 0.87 | 0.87 | 0.55 |
| | 0% Moisture | m °C $W^{-1}$ | 1.66 | 1.57 | 1.78 |
| **Moisture Content** | | | | | |
| | as-received | % | 5.5% | 5.1% | 6.1% |

Thermal Resistivity in general accordance with ASTM D5334-08
ND = not detected
na = not analyzed

# PSH Deaggregation on NEHRP CD soil
## Canadian_Solar 118.330º W, 34.684 N.

Peak Horiz. Ground Accel.>=1.0396 g
Ann. Exceedance Rate .404E-03. Mean Return Time 2475 years
Mean (R,M,$\varepsilon_0$) 5.6 km, 7.67, 1.24
Modal (R,M,$\varepsilon_0$) = 5.2 km, 7.80, 1.14 (from peak R,M bin)
Modal (R,M,$\varepsilon$*) = 5.2 km, 7.80, 1 to 2 sigma (from peak R,M,$\varepsilon$ bin)
Binning: DeltaR 10. km, deltaM=0.2, Delta$\varepsilon$=1.0




GMT 2012 May 29 21:25:21 **Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on soil with average vs= 360. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted**

| Distance in Miles | Name | Slip Sense | Rupture Top (km) | Rupture Bottom (km) | Length (km) |
|---|---|---|---|---|---|
| 3.28 | S. San Andreas;SM+NSB+SSB+BG | strike slip | 0 | 12.8 | 234 |
| 3.28 | S. San Andreas;NM+SM+NSB+SSB+BG | strike slip | 0 | 13.9 | 271 |
| 3.28 | S. San Andreas;SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13 | 304 |
| 3.28 | S. San Andreas;BB+NM+SM+NSB+SSB+BG | strike slip | 0 | 13.9 | 321 |
| 3.28 | S. San Andreas;NM+SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13 | 341 |
| 3.28 | S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG | strike slip | 0 | 13.9 | 380 |
| 3.28 | S. San Andreas;BB+NM+SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13.1 | 391 |
| 3.28 | S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG | strike slip | 0 | 14 | 443 |
| 3.28 | S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13.1 | 450 |
| 3.28 | S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG | strike slip | 0.1 | 13.1 | 479 |
| 3.28 | S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13.1 | 512 |
| 3.28 | S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13.1 | 549 |
| 3.28 | S. San Andreas;SM | strike slip | 0 | 13 | 98 |
| 3.28 | S. San Andreas;SM+NSB | strike slip | 0 | 13 | 133 |
| 3.28 | S. San Andreas;NM+SM+NSB | strike slip | 0 | 13 | 170 |
| 3.28 | S. San Andreas;SM+NSB+SSB | strike slip | 0 | 13 | 177 |
| 3.28 | S. San Andreas;NM+SM+NSB+SSB | strike slip | 0 | 13 | 214 |
| 3.28 | S. San Andreas;NM+SM | strike slip | 0 | 14 | 135 |
| 3.28 | S. San Andreas;BB+NM+SM | strike slip | 0 | 14 | 185 |
| 3.28 | S. San Andreas;BB+NM+SM+NSB | strike slip | 0 | 14 | 220 |
| 3.28 | S. San Andreas;CC+BB+NM+SM | strike slip | 0 | 14 | 244 |
| 3.28 | S. San Andreas;BB+NM+SM+NSB+SSB | strike slip | 0 | 14 | 263 |
| 3.28 | S. San Andreas;CC+BB+NM+SM+NSB | strike slip | 0 | 14 | 279 |
| 3.28 | S. San Andreas;CH+CC+BB+NM+SM | strike slip | 0 | 14 | 306 |
| 3.28 | S. San Andreas;CC+BB+NM+SM+NSB+SSB | strike slip | 0 | 14 | 323 |
| 3.28 | S. San Andreas;CH+CC+BB+NM+SM+NSB | strike slip | 0 | 14 | 342 |
| 3.28 | S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB | strike slip | 0 | 14 | 385 |
| 3.28 | S. San Andreas;PK+CH+CC+BB+NM+SM | strike slip | 0.1 | 13.1 | 343 |
| 3.28 | S. San Andreas;PK+CH+CC+BB+NM+SM+NSB | strike slip | 0.1 | 13.1 | 378 |
| 3.28 | S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB | strike slip | 0.1 | 13.1 | 422 |
| 10.26 | S. San Andreas;NM | strike slip | 0 | 15 | 37 |
| 10.26 | S. San Andreas;CH+CC+BB+NM | strike slip | 0 | 14 | 208 |
| 10.26 | S. San Andreas;BB+NM | strike slip | 0 | 15 | 87 |
| 10.26 | S. San Andreas;CC+BB+NM | strike slip | 0 | 15 | 146 |
| 10.26 | S. San Andreas;PK+CH+CC+BB+NM | strike slip | 0.1 | 12.1 | 245 |
| 21.2 | San Gabriel | strike slip | 0 | 14.9 | 71 |
| 22.25 | Holser, alt 1 | reverse | 0 | 18.7 | 20 |
| 23.07 | Garlock;GE+GC+GW | strike slip | 0.3 | 12.3 | 256 |
| 23.07 | Garlock;GC+GW | strike slip | 0.4 | 12.4 | 211 |
| 23.07 | Garlock;GW | strike slip | 0.7 | 13.7 | 98 |
| 25.07 | Northridge | thrust | 7.4 | 16.6 | 33 |
| 26.6 | Santa Susana, alt 1 | reverse | 0 | 16.4 | 27 |
| 26.74 | Sierra Madre (San Fernando) | reverse | 0 | 12.7 | 18 |
| 26.74 | Sierra Madre Connected | reverse | 0 | 14 | 76 |
| 28.34 | Sierra Madre | reverse | 0 | 14.4 | 57 |
| 29.67 | Verdugo | reverse | 0 | 14.7 | 29 |
| 29.88 | Oak Ridge Connected | reverse | 0.6 | 15 | 94 |
| 29.88 | Oak Ridge (Onshore) | reverse | 1 | 19.1 | 49 |
| 30 | San Cayetano | thrust | 0 | 16.1 | 42 |
| 32.98 | S. San Andreas;BB | strike slip | 0 | 15 | 50 |
| 32.98 | S. San Andreas;CH+CC+BB | strike slip | 0 | 14 | 171 |
| 32.98 | S. San Andreas;CC+BB | strike slip | 0 | 15 | 109 |
| 32.98 | S. San Andreas;PK+CH+CC+BB | strike slip | 0.1 | 12.1 | 208 |
| 33.41 | Santa Ynez Connected | strike slip | 0 | 11.3 | 132 |
| 33.41 | Santa Ynez (East) | strike slip | 0 | 13.2 | 69 |

| | | | | | |
|---|---|---|---|---|---|
| 33.56 | Simi-Santa Rosa | strike slip | 1 | 12.3 | 39 |
| 35.7 | Pleito | reverse | 0 | 13.7 | 44 |
| 39.32 | Raymond | strike slip | 0 | 15.7 | 23 |
| 39.41 | Hollywood | strike slip | 0 | 16.9 | 17 |
| 39.48 | Clamshell-Sawpit | reverse | 0 | 13.8 | 16 |
| 39.52 | Elysian Park (Upper) | reverse | 3 | 15.3 | 20 |
| 39.79 | Santa Monica Connected alt 2 | strike slip | 0.8 | 11.2 | 93 |
| 42.03 | White Wolf | reverse | 0 | 14.5 | 63 |
| 42.75 | Santa Monica Connected alt 1 | strike slip | 0 | 16.3 | 80 |
| 42.75 | Santa Monica, alt 1 | strike slip | 0 | 18.4 | 14 |
| 44.4 | Newport-Inglewood, alt 1 | strike slip | 0 | 15 | 65 |
| 44.4 | Newport Inglewood Connected alt 1 | strike slip | 0 | 11 | 208 |
| 44.4 | Newport Inglewood Connected alt 2 | strike slip | 0 | 11 | 208 |
| 44.88 | Garlock;GC | strike slip | 0 | 12 | 111 |
| 44.88 | Garlock;GE+GC | strike slip | 0 | 12 | 157 |
| 45 | Puente Hills (LA) | thrust | 2.1 | 14.8 | 22 |
| 45.59 | So Sierra Nevada | normal | 0 | 13.8 | 112 |
| 46.64 | Malibu Coast, alt 2 | strike slip | 0 | 16.3 | 38 |
| 46.64 | Malibu Coast, alt 1 | strike slip | 0 | 7.7 | 38 |
| 47.59 | Anacapa-Dume, alt 2 | thrust | 1.2 | 11.7 | 65 |
| 48.27 | Lenwood-Lockhart-Old Woman Springs | strike slip | 0 | 13 | 145 |
| 49.84 | Mission Ridge-Arroyo Parida-Santa Ana | reverse | 0 | 7.5 | 69 |
| 50.23 | Elsinore;W | strike slip | 0 | 14.5 | 46 |
| 50.23 | Elsinore;W+GI | strike slip | 0 | 13.8 | 83 |
| 50.23 | Elsinore;W+GI+T | strike slip | 0 | 13.9 | 124 |
| 50.23 | Elsinore;W+GI+T+J | strike slip | 0 | 15.9 | 200 |
| 50.23 | Elsinore;W+GI+T+J+CM | strike slip | 0 | 15.9 | 242 |
| 50.82 | Helendale-So Lockhart | strike slip | 0 | 13 | 114 |
| 51 | Palos Verdes Connected | strike slip | 0 | 10 | 285 |
| 51 | Palos Verdes | strike slip | 0 | 14 | 99 |
| 51.17 | S. San Andreas;NSB+SSB+BG | strike slip | 0 | 13.5 | 137 |
| 51.17 | S. San Andreas;NSB+SSB+BG+CO | strike slip | 0.2 | 12 | 206 |
| 51.17 | S. San Andreas;NSB | strike slip | 0 | 13 | 35 |
| 51.17 | S. San Andreas;NSB+SSB | strike slip | 0 | 13 | 79 |
| 51.19 | San Jacinto;SBV | strike slip | 0 | 16 | 45 |
| 51.19 | San Jacinto;SBV+SJV | strike slip | 0 | 16 | 88 |
| 51.19 | San Jacinto;SBV+SJV+A | strike slip | 0 | 16 | 134 |
| 51.19 | San Jacinto;SBV+SJV+A+CC | strike slip | 0 | 16 | 181 |
| 51.19 | San Jacinto;SBV+SJV+A+C | strike slip | 0 | 17 | 181 |
| 51.19 | San Jacinto;SBV+SJV+A+CC+B | strike slip | 0.1 | 15.1 | 215 |
| 51.19 | San Jacinto;SBV+SJV+A+CC+B+SM | strike slip | 0.1 | 15.1 | 242 |
| 51.38 | San Jose | strike slip | 0 | 15.4 | 20 |
| 51.59 | Cucamonga | reverse | 0 | 7.8 | 28 |
| 51.87 | Pitas Point Connected | reverse | 1.2 | 12.7 | 79 |
| 51.87 | Ventura-Pitas Point | reverse | 1 | 15.4 | 44 |
| 52.72 | Anacapa-Dume, alt 1 | reverse | 0 | 15.6 | 51 |
| 54.77 | Puente Hills (Santa Fe Springs) | thrust | 2.8 | 14.9 | 11 |
| 55.57 | Cleghorn | strike slip | 0 | 16 | 25 |
| 55.94 | Chino, alt 2 | strike slip | 0 | 13.6 | 29 |
| 56.06 | Chino, alt 1 | strike slip | 0 | 9.2 | 24 |
| 57.04 | Puente Hills (Coyote Hills) | thrust | 2.8 | 14.6 | 17 |
| 60.42 | Red Mountain | reverse | 0 | 14.1 | 101 |
| 61.52 | Oak Ridge (Offshore) | thrust | 0 | 7.9 | 38 |

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*                       *
*    E Q S E A R C H    *
*                       *
*     Version 3.00      *
*                       *
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ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 603455-001

DATE: 05-29-2012

JOB NAME: Lancaster Canadian Solar

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  5.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  34.6840
   SITE LONGITUDE:  118.3300

SEARCH DATES:
           START DATE:   1800
           END DATE:   2012

SEARCH RADIUS:
           62.1 mi
           99.9 km

ATTENUATION RELATION:  20) Sadigh et al. (1997) Horiz. - Soil
   UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
   ASSUMED SOURCE TYPE:  DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   0  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:        Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km):  0.0

EARTHQUAKE SEARCH RESULTS

Page 1

| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 34.5190 | 118.1980 | 08/23/1952 | 10 9 7.1 | 13.1 | 5.00 | 0.058 | VI | 13.6( 21.9) |
| DMG | 34.4110 | 118.4010 | 02/09/1971 | 14 244.0 | 8.0 | 5.80 | 0.075 | VII | 19.3( 31.0) |
| DMG | 34.4110 | 118.4010 | 02/09/1971 | 14 1 8.0 | 8.0 | 5.80 | 0.075 | VII | 19.3( 31.0) |
| DMG | 34.4110 | 118.4010 | 02/09/1971 | 141028.0 | 8.0 | 5.30 | 0.049 | VI | 19.3( 31.0) |
| DMG | 34.4110 | 118.4010 | 02/09/1971 | 14 041.8 | 8.4 | 6.40 | 0.122 | VII | 19.3( 31.0) |
| T-A | 34.8300 | 118.7500 | 11/27/1852 | 0 0 0.0 | 0.0 | 7.00 | 0.133 | VIII | 25.9( 41.6) |
| GSP | 34.3780 | 118.6180 | 01/19/1994 | 211144.9 | 11.0 | 5.10 | 0.027 | V | 26.7( 43.0) |
| DMG | 34.3080 | 118.4540 | 02/09/1971 | 144346.7 | 6.2 | 5.20 | 0.029 | V | 26.9( 43.3) |
| GSP | 34.3940 | 118.6690 | 06/26/1995 | 084028.9 | 13.0 | 5.00 | 0.024 | IV | 27.8( 44.7) |
| GSP | 34.3690 | 118.6720 | 04/26/1997 | 103730.7 | 16.0 | 5.10 | 0.024 | V | 29.2( 47.0) |
| PAS | 34.9430 | 118.7430 | 06/10/1988 | 23 643.0 | 6.8 | 5.40 | 0.031 | V | 29.5( 47.4) |
| GSB | 34.3010 | 118.5650 | 01/17/1994 | 204602.4 | 9.0 | 5.20 | 0.026 | V | 29.6( 47.7) |
| GSP | 34.3050 | 118.5790 | 01/29/1994 | 112036.0 | 1.0 | 5.10 | 0.023 | IV | 29.8( 47.9) |
| GSP | 34.3770 | 118.6980 | 01/18/1994 | 004308.9 | 11.0 | 5.20 | 0.026 | V | 29.8( 47.9) |
| GSB | 34.3790 | 118.7110 | 01/19/1994 | 210928.6 | 14.0 | 5.50 | 0.033 | V | 30.2( 48.6) |
| DMG | 34.3000 | 118.6000 | 04/04/1893 | 1940 0.0 | 0.0 | 6.00 | 0.050 | VI | 30.6( 49.3) |
| GSP | 34.2310 | 118.4750 | 03/20/1994 | 212012.3 | 13.0 | 5.30 | 0.025 | V | 32.3( 52.1) |
| GSP | 34.3260 | 118.6980 | 01/17/1994 | 233330.7 | 9.0 | 5.60 | 0.033 | V | 32.4( 52.1) |
| GSP | 34.2130 | 118.5370 | 01/17/1994 | 123055.4 | 18.0 | 6.70 | 0.077 | VII | 34.6( 55.7) |
| GSP | 34.2620 | 118.0020 | 06/28/1991 | 144354.5 | 11.0 | 5.40 | 0.025 | V | 34.6( 55.7) |
| DMG | 34.9500 | 118.8670 | 07/21/1952 | 121936.0 | 0.0 | 5.30 | 0.022 | IV | 35.5( 57.2) |
| DMG | 34.9000 | 118.9000 | 10/23/1916 | 244 0.0 | 0.0 | 6.00 | 0.041 | V | 35.6( 57.3) |
| DMG | 35.0000 | 118.8330 | 07/23/1952 | 181351.0 | 0.0 | 5.20 | 0.020 | IV | 35.9( 57.8) |
| DMG | 35.0000 | 118.8330 | 07/23/1952 | 75319.0 | 0.0 | 5.40 | 0.024 | IV | 35.9( 57.8) |
| DMG | 34.8670 | 118.9330 | 09/21/1941 | 1953 7.2 | 0.0 | 5.20 | 0.019 | IV | 36.5( 58.7) |
| DMG | 35.1500 | 118.6330 | 01/27/1954 | 141948.0 | 0.0 | 5.00 | 0.016 | IV | 36.5( 58.7) |
| T-A | 34.9200 | 118.9200 | 01/20/1857 | 0 0 0.0 | 0.0 | 5.00 | 0.016 | IV | 37.2( 59.9) |
| T-A | 34.9200 | 118.9200 | 05/23/1857 | 0 0 0.0 | 0.0 | 5.00 | 0.016 | IV | 37.2( 59.9) |
| DMG | 34.7000 | 119.0000 | 10/23/1916 | 254 0.0 | 0.0 | 5.50 | 0.024 | IV | 38.0( 61.2) |
| DMG | 34.9000 | 118.9500 | 08/01/1952 | 13 430.0 | 0.0 | 5.10 | 0.016 | IV | 38.2( 61.4) |
| DMG | 35.1830 | 118.6500 | 07/21/1952 | 151358.0 | 0.0 | 5.10 | 0.016 | IV | 38.9( 62.6) |
| GSP | 35.2100 | 118.0660 | 07/11/1992 | 181416.2 | 10.0 | 5.70 | 0.027 | V | 39.3( 63.2) |
| DMG | 35.2330 | 118.5330 | 07/21/1952 | 174244.0 | 0.0 | 5.10 | 0.016 | IV | 39.6( 63.7) |
| DMG | 35.1330 | 118.7670 | 07/21/1952 | 194122.0 | 0.0 | 5.50 | 0.023 | IV | 39.7( 63.8) |
| DMG | 34.9320 | 118.9760 | 03/01/1963 | 02557.9 | 13.9 | 5.00 | 0.014 | IV | 40.4( 65.1) |
| DMG | 34.9410 | 118.9870 | 11/15/1961 | 53855.5 | 10.7 | 5.00 | 0.013 | III | 41.3( 66.4) |
| DMG | 34.2000 | 117.9000 | 08/28/1889 | 215 0.0 | 0.0 | 5.50 | 0.021 | IV | 41.4( 66.7) |
| MGI | 34.0800 | 118.2600 | 07/16/1920 | 18 8 0.0 | 0.0 | 5.00 | 0.013 | III | 41.9( 67.4) |
| DMG | 34.9830 | 118.9830 | 05/23/1954 | 235243.0 | 0.0 | 5.10 | 0.014 | IV | 42.4( 68.2) |
| MGI | 34.1000 | 118.1000 | 07/11/1855 | 415 0.0 | 0.0 | 6.30 | 0.042 | VI | 42.4( 68.2) |
| DMG | 35.0000 | 119.0000 | 07/21/1952 | 12 531.0 | 0.0 | 6.40 | 0.044 | VI | 43.8( 70.5) |
| DMG | 35.0000 | 119.0000 | 02/16/1919 | 1557 0.0 | 0.0 | 5.00 | 0.012 | III | 43.8( 70.5) |
| PAS | 34.0730 | 118.0980 | 10/04/1987 | 105938.2 | 8.2 | 5.30 | 0.016 | IV | 44.2( 71.1) |
| DMG | 35.3110 | 118.4990 | 07/25/1952 | 1313 8.2 | 2.8 | 5.00 | 0.012 | III | 44.3( 71.3) |
| DMG | 34.3700 | 117.6500 | 12/08/1812 | 15 0 0.0 | 0.0 | 7.00 | 0.070 | VI | 44.3( 71.4) |
| DMG | 34.8000 | 119.1000 | 09/05/1883 | 1230 0.0 | 0.0 | 6.00 | 0.030 | V | 44.4( 71.5) |
| DMG | 35.0000 | 119.0170 | 01/12/1954 | 233349.0 | 0.0 | 5.90 | 0.027 | V | 44.6( 71.8) |
| DMG | 35.0000 | 119.0170 | 07/21/1952 | 115214.0 | 0.0 | 7.70 | 0.114 | VII | 44.6( 71.8) |
| DMG | 35.3170 | 118.4940 | 07/25/1952 | 19 944.6 | 5.5 | 5.70 | 0.023 | IV | 44.7( 71.9) |
| DMG | 35.3150 | 118.5160 | 07/25/1952 | 194323.7 | 11.2 | 5.70 | 0.023 | IV | 44.8( 72.1) |
| PAS | 34.0610 | 118.0790 | 10/01/1987 | 144220.0 | 9.5 | 5.90 | 0.027 | V | 45.3( 72.9) |
| DMG | 35.0000 | 119.0330 | 07/21/1952 | 12 2 0.0 | 0.0 | 5.60 | 0.020 | IV | 45.4( 73.1) |
| DMG | 35.2170 | 118.8170 | 07/23/1952 | 1317 5.0 | 0.0 | 5.70 | 0.022 | IV | 46.0( 74.0) |

EARTHQUAKE SEARCH RESULTS

Page 2

| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| MGI | 34.0000 | 118.3000 | 09/03/1905 | 540 0.0 | 0.0 | 5.30 | 0.015 | IV | 47.3( 76.0) |
| DMG | 35.3330 | 118.6000 | 07/31/1952 | 12 9 9.0 | 0.0 | 5.80 | 0.023 | IV | 47.3( 76.2) |
| T-A | 34.0000 | 118.2500 | 09/23/1827 | 0 0 0.0 | 0.0 | 5.00 | 0.011 | III | 47.4( 76.3) |
| T-A | 34.0000 | 118.2500 | 03/26/1860 | 0 0 0.0 | 0.0 | 5.00 | 0.011 | III | 47.4( 76.3) |
| T-A | 34.0000 | 118.2500 | 01/10/1856 | 0 0 0.0 | 0.0 | 5.00 | 0.011 | III | 47.4( 76.3) |
| MGI | 34.0000 | 118.5000 | 11/19/1918 | 2018 0.0 | 0.0 | 5.00 | 0.011 | III | 48.2( 77.6) |
| DMG | 34.0000 | 118.5000 | 08/04/1927 | 1224 0.0 | 0.0 | 5.00 | 0.011 | III | 48.2( 77.6) |
| DMG | 35.3670 | 118.5830 | 07/23/1952 | 31923.0 | 0.0 | 5.00 | 0.010 | III | 49.3( 79.3) |
| DMG | 35.3670 | 118.5830 | 07/23/1952 | 03832.0 | 0.0 | 6.10 | 0.029 | V | 49.3( 79.3) |
| DMG | 34.3000 | 117.6000 | 07/30/1894 | 512 0.0 | 0.0 | 6.00 | 0.026 | V | 49.3( 79.3) |
| DMG | 35.3000 | 118.8000 | 12/23/1905 | 2223 0.0 | 0.0 | 5.00 | 0.010 | III | 50.2( 80.7) |
| MGI | 34.0000 | 118.0000 | 12/25/1903 | 1745 0.0 | 0.0 | 5.00 | 0.010 | III | 50.8( 81.8) |
| GSP | 35.3900 | 118.6230 | 09/29/2004 | 225454.2 | 3.0 | 5.00 | 0.010 | III | 51.5( 82.8) |
| GSP | 34.1400 | 117.7000 | 02/28/1990 | 234336.6 | 5.0 | 5.20 | 0.012 | III | 51.9( 83.6) |
| DMG | 34.2700 | 117.5400 | 09/12/1970 | 143053.0 | 8.0 | 5.40 | 0.013 | III | 53.3( 85.7) |
| DMG | 33.9500 | 118.6320 | 08/31/1930 | 04036.0 | 0.0 | 5.20 | 0.011 | III | 53.5( 86.1) |
| DMG | 34.3000 | 117.5000 | 07/22/1899 | 2032 0.0 | 0.0 | 6.50 | 0.036 | V | 54.2( 87.2) |
| GSP | 35.1490 | 119.1040 | 05/28/1993 | 044740.6 | 21.0 | 5.20 | 0.011 | III | 54.3( 87.4) |
| PAS | 33.9440 | 118.6810 | 01/01/1979 | 231438.9 | 11.3 | 5.00 | 0.009 | III | 54.9( 88.3) |
| PAS | 33.9190 | 118.6270 | 01/19/1989 | 65328.8 | 11.9 | 5.00 | 0.009 | III | 55.5( 89.3) |
| DMG | 35.3330 | 118.9170 | 08/22/1952 | 224124.0 | 0.0 | 5.80 | 0.018 | IV | 55.8( 89.7) |
| DMG | 35.3830 | 118.8500 | 07/29/1952 | 7 347.0 | 0.0 | 6.10 | 0.023 | IV | 56.5( 90.9) |
| DMG | 35.4000 | 118.8170 | 07/29/1952 | 8 146.0 | 0.0 | 5.10 | 0.009 | III | 56.6( 91.1) |
| DMG | 33.8500 | 118.2670 | 03/11/1933 | 1425 0.0 | 0.0 | 5.00 | 0.008 | III | 57.7( 92.8) |
| DMG | 34.0650 | 119.0350 | 02/21/1973 | 144557.3 | 8.0 | 5.90 | 0.018 | IV | 58.7( 94.4) |
| GSG | 33.9530 | 117.7610 | 07/29/2008 | 184215.7 | 14.0 | 5.30 | 0.010 | III | 60.0( 96.6) |
| DMG | 35.5000 | 118.7000 | 01/06/1905 | 1430 0.0 | 0.0 | 5.00 | 0.008 | II | 60.1( 96.7) |
| DMG | 34.0000 | 119.0000 | 09/24/1827 | 4 0 0.0 | 0.0 | 7.00 | 0.046 | VI | 60.7( 97.7) |
| MGI | 34.0000 | 119.0000 | 12/14/1912 | 0 0 0.0 | 0.0 | 5.70 | 0.015 | IV | 60.7( 97.7) |

-END OF SEARCH- 82 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2012

LENGTH OF SEARCH TIME: 213 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 13.6 MILES (21.9 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.7

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.133 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 1.230
b-value= 0.374
beta-value= 0.862

TABLE OF MAGNITUDES AND EXCEEDANCES:

| Earthquake Magnitude | Number of Times Exceeded | Cumulative No. / Year |
|---|---|---|
| 4.0 | 82 | 0.38679 |
| 4.5 | 82 | 0.38679 |
| 5.0 | 82 | 0.38679 |
| 5.5 | 33 | 0.15566 |
| 6.0 | 15 | 0.07075 |
| 6.5 | 6 | 0.02830 |
| 7.0 | 4 | 0.01887 |
| 7.5 | 1 | 0.00472 |

# APPENDIX E

# EARTHWORK AND GRADING GUIDE SPECIFICATIONS

# APPENDIX E

# LEIGHTON CONSULTING, INC.
# EARTHWORK AND GRADING GUIDE SPECIFICATIONS

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# E-1.0 GENERAL

## E-1.1 Intent

These Earthwork and Grading Guide Specifications are for grading and earthwork shown on the current, approved grading plan(s) and/or indicated in the Leighton Consulting, Inc. geotechnical report(s). These Guide Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the project-specific recommendations in the geotechnical report shall supersede these Guide Specifications. Leighton Consulting, Inc. shall provide geotechnical observation and testing during earthwork and grading. Based on these observations and tests, Leighton Consulting, Inc. may provide new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

## E-1.2 Role of Leighton Consulting, Inc.

Prior to commencement of earthwork and grading, Leighton Consulting, Inc. shall meet with the earthwork contractor to review the earthwork contractor's work plan, to schedule sufficient personnel to perform the appropriate level of observation, mapping and compaction testing. During earthwork and grading, Leighton Consulting, Inc. shall observe, map, and document subsurface exposures to verify geotechnical design assumptions. If observed conditions are found to be significantly different than the interpreted assumptions during the design phase, Leighton Consulting, Inc. shall inform the owner, recommend appropriate changes in design to accommodate these observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include (1) natural ground after clearing to receiving fill but before fill is placed, (2) bottoms of all "remedial removal" areas, (3) all key bottoms, and (4) benches made on sloping ground to receive fill.

Leighton Consulting, Inc. shall observe moisture-conditioning and processing of the subgrade and fill materials, and perform relative compaction testing of fill to determine the attained relative compaction. Leighton Consulting, Inc. shall provide *Daily Field Reports* to the owner and the Contractor on a routine and frequent basis.

## E-1.3 The Earthwork Contractor

The earthwork contractor (Contractor) shall be qualified, experienced and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Guide Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing grading and backfilling in accordance with the current, approved plans and specifications.

The Contractor shall inform the owner and Leighton Consulting, Inc. of changes in work schedules at least one working day in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that Leighton Consulting, Inc. is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish earthwork and grading in accordance with the applicable grading codes and agency ordinances, these Guide Specifications, and recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of Leighton Consulting, Inc., unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, Leighton Consulting, Inc. shall reject the work and may recommend to the owner that earthwork and grading be stopped until unsatisfactory condition(s) are rectified.

## E-2.0 PREPARATION OF AREAS TO BE FILLED

### E-2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies and Leighton Consulting, Inc. Care should be taken not to encroach upon or otherwise damage native and/or historic trees designated by the Owner or appropriate agencies to remain. Pavements, flatwork or other construction should not extend under the “drip line” of designated trees to remain.

Leighton Consulting, Inc. shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 3 percent of organic materials (by dry weight: ASTM D 2974). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area. As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

### E-2.2 Processing

Existing ground that has been declared satisfactory for support of fill, by Leighton Consulting, Inc., shall be scarified to a minimum depth of 6 inches (15 cm). Existing ground that is not satisfactory shall be overexcavated as specified in the following Section E-2.3. Scarification

shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

### E-2.3 Overexcavation

In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by Leighton Consulting, Inc. during grading. All undocumented fill soils under proposed structure footprints should be excavated

### E-2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), (>20 percent grade) the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet (4.5 m) wide and at least 2 feet (0.6 m) deep, into competent material as evaluated by Leighton Consulting, Inc. Other benches shall be excavated a minimum height of 4 feet (1.2 m) into competent material or as otherwise recommended by Leighton Consulting, Inc. Fill placed on ground sloping flatter than 5:1 (horizontal to vertical units), (<20 percent grade) shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

### E-2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by Leighton Consulting, Inc. as suitable to receive fill. The Contractor shall obtain a written acceptance (*Daily Field Report*) from Leighton Consulting, Inc. prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

## E-3.0 FILL MATERIAL

### E-3.1 Fill Quality

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by Leighton Consulting, Inc. prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to Leighton Consulting, Inc. or mixed with other soils to achieve satisfactory fill material.

### E-3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 6 inches (15 cm), shall not be buried or placed in fill unless location, materials and

placement methods are specifically accepted by Leighton Consulting, Inc. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet (3 m) measured vertically from finish grade, or within 2 feet (0.61 m) of future utilities or underground construction.

### E-3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section E-3.1, and be free of hazardous materials ("contaminants") and rock larger than 3-inches (8 cm) in largest dimension. All import soils shall have an Expansion Index (EI) of 20 or less and a sulfate content no greater than (≤) 500 parts-per-million (ppm). A representative sample of a potential import source shall be given to Leighton Consulting, Inc. at least four full working days before importing begins, so that suitability of this import material can be determined and appropriate tests performed.

## E-4.0 FILL PLACEMENT AND COMPACTION

### E-4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill, as described in Section E-2.0, above, in near-horizontal layers not exceeding 8 inches (20 cm) in loose thickness. Leighton Consulting, Inc. may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers, and only if the building officials with the appropriate jurisdiction approve. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

### E-4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM) Test Method D 1557.

### E-4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density as determined by ASTM Test Method D 1557. For fills thicker than 15 feet (4.5 m), the portion of the fill deeper than 15 feet below proposed finish grade shall be compacted to 95 percent of the ASTM D 1557 laboratory maximum density. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

### E-4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet (1 to 1.2 m) in fill elevation, or by other methods producing satisfactory results acceptable to Leighton Consulting, Inc. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of the ASTM D 1557 laboratory maximum density.

### E-4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by Leighton Consulting, Inc. Location and frequency of tests shall be at our field representative(s) discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

### E-4.6 Compaction Test Locations

Leighton Consulting, Inc. shall document the approximate elevation and horizontal coordinates of each density test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that Leighton Consulting, Inc. can determine the test locations with sufficient accuracy. Adequate grade stakes shall be provided.

## E-5.0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by Leighton Consulting, Inc. during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by Leighton Consulting, Inc. based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by Leighton Consulting, Inc. prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by Leighton Consulting, Inc.

## E-6.0 TRENCH BACKFILLS

### E-6.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations. Work should be performed in accordance with Article 6 of the *California Construction Safety Orders*, latest edition (see also: http://www.dir.ca.gov/title8/sb4a6.html ).

### E-6.2 Bedding and Backfill

All utility trench bedding and backfill shall be performed in accordance with applicable provisions of the latest edition of the *Standard Specifications for Public Works Construction*

(Green Book). Bedding material shall have a Sand Equivalent greater than 30 (SE>30). Bedding shall be placed to 1-foot (0.3 m) over the top of the conduit, and densified by jetting in areas of granular soils, if allowed by the permitting agency. Otherwise, the pipe bedding zone should be backfilled with Controlled Low Strength Material (CLSM) consisting of at least one sack of Portland cement per cubic-yard of sand, and conforming to Section 201-6 of the 2009 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Backfill over the bedding zone shall be placed and densified mechanically to a minimum of 90 percent of relative compaction (ASTM D 1557) from 1 foot (0.3 m) above the top of the conduit to the surface. Backfill above the pipe zone shall **not** be jetted. Jetting of the bedding around the conduits shall be observed by Leighton Consulting, Inc. and backfill above the pipe zone (bedding) shall be observed and tested by Leighton Consulting, Inc.

### E-6.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to Leighton Consulting, Inc. that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method, and only if the building officials with the appropriate jurisdiction approve.

# APPENDIX E

# PHASE I ENVIRONMENTAL SITE ASSESSMENT

# PHASE I ENVIRONMENTAL SITE ASSESSMENT, PROPOSED 20-MWAC PHOTOVOLTAIC ARRAY, WEST OF 110TH STREET WEST, NORTH AND SOUTH OF WEST AVENUE J, LANCASTER AREA, UNINCORPORATED LOS ANGELES COUNTY, CALIFORNIA

Prepared For:

**CANADIAN SOLAR (USA) INC.**
12657 Alcosta Boulevard, Suite 130
San Ramon, California 94583

Project No. 603455-002

July 3, 2012

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

July 3, 2012

Project No. 603455-002

To: Canadian Solar (USA) Inc.
12657 Alcosta Blvd., Suite 130
San Ramon, California 94583

Attention: Mr. Antonio Rodriguez, Senior Project Engineer

Subject: Phase I Environmental Site Assessment for Proposed 20-MWAC Photovoltaic Array, West of 110th Street West, North and South of West Avenue J, Lancaster Area, Unincorporated Los Angeles County, California

Leighton Consulting, Inc. (Leighton Consulting) is pleased to present this Phase I Environmental Site Assessment Report for the subject property. Leighton Consulting declares that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312.

Leighton Consulting personnel have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. Leighton Consulting has developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

If you have questions regarding this report, please contact me at (909) 527-8782 or by e-mail at rorr@leightongroup.com. We appreciate the opportunity to be of service.

PROFESSIONAL GEOLOGIST
RICHARD L. ORR
No. PG 7199
Exp 9/30/13
STATE OF CALIFORNIA

Respectfully submitted,

LEIGHTON CONSULTING, INC.

Richard Orr, PG
Associate Geologist

WS/RLO/gv

Distribution: (3) Addressee

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# 1.0 INTRODUCTION

## 1.1 Authorization

Leighton Consulting, Inc. (Leighton Consulting) performed a Phase I Environmental Site Assessment (ESA) of the property located west of 110th Street West and north and south of West Avenue J, near Lancaster in an unincorporated area of Los Angeles County, California (collectively referred to as the "subject property" – Figure 1) in accordance with Canadian Solar (USA), Inc.'s (Client) authorization.

## 1.2 Purpose

The purpose of the Phase I ESA was to identify, to the extent feasible pursuant to the processes prescribed in ASTM International (ASTM) E 1527-05 recognized environmental conditions (RECs) in connection with the subject property. RECs are defined as: *the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimus conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de minimus are not recognized environmental conditions*" (ASTM E 1527-05, 2005).

## 1.3 Scope of Work

The scope of work was performed in accordance with Leighton Consulting's proposal and included the following tasks:

- A reconnaissance-level visit of the subject property for evidence of release(s) of hazardous materials and petroleum products and to assess the potential for onsite releases of hazardous materials and petroleum products;
- Records Review (including review of previous environmental reports, selected governmental databases, and historical review);

- Interviews; and
- Preparation of a report presenting our findings.

## 1.4 Significant Assumptions

Leighton Consulting assumes that the purpose of this ESA is to provide appropriate inquiry into the previous ownership and use of the subject property so that the Client may qualify for the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) landowner liability protections as defined in CERCLA, 42 USC §9601(35)(B). Leighton Consulting also assumes that the information provided by the Client and its agents, regulatory database provider, and regulatory agencies is true and reliable.

## 1.5 Limitations and Exceptions

Site-specific activities performed by Leighton Consulting and information collected regarding these activities are summarized in the following sections. The findings of this ESA are presented in Section 7.0. Opinions, and conclusions drawn by Leighton Consulting, based on the information collected as part of the ESA, are presented in Sections 8.0 and 9.0, respectively.

This ESA was conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions.

The observations and conclusions presented in this report are professional opinions based on the scope of activities, work schedule, and information obtained through the ESA described herein. Opinions presented herein apply to site conditions existing at the time of our study and cannot necessarily be taken to apply to site conditions or changes that we are not aware of or have not had the opportunity to evaluate. It must be recognized that conclusions drawn from these data are limited to the amount, type, distribution, and integrity of the information collected at the time of the investigation, the methods utilized to collect and evaluate the data, and that a full and complete determination of environmental risks cannot be made. Although Leighton Consulting has taken steps to obtain true copies of available information, we make no representation or warranty with respect to the accuracy or completeness of this information.

This practice does not address whether requirements in addition to all appropriate inquiry have been met in order to qualify for the landowner liability protections including the continuing obligation not to impede the integrity and effectiveness of activity and use limitations, or the duty to take reasonable steps to prevent releases, or the duty to comply with legally required release reporting obligations. Users should also be aware that there are likely to be other legal obligations with regard to hazardous substances or petroleum products discovered on the subject property that are not addressed in this practice and that may pose risks of civil and/or criminal sanctions for non-compliance.

## 1.6 Special Terms and Conditions

The scope of work for this Phase I ESA did not include testing of electrical equipment for the presence of polychlorinated biphenyls (PCBs) or collection of other environmental samples such as air, soil, water, building materials, paint, or other media; assessment of the potential presence of radionuclides; or assessment of non-chemical hazards such as the potential for damage from earthquakes or floods, or the presence of endangered species or wildlife habitats. This ESA also did not include an extensive assessment of the environmental compliance status of the subject property or of businesses operating at the subject property, or a health-based risk assessment.

## 1.7 User Reliance

This report is for the exclusive use of Canadian Solar (USA), Inc. and Tuusso Energy, LLC. Use of this report by other parties shall be at such party's sole risk.

## 1.8 Important Information About Geoenvironmental Reports

The Client is referred to Appendix G regarding important information provided by the Associated Soil and Foundation Engineers (ASFE) on geoenvironmental studies and reports.

# 2.0 SITE DESCRIPTION

## 2.1 Location and Legal Description

The subject property is located west of 110th Street West and north and south of West Avenue J near Lancaster, in an unincorporated area of Los Angeles County, California (Figure 1). The Los Angeles County Assessor's office designates the subject property as Assessor Parcel Numbers (APNs) 3267-004-016 through 3267-004-018, 3267-004-025 through 3267-004-029, 3267-004-044 through 3267-004-046, and 3267-014-017 through 3267-014-020. Addresses were not found associated with these APN numbers.

## 2.2 Site and Vicinity General Characteristics

The immediate site vicinity consists primarily of undeveloped vacant land.

## 2.3 Current Use of the Subject Property

The subject property consists of approximately 250 acres of vacant, undeveloped land (Photos 1 through 15, Appendix B).

## 2.4 Descriptions of Structures, Roads and Other Improvements on the Site

The subject property is bisected by West Avenue J. Transmission line towers flank the west and south sides of the subject property. No other significant structures were observed. Utilities are not connected to the subject property, however, transmission line towers exist along the west and south edges of the subject property.

## 2.5 Current Uses of Adjoining Properties

The subject property is bordered to the east by 110th Street West followed by vacant land, to the west by 115th Street West followed by vacant land, to the south by West Avenue J8 followed by vacant land, and to the north by undeveloped land. Land to the north and east of the subject property has a few isolated residences, but the majority of the adjoining land is undeveloped.

# 3.0 USER PROVIDED INFORMATION

The User of this Phase I ESA is identified as Canadian Solar (USA) Inc. As a part of the ASTM E 1527-05 process, Mr. Antonio Rodriguez completed a user questionnaire on the subject property. A copy of this questionnaire is provided in Appendix C.

## 3.1 Title Records

Leighton Consulting was provided preliminary title reports for our review which were prepared by Fidelity National Title Company, dated April 26, 2010, and North American Title Company, dated May 25, 2010. According to the title reports, the subject property is owned by Antonios Margaritis, private owner, A.V. Foothills, LLC, and Royal Investors Group, LLC, a California limited liability company. Evidence of recognized environmental conditions was not found in the preliminary title report. Copies of the preliminary title reports are provided in Appendix C.

Leighton Consulting also researched environmental liens through GeoSearch. According to the Environmental Lien Search, effective date April 9, 2010, environmental liens, institutional controls (ICs), land use controls (LUCs), activity and usage limitations (AULs), declaration of environmental use restrictions (DEURs), and judgments were not identified for the subject property. A copy of the lien search is included in Appendix D and references are provided in Appendix A.

## 3.2 Environmental Liens or Activity and Use Limitations

Mr. Rodriguez was not aware of evidence of environmental liens or activity or land use limitations for the subject property.

## 3.3 Specialized Knowledge

Neither the user nor the owners have specialized knowledge related to the subject property.

## 3.4 Commonly Known or Reasonably Ascertainable Information

Mr. Rodriguez states that Canadian Solar (USA) Inc. is aware of the previous use of the subject property, however both the user and owners are not aware of

any chemicals used at the property, any chemicals that may have been released, or chemicals that have been cleaned up at the subject property.

3.5 Valuation Reduction for Environmental Issues

Information regarding valuation reduction for environmental issues was not provided by the user or owners.

3.6 Owner, Property Manager, and Occupant Information

The following information was provided to Leighton:

| APN | Owner |
|---|---|
| 3267-004-016 | Antonios Margaritis |
| 3267-004-017 | |
| 3267-004-018 | |
| 3267-004-025 | |
| 3267-004-026 | |
| 3267-004-027 | |
| 3267-004-028 | |
| 3267-004-029 | |
| 3267-004-044 | |
| 3267-004-045 | |
| 3267-004-046 | |
| 3267-014-017 | A.V. Foothills, LLC |
| 3267-014-018 | |
| 3267-014-019 | Royal Investors Group, LLC |
| 3267-014-020 | |

3.7 Reason for Performing Phase I ESA

The purpose of this ESA is to provide due diligence for the proposed property purchase.

3.8 Other

Other information was not provided to Leighton Consulting.

# 4.0 RECORDS REVIEW

## 4.1 Physical Setting Source(s)

Leighton Consulting reviewed pertinent maps and readily available literature for information on the physiography and hydrogeology of the subject property. A summary of this information is presented in the following subsections.

### 4.1.1 Topography

The subject property is located within Section 14 and 23 of Township 7 North, Range 14 West near Lancaster, in an unincorporated area of Los Angeles County, California. Topographic map coverage of the subject property is provided by the United States Geological Survey (USGS) *Del Sur, California* Quadrangle (1995). The elevation of the property is approximately 2,550-feet above mean sea level (msl) and slopes gently to the northeast.

### 4.1.2 Surface Water

Surface water was not observed on the subject property. Several ephemeral stream channels are depicted on the subject property and surrounding sites, however, evidence of recent water flow was not observed. The California Aqueduct is located approximately 0.8 miles to the southwest of the subject property.

### 4.1.3 Geology and Soils

The subject property is located within the Antelope Valley portion of the Mojave Desert Geomorphic Province of California. The Antelope Valley lies within a wedge-shaped part of the Mojave Desert bounded by the San Andreas Fault to the southwest and the Garlock Fault to the northwest (CGS, 2002). The subject property is underlain by Quaternary-aged alluvium and colluvium of unknown depth (CGS, 2005).

### 4.1.4 Hydrogeology

A review of the Seismic Hazard Zone Report for the Del Sur 7.5-Minute Quadrangle at the subject property shows groundwater ranging from

approximately 275 feet below ground surface (bgs) to 350 feet bgs (CGS, 2005). Groundwater is assumed to flow to the east/northeast.

4.1.5 Oil and Gas Fields

Leighton Consulting reviewed the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR), Online Mapping System, updated May 17, 2012. Oil or gas wells were not identified on the subject property; however, a plugged and abandoned well was mapped approximately 0.3 miles to the southwest of the subject property. In addition, the GeoSearch Oil & Gas Report identified the same plugged and abandoned dry well identified within the oil and gas well report is located approximately 0.3 miles south-southwest of the subject property. A copy of this report has been provided in Appendix F.

4.1.6 Naturally Occurring Hazardous Materials

The California Department of Health Services maintains a database of indoor radon levels that are sorted by zip code. According to the most recent update prepared on May 4, 2010, of the 32 tests that were completed in the subject property's zip code of 93536, one test (or 3.13 %) exceeded 4pCi/L (CDHS, 2010).

In addition, the GeoSearch GeoPlus Radius Report identified the subject property to be within Radon Zone 2, an EPA-designated, geographically specific zone designed to demonstrate potential radon exposure levels to national, state, and local organizations. In Radon Zone 2, radon exposure potential is considered to be moderate, and has a predicted average indoor radon screening level between 2 and 4 pCi/L (EPA, 2012, GeoSearch, 2012). The potential for elevated radon levels at the subject property appears to be low to moderate.

A review of the *Del Sur, California* 7.5-minute quadrangle indicated that no mines or mining prospects were depicted within 1.0 miles of the subject property. Therefore, no impacts are expected from mining wastes or natural mineralization.

## 4.2 Standard Environmental Record Sources

A search of selected government databases was conducted by Leighton Consulting using GeoSearch. Details of the databases search along with descriptions of each database researched are provided in the GeoSearch GeoPlus Radius report. The report meets the government records search requirements of ASTM E 1527-05 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. The database listings were reviewed within the specified radii established by the ASTM E 1527-05. A copy of this report is included in Appendix D.

### 4.2.1 Site

The subject property was not identified in the GeoSearch GeoPlus Radius report.

### 4.2.2 Offsite

Adjacent or nearby properties were not identified in the GeoSearch Geoplus Radius report within the specified radii established by ASTM E 1527-05.

One location was listed within the GeoSearch Geoplus Radius Report as “unlocatable”. Unlocatable listings are properties without a complete street address and therefore cannot be located on a map, or are non-geocoded. Leighton Consulting reviewed the listing to evaluate if the property was possibly located near the subject property. The listing, a Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) site, was identified in the Radius Report to be 0.5 miles from the subject property (GeoSearch Radius Report, 2012). However, since the CERCLIS site could not be located, its impact on the subject site could not be evaluated.

## 4.3 Additional Environmental Record Sources

### 4.3.1 Regulatory Agency Consultations

Leighton Consulting requested regulatory records from the following agencies. It should be noted that the subject property does not have a

physical address; therefore, APNs were utilized. It is Leighton Consulting's experience that records often cannot be found without a site address. Copies of the records requests and associated responses can be found in Appendix E.

On June 6, 2012, a file review request was forwarded to the Los Angeles County Department of Public Works via facsimile. Per a return facsimile received on June 11, 2012, the Los Angeles County Department of Public Works indicated that they do not have records for the subject property.

On June 6, 2012, a pipeline location certification request was forwarded to the Office of the State Fire Marshal via facsimile. A response from the State Fire Marshal via email directed Leighton Consulting to records posted on the National Pipeline Mapping System's NPMS Public Map Viewer. Searches were conducted by reviewing the Site and surrounding areas. No pipelines were shown on the Site or in surrounding areas (NPMS, 2012).

On June 6, 2012, a file review request was forwarded to the Custodian of Records at Los Angeles County Public Health Investigations via facsimile. Per a return facsimile received on June 7, 2012, Los Angeles County Public Health Investigations could not process the request without a site address.

On June 6, 2012, a file review request was forwarded to the Los Angeles County Sanitation District via facsimile. Per a return voicemail message received on June 12, 2012, the Los Angeles County Sanitation District does not have records for the subject property.

On June 7, 2012, a file review request was forwarded to the Lahontan Regional Water Quality Control Board via email. Per a return email received on June 8, 2012, the Board could not complete the request without a facility name, address, or WDID number.

On June 7, 2012, a file review request was forwarded to the Department of Toxic Substances Control offices in Cypress and Chatsworth, California via facsimile. Per return letters dated June 8 (Cypress office) and June 12 (Chatsworth office), 2012, Department of Toxic Substances Control offices did not have records for the subject property.

On June 7, 2012, a search of the State of California GeoTracker online database showed no locations of concern on or within a 1.0-mile radius of the subject property.

On June 7, 2012, a search of the South Coast Air Quality Control District's Facility INformation Detail (FIND) online database was not able to show records without an address, school or facility name.

#### 4.3.2 Previous Environmental Assessment Reports

Previous environmental reports were not available for the subject property.

### 4.4 Historical Use Information on the Property

Leighton Consulting reviewed selected historical information on the subject property. These references were reviewed for evidence of activities, which would suggest the potential presence of hazardous substances at the subject property and to evaluate the potential for the subject property to be impacted by offsite sources of contamination. The following paragraphs are a chronological summary of the review.

#### 4.4.1 Aerial Photographs

Historical aerial photographs were reviewed for information regarding past subject property uses. Aerial photographs were reviewed for the following years: 1954, 1968, 1989, 1995, and 2009. References are provided in Appendix A and copies of the aerial photographs are included in Appendix F.

In the **1954** aerial photograph, the subject property and all adjacent properties observed appear to be used for agricultural purposes. 110$^{th}$ Street West and West Avenue J were observed as dirt roads. No structures were identified in the photograph. A dirt road borders the subject property to the south (along West Avenue J8). Adjacent properties were also observed to be used for agricultural purposes.

In the **1968** aerial photograph, only the northern portion of the subject property was observed to be used for agricultural purposes. The southern

portion of the subject property appears to be vacant land. 110th Street West and West Avenue J are observed as dirt roads. No structures were identified in the photograph. The adjacent property to the northeast is also used for agricultural purposes. Adjacent to the east, west, and north appears to be vacant land. The property adjacent to the south was not visible in this aerial photograph.

In the **1989** aerial photograph, the subject property appears to be vacant land. A large clearing is present in the southern portion of the subject property along with more dirt roads. A structure is present along the north side of West Avenue J, east of the subject property. 110th Street West, West Avenue J, West Avenue J8, 115th Street West, and Lancaster Boulevard are depicted. 110th Street West and a portion of West Avenue J have been paved.

In the **1995** aerial photograph, significant changes were not observed on the subject property or on adjacent properties.

In the **2009** aerial photograph, significant changes were not observed on the subject property or on adjacent properties.

4.4.2 Historical Topographic Maps

Historical topographic maps were reviewed for information regarding past subject property uses. Topographic map coverage of the subject property vicinity is provided by GeoSearch Historical Topographic Maps: *Del Sur Quadrangle* (1:24,000) (1958, 1958 photorevised 1974, and 1995). References are provided in Appendix A and copies of the maps have been provided in Appendix F.

**1958:** Structures, tanks or wells were not depicted on the subject property or on adjacent properties. Two intermittent streams transect the northern portion of the subject property. 110th Street West and West Avenue J are depicted on the topographic maps.

**1958 Photorevised 1974:** The subject property and surrounding properties do not appear to have changed significantly.

**1995:** The subject property and surrounding properties do not appear to have changed significantly, except that dirt roads are depicted throughout the southern property.

4.4.3 Fire Insurance Maps

Fire insurance maps, or Sanborn® maps, are detailed city plans showing building footprints, construction details, use of structure, street address, etc. The maps were designed to assist fire insurance agents in evaluating the degree of hazard associated with a particular property. Sanborn Maps were produced from approximately 1867 to the present for commercial, industrial, and residential sections of approximately 12,000 cities and towns in the United States.

According to the report by GeoSearch, there is no Sanborn Fire Insurance Map coverage for the subject property. A copy of this report has been provided in Appendix F.

4.4.4 Historical City Directories

According to the report by GeoSearch, there is no city directory coverage for the subject property. A copy of this report has been provided in Appendix F.

4.4.5 Building Department, Zoning and/or Land Use Records

The subject property does not have a physical address and no structures were evident during our historical review and site reconnaissance. It is Leighton Consulting's experience that building department records can only be researched by using an address. Since there is not an address associated with the subject property, building department records could not be researched.

4.4.6 Other Historical Sources

Additional resources were not researched as a part of this assessment.

### 4.4.7 Summary of Historical Land Use

Based on historical records, land usage is summarized as follows:

| Time Period | Land Usage | Reference |
|---|---|---|
| Prior to 1954 | Unknown | None Available |
| Approximately 1954 to 1968 | Agricultural | Aerial Photographs |
| Approximately 1968 to present | Vacant Land<br>Grazing Land | Aerial Photographs<br>Site Reconnaissance |

# 5.0 SITE RECONNAISSANCE

## 5.1 Methodology and Limiting Conditions

On June 13, 2012, a representative of Leighton Consulting conducted a reconnaissance–level assessment of the subject property. The site reconnaissance consisted of the observation and documentation of existing conditions on the subject property and nature of the neighboring property development. Photographs of the subject property are presented in Appendix B and the location where the photographs were taken and their view directions are noted on Figure 2.

## 5.2 General Site Setting

The subject property consists of approximately 250 acres of vacant, undeveloped land. The subject property is bounded to the east by 110th Street West, to the west by 115th Street West, to the south by West Avenue J8, and the north is bounded by undeveloped land extending north approximately 300 feet to Lancaster Boulevard. The subject property is bisected by West Avenue J. Transmission lines bound the west and southern property boundaries. Aside from small, infrequently traveled dirt roads, there are no significant structures on any of the property. Utilities are not connected to the subject property, however, transmission line towers exist along the west and south edges of the subject property.

## 5.3 Exterior and Interior Observations

### 5.3.1 Hazardous Substances, Drums, and Other Chemical Containers

One empty automotive oil container had been discarded at the eastern property boundary along 110th Street West, south of West Avenue J (Photos 12 and 13, Appendix B). Staining was not observed on the ground surface beneath the container.

### 5.3.2 Storage Tanks

Evidence of underground storage tanks (USTs) (such as vent lines, fill or overfill ports) or aboveground storage tanks (ASTs) were not observed on the subject property.

5.3.3 Polychlorinated Biphenyls (PCBs)

No evidence of PCBs was observed on the subject property. No pole- or pad-mounted transformers were identified on the subject property.

5.3.4 Waste Disposal

As the subject property is vacant land, there is currently no waste disposal.

5.3.5 Dumping

Evidence of scattered, uncontrolled dumping was observed on the subject property. Dumped materials were often solitary and consisted of carpet, wood, tires, concrete, rusted metal cans, plastics, fiberglass, glass bottles, an empty oil container (mentioned in section 5.3.1), and other materials. Small quantities of windblown objects were also observed throughout the subject property. None of these materials appeared to be RECs.

5.3.6 Pits, Ponds, Lagoons, Septic Systems, Wastewater, Drains, Cisterns, and Sumps

No evidence of pits, ponds, lagoons, septic systems, wastewater, drains, cisterns, or sumps were observed on the subject property. Natural depressions were evident across the subject property.

5.3.7 Pesticide Use

Pesticides were not observed on the subject property. It is not known if pesticides were previously applied to the subject property as a result of former agricultural use.

5.3.8 Staining, Discolored Soils, Corrosion

Staining was not observed location on the subject property.

5.3.9 Stressed Vegetation

Areas of limited vegetation were observed on the subject property. However, it is Leighton Consulting's opinion that the vegetation difference

is likely a result of flowing/standing water over the northern portion of the subject property.

5.3.10 Unusual Odors

No unusual odors were detected on the subject property.

5.3.11 Onsite Wells

The GeoSearch™ GeoPlus Water Well Report identified a National Water Information System (NWIS) well and a California Department of Water Resources (DWR) well in the northern portion of the subject property. The two wells were not found during the site reconnaissance. A copy of the report is included in Appendix D and a reference is provided in Appendix A.

5.3.12 Other Observations

No other conditions were observed on the subject property.

# 6.0 INTERVIEWS

Leighton Consulting conducted interviews with persons having knowledge of current or past subject property usage. Interviews were conducted either orally or in the form of a written questionnaire. Written responses are included as Appendix C.

## 6.1 Interview with Owners

A Standard Phase I ESA Owner/Site Contact Interview Form was forwarded to each of the owners by Mr. Antonio Rodriguez of Canadian Solar (USA), Inc.

| APN | Owner | Description |
|---|---|---|
| 3267-004-016 through -018, 3267-004-025 through -029, 3267-004-044 through -046 | Antonios Margaritis | On June 22, 2012, Leighton Consulting received an Interview Form, completed by Mr. Antonios Margaritis, from Mr. Antonio Rodriguez via electronic mail. Mr. Margaritis indicated that this portion of the subject property was purchased in 1981. Mr. Margaritis was not aware of any environmental concerns associated with the subject property or any adjacent properties. |
| 3267-014-017 and -018 | A.V. Foothills, LLC | No information provided. |
| 3267-014-019 and -020 | Royal Investors Group, LLC | On June 22, 2012, Leighton Consulting received an Interview Form, completed by Mr. Jamshid Goltche of Royal Investors Group, LLC, from Mr. Antonio Rodriguez via electronic mail. Mr. Goltche is a managing member of the owner. Mr. Goltche did not indicate when this portion of the subject property was purchased. Mr. Goltche was not aware of any environmental concerns associated with the subject property or any adjacent properties. |

## 6.2 Interview with Site/Property Manager

No site or property manager was present.

## 6.3 Interviews with Occupants

The subject property is not currently occupied.

## 6.4 Interviews with Local Government Officials

Leighton Consulting did not interview employees with local government agencies to request information regarding historic and current uses of the subject property with the exception of those noted in Section 4.2.

## 6.5 Interviews with Others

Leighton Consulting did not interview others as part of this Phase I ESA.

# 7.0 FINDINGS

Leighton Consulting performed a Phase I ESA of the property located west of 110th Street West and north and south of West Avenue J, near Lancaster, in an unincorporated area of Los Angeles County, California and identified as APNs 3267-004-016 through 3267-004-018, 3267-004-025 through 3267-004-029, 3267-004-044 through 3267-004-046, and 3267-014-017 through 3267-014-020-in accordance with Canadian Solar (USA) Inc.'s authorization.

## 7.1 Onsite

Historically, the subject property was vacant land that appears to have been used for agricultural purposes. Currently, the subject property consists of vacant, undeveloped land. The subject property is bounded to the east by 110th Street West, to the west by 115th Street West, to the south by West Avenue J8, and the north is bounded by undeveloped land extending north approximately 300 feet to Lancaster Boulevard. The subject property is bisected by West Avenue J. Some of the APNs are bounded by dirt roads. Aside from transmission towers and small, infrequently traveled dirt roads, there are no structures on the subject property. Utilities are not connected to the subject property, however, transmission line towers exist along the west and south sides of the subject property.

Evidence of small, scattered, uncontrolled dumping was observed on the subject property. Dumped materials found across the site consisted of glass bottles, rusted metal cans, wood, plastic, and other materials. An empty automotive oil container was observed along 110th Street West, however, there was no observable evidence of staining around the container (Photos 12 and 13, Appendix B). Windblown objects were also observed throughout the subject property. None of these materials indicate a REC.

Two water wells identified in the GeoSearch™ GeoPlus Water Well Report; a National Water Information System (NWIS) well and a California Department of Water Resources (DWR) well, in the northern portion of the subject property were not found during the site reconnaissance. A copy of the report is included in Appendix D and a reference is provided in Appendix A.

Areas of limited vegetation were observed on the subject site. However, it is Leighton Consulting's opinion that the vegetation difference is likely a result of flowing/standing water over the northern portion of the subject property. Areas sectioned off with signage indicating "Environmentally Sensitive Area" were observed at the site (Photos 9 through 11, Appendix B), however no indication as to the nature of the sensitive areas was found.

A search of selected government databases was conducted by Leighton Consulting using GeoSearch™. Regulatory database lists were reviewed for cases pertaining to leaking underground storage tanks (LUSTs); ASTs, hazardous waste sites, and abandoned sites within the specified radii of standards established by the ASTM E 1527-05. The subject property was not identified within the GeoSearch reports.

## 7.2 Offsite

Historically, the adjacent properties were vacant, undeveloped land, or formerly used for agriculture.

The subject property is bounded to the east by 110th Street West, to the west by 115th Street West, to the south by West Avenue J8, and the northern portion is bounded by undeveloped land extending north approximately 300 feet to Lancaster Boulevard. Land to the north and east of the subject property has a few isolated residences, but the majority of the adjoining land is undeveloped. A small collection of building materials was observed approximately 400 feet north of the northwestern portion of the subject property. The collection consisted of cinder blocks, fiberglass, wood, metal, pipes, glass, and other materials, and appeared to be remnants of a demolished small dwelling.

A search of selected government databases was conducted by Leighton Consulting using GeoSearch™ reports. The GeoSearch™ reports did not identify listings within the specified radii of standards established by the ASTM E 1527-05 with a potential to adversely affect the subject property.

## 7.3 Data Gaps

Data gaps were identified by Leighton Consulting:

- Historical records prior to 1954 were not available.
- An Owner questionnaire for APN numbers 3267-014-017 and 3267-014-018, under the ownership of A.V. Foothills, LLC, has not been returned (North American Title Company, 2010).

It is Leighton Consulting's opinion that the data gaps described above will not impact the conclusions and recommendations regarding the subject property.

# 8.0 OPINION

## 8.1 Onsite

The two water wells identified in the GeoSearch™ GeoPlus Water Well Report; a National Water Information System (NWIS) well and a California Department of Water Resources (DWR) well in the northern portion of the subject property, were not found during the site reconnaissance. If these wells are found during development of the subject property, they may need to be properly abandoned.

Based on the historical land use of the subject property for agricultural purposes between 1954 and 1968, it is possible that the soil on the subject site has been impacted with pesticides and/or arsenic.

## 8.2 Offsite

No offsite recognized environmental conditions were identified that would negatively impact the subject property.

# 9.0 CONCLUSIONS AND RECOMMENDATIONS

Leighton Consulting performed a Phase I ESA for the subject property in conformance with the scope and limitations of ASTM Practice E 1527-05 of the subject property. Exceptions to, or deletions from, this practice are described in Section 1.5 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the subject property except the former use as agricultural land as identified in the 1954 and 1968 aerial photos. Persistent pesticides and arsenic may have been applied to the land during this activity. Testing of surface soils for organochlorine pesticides and arsenic is recommended.

Two groundwater wells are listed for the subject property but were not located in our field reconnaissance. If these wells are encountered during site development, they should be properly abandoned under appropriate permitting.

In general, observations should be made during future site development for areas of possible contamination such as, but not limited to, the presence of underground facilities, buried debris, waste drums, and tanks, stained soil or odorous soils. Should such materials be encountered, further investigation and analysis may be necessary at that time.

# 10.0 DEVIATIONS

Leighton Consulting did not deviate from or alter the scope of work, as defined in Section 1.3 of this report.

# 11.0 ADDITIONAL SERVICES

Leighton Consulting did not perform work outside the scope of work as defined in Section 1.3 of this report.

# 12.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

## 12.1 Corporate

Leighton Consulting is a California corporation, providing geotechnical and environmental consulting services throughout California. We are solely a consulting firm without interests in real property other than our nine offices in Southern California. We provide professional environmental consulting services including application of science and engineering to environmental compliance, hazardous materials/waste assessment and cleanup, and management of hazardous, solid and industrial waste. Phase I Environmental Site Assessments are a part of this practice area and have been conducted by us.

## 12.2 Individual

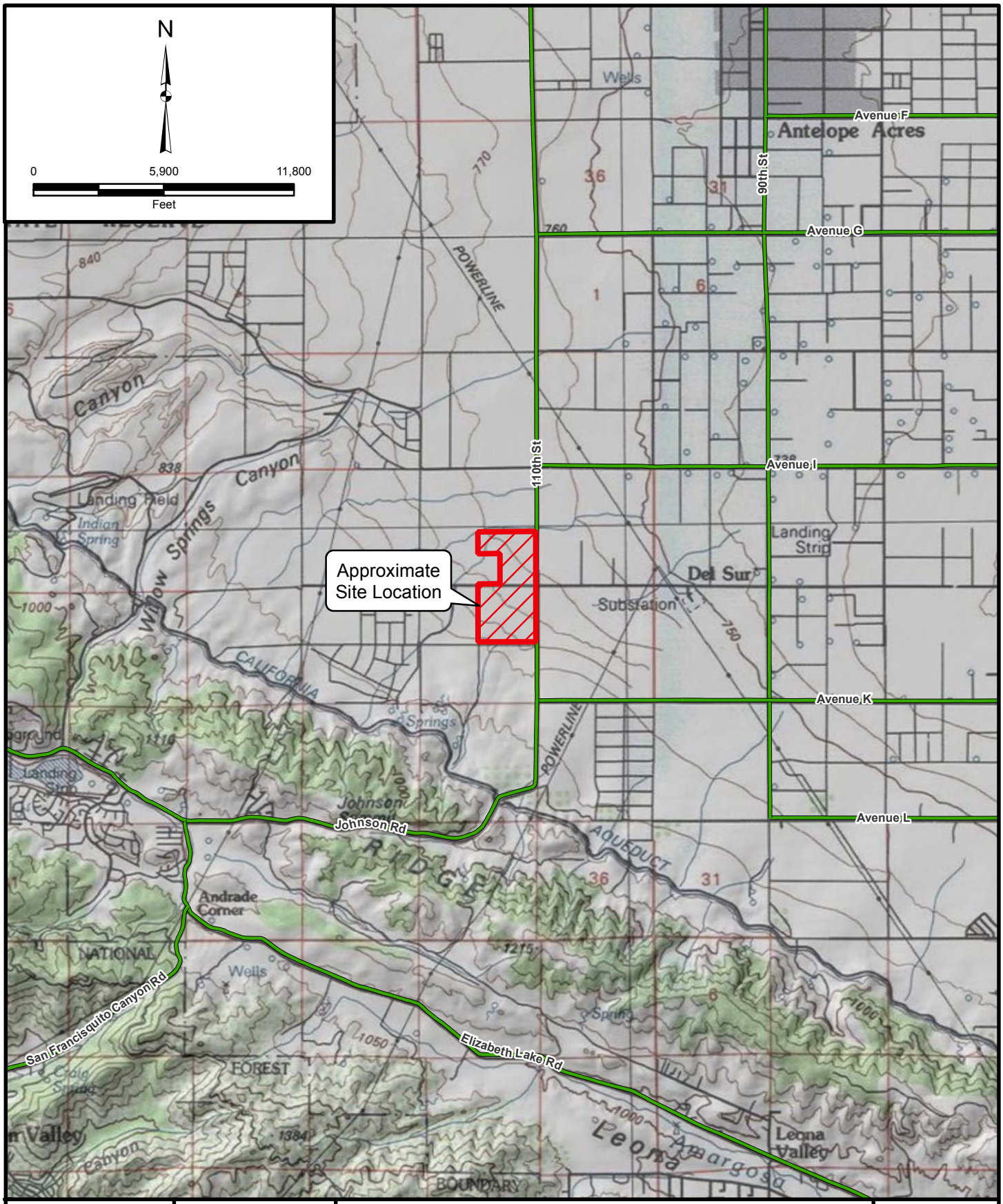
The qualifications of the Project Manager and the other Leighton Consulting environmental professionals involved in this Phase I ESA meet the Leighton Consulting corporate requirements for performing Phase I ESAs as specified by ASTM E 1527-05. In addition, Mr. Richard Orr is a Professional Geologist in the State of California.

## 12.3 Environmental Professional Statement

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined by §312.10 of 40 CFR Part 312.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Richard L. Orr, PG
Associate Geologist




| | |
|---|---|
| Project: 603455-002 | Eng/Geol: KS |
| Scale: 1 " = 6,000 ' | Date: July 2012 |

Base Map: ESRI Resource Center, 2010
Thematic Info: Leighton
Author: Geomatics (mmurphy)

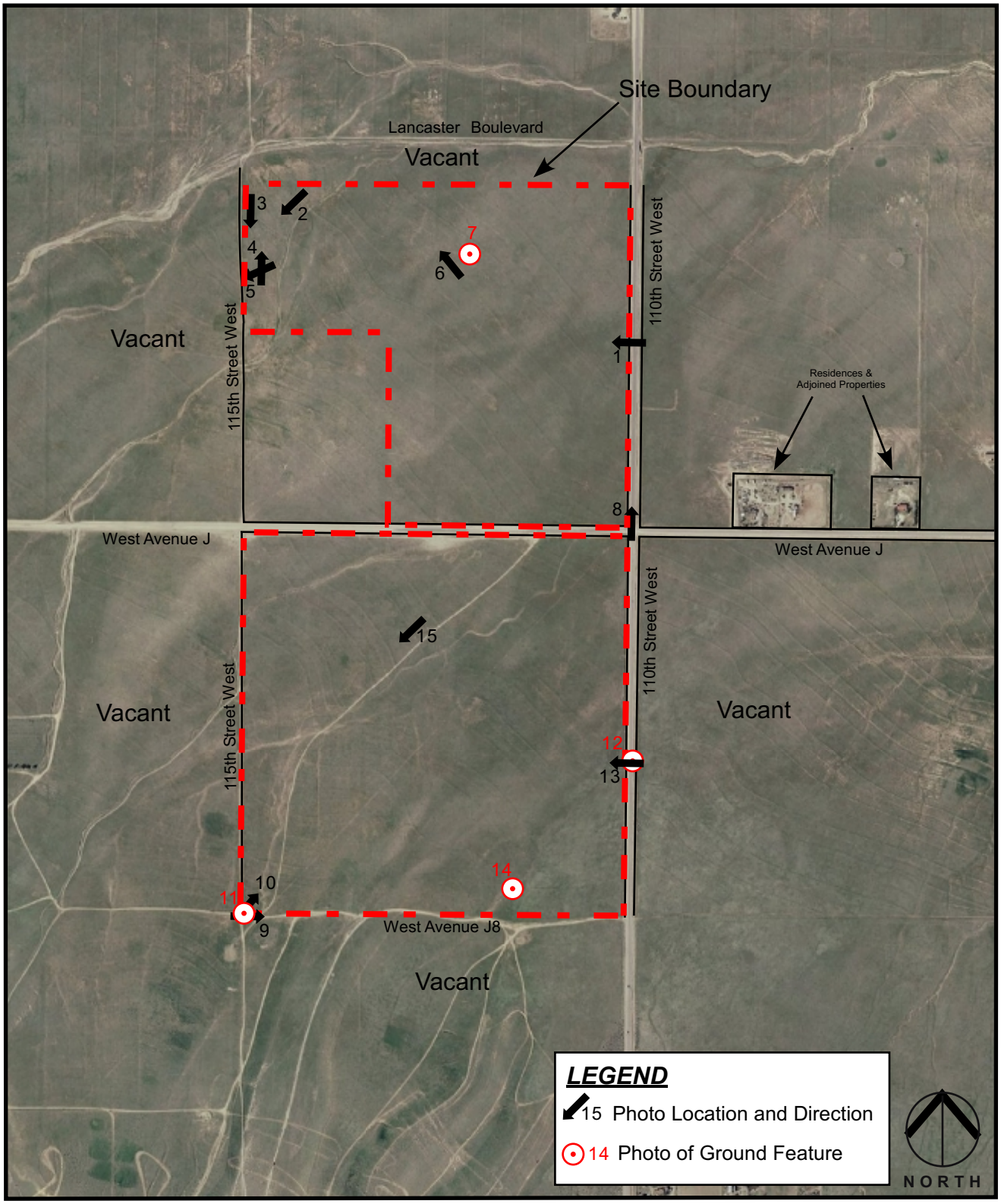
# SITE LOCATION MAP

Proposed 20-MWAC Photovoltaic Array, West of 110th Street West, North and South of West Avenue J, Lancaster Area, Unincorporated Los Angeles County, California

Figure 1

Leighton

Map Saved as P:\drafting\603455\002\GIS\of_2012-06-19\Figure1.mxd on 6/19/2012 4:11:11 PM




Aerial Base Map: ESRI Resource Center, 2012, scale 1:12,000.

Scale: 1" = 1,000'

# SITE PLAN

**Proposed 20-MWAC Photovoltaic Array, West of 110th Street West, North and South of West Avenue J, Lancaster Area, Unincorporated Los Angeles County, California**

Project No.

**603455-002**

Date

**July 2012**

Figure 2

# APPENDIX A

# APPENDIX A

## References

American Society for Testing and Materials, ASTM, 2005, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation E 1527-05, dated November 1, 2005.

California Department of Health Services (CDHS), 2010, California Indoor Radon Levels Sorted by Zip Code, http://www.cdph.ca.gov/HealthInfo/environhealth/Documents/Radon/CaliforniaRadonDatabase.pdf, May 4, 2010.

California Geological Survey (CGS), 2002, California Geomorphic Provinces, Note 36, dated 2002.

California Geological Survey (CGS), 2005, Seismic Hazard Zone Report for the Del Sur 7.5-Minute Quadrangle, Los Angeles County, California, updated September 9, 2005 and January 13, 2006.

Department of Conservation, Division of Oil, Gas, and Geothermal Resources, 2001, DOGGR Online Mapping System, http://maps.conservation.ca.gov/doms/index.html, December 9, 2010.

Environmental Protection Agency (EPA), 2012, EPA Map of Radon Zones, http://www.epa.gov/radon/zonemap.html, updated April 2, 2012.

Fidelity National Title Company, 2010, Preliminary Report, dated April 26, 2010.

GeoSearch™, GeoPlus Oil & Gas Report, dated June 6, 2012.

GeoSearch™, GeoPlus Radius Report. (GeoSearch™), dated June 6, 2012.

GeoSearch™, GeoPlus Water Well Report, dated June 6, 2012.

GeoSearch™, GS#18317, environmental lien report, effective date April 9, 2010.

GeoSearch™, Historical Aerials for GeoPreferred & GeoVantage, dated June 6, 2012.

GeoSearch™, Historical Topographic Maps, dated June 6, 2012.

Appendix A (Continued)

## References

National Pipeline Mapping System (NPMS), 2012, NPMS Public Map Viewer, Pipeline and Hazardous Materials Safety Administration, 2012. https://www.npms.phmsa.dot.gov/PublicViewer/composite.jsf

North American Title Company, 2010, Report, dated May 25, 2010.

South Coast Air Quality Management District, Facility INformation Detail (FIND), version 1.50, http://www3.aqmd.gov/webappl/fim/prog/search.aspx

State of California, 2012, State Water Resources Control Board GeoTracker Search, https://geotracker.waterboards.ca.gov/

United States Geological Survey, 2012, Del Sur Quadrangle, California-Los Angeles County, 7.5-Minute Series Topographic Map, Del Sur, California, dated 2012, Scale 1:24,000.

# APPENDIX B

# Appendix B

## Site Reconnaissance Photographs

**PHOTO NO. 1:**
*View to west near the northeastern corner of the subject property, north of West Avenue J along 110th Street West. A transmission line tower is visible and trends north-south along western property boundary. Note the berm in foreground and reduced vegetation in background.*

**PHOTO NO. 2:**
*View of channel to southwest from northwestern portion of subject property.*

**PHOTO NO. 3:**
*View to south from northwestern portion of subject property; note the clearing to the south and north-south trending transmission line towers. Vegetation is typical within the subject property.*

**PHOTO NO. 4:**
*View to north from clearing approximately 200 feet in diameter in northwestern portion of the subject property. Little vegetation and droppings present, and tire tracks were observed in all directions.*

**PHOTO NO. 5:**
*View to west/southwest from within the same clearing.*

**PHOTO NO. 6:**
*View to northwest from north central portion of the subject property of ~100-foot diameter clearing.*

**PHOTO NO. 7:**
*View of soil in north central portion of subject property. Soil is desiccated, grayish brown, and relatively unsupportive to vegetation with loose coarse sand on surface. Region of reduced vegetation extends across the northern portion of the subject property.*

**PHOTO NO. 8:**
*View to north from northwestern corner of 110th Street West and West Avenue J intersection.*

**PHOTO NO. 9:**
*View to east from southwestern corner of subject property. Near transmission line tower is a sectioned off area marked as "Environmentally Sensitive Area".*

**PHOTO NO. 10:**
*View to northeast at same sectioned off area.*

**PHOTO NO. 11:**
*Photo of sign denoting sectioned off area.*

**PHOTO NO. 12:**
*View of empty automotive oil container discarded alongside 110th Street West south of West Avenue J. Staining of surrounding soil was not observed.*

**PHOTO NO. 13:**
*Similar view of discarded automotive oil container with nearby green vegetation.*

**PHOTO NO. 14:**
*View of furniture cushion used as a shooting target in southeastern portion of the subject property.*

**PHOTO NO. 15:**
*View to southwest at channel from south central portion of subject property south of West Avenue J. Vegetation is typical of subject property.*

# APPENDIX C

# Appendix C

## User Supplied Information and Phase I ESA Owner/Site Contact Interview Form

# Phase I ESA Users Questionnaire

**Project Name:** West Antelope

**Project Address or APN:** 110th St. W and West Avenue J, Lancaster, CA, (LA County)

| **Client** (or user of the Phase I Environmental Site Assessment): | **Name/Title:** |
|---|---|
| Canadian Solar (USA) Inc. | Antonio Rodriguez/Sr. Project Engineer |

**Client Phone:** 415-806-2947

Reason Phase I is required: Assessment of the land prior the permitting and construction of a solar farm

Type of property: Vacant

Type of property transaction (e.g., Sale, purchase, exchange): Purchase

Complete and Correct Address of the property and APN(s): 3267-014-017, 3267-014-018, 3267-014-019

3267-014-020, 3267-004,016 to 018, 025 to 029, 044 to 046

Any scope of services beyond the ASTM Practice E 1527:

All Parties that will rely on the Phase I report: Canadian Solar (USA) Inc., Tuusso Energy LLC,

Name and Contact Information for Site Contact: Antonio Rodriguez, Senior Project Engineer, Canadian Solar (USA) Inc.,

12657 Alcosta Blvd., Suite 130, San Ramon, CA 94583

Any special terms or conditions:

Any other pertinent knowledge or experience with the property (e.g., prior reports, documents, correspondence concerning the environmental conditions of the property):

**(1). Environmental cleanup liens that are filed or recorded against the site (40 CFR 312.25).**

Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law? ☐ Yes | ☑ No

If Yes, Describe:

**(2). Activity and land use limitations (AULs) that are in place on the site or that have been filed or recorded in a registry (40 CFR 312.26).**

Are you aware of any AULs, such as engineering controls, land use restrictions or institutional controls that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state or local law? ☐ Yes | ☑ No

If Yes, Describe:

**(3). Specialized knowledge or experience of the person seeking to qualify for the Landowners Liability Protections (LLP) (40 CFR 312.28).**

As the user of this ESA do you have any specialized knowledge or experience related to the property or the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business? ☐ Yes | ☑ No

If Yes, Describe:

**(4). Relationship of the purchase price to the fair market value of the property if it were not contaminated (40 DRF 312.29).**

Does the purchase price being paid for this property reasonably reflect the fair market value of the property? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property? ☑ Yes | ☐ No

If Yes, Describe:

**(5). Commonly known or reasonable ascertainable information about the property (40 CFR 312.30).**

Are you aware of commonly known or *reasonably ascertainable* information about the property that would help the *environmental professional* to identify conditions indicative of releases or threatened releases? For example, as user,

(a.) Do you know the past uses of the property? ☑ Yes | ☐ No

(b.) Do you know of specific chemicals that are present or once were present at the property? ☐ Yes | ☑ No

(c.) Do you know of spills or other chemical releases that have taken place at the property? ☐ Yes | ☑ No

(d.) Do you know of any environmental cleanups that have taken place at the property? ☐ Yes | ☑ No

If Yes, Describe:

**(6). The degree of obviousness of the presence of likely presence of contamination at the property, and the ability to detect the contamination by appropriate investigation (40 CFR 312.31).**

As the *user of this ESA,* based on your knowledge and experience related to the *property* are there any *obvious* indicators that point to the presence or likely presence of contamination at the *property?* ☐ Yes | ☑ No

If Yes, Describe:

# Fidelity National Title Company

## PRELIMINARY REPORT

*In response to the application for a policy of title insurance referenced herein,* ***Fidelity National Title Company*** *hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a policy or policies of title insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an exception herein or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations or Conditions of said policy forms.*

*The printed Exceptions and Exclusions from the coverage and Limitations on Covered Risks of said policy or policies are set forth in Attachment One. The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than that set forth in the arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties. Limitations on Covered Risks applicable to the CLTA and ALTA Homeowner's Policies of Title Insurance which establish a Deductible Amount and a Maximum Dollar Limit of Liability for certain coverages are also set forth in Attachment One. Copies of the policy forms should be read. They are available from the office which issued this report.*

*This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.*

*The policy(s) of title insurance to be issued hereunder will be policy(s) of Fidelity National Title Insurance Company, a California corporation.*

***Please read the exceptions shown or referred to herein and the exceptions and exclusions set forth in Attachment One of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.***

***It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects and encumbrances affecting title to the land.***

**Fidelity National Title Company**

BY _____ President

ATTEST _____ Secretary

Countersigned

*Visit Us on our Website: www.fntic.com*

Fidelity National Title Company

***ISSUING OFFICE:*** 1300 Dove Street, Suite 310 • Newport Beach, CA 92660
949 622-5000 • FAX Call for Fax

# PRELIMINARY REPORT

Title Officer: Steven Ball

Title No.: 10-**725129418**-SB
Locate No.: CAFNT0972-0972-0051-0725129418

TO: TUUSSO Energy, LLC

ATTN: Jason Evans

**PROPERTY ADDRESS:** Vacant Land, Unincorporated, California

**EFFECTIVE DATE: April 26, 2010, 07:30 A.M.**

The form of policy or policies of title insurance contemplated by this report is:

CLTA Standard Coverage Policy - 1990

1. THE ESTATE OR INTEREST IN THE LAND HEREINAFTER DESCRIBED OR REFERRED TO COVERED BY THIS REPORT IS:

   A Fee

2. TITLE TO SAID ESTATE OR INTEREST AT THE DATE HEREOF IS VESTED IN:

   **ANTONIOS MARGARITIS, a single man**

3. THE LAND REFERRED TO IN THIS REPORT IS DESCRIBED AS FOLLOWS:

   SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF

DS\DS 05/03/2010

## LEGAL DESCRIPTION

## EXHIBIT "A"

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN AN UNINCORPORATED AREA, COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, AND IS DESCRIBED AS FOLLOWS:

THE SOUTHEAST QUARTER OF SECTION 14, TOWNSHIP 7 NORTH, RANGE 14 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT OF SAID LAND.

EXCEPT THE NORTH HALF OF THE NORTH HALF OF THE NORTH HALF OF SAID SOUTHEAST QUARTER.

ALSO EXCEPT THE WEST HALF, ESTABLISHED BY BISECTING THE NORTH AND SOUTH LINES OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION.

ALSO EXCEPT THE WEST HALF, ESTABLISHED BY BISECTING THE NORTH AND SOUTH LINES OF THE EAST HALF, ESTABLISHED BY BISECTING THE NORTH AND SOUTH LINES OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION.

EXCEPT THEREFROM AN UNDIVIDED 25 PERCENT OF ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES AND OTHER MINERAL RIGHTS WHETHER METALLIC OR NON-METALLIC IN AND UNDER SAID LAND, WHICH MAY BE EXTRACTED FROM OR PRODUCED FROM OR UPON SAID LAND, AS PROVIDED IN THE DEED FROM HERMAN HERBAT, ET AL., RECORDED APRIL 2, 1942, IN BOOK 19199, PAGE 275, OF OFFICIAL RECORDS OF SAID COUNTY.

APN: 3267-004-016 to 018, 3267-004-025 to 029, 3267-004-044 to 046

**AT THE DATE HEREOF, ITEMS TO BE CONSIDERED AND EXCEPTIONS TO COVERAGE IN ADDITION TO THE PRINTED EXCEPTIONS AND EXCLUSIONS IN SAID POLICY FORM WOULD BE AS FOLLOWS:**

**1.** **Property taxes**, which are a lien not yet due and payable, including any assessments collected with taxes to be levied for the fiscal year 2010-2011.

**2.** **The lien of supplemental taxes**, if any, assessed pursuant to the provisions of Chapter 3.5 (Commencing with Section 75) of the Revenue and Taxation code of the State of California.

**3.** **Water rights, claims or title to water**, whether or not disclosed by the public records.

**4.** **Easement(s)** for the purpose(s) shown below and rights incidental thereto as granted in a document.

| | |
|---|---|
| Granted to: | County of Los Angeles |
| Purpose: | Storm drain |
| Recorded: | January 1, 1944, Book 20873, Page 377, of Official Records |
| Affects: | The West 30 feet of the East 80 feet |

**5.** **Easement(s)** for the purpose(s) shown below and rights incidental thereto as granted in a document.

| | |
|---|---|
| Granted to: | County of Los Angeles |
| Purpose: | Public road and highway purposes |
| Recorded: | June 27, 1950, Book 33519, Page 311, of Official Records |
| Affects: | The Southerly 30 feet |

**6.** **Easement(s)** for the purpose(s) shown below and rights incidental thereto as granted in a document.

| | |
|---|---|
| Granted to: | County of Los Angeles |
| Purpose: | Public road and highway purposes |
| Recorded: | March 11, 1965, Instrument No. 3067, of Official Records |
| Affects: | The Easterly 50 feet. |

To be known as 110th Street West.

**7.** **Matters contained** in that certain document entitled "Declaration and Grant of Easement", executed by George Q. Woo, recorded June 28, 1968, Instrument No. 5146, of Official Records.

Which document, among other things, contains or provides for:

To create easements for ingress, egress and road purposes over the West 40 feet, the South 50 feet, and the East 50 feet.

Reference is hereby made to said document for full particulars.

**8.** **Matters** contained in that certain document entitled "Grant of Waiver and Certificate of Compliance" dated November 5, 1980, executed by Department of Regional Planning, recorded November 5, 1980, Instrument No. 80-1113731, of Official Records.

Reference is hereby made to said document for full particulars.

**9.** **Matters** contained in that certain document entitled "Grant of Waiver and Certificate of Compliance" dated July 16, 1981, executed by Department of Regional Planning recorded July 24, 1981, Instrument No. 81-742747, of Official Records.

Reference is hereby made to said document for full particulars.

**10.** **Easement(s)** for the purpose(s) shown below and rights incidental thereto as granted in a document.

| | |
|---|---|
| Granted to: | County of Los Angeles |
| Purpose: | Slope |
| Recorded: | July 24, 1981, Instrument No. 81-742749, of Official Records |
| Affects: | Shown as Parcel 3 on map attached to said document. |

And recorded July 24, 1981, Instrument Nos. 81-742753; 81-742755; 81-742759; 81-742762; 81-742764; 81-742767; and 81-742770, all Official Records

**11.** **An irrevocable offer** to dedicate an easement over a portion of said land for public road and highway.

| | |
|---|---|
| Recorded: | July 24, 1981, Instrument No. 81-742750, of Official Records |
| Affects: | Shown as Parcel 2 on the map attached to said document. |

And recorded July 24, 1981, Instrument Nos. 81-742751; 81-742756; 81-742758; 81-742761; 81-742765; 81-742766; and 81-742769, all Official Records

**12.** **A deed of trust** to secure an indebtedness in the amount shown below, and any other obligations secured thereby

| | |
|---|---|
| Amount: | $148,500.00 |
| Dated: | July 31, 1981 |
| Trustor: | John P. Eliopulos and Georgia Eliopulos, husband and wife as joint tenants |
| Trustee: | Antelope Valley Escrow Co., a California corporation |
| Beneficiary: | George Q. Woo, an unmarried man, as to an undivided 2/25ths interes; Peggy S. Woo, an unmarried woman, as to an undivided 2/25ths interest; Tom Q. Woo and Lily Woo, husband and wife as joint tenants, as to an undivided 4/25ths interest; James Q. Woo, an unmarried man, as to an undivided 2/25ths interest; Esther Chew Lew, a married woman, as to an undivided 1/25ths interest; Hainie Chew, a single man, as to an undivided 4/25ths interest; Charles Yoek Lim, a widower, as to an undivided 5/25ths interest; and Joe Jow Lim and Fee Jin Lim, husband and wife, as to an undivided 5/25ths interest |
| Loan No.: | |
| Recorded: | August 6, 1981, Instrument No. 81-786205, of Official Records |

**13.** **A tax lien** for the amount shown and any other amounts due, in favor of the State of California.

| | |
|---|---|
| Amount: | $1,031.24 |
| Filed by: | State of California, Employment Development Department |
| Taxpayer: | Antonios Margaritis |
| Certificate No.: | W072847002 |
| Recorded: | October 29, 2007, Instrument No. 20072434204, of Official Records |

**14.** **A pending Court Action** as disclosed by a recorded notice:

| | |
|---|---|
| Plaintiff: | Southern California Edison Company, a California corporation |
| Defendant: | Antonios Margaritis, an individual, et al. |
| County: | Los Angeles |
| Court: | Superior - Central District |
| Case No.: | BC430386 |
| Nature of Action: | To condemn and acquire easements |
| Recorded: | March 2, 2010, Instrument No. 20100279296, of Official Records |

**15.** **This company will require a statement of information** from the parties named below in order to complete this report, based on the effect of documents, proceedings, liens, decrees, or other matters which do not specifically describe said land, but which, if any do exist, may affect the title or impose liens or encumbrances thereon. After review of the requested Statement(s) of Information the Company may have additional requirements before the issuance of any policy of title insurance.

Parties: ALL PARTIES

(Note: The statement of information is necessary to complete the search and examination of title under this order. Any title search includes matters that are indexed by name only, and having a completed statement of information assists the Company in the elimination of certain matters which appear to involve the parties but in fact affect another party with the same or similar name. Be assured that the statement of information is essential and will be kept strictly confidential to this file).

**END OF ITEMS**

**Note 1.** Property taxes for the fiscal year shown below are PAID. For proration purposes the amounts are:

| | |
|---|---|
| Tax Identification No.: | 3267-004-016 |
| Fiscal Year: | 2009 - 2010 |
| 1st Installment: | $184.35 |
| 2nd Installment: | $184.35 |
| Exemption: | $0.00 |
| Land: | $20,700.00 |
| Improvements: | $0.00 |
| Personal Property: | $0.00 |
| Code Area: | 0009610 |

**Note 2.** Property taxes for the fiscal year shown below are PAID. For proration purposes the amounts are:

| | |
|---|---|
| Tax Identification No.: | 3267-004-017 |
| Fiscal Year: | 2009 - 2010 |
| 1st Installment: | $184.35 |
| 2nd Installment: | $184.35 |
| Exemption: | $0.00 |
| Land: | $20,700.00 |
| Improvements: | $0.00 |
| Personal Property: | $0.00 |
| Code Area: | 0009610 |

**Note 3.** Property taxes for the fiscal year shown below are PAID. For proration purposes the amounts are:

| | |
|---|---|
| Tax Identification No.: | 3267-004-018 |
| Fiscal Year: | 2009 - 2010 |
| 1st Installment: | $184.35 |
| 2nd Installment: | $184.35 |
| Exemption: | $0.00 |
| Land: | $20,700.00 |
| Improvements: | $0.00 |
| Personal Property: | $0.00 |
| Code Area: | 0009610 |

**Note 4.** Property taxes for the fiscal year shown below are PAID. For proration purposes the amounts are:

| | |
|---|---|
| Tax Identification No.: | 3267-004-025 |
| Fiscal Year: | 2009 - 2010 |
| 1st Installment: | $195.83 |
| 2nd Installment: | $195.82 |
| Exemption: | $0.00 |
| Land: | $22,690.00 |
| Improvements: | $0.00 |
| Personal Property: | $0.00 |
| Code Area: | 0009610 |

**Note 5.** Property taxes for the fiscal year shown below are PAID. For proration purposes the amounts are:

| | |
|---|---|
| Tax Identification No.: | 3267-004-026 |
| Fiscal Year: | 2009 - 2010 |
| 1st Installment: | $195.83 |
| 2nd Installment: | $195.82 |
| Exemption: | $0.00 |
| Land: | $22,690.00 |
| Improvements: | $0.00 |
| Personal Property: | $0.00 |
| Code Area: | 0009610 |

**Note 6.** Property taxes for the fiscal year shown below are PAID. For proration purposes the amounts are:

| | |
|---|---|
| Tax Identification No.: | 3267-004-027 |
| Fiscal Year: | 2009 - 2010 |
| 1st Installment: | $195.83 |
| 2nd Installment: | $195.82 |
| Exemption: | $0.00 |
| Land: | $22,690.00 |
| Improvements: | $0.00 |
| Personal Property: | $0.00 |
| Code Area: | 0009610 |

**Note 7.** Property taxes for the fiscal year shown below are PAID. For proration purposes the amounts are:

| | |
|---|---|
| Tax Identification No.: | 3267-004-028 |
| Fiscal Year: | 2009 - 2010 |
| 1st Installment: | $195.83 |
| 2nd Installment: | $195.82 |
| Exemption: | $0.00 |
| Land: | $22,690.00 |
| Improvements: | $0.00 |
| Personal Property: | $0.00 |
| Code Area: | 0009610 |

**Note 8.** Property taxes for the fiscal year shown below are PAID. For proration purposes the amounts are:

| | |
|---|---|
| Tax Identification No.: | 3267-004-029 |
| Fiscal Year: | 2009 - 2010 |
| 1st Installment: | $195.83 |
| 2nd Installment: | $195.82 |
| Exemption: | $0.00 |
| Land: | $22,690.00 |
| Improvements: | $0.00 |
| Personal Property: | $0.00 |
| Code Area: | 0009610 |

**Note 9.** Property taxes for the fiscal year shown below are PAID. For proration purposes the amounts are:

| | |
|---|---|
| Tax Identification No.: | 3267-004-044 |
| Fiscal Year: | 2009 - 2010 |
| 1st Installment: | $197.74 |
| 2nd Installment: | $197.74 |
| Exemption: | $0.00 |
| Land: | $23,023.00 |
| Improvements: | $0.00 |
| Personal Property: | $0.00 |
| Code Area: | 0009610 |

**Note 10.** Property taxes for the fiscal year shown below are PAID. For proration purposes the amounts are:

| | |
|---|---|
| Tax Identification No.: | 3267-004-045 |
| Fiscal Year: | 2009 - 2010 |
| 1st Installment: | $200.62 |
| 2nd Installment: | $200.62 |
| Exemption: | $0.00 |
| Land: | $23,522.00 |
| Improvements: | $0.00 |
| Personal Property: | $0.00 |
| Code Area: | 0009610 |

**Note 11.** Property taxes for the fiscal year shown below are PAID. For proration purposes the amounts are:

| | |
|---|---|
| Tax Identification No.: | 3267-004-046 |
| Fiscal Year: | 2009 - 2010 |
| 1st Installment: | $204.43 |
| 2nd Installment: | $204.43 |
| Exemption: | $0.00 |
| Land: | $24,183.00 |
| Improvements: | $0.00 |
| Personal Property: | $0.00 |
| Code Area: | 0009610 |

**Note 12.** There are NO deeds affecting said land, recorded within twenty-four (24) months of the date of this report.

**Note 13.** If a county recorder, title insurance company, escrow company, real estate broker, real estate agent or association provides a copy of a declaration, governing document or deed to any person, California law requires that the document provided shall include a statement regarding any unlawful restrictions. Said statement is to be in at least 14-point bold face type and may be stamped on the first page of any document provided or included as a cover page attached to the requested document. Should a party to this transaction request a copy of any document reported herein that fits this category, the statement is to be included in the manner described.

**Note 14.** Wiring instructions for Fidelity National Title Company, Corona, CA, are as follows:

| | |
|---|---|
| Receiving Bank: | Union Bank of California<br>(800) 849-6466<br>Irvine, CA 92614 |
| ABA Routing No.: | 122000496 |
| Credit Account Name: | Fidelity National Title Company - Major Accounts Payoff/Admin<br>1315 Corona Point Court, Corona, CA 92879 |
| Credit Account No.: | 9100586999 |
| Reference No.: | 10-**725129418** |

These wiring instructions are for this specific transaction involving the Title Department of the Newport Beach office of Fidelity National Title Company. These instructions therefore should not be used in other transactions without first verifying the information with our accounting department. It is imperative that the wire text be exactly as indicated. Any extraneous information may cause unnecessary delays in confirming the receipt of funds.

**Note 15.** Any documents being executed in conjunction with this transaction must be signed in the presence of an authorized Company employee, an authorized employee of an agent, an authorized employee of the insured lender, or by using Bancserv or other approved third-party service. If the above requirements cannot be met, please call the company at the number provided in this report.

OWNER'S DECLARATION

The undersigned hereby declares as follows:

1. (Fill in the applicable paragraph and strike the other)

a. Declarant ("Owner") is the owner or lessee, as the case may be, of certain premises located at _____, further described as follows: See Preliminary Report/Commitment No. _____ for full legal description (the "Land").

b. Declarant is the _____ of _____ ("Owner"), which is the owner or lessee, as the case may be, of certain premises located at _____, further described as follows: See Preliminary Report/Commitment No. _____ for full legal description (the "Land").

2. (Fill in the applicable paragraph and strike the other.)

a. During the period of six months immediately preceding the date of this declaration no work has been done, no surveys or architectural or engineering plans have been prepared, and no materials have been furnished in connection with the erection, equipment, repair, protection or removal of any building or other structure on the Land or in connection with the improvement of the Land in any manner whatsoever.

b. During the period of six months immediately preceding the date of this declaration certain work has been done and materials furnished in connection with _____ upon the Land in the approximate total sum of $_____, but no work whatever remains to be done and no materials remain to be furnished to complete the construction in full compliance with the plans and specifications, nor are there any unpaid bills incurred for labor and materials used in making such improvements or repairs upon the Land, or for the services of architects, surveyors or engineers, except as follows: _____. Owner, by the undersigned Declarant, agrees to and does hereby indemnify and hold harmless Fidelity National Title Insurance Company against any and all claims arising therefrom.

3. Owner has not previously conveyed the Land; is not a debtor in bankruptcy (and if a partnership, the general partner thereof is not a debtor in bankruptcy); and has not received notice of any pending court action affecting the title to the Land.

4. Except as shown in the above-referenced Preliminary Report/Commitment, there are no unpaid or unsatisfied mortgages, deeds of trust, Uniform Commercial Code financing statements, claims of lien, special assessments, or taxes that constitute a lien against the Land or that affect the Land but have not been recorded in the public records.

5. The Land is currently in use as _____; _____ occupy/occupies the Land; and the following are all of the leases or other occupancy rights affecting the Land: _____.

6. There are no other persons or entities that assert an ownership interest in the Land, nor are there unrecorded easements, claims of easement, or boundary disputes that affect the Land.

7. There are no outstanding options to purchase or rights of first refusal affecting the Land.

This declaration is made with the intention that Fidelity National Title Insurance Company (the "Company") and its policy issuing agents will rely upon it in issuing their title insurance policies and endorsements. Owner, by the undersigned Declarant, agrees to indemnify the Company against loss or damage (including attorneys fees, expenses, and costs) incurred by the Company as a result of any untrue statement made herein.

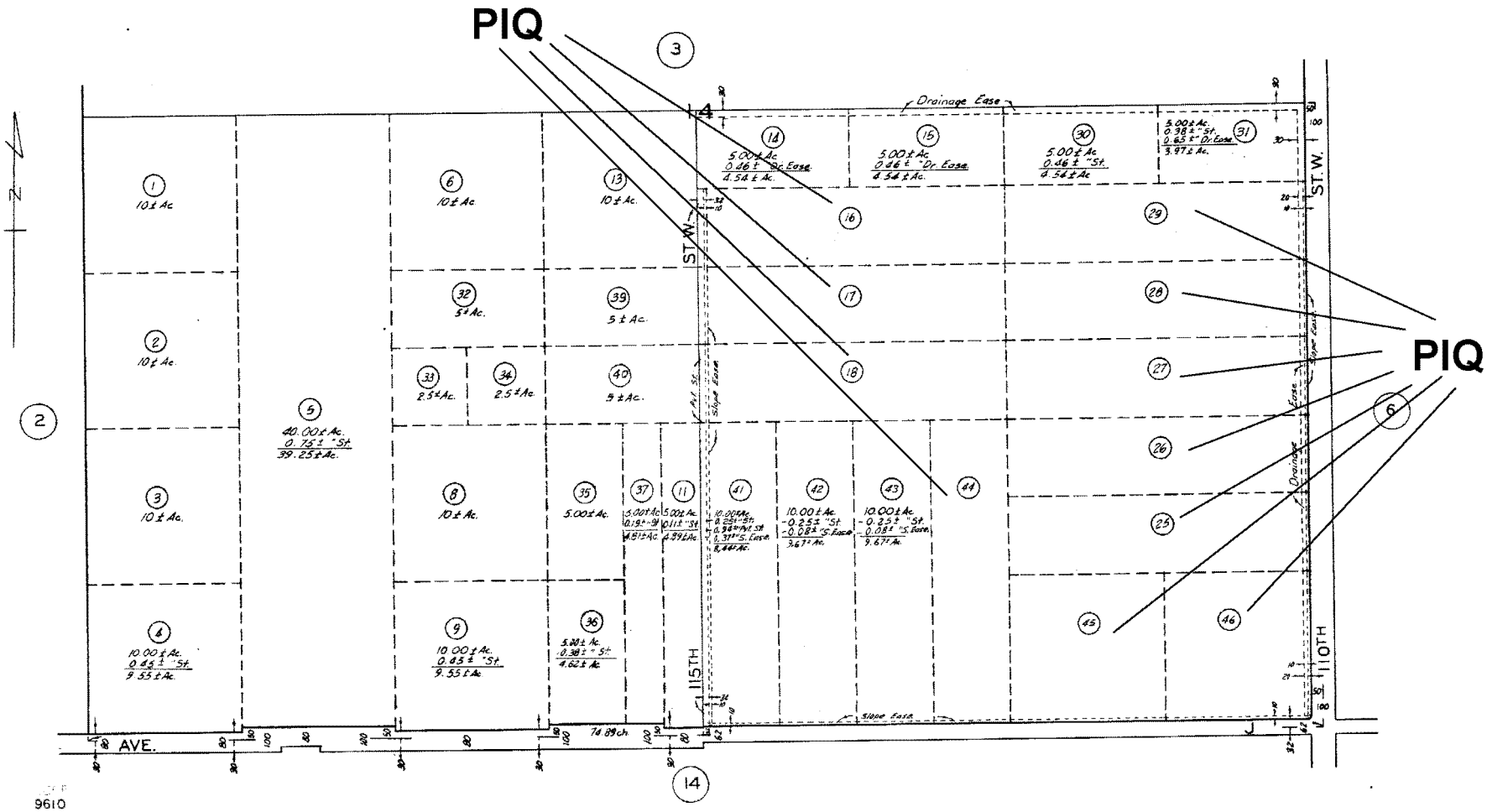
I declare under penalty of perjury that the foregoing is true and correct and that this declaration was executed on _____ at _____.

Signature: _____

**END OF NOTES**

| 3267 | 4 |
|---|---|
| SCALE 1" = 400' | |

711102208
720602204
730107303
750711104
810810229




9610

This plat is for you aid in locating your land with reference to streets and other parcels. While this plat is believed to be correct: Fidelity National Title Insurance assumes no liability for any loss occuring by reason of reliance thereon.

FOR PREV. ASSM'T SEE:
3222-12

T. 7 N., R. 14 W.

ASSESSOR'S MAP
COUNTY OF LOS ANGELES, CALIF.

# ATTACHMENT ONE

## AMERICAN LAND TITLE ASSOCIATION
## RESIDENTIAL TITLE INSURANCE POLICY (6-1-87) EXCLUSIONS

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes building and zoning ordinances and also laws and regulations concerning:
   - land use
   - improvements on the land
   - land division
   - environmental protection

   This exclusion does not apply to violations or the enforcement of these matters which appear in the public records at policy date.

   This exclusion does not limit the zoning coverage described in Items 12 and 13 of Covered Title Risks.
2. The right to take the land by condemning it, unless:
   - a notice of exercising the right appears in the public records on the Policy Date
   - the taking happened prior to the Policy Date and is binding on you if you bought the land without knowledge of the taking
3. Title Risks:
   - that are created, allowed, or agreed to by you
   - that are known to you, but not to us, on the Policy Date- unless they appeared in the public records
   - that result in no loss to you
   - that first affect your title after the Policy Date - this does not limit the labor and material lien coverage in Item 8 of Covered Title Risks
4. Failure to pay value for your title.
5. Lack of a right:
   - to any land outside the area specifically described and referred to in Item 3 of Schedule A

     or
   - in streets, alleys, or waterways that touch your land

   This exclusion does not limit the access coverage in Item 5 of Covered Title Risks.

In addition to the Exclusions, you are not insured against loss, costs, attorneys' fees, and the expenses resulting from:

1. Any rights, interests, or claims of parties in possession of the land not shown by the public records.
2. Any easements or liens not shown by the public records. This does not limit the lien coverage in Item 8 of Covered Title Risks.
3. Any facts about the land which a correct survey would disclose and which are not shown by the public records. This does not limit the forced removal coverage in Item 12 of Covered Title Risks.
4. Any water rights or claims or title to water in or under the land, whether or not shown by the public records.

# ATTACHMENT ONE
## (CONTINUED)

## CALIFORNIA LAND TITLE ASSOCIATION STANDARD COVERAGE POLICY - 1990
## EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage or for the estate or interest insured by this policy.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with the applicable doing business laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by this policy or the transaction creating the interest of the insured lender, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws.

## SCHEDULE B, PART I
## EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

### PART I

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records. Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the public records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

# ATTACHMENT ONE
## (CONTINUED)

## FORMERLY AMERICAN LAND TITLE ASSOCIATION LOAN POLICY (10-17-92) WITH A.L.T.A. ENDORSEMENT-FORM 1 COVERAGE EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy (except to the extent that this policy insures the priority of the lien of the insured mortgage over any statutory lien for services, labor or material or to the extent insurance is afforded herein as to assessments for street improvements under construction or completed at Date of Policy); or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable doing business laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any statutory lien for services, labor or materials (or the claim of priority of any statutory lien for services, labor or materials over the lien of the insured mortgage) arising from an improvement or work related to the land which is contracted for and commenced subsequent to Date of Policy and is not financed in whole or in part by proceeds of the indebtedness secured by the insured mortgage which at Date of Policy the insured has advanced or is obligated to advance.
7. Any claim, which arises out of the transaction creating the interest of the mortgagee insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the interest of the insured mortgagee being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the subordination of the interest of the insured mortgagee as a result of the application of the doctrine of equitable subordination; or
   (iii) the transaction creating the interest of the insured mortgagee being deemed a preferential transfer except where the preferential transfer results from the failure:
      (a) to timely record the instrument of transfer; or
      (b) of such recordation to impart notice to a purchaser for value or a judgement or lien creditor.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage.
In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

## EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records. Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

# ATTACHMENT ONE
## (CONTINUED)

### 2006 AMERICAN LAND TITLE ASSOCIATION LOAN POLICY (06-17-06)
### EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
   (a) a fraudulent conveyance or fraudulent transfer, or
   (b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

The above policy form may be issued to afford either Standard Coverage or Extended Coverage.
In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

### EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

# ATTACHMENT ONE
## (CONTINUED)

### FORMERLY AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY (10-17-92)
### EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy, or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.
4. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the estate or interest insured by this policy being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the transaction creating the estate or interest insured by this policy being deemed a preferential transfer except where the preferential transfer results from the failure:
      (a) to timely record the instrument of transfer; or
      (b) of such recordation to impart notice to a purchaser for value or a judgement or lien creditor.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage.
In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

### EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records. Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

# ATTACHMENT ONE
## (CONTINUED)

### 2006 AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY (06-17-06)
### EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is
   (a) a fraudulent conveyance or fraudulent transfer; or
   (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage.
In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

### EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

# ATTACHMENT ONE
## (CONTINUED)

### CLTA HOMEOWNER'S POLICY OF TITLE INSURANCE (10-22-03)
### ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE (10-22-03)
### EXCLUSIONS

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes ordinances, laws and regulations concerning:
   a. building
   b. zoning
   c. Land use
   d. improvements on Land
   e. Land division
   f. environmental protection

This Exclusion does not apply to violations or the enforcement of these matters if notice of the violation or enforcement appears in the Public Records at the Policy Date.
This Exclusion does not limit the coverage described in Covered Risk 14, 15, 16, 17 or 24.

2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not apply to violations of building codes if notice of the violation appears in the Public Records at the Policy Date.
3. The right to take the Land by condemning it, unless:
   a. notice of exercising the right appears in the Public Records at the Policy Date; or
   b. the taking happened before the Policy Date and is binding on You if You bought the Land without Knowing of the taking.
4. Risks:
   a. that are created, allowed, or agreed to by You, whether or not they appear in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they appear in the Public Records at the Policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.d, 22, 23, 24 or 25.
5. Failure to pay value for Your Title.
6. Lack of a right:
   a. to any Land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   b. in streets, alleys, or waterways that touch the Land.

This Exclusion does not limit the coverage described in Covered Risk 11 or 18.

### LIMITATIONS ON COVERED RISKS

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows:

- For Covered Risk 14, 15, 16 and 18, Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.

The deductible amounts and maximum dollar limits shown on Schedule A are as follows:

| | Your Deductible Amount | Our Maximum Dollar Limit of Liability |
|---|---|---|
| Covered Risk 14: | 1.00% of Policy Amount or $ 2,500.00 (whichever is less) | $ 10,000.00 |
| Covered Risk 15: | 1.00% of Policy Amount or $ 5,000.00 (whichever is less) | $ 25,000.00 |
| Covered Risk 16: | 1.00% of Policy Amount or $ 5,000.00 (whichever is less) | $ 25,000.00 |
| Covered Risk 18: | 1.00% of Policy Amount or $ 2,500.00 (whichever is less) | $ 5,000.00 |

# ATTACHMENT ONE
## (CONTINUED)

## CLTA HOMEOWNER'S POLICY OF TITLE INSURANCE (01-01-08)
## ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE (01-01-08)
## EXCLUSIONS

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of those portions of any law or government regulation concerning:
   a. building;
   b. zoning;
   c. land use;
   d. improvements on the Land;
   e. land division; and
   f. environmental protection.

   This Exclusion does not limit the coverage described in Covered Risk 8.a., 14, 15, 16, 18, 19, 20, 23 or 27.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not limit the coverage described in Covered Risk 14 or 15.
3. The right to take the Land by condemning it. This Exclusion does not limit the coverage described in Covered Risk 17.
4. Risks:
   a. that are created, allowed, or agreed to by You, whether or not they are recorded in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they are recorded in the Public Records at the Policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.e., 25, 26, 27 or 28.
5. Failure to pay value for Your Title.
6. Lack of a right:
   a. to any land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   b. in streets, alleys, or waterways that touch the Land.

   This Exclusion does not limit the coverage described in Covered Risk 11 or 21.

## LIMITATIONS ON COVERED RISKS

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows:

- For Covered Risk 16, 18, 19 and 21, Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.

The deductible amounts and maximum dollar limits shown on Schedule A are as follows:

| | Your Deductible Amount | Our Maximum Dollar Limit of Liability |
|---|---|---|
| Covered Risk 16: | 1.00% of Policy Amount Shown in Schedule A or $ 2,500.00 (whichever is less) | $ 10,000.00 |
| Covered Risk 18: | 1.00% of Policy Amount Shown in Schedule A or $ 5,000.00 (whichever is less) | $ 25,000.00 |
| Covered Risk 19: | 1.00% of Policy Amount Shown in Schedule A or $ 5,000.00 (whichever is less) | $ 25,000.00 |
| Covered Risk 21: | 1.00% of Policy Amount Shown in Schedule A or $ 2,500.00 (whichever is less) | $ 5,000.00 |

# ATTACHMENT ONE
## (CONTINUED)

### ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (10/13/01)
### EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the Land; (ii) the character, dimensions or location of any improvements now or hereafter erected on the Land; (iii) a separation in ownership or a change in the dimensions or areas of the Land or any parcel of which the Land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the Land has been recorded in the Public Records at Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 12, 13, 14, and 16 of this policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the Land has been recorded in the Public Records at Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 12, 13, 14, and 16 of this policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the Public Records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without Knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) created, suffered, assumed or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (this paragraph does not limit the coverage provided under Covered Risks 8, 16, 18, 19, 20, 21, 22, 23, 24, 25 and 26); or
   (e) resulting in loss or damage which would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of the Insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable doing business laws of the state in which the Land is situated.
5. Invalidity or unenforceability of the lien of the Insured Mortgage, or claim thereof, which arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, except as provided in Covered Risk 27, or any consumer credit protection or truth in lending law.
6. Real property taxes or assessments of any governmental authority which become a lien on the Land subsequent to Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 7, 8(e) and 26.
7. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This exclusion does not limit the coverage provided in Covered Risk 8.
8. Lack of priority of the lien of the Insured Mortgage as to each and every advance made after Date of Policy, and all interest charged thereon, over liens, encumbrances and other matters affecting the title, the existence of which are Known to the Insured at:
   (a) The time of the advance; or
   (b) The time a modification is made to the terms of the Insured Mortgage which changes the rate of interest charged, if the rate of interest is greater as a result of the modification than it would have been before the modification. This exclusion does not limit the coverage provided in Covered Risk 8.
9. The failure of the residential structure, or any portion thereof to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This exclusion does not apply to violations of building codes if notice of the violation appears in the Public Records at Date of Policy.

# ATTACHMENT ONE
## (CONTINUED)

### ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (01/01/08)
### EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27 or 28); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, or any consumer credit protection or truth-in-lending law. This Exclusion does not modify or limit the coverage provided in Covered Risk 26.
6. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to Advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching subsequent to Date of Policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11(b) or 25.
8. The failure of the residential structure, or any portion of it, to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6.

## Notice

You may be entitled to receive a $20.00 discount on escrow services if you purchased, sold or refinanced residential property in California between May 19, 1995 and November 1, 2002. If you had more than one qualifying transaction, you may be entitled to multiple discounts.

If your previous transaction involved the same property that is the subject of your current transaction, you do not have to do anything; the Company will provide the discount, provided you are paying for escrow or title services in this transaction.

If your previous transaction involved property different from the property that is subject of your current transaction, you must - prior to the close of the current transaction - inform the Company of the earlier transaction, provide the address of the property involved in the previous transaction, and the date or approximate date that the escrow closed to be eligible for the discount.

Unless you inform the Company of the prior transaction on property that is not the subject of this transaction, the Company has no obligation to conduct an investigation to determine if you qualify for a discount. If you provide the Company information concerning a prior transaction, the Company is required to determine if you qualify for a discount which is subject to other terms and conditions.

Effective Date: 5/1/2008

Fidelity National Financial, Inc.

# Privacy Statement

Fidelity National Financial, Inc. and its subsidiaries ("FNF") respect the privacy and security of your non-public personal information ("Personal Information") and protecting your Personal Information is one of our top priorities. This Privacy Statement explains FNF's privacy practices, including how we use the Personal Information we receive from you and from other specified sources, and to whom it may be disclosed. FNF follows the privacy practices described in this Privacy Statement and, depending on the business performed, FNF companies may share information as described herein.

## Personal Information Collected

We may collect Personal Information about you from the following sources:

- Information we receive from you on applications or other forms, such as your name, address, social security number, tax identification number, asset information, and income information;
- Information we receive from you through our Internet websites, such as your name, address, email address, Internet Protocol address, the website links you used to get to our websites, and your activity while using or reviewing our websites;
- Information about your transactions with or services performed by us, our affiliates, or others, such as information concerning your policy, premiums, payment history, information about your home or other real property, information from lenders and other third parties involved in such transaction, account balances, and credit card information; and
- Information we receive from consumer or other reporting agencies and publicly recorded documents.

## Disclosure of Personal Information

We may provide your Personal Information (excluding information we receive from consumer or other credit reporting agencies) to various individuals and companies, as permitted by law, without obtaining your prior authorization. Such laws do not allow consumers to restrict these disclosures. Disclosures may include, without limitation, the following:

- To insurance agents, brokers, representatives, support organizations, or others to provide you with services you have requested, and to enable us to detect or prevent criminal activity, fraud, material misrepresentation, or nondisclosure in connection with an insurance transaction;
- To third-party contractors or service providers for the purpose of determining your eligibility for an insurance benefit or payment and/or providing you with services you have requested;
- To an insurance regulatory authority, or a law enforcement or other governmental authority, in a civil action, in connection with a subpoena or a governmental investigation;
- To companies that perform marketing services on our behalf or to other financial institutions with which we have joint marketing agreements and/or
- To lenders, lien holders, judgment creditors, or other parties claiming an encumbrance or an interest in title whose claim or interest must be determined, settled, paid or released prior to a title or escrow closing.

We may also disclose your Personal Information to others when we believe, in good faith, that such disclosure is reasonably necessary to comply with the law or to protect the safety of our customers, employees, or property and/or to comply with a judicial proceeding, court order or legal process.

Effective Date: 5/1/2008

Disclosure to Affiliated Companies - We are permitted by law to share your name, address and facts about your transaction with other FNF companies, such as insurance companies, agents, and other real estate service providers to provide you with services you have requested, for marketing or product development research, or to market products or services to you. We do not, however, disclose information we collect from consumer or credit reporting agencies with our affiliates or others without your consent, in conformity with applicable law, unless such disclosure is otherwise permitted by law.

Disclosure to Nonaffiliated Third Parties - We do not disclose Personal Information about our customers or former customers to nonaffiliated third parties, except as outlined herein or as otherwise permitted by law.

**Confidentiality and Security of Personal Information**

We restrict access to Personal Information about you to those employees who need to know that information to provide products or services to you. We maintain physical, electronic, and procedural safeguards that comply with federal regulations to guard Personal Information.

**Access To Personal Information/**
**Requests for Correction, Amendment, or Deletion of Personal Information**

As required by applicable law, we will afford you the right to access your Personal Information, under certain circumstances to find out to whom your Personal Information has been disclosed, and request correction or deletion of your Personal Information. However, FNF's current policy is to maintain customers' Personal Information for no less than your state's required record retention requirements for the purpose of handling future coverage claims.

For your protection, all requests made under this section must be in writing and must include your notarized signature to establish your identity. Where permitted by law, we may charge a reasonable fee to cover the costs incurred in responding to such requests. Please send requests to:

Chief Privacy Officer
Fidelity National Financial, Inc.
601 Riverside Avenue
Jacksonville, FL 32204

**Changes to this Privacy Statement**

This Privacy Statement may be amended from time to time consistent with applicable privacy laws. When we amend this Privacy Statement, we will post a notice of such changes on our website. The effective date of this Privacy Statement, as stated above, indicates the last time this Privacy Statement was revised or materially changed.

## Notice of Available Discounts

Pursuant to Section 2355.3 in Title 10 of the California Code of Regulations Fidelity National Financial, Inc. and its subsidiaries ("FNF") must deliver a notice of each discount available under our current rate filing along with the delivery of escrow instructions, a preliminary report or commitment. Please be aware that the provision of this notice does not constitute a waiver of the consumer's right to be charged the filed rate. As such, your transaction may not qualify for the below discounts.

You are encouraged to discuss the applicability of one or more of the below discounts with a Company representative. These discounts are generally described below; consult the rate manual for a full description of the terms, conditions and requirements for such discount. These discounts only apply to transactions involving services rendered by the FNF Family of Companies. This notice only applies to transactions involving property improved with a one-to-four family residential dwelling.

**FNF Underwritten Title Companies**
FNTC – Fidelity National Title Company
FNTCCA – Fidelity National Title Company of California

**FNF Underwriter**
FNTIC – Fidelity National Title Insurance Co.

**Available Discounts**

**CREDIT FOR PRELIMINARY REPORTS AND/OR COMMITMENTS ON SUBSEQUENT POLICIES (FNTIC)**
Where no major change in the title has occurred since the issuance of the original report or commitment, the order may be reopened within 12 months and all or a portion of the charge previously paid for the report or commitment may be credited on a subsequent policy charge within the following time period from the date of the report.

**FEE REDUCTION SETTLEMENT PROGRAM (FNTC, FNTCCA and FNTIC)**
Eligible customers shall receive a $20.00 reduction in their title and/or escrow fees charged by the Company for each eligible transaction in accordance with the terms of the Final Judgments entered in The People of the State of California.

**DISASTER LOANS (FNTIC)**
The charge for a Lender's Policy (Standard or Extended coverage) covering the financing or refinancing by an owner of record, within 24 months of the date of a declaration of a disaster area by the government of the United States or the State of California on any land located in said area, which was partially or totally destroyed in the disaster, will be 50% of the appropriate title insurance rate.

**CHURCHES OR CHARITABLE NON-PROFIT ORGANIZATIONS (FNTIC)**
On properties used as a church or for charitable purposes within the scope of the normal activities of such entities, provided said charge is normally the church's obligation the charge for an owner's policy shall be 50% to 70% of the appropriate title insurance rate, depending on the type of coverage selected. The charge for a lender's policy shall be 40% to 50% of the appropriate title insurance rate, depending on the type of coverage selected.

**EMPLOYEE RATE (FNTC, FNTCCA and FNTIC)**
No charge shall be made to employees (including employees on approved retirement) of the Company or its underwritten, subsidiary or affiliated title companies for policies or escrow services in connection with financing, refinancing, sale or purchase of the employees' bona fide home property. Waiver of such charges is authorized only in connection with those costs which the employee would be obligated to pay, by established custom, as a party to the transaction.

101 North Brand Blvd., Suite 1800
Glendale, California 91203
Office Phone: (800)660-2728
Office Fax:
Email: mmcdonald@nat.com

North American Title Company
101 North Brand Blvd., Suite 1800
Glendale, CA 91203

Our Order No.: 1009956
Property Address: Vacant Land, CA

Attention: JB Jennings

---

Dated as of May 25, 2010 at 7:30 A.M.

In response to the above referenced application for a Policy of Title Insurance,

**North American Title Company**

Hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms.

The printed Exceptions and Exclusions from the coverage and limitations on covered risks of said Policy or Policies are set forth in Exhibit A attached. The Policy to be issued may contain an Arbitration Clause. When the amount if insurance is less than that set forth in the Arbitration Clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the Parties. Limitations on covered risks applicable to the CLTA and ALTA Homeowner's Policies of Title Insurance which establish a deductible amount and a maximum dollar limit of liability for certain coverages are also set forth in Exhibit A. Copies of the Policy forms should be read. They are available from the office which issued this report.

**Please read the exceptions shown or referred to below and the exceptions and exclusions set forth in Exhibit A of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.**

**It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects, and encumbrances affecting title to the land.**

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.

The form of Policy of title insurance contemplated by this report is:
Eagle Loan Policy

Mark McDonald, Title Officer

## IMPORTANT NOTICE

California Assembly Bill 512 ("AB 512") is effective on January 1, 1990. Under AB 512, all title companies may only make funds available for monetary disbursal in accordance with the following rules:

1. Same Day Availability. Disbursement on the date of deposit is allowed only when funds are deposited to NATC in cash or by electronic transfer (wire). Bear in mind that cash will be accepted from customers only under special circumstances as individually approved by management.

2. Next Day Availability. If funds are deposited to NATC by cashier's checks, certified checks, or teller's checks, disbursement may be on the next business day following deposit. A "teller's check" is one drawn by an insured financial institution against another insured financial institution (e.g., a savings and loan funding with a check drawn against an FDIC insured bank).

3. 3-7 Banking Days Availability (Regulation CC). If the deposit is made by checks other than those described in Paragraphs 1 and 2 above, disbursement may occur on the day when funds must be made available to depositors under Federal Reserve Regulation CC. This requires a "hold" on some checks of 2-7 banking days or longer in some instances. Personal checks, private corporation and company checks, and funding checks from mortgage companies that are not teller's checks are among those checks subject to such holds.

(For further details, consult Chapter 598, statutes of 1989.)

Note: The above guidelines are in conformity with those issued by the Department of Insurance for all California Title Insurers.

# SCHEDULE A

1. The estate or interest in the land hereinafter described or referred to covered by this report is:

   A fee.

2. Title to said estate or interest at the date hereof is vested in:

   A. V. Foothills, LLC, as to Parcels 1 and 2 and Royal Investors Group, LLC, a California limited liability company, as to Parcels 3 and 4

3. The Land referred to in this report is situated in the State of California, County of Los Angeles, and is described as follows:

SEE EXHIBIT "A" ATTACHED HEREWITH AND MADE A PART HEREOF

## LEGAL DESCRIPTION

Real property in the unincorporated area of the County of Los Angeles, State of California, described as follows:

PARCEL 1:

THE NORTH HALF OF THE NORTH HALF OF THE NORTHEAST QUARTER OF SECTION 23, TOWNSHIP 7 NORTH, RANGE 14 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT OF SAID LAND.

EXCEPT THEREFROM AN UNDIVIDED 25 PERCENT INTEREST IN AND TO ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES AND OTHER MINERALS AND MINERAL RIGHTS, WHETHER METALLIC OR NON-METALLIC, IN AND UNDER SAID LAND, WHICH MAY BE EXTRACTED FROM OR PRODUCED FROM OR UPON SAID LAND, AS RESERVED BY FRED MEYERS, A MARRIED MAN IN DEED RECORDED JANUARY 21, 1957.

ALSO EXCEPT THEREFROM ONE-HALF OF ALL OIL, MINERAL, GAS AND OTHER HYDROCARBON SUBSTANCES BELOW A DEPTH OF 500 FEET FROM THE SURFACE THEREOF, WITHOUT HOWEVER, THE RIGHT TO USE THE SURFACE AND SUBSURFACE OF SAID LAND LYING ABOVE A DEPTH OF 500 FEET, AS RESERVED BY JACK ABRAMSON AND TILLY ABRAMSON, HUSBAND AND WIFE IN DEED RECORDED JUNE 30, 1982 AS INSTRUMENT NO. 82-656491 OF OFFICIAL RECORDS.

PARCEL 2:

THE SOUTH HALF OF THE NORTH HALF OF THE NORTHEAST QUARTER OF SECTION 23, TOWNSHIP 7 NORTH, RANGE 14 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT OF SAID LAND.

EXCEPT THEREFROM AN UNDIVIDED 25 PERCENT INTEREST IN AND TO ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES AND OTHER MINERALS AND MINERAL RIGHTS, WHETHER METALLIC OR NON-METALLIC, IN AND UNDER SAID LAND, WHICH MAY BE EXTRACTED FROM OR PRODUCED FROM OR UPON SAID LAND, AS RESERVED BY FRED MEYERS, A MARRIED MAN IN DEED RECORDED JANUARY 21, 1957.

ALSO EXCEPT THEREFROM ONE-HALF OF ALL OIL, MINERAL, GAS AND OTHER HYDROCARBON SUBSTANCES BELOW A DEPTH OF 500 FEET FROM THE SURFACE THEREOF, WITHOUT HOWEVER, THE RIGHT TO USE THE SURFACE AND SUBSURFACE OF SAID LAND LYING ABOVE A DEPTH OF 500 FEET, AS RESERVED BY JACK ABRAMSON AND TILLY ABRAMSON, HUSBAND AND WIFE IN DEED RECORDED JUNE 30, 1982 AS INSTRUMENT NO. 82-656492 OF OFFICIAL RECORDS.

PARCEL 3:

THE NORTH HALF OF THE SOUTH HALF OF THE NORTHEAST QUARTER OF SECTION 23, TOWNSHIP 7 NORTH, RANGE 14 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT OF SAID LAND.

EXCEPT THEREFROM AN UNDIVIDED 25 PERCENT INTEREST IN AND TO ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES AND OTHER MINERALS AND MINERAL RIGHTS, WHETHER METALLIC OR NON-METALLIC, IN AND UNDER SAID LAND, WHICH MAY BE EXTRACTED FROM OR PRODUCED FROM OR UPON SAID LAND, AS RESERVED BY FRED MEYERS, A MARRIED MAN IN DEED RECORDED JANUARY 21, 1957.

ALSO EXCEPT THEREFROM ONE-HALF OF ALL OIL, MINERAL, GAS AND OTHER HYDROCARBON SUBSTANCES BELOW A DEPTH OF 500 FEET FROM THE SURFACE THEREOF, WITHOUT HOWEVER, THE RIGHT TO USE THE SURFACE AND SUBSURFACE OF SAID LAND LYING ABOVE A DEPTH OF 500 FEET, AS RESERVED BY JACK ABRAMSON AND TILLY ABRAMSON, HUSBAND AND WIFE IN DEED RECORDED JUNE 30, 1982 AS INSTRUMENT NO. 82-656493 OF OFFICIAL RECORDS.

PARCEL 4:

THE SOUTH HALF OF THE SOUTH HALF OF THE NORTHEAST QUARTER OF SECTION 23, TOWNSHIP 7 NORTH, RANGE 14 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT OF SAID LAND.

EXCEPT THEREFROM AN UNDIVIDED 25 PERCENT INTEREST IN AND TO ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES AND OTHER MINERALS AND MINERAL RIGHTS, WHETHER METALLIC OR NON-METALLIC, IN AND UNDER SAID LAND, WHICH MAY BE EXTRACTED FROM OR PRODUCED FROM OR UPON SAID LAND, AS RESERVED BY FRED MEYERS, A MARRIED MAN IN DEED RECORDED JANUARY 21, 1957.

ALSO EXCEPT THEREFROM ONE-HALF OF ALL OIL, MINERAL, GAS AND OTHER HYDROCARBON SUBSTANCES BELOW A DEPTH OF 500 FEET FROM THE SURFACE THEREOF, WITHOUT HOWEVER, THE RIGHT TO USE THE SURFACE AND SUBSURFACE OF SAID LAND LYING ABOVE A DEPTH OF 500 FEET, AS RESERVED BY JACK ABRAMSON AND TILLY ABRAMSON, HUSBAND AND WIFE IN DEED RECORDED JUNE 30, 1982 AS INSTRUMENT NO. 82-656494 OF OFFICIAL RECORDS.

APN: 3267-014-017 (Affects Parcel 1); 3267-014-018 (Affects Parcel 2); 3267-014-019 (Affects Parcel 3) and 3267-014-020 (Affects Parcel 4)

# SCHEDULE B

At the date hereof exceptions to coverage in addition to the printed exceptions and exclusions in the policy form designated on the face page of this report would be as follows:

1. General and special taxes and assessments for the fiscal year 2010-2011, a lien not yet due or payable.

2. General and special taxes and assessments for the fiscal year 2009-2010.

| | |
|---|---|
| First Installment: | $4,778.07, DELINQUENT |
| Penalty: | $477.81 |
| Second Installment: | $4,778.07, DELINQUENT |
| Penalty: | $487.81 |
| Tax Rate Area: | 09-610 |
| A. P. No.: | 3267-014-017 |

(Affects Parcel 1)

The County Tax Collector could not verify the amounts shown above. Please verify the amounts with the County Tax Collector prior to the close of the contemplated transaction.

3. The lien of defaulted taxes for the fiscal year 2008-2009, and any subsequent delinquencies.

| | |
|---|---|
| Tax Rate Area: | 09-610 |
| A. P. No.: | 3267-014-017 |
| Amount to redeem: | $11,735.40 |
| Valid through: | June 2010 |
| Amount to redeem: | $Amounts to Follow |
| Valid through: | July 2010 |

(Affects Parcel 1)

4. General and special taxes and assessments for the fiscal year 2009-2010.

| | |
|---|---|
| First Installment: | $4,778.07, DELINQUENT |
| Penalty: | $477.81 |
| Second Installment: | $4,778.07, DELINQUENT |
| Penalty: | $487.81 |
| Tax Rate Area: | 09-610 |
| A. P. No.: | 3267-014-018 |

(Affects Parcel 2)

The County Tax Collector could not verify the amounts shown above. Please verify the amounts with the County Tax Collector prior to the close of the contemplated transaction.

5. The lien of defaulted taxes for the fiscal year 2008-2009, and any subsequent delinquencies.

| | |
|---|---|
| Tax Rate Area: | 09-610 |
| A. P. No.: | 3267-014-018 |

| | |
|---|---|
| Amount to redeem: | $11,735.40 |
| Valid through: | June 2010 |
| Amount to redeem: | $Amounts to Follow |
| Valid through: | July 2010 |

(Affects Parcel 2)

6. General and special taxes and assessments for the fiscal year 2009-2010.

| | |
|---|---|
| First Installment: | $4,778.07, DELINQUENT |
| Penalty: | $477.81 |
| Second Installment: | $4,778.07, DELINQUENT |
| Penalty: | $487.81 |
| Tax Rate Area: | 09-610 |
| A. P. No.: | 3267-014-019 |

(Affects Parcel 3)

The County Tax Collector could not verify the amounts shown above. Please verify the amounts with the County Tax Collector prior to the close of the contemplated transaction.

7. The lien of defaulted taxes for the fiscal year 2008-2009, and any subsequent delinquencies.

| | |
|---|---|
| Tax Rate Area: | 09-610 |
| A. P. No.: | 3267-014-019 |
| Amount to redeem: | $11,735.40 |
| Valid through: | June 2010 |
| Amount to redeem: | $Amounts to Follow |
| Valid through: | July 2010 |

(Affects Parcel 3)

8. General and special taxes and assessments for the fiscal year 2009-2010.

| | |
|---|---|
| First Installment: | $4,778.07, DELINQUENT |
| Penalty: | $477.81 |
| Second Installment: | $4,778.07, DELINQUENT |
| Penalty: | $487.81 |
| Tax Rate Area: | 09-610 |
| A. P. No.: | 3267-014-020 |

(Affects Parcel 4)

The County Tax Collector could not verify the amounts shown above. Please verify the amounts with the County Tax Collector prior to the close of the contemplated transaction.

9. The lien of defaulted taxes for the fiscal year 2008-2009, and any subsequent delinquencies.

| | |
|---|---|
| Tax Rate Area: | 09-610 |
| A. P. No.: | 3267-014-020 |
| Amount to redeem: | $11,735.40 |
| Valid through: | June 2010 |

Amount to redeem: $Amounts to Follow
Valid through: July 2010

(Affects Parcel 4)

10. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.

11. Rights of the public in and to that portion of the land lying within 110th Street, West and Avenue J.

12. Any and all offers of dedications, conditions, restrictions, easements, notes and/or provisions shown or disclosed by the filed or recorded map referred to in the legal description including but not limited to: Drainage and incidental purposes affecting said land.

13. An easement for public road, highway and incidental purposes, recorded April 04, 1941 as Book 18303, Page 233 of Official Records.
In Favor of: County of Los Angeles
Affects: The Easterly 30 feet of said land.

To be known as 110th Street.

14. An easement for right to construct, maintain, use a debris basin, storm drain and appurtenances and structures and incidental purposes, recorded June 01, 1944 as Book 21009, Page 15 of Official Records.
In Favor of: County of Los Angeles
Affects: The Westerly 30 feet of the Easterly 70 feet of said Section 23

15. An easement for road and highway and incidental purposes, recorded June 27, 1950 as Book 33519, Page 296 of Official Records.
In Favor of: County of Los Angeles
Affects: The Northerly 30 feet of said land, except the Easterly 30 feet, to be known as Avenue "J" Del Sur Road

16. An easement for public road and highway and incidental purposes, recorded June 29, 1965 as Instrument No. 3437 of Official Records.
In Favor of: County of Los Angeles
Affects: The Westerly 20 feet of the Easterly 50 feet of said land.

To be known as 110th Street West.

17. Covenants, conditions, restrictions, easements, assessments, liens, charges, terms and provisions in the document recorded October 12, 2007 as Instrument No. 2007-2335242 of Official Records, which provide that a violation thereof shall not defeat or render invalid the lien of any first mortgage or deed of trust made in good faith and for value, but deleting any covenant, condition, or restriction indicating a preference, limitation or discrimination based on race, color, religion, sex, sexual orientation, marital status, ancestry, disability, handicap, familial status, national origin or source of income (as defined in California Government Code §12955(p)), to the extent such covenants, conditions or restrictions violate 42 U.S.C. §3604(c) or California Government Code §12955. Lawful restrictions under state and federal law on the age of occupants in senior housing or housing for older persons shall not be construed as restrictions based on familial status.

Note: You may wish to contact the homeowners association referred to in the above document for information regarding assessments, transfer requirements or other matters.

(Affects Parcels 1 and 2)

18. A Deed of Trust to secure an original indebtedness of $750,000.00 recorded April 14, 2010 as Instrument No. 2010-0503119 of Official Records.

| | |
|---|---|
| Dated: | January 18, 2010 |
| Trustor: | Royal Investors Group, LLC, a California limited liability company |
| Trustee: | Commonwealth Land Title Company, a California corporation |
| Beneficiary: | SR Capital Inc., a California corporation |

(Affects Parcels 3 and 4)

19. Any right or asserted right of a creditor, trustee or debtor in possession in bankruptcy to avoid that certain conveyancing document which recorded May 10, 2010 as Instrument No. 2010-0633862 of official records of Los Angeles pursuant to Title 11 U.S.C. (Bankruptcy), Section 548(a) or 549.

NOTE: This exception to Title will not be shown in our policy of Title Insurance based upon a sale to a bona fide purchaser for value.

Document re-recorded May 21, 2010 as Instrument No. 2010-0698726 of Official Records.

(Affects Parcels 1 and 2)

20. Any irregularity in the foreclosure proceedings leading up to the Trustee's Deed recorded May 10, 2010 as Instrument No. 2010-0633862 of Official Records.

Document re-recorded May 21, 2010 as Instrument No. 2010-0698726 of Official Records.

(Affects Parcels 1 and 2)

21. Rights of parties in possession.

**Prior to the issuance of any policy of title insurance, the Company will require:**

22. With respect to A. V. Foothills, LLC and Royal Investors Group, LLC, a California limited liability company:

a. A copy of its operating agreement and any amendments thereto;

b. If it is a California limited liability company, that a certified copy of its articles of organization (LLC-1) and any certificate of correction (LLC-11), certificate of amendment (LLC-2), or restatement of articles of organization (LLC-10) be recorded in the public records;

c. If it is a foreign limited liability company, that a certified copy of its application for registration (LLC-5) be recorded in the public records;

d. With respect to any deed, deed of trust, lease, subordination agreement or other document or instrument executed by such limited liability company and presented for recordation by the Company or upon which the Company is asked to rely, that such document or instrument be executed in accordance with one of the following, as appropriate:

(i) If the limited liability company properly operates through officers appointed or elected pursuant to the terms of a written operating agreement, such document must be executed by at least two duly elected or appointed officers, as follows: the chairman of the board, the president or any vice president, and any secretary, assistant secretary, the chief financial officer or any assistant treasurer;

(ii) If the limited liability company properly operates through a manager or managers identified in the articles of organization and/or duly elected pursuant to the terms of a written operating agreement, such document must be executed by at least two such managers or by one manager if the limited liability company properly operates with the existence of only one manager.

e. Other requirements which the Company may impose following its review of the material required herein and other information which the Company may require

********** END OF REPORT **********

## ***** NOTES *****

1. The property covered by this report is vacant land.

2. According to the public records, there has been no conveyance of the land within a period of twenty four months prior to the date of this report, except as follows:

   A document recorded March 02, 2010 as Instrument No. 2010-0275945 of Official Records.
   From: Asset Foreclosure Services, Inc., a California corporation
   To: 26 Tierra Subida LLC

   (Affects Parcels 3 and 4)

   A document recorded April 09, 2010 as Instrument No. 2010-0483952 of Official Records.
   From: 26 Tierra Subida LLC, a California limited liability company
   To: Royal Investors Group, LLC, a California limited liability company

   (Affects Parcels 3 and 4)

   A document recorded May 10, 2010 as Instrument No. 2010-0633862 of Official Records.
   From: Asset Foreclosure Services, Inc., a California corporation
   To: A. V. Foothills, LLC

   (Affects Parcels 1 and 2)

   Document re-recorded May 21, 2010 as Instrument No. 2010-0698726 of Official Records.

3. Basic rate applies.

4. Notice of change in ownership recording procedure

   Effective July 1, 1985, pursuant to a new state law (Section 480.3 of the Revenue and Taxation Code), all Deeds and other Documents that reflect a change in ownership must be accompanied by a Preliminary Change of Ownership Report to be completed by the transferee.

   If this special report is not presented at the time of recording, an additional recording fee of $20.00, as required by law, will be charged.

   Preliminary Change in Ownership forms, instructions on how to complete them, and a non-exclusive list of documents that are affected by this change, are available from the County Recorder's Office or the Office of the County Assessor.

5. GOOD FUNDS LAW

   Under Section 12413.1 of the California Insurance Code, North American Title Company, Inc. may only make funds available for disbursement in accordance with the following rules:

   Same day availability. Disbursement on the date of deposit is allowed only when funds are deposited to North American Title Company, Inc. by Cash or Electronic Transfer (Wire). Cash will be accepted only under special circumstances and upon approval by management.

Next business day availability. If funds are deposited to North American Title Company, Inc. by cashier's checks, certified checks or teller's checks, disbursement may be on the next business day following deposit. A "teller's check" is one drawn by an insured financial institution against another insured financial institution (e.g., a savings and loan funding with a check drawn against a FDIC insured bank).

Second business day availability. If the deposit is made by checks other than those described in paragraphs 1 and 2 above, disbursement may occur on the day when funds must be made available to depositors under Federal Reserve Regulation CC. In most cases, these checks will be available on the second business day following deposit. (For further details, consult California Insurance Code Section 12413, et seq. and Regulation CC).

These are the minimum periods before funds will be made available. North American Title Company, Inc. may require additional time before disbursing on deposited funds.

North American Title Company will not be responsible for accruals of interest or other charges resulting from compliance with the disbursement restrictions imposed by state law.

For Your Information, Our Wire Instructions Are:

| **Wire To:** | **Credit the Account of:** |
|---|---|
| Comerica Bank | North American Title Company |
| 2321 Rosecrans Ave, Ste 5000 | Bank Account No.: 1892091172 ABA No.: 121137522 |
| El Segundo, CA 90245 | Escrow No. 91401-1009956-10 |

**ACH FUNDS** - Automatic Clearing House

North American Title Company will not accept funds in the form of ACH transfers.

Be sure to reference our order number and Title Officer name.

Should this office be required to wire funds out at close of escrow, please be informed that wiring instructions should be received as soon as possible, but no later than the following times.

Wires outside the State of California:
11:00 A.M. ON DATE OF WIRE

Wires within the State of California:
12:00 P.M. ON DATE OF WIRE

Effective January 1, 1991

A service charge of $25.00 will be assessed for all funds disbursed by this Company by wire.

6. Payoff Requirement

If any of the deeds of trust shown in this Preliminary Report secures a revolving credit loan, this Company will require prior to closing that:

1. The Borrower provide authorization to the Lender to freeze the loan from further disbursements and that we be provided with proof that the account has been frozen and the effective date of the freeze.

2. All unused checks, voided checks and/or credit cards be submitted to this Company.

3. There are no outstanding checks unpaid.

4. Should the Company be unable to ascertain that one or more of the above have not been complied with, we will withhold from the proceeds the maximum amount of the loan obligation until such time as we may verify that the payoff was sufficient to obtain a full reconveyance.

7. This report is incomplete. We will require a statement of information from the parties indicated below, five (5) days prior to closing, in order to complete this report, based on the effect of Documents, Proceedings, Liens, Decrees, or other matters which do not specifically describe said Land, but which, if any do exist, may affect the title or impose Liens or Encumbrances thereon.

   Borrower:
   Seller: A. V. Foothills, LLC
   All Parties:

   NOTE: The statement of information is necessary to complete the search and examination of Title under this order. Any Title Search includes matters that are indexed by name only, and having a completed Statement of Information assists the Company in the elimination of certain matters which appear to involve the Parties, but in fact affect another Party with the same or similar name.

   Be assured that the Statement of Information is essential and will be kept strictly confidential to this file.

8. North American Title Company, Inc.'s charges for recording the transaction documents include charges for services performed by North American Title Company, Inc., in addition to an estimate of payments to be made to governmental agencies.

9. If North American Title Company is asked to hold money for taxes at the close of escrow, written approval by the Borrower/Seller must be submitted prior to closing.

10. The map attached, if any, may or may not be a survey of the land depicted hereon. North American Title Company expressly disclaims any liability for loss or damage which may result from reliance on this map except to the extent coverage for such loss or damage is expressly provided by the terms and provisions of the title insurance policy, if any, to which this map is attached.

**NORTH AMERICAN TITLE COMPANY**
101 North Brand Blvd., Suite 1800, Glendale, CA 91203
(818)240-4912
Fax: Email:

Attention:

Your Ref:
Our Order No.: 91401-1009956-10

**LENDERS SUPPLEMENTAL REPORT**

Dated as of May 25, 2010 AT 7:30 A.M.

Title Officer: Mark McDonald

The above numbered report (including any supplements or amendments thereto) is hereby modified and/or supplemented in order to reflect the following additional items relating to the issuance of an American Land Title Association loan form policy of Title Insurance:

Our ALTA Loan Policy, when issued, will contain Endorsement Nos. 100 and 116.

There is located on said land a Vacant Land
Known as: Vacant Land
City of Unincorporated area
County of Los Angeles
State of California.

# Privacy Policy Notice

We at the North American Title Group family of companies take your privacy very seriously. This Notice is being given on behalf of each of the companies listed below1 (the "North American Title Companies"), as well as on behalf of North American Advantage Insurance Services, LLC. It explains our policy regarding the personal information of our customers and our former customers.

**OUR PRIVACY POLICIES AND PRACTICES**

***<u>The North American Title Companies</u>***

1. **Information North American Title Companies collect, and the sources from which we collect it:** On forms related to your real estate transaction, North American Title Companies collect personal information that you, our affiliates or third parties have provided to us, such as, for example, your name, address, and sale price of your home. All of the information that we collect is referred to in this notice as "NAT Collected Information".

2. **What information North American Title Companies disclose to our affiliates:** From time to time, as permitted by law, the North American Title Companies may share NAT Collected Information with each other and with North American Advantage Insurance Services, LLC ("NAAIS") about customers and former customers. You may ask us not to share NAT Collected Information among the North American Title Companies and NAAIS by writing to us and letting us know at: North American Title Group, Inc., Attention: Corporate Affairs, 700 NW 107th Avenue, Suite 300, Miami, FL 33172. Your request will not affect NAT Collected Information that the North American Title Companies are otherwise permitted by law to share, such as, in certain circumstances, NAT Collected Information related to our experiences and transactions with you.

3. **What information North American Title Companies disclose to third parties:**
   - If permitted by federal law and the law of your state, we may disclose some or all of the following information to companies that perform marketing services on our behalf and to certain unaffiliated insurance companies with whom we have joint marketing agreements: your name, current address, purchased property address, and closing date.

   - We also may share NAT Collected Information about customers and former customers with other unaffiliated third parties, as permitted by law. For example, NAT Collected Information may be shared in certain circumstances (A) with companies involved in servicing or processing your account (B) with insurance regulatory authorities, and (C) with law enforcement officials, to protect against fraud or other crimes.

4. **Your right to access your personal information:** You have the right to review your personal information that we have on record about you. If you wish to review that information, please contact the local North American Title Company office identified on the title insurance product to which this notice is attached or where you received this notice and give us a reasonable time to make that information available to you. If you believe any information is incorrect, notify us, and if we agree, we will correct it. If we disagree, we will advise you in writing why we disagree.

**<u>North American Advantage Insurance Services, LLC</u>**

1. **Information North American Advantage Insurance Services, LLC ("NAAIS") collect and sources from which we collect it:** NAAIS collects personal information about you from you, our affiliates, or third parties on forms related to your transaction with NAAIS or a North American Title Company, such as your name, address, or information about the property that is or will be insured. We also receive information from companies, which compile and distribute public records. All of the information that NAAIS collects, as described in this paragraph, is referred to in this notice as "NAAIS Collected Information."

2. **Information NAAIS may disclose to its affiliates or third parties:** NAAIS may disclose NAAIS Collected Information about you or others without your permission as permitted or required by law, including to the following types of institutions for the reasons described:

- To a third party or an affiliate if the disclosure will enable that party to perform a business, professional or insurance function for us in connection with an insurance transaction involving you.

- To an insurance institution, agent, or credit reporting agency in order to detect or prevent criminal activity, fraud or misrepresentation in connection with an insurance transaction.

- To an insurance institution, agent, or credit reporting agency for either this agency or the entity to whom we disclose the information to perform a function in connection with an insurance transaction involving you.

- To an insurance regulatory authority, law enforcement, or other governmental authority in order to protect our interests in preventing or prosecuting fraud, or if we believe that you have conducted illegal activities.

3. **Your right to access and amend your personal information:** You have the right to request access to the personal information that we record about you. Your right includes the right to know the source of the information and the identity of the persons, institutions or types of institutions to whom we have disclosed such information within two (2) years prior to your request. Your right includes the right to view such information and copy it in person, or request that a copy of it be sent to you by mail (for which we may charge you a reasonable fee to cover our costs). Your right also includes the right to request corrections, amendments or deletions of any information in our possession. The procedures that you must follow to request access to or an amendment of your information are as follows:

To obtain access to your information: You should submit a request in writing to: North American Title Group, Inc., Attention: Corporate Affairs, 700 NW 107th Avenue, Suite 300, Miami, FL 33172. The request should include your name, address, social security number, telephone number, and the recorded information to which you would like access. The request should state whether you would like access in person or a copy of the information sent to you by mail. Upon receipt of your request, we will contact you within 30 business days to arrange providing you with access in person or the copies that you have requested.

To correct, amend, or delete any of your information: You should submit a request in writing to: North American Title Group, Inc., Attention: Corporate Affairs, 700 NW 107th Avenue, Suite 300, Miami, FL 33172. The request should include your name, address, social security number, telephone number, the specific information in dispute, and the identity of the document or record that contains the disputed information. Upon receipt of your request, we will contact you within 30 business days to notify you either that we have made the correction, amendment or deletion, or that we refuse to do so and the reasons for the refusal, which you will have an opportunity to challenge.

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**SECURITY PROCEDURES**

We restrict access to NAT Collected Information and NAAIS Collected Information about you to individuals who need to know such information in order to provide you with your product or service. We maintain physical, electronic and procedural safeguards to protect NAT Collected Information and NAAIS Collected Information about you.

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**CHANGES TO OUR PRIVACY POLICY**

This Notice reflects our privacy policy as of February 1, 2008. We reserve the right to change, modify or amend this policy at any time. Please check our Privacy Policy periodically for changes.

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1The North American Title Group Family of Companies are: North American Title Company, North American Title Insurance Company, North American Title Alliance, LLC, North American Title Florida Alliance, LLC, North American Services, LLC, North American Exchange Company, North American Title Agency, North American Abstract Agency and North American Legal Services, L.L.C.

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**ACKNOWLEDGEMENT**

Your receipt of a copy of the preliminary report, commitment, your policy of insurance, or escrow documents accompanied by this Notice will constitute your acknowledgment of receipt of this Privacy Policy Notice.

**Exhibit A (Revised 02-05-10)**

**CALIFORNIA LAND TITLE ASSOCIATION**
**STANDARD COVERAGE POLICY —1990**

**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building or zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien, or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage or for the estate or interest insured by this policy.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with the applicable doing business laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any claim, which arises out of the transaction vesting in the insured the estate of interest insured by this policy or the transaction creating the interest of the insured lender, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws.

**EXCEPTIONS FROM COVERAGE- SCHEDULE B, PART I**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
   Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**CLTA HOMEOWNER'S POLICY OF TITLE INSURANCE (10/22/03)**
**ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE**

**EXCLUSIONS**

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes ordinances, laws and regulations concerning:
   a. building
   b. zoning
   c. Land use
   d. improvements on the Land
   e. Land division
   f. environmental protection
   This Exclusion does not apply to violations or the enforcement of these matters if notice of the violation or enforcement appears in the Public Records at the Policy Date.
   This Exclusion does not limit the coverage described in Covered Risk 14, 15, 16, 17 or 24.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not apply to violations of building codes if notice of the violation appears in the Public Records at the Policy Date.
3. The right to take the Land by condemning it, unless:
   a. a notice of exercising the right appears in the Public Records at the Policy Date; or
   b. the taking happened before the Policy Date and is binding on You if You bought the Land without Knowing of the taking.
4. Risks:
   a. that are created, allowed, or agreed to by You, whether or not they appear in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they appear in the Public Records at the Policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.d, 22, 23, 24 or 25.
5. Failure to pay value for Your Title.
6. Lack of a right:
   a. to any Land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   b. in streets, alleys, or waterways that touch the Land.
   This Exclusion does not limit the coverage described in Covered Risk 11 or 18.

**LIMITATIONS ON COVERED RISKS**

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows:

- For Covered Risk 14, 15, 16 and 18, Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.

The deductible amounts and maximum dollar limits shown on Schedule A are as follows:

| | Your Deductible Amount | Our Maximum Dollar Limit of Liability |
|---|---|---|
| Covered Risk 14: | 1% of Policy Amount or $2,500 (whichever is less) | $10,000 |
| Covered Risk 15 | 1% of Policy Amount or $5,000 (whichever is less) | $10,000 |
| Covered Risk 16: | 1% of Policy Amount or $5,000 (whichever is less) | $25,000 |
| Covered Risk 18 | 1% of Policy Amount or $2,500 (whichever is less) | $5,000 |

**CLTA HOMEOWNER'S POLICY OF TITLE INSURANCE (01/01/08)**
**ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE**

**EXCLUSIONS**

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of those portions of any law or government regulation concerning:
   a. building;
   b. zoning;
   c. land use;
   d. improvements on the Land;
   e. land division; and
   f. environmental protection.

   This Exclusion does not limit the coverage described in Covered Risk 8.a., 14, 15, 16, 18, 19,20, 23 or 27.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not limit the coverage described in Covered Risk 14 or 15.
3. The right to take the Land by condemning it. This Exclusion does not limit the coverage described in Covered Risk 17.
4. Risks:
   a. that are created, allowed, or agreed to by You, whether or not they are recorded in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they are recorded in the Public Records at the Policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.e., 25, 26, 27 or 28.
5. Failure to pay value for Your Title.
6. Lack of a right:
   a. to any land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   b. in streets, alleys, or waterways that touch the Land.

   This Exclusion does not limit the coverage described in Covered Risk 11 or 21.

**LIMITATIONS ON COVERED RISKS**

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows:

- For Covered Risk 16, 18, 19, and 21 Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.

The deductible amounts and maximum dollar limits shown on Schedule A are as follows:

| | Your Deductible Amount | Our Maximum Dollar Limit of Liability |
|---|---|---|
| Covered Risk 16: | 1% of Policy Amount Shown in Schedule A or $2,500 (whichever is less) | $10,000 |
| Covered Risk 18: | 1% of Policy Amount Shown in Schedule A or $5,000 (whichever is less) | $10,000 |
| Covered Risk 19: | 1% of Policy Amount Shown in Schedule A or $5,000 (whichever is less) | $25,000 |
| Covered Risk 21 | 1% of Policy Amount Shown in Schedule A or $2,500 (whichever is less) | $5,000 |

**AMERICAN LAND TITLE ASSOCIATION**
**RESIDENTIAL TITLE INSURANCE POLICY (6-1-87)**

**EXCLUSIONS**

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes building and zoning ordinances and also laws and regulations concerning:

* land use
* improvements on the land
* land division
* environmental protection

This exclusion does not apply to violations or the enforcement of these matters which appear in the public records at Policy Date.
This exclusion does not limit the zoning coverage described in Items 12 and 13 of Covered Title Risks.

2. The right to take the land by condemning it, unless:
   * a notice of exercising the right appears in the public records
   * on the Policy Date
   * the taking happened prior to the Policy Date and is binding on you if you bought the land without knowing of the taking
3. Title Risks:
   * that are created, allowed, or agreed to by you
   * that are known to you, but not to us, on the Policy Date-- unless they appeared in the public records
   * that result in no loss to you
   * that first affect your title after the Policy Date --this does not limit the labor and material lien coverage in Item 8 of Covered Title Risks
4. Failure to pay value for your title.
5. Lack of a right:
   * to any land outside the area specifically described and referred to in Item 3 of Schedule A

     OR
   * in streets, alleys, or waterways that touch your land

   This exclusion does not limit the access coverage in Item 5 of Covered Title Risks.

**ALTA LOAN POLICY (10-17-92)**
**WITH ALTA ENDORSEMENT-FORM 1 COVERAGE**

**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land: (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy (except to the extent that this policy insures the priority of the lien of the insured mortgage over any statutory lien for services, labor or material or to the extent insurance is afforded herein as to assessments for street improvements under construction or completed at Date of Policy); or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable doing business laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any statutory lien for services, labor or materials (or the claim of priority of any statutory lien for services, labor or materials over the lien of the insured mortgage) arising from an improvement or work related to the land which is contracted for and commenced subsequent to Date of Policy and is not financed in whole or in part by proceeds of the indebtedness secured by the insured mortgage which at Date of Policy the insured has advanced or is obligated to advance.
7. Any claim, which arises out of the transaction creating the interest of the mortgagee insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the interest of the insured mortgagee being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the subordination of the interest of the insured mortgagee as a result of the application of the doctrine or equitable subordination; or
   (iii) the transaction creating the interest of the insured mortgagee being deemed a preferential transfer except where the preferential transfer results from the failure:
      (a) to timely record the instrument of transfer; or
      (b) of such recordation to impart notice to a purchaser for value or a judgement or lien creditor.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

**EXCEPTIONS FROM COVERAGE**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
   Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights. claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**2006 ALTA LOAN POLICY (06-17-06)**

**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11,13, or 14); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing- business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
   (a) a fraudulent conveyance or fraudulent transfer, or
   (b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

**EXCEPTIONS FROM COVERAGE**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**ALTA OWNER'S POLICY (10-17-92)**

**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.
4. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:

(i) the transaction creating the estate or interest insured by this policy being deemed a fraudulent conveyance or fraudulent transfer; or
(ii) the transaction creating the estate or interest insured by this policy being deemed a preferential transfer except where the preferential transfer results from the failure:
(a) to timely record the instrument of transfer; or
(b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage Policy will also include the following Exceptions from Coverage:

**EXCEPTIONS FROM COVERAGE**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
   Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**2006 ALTA OWNER'S POLICY (06-17-06)**

**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions, or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection;
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 1O);or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is
   (a) a fraudulent conveyance or fraudulent transfer; or
   (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

**EXCEPTIONS FROM COVERAGE**

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown in the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and that are not shown by the Public Records.
5. (a) Unpatented mining claims: (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof: (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

**ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (10/13/01)**

**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorney's fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the Land: (ii) the character, dimensions or location of any improvement now or hereafter erected on the Land: (iii) a separation in ownership or a change in the dimensions or areas of the Land or any parcel of which the Land is or was a part: or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the Land has been recorded in the Public Records at Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 12, 13, 14, and 16 of this policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the Land has been recorded in the Public Records at Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 12, 13, 14, and 16 of this policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the Public Records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without Knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) created, suffered, assumed or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting In no loss or damage to the Insured Claimant:
   (d) attaching or created subsequent to Date of Policy (this paragraph does not limit the coverage provided under Covered Risks 8, 16, 18, 19, 20, 21, 22, 23, 24, 25 and 26); or
   (e) resulting in loss or damage which would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of the Insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable doing business laws of the state in which the Land is situated.
5. Invalidity or unenforceability of the lien of the Insured Mortgage, or claim thereof, which arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, except as provided in Covered Risk 27, or any consumer credit protection or truth in lending law.
6. Real property taxes or assessments of any governmental authority which become a lien on the Land subsequent to Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 7, 8(e) and 26.
7. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This exclusion does not limit the coverage provided in Covered Risk 8.
8. Lack of priority of the lien of the Insured Mortgage as to each and every advance made after Date of Policy, and all interest charged thereon, over liens, encumbrances and other matters affecting the title, the existence of which are Known to the Insured at:
   (a) The time of the advance; or
   (b) The time a modification is made to the terms of the Insured Mortgage which changes the rate of interest charged, if the rate of Interest is greater as a result of the modification than it would have been before the modification. This exclusion does not limit the coverage provided in Covered Risk 8.
9. The failure of the residential structure, or any portion thereof to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This exclusion does not apply to violations of building codes if notice of the violation appears in the Public Records at Date of Policy.

**ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (01-01-08)**
**EXCLUSIONS FROM COVERAGE**

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorney's fees or expenses which arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting or relating to
      (i) the occupancy, use, or enjoyment of the Land;
      (ii) the character, dimensions or location of any improvement erected on the Land;
      (iii) the subdivision of land; or
      (iv) environmental protection;
      or the effect of any violation of these laws, ordinances or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 5, 6, 13(c), 13(d), 14 or 16.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) created, suffered, assumed or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27 or 28); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, or any consumer credit protection or truth-in-lending law. This Exclusion does not modify or limit the coverage provided in Covered Risk 26.
6. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to Advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching subsequent to Date of Policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11(b) or 25.
8. The failure of the residential structure, or any portion of it, to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6.

## NATCO NOTES:

**DON'T DELAY YOUR CLOSE OF ESCROW! IF ANY OF THE FOLLOWING ITEMS AFFECT YOUR TRANSACTION, PLEASE NOTIFY YOUR ESCROW OFFICER AS SOON AS POSSIBLE.**

**I. Ongoing Construction**

The Title Company will require, as a minimum, the following prior to insuring:

A. Valid Notice of Completion verified by inspection and expiration of 60 days from recordation of said notice or;
B. Approved Indemnities from Borrower/Seller, approved financial statement not over one year old and a waiver of lien rights from the general contractor.
C. The Title Company may also require proof of payment of subcontractors, indemnity and financial statement from the general contractor, a copy of the contract and the with-holding of a sum of money, to cover the contract until the mechanics lien period has expired, with which to pay filed mechanics liens, or other assurances to be determined on a case by case basis.

**II. Bankruptcy**

The Title Company will require, as a minimum, the following prior to insuring:

A. The bankruptcy case be closed or,
B. An order from the bankruptcy court verifying the transaction, with a demand placed into escrow by the trustee.
C. Escrow may not close until 15 days have elapsed from the order and the file has been checked to verify that there are no objections to said order.

**III. Abstracts of Judgment, Liens, Tax Liens**

The Title Company will require, as a minimum, the following prior to insuring:

A. Proof that the buyer/seller is not the same party as on the recorded liens.
B. This is accomplished by the buyer/seller/borrower completely filling out and signing a statement of information.
C. The items are to paid off in escrow.
D. The items are to be subordinated to the new transaction.

**IV. Community Property**

California is a community property state:

A. A quitclaim from one spouse to another must specifically quitclaim any community property interest.
B. An interlocutory decree of divorce specifically granting the property to one spouse is sufficient if a final decree is issued and recorded in the county.

## DID YOU KNOW?

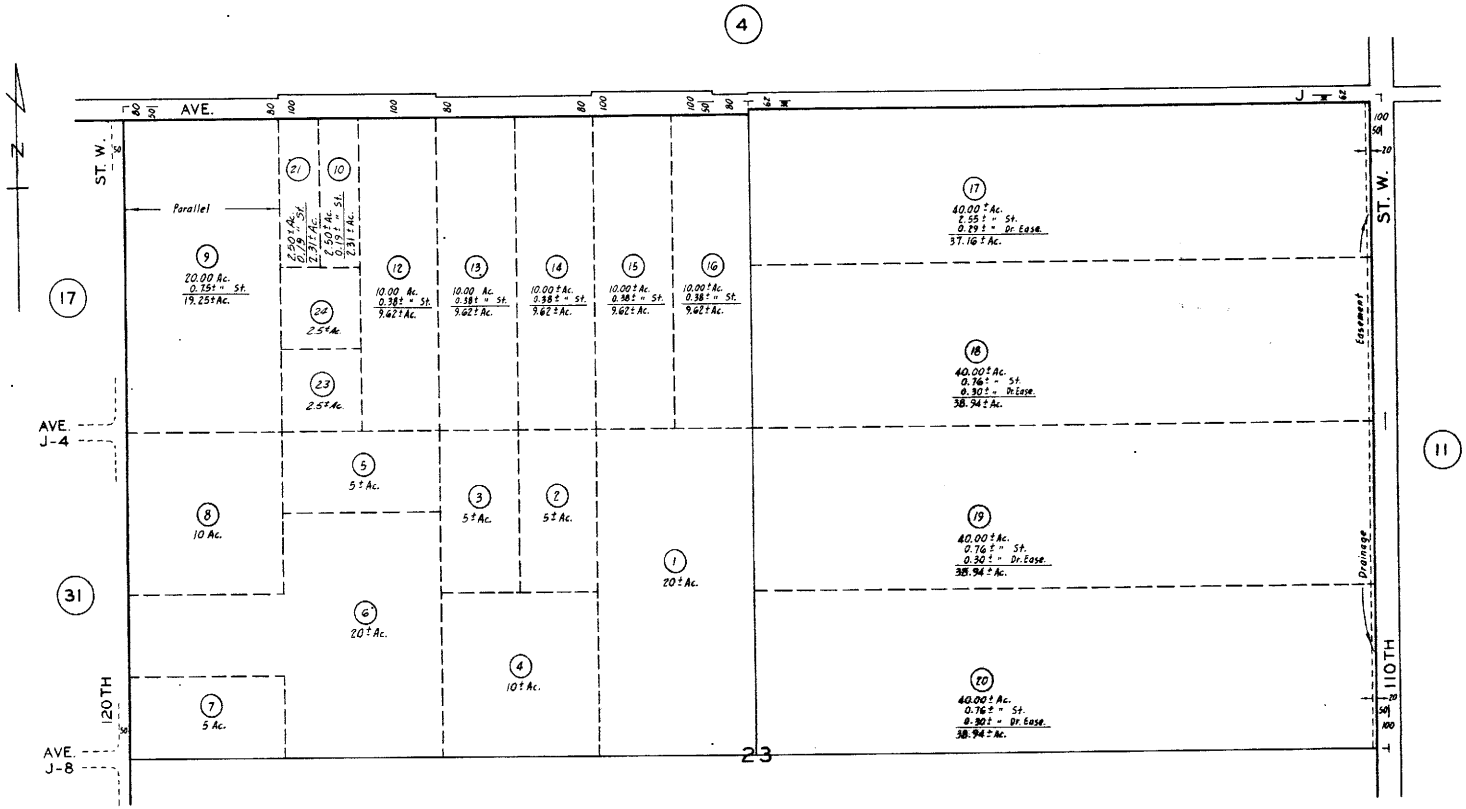
Any of the following situations could cause a substantial delay in close of escrow. The earlier we are made aware of potential problems, the earlier the issues can be dealt with to ensure a smooth and timely close of your transaction.

- Are your principals trying to accomplish a tax deferred exchange? If so, have they chosen an intermediary and who is it?
- Will any of the principals be using a Power of Attorney?
- Are any of the vested owners deceased or in any way incapacitated?
- Do all of the principals who will be signing have a current photo I.D. or Driver's License?
- Are the sellers of this transaction residents of California?
- Has there been a change in marital status of any of the vested owners or will we be adding anyone to title, i.e. co-signers, additional insured, etc.?
- Is the property currently vested in a trust or will the new buyer/borrower vest in a trust?
- Are any of the trustees of the trust deceased or incapacitated?
- Will this transaction involve a short sale?
- Will there be a new entity formed, i.e. partnership, corporation?
- Will all of the principals be available to sign or will we be Federal Expressing documents to another state/country? If so, where?

If you have any other information which may be useful to us, please contact your escrow officer as soon as possible. Our goal is to make your transaction as easy and trouble-free as possible. We appreciate your business and hope that you find North American Title Company your company of choice for all of your title and escrow needs.

| 3267 | 14 |
|---|---|
| SCALE 1" = | 400' |

770103218
790622225




CODE
9610

FOR PREV. ASSM'T SEE:
3222-16

T. 7N., R. 14W.

ASSESSOR'S MAP
COUNTY OF LOS ANGELES, CALIF.

Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

## Phase I ESA Owner/Site Contact Interview Form

Interviewee Name: ANTONIOS MARGARITIS Title: OWNER

Address: 9022 HASTY AVE DOWNE CA Phone: 562 869 1222

Relationship to Property: OWNER

Name and Address of Owner of the Property: 9022 HASTY AVE DOWNEY CA 90240

Date of Ownership: 1981 Site Name:

Property Address: 110th ST W and AVE J. UNICORPORATET CA COUNTY

Previous Street Names/Numbers: 3267 004 016-18025-029+044-46

General Business Type/Present Property Use:

Assessor Parcel Number: 3267004016-018, 025-029 Total # of Buildings: 0

Grand Total Square Footage: N/A Date Built:

Past Property Uses (include dates):

Source of Potable Water Supply (municipal/groundwater wells):

Sewage Disposal (municipal/septic) (provide name of utility): NONE

Means of Heating/Cooling (gas, electric, heating oil, etc.): NONE

Fuel Source for Heating/Air Conditioning (provide name of utility): NONE

Neighboring Property Types (commercial/industrial/residential): Rural residential VACANT

Current Uses of Adjoining Properties: North: VACANT / RURAL RESIDENTIAL

South: VACANT / RURAL RESIDENTIAL

East: VACANT

West: VACANT

**ARE THERE NOW, OR HAVE THERE BEEN IN THE PAST, ANY OF THESE ITEMS ONSITE OR ON ADJACENT PROPERTIES:**

| ITEM | YES | NO | UNK | ADJACENT PROPERTY |
|---|---|---|---|---|
| • Hazardous Materials | | ✓ | | |
| • Hazardous Waste | | ✓ | | |
| • MSDS Sheets | | ✓ | | |
| • Underground Storage Tanks | | ✓ | | |
| • Aboveground Storage Tanks | | ✓ | | |
| • Vent Pipes, fill pipes, or access ways indicating a fill pipe to an underground storage area | | ✓ | | |
| • Odors | | ✓ | | |
| • Drums | | ✓ | | |
| • Electrical or hydraulic equipment known to contain PCBs | | ✓ | | |
| • Stained soil or surfaces | | ✓ | | |
| • Drains | | ✓ | | |
| • Sumps | | ✓ | | |
| • Clarifier | | ✓ | | |
| • Pits, ponds, or lagoons | | ✓ | | |
| • Stressed vegetation | | | | |
| • Areas for dumping solid waste (landfill) | | ✓ | | |
| • Wastewater | | ✓ | | |
| • Wells (oil or gas) | | ✓ | | |
| • Septic Systems | | ✓ | | |
| • Fill Material (if fill material is on site, please state source of fill) | | ✓ | | |

| ADDITIONAL QUESTIONS: | YES | NO | UNK | REMARKS |
|---|---|---|---|---|
| Has the Site been used as any of the following: gas station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard, or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility? If so, state which type of facility. | | ✓ | | |
| Are you aware of any regulatory compliance audit reports, geotechnical reports, Phase I Environmental Site Assessments, or Phase II Environmental Site Assessments, or soil sampling reports prepared for the Site? | | ✓ | | |
| Do you know of any notices or correspondence from any government agency relating to past or current violations of environmental laws with respect to the Site or relating to environmental liens encumbering the Site? | | ✓ | | |
| Do you know of any pending, threatened, or past litigation or administrative proceedings relevant to hazardous substances or petroleum products in, on or from the Site? | | ✓ | | |
| Do you know of any notices from any governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products? | | ✓ | | |
| Do you know of any environmental concerns associated with the Site? If so please state in remarks column. | | ✓ | | |
| Do you know of any environmental concerns associated with any adjacent or nearby properties? If so please state in remarks column. | | ✓ | | |

Current Property Owner's Time Period of Ownership: 1981 TILL NOW

Property Utilization During Ownership: NONE

Name and Address of Past Owners: George Woo San Francisco CO

Additional Comments:

Preparer presents that to the best of the preparer's knowledge the above statements and facts are true and correct and to the best of the preparer's actual knowledge no material facts have been suppressed or misstated.

Signature

6-12-2012
Date

Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

## Phase I ESA Owner/Site Contact Interview Form

Interviewee Name: Jamshid Goltche Title: Managing Member

Address: 15821 Ventura Blvd Ste 460 Encino CA 91436 Phone: 818-981-3380

Relationship to Property: Managing Member of Owner

Name and Address of Owner of the Property: Royal Investors Group LLC 15821 Ventura Blvd, Ste 460, Encino, CA

Date of Ownership: _____ Site Name: N/A

Property Address: 110th St. W. and W. Ave. J, Unincorporated LA County, CA

Previous Street Names/Numbers: _____

General Business Type/Present Property Use: Vacant

Assessor Parcel Number: 3267-014-019 and 020 Total # of Buildings: 0

Grand Total Square Footage: N/A Date Built: N/A

Past Property Uses (include dates): _____

Source of Potable Water Supply (municipal/groundwater wells): None

Sewage Disposal (municipal/septic) (provide name of utility): None

Means of Heating/Cooling (gas, electric, heating oil, etc.): None

Fuel Source for Heating/Air Conditioning (provide name of utility): None

Neighboring Property Types (commercial/industrial/residential): Rural residential and vacant

Current Uses of Adjoining Properties: North: Vacant / rural residential

South: Vacant / rural residential

East: Vacant / rural residential

West: Vacant

**ARE THERE NOW, OR HAVE THERE BEEN IN THE PAST, ANY OF THESE ITEMS ONSITE OR ON ADJACENT PROPERTIES:**

| ITEM | YES | NO | UNK | ADJACENT PROPERTY |
|---|---|---|---|---|
| • Hazardous Materials | | ✓ | | |
| • Hazardous Waste | | ✓ | | |
| • MSDS Sheets | | ✓ | | |
| • Underground Storage Tanks | | ✓ | | |
| • Aboveground Storage Tanks | | ✓ | | |
| • Vent Pipes, fill pipes, or access ways indicating a fill pipe to an underground storage area | | ✓ | | |
| • Odors | | ✓ | | |
| • Drums | | ✓ | | |
| • Electrical or hydraulic equipment known to contain PCBs | | ✓ | | |
| • Stained soil or surfaces | | ✓ | | |
| • Drains | | ✓ | | |
| • Sumps | | ✓ | | |
| • Clarifier | | ✓ | | |
| • Pits, ponds, or lagoons | | ✓ | | |
| • Stressed vegetation | | ✓ | | |
| • Areas for dumping solid waste (landfill) | | ✓ | | |
| • Wastewater | | ✓ | | |
| • Wells (oil or gas) | | ✓ | | |
| • Septic Systems | | ✓ | | |
| • Fill Material (if fill material is on site, please state source of fill) | | ✓ | | |

| ADDITIONAL QUESTIONS: | YES | NO | UNK | REMARKS |
|---|---|---|---|---|
| Has the Site been used as any of the following: gas station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard, or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility? If so, state which type of facility. | | ✓ | | |
| Are you aware of any regulatory compliance audit reports, geotechnical reports, Phase I Environmental Site Assessments, or Phase II Environmental Site Assessments, or soil sampling reports prepared for the Site? | | ✓ | | |
| Do you know of any notices or correspondence from any government agency relating to past or current violations of environmental laws with respect to the Site or relating to environmental liens encumbering the Site? | | ✓ | | |
| Do you know of any pending, threatened, or past litigation or administrative proceedings relevant to hazardous substances or petroleum products in, on or from the Site? | | ✓ | | |
| Do you know of any notices from any governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products? | | ✓ | | |
| Do you know of any environmental concerns associated with the Site? If so please state in remarks column. | | ✓ | | |
| Do you know of any environmental concerns associated with any adjacent or nearby properties? If so please state in remarks column. | | ✓ | | |

Current Property Owner's Time Period of Ownership: .....

Property Utilization During Ownership: None

Name and Address of Past Owners: Landbank LLC

Additional Comments: .....

Preparer presents that to the best of the preparer's knowledge the above statements and facts are true and correct and to the best of the preparer's actual knowledge no material facts have been suppressed or misstated.

Signature

Date

# APPENDIX D

# Appendix D

## Environmental FirstSearch™ Report

GeoSearch
On time. On target. In touch.

| | | | | | |
|---|---|---|---|---|---|
| **Order Number** | GS#18317 | **Effective Date** | 4/9/2010 | | |
| **Last name** | ROYAL INVESTORS GROUP L.L.C. | | | | |
| **First name** | | **County** | LOS ANGELES | | |
| **Street address** | WEST AVENUE J, LOS ANGELES, CA 93536 | **City** | LOS ANGELES | **State** | CA |
| **Mailing address** | | | | | |
| **Parcel number** | 3267-014-019 | **Alternate APN** | | | |
| **Legal Description** | TOWNSHIP 7N, RANGE 14W, LOS ANGELES COUNTY, CALIFORNIA. | | | | |

*Federal, state, and local environmental records have been researched, resulting in the following list of recorded environmental liens and AUL's (activity and usage limitations) for the subject property having been found:*

**ENVIRONMENTAL LIENS, IC s, LUC s, AUL s, & DEUR s**

**1 NONE FOUND**
**2 NONE FOUND**
**3**
**4**

**JUDGMENTS, LIENS**

**1 NO FOUND**
**2**
**3**
**4**

**OTHER INFORMATION:**

# GeoPlus Radius Report

http://www.geo-search.net/QuickMap/index.htm?DataID=Standard0000042898

*Click on link above to access the map and satellite view of current property*

*Target Property:*

***Canadian Solar***
***West Avenue J***
***Los Angeles County, California 93536***

*Prepared For:*

***Leighton Consulting***

***Order #: 18317***
***Job #: 42898***
***Project #: 603455-002***
***PO #: 603455-002RLO***
***Date: 06/06/2012***

***3006 Bee Caves Rd, Suite A-230 · Austin, Texas 78746 · phone: 888-396-0042 · fax: 512-472-9967 · www.geo-search.net***

## *TARGET PROPERTY SUMMARY*

***Canadian Solar***
***West Avenue J***
***Los Angeles County, California 93536***

*USGS Quadrangle:* ***Del Sur, CA***
*Target Property Geometry:* ***Area***

*Target Property Longitude(s)/Latitude(s):*
***(-118.324481, 34.695653), (-118.333125, 34.695546), (-118.333157, 34.692820), (-118.329843, 34.692847), (-118.329745, 34.689159), (-118.333222, 34.689106), (-118.333092, 34.681864), (-118.324383, 34.681918), (-118.324481, 34.695653)***

*County/Parish Covered:*
***Los Angeles (CA)***

*Zipcode(s) Covered:*
***Lake Hughes CA: 93532***
***Lancaster CA: 93536***

*State(s) Covered:*
***CA***

****Target property is located in Radon Zone 2.***
***Zone 2 areas have a predicted average indoor radon screening level between 2 and 4 pCi/L (picocuries per liter).***

Disclaimer - The information provided in this report was obtained from a variety of public sources. GeoSearch cannot ensure and makes no warranty or representation as to the accuracy, reliability, quality, errors occurring from data conversion or the customer's interpretation of this report. This report was made by GeoSearch for exclusive use by its clients only. Therefore, this report may not contain sufficient information for other purposes or parties. GeoSearch and its partners, employees, officers And independent contractors cannot be held liable For actual, incidental, consequential, special or exemplary damages suffered by a customer resulting directly or indirectly from any information provided by GeoSearch.

## DATABASE FINDINGS SUMMARY

| DATABASE | ACRONYM | LOCA-TABLE | UNLOCA-TABLE | SEARCH RADIUS (miles) |
|---|---|---|---|---|
| **FEDERAL** | | | | |
| AEROMETRIC INFORMATION RETRIEVAL SYSTEM / AIR FACILITY SUBSYSTEM | AIRSAFS | 0 | 0 | Target Property |
| BIENNIAL REPORTING SYSTEM | BRS | 0 | 0 | Target Property |
| CLANDESTINE DRUG LABORATORY LOCATIONS | CDL | 0 | 0 | Target Property |
| EPA DOCKET DATA | DOCKETS | 0 | 0 | Target Property |
| FEDERAL ENGINEERING INSTITUTIONAL CONTROL SITES | EC | 0 | 0 | Target Property |
| EMERGENCY RESPONSE NOTIFICATION SYSTEM | ERNSCA | 0 | 0 | Target Property |
| FACILITY REGISTRY SYSTEM | FRSCA | 0 | 0 | Target Property |
| HAZARDOUS MATERIALS INCIDENT REPORTING SYSTEM | HMIRSR09 | 0 | 0 | Target Property |
| INTEGRATED COMPLIANCE INFORMATION SYSTEM (FORMERLY DOCKETS) | ICIS | 0 | 0 | Target Property |
| INTEGRATED COMPLIANCE INFORMATION SYSTEM NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM | ICISNPDES | 0 | 0 | Target Property |
| MATERIAL LICENSING TRACKING SYSTEM | MLTS | 0 | 0 | Target Property |
| NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM | NPDESR09 | 0 | 0 | Target Property |
| PCB ACTIVITY DATABASE SYSTEM | PADS | 0 | 0 | Target Property |
| PERMIT COMPLIANCE SYSTEM | PCSR09 | 0 | 0 | Target Property |
| RCRA SITES WITH CONTROLS | RCRASC | 0 | 0 | Target Property |
| CERCLIS LIENS | SFLIENS | 0 | 0 | Target Property |
| SECTION SEVEN TRACKING SYSTEM | SSTS | 0 | 0 | Target Property |
| TOXICS RELEASE INVENTORY | TRI | 0 | 0 | Target Property |
| TOXIC SUBSTANCE CONTROL ACT INVENTORY | TSCA | 0 | 0 | Target Property |
| NO LONGER REGULATED RCRA GENERATOR FACILITIES | NLRRCRAG | 0 | 0 | Target Property and Adjoining |
| RESOURCE CONSERVATION & RECOVERY ACT - GENERATOR FACILITIES | RCRAGR09 | 0 | 0 | Target Property and Adjoining |
| BROWNFIELDS MANAGEMENT SYSTEM | BF | 0 | 0 | 0.5000 |
| COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION & LIABILITY INFORMATION SYSTEM | CERCLIS | 0 | 1 | 0.5000 |
| LAND USE CONTROL INFORMATION SYSTEM | LUCIS | 0 | 0 | 0.5000 |

## DATABASE FINDINGS SUMMARY

| DATABASE | ACRONYM | LOCA-TABLE | UNLOCA-TABLE | SEARCH RADIUS (miles) |
|---|---|---|---|---|
| NO FURTHER REMEDIAL ACTION PLANNED SITES | NFRAP | 0 | 0 | 0.5000 |
| NO LONGER REGULATED RCRA NON-CORRACTS TSD FACILITIES | NLRRCRAT | 0 | 0 | 0.5000 |
| OPEN DUMP INVENTORY | ODI | 0 | 0 | 0.5000 |
| RESOURCE CONSERVATION & RECOVERY ACT - TREATMENT, STORAGE & DISPOSAL FACILITIES | RCRAT | 0 | 0 | 0.5000 |
| DELISTED NATIONAL PRIORITIES LIST | DNPL | 0 | 0 | 1.0000 |
| DEPARTMENT OF DEFENSE SITES | DOD | 0 | 0 | 1.0000 |
| FORMERLY USED DEFENSE SITES | FUDS | 0 | 0 | 1.0000 |
| NO LONGER REGULATED RCRA CORRECTIVE ACTION FACILITIES | NLRRCRAC | 0 | 0 | 1.0000 |
| NATIONAL PRIORITIES LIST | NPL | 0 | 0 | 1.0000 |
| PROPOSED NATIONAL PRIORITIES LIST | PNPL | 0 | 0 | 1.0000 |
| RESOURCE CONSERVATION & RECOVERY ACT - CORRECTIVE ACTION FACILITIES | RCRAC | 0 | 0 | 1.0000 |
| RECORD OF DECISION SYSTEM | RODS | 0 | 0 | 1.0000 |
| **SUB-TOTAL** | | **0** | **1** | |

**STATE (CA)**

| | | | | |
|---|---|---|---|---|
| CLANDESTINE DRUG LABS | CDL | 0 | 0 | Target Property |
| CALIFORNIA HAZARDOUS MATERIAL INCIDENT REPORT SYSTEM | CHMIRS | 0 | 0 | Target Property |
| DTSC DEED RESTRICTIONS | DTSCDR | 0 | 0 | Target Property |
| EMISSIONS INVENTORY DATA | EMI | 0 | 0 | Target Property |
| HAZARDOUS WASTE TANNER SUMMARY | HWTS | 0 | 0 | Target Property |
| RECORDED ENVIRONMENTAL CLEANUP LIENS | LIENS | 0 | 0 | Target Property |
| NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM FACILITIES | NPDES | 0 | 0 | Target Property |
| ABOVE GROUND STORAGE TANKS | ABST | 0 | 0 | 0.2500 |
| DRY CLEANER FACILITIES | CLEANER | 0 | 0 | 0.2500 |
| DTSC REGISTERED HAZARDOUS WASTE TRANSPORTERS | DTSCHWT | 0 | 0 | 0.2500 |

## DATABASE FINDINGS SUMMARY

| DATABASE | ACRONYM | LOCA-TABLE | UNLOCA-TABLE | SEARCH RADIUS (miles) |
|---|---|---|---|---|
| HISTORICAL UNDERGROUND STORAGE TANKS | HISTUST | 0 | 0 | 0.2500 |
| CALIFORNIA MEDICAL WASTE MANAGEMENT PROGRAM FACILITY LIST | MWMP | 0 | 0 | 0.2500 |
| SPILLS, LEAKS, INVESTIGATION & CLEANUP RECOVERY LISTING | SLIC | 0 | 0 | 0.2500 |
| STATEWIDE ENVIRONMENTAL EVALUATION AND PLANNING SYSTEM | SWEEPS | 0 | 0 | 0.2500 |
| UNDERGROUND STORAGE TANKS | USTCUPA | 0 | 0 | 0.2500 |
| GEOTRACKER CLEANUP SITES | CLEANUPSITES | 0 | 0 | 0.5000 |
| CORTESE LIST | CORTESE | 0 | 0 | 0.5000 |
| EXPEDITED REMOVAL ACTION PROGRAM SITES | ERAP | 0 | 0 | 0.5000 |
| LEAKING UNDERGROUND STORAGE TANKS | LUST | 0 | 0 | 0.5000 |
| NO FURTHER ACTION DETERMINATION | NFA | 0 | 0 | 0.5000 |
| SITES NEEDING FURTHER EVALUATION | NFE | 0 | 0 | 0.5000 |
| LISTING OF CERTIFIED PROCESSORS | PROC | 0 | 0 | 0.5000 |
| REFERRED TO ANOTHER LOCAL OR STATE AGENCY | REF | 0 | 0 | 0.5000 |
| SCHOOL PROPERTY EVALUATIONS | SCH | 0 | 0 | 0.5000 |
| SOLID WASTE INFORMATION SYSTEM SITES | SWIS | 0 | 0 | 0.5000 |
| RECYCLING CENTERS | SWRCY | 0 | 0 | 0.5000 |
| VOLUNTARY CLEANUP PROGRAM | VCP | 0 | 0 | 0.5000 |
| WASTE MANAGEMENT UNIT DATABASE | WMUDS | 0 | 0 | 0.5000 |
| CALSITES DATABASE | CALSITES | 0 | 0 | 1.0000 |
| ENVIROSTOR CLEANUP SITES | ENVIROSTOR | 0 | 0 | 1.0000 |
| ENVIROSTOR PERMITTED AND CORRECTIVE ACTION SITES | ENVIROSTORPCA | 0 | 0 | 1.0000 |
| TOXIC PITS CLEANUP ACT SITES | TOXPITS | 0 | 0 | 1.0000 |
| **SUB-TOTAL** | | **0** | **0** | |

**LOCAL**

| | | | | |
|---|---|---|---|---|
| LOS ANGELES COUNTY HAZARDOUS MATERIALS SYSTEM | LAHMS | 0 | 0 | Target Property |
| LOS ANGELES COUNTY SITE MITIGATION LIST | LASM | 0 | 0 | Target Property |

## DATABASE FINDINGS SUMMARY

| DATABASE | ACRONYM | LOCA-TABLE | UNLOCA-TABLE | SEARCH RADIUS (miles) |
|---|---|---|---|---|
| WELL INVESTIGATIONS PROGRAM CASE LIST | WIP | 0 | 0 | 0.2500 |
| SAN GABRIEL VALLEY AREAS OF CONCERN | AOC | 0 | 0 | 1.0000 |
| **SUB-TOTAL** | | **0** | **0** | |
| | | | | |
| **TRIBAL** | | | | |
| UNDERGROUND STORAGE TANKS ON TRIBAL LANDS | USTR09 | 0 | 0 | 0.2500 |
| LEAKING UNDERGROUND STORAGE TANKS ON TRIBAL LANDS | LUSTR09 | 0 | 0 | 0.5000 |
| OPEN DUMP INVENTORY ON TRIBAL LANDS | ODINDIAN | 0 | 0 | 0.5000 |
| INDIAN RESERVATIONS | INDIANRES | 0 | 0 | 1.0000 |
| **SUB-TOTAL** | | **0** | **0** | |
| | | | | |
| **TOTAL** | | **0** | **1** | |

# LOCATABLE DATABASE FINDINGS

| ACRONYM | Target Property | SEARCH RADIUS (miles) | 1/8 Mile (> TP) | 1/4 Mile (> 1/8) | 1/2 Mile (> 1/4) | 1 Mile (> 1/2) | > 1 Mile | Total |
|---|---|---|---|---|---|---|---|---|
| **FEDERAL** | | | | | | | | |
| AIRSAFS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| BRS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| CDL | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| DOCKETS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| EC | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| ERNSCA | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| FRSCA | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| HMIRSR09 | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| ICIS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| ICISNPDES | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| MLTS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| NPDESR09 | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| PADS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| PCSR09 | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| RCRASC | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| SFLIENS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| SSTS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| TRI | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| TSCA | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| NLRRCRAG | | .1250 | 0 | 0 | 0 | 0 | NS | 0 |
| RCRAGR09 | | .1250 | 0 | 0 | 0 | 0 | NS | 0 |
| BF | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| CERCLIS | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| LUCIS | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| NFRAP | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| NLRRCRAT | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| ODI | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |

## LOCATABLE DATABASE FINDINGS

| ACRONYM | Target Property | SEARCH RADIUS (miles) | 1/8 Mile (> TP) | 1/4 Mile (> 1/8) | 1/2 Mile (> 1/4) | 1 Mile (> 1/2) | > 1 Mile | Total |
|---|---|---|---|---|---|---|---|---|
| RCRAT | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| DNPL | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| DOD | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| FUDS | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| NLRRCRAC | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| NPL | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| PNPL | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| RCRAC | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| RODS | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| **SUB-TOTAL** | | | **0** | **0** | **0** | **0** | **0** | **0** |
| | | | | | | | | |
| **STATE (CA)** | | | | | | | | |
| CDL | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| CHMIRS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| DTSCDR | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| EMI | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| HWTS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| LIENS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| NPDES | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| ABST | | .2500 | 0 | 0 | 0 | 0 | NS | 0 |
| CLEANER | | .2500 | 0 | 0 | 0 | 0 | NS | 0 |
| DTSCHWT | | .2500 | 0 | 0 | 0 | 0 | NS | 0 |
| HISTUST | | .2500 | 0 | 0 | 0 | 0 | NS | 0 |
| MWMP | | .2500 | 0 | 0 | 0 | 0 | NS | 0 |
| SLIC | | .2500 | 0 | 0 | 0 | 0 | NS | 0 |
| SWEEPS | | .2500 | 0 | 0 | 0 | 0 | NS | 0 |
| USTCUPA | | .2500 | 0 | 0 | 0 | 0 | NS | 0 |
| CLEANUPSITES | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |

## LOCATABLE DATABASE FINDINGS

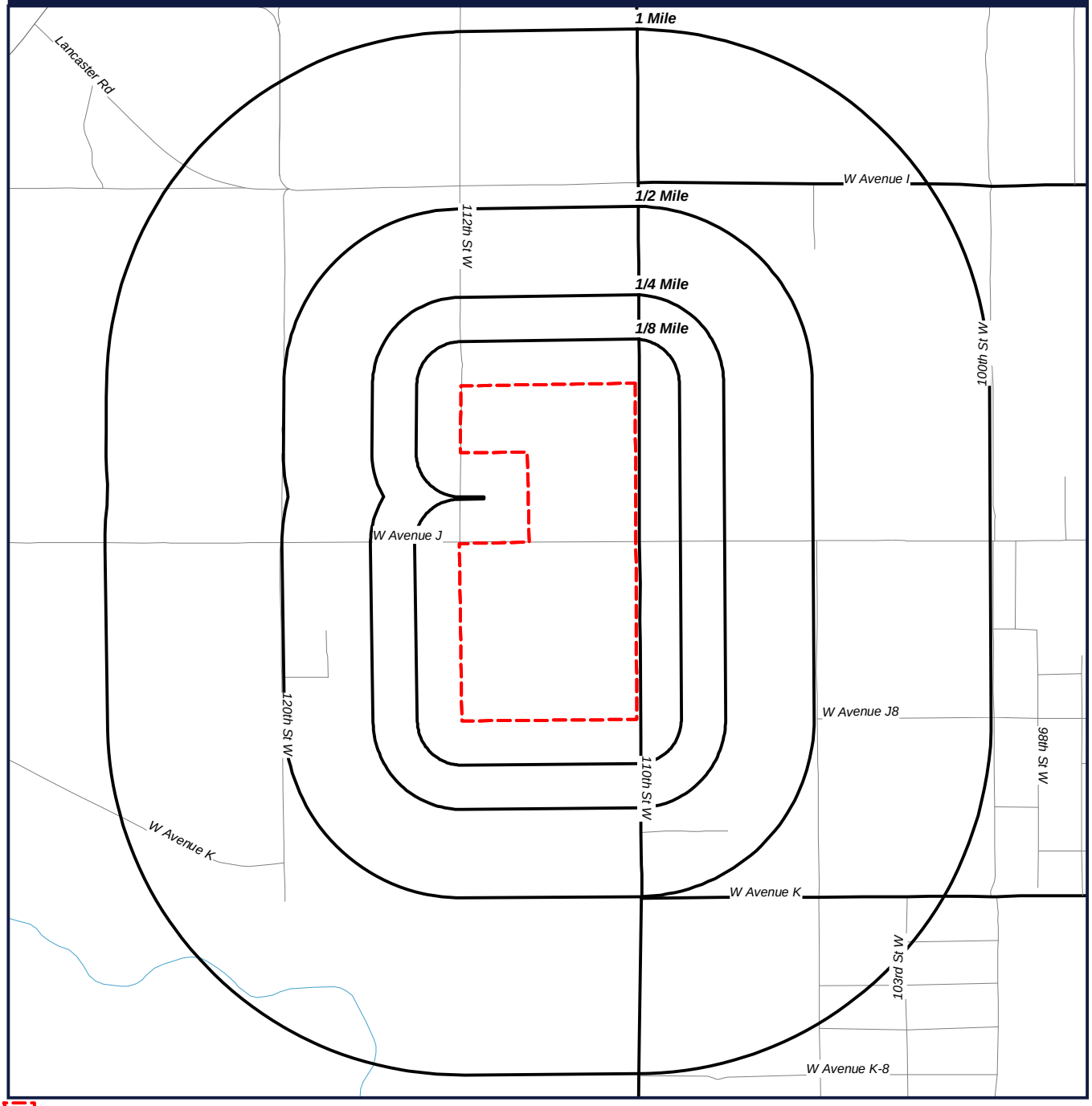
| ACRONYM | Target Property | SEARCH RADIUS (miles) | 1/8 Mile (> TP) | 1/4 Mile (> 1/8) | 1/2 Mile (> 1/4) | 1 Mile (> 1/2) | > 1 Mile | Total |
|---|---|---|---|---|---|---|---|---|
| CORTESE | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| ERAP | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| LUST | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| NFA | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| NFE | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| PROC | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| REF | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| SCH | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| SWIS | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| SWRCY | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| VCP | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| WMUDS | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| CALSITES | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| ENVIROSTOR | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| ENVIROSTORPCA | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| TOXPITS | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| **SUB-TOTAL** | | | **0** | **0** | **0** | **0** | **0** | **0** |
| **LOCAL** | | | | | | | | |
| LAHMS | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| LASM | | .0200 | 0 | 0 | 0 | 0 | NS | 0 |
| WIP | | .2500 | 0 | 0 | 0 | 0 | NS | 0 |
| AOC | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| **SUB-TOTAL** | | | **0** | **0** | **0** | **0** | **0** | **0** |
| **TRIBAL** | | | | | | | | |
| USTR09 | | .2500 | 0 | 0 | 0 | 0 | NS | 0 |
| LUSTR09 | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |

## *LOCATABLE DATABASE FINDINGS*

| ACRONYM | Target Property | SEARCH RADIUS (miles) | 1/8 Mile (> TP) | 1/4 Mile (> 1/8) | 1/2 Mile (> 1/4) | 1 Mile (> 1/2) | > 1 Mile | Total |
|---|---|---|---|---|---|---|---|---|
| ODINDIAN | | .5000 | 0 | 0 | 0 | 0 | NS | 0 |
| INDIANRES | | 1.000 | 0 | 0 | 0 | 0 | NS | 0 |
| **SUB-TOTAL** | | | **0** | **0** | **0** | **0** | **0** | **0** |
| **TOTAL** | | | **0** | **0** | **0** | **0** | **0** | **0** |

**NOTES:**
**NS = NO SEARCH REQUESTED BY CUSTOMER**

# RADIUS MAP



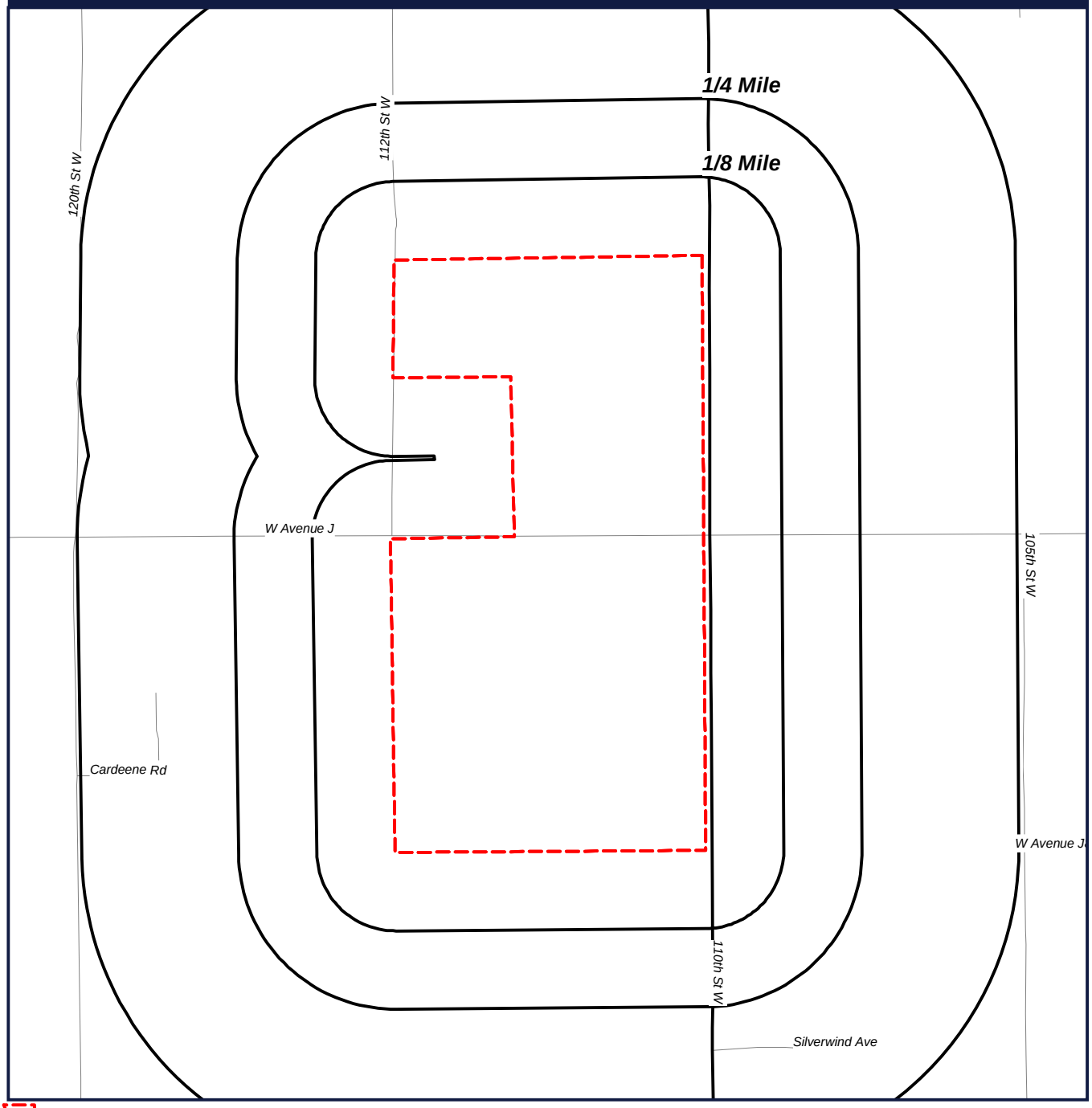

Target Property (TP)

**Canadian Solar**
**West Avenue J**
**Los Angeles County, California**
**93536**

N
W E
S

0' 1150' 2300' 3450'
SCALE: 1" = 2300'

# RADIUS MAP



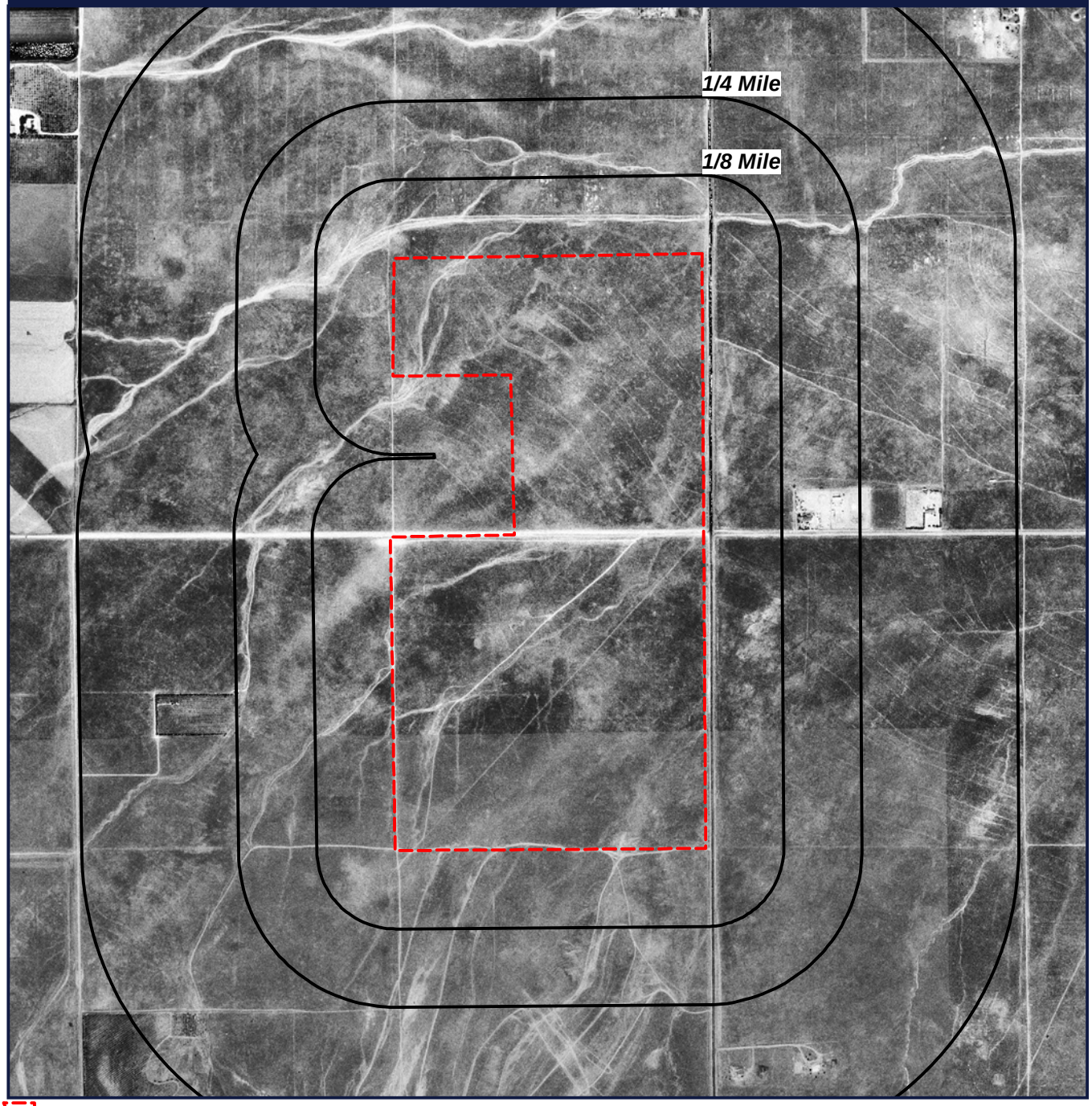

Target Property (TP)

**Canadian Solar**
**West Avenue J**
**Los Angeles County, California**
**93536**

N
W E
S

0' 650' 1300' 1950'
SCALE: 1" = 1300'

# ORTHOPHOTO MAP




Target Property (TP)

**Quadrangle(s): Del Sur**
**Source: USGS (06/01/1994)**
**Canadian Solar**
**West Avenue J**
**Los Angeles County, California**
**93536**

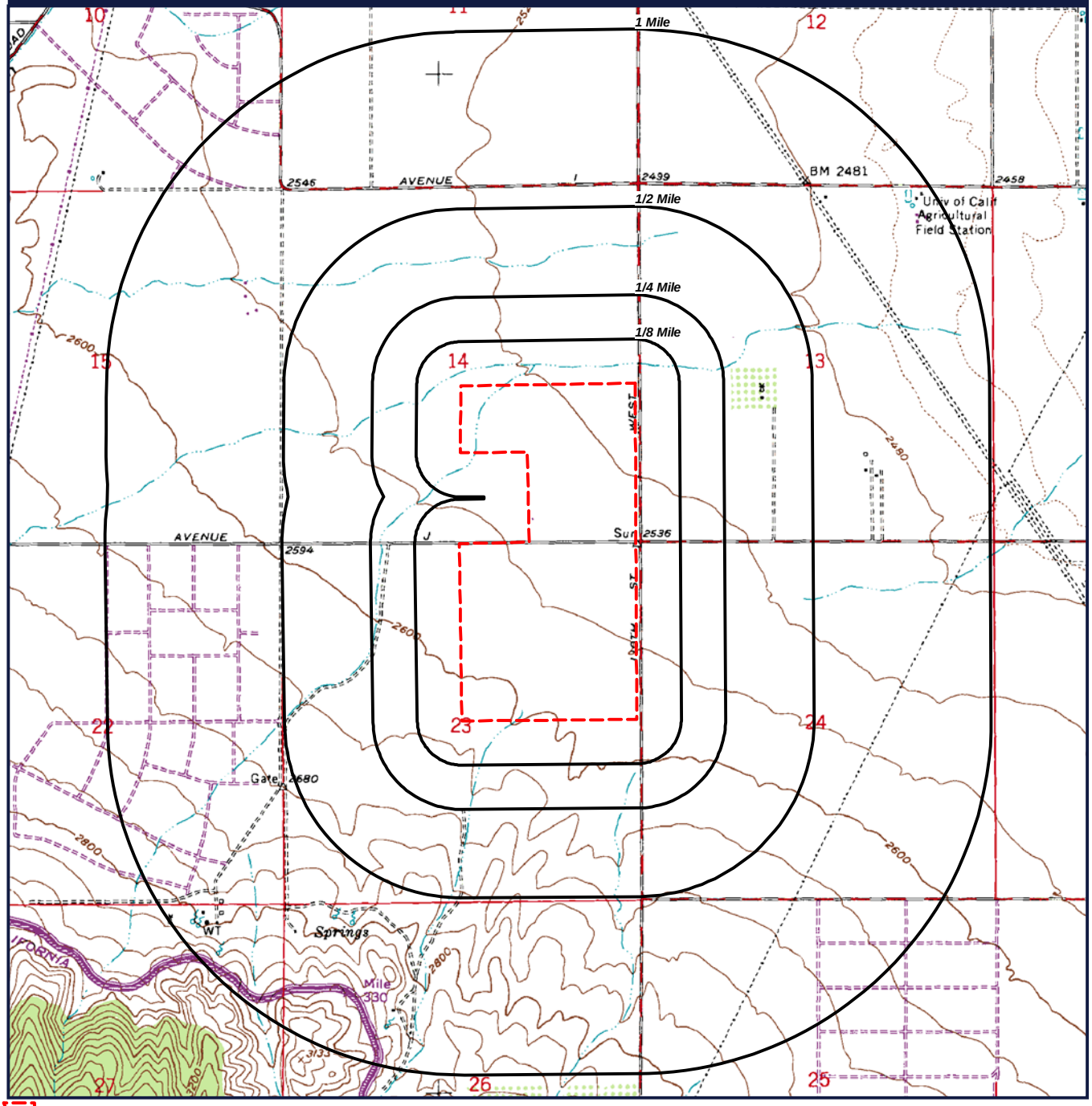
N
W E
S

0' 650' 1300' 1950'
SCALE: 1" = 1300'

GeoSearch www.geo-search.net - phone: 888-396-0042 - fax: 512-472-9967

JOB #: 42898 - 6/6/2012

# TOPOGRAPHIC MAP




Target Property (TP)

**Quadrangle(s): Del Sur**
**Source: USGS, 1974**
**Canadian Solar**
**West Avenue J**
**Los Angeles County, California**
**93536**

N
W E
S

0' 1150' 2300' 3450'
SCALE: 1" = 2300'

## *REPORT SUMMARY OF UNLOCATABLE SITES*

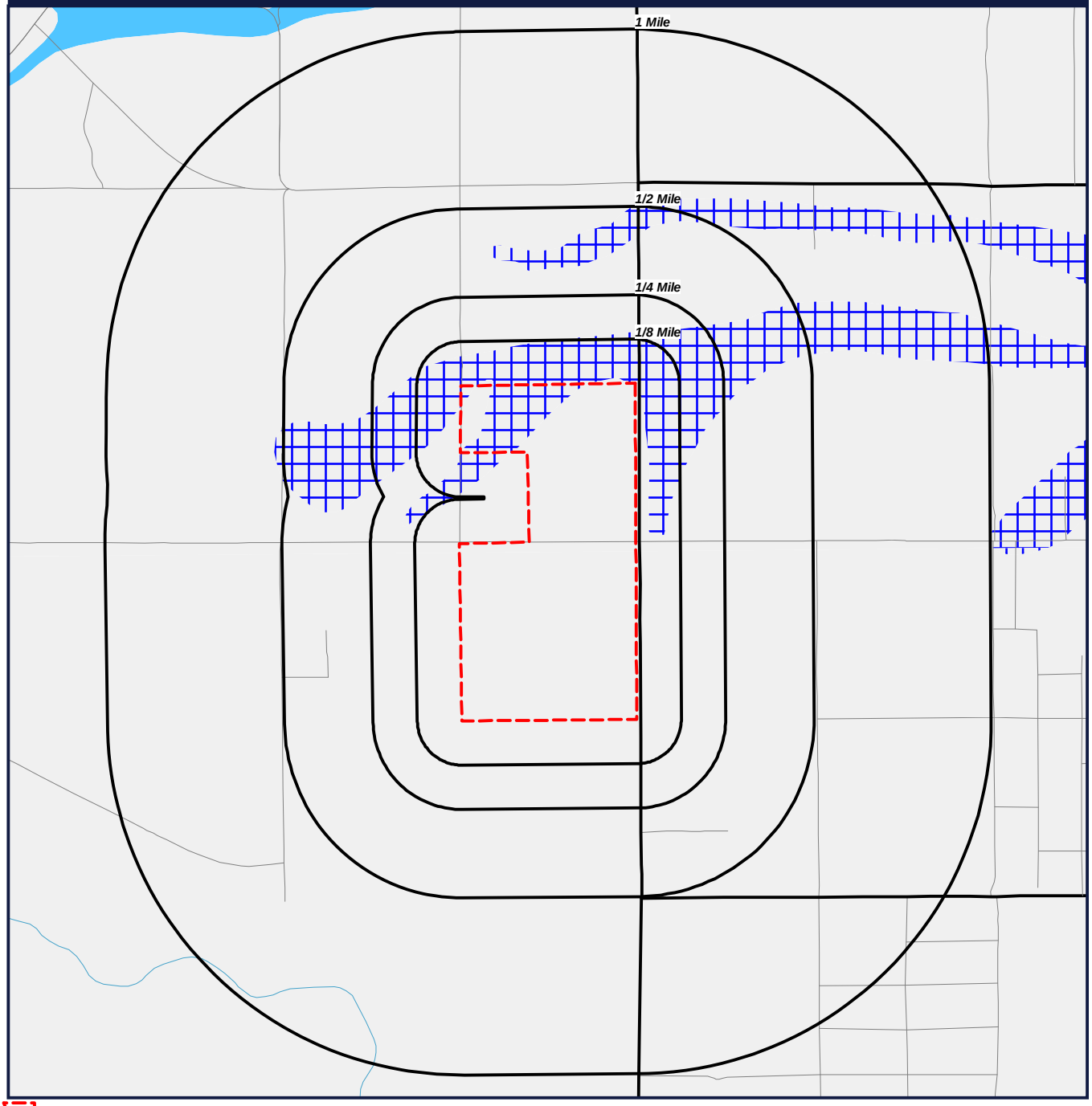
| DATABASE TYPE | SITE ID# | SITE NAME | ADDRESS | CITY | ZIP CODE |
|---|---|---|---|---|---|
| CERCLIS | CASFN0905444 | LANCASTER RED MUNITIONS | | LANCASTER | 93536 |

## FACILITY INFORMATION

EPA ID#: **CASFN0905444**
SITE ID#: **905444**
NAME: **LANCASTER RED MUNITIONS**
ADDRESS:
**LANCASTER, CA 93536**
COUNTY: **LOS ANGELES**
NATIONAL PRIORITY LISTING: **N - NOT ON THE NPL**
FEDERAL FACILITY CLASSIFICATION: **N - NOT A FEDERAL FACILITY**
NON-NPL STATUS: **RO - REMOVAL ONLY SITE (NO SITE ASSESSMENT**
NON-NPL STATUS DATE: **04/03/03**
PHYSICAL CLASSIFICATION OF SITE / INCIDENT: **NO INFORMATION AVAILABLE**
SITE DESCRIPTION **- NO SITE DESCRIPTION INFORMATION AVAILABLE -**
SITE HISTORY **- NO SITE HISTORY INFORMATION AVAILABLE -**
ACTIONS

| START DATE | COMPLETION DATE | TYPE |
|---|---|---|
| **NR** | **03/08/1999** | **DS - DISCOVERY** |

# FEMA MAP




Target Property (TP)

ZONE A
ZONE AE
ZONE AH
ZONE ANI
ZONE D
ZONE UNDES
ZONE V
ZONE VE
ZONE X
ZONE X500
NDA - DIGITAL DATA NOT AVAILABLE

**Canadian Solar**
**West Avenue J**
**Los Angeles County, California**
**93536**

Panel #: 0650430070B

N
W E
S

0' 1150' 2300' 3450'
SCALE: 1" = 2300'

GeoSearch www.geo-search.net - phone: 888-396-0042 - fax: 512-472-9967

JOB #: 42898 - 6/6/2012

# FEDERAL EMERGENCY MANAGEMENT AGENCY REPORT

## FEMA - Federal Emergency Management Agency

The information used in this report is derived from the Federal Emergency Management Agency (FEMA). The Q3 Flood Data is developed by electronically scanning the current effective map panels of existing paper Flood Insurance Rate Maps (FIRMs). Certain key features are digitally captured and then converted into area features, such as floodplain boundaries. Q3 Flood Data captures certain key features from the existing paper FIRMs, including:

- 100-year and 500-year (1% and 0.2% annual chance) floodplain areas, including Zone V areas, certain floodway areas (when present on the FIRM), and zone designations
- Coastal Barrier Resources Act (COBRA) areas
- FIRM panel areas, including panel number and suffix

This data was last updated between 1996 and 2000 and is available in select counties throughout the United States.

## FEMA Flood Zone Definitions Relevant to Map

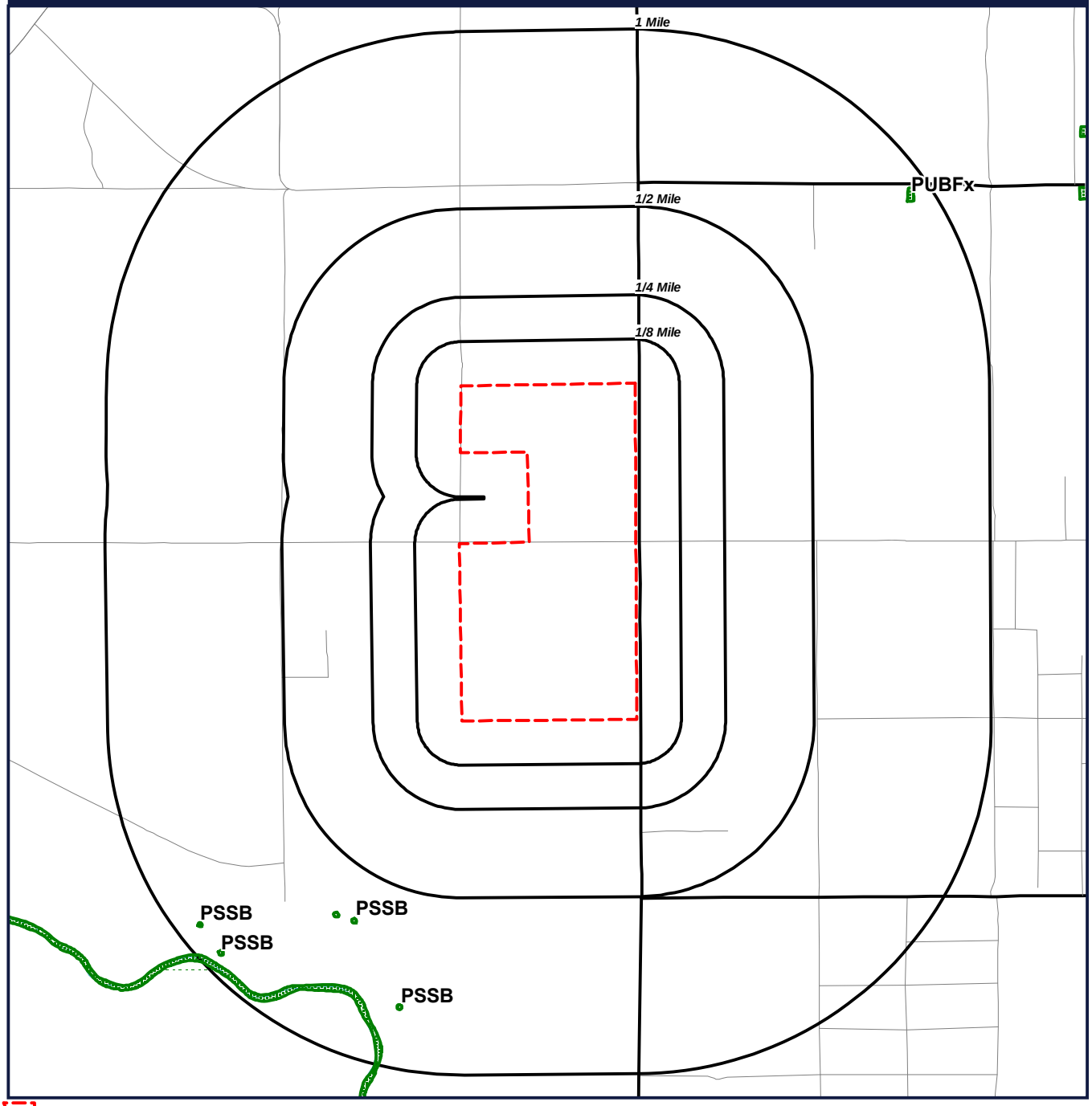
| | |
|---|---|
| **X** | Zone X |

An area that is determined to be outside the 100 and 500 year floodplains.

| | |
|---|---|
| **X500** | Zone X500 (0.2% Annual Chance) |

An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding.

# NWI MAP




Target Property (TP)

NWI BOUNDARY

NDA - DIGITAL DATA NOT AVAILABLE

**Canadian Solar**
**West Avenue J**
**Los Angeles County, California**
**93536**

N
W E
S

0' 1150' 2300' 3450'
SCALE: 1" = 2300'

# NATIONAL WETLANDS INVENTORY REPORT

## NWI - National Wetlands Inventory

The US NWI digital data bundle is a set of records of wetlands location and classification as defined by the U.S. Fish & Wildlife Service. This dataset is one of a series available in 7.5 minute by 7.5 minute blocks containing ground planimetric coordinates of wetlands point, line, and area features and wetlands attributes. When completed, the series will provide coverage for all of the contiguous United States, Hawaii, Alaska, and U.S. protectorates in the Pacific and Caribbean. The digital data as well as the hardcopy maps that were used as the source for the digital data are produced and distributed by the U.S. Fish & Wildlife Service's National Wetlands Inventory project. Currently, this data is only available in select counties throughout the United States.

## NWI Definitions Relevant to Map

### PSSB

SYSTEM: **PALUSTRINE**
CLASS: **SCRUB-SHRUB**
WATER REGIME: **SATURATED**

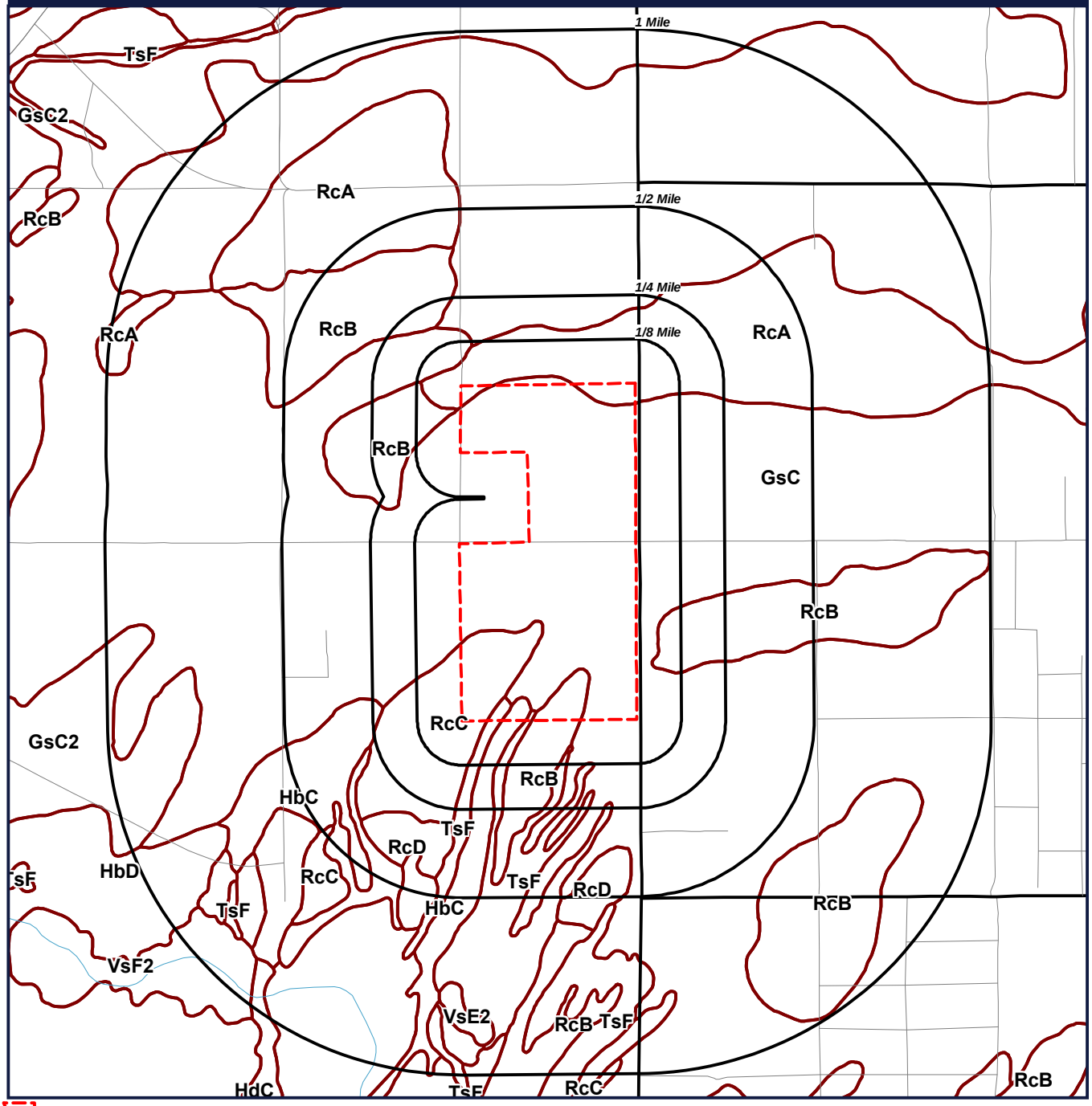
### PUBFx

SYSTEM: **PALUSTRINE**
CLASS: **UNCONSOLIDATED BOTTOM**
WATER REGIME: **SEMIPERMANENTLY FLOODED**
SPECIAL MODIFIER: **EXCAVATED**

### R2UBKx

SYSTEM: **RIVERINE**
SUBSYSTEM: **LOWER PERENNIAL**
CLASS: **UNCONSOLIDATED BOTTOM**
WATER REGIME: **ARTIFICIALLY FLOODED**
SPECIAL MODIFIER: **EXCAVATED**

# SOIL SURVEY MAP




Target Property (TP)

SOIL BOUNDARY

NDA - DIGITAL DATA NOT AVAILABLE

**Canadian Solar**
**West Avenue J**
**Los Angeles County, California**
**93536**

N
W E
S

0' 1150' 2300' 3450'
SCALE: 1" = 2300'

## Soil Surveys

The soil data used in this report is obtained from the Natural Resources Conservation Service (NRCS). The NRCS is the primary federal agency that works with private landowners to help them conserve, maintain and improve their natural resources. The soil survey contains information that can be applied in managing farms and ranches; in selecting sites for roads, ponds, buildings and other structures; and in determining the suitability of tracts of land for farming, industry and recreation. This data is available in select counties throughout the United States.

**Soil Code Definitions Relevant to Map**

| | |
|---|---|
| **VsF2** | VISTA COARSE SANDY LOAM, 30 TO 50 PERCENT SLOPES, ERODED |
| **VsE2** | VISTA COARSE SANDY LOAM, 15 TO 30 PERCENT SLOPES, ERODED |
| **TsF** | TERRACE ESCARPMENTS |
| **RcD** | RAMONA COARSE SANDY LOAM, 9 TO 15 PERCENT SLOPES |
| **RcC** | RAMONA COARSE SANDY LOAM, 5 TO 9 PERCENT SLOPES |
| **RcB** | RAMONA COARSE SANDY LOAM, 2 TO 5 PERCENT SLOPES |
| **RcA** | RAMONA COARSE SANDY LOAM, 0 TO 2 PERCENT SLOPES |
| **HdC** | HANFORD GRAVELLY SANDY LOAM, 2 TO 9 PERCENT SLOPES |
| **HbD** | HANFORD COARSE SANDY LOAM, 9 TO 15 PERCENT SLOPES |
| **HbC** | HANFORD COARSE SANDY LOAM, 2 TO 9 PERCENT SLOPES |
| **GsC2** | GREENFIELD SANDY LOAM, 2 TO 9 PERCENT SLOPES, ERODED |
| **GsC** | GREENFIELD SANDY LOAM, 2 TO 9 PERCENT SLOPES |
| **GsA** | GREENFIELD SANDY LOAM, 0 TO 2 PERCENT SLOPES |

# ENVIRONMENTAL RECORDS DEFINITIONS - FEDERAL

**AIRSAFS** Aerometric Information Retrieval System / Air Facility Subsystem

**VERSION DATE: 8/2011**

The United States Environmental Protection Agency (EPA) modified the Aerometric Information Retrieval System (AIRS) to a database that exclusively tracks the compliance of stationary sources of air pollution with EPA regulations: the Air Facility Subsystem (AFS). Since this change in 2001, the management of the AIRS/AFS database was assigned to EPA's Office of Enforcement and Compliance Assurance.

**BF** Brownfields Management System

**VERSION DATE: 3/2012**

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. The United States Environmental Protection Agency maintains this database to track activities in the various brown field grant programs including grantee assessment, site cleanup and site redevelopment.

**BRS** Biennial Reporting System

**VERSION DATE: 1/2003**

The United States Environmental Protection Agency (EPA), in cooperation with the States, biennially collects information regarding the generation, management, and final disposition of hazardous wastes regulated under the Resource Conservation and Recovery Act of 1976 (RCRA), as amended. The Biennial Report captures detailed data on the generation of hazardous waste from large quantity generators and data on waste management practices from treatment, storage and disposal facilities. Currently, the EPA states that data collected between 1991 and 1997 was originally a part of the defunct Biennial Reporting System and is now incorporated into the RCRAInfo data system.

**CDL** Clandestine Drug Laboratory Locations

**VERSION DATE: 3/2012**

The U.S. Department of Justice ("the Department") provides this information as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments. The Department does not establish, implement, enforce, or certify compliance with clean-up or remediation standards for contaminated sites; the public should contact a state or local health department or environmental protection agency for that information.

## *ENVIRONMENTAL RECORDS DEFINITIONS - FEDERAL*

**CERCLIS** Comprehensive Environmental Response, Compensation & Liability Information System

**VERSION DATE: 3/2012**

CERCLIS is the repository for site and non-site specific Superfund information in support of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This United States Environmental Protection Agency database contains an extract of sites that have been investigated or are in the process of being investigated for potential environmental risk.

**DNPL** Delisted National Priorities List

**VERSION DATE: 3/2012**

This database includes sites from the United States Environmental Protection Agency's Final National Priorties List (NPL) where remedies have proven to be satisfactory or sites where the original analyses were inaccurate, and the site is no longer appropriate for inclusion on the NPL, and final publication in the Federal Register has occurred.

**DOCKETS** EPA Docket Data

**VERSION DATE: 12/2005**

The United States Environmental Protection Agency Docket data lists Civil Case Defendants, filing dates as far back as 1971, laws broken including section, violations that occurred, pollutants involved, penalties assessed and superfund awards by facility and location. Please refer to ICIS database as source of current data.

**DOD** Department of Defense Sites

**VERSION DATE: 12/2005**

This information originates from the National Atlas of the United States Federal Lands data, which includes lands owned or administered by the Federal government. Army DOD, Army Corps of Engineers DOD, Air Force DOD, Navy DOD and Marine DOD areas of 640 acres or more are included.

**EC** Federal Engineering Institutional Control Sites

**VERSION DATE: 3/2012**

This database includes site locations where Engineering and/or Institutional Controls have been identified as part of a selected remedy for the site as defined by United States Environmental Protection Agency official remedy decision documents. A site listing does not indicate that the institutional and engineering controls are currently in place nor will be in place once the remedy is complete; it only indicates that the decision to include either of them in the remedy is documented as of the completed date of the document. Institutional controls are actions, such as legal controls, that help minimize the potential for human exposure to contamination by ensuring appropriate land or resource use. Engineering controls include caps, barriers, or other device engineering to prevent access, exposure, or continued migration of contamination.

**ERNSCA** Emergency Response Notification System

**VERSION DATE: 12/2011**

This National Response Center database contains data on reported releases of oil, chemical, radiological, biological, and/or etiological discharges into the environment anywhere in the United States and its territories. The data comes from spill reports made to the U.S. Environmental Protection Agency, U.S. Coast Guard, the National Response Center and/or the U.S. Department of Transportation.

**FRSCA** Facility Registry System

**VERSION DATE: 12/2011**

The United States Environmental Protection Agency's Office of Environmental Information (OEI) developed the Facility Registry System (FRS) as the centrally managed database that identifies facilities, sites or places subject to environmental regulations or of environmental interest. The Facility Registry System replaced the Facility Index System or FINDS database.

**FUDS** Formerly Used Defense Sites

**VERSION DATE: 10/2011**

The 2010 FUDS inventory includes properties previously owned by or leased to the United States and under Secretary of Defense jurisdiction. The remediation of these properties is the responsibility of the Department of Defense.

**HMIRSR09** Hazardous Materials Incident Reporting System

**VERSION DATE: 12/2011**

The HMIRS database contains unintentional hazardous materials release information reported to the U.S. Department of Transportation located in EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa.

**ICIS** Integrated Compliance Information System (formerly DOCKETS)

**VERSION DATE: 8/2011**

ICIS is a case activity tracking and management system for civil, judicial, and administrative federal Environmental Protection Agency enforcement cases. ICIS contains information on federal administrative and federal judicial cases under the following environmental statutes: the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Emergency Planning and Community Right-to-Know Act - Section 313, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Safe Drinking Water Act, and the Marine Protection, Research, and Sanctuaries Act.

**ICISNPDES** Integrated Compliance Information System National Pollutant Discharge Elimination System

**VERSION DATE: 8/2011**

In 2006, the Integrated Compliance Information System (ICIS) - National Pollutant Discharge Elimination System (NPDES) became the NPDES national system of record for select states, tribes and territories. ICIS-NPDES is an information management system maintained by the United States Environmental Protection Agency's Office of Compliance to track permit compliance and enforcement status of facilities regulated by the NPDES under the Clean Water Act. ICIS-NPDES is designed to support the NPDES program at the state, regional, and national levels.

**LUCIS** Land Use Control Information System

**VERSION DATE: 9/2006**

The LUCIS database is maintained by the U.S. Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

**MLTS** Material Licensing Tracking System

**VERSION DATE: 2/2012**

MLTS is a list of approximately 8,100 sites which have or use radioactive materials subject to the United States Nuclear Regulatory Commission (NRC) licensing requirements.

**NFRAP** No Further Remedial Action Planned Sites

**VERSION DATE: 3/2012**

This database includes sites which have been determined by the United States Environmental Protection Agency, following preliminary assessment, to no longer pose a significant risk or require further activity under CERCLA. After initial investigation, no contamination was found, contamination was quickly removed or contamination was not serious enough to require Federal Superfund action or NPL consideration.

**NLRRCRAC** No Longer Regulated RCRA Corrective Action Facilities

**VERSION DATE: 4/2012**

This database includes RCRA Corrective Action facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements.

**NLRRCRAG** No Longer Regulated RCRA Generator Facilities

**VERSION DATE: 4/2012**

This database includes RCRA Generator facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly generated hazardous waste.

Large Quantity Generators: Generate 1,000 kg or more of hazardous waste during any calendar month; or Generate more than 1 kg of acutely hazardous waste during any calendar month; or Generate more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month; or Generate 1 kg or less of acutely hazardous waste during any calendar month, and accumulate more than 1kg of acutely hazardous waste at any time; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulated more than 100 kg of that material at any time.
Small Quantity Generators: Generate more than 100 and less than 1000 kilograms of hazardous waste during any calendar month and accumulate less than 6000 kg of hazardous waste at any time; or Generate 100 kg or less of hazardous waste during any calendar month, and accumulate more than 1000 kg of hazardous waste at any time.
Conditionally Exempt Small Quantity Generators: Generate 100 kilograms or less of hazardous waste per calendar month, and accumulate 1000 kg or less of hazardous waste at any time; or Generate one kilogram or less of acutely hazardous waste per calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste.

**NLRRCRAT** No Longer Regulated RCRA Non-CORRACTS TSD Facilities

**VERSION DATE: 4/2012**

This database includes RCRA Non-Corrective Action TSD facilities that are no longer regulated by the United States Environmental Protection Agency or do not meet other RCRA reporting requirements. This listing includes facilities that formerly treated, stored or disposed of hazardous waste.

**NPDESR09** National Pollutant Discharge Elimination System

**VERSION DATE: 4/2007**

Information in this database is extracted from the Water Permit Compliance System (PCS) database which is used by United States Environmental Protection Agency to track surface water permits issued under the Clean Water Act. This database includes permitted facilities located in EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa. The NPDES database was collected from December 2002 until April 2007. Refer to the PCS and/or ICIS-NPDES database as source of current data.

**NPL** National Priorities List

**VERSION DATE: 3/2012**

This database includes United States Environmental Protection Agency (EPA) National Priorities List sites that fall under the EPA's Superfund program, established to fund the cleanup of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action.

**ODI** Open Dump Inventory

**VERSION DATE: 6/1985**

The open dump inventory was published by the United States Environmental Protection Agency. An “open dump” is defined as a facility or site where solid waste is disposed of which is not a sanitary landfill which meets the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944) and which is not a facility for disposal of hazardous waste. This inventory has not been updated since June 1985.

**PADS** PCB Activity Database System

**VERSION DATE: 10/2011**

The PCB Activity Database System (PADS) is used by the United States Environmental Protection Agency to monitor the activities of polychlorinated biphenyls (PCB) handlers.

**PCSR09** Permit Compliance System

**VERSION DATE: 8/2011**

The Permit Compliance System is used in tracking enforcement status and permit compliance of facilities controlled by the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act and is maintained by the United States Environmental Protection Agency's Office of Compliance. PCS is designed to support the NPDES program at the state, regional, and national levels. This database includes permitted facilities located in EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa.

**PNPL** Proposed National Priorities List

**VERSION DATE: 3/2012**

This database contains sites proposed to be included on the National Priorities List (NPL) in the Federal Register. The United States Environmental Protection Agency investigates these sites to determine if they may present long-term threats to public health or the environment.

**RCRAC** Resource Conservation & Recovery Act - Corrective Action Facilities

**VERSION DATE: 4/2012**

This database includes hazardous waste sites listed with corrective action activity in the RCRAInfo system. The Corrective Action Program requires owners or operators of RCRA facilities (or treatment, storage, and disposal facilities) to investigate and cleanup contamination in order to protect human health and the environment. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS).

**RCRAGR09** Resource Conservation & Recovery Act - Generator Facilities

**VERSION DATE: 4/2012**

This database includes sites listed as generators of hazardous waste (large, small, and exempt) in the RCRAInfo system. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). This database includes sites located in EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa.
Large Quantity Generators: Generate 1,000 kg or more of hazardous waste during any calendar month; or Generate more than 1 kg of acutely hazardous waste during any calendar month; or Generate more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste during any calendar month; or Generate 1 kg or less of acutely hazardous waste during any calendar month, and accumulate more than 1kg of acutely hazardous waste at any time; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulated more than 100 kg of that material at any time.
Small Quantity Generators: Generate more than 100 and less than 1000 kilograms of hazardous waste during any calendar month and accumulate less than 6000 kg of hazardous waste at any time; or Generate 100 kg or less of hazardous waste during any calendar month, and accumulate more than 1000 kg of hazardous waste at any time.
Conditionally Exempt Small Quantity Generators: Generate 100 kilograms or less of hazardous waste per calendar month, and accumulate 1000 kg or less of hazardous waste at any time; or Generate one kilogram or less of acutely hazardous waste per calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous waste; or Generate 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, or acutely hazardous

waste during any calendar month, and accumulate at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste.

**RCRASC** RCRA Sites with Controls

**VERSION DATE: 10/2010**

This list of Resource Conservation and Recovery Act sites with institutional controls in place is provided by the U.S. Environmental Protection Agency.

**RCRAT** Resource Conservation & Recovery Act - Treatment, Storage & Disposal Facilities

**VERSION DATE: 4/2012**

This database includes Non-Corrective Action sites listed as treatment, storage and/or disposal facilities of hazardous waste in the RCRAInfo system. The United States Environmental Protection Agency defines RCRAInfo as the comprehensive information system which provides access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS).

**RODS** Record of Decision System

**VERSION DATE: 2/2012**

These decision documents maintained by the United States Environmental Protection Agency describe the chosen remedy for NPL (Superfund) site remediation. They also include site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, and scope and role of response action.

**SFLIENS** CERCLIS Liens

**VERSION DATE: 8/2011**

A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which United States Environmental Protection Agency has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties. This database contains those CERCLIS sites where the Lien on Property action is complete.

**SSTS** Section Seven Tracking System

**VERSION DATE: 12/2009**

The United States Environmental Protection Agency tracks information on pesticide establishments through the Section Seven Tracking System (SSTS). SSTS records the registration of new

establishments and records pesticide production at each establishment. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires that production of pesticides or devices be conducted in a registered pesticide-producing or device-producing establishment. ("Production" includes formulation, packaging, repackaging, and relabeling.)

**TRI** Toxics Release Inventory

**VERSION DATE: 12/2010**

The Toxics Release Inventory, provided by the United States Environmental Protection Agency, includes data on toxic chemical releases and waste management activities from certain industries as well as federal facilities. This inventory contains information about the types and amounts of toxic chemicals that are released each year to the air, water, and land as well as information on the quantities of toxic chemicals sent to other facilities for further waste management.

**TSCA** Toxic Substance Control Act Inventory

**VERSION DATE: 12/2006**

The Toxic Substances Control Act (TSCA) was enacted in 1976 to ensure that chemicals manufactured, imported, processed, or distributed in commerce, or used or disposed of in the United States do not pose any unreasonable risks to human health or the environment. TSCA section 8(b) provides the United States Environmental Protection Agency authority to "compile, keep current, and publish a list of each chemical substance that is manufactured or processed in the United States." This TSCA Chemical Substance Inventory contains non-confidential information on the production amount of toxic chemicals from each manufacturer and importer site.

**ABST** Above Ground Storage Tanks

**VERSION DATE: 12/2007**

This database contains aboveground storage tank facilities registered with the California State Water Resources Control Board (SWRCB). Since 2006, tanks were required to contain a minimum (even as cumulative) of 1320 gallons to be in the program. As of January 1, 2008, the SWRCB no longer maintains a list of registered aboveground storage tanks, due to effective Assembly Bill No. 1130 (Laird) of the Aboveground Petroleum Storage Act (APSA). This Bill authorized the Certified Unified Program Agencies to implement and administer the requirements of the APSA.

**CALSITES** CALSITES Database

**VERSION DATE: 9/2004**

This historical database was maintained by the Department of Toxic Substance Control for more than a decade. CALSITES contains information on Brownfield properties with confirmed or potential hazardous contamination. In 2006, DTSC introduced EnviroStor as the latest Brownfields site database.

**CDL** Clandestine Drug Labs

**VERSION DATE: 12/2011**

The California Department of Toxic Substance Control (DTSC) provides this listing of illegal drug laboratories. Pursuant to Section 25354.5 of the California Health and Safety Code, DTSC conducts emergency removal actions at clandestine drug labs at the request of State and local law enforcement agencies. DTSC's contractors typically remove hazardous substances that may pose an immediate threat to public health and the environment while the enforcement officials are on scene. During the emergency removal actions, contractors remove and properly dispose of contaminated lab equipment, chemicals used to make the illegal drugs (usually methamphetamine), lab chemical wastes, and other grossly contaminated materials. DTSC does not perform additional assessment work beyond standard emergency removal actions and makes no further determination regarding the need for future cleanup work at the emergency removal location. The reported location information may or may not include the actual location of the illegal drug lab. The DTSC does not guarantee the accuracy of the address or location information or the condition of the location listed.

**CHMIRS** California Hazardous Material Incident Report System

**VERSION DATE: 2/2012**

The California Hazardous Material Incident Report System database is provided by the California Emergency Management Agency. This database contains accidental or spill release information from reported hazardous material incidents since 1993.

**CLEANER** Dry Cleaner Facilities

**VERSION DATE: 4/2012**

This database, created by accessing the California Department of Toxic Substances Control's (DTSC) Hazardous Waste Tracking System, includes dry cleaner facilities that have registered EPA identification numbers. These facilities are categorized with one of the following NAICS Codes: 81231 or 81232. This database may also include facilities other than dry cleaners who also register with these same NAICS Codes. Not all companies report their NAICS/SIC Codes to the DTSC and therefore this database may exclude registered dry cleaner facilities with incomplete classification information.

**CLEANUPSITES** GeoTracker Cleanup Sites

**VERSION DATE: 5/2012**

This GeoTracker Cleanup Sites database is maintained by the California Regional Water Quality Control Board (RWQCB). The database contains contaminated sites that impact groundwater or have the potential to impact ground water, including spills, investigations, cleanup recoveries and reported leaking underground storage tank incidents.

**CORTESE** Cortese List

**VERSION DATE: 11/2002**

This historical listing includes hazardous waste and substances sites designated by the State Water Resources Control Board (LUST), the Integrated Waste Board (SWIS), and the Department of Toxic Substance Control (CALSITES). The Cortese List was utilized by the State, local agencies and developers to comply with the California Environmental Quality Act requirements in providing information about the location of hazardous materials release sites.

**DTSCDR** DTSC Deed Restrictions

**VERSION DATE: 1/2012**

The California Department of Toxic Substances Control (DTSC) maintains this listing of sites with deed restrictions. According to the DTSC, restricted land use indicates whether the site or area within the site has an environmental restriction recorded and/or other institutional control preventing certain types of land use or activities. The land use restrictions listed under the site management requirements are only an abbreviated summary of the land use restrictions, and may not encompass all restrictions and notification requirements placed on a property. For complete land use restriction information please contact the DTSC to review associated Land Use Restriction documents.

**DTSCHWT** DTSC Registered Hazardous Waste Transporters

**VERSION DATE: 2/2012**

The Department of Toxic Substances Control provides this list of Registered Hazardous Waste

Transporters.

**EMI** Emissions Inventory Data

**VERSION DATE: 12/2008**

The Air Resources Board's Emissions Inventory Database contains criteria pollutant data and toxic data on facilities throughout the state of California for the 2008 inventory year.

**ENVIROSTOR** EnviroStor Cleanup Sites

**VERSION DATE: 3/2012**

The Department of Toxic Substances Control (DTSC) has developed the EnviroStor database system to evaluate and track sites with confirmed or potential contamination and sites where further investigation may be necessary. This EnviroStor database of cleanup sites contains the following: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. Sites where DTSC has made a "No Action Required" determination are not included in this database, as these sites had assessments that revealed no evidence of recognized environmental conditions in connection with the property.

**ENVIROSTORPC** EnviroStor Permitted and Corrective Action Sites

**VERSION DATE: 7/2010**

The Department of Toxic Substances Control (DTSC) has developed the EnviroStor database system to evaluate and track sites with confirmed or potential contamination and sites where further investigation may be necessary. This EnviroStor database contains detailed information on hazardous waste permitted and corrective action facilities. Investigation and cleanup activities at hazardous waste facilities (either Resource Conservation and Recovery Act (RCRA) or State-only) that either were eligible for a permit or received a permit are called "corrective action." These facilities treated stored, disposed and/or transferred hazardous waste.

**ERAP** Expedited Removal Action Program Sites

**VERSION DATE: 2/2012**

The Expedited Remedial Action Program is a pilot project administered by the Department of Toxic Substances Control's Site Mitigation and Brownfields Reuse Program to promote the cleanup of up to 30 hazardous substance release sites. ERAP provides significant incentives for redevelopment of contaminated properties by promoting cleanups based on the planned land use, by providing a covenant not to sue, and by outlining a fair and equitable liability scheme.

**HISTUST** Historical Underground Storage Tanks

**VERSION DATE: 12/1987**

The Hazardous Substance Storage Container Database is a historical list of Underground Storage Tank sites, compiled from tank survey and registration information collected at one time between 1984 and 1987 by the State Water Resources Control Board. The hazardous substances stored within these tanks includes, but not restricted to, petroleum products, industrial solvents, and other materials.

**HWTS** Hazardous Waste Tanner Summary

**VERSION DATE: 12/2010**

This data is prepared from information extracted from copies of hazardous waste manifests received each year by the Department of Toxic Substances Control. The Hazardous Waste Summary Report (Tanner Report) currently includes manifest data from the 1993 through the 2010 reporting years.

**LIENS** Recorded Environmental Cleanup Liens

**VERSION DATE: 5/2012**

The California Department of Toxic Substance Control (DTSC) maintains this listing of liens placed upon real properties. A lien is utilized by the DTSC to obtain reimbursement from responsible parties for costs associated with the remediation of contaminated properties.

**LUST** Leaking Underground Storage Tanks

**VERSION DATE: 6/2008**

This database is maintained by the State Water Resources Control Board. LUST records contain an inventory of reported leaking underground storage tank incidents. Please refer to the CLEANUPSITES database as source of current data.

**MWMP** California Medical Waste Management Program Facility List

**VERSION DATE: NR**

To protect the public and the environment from potential infectious exposure to disease causing agents, the Medical Waste Management Program (MWMP), in the Environmental Management Branch of the California Department of Public Health, regulates the generation, handling, storage, treatment, and disposal of medical waste by providing oversight for the implementation of the Medical Waste Management Act (MWMA). The MWMP permits and inspects all medical waste off-site treatment facilities and medical waste transfer stations. This listing includes medical waste transporters as of August 2011, transfer stations as of September 2011, and off-site treatment facilities as of May 2011.

**NFA** No Further Action Determination

**VERSION DATE: 7/2005**

The NFA listing contains properties at which the Department of Toxic Substance Control has made a clear determination that the property does not pose a problem to the environment or to public health.

**NFE** Sites Needing Further Evaluation

**VERSION DATE: 7/2005**

The NFE listing contains properties that the Department of Toxic Substance Control suspects with possible contamination. These are unconfirmed contaminated properties that need further assessment.

**NPDES** National Pollutant Discharge Elimination System Facilities

**VERSION DATE: 5/2012**

This State Water Resources Control Board database contains NPDES permits, including stormwater general permit enrollees that are active or have been active within the past three years. NPDES permits are required from all facilities that discharge their wastewater from a point source into a waterbody.

**PROC** Listing of Certified Processors

**VERSION DATE: 3/2012**

Listing of Certified Processors that are operating under the state of California's Beverage Container Recycling Program. This list is maintained by the Department of Conservation.

**REF** Referred to Another Local or State Agency

**VERSION DATE: 7/2005**

The REF listing contains properties where contamination has not been confirmed and which were determined as not requiring direct Department of Toxic Substance Control Site Mitigation Program action or oversight. Accordingly, these sites have been referred to another state or local regulatory agency.

**SCH** School Property Evaluations

**VERSION DATE: 7/2005**

The SCH listing contains proposed and existing school sites that are being evaluated by Department of Toxic Substance Control for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

**SLIC** Spills, Leaks, Investigation & Cleanup Recovery Listing

**VERSION DATE: 6/2008**

These records are maintained by the California Regional Water Quality Control Board (RWQCB). This list includes contaminated sites that impact groundwater or have the potential to impact ground water. Please refer to CLEANUPSITES database as source of current data.

**SWEEPS** Statewide Environmental Evaluation and Planning System

**VERSION DATE: 10/1994**

The Statewide Environmental Evaluation and Planning System (SWEEPS) contains a historical listing of active and inactive underground storage tank locations from the State Water Resources Control Board. The hazardous substances stored within these tanks includes, but not restricted to, petroleum products, industrial solvents, and other materials. Refer to CUPA listing for source of current data.

**SWIS** Solid Waste Information System Sites

**VERSION DATE: 3/2012**

The Solid Waste Information System (SWIS) database includes information on solid waste facilities, operations, and disposal sites located in California. This database is maintained by the California Department of Resources Recycling and Recovery.

**SWRCY** Recycling Centers

**VERSION DATE: 3/2012**

Listing of Certified Recycling Centers that are operating under the state of California's Beverage Container Recycling Program. This list is maintained by the Department of Conservation.

**TOXPITS** Toxic Pits Cleanup Act Sites

**VERSION DATE: 7/1995**

Toxic Pits are sites with possible contamination of hazardous substances where cleanup is necessary. This listing is no longer updated by the State Water Resources Control Board.

**USTCUPA** Underground Storage Tanks

**VERSION DATE: 5/2012**

An underground storage tank is an individual tank or group of tanks that store hazardous substances. Underground storage tanks are completely or considerably below the ground surface. This database contains UST permit data submitted from the Certified Unified Program Agencies (CUPA) directly to the State Water Resources Control Board. CUPA's are local agencies that have been certified by the California EPA to implement state environmental programs within the local agency's jurisdiction.

**VCP** Voluntary Cleanup Program

**VERSION DATE: 9/2004**

The California Voluntary Cleanup program provides regulatory oversight by the Department of Toxic Substance Control (DTSC) to project proponents desiring to address mitigation activities at sites which have lower health and/or environmental risk than sites which are currently being addressed by DTSC. Refer to Envirostor database as source of current data.

**WMUDS** Waste Management Unit Database

**VERSION DATE: 1/2000**

The Waste Management Unit Database System tracks and inventories waste management units. CCR Title 27 contains criteria stating that Waste Management Units are classified according to their ability to contain wastes. Containment shall be determined by geology, hydrology, topography, climatology, and other factors relating to the ability of the Unit to protect water quality. Water Code Section 13273.1 requires that operators submit a water quality solid waste assessment test (SWAT) report to address leak status. The WMUDS was last updated by the State Water Resources control board in 2000.

**AOC** San Gabriel Valley Areas of Concern

**VERSION DATE: 1/2006**

A listing of the San Gabriel Valley Superfund Sites located in Los Angeles County with Volatile Organic Compound groundwater contamination.

**LAHMS** Los Angeles County Hazardous Materials System

**VERSION DATE: 2/2006**

The Los Angeles County Department of Public Works maintains this listing of Industrial Waste and Underground Storage Tank sites.

**LASM** Los Angeles County Site Mitigation List

**VERSION DATE: 12/2011**

This listing of industrial sites with a reported spill or complaint is provided by the Site Mitigation Unit (SMU) of the Health Hazardous Materials Division, Los Angeles County Fire Department.

**WIP** Well Investigations Program Case List

**VERSION DATE: 7/2009**

The Well Investigations Case List for the San Gabriel and San Fernando Valley Cleanup Programs is maintained by the State Water Resources Control Board.

**INDIANRES** Indian Reservations

**VERSION DATE: 1/2000**

The Department of Interior and Bureau of Indian Affairs maintains this database that includes American Indian Reservations, off-reservation trust lands, public domain allotments, Alaska Native Regional Corporations and Recognized State Reservations.

**LUSTR09** Leaking Underground Storage Tanks On Tribal Lands

**VERSION DATE: 2/2012**

This database, provided by the United States Environmental Protection Agency (EPA), contains leaking underground storage tanks on Tribal lands located in EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa.

**ODINDIAN** Open Dump Inventory on Tribal Lands

**VERSION DATE: 11/2006**

This Indian Health Service database contains information about facilities and sites on tribal lands where solid waste is disposed of, which are not sanitary landfills or hazardous waste disposal facilities, and which meet the criteria promulgated under section 4004 of the Solid Waste Disposal Act (42 U.S.C. 6944).

**USTR09** Underground Storage Tanks On Tribal Lands

**VERSION DATE: 2/2012**

This database, provided by the United States Environmental Protection Agency (EPA), contains underground storage tanks on Tribal lands located in EPA Region 9. This region includes the following states: Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa.

# GeoPlus Water Well Report

http://www.geo-search.net/QuickMap/index.htm?DataID=Standard0000042895

*Click on link above to access the map and satellite view of current property*

*Target Property:*

***Canadian Solar***
***West Avenue J***
***Los Angeles County, California 93536***

*Prepared For:*

***Leighton Consulting***

***Order #: 18317***
***Job #: 42895***
***Project #: 603455-002***
***PO #: 603455-002RLO***
***Date: 06/06/2012***

***3006 Bee Caves Rd, Suite A-230 · Austin, Texas 78746 · phone: 888-396-0042 · fax: 512-472-9967 · www.geo-search.net***

## *TARGET PROPERTY SUMMARY*

***Canadian Solar***
***West Avenue J***
***Los Angeles County, California 93536***

*USGS Quadrangle:* ***Del Sur, CA***
*Target Property Geometry:* ***Area***

*Target Property Longitude(s)/Latitude(s):*
***(-118.324481, 34.695653), (-118.333125, 34.695546), (-118.333157, 34.692820), (-118.329843, 34.692847), (-118.329745, 34.689159), (-118.333222, 34.689106), (-118.333092, 34.681864), (-118.324383, 34.681918), (-118.324481, 34.695653)***

*County/Parish Covered:*
***Los Angeles (CA)***

*Zipcode(s) Covered:*
***Lancaster CA: 93536***

*State(s) Covered:*
***CA***

****Target property is located in Radon Zone 2.***
***Zone 2 areas have a predicted average indoor radon screening level between 2 and 4 pCi/L (picocuries per liter).***

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## DATABASE FINDINGS SUMMARY

| DATABASE | ACRONYM | LOCA-TABLE | UNLOCA-TABLE | SEARCH RADIUS (miles) |
|---|---|---|---|---|
| **FEDERAL** | | | | |
| UNITED STATES GEOLOGICAL SURVEY NATIONAL WATER INFORMATION SYSTEM | NWIS | 4 | 0 | 0.5000 |
| **SUB-TOTAL** | | **4** | **0** | |
| **STATE (CA)** | | | | |
| CALIFORNIA DEPARTMENT OF WATER RESOURCES WATER WELLS | DWRWELLS | 2 | 0 | 0.5000 |
| **SUB-TOTAL** | | **2** | **0** | |
| **TOTAL** | | **6** | **0** | |

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# LOCATABLE DATABASE FINDINGS

| ACRONYM | Target Property | SEARCH RADIUS (miles) | 1/8 Mile (> TP) | 1/4 Mile (> 1/8) | 1/2 Mile (> 1/4) | 1 Mile (> 1/2) | > 1 Mile | Total |
|---|---|---|---|---|---|---|---|---|
| **FEDERAL** | | | | | | | | |
| NWIS | 1 | .5000 | 1 | 0 | 2 | 0 | NS | 4 |
| **SUB-TOTAL** | **1** | | **1** | **0** | **2** | **0** | **0** | **4** |
| **STATE (CA)** | | | | | | | | |
| DWRWELLS | 1 | .5000 | 0 | 1 | 0 | 0 | NS | 2 |
| **SUB-TOTAL** | **1** | | **0** | **1** | **0** | **0** | **0** | **2** |
| **TOTAL** | **2** | | **1** | **1** | **2** | **0** | **0** | **6** |

**NOTES:**

**NS = NO SEARCH REQUESTED BY CUSTOMER**

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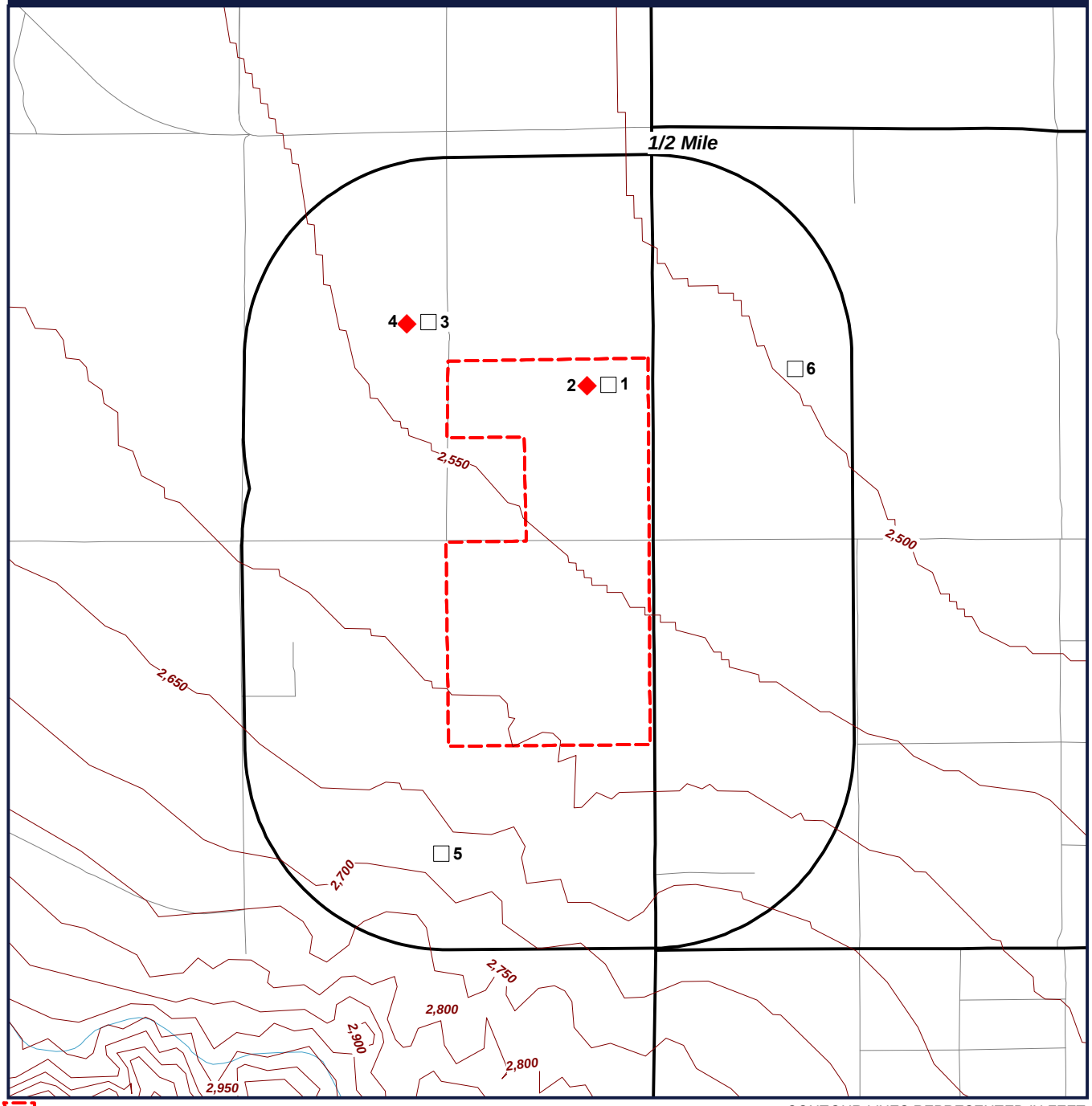
# WATER WELL MAP




Target Property (TP)
NWIS
DWRWELLS

**Canadian Solar**
**West Avenue J**
**Los Angeles County, California**
**93536**

CONTOUR LINES REPRESENTED IN FEET

N
W E
S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

GeoSearch www.geo-search.net - phone: 888-396-0042 - fax: 512-472-9967

JOB #: 42895 - 6/6/2012

# REPORT SUMMARY OF LOCATABLE SITES

| MAP ID# | DATABASE NAME | SITE ID# | DISTANCE FROM SITE | SITE NAME | ADDRESS | CITY, ZIP CODE | PAGE # |
|---|---|---|---|---|---|---|---|
| 1 | NWIS | 00240060 | 0.001 SW | 007N024W24B001S | | | 1 |
| 2 | DWRWELLS | 07N14W14J001S | 0.001 SW | | | LANCASTER, 93536 | 3 |
| 3 | NWIS | 00240107 | 0.110 W | A-15-01 12ACB | | | 4 |
| 4 | DWRWELLS | 07N14W14F001S | 0.140 W | | | LANCASTER, 93536 | 6 |
| 5 | NWIS | 00239499 | 0.270 SW | 007N014W23P001S | | | 7 |
| 6 | NWIS | 00240071 | 0.370 E | 007N023E18H002S | | | 9 |

# UNITED STATES GEOLOGICAL SURVEY NATIONAL WATER INFORMATION SYSTEM (NWIS)

**MAP ID# 1** **Distance from Property: 0.00 mi. SW**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414111**
STATION NAME: **007N004W18K001S**
SITE TYPE: **WELL**
LATITUDE: **34.69471065** LONGITUDE: **-117.33671430**
DATE DRILLED: **06/11/1958**
WELL DEPTH: **60**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 1** **Distance from Property: 0.00 mi. SW**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414111**
STATION NAME: **007N004W18L001S**
SITE TYPE: **WELL**
LATITUDE: **34.69471060** LONGITUDE: **-117.34115880**
DATE DRILLED: **05/28/1958**
WELL DEPTH: **69**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 1** **Distance from Property: 0.00 mi. SW**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414111**
STATION NAME: **007N012W16L004S**
SITE TYPE: **WELL**
LATITUDE: **34.69470720** LONGITUDE: **-118.16007330**
DATE DRILLED:
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **9.0**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 1** **Distance from Property: 0.00 mi. SW**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414111**
STATION NAME: **007N014W14J001S**
SITE TYPE: **WELL**
LATITUDE: **34.69470668** LONGITUDE: **-118.32618930**
DATE DRILLED: **01/01/1909**
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **175**
LOCAL AQUIFER: **NOT REPORTED**

## UNITED STATES GEOLOGICAL SURVEY NATIONAL WATER INFORMATION SYSTEM (NWIS)

**MAP ID# 1** **Distance from Property: 0.00 mi. SW**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414111**
STATION NAME: **007N024W24B001S**
SITE TYPE: **WELL**
LATITUDE: **34.69470590** LONGITUDE: **-119.37261800**
DATE DRILLED: **07/07/1952**
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

## CALIFORNIA DEPARTMENT OF WATER RESOURCES WATER WELLS (DWRWELLS)

**MAP ID# 2** **Distance from Property: 0.00 mi. SW**

WATERWELL NUMBER: **07N14W14J001S**

LOCATION: **LANCASTER, CA 93536**
**LOS ANGELESCOUNTY**

WELL USAGE: **UNDETERMINED**

LONGITUDE: **-118.3271**

LATITUDE: **34.6947**

## UNITED STATES GEOLOGICAL SURVEY NATIONAL WATER INFORMATION SYSTEM (NWIS)

**MAP ID# 3** **Distance from Property: 0.11 mi. W**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414911**
STATION NAME: **007N009W18M001S**
SITE TYPE: **WELL**
LATITUDE: **34.69693115** LONGITUDE: **-117.87645430**
DATE DRILLED:
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 3** **Distance from Property: 0.11 mi. W**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414911**
STATION NAME: **007N012W15Z033S**
SITE TYPE: **WELL**
LATITUDE: **34.69692944** LONGITUDE: **-118.13951720**
DATE DRILLED:
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **287**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 3** **Distance from Property: 0.11 mi. W**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414911**
STATION NAME: **007N012W15F002S**
SITE TYPE: **WELL**
LATITUDE: **34.69692944** LONGITUDE: **-118.14035060**
DATE DRILLED: **09/23/1943**
WELL DEPTH: **524**
HOLE DEPTH: **600**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 3** **Distance from Property: 0.11 mi. W**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414911**
STATION NAME: **007N012W15Z044S**
SITE TYPE: **WELL**
LATITUDE: **34.69692940** LONGITUDE: **-118.14229500**
DATE DRILLED:
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **411**
LOCAL AQUIFER: **NOT REPORTED**

## UNITED STATES GEOLOGICAL SURVEY NATIONAL WATER INFORMATION SYSTEM (NWIS)

**MAP ID# 3** **Distance from Property: 0.11 mi. W**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414911**
STATION NAME: **007N012W16E001S**
SITE TYPE: **WELL**
LATITUDE: **34.69692934** LONGITUDE: **-118.16257340**
DATE DRILLED: **11/17/1958**
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **200**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 3** **Distance from Property: 0.11 mi. W**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414911**
STATION NAME: **007N014W14F001S**
SITE TYPE: **WELL**
LATITUDE: **34.69692880** LONGITUDE: **-118.33396730**
DATE DRILLED: **1909**
WELL DEPTH: **109**
HOLE DEPTH: **160**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 3** **Distance from Property: 0.11 mi. W**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414911**
STATION NAME: **A-15-01 12ACB**
SITE TYPE: **WELL**
LATITUDE: **34.69696786** LONGITUDE: **-112.20849650**
DATE DRILLED: **02/24/1982**
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

## CALIFORNIA DEPARTMENT OF WATER RESOURCES WATER WELLS (DWRWELLS)

**MAP ID# 4** **Distance from Property: 0.14 mi. W**

WATERWELL NUMBER: **07N14W14F001S**

LOCATION: **LANCASTER, CA 93536**
**LOS ANGELESCOUNTY**

WELL USAGE: **UNDETERMINED**

LONGITUDE: **-118.3349**

LATITUDE: **34.6969**

## UNITED STATES GEOLOGICAL SURVEY NATIONAL WATER INFORMATION SYSTEM (NWIS)

**MAP ID# 5** **Distance from Property: 0.27 mi. SW**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34404111**
STATION NAME: **007N012W22R002S**
SITE TYPE: **WELL**
LATITUDE: **34.67804134** LONGITUDE: **-118.13396160**
DATE DRILLED: **02/17/1953**
WELL DEPTH: **390**
HOLE DEPTH: **390**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 5** **Distance from Property: 0.27 mi. SW**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34404111**
STATION NAME: **007N012W20Z003S**
SITE TYPE: **WELL**
LATITUDE: **34.67804116** LONGITUDE: **-118.17451830**
DATE DRILLED:
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **509**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 5** **Distance from Property: 0.27 mi. SW**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34404111**
STATION NAME: **007N013W24Q001S**
SITE TYPE: **WELL**
LATITUDE: **34.67804100** LONGITUDE: **-118.20979700**
DATE DRILLED: **05/17/1960**
WELL DEPTH: **300**
HOLE DEPTH: **300**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 5** **Distance from Property: 0.27 mi. SW**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34404111**
STATION NAME: **007N013W24Q002S**
SITE TYPE: **WELL**
LATITUDE: **34.67804100** LONGITUDE: **-118.20979700**
DATE DRILLED:
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

## UNITED STATES GEOLOGICAL SURVEY NATIONAL WATER INFORMATION SYSTEM (NWIS)

**MAP ID# 5** **Distance from Property: 0.27 mi. SW**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34404111**
STATION NAME: **007N014W23P001S**
SITE TYPE: **WELL**
LATITUDE: **34.67804070** LONGITUDE: **-118.33341190**
DATE DRILLED:
WELL DEPTH: **3153**
HOLE DEPTH: **3153**
LOCAL AQUIFER: **NOT REPORTED**

## UNITED STATES GEOLOGICAL SURVEY NATIONAL WATER INFORMATION SYSTEM (NWIS)

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **007N011W18J001S**
SITE TYPE: **WELL**
LATITUDE: **34.69526310** LONGITUDE: **-118.07729330**
DATE DRILLED:
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **65.0**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **007N012W14J001S**
SITE TYPE: **WELL**
LATITUDE: **34.69526295** LONGITUDE: **-118.11673880**
DATE DRILLED:
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **300**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **007N012W15Z018S**
SITE TYPE: **WELL**
LATITUDE: **34.69526280** LONGITUDE: **-118.14423960**
DATE DRILLED:
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **300**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **007N014W13L001S**
SITE TYPE: **WELL**
LATITUDE: **34.69526220** LONGITUDE: **-118.31813350**
DATE DRILLED:
WELL DEPTH: **400**
HOLE DEPTH: **400**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **007N023W14N001S**
SITE TYPE: **WELL**
LATITUDE: **34.69526108** LONGITUDE: **-119.29233660**
DATE DRILLED: **03/25/1966**
WELL DEPTH: **119**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **007N023W14N002S**
SITE TYPE: **WELL**
LATITUDE: **34.69526108** LONGITUDE: **-119.29344780**
DATE DRILLED:
WELL DEPTH: **NOT REPORTED**
HOLE DEPTH: **247**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **007N023W15R001S**
SITE TYPE: **WELL**
LATITUDE: **34.69526110** LONGITUDE: **-119.29761460**
DATE DRILLED: **03/25/1966**
WELL DEPTH: **80.0**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **007N023W21C003S**
SITE TYPE: **WELL**
LATITUDE: **34.69525000** LONGITUDE: **-119.32502780**
DATE DRILLED: **05/23/1967**
WELL DEPTH: **357.**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

## UNITED STATES GEOLOGICAL SURVEY NATIONAL WATER INFORMATION SYSTEM (NWIS)

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **007N023W21C004S**
SITE TYPE: **WELL**
LATITUDE: **34.69526124** LONGITUDE: **-119.32594930**
DATE DRILLED: **1966**
WELL DEPTH: **370**
HOLE DEPTH: **370**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **A-15-01 10BCD2**
SITE TYPE: **WELL**
LATITUDE: **34.69530150** LONGITUDE: **-112.25099790**
DATE DRILLED: **02/24/1981**
WELL DEPTH: **350.**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **A-15-01 10BCD1**
SITE TYPE: **WELL**
LATITUDE: **34.69530150** LONGITUDE: **-112.25127570**
DATE DRILLED:
WELL DEPTH: **350.**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **007N023E18H001S**
SITE TYPE: **WELL**
LATITUDE: **34.69526776** LONGITUDE: **-114.60983630**
DATE DRILLED: **06/04/2003**
WELL DEPTH: **166.68**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

**MAP ID# 6** **Distance from Property: 0.37 mi. E**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **34414311**
STATION NAME: **007N023E18H002S**
SITE TYPE: **WELL**
LATITUDE: **34.69532609** LONGITUDE: **-114.60981960**
DATE DRILLED: **06/04/2003**
WELL DEPTH: **77.67**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **NOT REPORTED**

**NWIS** United States Geological Survey National Water Information System

**VERSION DATE: 3/2012**

This USGS National Water Information System database only includes groundwater wells. The USGS defines this well type as: A hole or shaft constructed in the earth intended to be used to locate, sample, or develop groundwater, oil, gas, or some other subsurface material. The diameter of a well is typically much smaller than the depth. Wells are also used to artificially recharge groundwater or to pressurize oil and gas production zones. Additional information about specific kinds of wells should be recorded under the secondary site types or the Use of Site field. Underground waste-disposal wells should be classified as waste-injection wells.

**DWRWELLS** California Department of Water Resources Water Wells

**VERSION DATE: 6/2011**

The California Department of Water Resources (DWR) maintains this database of water wells. This hydrological data is collected by the DWR's Division of Planning and Local Assistance and other organizations inside and outside the Department.

# APPENDIX E

# Appendix E

## Regulatory Records Documentation

Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

June 6, 2012

Los Angeles County Department of Public Works
Environmental Programs Division
900 Fremont Ave.
Alhambra, CA
FACSIMILE: (626) 458-3569
Phone: (626) 458-3517

Subject: **File Review**

Leighton Consulting, Inc. is requesting information for the property located at:

- **West of 110th Street West, North and South of Avenue J, West of Lancaster in Unincorporated Portion of Los Angeles County, California**
- **Includes AIN (Assessor's ID Number, APN equivalent) numbers 3267-004-016 through -018, 3267-004-025 through -029, 3267-004-044 through -046, and 3267-014-017 through -020**

The property is located in an unincorporated portion of Los Angeles County west of Lancaster, California. We are requesting information concerning hazardous waste/materials, above and below ground storage tanks, leaking underground storage tanks, hazardous waste cleanups, inspections, violations, or any other environmental sensitive spills, responses or concerns. Thank you for your assistance.

Sincerely,

LEIGHTON CONSULTING, INC.

Wallace Sconiers, Jr.
Senior Staff Geologist
661-705-3324 (phone)
wsconiers@leightongroup.com

# Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

June 6, 2012

Los Angeles County Department of Public Works
Environmental Programs Division
900 Fremont Ave.
Alhambra, CA
FACSIMILE: (626) 458-3569
Phone: (626) 458-3517

Subject: **File Review**

Leighton Consulting, Inc. is requesting information for the property located at:

- **West of 110th Street West, North and South of Avenue J, West of Lancaster in Unincorporated Portion of Los Angeles County, California**
- **Includes AIN (Assessor's ID Number, APN equivalent) numbers 3267-004-016 through -018, 3267-004-025 through -029, 3267-004-044 through -046, and 3267-014-017 through -020**

The property is located in an unincorporated portion of Los Angeles County west of Lancaster, California. We are requesting information concerning hazardous waste/materials, above and below ground storage tanks, leaking underground storage tanks, hazardous waste cleanups, inspections, violations, or any other environmental sensitive spills, responses or concerns. Thank you for your assistance.

Sincerely, No files found

LEIGHTON CONSULTING, INC.

Wallace Sconiers, Jr.
Senior Staff Geologist
661-705-3324 (phone)
wsconiers@leightongroup.com

| | | |
|---|---|---|
| To Wallace Sconiers | Date 6/11 | # of pages 1 |
| Co./Dept. Leighton Consulting Inc | From | |
| Phone # | Co. LACoDPW | |
| Fax # (949) 250-1114 | Phone # (626) 458-3517 | |
| | Fax # | |

June 6, 2012

Mrs. Lisa Dowdy
Office of the State Fire Marshal
Fax No. 916.445.8526

Subject: **Pipeline Location Certification Form. Project Number 603455-002**

Dear Lisa,

Leighton Consulting, Inc. is requesting information for the property located at:

- **West of 110th Street West, North and South of Avenue J, West of Lancaster in Unincorporated Portion of Los Angeles County, California**
- **Includes AIN (Assessor's ID Number, APN equivalent) numbers 3267-004-016 through -018, 3267-004-025 through -029, 3267-004-044 through -046, and 3267-014-017 through -020**

The subject property is located west of Lancaster, California in an unincorporated portion of Los Angeles County. I am requesting the completion of a Pipeline Certification by an engineer for the subject property. Maps are included to indicate the subject property location.

I am interested in the presence of pipelines jurisdiction to the State Fire Marshal's office within approximately 500 feet of the subject site.

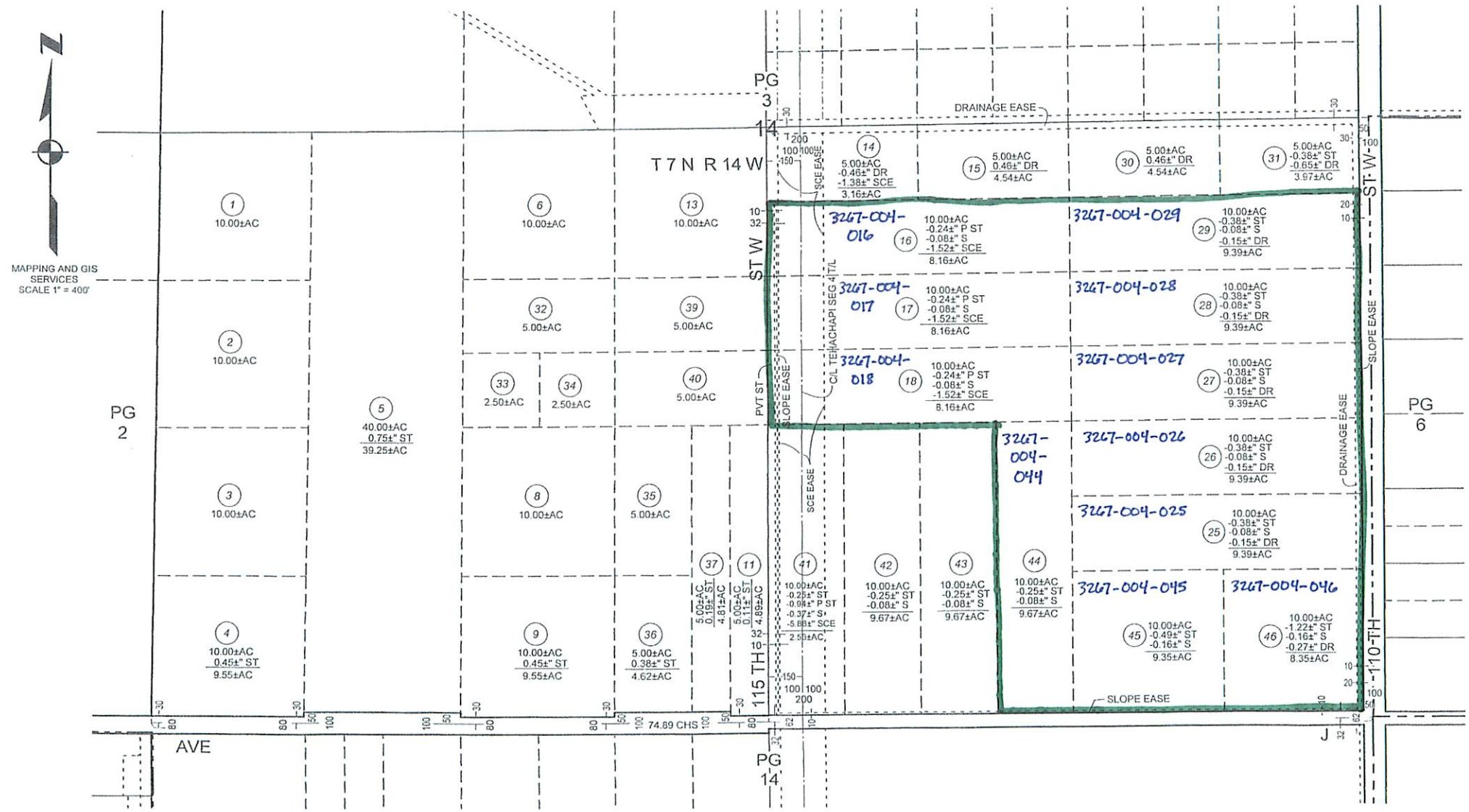
Included is a Thomas Guide Map with the Site Location marked, and a parcel map including the AINs for each parcel within the subject site. The subject site is located on Thomas Guide Page Numbers 4013 and 4103, Grids D6, E6, D7 and E7 (4013) and D1 and E1 (4103).

Sincerely,

LEIGHTON CONSULTING, INC.
Wallace Sconiers, Jr.
Senior Staff Geologist
661.705.3324
wsconiers@leightongroup.com

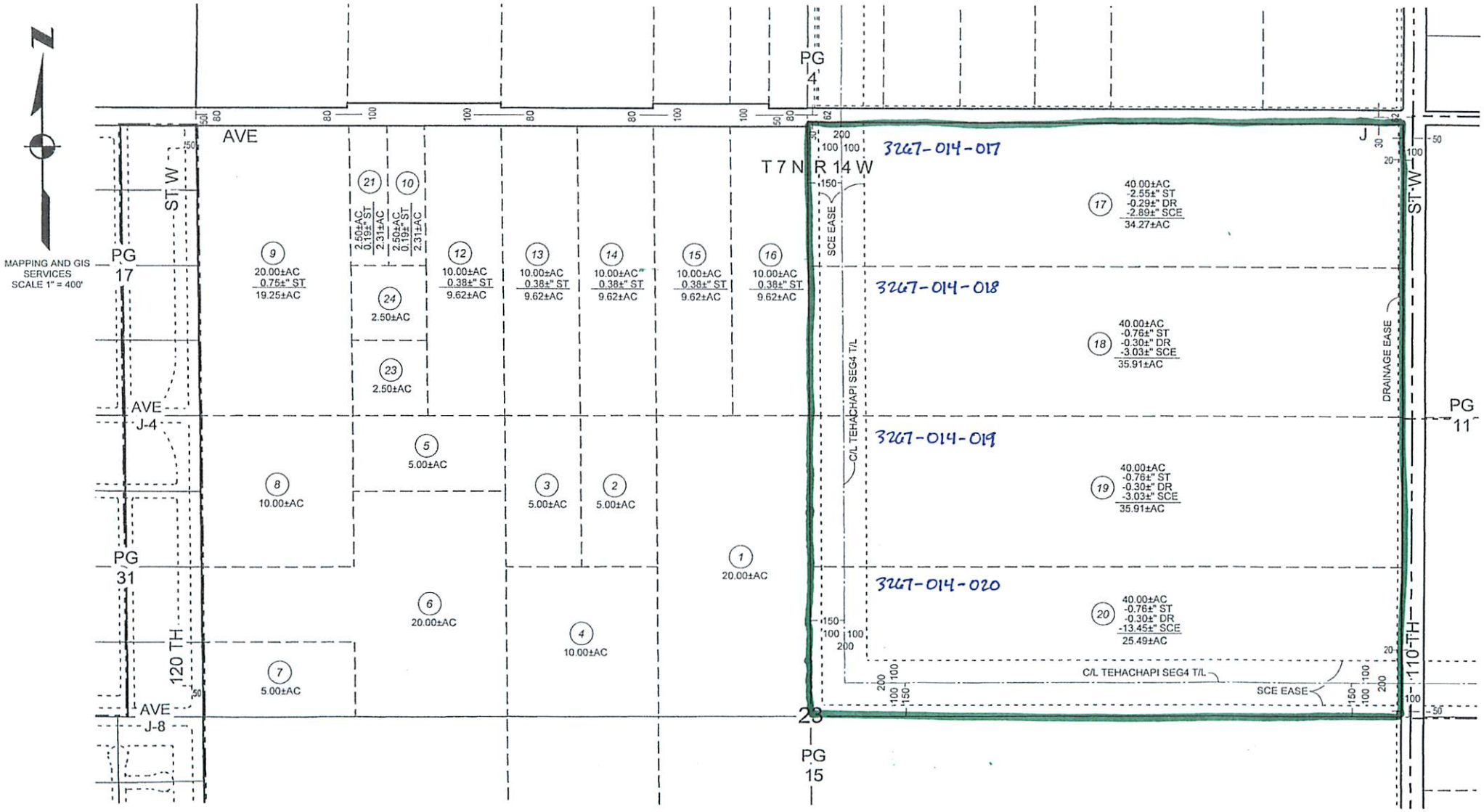
| 3267 | 4 SHEET | P. A. 3222-12 | TRA 9610 | REVISED 19810810229 2011071204-A1 | 2011072004-A1 | | | | SEARCH NO | | OFFICE OF THE ASSESSOR COUNTY OF LOS ANGELES COPYRIGHT © 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|

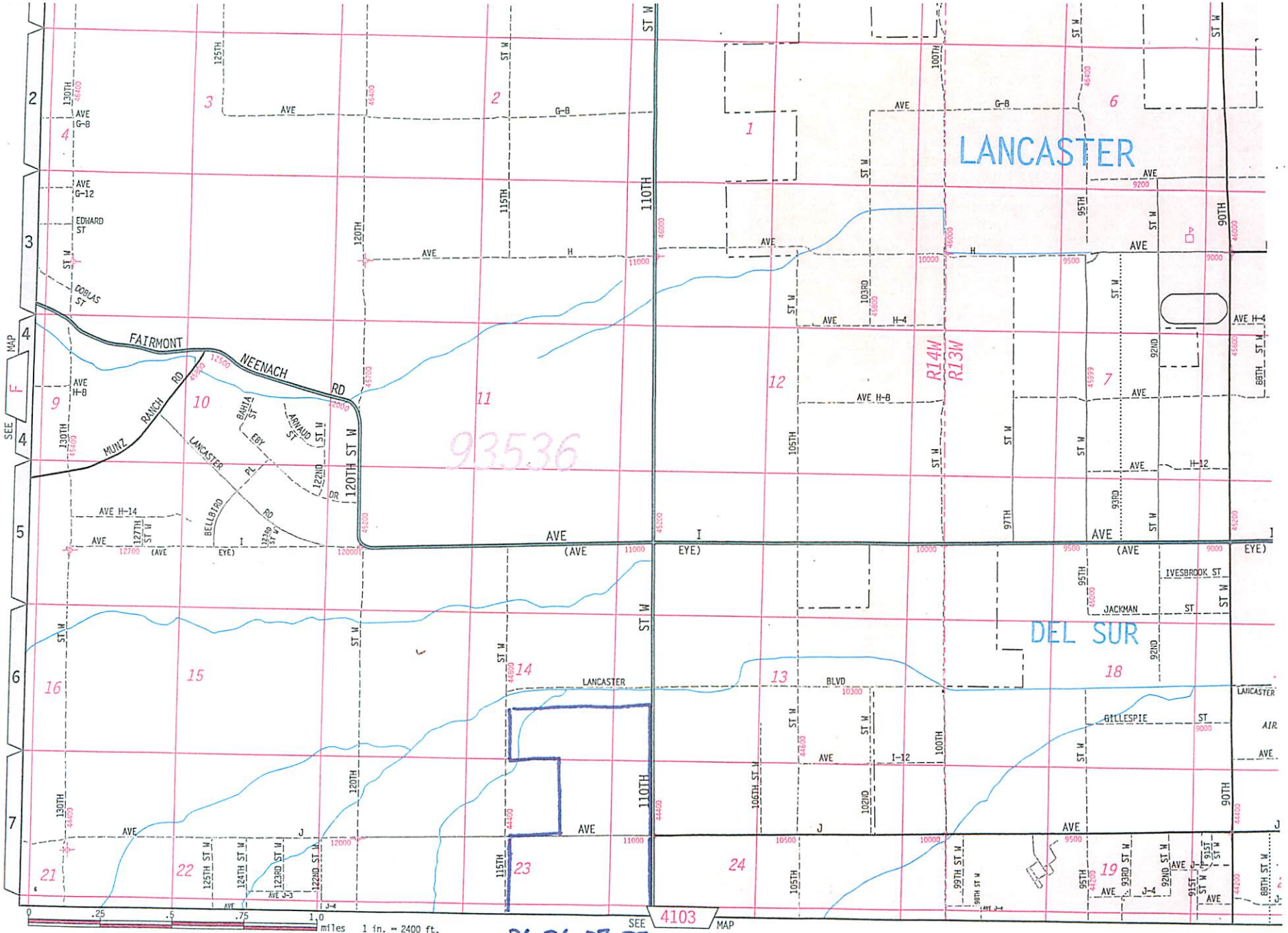
2012



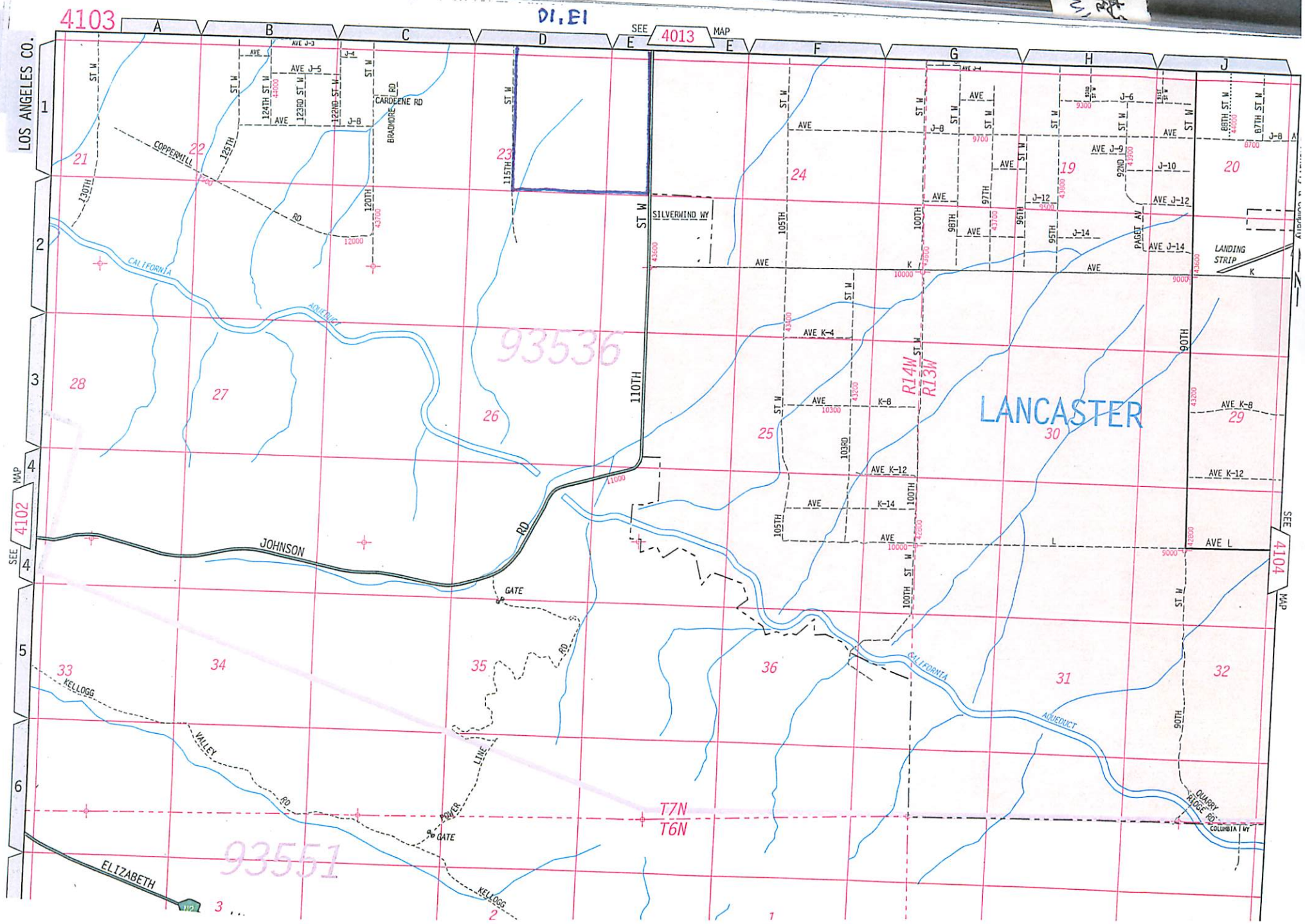
| 3267 | 14 SHEET | P. A. 3222-16 | TRA 9610 | REVISED 19790622225 2011072004-A1 | | | | | SEARCH NO | | OFFICE OF THE ASSESSOR COUNTY OF LOS ANGELES COPYRIGHT © 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|

2012




LANCASTER
DEL SUR
FAIRMONT
NEENACH RD
MUNZ RANCH RD
LANCASTER PL
BELLBIRD RD
BAHIA ST
ARNAUD ST
EBY
DOBLAS ST
EDWARD ST
IVESBROOK ST
JACKMAN ST
GILLESPIE ST
LANCASTER BLVD
120TH ST W
110TH ST W
R14W
R13W
93536
SEE MAP F
SEE MAP 4103
0 .25 .5 .75 1.0 miles 1 in. = 2400 ft.

D6, E6, D7, E7


4103
D1, E1
SEE MAP 4013
LOS ANGELES CO.
A
B
C
D
E
F
G
H
J
1
2
3
4
5
6
SEE MAP 4102
SEE MAP 4104
AVE J-3
AVE J-5
J-4
J-8
CARDEENE RD
BRADMORE RD
124TH ST W
123RD ST W
122ND ST W
ST W
COPPERMILL RD
125TH
130TH
120TH
115TH
110TH
CALIFORNIA AQUEDUCT
93536
SILVERWIND WY
105TH
100TH
98TH
97TH
96TH
95TH
92ND
PAGET AV
90TH
89TH ST W
87TH ST W
AVE K
AVE K-4
AVE K-8
AVE K-12
AVE K-14
AVE L
K-8
K-14
103RD
J-6
J-9
J-10
J-12
J-14
AVE J-12
AVE J-14
LANDING STRIP
R14W
R13W
LANCASTER
JOHNSON RD
GATE
KELLOGG VALLEY RD
POWER LINE RD
T7N
T6N
93551
ELIZABETH
QUARRY RIDGE RD
COLUMBIA WY
19
20
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36

## Gina Velarde

**From:** Kristin Stout
**Sent:** Tuesday, June 19, 2012 11:36 AM
**To:** Environmental
**Subject:** FW: NPMS Website - Pipelines, Phase I ESA Records Requests

I got a call from the State Fire Marshall and they are thinking about no longer responding to our requests for information on pipelines because they are only mandated to do this for school sites. She directed me to another website that has this information. See link below. She also asked for any input on how this would affect us if they no longer responded to our requests.

Please use this website and let me know if you have any questions or comments for Lisa.

Thank you.

**Kristin Stout**
Sr. Project Scientist
Temecula Office 951.252.8927

**Please consider the environment before printing this e-mail.**

**From:** Dowdy, Lisa [mailto:Lisa.Dowdy@fire.ca.gov]
**Sent:** Tuesday, June 19, 2012 11:30 AM
**To:** Kristin Stout
**Subject:** NPMS Website

Here you go. Please email me any other comments you may have about the Pipelines Safety Division eliminating our location request service.

https://www.npms.phmsa.dot.gov/

*Thank*´¨)
¸.·´¸.·*´¨) ¸.·*¨)
(¸.·´(¸.·´*you! *

Lisa

Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

June 6, 2012

Custodian of Records
Los Angeles County Public Health Investigations
5555 Ferguson Drive, Suite 120-04
Commerce, CA 90022
Fax (323) 728-0217
Phone (323) 890-7806

Subject: **File Review**

Leighton Consulting, Inc. is requesting information for the property located at:

- **West of 110th Street West, North and South of Avenue J, West of Lancaster in Unincorporated Portion of Los Angeles County, California**
- **Includes AIN (Assessor's ID Number, APN equivalent) numbers 3267-004-016 through -018, 3267-004-025 through -029, 3267-004-044 through -046, and 3267-014-017 through -020**

The property is located in an unincorporated portion of Los Angeles County west of Lancaster, California. We are requesting any information concerning industrial waste permits, hazardous waste/materials, underground storage tanks, leaking underground storage tanks cleanup, inspections, violations, or any other environmental sensitive spills, responses or concerns. Thank you for your assistance.

Sincerely,

LEIGHTON CONSULTING, INC.

Wallace Sconiers, Jr.
Senior Staff Geologist
661-705-3324 (phone)
949-250-1114 (fax)
wsconiers@leightongroup.com

6/7/12
Sorry! We need a specific address to process your request.
MP

# Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

June 6, 2012

Custodian of Records
Los Angeles County Public Health Investigations
5555 Ferguson Drive, Suite 120-04
Commerce, CA 90022
Fax (323) 728-0217
Phone (323) 890-7806

Subject: **File Review**

Leighton Consulting, Inc. is requesting information for the property located at:

- **West of 110th Street West, North and South of Avenue J, West of Lancaster in Unincorporated Portion of Los Angeles County, California**
- **Includes AIN (Assessor's ID Number, APN equivalent) numbers 3267-004-016 through -018, 3267-004-025 through -029, 3267-004-044 through -046, and 3267-014-017 through -020**

The property is located in an unincorporated portion of Los Angeles County west of Lancaster, California. We are requesting any information concerning industrial waste permits, hazardous waste/materials, underground storage tanks, leaking underground storage tanks cleanup, inspections, violations, or any other environmental sensitive spills, responses or concerns. Thank you for your assistance.

Sincerely,

LEIGHTON CONSULTING, INC.

Wallace Sconiers, Jr.
Senior Staff Geologist
661-705-3324 (phone)
949-250-1114 (fax)
wsconiers@leightongroup.com

Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

June 6, 2012

Los Angeles County Sanitation District
920 S. Alameda Street
Compton, CA 9022
Phone (310) 638-1161
Fax (310) 764-1934

Subject: **File Review**

Dear Records Review Department:

Leighton Consulting, Inc. is requesting information for the property located at:

- **West of 110th Street West, North and South of Avenue J, West of Lancaster in Unincorporated Portion of Los Angeles County, California**
- **Includes AIN (Assessor's ID Number, APN equivalent) numbers 3267-004-016 through -018, 3267-004-025 through -029, 3267-004-044 through -046, and 3267-014-017 through -020**

The property is located in an unincorporated portion of Los Angeles County west of Lancaster, California. We are requesting any information concerning industrial waste permits, hazardous waste/materials, underground storage tanks, leaking underground storage tanks cleanup, inspections, violations, or any other environmental sensitive spills, responses or concerns. Thank you for your assistance.

Sincerely,

LEIGHTON CONSULTING, INC.

Wallace Sconiers, Jr.
Senior Staff Geologist
661-705-3324 (phone)
949-250-1114 (fax)
wsconiers@leightongroup.com

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

California Regional Water Quality Control Board
Lahontan Region

# PUBLIC RECORDS ACCESS REQUEST FORM

## 1. Requestor Information

| | | | |
|---|---|---|---|
| **Requester Name:** Wallace Sconiers, Jr. | | | |
| **Organization:** Leighton Consulting, Inc. | | | |
| **Address:** 26074 Avenue Hall Suite #23 | | | |
| **City:** Santa Clarita | **State:** CA | **Zip Code:** 91355 | **E-Mail Address** wsconiers@leightongroup.com |
| **Daytime Phone:** 661-705-3324 | **Cell Phone:** 661-302-3169 | | **Fax** 949-250-1114 |

## 2. Request For Appointment to Inspect Regional Board Records

| | | | |
|---|---|---|---|
| **Date of Request** *(The date you submitted this form to the Regional Board)* | **Day and Appointment Time for Record Review (optional -** *You may specify the day of the week and appointment time that works best for you)* | Preferred *day of the week* | *Preferred Tine* |

### For Regional Board Office Use Only

**Request Form Received by:** **Phone** ☐ **Mail** ☐ **E-mail** ☐ **Fax** ☐ **Walk-In** ☐

| | | |
|---|---|---|
| **Date Form Received** _____ *RWQCB Staff Initials:* _____ | **Date Requester Contacted:** _____ *RWQCB Staff Initials:* _____ | **Date / Time of Appointment:**_____ *RWQCB Staff Initials:* _____ |
| **Date Copies Requested** _____ *RWQCB Staff Initials:* _____ | **Copy Fee :**_____ **Check #:** *RWQCB Staff Initials:* _____ | **Date Copies Mailed:** _____ *RWQCB Staff Initials:* _____ |

## 3. Description of Public Records Requested

### Record 1

| | | |
|---|---|---|
| **Agency/Owner Name (if known):** | | **Facility Name (if Known)** None |
| **Facility Address (if known):** | | |
| **City (if known):** West of Lancaster | **State:** CA | **Zip Code (if known):** |
| **Public Record Subject (if known):** | | |
| **Time Period (if known):** *Please specify either "Most current volume of record" or what portion of record in terms of approximate start date (month/year) and approximate end date (month/year) you are interested in.* Most current volume of record: ☐ or Start Date (mm/yyyy ): inception and End Date (mm/yyyy): present | | |

- Additional Information: ***If a particular document is required, it should be identified precisely, preferably by date and title. If you cannot identify a specific record clearly explain your needs:***
- No addresses listed, AINs (Assessor's ID Numbers, APN equivalent) are listed as follows:
- 3267-004-016 through -018,
- 3267-004-025 through -029,
- 3267-004-044 through -046, and
- 3267-014-017 through -020.
- Parcels are located west of 110th Street West and are north and south of Avenue J.
- Attached maps show extent of property.

| | | | |
|---|---|---|---|
| **For Regional Board Office Use Only** | **Records Located:** ☐ | **File Records Not Located:** ☐ | **Records Exempt From Public Review:** ☐ |

## Record 2

| | | | |
|---|---|---|---|
| **Agency/Owner Name (if known):** | | **Facility Name (if Known)** | |
| **Address (if known):** | | | |
| **City (if known):** | **State:** | **Zip Code (if known):** | |
| **File Record Subject (if known):** | | | |
| **Time Period (if known):** *Please specify either "Most current volume of record" or what portion of record in terms of approximate start date (month/year) and approximate end date ( month /year) you are interested in.*<br>Most current volume of record: ☐ or Start Date (mm/yyyy ): _____ and End Date (mm/yyyy): _____ | | | |
| ***If a particular document is required, it should be identified precisely, preferably by date and title. If you cannot identify a specific record clearly explain your needs:*** | | | |
| **For Regional Board Office Use Only** | **Records Located:** ☐ | **File Records Not Located:** ☐ | **Records Exempt From** ☐ **Public Review:** |

## Record 3

| | | | |
|---|---|---|---|
| **Agency/Owner Name (if known):** | | **Facility Name (if Known)** | |
| **Address (if known):** | | | |
| **City (if known):** | **State:** | **Zip Code (if known):** | |
| **File Record Subject (if known):** | | | |
| **Time Period (if known):** *Please specify either "Most current volume of record" or what portion of record in terms of approximate start date (month/year) and approximate end date (month/year) you are interested in.*<br>Most current volume of record: ☐ or Start Date (mm/yyyy ): _____ and End Date (mm/yyyy): _____ | | | |
| ***If a particular document is required, it should be identified precisely, preferably by date and title. If you cannot identify a specific record clearly explain your needs:*** | | | |
| **For Regional Board Office Use Only** | **Records Located:** ☐ | **File Records Not Located:** ☐ | **Records Exempt From** ☐ **Public Review:** |

## Record 4

| | | | |
|---|---|---|---|
| **Agency/Owner Name (if known):** | | **Facility Name (if Known)** | |
| **Address (if known):** | | | |
| **City (if known):** | **State:** | **Zip Code (if known):** | |
| **File Record Subject (if known):** | | | |
| **Time Period (if known):** *Please specify either "Most current volume of record" or what portion of record in terms of approximate start date (month/year) and approximate end date ( month /year) you are interested in.*<br>Most current volume of record: ☐ or Start Date (mm/yyyy ): _____ and End Date (mm/yyyy): _____ | | | |
| ***If a particular document is required, it should be identified precisely, preferably by date and title. If you cannot identify a specific record clearly explain your needs:*** | | | |
| **For Regional Board Office Use Only** | **Records Located:** ☐ | **File Records Not Located:** ☐ | **Records Exempt From** ☐ **Public Review:** |

## Record 5

| | | | |
|---|---|---|---|
| **Agency/ Owner Name (if known):** | | **Facility Name (if Known)** | |
| **Address (if known):** | | | |
| **City (if known):** | **State:** | **Zip Code (if known):** | |
| **File Record Subject (if known):** | | | |
| **Time Period (if known):** *Please specify either "Most current volume of record" or what portion of record in terms of approximate start date (month/year) and approximate end date ( month /year) you are interested in.*<br>Most current volume of record: ☐ or Start Date (mm/yyyy ): _____ and End Date (mm/yyyy): _____ | | | |
| ***If a particular document is required, it should be identified precisely, preferably by date and title. If you cannot identify a specific record clearly explain your needs:*** | | | |
| **For Regional Board Office Use Only** | **Records Located:** ☐ | **File Records Not Located:** ☐ | **Records Exempt From** ☐ **Public Review:** |

FILES CONTAINING RECORDS THAT ARE EXEMPT FROM PUBLIC DISCLOSURE

There may be some records in the Regional Board's files that are exempt from disclosure under the California Public Records Act ("PRA"). Our staff will inform you, by checking the appropriate category box shown below, if there are records in the files you have requested to review that are kept separately because they are not for public disclosure pursuant to one of the following provisions of the PRA:

- ❑ Attorney-Client Privileged Communication
- ❑ Preliminary notes or drafts not retained by the public agency during the normal course of business [PRA §6254(a)]
- ❑ Records pertaining to pending litigation [§6254(b)]
- ❑ Corporate financial records or proprietary information including trade secrets [§6254.15]
- ❑ Attorney Work Product – documents prepared at the request of or specifically for the use by an attorney representing the Regional Board or another state agency
- ❑ Other _____

RESPONSIBILITY STATEMENT:

I understand that I cannot remove documents from Regional Board files without the expressed permission and supervision of Regional Board staff. **I must leave any bags and/or briefcases outside in my vehicle or check them with the receptionist. I understand that files cannot be carried outside the file review area.** A pencil for making notes and paper clips for temporary referencing will be provided. Files must be returned in the same condition that I found them. Staff cannot provide file search services. I will provide a business card (if available) to be attached to this form.

| _____ | _____ | _____ |
|---|---|---|
| File Reviewer's Signature | Please Print Name | Date |

| _____ | _____ |
|---|---|
| Company/Agency Name and Address | Phone Number |

**NOTE**: A copy of this completed form, with any appropriate PRA-exempt category boxes checked off by staff, is to be provided to the File Reviewer.

***Please send to:***

**SOUTH LAKE TAHOE OFFICE**

**Regional Board Records Management Officer**
**Attn: Kathy Minsky**
**California Regional Water Quality Control Board, Lahontan Region**
**2501 Lake Tahoe Blvd.**
**South Lake Tahoe, CA 96150**

**Phone (530) 542-5400**
**Fax (530) 544-2271**
**email: SLT_Records@waterboards.ca.gov**

**or**

**VICTORVILLE OFFICE**

**Regional Board Records Management Officer**
**Attn: Robin Coale**
**California Regional Water Quality Control Board, Lahontan Region**
**14440 Civic Dr., Suite 200**
**Victorville, CA 92392**

**Phone: (760) 241-6583**
**Fax: (760) 241-7308**
**email: VVL_Records@waterboards.ca.gov**

## Gina Velarde

**From:** Robin Coale <RCoale@waterboards.ca.gov>
**Sent:** Friday, June 08, 2012 10:19 AM
**To:** Wallace Sconiers
**Subject:** Re: PRA Request Form

Mr. Sconiers,

I received your PRA request for several APN numbers, west of Lancaster on June 7, 2012.

We don't reference our files by APN number. I would need a facility name, address or WDID number.
From the map, it looks as tho it is vacant property, so we may not have any records for it.
Let me know if I can help you further.

Regards,

Robin Coale

Office Technician
760/ 241-6467
Fax: 760/ 241-7308
rcoale@waterboards.ca.gov

>>> Wallace Sconiers <wsconiers@leightongroup.com> 6/7/2012 9:39 AM >>>
Ms. Coale,

Attached is the PRA request form that was to accompany an earlier fax our company sent between yesterday afternoon and this morning. Please feel free to contact me at this email or at the number(s) listed below if you have any questions or need additional information. Thank you.

**Wallace Sconiers, Jr.**
**Senior Staff Geologist**
**26074 Avenue Hall, Suite 23**
**Santa Clarita, CA 91355**
**661-302-3169 Cell**
**661-705-3324 Office**

**Leighton**
**Solutions You Can Build On**

**The information accompanying this email transmission may contain confidential or legally privileged information that is intended only for the use of the individual or entity named in this message. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution or reliance upon the contents of this email is strictly prohibited. If you receive this email in error, please immediately notify the sender by reply email and destroy all copies of the communication and any attachments.**

June 6, 2012

Ms. Julie Johnson
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630
VIA FACSIMILE: (714) 484-5318

Subject: **File Review, Project Number 603455-002**

Dear Ms. Johnson:

Leighton Consulting, Inc. is requesting information for the property located at:

- **West of 110th Street West, North and South of Avenue J, West of Lancaster in Unincorporated Portion of Los Angeles County, California**
- **Includes AIN (Assessor's ID Number, APN equivalent) numbers 3267-004-016 through -018, 3267-004-025 through -029, 3267-004-044 through -046, and 3267-014-017 through -020**

The property is located in an unincorporated portion of Los Angeles County west of Lancaster, California. We are requesting information concerning hazardous waste/materials, above and below ground storage tanks, leaking underground storage tanks, hazardous waste cleanups, inspections, violations, or any other environmental sensitive spills, responses or concerns. Thank you for your assistance.

Sincerely,

LEIGHTON CONSULTING, INC.

Wallace Sconiers, Jr.
Senior Staff Geologist
661-705-3324 (phone)
wsconiers@leightongroup.com

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

PR406071 28

June 6, 2012

Ms. Julie Johnson
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630
VIA FACSIMILE: (714) 484-5318

NO

Subject: **File Review, Project Number 603455-002**

Dear Ms. Johnson:

Leighton Consulting, Inc. is requesting information for the property located at:

- **West of 110th Street West, North and South of Avenue J, West of Lancaster in Unincorporated Portion of Los Angeles County, California**
- **Includes AIN (Assessor's ID Number, APN equivalent) numbers 3267-004-016 through -018, 3267-004-025 through -029, 3267-004-044 through -046, and 3267-014-017 through -020**

The property is located in an unincorporated portion of Los Angeles County west of Lancaster, California. We are requesting information concerning hazardous waste/materials, above and below ground storage tanks, leaking underground storage tanks, hazardous waste cleanups, inspections, violations, or any other environmental sensitive spills, responses or concerns. Thank you for your assistance.

Sincerely,

LEIGHTON CONSULTING, INC.

Wallace Sconiers, Jr.
Senior Staff Geologist
661-705-3324 (phone)
wsconiers@leightongroup.com

DTSC
JUN 07 2012
CYPRESS

Matthew Rodriquez
Acting Secretary for
Environmental Protection

# Department of Toxic Substances Control

Deborah O. Raphael, Director
5796 Corporate Avenue
Cypress, California 90630

Edmund G. Brown Jr.
Governor

June 8, 2012

Wallace Sconiers, Jr.
LEIGHTON CONSULTING, INC.
26074 Avenue Hall, #23
Santa Clarita, CA 91355

SEE ATTACHED SHEET
PR#40607128

Dear Mr. Wallace:

The Department of Toxic Substances Control has received your letter to review records under the Public Records Act.

After a thorough review of our files we have found no such records exist at this office pertaining to the facility referenced above.

If you have any questions, or would like further information regarding your request, please contact our Regional Records Coordinator at (714) 484-5337.

We would like to inform you about Envirostor, a database that provides information and documents on over 5,000 DTSC cleanup sites. EnviroStor can be accessed at: http://www.envirostor.dtsc.ca.gov/public. Also, a computer is available in the Central Files of each DTSC Regional Office for use by community members to view EnviroStor.

Sincerely,

Julie Johnson
Regional Records Coordinator

Printed on Recycled Paper

June 6, 2012

Ms. Jone Barrio
Department of Toxic Substances Control
9211 Oakdale Avenue
Chatsworth, CA 91311
VIA FACSIMILE: (818) 717-6526

Subject: **File Review, Project Number 603455-002**

Dear Ms. Barrio:

Leighton Consulting, Inc. is requesting information for the property located at:

- **West of 110th Street West, North and South of Avenue J, West of Lancaster in Unincorporated Portion of Los Angeles County, California**
- **Includes AIN (Assessor's ID Number, APN equivalent) numbers 3267-004-016 through -018, 3267-004-025 through -029, 3267-004-044 through -046, and 3267-014-017 through -020**

The property is located in an unincorporated portion of Los Angeles County west of Lancaster, California. We are requesting information concerning hazardous waste/materials, above and below ground storage tanks, leaking underground storage tanks, hazardous waste cleanups, inspections, violations, or any other environmental sensitive spills, responses or concerns. Thank you for your assistance.

Sincerely,

LEIGHTON CONSULTING, INC.

Wallace Sconiers, Jr.
Senior Staff Geologist
661-705-3324 (phone)
wsconiers@leightongroup.com

Linda S. Adams
Secretary for
Environmental Protection

# Department of Toxic Substances Control

Deborah O. Raphael, Director
9211 Oakdale Avenue
Chatsworth, California 91311

Arnold Schwarzenegger
Governor

June 12, 2012

Mr. Wallace Sconiers, Jr.
Senior Staff Geologist
Leighton Consulting, Inc.
26074 Avenue Hall, Suite 23
Santa Clarita, CA 91355

VARIOUS SITES
PR30608122

Dear Mr. Sconiers:

We have received your Public Records Act Request for records from the Department of Toxic Substances Control.

After a thorough review of our files we have found that no such records exist at this office pertaining to the sites/facilities referenced below.

- West of 110th Street, North & South of Avenue J, West of Lancaster in Unincorporated Portion of Los Angeles County, California
- APN: 3267-004-016 through -018
- APN: 3267-004-025 through -029
- APN: 3267-004-044 through -046
- APN: 3267-014-017 through -020

We would like to inform you about Envirostor, a database that provides information and documents on over 5,000 DTSC cleanup sites. EnviroStor can be accessed at: http://www.envirostor.dtsc.ca.gov/public. Also, a computer is available in the Central Files of each DTSC Regional Office for use by community members to view EnviroStor.

Printed on Recycled Paper

If you have any questions, would like further information regarding your request or would like an appointment to visit Chatsworth Central Files, please contact me at (818) 717-6522.

Sincerely,

Glenn Castillo /bh
Regional Records Coordinator

Linda S. Adams
Secretary for
Environmental Protection

# Department of Toxic Substances Control

Deborah O. Raphael, Director
9211 Oakdale Avenue
Chatsworth, California 91311

Arnold Schwarzenegger
Governor

June 12, 2012

Mr. Wallace Sconiers, Jr.
Senior Staff Geologist
Leighton Consulting, Inc.
26074 Avenue Hall, Suite 23
Santa Clarita, CA 91355

VARIOUS SITES
PR30608122

Dear Mr. Sconiers:

We have received your Public Records Act Request for records from the Department of Toxic Substances Control.

After a thorough review of our files we have found that no such records exist at this office pertaining to the sites/facilities referenced below.

- West of 110th Street, North & South of Avenue J, West of Lancaster in Unincorporated Portion of Los Angeles County, California
- APN: 3267-004-016 through -018
- APN: 3267-004-025 through -029
- APN: 3267-004-044 through -046
- APN: 3267-014-017 through -020

We would like to inform you about Envirostor, a database that provides information and documents on over 5,000 DTSC cleanup sites. EnviroStor can be accessed at: http://www.envirostor.dtsc.ca.gov/public. Also, a computer is available in the Central Files of each DTSC Regional Office for use by community members to view EnviroStor.

Printed on Recycled Paper

If you have any questions, would like further information regarding your request or would like an appointment to visit Chatsworth Central Files, please contact me at (818) 717-6522.

Sincerely,

Glenn Castillo /bh
Regional Records Coordinator

# APPENDIX F

# Appendix F

## Historical Research Documentation

# GeoPlus Oil & Gas Report

http://www.geo-search.net/QuickMap/index.htm?DataID=Standard0000042897

*Click on link above to access the map and satellite view of current property*

*Target Property:*

***Canadian Solar***
***West Avenue J***
***Los Angeles County, California 93536***

*Prepared For:*

***Leighton Consulting***

***Order #: 18317***
***Job #: 42897***
***Project #: 603455-002***
***PO #: 603455-002RLO***
***Date: 06/06/2012***

***3006 Bee Caves Rd, Suite A-230 · Austin, Texas 78746 · phone: 888-396-0042 · fax: 512-472-9967 · www.geo-search.net***

## *TARGET PROPERTY SUMMARY*

***Canadian Solar***
***West Avenue J***
***Los Angeles County, California 93536***

*USGS Quadrangle:* ***Del Sur, CA***
*Target Property Geometry:* ***Area***

*Target Property Longitude(s)/Latitude(s):*
***(-118.324481, 34.695653), (-118.333125, 34.695546), (-118.333157, 34.692820), (-118.329843, 34.692847), (-118.329745, 34.689159), (-118.333222, 34.689106), (-118.333092, 34.681864), (-118.324383, 34.681918), (-118.324481, 34.695653)***

*County/Parish Covered:*
***Los Angeles (CA)***

*Zipcode(s) Covered:*
***Lancaster CA: 93536***

*State(s) Covered:*
***CA***

****Target property is located in Radon Zone 2.***
***Zone 2 areas have a predicted average indoor radon screening level between 2 and 4 pCi/L (picocuries per liter).***

Disclaimer - The information provided in this report was obtained from a variety of public sources. GeoSearch cannot ensure and makes no warranty or representation as to the accuracy, reliability, quality, errors occurring from data conversion or the customer's interpretation of this report. This report was made by GeoSearch for exclusive use by its clients only. Therefore, this report may not contain sufficient information for other purposes or parties. GeoSearch and its partners, employees, officers And independent contractors cannot be held liable For actual, incidental, consequential, special or exemplary damages suffered by a customer resulting directly or indirectly from any information provided by GeoSearch.

## *DATABASE FINDINGS SUMMARY*

| DATABASE | ACRONYM | LOCA-TABLE | UNLOCA-TABLE | SEARCH RADIUS (miles) |
|---|---|---|---|---|
| **STATE (CA)** | | | | |
| OIL AND GAS | OG | 1 | 0 | 0.5000 |
| **SUB-TOTAL** | | **1** | **0** | |
| **TOTAL** | | **1** | **0** | |

GeoSearch *www.geo-search.net · phone: 888-396-0042 · fax: 512-472-9967*

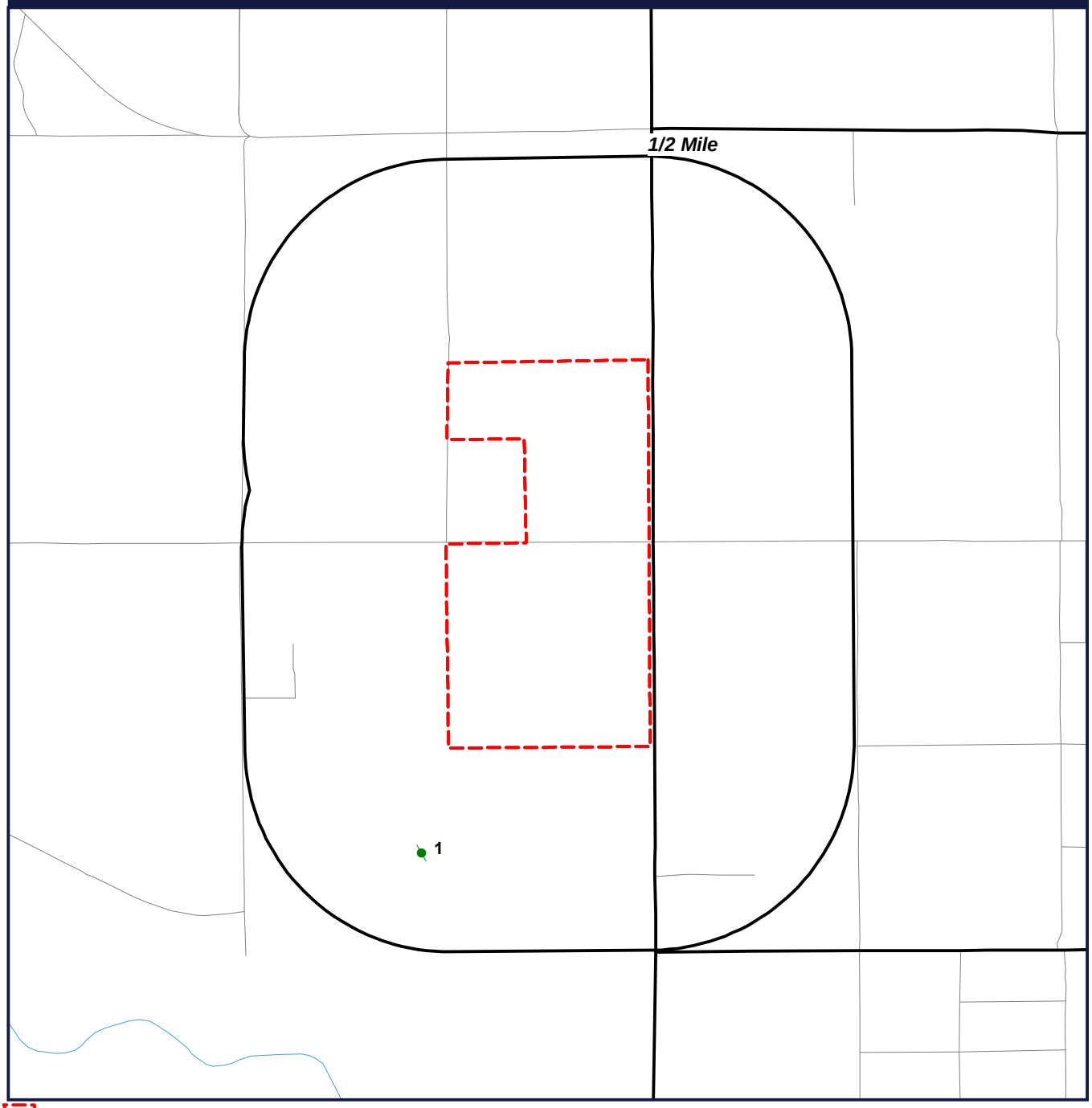
## *LOCATABLE DATABASE FINDINGS*

| ACRONYM | Target Property | SEARCH RADIUS (miles) | 1/8 Mile (> TP) | 1/4 Mile (> 1/8) | 1/2 Mile (> 1/4) | 1 Mile (> 1/2) | > 1 Mile | Total |
|---|---|---|---|---|---|---|---|---|
| **STATE (CA)** | | | | | | | | |
| OG | | .5000 | 0 | 0 | 1 | 0 | NS | 1 |
| **SUB-TOTAL** | | | **0** | **0** | **1** | **0** | **0** | **1** |
| **TOTAL** | | | **0** | **0** | **1** | **0** | **0** | **1** |

**NOTES:**
**NS = NO SEARCH REQUESTED BY CUSTOMER**

GeoSearch *www.geo-search.net · phone: 888-396-0042 · fax: 512-472-9967*

# OIL / GAS WELL MAP




Target Property (TP)

**Well Location**

***Canadian Solar***
***West Avenue J***
***Los Angeles County, California***
***93536***

N
W E
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0' 1000' 2000' 3000'
SCALE: 1" = 2000'

# REPORT SUMMARY OF LOCATABLE SITES

| MAP ID# | DATABASE NAME | SITE ID# | DISTANCE FROM SITE | SITE NAME | ADDRESS | CITY, ZIP CODE | PAGE # |
|---|---|---|---|---|---|---|---|
| 1 | OG | 03705294 | 0.260 SW | | | | -- |

# OIL & GAS WELL REPORT

| MAP ID | API # | WELL # | OPERATOR NAME | LEASE NUMBER | SPUD DATE | T.D. | WELL TYPE | STR | LATITUDE | LONGITUDE |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 03705294 | 57-23 | C. W. COLGROVE | SCHWANDT | NR | NR | PLUGGED AND ABANDONED DRY HOLE | T07N S23 | 34.6782680 | -118.33421500 |

**OG** Oil and Gas

**VERSION DATE: 12/2011**

This oil, gas, and geothermal well information database is maintained by the California Department of Conservation's Division of Oil, Gas, and Geothermal Resources. The database information may change without notice. The Department of Conservation makes no warranties, whether expressed or implied, as to the suitability of the product for any particular purpose. Any use of this information is at the user's own risk.

# Historical Aerials for GeoPreferred & GeoVantage

http://www.geo-search.net/QuickMap/index.htm?DataID=Standard0000042896

*Click on link above to access the map and satellite view of current property*

*Target Property:*

***Canadian Solar***
***West Avenue J***
***Los Angeles County, California 93536***

*Prepared For:*

***Leighton Consulting***

***Order #: 18317***
***Job #: 42896***
***Project #: 603455-002***
***PO #: 603455-002RLO***
***Date: 06/06/2012***

***3006 Bee Caves Rd, Suite A-230 · Austin, Texas 78746 · phone: 888-396-0042 · fax: 512-472-9967 · www.geo-search.net***

## *TARGET PROPERTY SUMMARY*

***Canadian Solar***
***West Avenue J***
***Los Angeles County, California 93536***

*USGS Quadrangle:* ***Del Sur, CA***
*Target Property Geometry:* ***Point***

*Target Property Longitude(s)/Latitude(s):*
***(-118.329014, 34.688625)***

*County/Parish Covered:*
***Los Angeles (CA)***

*Zipcode(s) Covered:*
***Lancaster CA: 93536***

*State(s) Covered:*
***CA***

****Target property is located in Radon Zone 2.***
***Zone 2 areas have a predicted average indoor radon screening level between 2 and 4 pCi/L (picocuries per liter).***

Disclaimer - The information provided in this report was obtained from a variety of public sources. GeoSearch cannot ensure and makes no warranty or representation as to the accuracy, reliability, quality, errors occurring from data conversion or the customer's interpretation of this report. This report was made by GeoSearch for exclusive use by its clients only. Therefore, this report may not contain sufficient information for other purposes or parties. GeoSearch and its partners, employees, officers And independent contractors cannot be held liable For actual, incidental, consequential, special or exemplary damages suffered by a customer resulting directly or indirectly from any information provided by GeoSearch.

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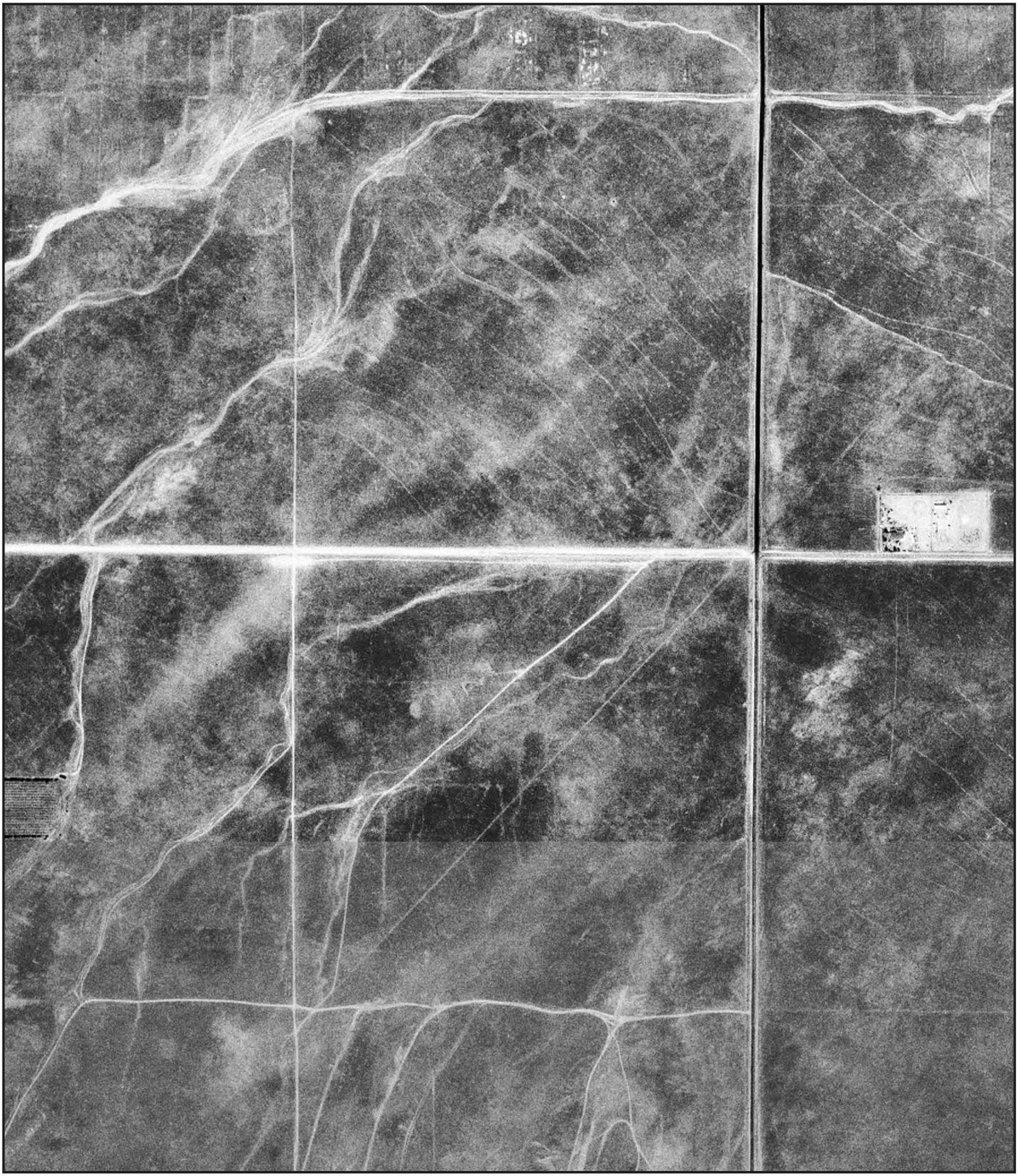
JOB #: 42896 - 6/6/2012

*SITE: CANADIAN SOLAR*
*SOURCE: DIGITAL GLOBE*
*DATE: 6-18-09*
*COUNTY: LOS ANGELES, CA*
*SCALE: 1" = 700'*

GeoSearch



N
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JOB #: 42896 - 6/6/2012

***SITE:*** ***CANADIAN SOLAR***
***SOURCE:*** ***USGS***
***DATE:*** ***1995***
***COUNTY:*** ***LOS ANGELES, CA***
***SCALE:*** ***1" = 700'***

GeoSearch

N
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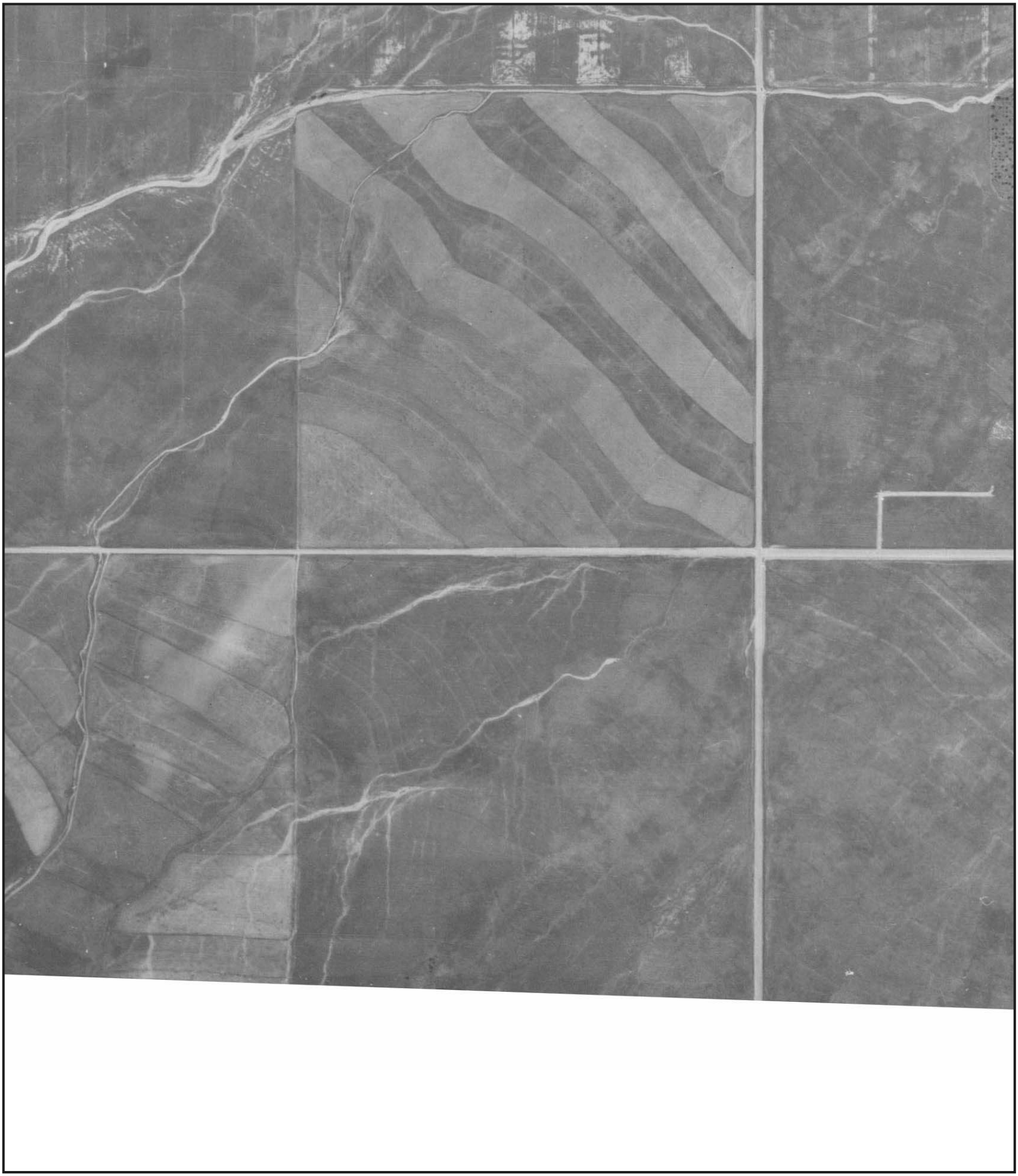
JOB #: 42896 - 6/6/2012

***SITE:*** ***CANADIAN SOLAR***
***SOURCE:*** ***USGS***
***DATE:*** ***8-26-89***
***COUNTY:*** ***LOS ANGELES, CA***
***SCALE:*** ***1" = 700'***

GeoSearch



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JOB #: 42896 - 6/6/2012

***SITE:*** ***CANADIAN SOLAR***
***SOURCE:*** ***TELEDYNE***
***DATE:*** ***4-4-68***
***COUNTY:*** ***LOS ANGELES, CA***
***SCALE:*** ***1" = 700'***

GeoSearch

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JOB #: 42896 - 6/6/2012

***SITE:*** ***CANADIAN SOLAR***
***SOURCE:*** ***ASCS***
***DATE:*** ***6-7-54***
***COUNTY:*** ***LOS ANGELES, CA***
***SCALE:*** ***1" = 700'***

GeoSearch

# Historical Topographic Maps

http://www.geo-search.net/QuickMap/index.htm?DataID=Standard0000042893

*Click on link above to access the map and satellite view of current property*

*Target Property:*

***Canadian Solar***
***West Avenue J***
***Los Angeles County, California 93536***

*Prepared For:*

***Leighton Consulting***

***Order #: 18317***
***Job #: 42893***
***Project #: 603455-002***
***PO #: 603455-002RLO***
***Date: 06/06/2012***

***3006 Bee Caves Rd, Suite A-230 · Austin, Texas 78746 · phone: 888-396-0042 · fax: 512-472-9967 · www.geo-search.net***

## *TARGET PROPERTY SUMMARY*

***Canadian Solar***
***West Avenue J***
***Los Angeles County, California 93536***

*USGS Quadrangle:* ***Del Sur, CA***
*Target Property Geometry:* ***Area***

*Target Property Longitude(s)/Latitude(s):*
***(-118.324481, 34.695653), (-118.333125, 34.695546), (-118.333157, 34.692820), (-118.329843, 34.692847), (-118.329745, 34.689159), (-118.333222, 34.689106), (-118.333092, 34.681864), (-118.324383, 34.681918), (-118.324481, 34.695653)***

*County/Parish Covered:*
***Los Angeles (CA)***

*Zipcode(s) Covered:*
***Lancaster CA: 93536***

*State(s) Covered:*
***CA***

****Target property is located in Radon Zone 2.***
***Zone 2 areas have a predicted average indoor radon screening level between 2 and 4 pCi/L (picocuries per liter).***

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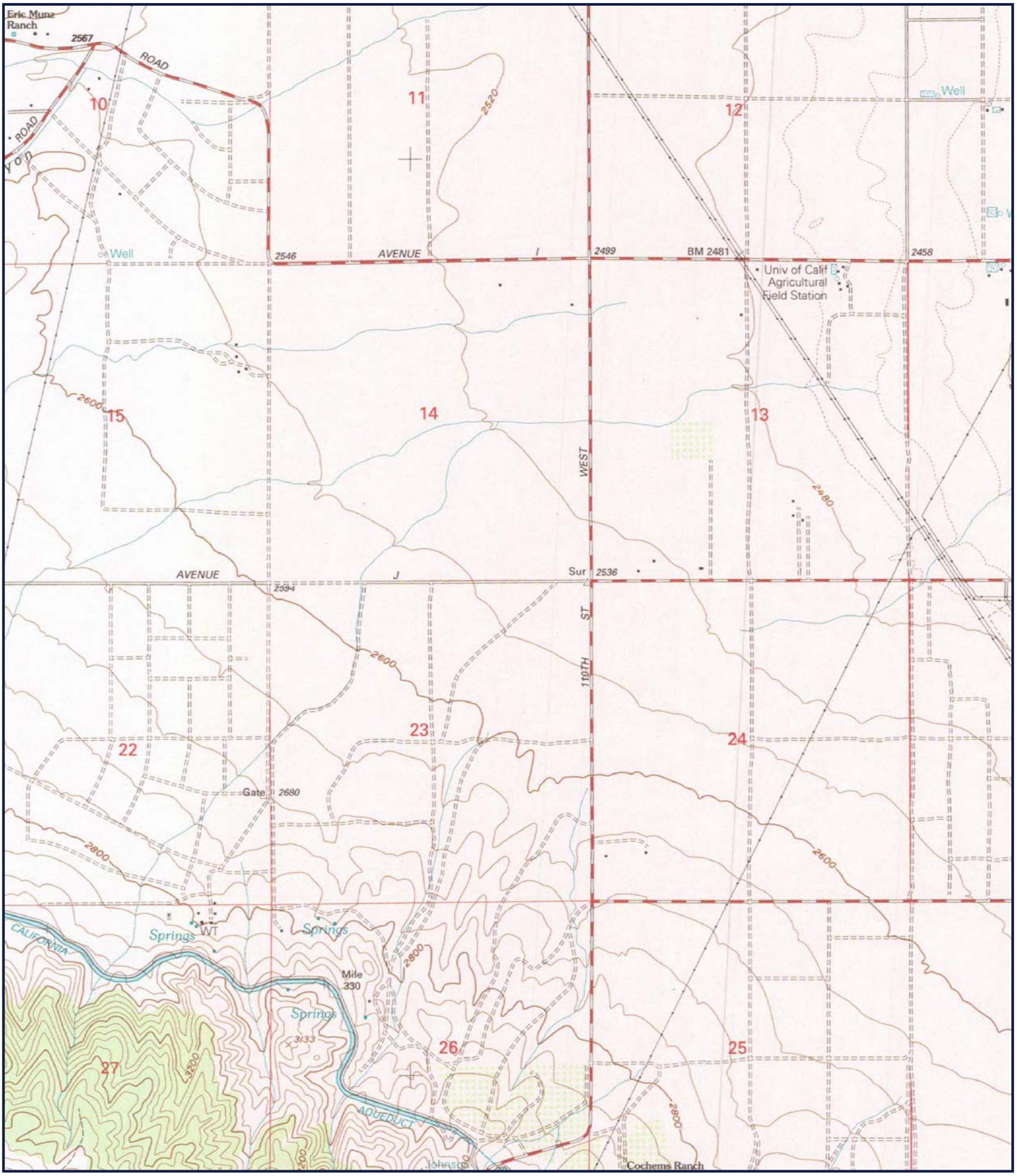


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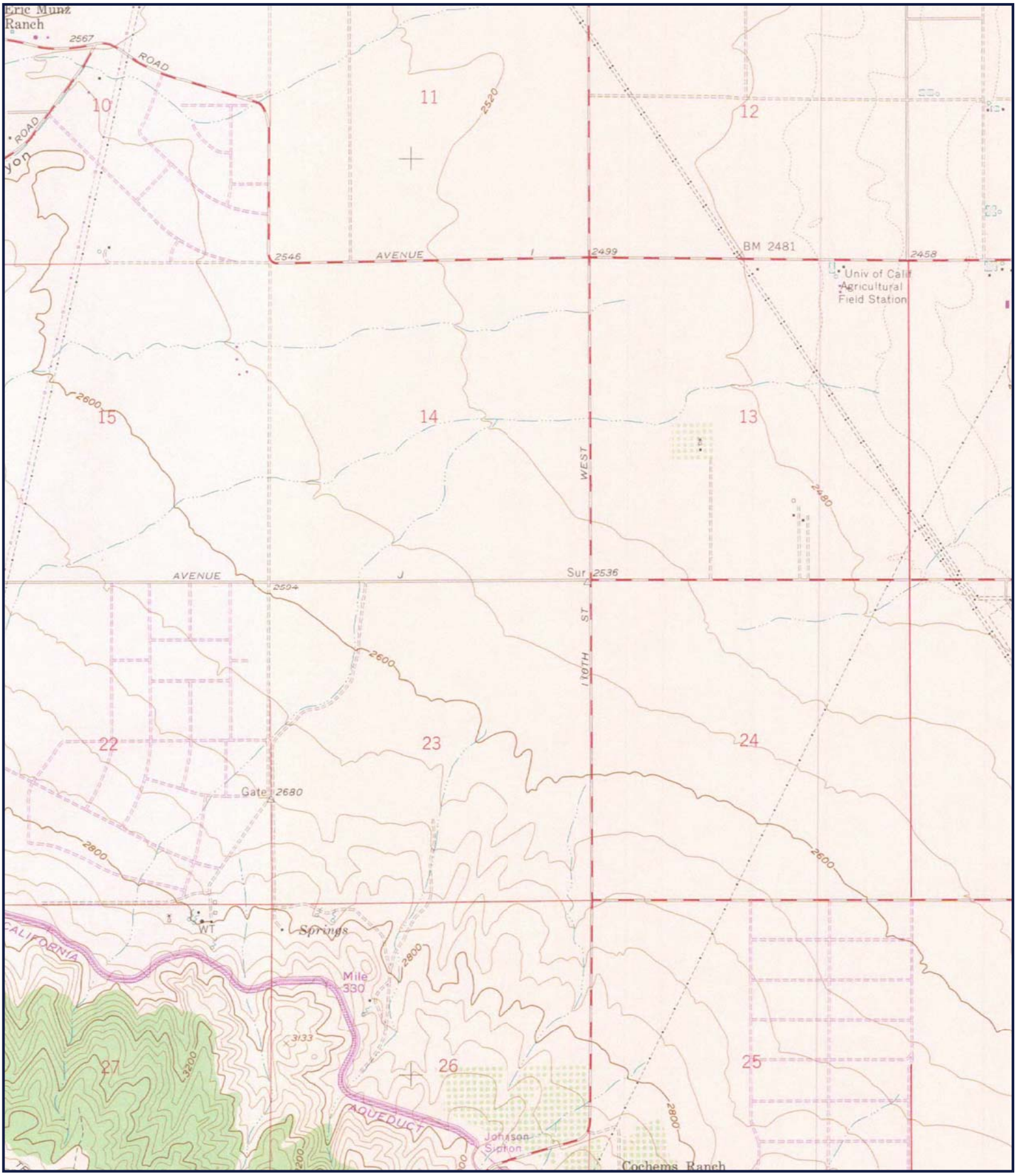
JOB #: 42893 - 6/6/2012

***SITE: CANADIAN SOLAR***
***QUAD: DEL SUR, CA***
***DATE: 1995***
***SCALE: 1 : 24,000***

GeoSearch




N
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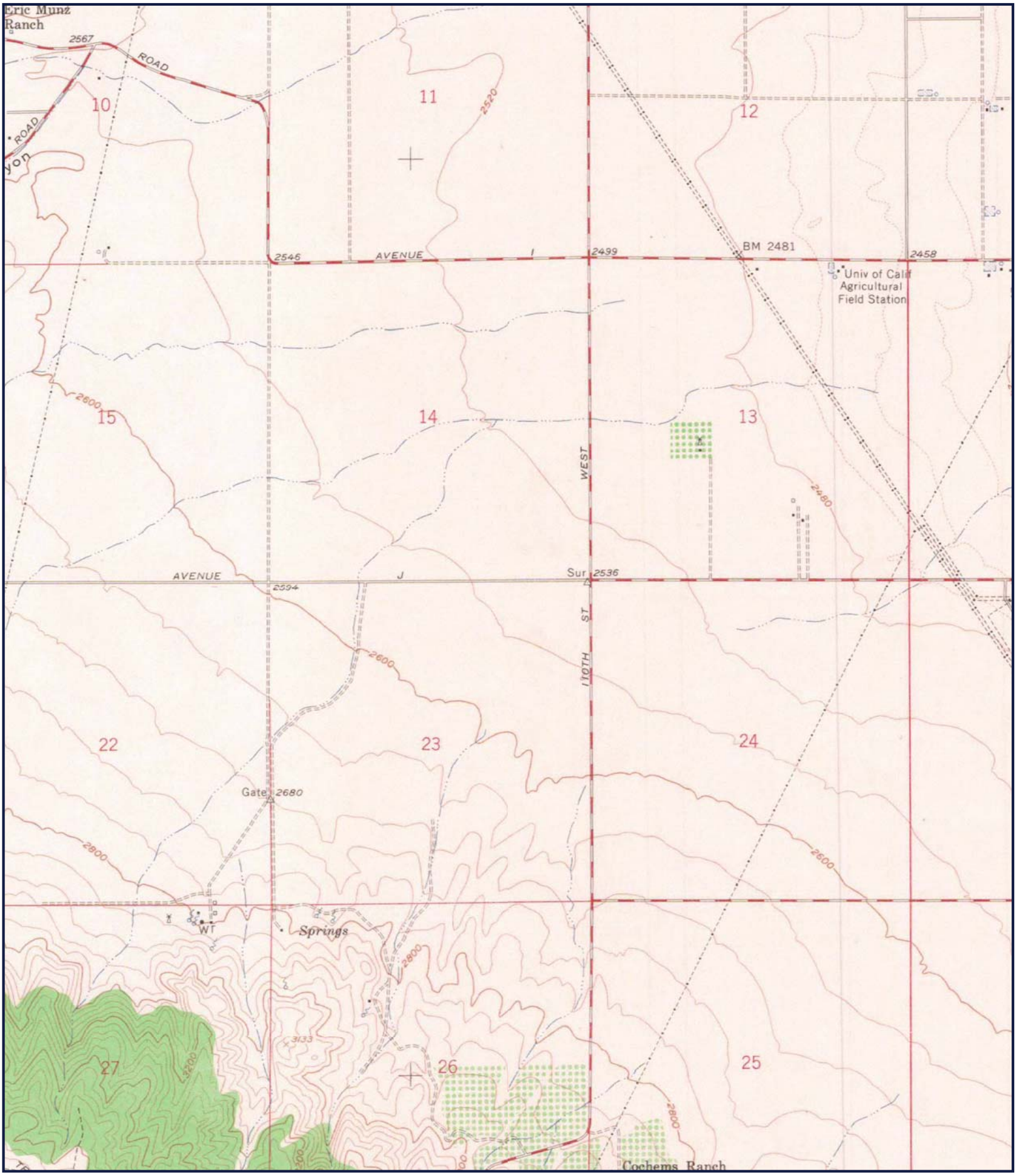
JOB #: 42893 - 6/6/2012

***SITE: CANADIAN SOLAR***
***QUAD: DEL SUR, CA***
***DATE: 1958 PHOTOREVISED 1974***
***SCALE: 1 : 24,000***

GeoSearch

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JOB #: 42893 - 6/6/2012

***SITE: CANADIAN SOLAR***
***QUAD: DEL SUR, CA***
***DATE: 1958***
***SCALE: 1 : 24,000***

GeoSearch

GeoSearch
On time. On target. In touch.™

**Date:** June 6, 2012

**GS Job Number:** 18317

**Client Contact:** W. Sconiers

**Client Information:** Leighton & Associates
10532 Acacia St Suite B-6
Rancho Cucamonga, CA 91786

**Project Number:** 603455-002

**Site Information:** Canadian Solar

The collection of Sanborn fire insurance maps has been reviewed according to the site information listed above. Based on the information provided, no coverage is available.

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GeoSearch
On time. On target. In touch.™

June 8, 2012

Leighton Consulting
Attn: Zach Freeman

RE: CITY DIRECTORY SEARCH

Dear Mr. Freeman,

GeoSearch conducted a city directory search for target property on West Avenue J, in Lancaster, CA, 93536. The directories that were available for the city of Lancaster were searched; however, the researched directories did not canvass out far enough for coverage to include the target property. Research was conducted at the Library of Congress. If you have any questions please do not hesitate to call at (512) 472-9966.

Sincerely,

Amy Wearden

*3006 Bee Caves Rd, Suite A-230 · Austin, Texas 78746 · phone: 1-866-396-0042 · fax: 512-472-9967*

# APPENDIX G

# Appendix G

## ASFE Geoenvironmental Report

# Important Information About Your Geoenvironmental Report

Geoenvironmental studies are commissioned to gain information about environmental conditions on and beneath the surface of a site. The more comprehensive the study, the more reliable the assessment is likely to be. But remember: Any such assessment is to a greater or lesser extent based on professional opinions about conditions that cannot be seen or tested. Accordingly, no matter how many data are developed, risks created by unanticipated conditions will always remain. *Have realistic expectations.* Work with your geoenvironmental consultant to manage known and unknown risks. Part of that process should already have been accomplished, through the risk allocation provisions you and your geoenvironmental professional discussed and included in your contract's general terms and conditions. This document is intended to explain some of the concepts that may be included in your agreement, and to pass along information and suggestions to help you manage your risk.

## Beware of Change; Keep Your Geoenvironmental Professional Advised

The design of a geoenvironmental study considers a variety of factors that are subject to change. Changes can undermine the applicability of a report's findings, conclusions, and recommendations. *Advise your geoenvironmental professional about any changes you become aware of.* Geoenvironmental professionals cannot accept responsibility or liability for problems that occur because a report fails to consider conditions that did not exist when the study was designed. Ask your geoenvironmental professional about the types of changes you should be particularly alert to. Some of the most common include:

- modification of the proposed development or ownership group,
- sale or other property transfer,
- replacement of or additions to the financing entity,
- amendment of existing regulations or introduction of new ones, or
- changes in the use or condition of adjacent property.

Should you become aware of any change, *do not rely on a geoenvironmental report.* Advise your geoenvironmental professional immediately; follow the professional's advice.

## Recognize the Impact of Time

A geoenvironmental professional's findings, recommendations, and conclusions cannot remain valid indefinitely. The more time that passes, the more likely it is that important latent changes will occur. *Do not rely on a geoenvironmental report if too much time has elapsed since it was completed.* Ask your environmental professional to define "too much time." In the case of Phase I Environmental Site Assessments (ESAs), for example, more than 180 days after submission is generally considered "too much."

## Prepare To Deal with Unanticipated Conditions

The findings, recommendations, and conclusions of a Phase I ESA report typically are based on a review of historical information, interviews, a site "walkover," and other forms of noninvasive research. When site subsurface conditions are not sampled in any way, the risk of unanticipated conditions is higher than it would otherwise be.

While borings, installation of monitoring wells, and similar invasive test methods can help reduce the risk of unanticipated conditions, *do not overvalue the effectiveness of testing.* Testing provides information about actual conditions only at the precise locations where samples are taken, and only when they are taken. Your geoenvironmental professional has applied that specific information to develop a general opinion about environmental conditions. *Actual conditions in areas not sampled may differ (sometimes sharply) from those predicted in a report.* For example, a site may contain an unregistered underground storage tank that shows no surface trace of its existence. *Even conditions in areas that were tested can change,* sometimes suddenly, due to any number of events, not the least of which include occurrences at

adjacent sites. Recognize, too, that *even some conditions in tested areas may go undiscovered,* because the tests or analytical methods used were designed to detect only those conditions assumed to exist.

Manage your risks by retaining your geoenvironmental professional to work with you as the project proceeds. Establish a contingency fund or other means to enable your geoenvironmental professional to respond rapidly, in order to limit the impact of unforeseen conditions. And to help prevent any misunderstanding, identify those empowered to authorize changes and the administrative procedures that should be followed.

## Do Not Permit Any Other Party To Rely on the Report

Geoenvironmental professionals design their studies and prepare their reports to meet the specific needs of the clients who retain them, in light of the risk management methods that the client and geoenvironmental professional agree to, and the statutory, regulatory, or other requirements that apply. The study designed for a developer may differ sharply from one designed for a lender, insurer, public agency...or even another developer. *Unless the report specifically states otherwise, it was developed for you and only you.* Do not unilaterally permit any other party to rely on it. The report and the study underlying it may not be adequate for another party's needs, and you could be held liable for shortcomings your geoenvironmental professional was powerless to prevent or anticipate. Inform your geoenvironmental professional when you know or expect that someone else—a third-party—will want to use or rely on the report. *Do not permit third-party use or reliance until you first confer with the geoenvironmental professional who prepared the report.* Additional testing, analysis, or study may be required and, in any event, appropriate terms and conditions should be agreed to so both you and your geoenvironmental professional are protected from third-party risks. *Any party who relies on a geoenvironmental report without the express written permission of the professional who prepared it and the client for whom it was prepared may be solely liable for any problems that arise.*

## Avoid Misinterpretation of the Report

Design professionals and other parties may want to rely on the report in developing plans and specifications. They need to be advised, in writing, that their needs may not have been considered when the study's scope was developed, and, even if their needs were considered, they might misinterpret geoenvironmental findings, conclusions, and recommendations. *Commission your geoenvironmental professional to explain pertinent elements of the report to others who are permitted to rely on it, and to review any plans, specifications or other instruments of professional service that incorporate any of the report's findings, conclusions, or recommendations.* Your geoenvironmental professional has the best understanding of the issues involved, including the fundamental assumptions that underpinned the study's scope.

## Give Contractors Access to the Report

Reduce the risk of delays, claims, and disputes by giving contractors access to the full report, *providing that it is accompanied by a letter of transmittal that can protect you* by making it unquestionably clear that: 1) the study was not conducted and the report was not prepared for purposes of bid development, and 2) the findings, conclusions, and recommendations included in the report are based on a variety of opinions, inferences, and assumptions and are subject to interpretation. Use the letter to also advise contractors to consult with your geoenvironmental professional to obtain clarifications, interpretations, and guidance (a fee may be required for this service), and that—in any event—they should conduct additional studies to obtain the specific type and extent of information each prefers for preparing a bid or cost estimate. Providing access to the full report, with the appropriate caveats, helps prevent formation of adversarial attitudes and claims of concealed or differing conditions. If a contractor elects to ignore the warnings and advice in the letter of transmittal, it would do so at its own risk. Your geoenvironmental professional should be able to help you prepare an effective letter.

## Do Not Separate Documentation from the Report

Geoenvironmental reports often include supplemental documentation, such as maps and copies of regulatory files, permits, registrations, citations, and correspondence with regulatory agencies. If subsurface explorations were performed, the report may contain final boring logs and copies of laboratory data. If remediation activities occurred on site, the report may include: copies of daily field reports; waste manifests; and information about the disturbance of subsurface materials, the type and thickness of any fill placed on site, and fill placement practices, among other types of documentation. *Do not separate supplemental documentation from the report. Do not, and do not permit any other party to redraw or modify any of the supplemental documentation for incorporation into other professionals' instruments of service.*

## Understand the Role of Standards

Unless they are incorporated into statutes or regulations, standard practices and standard guides developed by the American Society for Testing and Materials (ASTM) and other recognized standards-developing organizations (SDOs) are little more than aspirational methods agreed to by a consensus of a committee. The committees that develop standards may not comprise those best-qualified to establish methods and, no matter what, no standard method can possibly consider the infinite client- and project-specific variables that fly in the face of the theoretical "standard conditions" to which standard practices and standard guides apply. In fact, these variables can be so pronounced that geoenvironmental professionals who comply with every directive of an ASTM or other standard procedure could run afoul of local custom and practice, thus violating the standard of care.

Accordingly, when geoenvironmental professionals indicate in their reports that they have performed a service "in general compliance" with one standard or another, it means they have applied professional judgement in creating and implementing a scope of service designed for the specific client and project involved, and which follows some of the general precepts laid out in the referenced standard. To the extent that a report indicates "general compliance" with a standard, you may wish to speak with your geoenvironmental professional to learn more about what was and was not done. *Do not assume a given standard was followed to the letter.* Research indicates that that seldom is the case.

### Realize That Recommendations May Not Be Final

The technical recommendations included in a geoenvironmental report are based on assumptions about actual conditions, and so are preliminary or tentative. Final recommendations can be prepared only by observing actual conditions as they are exposed. For that reason, you should retain the geoenvironmental professional of record to observe construction and/or remediation activities on site, to permit rapid response to unanticipated conditions. *The geoenvironmental professional who prepared the report cannot assume responsibility or liability for the report's recommendations if that professional is not retained to observe relevant site operations.*

### Understand That Geotechnical Issues Have Not Been Addressed

Unless geotechnical engineering was specifically included in the scope of professional service, a report is not likely to relate any findings, conclusions, or recommendations about the suitability of subsurface materials for construction purposes, especially when site remediation has been accomplished through the removal, replacement, encapsulation, or chemical treatment of on-site soils. The equipment, techniques, and testing used by geotechnical engineers differ markedly from those used by geoenvironmental professionals; their education, training, and experience are also significantly different. If you plan to build on the subject site, but have not yet had a geotechnical engineering study conducted, your geoenvironmental professional should be able to provide guidance about the next steps you should take. The same firm may provide the services you need.

### Read Responsibility Provisions Closely

Geoenvironmental studies cannot be exact; they are based on professional judgement and opinion. Nonetheless, some clients, contractors, and others assume geoenvironmental reports are or certainly should be unerringly precise. Such assumptions have created unrealistic expectations that have led to wholly unwarranted claims and disputes. To help prevent such problems, geoenvironmental professionals have developed a number of report provisions and contract terms that explain who is responsible for what, and how risks are to be allocated. Some people mistake these for "exculpatory clauses," that is, provisions whose purpose is to transfer one party's rightful responsibilities and liabilities to someone else. Read the responsibility provisions included in a report and in the contract you and your geoenvironmental professional agreed to. *Responsibility provisions are not "boilerplate."* They are important.

### Rely on Your Geoenvironmental Professional for Additional Assistance

Membership in ASFE exposes geoenvironmental professionals to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a geoenvironmental project. Confer with your ASFE-member geoenvironmental professional for more information.

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IIGR06055.0M

# APPENDIX F-1

# PRELIMINARY DRAINAGE REPORT

# PRELIMINARY DRAINAGE ANALYSIS FOR THE WEST ANTELOPE SOLAR PROJECT

## 110TH STREET WEST AND WEST AVENUE J
## LOS ANGELES COUNTY, CALIFORNIA

***PREPARED FOR:***


**TA – ACACIA, LLC**
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**JULY 11, 2012**

**REVISED: JUNE 2013**

This report has been prepared by or under the direction of the following registered civil engineer who attests to the technical information contained herein. The registered civil engineer has also judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.

| | | |
|---|---|---|
| Ceazar V. Aguilar RCE 41679<br>Registered Civil Engineer | Date | Seal |

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# I. PURPOSE AND SCOPE

The purpose of this preliminary drainage analysis is to determine the 50-year, 25-year, 10-year, 5-year, 2-year, 1-year and water quality storm (SUSMP) runoff as well as the 100-year and 50-year storm emanating from on-site and off-site drainage areas, respectively, for the proposed West Antelope Valley Solar Project. The study will compare the existing and proposed conditions to determine the increase in peak storm flows and volumes due to the proposed grading and site improvements.

The scope of the study includes the following:

1. Determination of points of flow concentration and tributary drainage areas.
2. Determination of the 50-year, 25-year, 10-year, 5-year, 2-year, 1-year and water quality on-site peak storm flows and volumes based upon the existing condition and the proposed or with-project condition.
3. Determination of the 100-year and 50-year off-site peak storm flows based upon the existing condition.
4. Determination of the potential scour depth and debris potential at solar panel array piers.
5. Preparation of on-site and off-site hydrology map.
6. Preparation of on-site flood hazard map.
7. Preparation of the drainage report.

# II. PROJECT DESCRIPTION

TA – ACACIA, LLC is proposing to develop, own and operate the West Antelope Solar Project ("Project"). This 20-megawatt photovoltaic project will be located in the unincorporated area of Los Angeles County at 110$^{th}$ Street West and West Avenue J, just outside of the western boundaries of the City of Lancaster. The property is currently vacant and it is zoned for heavy agricultural use.

The project site encompasses approximately the south-east quarter of section 14 and the north-east quarter of section 23 of Township 7 north and Range 14 west. 110$^{th}$ Street West runs along the east edge of the project boundary while West Avenue J runs down the middle of the site from east to west.

# III. DRAINAGE AREA OVERVIEW

The natural cover under existing condition is primarily sparse and dry vegetation. The majority of on-site soils consist of sandy loam. Based on the aerial topographic map, the

project site generally drains from southwesterly to northeasterly at a flat gradient of approximately 2.0 percent. 110th Street West runs along the east edge of the project boundary and directs the on-site flows north to the downstream corner of the site. Avenue J cuts through the middle of the project site and directs a portion of the on-site flows east to 110th Street where they are routed north to the downstream corner of the project site. The southern half (Areas "A") of the project site drains to the northeast corner of Area "A" at the intersection of Avenue J and 110th Street West (Nodal point 103). The north half (Area "B", "C", and "D") of the project site drains to the north edge of the project site (Nodal points 202, 301 and 401) (see Exhibit "A").

Upon development of the TA – Acacia, LLC Solar Facility, all increased storm flows and volumes due to site development will drain into the proposed on-site retention basins allowing the flows to infiltrate into the soil. The basins will be sized to retain the change in volume of the 50-year storm event per the Los Angeles County Department of Public Works (LACDPW) requirements. The minimal grading that is proposed for the project site will allow the existing 'sheet flow' condition to be maintained and transport on-site flows towards proposed retention basins. The off-site flows will be designed to pass through the site unimpeded.

Solar panels that are proposed to be constructed within the delineated 100-year floodplain should be safe from flooding inundation because they are elevated at a minimum of 2.5 feet above the ground based upon a maximum rotation of 45 degrees. However, the foundation of these panels will need to be protected against scour by increasing the depth of the foundation based upon the results of the HEC-18 calculations plus a factor of safety of 18 inches.

A Floodplain Management Path has been established in conjunction with the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation. According to LADCPW, this path is reserved for the construction of a future regional drainage facility. Furthermore, construction of the proposed solar panels should be avoided within this 50-foot wide path unless it can be demonstrated through detailed studies that an alternative path is feasible.

The majority of the site is relatively flat, which usually results in relatively slow moving sheet flows with low erosion potential. However some local erosion may still occur from time to time, especially around the perimeter of the proposed solar panel caused by concentrated rainfall sheeting off the side of the panels and hitting the natural ground uninhibited.

## IV. HYDROLOGY

The Los Angeles County Depart of Public Works Hydrology Manual, (Reference 1) was used to develop the hydrological parameters for the 100-year, 50-year, 25-year, 10-year,

5-year, 2-year, 1-year and water quality on-site and off-site peak storm flows and volumes. The Modified Rational Method was used for the on-site and off-site analysis. Computations were performed using the program Time of Concentration "Tc" Calculator developed by LACDPW.

The rainfall intensities and soil classifications for the project site used in this study were determined using the 50-Year/24-Hour Isohyet Map shown on Panel 1-H1.66 (see Appendix D) provided in the Los Angeles County Hydrology Manual (Ref. 1). To determine the rainfall intensities for the remaining storm events, the Los Angeles County Hydrology Manual provides a factor for determining those values.

For the on-site existing condition, an impervious site percentage of 2% was used to account for the relatively sparse vegetation and negligible site developments. The water quality hydrologic analysis assumed an impervious percentage of 0% in accordance with LACDPW Hydrology Methodology. For the on-site proposed or (with-project) condition the impervious percentage was increased to 10% to account for a decrease in site infiltration capacity caused by solar panel surface area covering the site as well as other post-development effects. The off-site hydrology was analyzed based on existing condition only assuming a 2% impervious percentage. Six (6) concentration points were analyzed around the perimeter of the south and west edge of the project boundary.

The LACDPW "Tc Calculator" was used to determine the peak storm flows and volumes generated by the site for the existing and proposed or (with-project) condition. Per the LA County standards, the largest change in storm water volume the project site experiences due to site development is to be permanently retained on-site.

Due to the inherent nature of the equation used for determining the tributary flow rates, the resulting computations should yield conservative peak flow values. The results of the hydrology analysis for the existing and proposed conditions are shown on Tables 1, 2 and 3.

## V. HYDRAULICS

As shown on Exhibit "C", portions of the proposed solar development are located within the 100-year flood hazard areas as determined by the Federal Emergency Management Agency (FEMA) and based upon the results of our floodplain analysis. The FEMA flood hazard is categorized as a Zone "A", meaning this area is subject to the 1% annual chance flood or known as the 100-year storm event. The FEMA Flood Insurance Study for Los Angeles County was used to acquire this information (Ref. 2).

The flood hazards delineated by AEI-CASC were determined using the Edwards and Thielman Equation as well as the Normal Depth Method for the flood hazards limits running north along the west side of 110$^{th}$ Street West. The program FlowMaster was

used for the normal depth computations. The cross sections used for the normal depth calculations were developed based upon the aerial topographic map (with 2-foot contours) prepared for the project site. The Edwards and Thielman floodplain, widths, depths and velocities were computed for the six off-site flow concentration points (Basins A, B, C, D, E and F). Due to the unpredictable nature of the existing water course tributary to concentration points D and E, two alternative flood hazard paths were delineated in the event that the currently assumed flow path shifts to a different flow path (see Exhibit C). The 100-year peak flow-rates and 50-year flow-rates were determined for the off-site hydrology, however only the 100-year flow-rates were used to analyze the on-site flood hazard areas. The Normal Depth Method was used to determine the capacity of the channel along the west side of 110$^{th}$ Street West. Four cross-sections were cut along this channel to determine the floodplain width, depth and velocity.

The results for the flood hazard analysis based on Edwards and Thielman and Normal Depth Method are listed in Appendix E. The results include the flood hazard widths, maximum flood depths, maximum flow velocities and the 100-year flow rates for the given concentration point along the project site boundary.

## VI. DEBRIS LOAD POTENTIAL

The Los Angeles County Department of Public Works Sedimentation Manual (Ref. 3) was used to determine the debris load potential for each of the tributary watershed basins affecting the project site. The Debris Potential Areas in the vicinity of the project site and the off-site tributary areas were used to determine a weighted Debris Production Rate (DPR) for each of the six basins. These DPR's were multiplied by each overall basin area giving a debris load in cubic yards per basin. Approximately 68,000 cubic yards of debris potential was determined to affect the project site.

## VII. SCOUR POTENTIAL ANALYSIS

Since the proposed solar panel array piers are very similar to round piers on bridges, the potential scour depths were computed using HEC-18, pier scour equation for bridges (Ref. 4). The scour analysis was performed based upon 6-inch diameter piers (details provided by AECOM). Throughout the project site, there are several locations that show the proposed solar panel array layout encroaching into the designated flood hazards. The scour computations were performed for the 100-year storm event for the various piers.

Potential scour depths were determined based on clear-water flow and bulked water flow. The bulk factor used for each basin was determined based on LACDPW Sedimentation Manual Methodology (see Bulking Factor Results table below).

| BULKING FACTOR RESULTS | |
|---|---|
| TRIBUTARY AREA | BULKING FACTOR |
| BASIN A | 1.24 |
| BASIN B | 1.07 |
| BASIN C | 1.26 |
| BASIN D | 1.18 |
| BASIN E | 1.23 |
| BASIN F | 1.19 |

The results of the scour computations are summarized in Table 4. The tables include Basin flow rates generated from the off-site tributary drainage area and computed scour depth.

It is noted that the scour depths in this study are solely based on the results of the HEC-18 computations (considered as "local scour") and do not reflect the "general scour", sediment transport characteristics, and long-term sediment transport trend of the studied streams.

## VIII. STUDY FINDINGS

The results of the hydrology analysis are tabulated in Tables 1, 2 and 3. The computed on-site flows based on existing condition in shown in Table 1 while the on-site based on the proposed Condition is tabulated in Table 2. The computed off-site flows based upon the existing condition can be found in Table 3. The computed foundation scour depths including the 1.5-foot factor of safety for the various 100-year flood plains are shown in Table 4.

The maximum change in the flood volume generated on-site between existing and proposed conditions was determined for all specified storm return periods. The results indicate that the 50-year storm event produced the largest change in volume. This volume was used to size the retention basins in order to mitigate against increases in on-site flood volume due to the proposed solar development (see Appendix C).

As shown in Table 2, the change in the 50-year/24-hour flood volume between the existing and proposed conditions peak 50-year/24-hour delta flood volume at nodal point 103 (Area "A") is 190,357 cubic-feet while the change in the 50-year/24-hour flood volume at nodal point 202 (Area "B") is 78,408 cubic-feet. For nodal points 301 (Area "C") and 401 (Area "D"), the maximum change in the 50-year/24-hour flood volume are 21,344 cubic-feet and 12,632 cubic feet, respectively. In order to mitigate against any increase in flood volumes due to the proposed solar development, the proposed retention

basins will be sized to store and infiltrate these on-site flood volumes (please refer to the prepared SUSMP report for typical infiltration basin section).

Solar panels that are proposed to be constructed within the delineated 100-year floodplain or flood hazard areas should be safe from flooding inundation as long as they are elevated at a minimum of 2.5 feet above the ground. Based on the maximum rotation of 45 degrees, these panels should be free from flooding. The foundation of the solar panels will need to be protected against scour by increasing the depth of the foundation as recommended and shown in Table 4 under the heading "bulked water flow".

Since the layout of the proposed solar panels does not impact the 50-foot Floodplain Management Path as established in the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation, there will be no need to perform additional an feasibility analysis to determine an alternate path.

Based on the results of the study, it is concluded that implementation of the proposed on-site retention basins will not increase the existing flood volume discharging from the project site due to the proposed solar development.

**Table 1 – Hydrology Results for On-Site Existing Condition (Based on Modified Rational Method)**

| SUBAREA | NODAL POINT | STORM FREQUENCY | FLOW-RATE (CFS) | VOLUME (CF) |
|---|---|---|---|---|
| A | 104 | 50-YEAR | 46.8 | 386,377 |
| | | 25-YEAR | 26.4 | 327,571 |
| | | 10-YEAR | 19.0 | 265,280 |
| | | 5-YEAR | 15.5 | 215,622 |
| | | 2-YEAR | 10.3 | 143,312 |
| | | 1-YEAR | 7.5 | 105,415 |
| | | SUSMP | 3.6 | 50,965 |
| B | 202 | 50-YEAR | 12.3 | 158,558 |
| | | 25-YEAR | 10.0 | 138,956 |
| | | 10-YEAR | 8.1 | 112,820 |
| | | 5-YEAR | 6.6 | 92,783 |
| | | 2-YEAR | 4.4 | 60,984 |
| | | 1-YEAR | 3.2 | 44,867 |
| | | SUSMP | 1.8 | 24,394 |
| C | 301 | 50-YEAR | 3.0 | 42,253 |
| | | 25-YEAR | 2.7 | 37,026 |
| | | 10-YEAR | 2.2 | 30,056 |
| | | 5-YEAR | 1.8 | 24,829 |
| | | 2-YEAR | 1.2 | 16,553 |
| | | 1-YEAR | 0.9 | 12,197 |
| | | SUSMP | 0.5 | 6,534 |
| D | 401 | 50-YEAR | 1.8 | 24,394 |
| | | 25-YEAR | 1.6 | 21,780 |
| | | 10-YEAR | 1.3 | 17,424 |
| | | 5-YEAR | 1.0 | 14,375 |
| | | 2-YEAR | 0.7 | 9,583 |
| | | 1-YEAR | 0.5 | 6,970 |
| | | SUSMP | 0.3 | 3,920 |

## Table 2 – Hydrology Results for On-Site Proposed Condition (Based on Modified Rational Method)

| SUBAREA | NODAL POINT | STORM FREQUENCY | FLOW-RATE (CFS) | VOLUME (CF) | ΔVOLUME (CF) |
|---|---|---|---|---|---|
| A | 104 | 50-YEAR | 68.2 | 576,734 | 190,357 |
| | | 25-YEAR | 41.8 | 490,921 | 163,350 |
| | | 10-YEAR | 28.5 | 396,396 | 131,116 |
| | | 5-YEAR | 23.3 | 324,086 | 108,464 |
| | | 2-YEAR | 15.5 | 215,186 | 71,874 |
| | | 1-YEAR | 11.3 | 157,252 | 51,836 |
| | | SUSMP | 5.4 | 76,230 | 25,265 |
| B | 202 | 50-YEAR | 18.0 | 236,966 | 78,408 |
| | | 25-YEAR | 14.9 | 207,781 | 68,825 |
| | | 10-YEAR | 12.1 | 168,577 | 55,757 |
| | | 5-YEAR | 10.0 | 138,085 | 45,302 |
| | | 2-YEAR | 6.6 | 91,040 | 30,056 |
| | | 1-YEAR | 4.8 | 66,647 | 21,780 |
| | | SUSMP | 2.6 | 37,026 | 12,632 |
| C | 301 | 50-YEAR | 4.5 | 63,598 | 21,344 |
| | | 25-YEAR | 4.0 | 55,757 | 18,731 |
| | | 10-YEAR | 3.2 | 45,302 | 15,246 |
| | | 5-YEAR | 2.7 | 37,026 | 12,197 |
| | | 2-YEAR | 1.8 | 24,394 | 7,841 |
| | | 1-YEAR | 1.3 | 17,860 | 5,663 |
| | | SUSMP | 0.7 | 10,019 | 3,485 |
| D | 401 | 50-YEAR | 2.6 | 37,026 | 12,632 |
| | | 25-YEAR | 2.3 | 32,234 | 10,454 |
| | | 10-YEAR | 1.9 | 26,136 | 8,712 |
| | | 5-YEAR | 1.6 | 21,344 | 6,970 |
| | | 2-YEAR | 1.0 | 14,375 | 4,792 |
| | | 1-YEAR | 0.8 | 10,454 | 3,485 |
| | | SUSMP | 0.4 | 5,663 | 1,742 |

**Table 3 – Hydrology Results for Off-Site Existing Condition (Based on Modified Rational Method)**

| SUBAREA | NODAL POINT | STORM FREQUENCY | FLOW-RATE |
|---|---|---|---|
| A | BASIN A | 100-YEAR | 1523.3 |
| | | 50-YEAR | 1213.0 |
| B | BASIN B | 100-YEAR | 60.2 |
| | | 50-YEAR | 46.9 |
| C | BASIN C | 100-YEAR | 443.1 |
| | | 50-YEAR | 346.5 |
| D | BASIN D | 100-YEAR | 319.9 |
| | | 50-YEAR | 255.3 |
| E | BASIN E | 100-YEAR | 1137.8 |
| | | 50-YEAR | 824.6 |
| F | BASIN F | 100-YEAR | 1725.1 |
| | | 50-YEAR | 1360.2 |

**Table 4 – Approximate Scour Depths Based on the HEC-18 Method**

| DRAINAGE AREA | PIER DIMETER (INCHES) | APPROXIMATE SCOUR DEPTH BASED ON CLEAR-FLOW PLUS 1.5 FEET OF FACTOR OF SAFETY (FEET) | APPROXIMATE SCOUR DEPTH BASED ON BULKED FLOW PLUS 1.5 FEET OF FACTOR OF SAFETY (FEET) |
|---|---|---|---|
| BASIN A | 6 | 2.96 | 3.01 |
| BASIN B | 6 | 2.36 | 2.37 |
| BASIN C | 6 | 2.68 | 2.72 |
| BASIN D | 6 | 2.63 | 2.65 |
| BASIN E | 6 | 2.82 | 2.86 |
| BASIN F | 6 | 2.95 | 2.98 |

# VI. REFERENCES

1. Los Angeles County Department Public Works Hydrology Manual, January 2006.
2. FEMA Flood Insurance Study, Los Angeles County, California, Volume 2 of 4, Flood Insurance Study Number 06037CV002A, January, 2008.
3. Los Angeles County Department of Public Works, Sedimentation Manual, March 2006.
4. Evaluating Scour at Bridges (Third Edition), Hydraulic Engineering Circular No. 18 (HEC-18), Federal Highways Administration, November 1995.

# APPENDICES

# APPENDIX A: ON-SITE HYDROLOGY CALCULATIONS BASED ON EXISTING CONDITION (MODIFIED RATIONAL METHOD)

# APPENDIX A.1: 50-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**EXISTING CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Peak Flow Rate (cfs) | Total Volume (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **50 YEAR STORM** | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.02 | 50 | 134 | 2,285 | 0.0136 | 5.4 | 30 | 1.39 | 0.16 | 0.17 | 5.94 | 1.38 | 60,113 | 46.8 | 386,377 |
| A2 | 522,233 | 12.0 | 0.02 | 50 | 134 | 948 | 0.0200 | 5.7 | 22 | 1.69 | 0.25 | 0.26 | 5.27 | 0.73 | 31,799 | | |
| A3 | 715,877 | 16.4 | 0.02 | 50 | 134 | 1,617 | 0.0192 | 5.4 | 30 | 1.39 | 0.16 | 0.17 | 3.88 | 0.90 | 39,204 | | |
| A4 | 517,947 | 11.9 | 0.02 | 50 | 134 | 919 | 0.0163 | 5.1 | 30 | 1.34 | 0.14 | 0.16 | 2.55 | 0.62 | 27,007 | | |
| A5 | 392,335 | 9.0 | 0.02 | 50 | 134 | 988 | 0.0243 | 5.8 | 21 | 1.76 | 0.27 | 0.28 | 4.44 | 0.56 | 24,394 | | |
| A6 | 1,134,501 | 26.0 | 0.02 | 50 | 134 | 1,365 | 0.0212 | 5.6 | 30 | 1.44 | 0.17 | 0.18 | 6.75 | 1.49 | 64,904 | | |
| A7 | 475,310 | 10.9 | 0.02 | 50 | 134 | 463 | 0.0130 | 5.4 | 13 | 2.06 | 0.32 | 0.33 | 7.42 | 0.66 | 28,750 | | |
| A8 | 1,004,776 | 23.1 | 0.02 | 50 | 134 | 1,467 | 0.0136 | 5.2 | 30 | 1.34 | 0.14 | 0.16 | 4.95 | 1.21 | 52,708 | | |
| A9 | 440,838 | 10.1 | 0.02 | 50 | 134 | 1,136 | 0.0238 | 5.5 | 30 | 1.41 | 0.16 | 0.17 | 2.43 | 0.57 | 24,829 | | |
| A10 | 606,228 | 13.9 | 0.02 | 50 | 134 | 945 | 0.0169 | 5.3 | 30 | 1.36 | 0.15 | 0.17 | 3.22 | 0.75 | 32,670 | | |
| **Area B** | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.02 | 50 | 134 | 1,526 | 0.0203 | 4.9 | 30 | 1.26 | 0.12 | 0.14 | 4.10 | 1.13 | 49,223 | 12.3 | 158,558 |
| B2 | 493,197 | 11.3 | 0.02 | 50 | 134 | 1,590 | 0.0113 | 4.7 | 30 | 1.21 | 0.10 | 0.12 | 1.64 | 0.53 | 23,087 | | |
| B3 | 641,930 | 14.7 | 0.02 | 50 | 134 | 1,378 | 0.0189 | 4.9 | 30 | 1.26 | 0.12 | 0.14 | 2.60 | 0.72 | 31,363 | | |
| B4 | 427,115 | 9.8 | 0.02 | 50 | 134 | 1,382 | 0.0130 | 4.7 | 30 | 1.21 | 0.10 | 0.12 | 1.42 | 0.45 | 19,602 | | |
| B5 | 756,357 | 17.4 | 0.02 | 50 | 131 | 2,066 | 0.0155 | 4.7 | 30 | 1.21 | 0.10 | 0.12 | 2.52 | 0.81 | 35,284 | | |
| **Area C** | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.02 | 50 | 128 | 1,445 | 0.0159 | 4.8 | 30 | 1.23 | 0.10 | 0.12 | 3.03 | 0.97 | 42,253 | 3.0 | 42,253 |
| **Area D** | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.02 | 50 | 127 | 1,194 | 0.0151 | 4.9 | 30 | 1.26 | 0.10 | 0.12 | 1.76 | 0.56 | 24,394 | 1.8 | 24,394 |

# APPENDIX A.2: 25-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**EXISTING CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Peak Flow Rate (cfs) | Total Volume (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **25 YEAR STORM** | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.02 | 25 | 134 | 2,285 | 0.0136 | 4.7 | 30 | 1.22 | 0.11 | 0.13 | 3.99 | 1.18 | 51,401 | 26.4 | 327,571 |
| A2 | 522,233 | 12.0 | 0.02 | 25 | 134 | 948 | 0.0200 | 5.0 | 30 | 1.29 | 0.13 | 0.15 | 2.32 | 0.60 | 26,136 | | |
| A3 | 715,877 | 16.4 | 0.02 | 25 | 134 | 1,617 | 0.0192 | 4.7 | 30 | 1.22 | 0.11 | 0.13 | 2.61 | 0.77 | 33,541 | | |
| A4 | 517,947 | 11.9 | 0.02 | 25 | 134 | 919 | 0.0163 | 4.5 | 30 | 1.17 | 0.10 | 0.12 | 1.67 | 0.54 | 23,522 | | |
| A5 | 392,335 | 9.0 | 0.02 | 25 | 134 | 988 | 0.0243 | 5.1 | 30 | 1.31 | 0.13 | 0.15 | 1.77 | 0.46 | 20,038 | | |
| A6 | 1,134,501 | 26.0 | 0.02 | 25 | 134 | 1,365 | 0.0212 | 4.9 | 30 | 1.26 | 0.12 | 0.14 | 4.59 | 1.28 | 55,757 | | |
| A7 | 475,310 | 10.9 | 0.02 | 25 | 134 | 463 | 0.0130 | 4.7 | 23 | 1.38 | 0.15 | 0.17 | 2.56 | 0.53 | 23,087 | | |
| A8 | 1,004,776 | 23.1 | 0.02 | 25 | 134 | 1,467 | 0.0136 | 4.6 | 30 | 1.17 | 0.10 | 0.12 | 3.24 | 1.04 | 45,302 | | |
| A9 | 440,838 | 10.1 | 0.02 | 25 | 134 | 1,136 | 0.0238 | 4.8 | 30 | 1.24 | 0.11 | 0.13 | 1.63 | 0.48 | 20,909 | | |
| A10 | 606,228 | 13.9 | 0.02 | 25 | 134 | 945 | 0.0169 | 4.7 | 30 | 1.20 | 0.10 | 0.12 | 2.00 | 0.64 | 27,878 | | |
| **Area B** | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.02 | 25 | 134 | 1,526 | 0.0203 | 4.3 | 30 | 1.11 | 0.10 | 0.12 | 3.09 | 0.99 | 43,124 | 10.0 | 138,956 |
| B2 | 493,197 | 11.3 | 0.02 | 25 | 134 | 1,590 | 0.0113 | 4.1 | 30 | 1.06 | 0.10 | 0.12 | 1.44 | 0.46 | 20,038 | | |
| B3 | 641,930 | 14.7 | 0.02 | 25 | 134 | 1,378 | 0.0189 | 4.3 | 30 | 1.11 | 0.10 | 0.12 | 1.96 | 0.63 | 27,443 | | |
| B4 | 427,115 | 9.8 | 0.02 | 25 | 134 | 1,382 | 0.0130 | 4.1 | 30 | 1.06 | 0.10 | 0.12 | 1.25 | 0.40 | 17,424 | | |
| B5 | 756,357 | 17.4 | 0.02 | 25 | 131 | 2,066 | 0.0155 | 4.1 | 30 | 1.06 | 0.10 | 0.12 | 2.21 | 0.71 | 30,928 | | |
| **Area C** | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.02 | 25 | 128 | 1,445 | 0.0159 | 4.2 | 30 | 1.08 | 0.10 | 0.12 | 2.66 | 0.85 | 37,026 | 2.7 | 37,026 |
| **Area D** | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.02 | 25 | 127 | 1,194 | 0.0151 | 4.3 | 30 | 1.11 | 0.10 | 0.12 | 1.55 | 0.50 | 21,780 | 1.6 | 21,780 |

# APPENDIX A.3: 10-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**EXISTING CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Peak Flow Rate (cfs) | Total Volume (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **10 YEAR STORM** | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.02 | 10 | 134 | 2,285 | 0.0136 | 3.9 | 30 | 0.99 | 0.10 | 0.12 | 2.99 | 0.96 | 41,818 | 19.0 | 265,280 |
| A2 | 522,233 | 12.0 | 0.02 | 10 | 134 | 948 | 0.0200 | 4.1 | 30 | 1.05 | 0.10 | 0.12 | 1.51 | 0.48 | 20,909 | | |
| A3 | 715,877 | 16.4 | 0.02 | 10 | 134 | 1,617 | 0.0192 | 3.9 | 30 | 0.99 | 0.10 | 0.12 | 1.95 | 0.63 | 27,443 | | |
| A4 | 517,947 | 11.9 | 0.02 | 10 | 134 | 919 | 0.0163 | 3.6 | 30 | 0.95 | 0.10 | 0.12 | 1.36 | 0.44 | 19,166 | | |
| A5 | 392,335 | 9.0 | 0.02 | 10 | 134 | 988 | 0.0243 | 4.1 | 30 | 1.06 | 0.10 | 0.12 | 1.15 | 0.37 | 16,117 | | |
| A6 | 1,134,501 | 26.0 | 0.02 | 10 | 134 | 1,365 | 0.0212 | 4.0 | 30 | 1.03 | 0.10 | 0.12 | 3.22 | 1.03 | 44,867 | | |
| A7 | 475,310 | 10.9 | 0.02 | 10 | 134 | 463 | 0.0130 | 3.9 | 30 | 0.99 | 0.10 | 0.12 | 1.30 | 0.42 | 18,295 | | |
| A8 | 1,004,776 | 23.1 | 0.02 | 10 | 134 | 1,467 | 0.0136 | 3.7 | 30 | 0.95 | 0.10 | 0.12 | 2.63 | 0.85 | 37,026 | | |
| A9 | 440,838 | 10.1 | 0.02 | 10 | 134 | 1,136 | 0.0238 | 3.9 | 30 | 1.01 | 0.10 | 0.12 | 1.23 | 0.39 | 16,988 | | |
| A10 | 606,228 | 13.9 | 0.02 | 10 | 134 | 945 | 0.0169 | 3.8 | 30 | 0.97 | 0.10 | 0.12 | 1.62 | 0.52 | 22,651 | | |
| **Area B** | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.02 | 10 | 134 | 1,526 | 0.0203 | 3.5 | 30 | 0.90 | 0.10 | 0.12 | 2.51 | 0.80 | 34,848 | 8.1 | 112,820 |
| B2 | 493,197 | 11.3 | 0.02 | 10 | 134 | 1,590 | 0.0113 | 3.4 | 30 | 0.86 | 0.10 | 0.12 | 1.17 | 0.38 | 16,553 | | |
| B3 | 641,930 | 14.7 | 0.02 | 10 | 134 | 1,378 | 0.0189 | 3.5 | 30 | 0.90 | 0.10 | 0.12 | 1.59 | 0.51 | 22,216 | | |
| B4 | 427,115 | 9.8 | 0.02 | 10 | 134 | 1,382 | 0.0130 | 3.4 | 30 | 0.86 | 0.10 | 0.12 | 1.01 | 0.32 | 13,939 | | |
| B5 | 756,357 | 17.4 | 0.02 | 10 | 131 | 2,066 | 0.0155 | 3.4 | 30 | 0.86 | 0.10 | 0.12 | 1.79 | 0.58 | 25,265 | | |
| **Area C** | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.02 | 10 | 128 | 1,445 | 0.0159 | 3.4 | 30 | 0.88 | 0.10 | 0.12 | 2.17 | 0.69 | 30,056 | 2.2 | 30,056 |
| **Area D** | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.02 | 10 | 127 | 1,194 | 0.0151 | 3.5 | 30 | 0.90 | 0.10 | 0.12 | 1.26 | 0.40 | 17,424 | 1.3 | 17,424 |

# APPENDIX A.4: 5-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**EXISTING CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Peak Flow Rate (cfs) | Total Volume (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **5 YEAR STORM** | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.02 | 5 | 134 | 2,285 | 0.0136 | 3.2 | 30 | 0.81 | 0.10 | 0.12 | 2.44 | 0.78 | 33,977 | 15.5 | 215,622 |
| A2 | 522,233 | 12.0 | 0.02 | 5 | 134 | 948 | 0.0200 | 3.3 | 30 | 0.86 | 0.10 | 0.12 | 1.24 | 0.39 | 16,988 | | |
| A3 | 715,877 | 16.4 | 0.02 | 5 | 134 | 1,617 | 0.0192 | 3.2 | 30 | 0.81 | 0.10 | 0.12 | 1.60 | 0.51 | 22,216 | | |
| A4 | 517,947 | 11.9 | 0.02 | 5 | 134 | 919 | 0.0163 | 3.0 | 30 | 0.77 | 0.10 | 0.12 | 1.10 | 0.35 | 15,246 | | |
| A5 | 392,335 | 9.0 | 0.02 | 5 | 134 | 988 | 0.0243 | 3.4 | 30 | 0.87 | 0.10 | 0.12 | 0.94 | 0.30 | 13,068 | | |
| A6 | 1,134,501 | 26.0 | 0.02 | 5 | 134 | 1,365 | 0.0212 | 3.3 | 30 | 0.84 | 0.10 | 0.12 | 2.63 | 0.84 | 36,590 | | |
| A7 | 475,310 | 10.9 | 0.02 | 5 | 134 | 463 | 0.0130 | 3.2 | 30 | 0.81 | 0.10 | 0.12 | 1.06 | 0.34 | 14,810 | | |
| A8 | 1,004,776 | 23.1 | 0.02 | 5 | 134 | 1,467 | 0.0136 | 3.0 | 30 | 0.78 | 0.10 | 0.12 | 2.16 | 0.69 | 30,056 | | |
| A9 | 440,838 | 10.1 | 0.02 | 5 | 134 | 1,136 | 0.0238 | 3.2 | 30 | 0.83 | 0.10 | 0.12 | 1.01 | 0.32 | 13,939 | | |
| A10 | 606,228 | 13.9 | 0.02 | 5 | 134 | 945 | 0.0169 | 3.1 | 30 | 0.80 | 0.10 | 0.12 | 1.34 | 0.43 | 18,731 | | |
| **Area B** | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.02 | 5 | 134 | 1,526 | 0.0203 | 2.9 | 30 | 0.74 | 0.10 | 0.12 | 2.06 | 0.66 | 28,750 | 6.6 | 92,783 |
| B2 | 493,197 | 11.3 | 0.02 | 5 | 134 | 1,590 | 0.0113 | 2.7 | 30 | 0.71 | 0.10 | 0.12 | 0.96 | 0.31 | 13,504 | | |
| B3 | 641,930 | 14.7 | 0.02 | 5 | 134 | 1,378 | 0.0189 | 2.9 | 30 | 0.74 | 0.10 | 0.12 | 1.31 | 0.42 | 18,295 | | |
| B4 | 427,115 | 9.8 | 0.02 | 5 | 134 | 1,382 | 0.0130 | 2.7 | 30 | 0.71 | 0.10 | 0.12 | 0.84 | 0.27 | 11,761 | | |
| B5 | 756,357 | 17.4 | 0.02 | 5 | 131 | 2,066 | 0.0155 | 2.7 | 30 | 0.71 | 0.10 | 0.12 | 1.48 | 0.47 | 20,473 | | |
| **Area C** | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.02 | 5 | 128 | 1,445 | 0.0159 | 2.8 | 30 | 0.72 | 0.10 | 0.12 | 1.77 | 0.57 | 24,829 | 1.8 | 24,829 |
| **Area D** | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.02 | 5 | 127 | 1,194 | 0.0151 | 2.9 | 30 | 0.74 | 0.10 | 0.12 | 1.04 | 0.33 | 14,375 | 1.0 | 14,375 |

# APPENDIX A.5: 2-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**EXISTING CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Peak Flow Rate (cfs) | Total Volume (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2 YEAR STORM** | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.02 | 2 | 134 | 2,285 | 0.0136 | 2.1 | 30 | 0.54 | 0.10 | 0.12 | 1.63 | 0.52 | 22,651 | 10.3 | 143,312 |
| A2 | 522,233 | 12.0 | 0.02 | 2 | 134 | 948 | 0.0200 | 2.2 | 30 | 0.57 | 0.10 | 0.12 | 0.82 | 0.26 | 11,326 | | |
| A3 | 715,877 | 16.4 | 0.02 | 2 | 134 | 1,617 | 0.0192 | 2.1 | 30 | 0.54 | 0.10 | 0.12 | 1.06 | 0.34 | 14,810 | | |
| A4 | 517,947 | 11.9 | 0.02 | 2 | 134 | 919 | 0.0163 | 2.0 | 30 | 0.51 | 0.10 | 0.12 | 0.73 | 0.23 | 10,019 | | |
| A5 | 392,335 | 9.0 | 0.02 | 2 | 134 | 988 | 0.0243 | 2.2 | 30 | 0.58 | 0.10 | 0.12 | 0.63 | 0.20 | 8,712 | | |
| A6 | 1,134,501 | 26.0 | 0.02 | 2 | 134 | 1,365 | 0.0212 | 2.2 | 30 | 0.56 | 0.10 | 0.12 | 1.75 | 0.56 | 24,394 | | |
| A7 | 475,310 | 10.9 | 0.02 | 2 | 134 | 463 | 0.0130 | 2.1 | 30 | 0.54 | 0.10 | 0.12 | 0.71 | 0.23 | 10,019 | | |
| A8 | 1,004,776 | 23.1 | 0.02 | 2 | 134 | 1,467 | 0.0136 | 2.0 | 30 | 0.52 | 0.10 | 0.12 | 1.44 | 0.46 | 20,038 | | |
| A9 | 440,838 | 10.1 | 0.02 | 2 | 134 | 1,136 | 0.0238 | 2.1 | 30 | 0.55 | 0.10 | 0.12 | 0.67 | 0.21 | 9,148 | | |
| A10 | 606,228 | 13.9 | 0.02 | 2 | 134 | 945 | 0.0169 | 2.1 | 30 | 0.53 | 0.10 | 0.12 | 0.89 | 0.28 | 12,197 | | |
| **Area B** | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.02 | 2 | 134 | 1,526 | 0.0203 | 1.9 | 30 | 0.49 | 0.10 | 0.12 | 1.37 | 0.43 | 18,731 | 4.4 | 60,984 |
| B2 | 493,197 | 11.3 | 0.02 | 2 | 134 | 1,590 | 0.0113 | 1.8 | 30 | 0.47 | 0.10 | 0.12 | 0.64 | 0.20 | 8,712 | | |
| B3 | 641,930 | 14.7 | 0.02 | 2 | 134 | 1,378 | 0.0189 | 1.9 | 30 | 0.49 | 0.10 | 0.12 | 0.87 | 0.28 | 12,197 | | |
| B4 | 427,115 | 9.8 | 0.02 | 2 | 134 | 1,382 | 0.0130 | 1.8 | 30 | 0.47 | 0.10 | 0.12 | 0.55 | 0.18 | 7,841 | | |
| B5 | 756,357 | 17.4 | 0.02 | 2 | 131 | 2,066 | 0.0155 | 1.8 | 30 | 0.47 | 0.10 | 0.12 | 0.98 | 0.31 | 13,504 | | |
| **Area C** | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.02 | 2 | 128 | 1,445 | 0.0159 | 1.9 | 30 | 0.48 | 0.10 | 0.12 | 1.18 | 0.38 | 16,553 | 1.2 | 16,553 |
| **Area D** | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.02 | 2 | 127 | 1,194 | 0.0151 | 1.9 | 30 | 0.49 | 0.10 | 0.12 | 0.69 | 0.22 | 9,583 | 0.7 | 9,583 |

# APPENDIX A.6: 1-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**EXISTING CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Peak Flow Rate (cfs) | Total Volume (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1 YEAR STORM** | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.02 | 1 | 134 | 2,285 | 0.0136 | 1.5 | 30 | 0.39 | 0.10 | 0.12 | 1.18 | 0.38 | 16,553 | 7.5 | 105,415 |
| A2 | 522,233 | 12.0 | 0.02 | 1 | 134 | 948 | 0.0200 | 1.6 | 30 | 0.41 | 0.10 | 0.12 | 0.59 | 0.19 | 8,276 | | |
| A3 | 715,877 | 16.4 | 0.02 | 1 | 134 | 1,617 | 0.0192 | 1.5 | 30 | 0.39 | 0.10 | 0.12 | 0.77 | 0.25 | 10,890 | | |
| A4 | 517,947 | 11.9 | 0.02 | 1 | 134 | 919 | 0.0163 | 1.4 | 30 | 0.37 | 0.10 | 0.12 | 0.53 | 0.17 | 7,405 | | |
| A5 | 392,335 | 9.0 | 0.02 | 1 | 134 | 988 | 0.0243 | 1.6 | 30 | 0.42 | 0.10 | 0.12 | 0.45 | 0.15 | 6,534 | | |
| A6 | 1,134,501 | 26.0 | 0.02 | 1 | 134 | 1,365 | 0.0212 | 1.6 | 30 | 0.41 | 0.10 | 0.12 | 1.28 | 0.41 | 17,860 | | |
| A7 | 475,310 | 10.9 | 0.02 | 1 | 134 | 463 | 0.0130 | 1.5 | 30 | 0.39 | 0.10 | 0.12 | 0.51 | 0.16 | 6,970 | | |
| A8 | 1,004,776 | 23.1 | 0.02 | 1 | 134 | 1,467 | 0.0136 | 1.5 | 30 | 0.38 | 0.10 | 0.12 | 1.05 | 0.34 | 14,810 | | |
| A9 | 440,838 | 10.1 | 0.02 | 1 | 134 | 1,136 | 0.0238 | 1.6 | 30 | 0.40 | 0.10 | 0.12 | 0.49 | 0.16 | 6,970 | | |
| A10 | 606,228 | 13.9 | 0.02 | 1 | 134 | 945 | 0.0169 | 1.5 | 30 | 0.39 | 0.10 | 0.12 | 0.65 | 0.21 | 9,148 | | |
| **Area B** | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.02 | 1 | 134 | 1,526 | 0.0203 | 1.4 | 30 | 0.36 | 0.10 | 0.12 | 1.00 | 0.32 | 13,939 | 3.2 | 44,867 |
| B2 | 493,197 | 11.3 | 0.02 | 1 | 134 | 1,590 | 0.0113 | 1.3 | 30 | 0.34 | 0.10 | 0.12 | 0.46 | 0.15 | 6,534 | | |
| B3 | 641,930 | 14.7 | 0.02 | 1 | 134 | 1,378 | 0.0189 | 1.4 | 30 | 0.36 | 0.10 | 0.12 | 0.64 | 0.20 | 8,712 | | |
| B4 | 427,115 | 9.8 | 0.02 | 1 | 134 | 1,382 | 0.0130 | 1.3 | 30 | 0.34 | 0.10 | 0.12 | 0.40 | 0.13 | 5,663 | | |
| B5 | 756,357 | 17.4 | 0.02 | 1 | 131 | 2,066 | 0.0155 | 1.3 | 30 | 0.34 | 0.10 | 0.12 | 0.71 | 0.23 | 10,019 | | |
| **Area C** | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.02 | 1 | 128 | 1,445 | 0.0159 | 1.4 | 30 | 0.35 | 0.10 | 0.12 | 0.86 | 0.28 | 12,197 | 0.9 | 12,197 |
| **Area D** | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.02 | 1 | 127 | 1,194 | 0.0151 | 1.4 | 30 | 0.36 | 0.10 | 0.12 | 0.50 | 0.16 | 6,970 | 0.5 | 6,970 |

# APPENDIX A.7: SUSMP (3/4”) STORM HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**EXISTING CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Peak Flow Rate (cfs) | Total Volume (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3/4" STORM** | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.02 | - | 134 | 2,285 | 0.0136 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.57 | 0.19 | 8,276 | 3.6 | 50,965 |
| A2 | 522,233 | 12.0 | 0.02 | - | 134 | 948 | 0.0200 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.27 | 0.09 | 3,920 | | |
| A3 | 715,877 | 16.4 | 0.02 | - | 134 | 1,617 | 0.0192 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.37 | 0.12 | 5,227 | | |
| A4 | 517,947 | 11.9 | 0.02 | - | 134 | 919 | 0.0163 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.27 | 0.09 | 3,920 | | |
| A5 | 392,335 | 9.0 | 0.02 | - | 134 | 988 | 0.0243 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.21 | 0.07 | 3,049 | | |
| A6 | 1,134,501 | 26.0 | 0.02 | - | 134 | 1,365 | 0.0212 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.59 | 0.19 | 8,276 | | |
| A7 | 475,310 | 10.9 | 0.02 | - | 134 | 463 | 0.0130 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.25 | 0.08 | 3,485 | | |
| A8 | 1,004,776 | 23.1 | 0.02 | - | 134 | 1,467 | 0.0136 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.53 | 0.17 | 7,405 | | |
| A9 | 440,838 | 10.1 | 0.02 | - | 134 | 1,136 | 0.0238 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.23 | 0.07 | 3,049 | | |
| A10 | 606,228 | 13.9 | 0.02 | - | 134 | 945 | 0.0169 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.32 | 0.10 | 4,356 | | |
| **Area B** | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.02 | - | 134 | 1,526 | 0.0203 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.53 | 0.17 | 7,405 | 1.8 | 24,394 |
| B2 | 493,197 | 11.3 | 0.02 | - | 134 | 1,590 | 0.0113 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.26 | 0.08 | 3,485 | | |
| B3 | 641,930 | 14.7 | 0.02 | - | 134 | 1,378 | 0.0189 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.34 | 0.11 | 4,792 | | |
| B4 | 427,115 | 9.8 | 0.02 | - | 134 | 1,382 | 0.0130 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.22 | 0.07 | 3,049 | | |
| B5 | 756,357 | 17.4 | 0.02 | - | 131 | 2,066 | 0.0155 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.40 | 0.13 | 5,663 | | |
| **Area C** | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.02 | - | 128 | 1,445 | 0.0159 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.47 | 0.15 | 6,534 | 0.5 | 6,534 |
| **Area D** | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.02 | - | 127 | 1,194 | 0.0151 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.27 | 0.09 | 3,920 | 0.3 | 3,920 |

# APPENDIX B: OFF-SITE HYDROLOGY CALCULATIONS BASED ON EXISTING CONDITION (RATIONAL METHOD)

# APPENDIX B.1: 100-YEAR HYDROLOGY CALCULATIONS

**TUUSSO WEST ANTELOPE PROJECT**
**EXISTING CONDITIONS**
**TC RESULTS**

| Sub Area Name | Sub Area Area (sq. ft) | Sub Area Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Flowrate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **100 YEAR STORM** | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | |
| A1 | 1,585,865 | 36.4 | 0.02 | 100 | 69 | 2,114 | 0.0946 | 8.1 | 13 | 3.08 | 0.57 | 0.58 | 65.04 | 4.91 | 213,880 | 1,523 |
| A2 | 1,806,019 | 41.5 | 0.02 | 100 | 75 | 821 | 0.0974 | 8.0 | 7 | 4.06 | 0.62 | 0.63 | 106.05 | 4.54 | 197,762 | |
| A3 | 1,009,163 | 23.2 | 0.02 | 100 | 100 | 673 | 0.0594 | 8.0 | 6 | 4.36 | 0.70 | 0.70 | 70.71 | 2.78 | 121,097 | |
| A4 | 1,560,947 | 35.8 | 0.02 | 100 | 100 | 779 | 0.0770 | 8.0 | 6 | 4.36 | 0.70 | 0.70 | 109.37 | 4.31 | 187,744 | |
| A5 | 2,554,864 | 58.7 | 0.02 | 100 | 100 | 817 | 0.0612 | 7.9 | 7 | 4.00 | 0.68 | 0.68 | 159.53 | 7.12 | 310,147 | |
| A6 | 574,021 | 13.2 | 0.02 | 100 | 119 | 1,007 | 0.0695 | 7.9 | 8 | 3.76 | 0.62 | 0.63 | 31.22 | 1.45 | 63,162 | |
| A7 | 2,315,850 | 53.2 | 0.02 | 100 | 78 | 2,426 | 0.2144 | 8.0 | 12 | 3.15 | 0.62 | 0.63 | 105.51 | 6.64 | 289,238 | |
| A8 | 849,604 | 19.5 | 0.02 | 100 | 105 | 1,094 | 0.1096 | 7.9 | 7 | 4.00 | 0.70 | 0.70 | 54.61 | 2.66 | 115,870 | |
| A9 | 574,021 | 13.2 | 0.02 | 100 | 133 | 515 | 0.0583 | 7.9 | 5 | 4.69 | 0.84 | 0.84 | 51.91 | 2.29 | 99,752 | |
| A10 | 1,446,874 | 33.2 | 0.02 | 100 | 79 | 1,957 | 0.2759 | 8.0 | 8 | 3.81 | 0.81 | 0.81 | 102.51 | 5.53 | 240,887 | |
| A11 | 1,787,378 | 41.0 | 0.02 | 100 | 94 | 1,256 | 0.1035 | 7.9 | 7 | 4.00 | 0.90 | 0.90 | 147.72 | 11.45 | 498,762 | |
| A12 | 524,790 | 12.0 | 0.02 | 100 | 134 | 821 | 0.0609 | 7.7 | 8 | 3.70 | 0.52 | 0.53 | 23.63 | 1.18 | 51,401 | |
| A13 | 1,579,756 | 36.3 | 0.02 | 100 | 98 | 1,916 | 0.2506 | 7.9 | 8 | 3.76 | 0.86 | 0.86 | 117.27 | 7.83 | 341,075 | |
| A14 | 1,630,631 | 37.4 | 0.02 | 100 | 131 | 1,632 | 0.1103 | 7.9 | 30 | 2.02 | 0.10 | 0.12 | 9.07 | 2.90 | 126,324 | |
| A15 | 1,342,876 | 30.8 | 0.02 | 100 | 134 | 1,281 | 0.0546 | 7.6 | 12 | 3.02 | 0.46 | 0.47 | 43.76 | 2.89 | 125,888 | |
| A16 | 1,038,729 | 23.8 | 0.02 | 100 | 133 | 1,010 | 0.0495 | 7.5 | 8 | 3.60 | 0.81 | 0.81 | 69.53 | 3.92 | 170,755 | |
| A17 | 1,738,958 | 39.9 | 0.02 | 100 | 122 | 3,124 | 0.0608 | 7.2 | 24 | 2.05 | 0.40 | 0.41 | 33.55 | 3.56 | 155,074 | |
| A18 | 1,396,803 | 32.1 | 0.02 | 100 | 121 | 3,109 | 0.0611 | 7.2 | 30 | 1.85 | 0.10 | 0.12 | 7.12 | 2.27 | 98,881 | |
| A19 | 1,099,194 | 25.2 | 0.02 | 100 | 134 | 1,309 | 0.0535 | 6.7 | 15 | 2.40 | 0.38 | 0.39 | 23.62 | 1.96 | 85,378 | |
| A20 | 1,141,335 | 26.2 | 0.02 | 100 | 120 | 2,409 | 0.0872 | 7.1 | 15 | 2.52 | 0.61 | 0.62 | 40.94 | 2.73 | 118,919 | |
| A21 | 1,444,919 | 33.2 | 0.02 | 100 | 121 | 1,673 | 0.0657 | 6.8 | 30 | 1.76 | 0.10 | 0.12 | 7.01 | 2.24 | 97,574 | |
| A22 | 1,200,702 | 27.6 | 0.02 | 100 | 127 | 745 | 0.0403 | 6.8 | 12 | 2.71 | 0.34 | 0.35 | 26.14 | 2.11 | 91,912 | |
| A23 | 1,078,039 | 24.7 | 0.02 | 100 | 131 | 1,372 | 0.0219 | 6.7 | 30 | 1.73 | 0.10 | 0.12 | 5.14 | 1.64 | 71,438 | |
| A24 | 1,266,527 | 29.1 | 0.02 | 100 | 120 | 2,874 | 0.0452 | 7.1 | 19 | 2.25 | 0.57 | 0.58 | 37.94 | 3.02 | 131,551 | |
| A25 | 1,474,213 | 33.8 | 0.02 | 100 | 123 | 2,791 | 0.0358 | 6.7 | 16 | 2.36 | 0.78 | 0.78 | 62.30 | 6.65 | 289,674 | |
| A26 | 694,722 | 15.9 | 0.02 | 100 | 134 | 1,037 | 0.0337 | 6.3 | 16 | 2.17 | 0.34 | 0.35 | 12.11 | 1.13 | 49,223 | |
| **Area B** | | | | | | | | | | | | | | | | |
| B1 | 1,719,978 | 39.5 | 0.02 | 100 | 120 | 3,286 | 0.0700 | 7.1 | 19 | 2.25 | 0.57 | 0.58 | 51.53 | 4.10 | 178,596 | 60 |
| B2 | 1,892,960 | 43.5 | 0.02 | 100 | 130 | 2,091 | 0.0316 | 6.5 | 30 | 1.67 | 0.10 | 0.12 | 8.71 | 2.79 | 121,532 | |
| **Area C** | | | | | | | | | | | | | | | | |
| C1 | 1,138,408 | 26.1 | 0.02 | 100 | 120 | 2,113 | 0.2272 | 7.7 | 10 | 3.33 | 0.67 | 0.67 | 58.31 | 3.11 | 135,472 | |
| C2 | 1,049,612 | 24.1 | 0.02 | 100 | 131 | 1,814 | 0.1985 | 7.7 | 30 | 1.99 | 0.10 | 0.12 | 5.75 | 1.84 | 80,150 | |
| C3 | 1,465,454 | 33.6 | 0.02 | 100 | 120 | 867 | 0.0462 | 7.6 | 8 | 3.65 | 0.69 | 0.69 | 84.73 | 4.01 | 174,676 | |
| C4 | 853,826 | 19.6 | 0.02 | 100 | 131 | 1,655 | 0.1046 | 7.6 | 30 | 1.96 | 0.10 | 0.12 | 4.61 | 1.48 | 64,469 | |
| C5 | 1,146,854 | 26.3 | 0.02 | 100 | 134 | 1,269 | 0.0630 | 7.5 | 12 | 2.97 | 0.45 | 0.46 | 35.97 | 2.42 | 105,415 | |
| C6 | 924,854 | 21.2 | 0.02 | 100 | 134 | 1,823 | 0.1536 | 7.7 | 12 | 3.06 | 0.46 | 0.47 | 30.54 | 2.03 | 88,427 | |

**TUUSSO WEST ANTELOPE PROJECT**
**EXISTING CONDITIONS**
**TC RESULTS**

| Sub Area Name | Sub Area Area (sq. ft) | Sub Area Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Flowrate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C7 | 1,267,824 | 29.1 | 0.02 | 100 | 126 | 884 | 0.1357 | 7.6 | 6 | 4.18 | 0.69 | 0.69 | 83.95 | 3.22 | 140,263 | 443 |
| C8 | 370,271 | 8.5 | 0.02 | 100 | 124 | 469 | 0.0853 | 7.5 | 6 | 4.12 | 0.48 | 0.49 | 17.16 | 0.74 | 32,234 | |
| C9 | 637,672 | 14.6 | 0.02 | 100 | 120 | 1,154 | 0.0693 | 7.3 | 9 | 3.30 | 0.67 | 0.67 | 32.37 | 1.62 | 70,567 | |
| C10 | 729,377 | 16.7 | 0.02 | 100 | 125 | 1,445 | 0.0415 | 7.3 | 30 | 1.87 | 0.10 | 0.12 | 3.76 | 1.21 | 52,708 | |
| C11 | 502,846 | 11.5 | 0.02 | 100 | 134 | 1,016 | 0.1900 | 7.5 | 8 | 3.60 | 0.51 | 0.52 | 21.61 | 1.09 | 47,480 | |
| C12 | 718,430 | 16.5 | 0.02 | 100 | 132 | 1,463 | 0.0957 | 7.3 | 30 | 1.87 | 0.10 | 0.12 | 3.70 | 1.19 | 51,836 | |
| C13 | 1,560,451 | 35.8 | 0.02 | 100 | 120 | 2,284 | 0.0525 | 7.1 | 16 | 2.44 | 0.60 | 0.61 | 53.32 | 3.72 | 162,043 | |
| C14 | 1,527,075 | 35.1 | 0.02 | 100 | 132 | 1,561 | 0.0365 | 6.7 | 30 | 1.73 | 0.10 | 0.12 | 7.28 | 2.33 | 101,495 | |
| **Area D** | | | | | | | | | | | | | | | | |
| D1 | 1,496,714 | 34.4 | 0.02 | 100 | 134 | 1,422 | 0.1266 | 7.4 | 12 | 2.93 | 0.45 | 0.46 | 46.31 | 3.10 | 135,036 | 320 |
| D2 | 1,806,473 | 41.5 | 0.02 | 100 | 133 | 1,028 | 0.0584 | 7.3 | 8 | 3.49 | 0.81 | 0.81 | 117.23 | 6.51 | 283,576 | |
| D3 | 1,823,295 | 41.9 | 0.02 | 100 | 132 | 1,173 | 0.0256 | 7.2 | 30 | 1.85 | 0.10 | 0.12 | 9.29 | 2.97 | 129,373 | |
| D4 | 1,754,927 | 40.3 | 0.02 | 100 | 133 | 927 | 0.0216 | 7.0 | 9 | 3.15 | 0.80 | 0.80 | 101.52 | 5.81 | 253,084 | |
| D5 | 1,652,885 | 37.9 | 0.02 | 100 | 134 | 1,057 | 0.0284 | 6.7 | 15 | 2.40 | 0.38 | 0.39 | 35.52 | 2.95 | 128,502 | |
| D6 | 824,006 | 18.9 | 0.02 | 100 | 134 | 1,258 | 0.0159 | 6.4 | 24 | 1.83 | 0.28 | 0.29 | 10.04 | 1.33 | 57,935 | |
| **Area E** | | | | | | | | | | | | | | | | |
| E1 | 1,718,474 | 39.5 | 0.02 | 100 | 100 | 1,780 | 0.1798 | 8.0 | 9 | 3.61 | 0.66 | 0.66 | 94.00 | 4.81 | 209,524 | 1,138 |
| E2 | 903,999 | 20.8 | 0.02 | 100 | 112 | 1,334 | 0.2549 | 7.9 | 6 | 4.30 | 0.85 | 0.85 | 75.85 | 4.10 | 178,596 | |
| E3 | 1,552,099 | 35.6 | 0.02 | 100 | 124 | 941 | 0.2339 | 7.7 | 8 | 3.70 | 0.44 | 0.45 | 59.33 | 3.27 | 142,441 | |
| E4 | 1,868,506 | 42.9 | 0.02 | 100 | 134 | 1,578 | 0.0254 | 7.6 | 17 | 2.56 | 0.40 | 0.41 | 45.02 | 3.94 | 171,626 | |
| E5 | 1,761,471 | 40.4 | 0.02 | 100 | 134 | 1,931 | 0.0518 | 7.5 | 18 | 2.46 | 0.39 | 0.40 | 39.79 | 3.63 | 158,123 | |
| E6 | 1,611,085 | 37.0 | 0.02 | 100 | 134 | 1,489 | 0.0336 | 7.1 | 18 | 2.31 | 0.36 | 0.37 | 31.61 | 3.06 | 133,294 | |
| E7 | 1,849,305 | 42.5 | 0.02 | 100 | 134 | 1,610 | 0.0249 | 6.8 | 23 | 1.99 | 0.31 | 0.32 | 27.03 | 3.30 | 143,748 | |
| E8 | 1,560,293 | 35.8 | 0.02 | 100 | 110 | 2,594 | 0.1831 | 7.9 | 10 | 3.38 | 0.86 | 0.86 | 104.12 | 12.45 | 542,322 | |
| E9 | 1,212,350 | 27.8 | 0.02 | 100 | 117 | 2,089 | 0.1340 | 7.9 | 9 | 3.55 | 0.89 | 0.89 | 87.93 | 9.81 | 427,324 | |
| E10 | 1,923,438 | 44.2 | 0.02 | 100 | 127 | 2,391 | 0.1338 | 7.6 | 22 | 2.27 | 0.27 | 0.28 | 28.07 | 3.70 | 161,172 | |
| E11 | 1,690,488 | 38.8 | 0.02 | 100 | 122 | 3,124 | 0.2113 | 7.7 | 16 | 2.67 | 0.49 | 0.50 | 51.81 | 3.89 | 169,448 | |
| E12 | 2,023,123 | 46.4 | 0.02 | 100 | 134 | 2,650 | 0.0717 | 7.5 | 22 | 2.24 | 0.35 | 0.36 | 37.45 | 4.09 | 178,160 | |
| E13 | 1,304,570 | 29.9 | 0.02 | 100 | 112 | 1,917 | 0.1774 | 7.9 | 9 | 3.55 | 0.83 | 0.83 | 88.24 | 5.99 | 260,924 | |
| E14 | 1,788,478 | 41.1 | 0.02 | 100 | 120 | 1,322 | 0.1059 | 7.7 | 9 | 3.50 | 0.68 | 0.68 | 97.72 | 4.92 | 214,315 | |
| E15 | 1,577,494 | 36.2 | 0.02 | 100 | 127 | 945 | 0.0846 | 7.6 | 10 | 3.29 | 0.41 | 0.42 | 50.04 | 3.18 | 138,521 | |
| E16 | 1,035,321 | 23.8 | 0.02 | 100 | 134 | 604 | 0.0662 | 7.5 | 7 | 3.83 | 0.53 | 0.54 | 49.16 | 2.25 | 98,010 | |
| E17 | 2,111,198 | 48.5 | 0.02 | 100 | 134 | 2,436 | 0.0862 | 7.5 | 19 | 2.39 | 0.38 | 0.39 | 45.18 | 4.31 | 187,744 | |
| E18 | 1,308,556 | 30.0 | 0.02 | 100 | 134 | 1,059 | 0.0378 | 7.3 | 12 | 2.88 | 0.44 | 0.45 | 38.93 | 2.66 | 115,870 | |
| E19 | 1,251,524 | 28.7 | 0.02 | 100 | 134 | 2,163 | 0.0277 | 7.0 | 29 | 1.82 | 0.28 | 0.29 | 15.16 | 2.22 | 96,703 | |
| E20 | 1,801,569 | 41.4 | 0.02 | 100 | 134 | 1,206 | 0.0166 | 6.6 | 20 | 2.06 | 0.32 | 0.33 | 28.12 | 3.08 | 134,165 | |
| E21 | 1,764,663 | 40.5 | 0.02 | 100 | 134 | 1,021 | 0.0196 | 6.3 | 19 | 2.00 | 0.31 | 0.32 | 25.93 | 2.85 | 124,146 | |
| E22 | 2,200,540 | 50.5 | 0.02 | 100 | 134 | 1,425 | 0.0168 | 6.1 | 30 | 1.56 | 0.21 | 0.22 | 17.34 | 3.20 | 139,392 | |

**TUUSSO WEST ANTELOPE PROJECT**
**EXISTING CONDITIONS**
**TC RESULTS**

| Sub Area Name | Sub Area Area (sq. ft) | Sub Area Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Flowrate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Area F** | | | | | | | | | | | | | | | | |
| F1 | 1,838,282 | 42.2 | 0.02 | 100 | 100 | 2,040 | 0.2058 | 8.0 | 10 | 3.43 | 0.65 | 0.66 | 95.53 | 5.10 | 222,156 | |
| F2 | 1,158,193 | 26.6 | 0.02 | 100 | 100 | 1,094 | 0.2010 | 7.9 | 7 | 4.00 | 0.68 | 0.68 | 72.32 | 3.23 | 140,699 | |
| F3 | 1,117,959 | 25.7 | 0.02 | 100 | 111 | 1,613 | 0.1240 | 7.7 | 9 | 3.50 | 0.74 | 0.74 | 66.47 | 3.81 | 165,964 | |
| F4 | 1,988,861 | 45.7 | 0.02 | 100 | 100 | 2,624 | 0.2363 | 8.0 | 12 | 3.15 | 0.63 | 0.64 | 92.05 | 5.57 | 242,629 | |
| F5 | 1,713,920 | 39.3 | 0.02 | 100 | 114 | 1,568 | 0.1403 | 7.9 | 9 | 3.55 | 0.66 | 0.66 | 92.19 | 5.33 | 232,175 | |
| F6 | 1,615,749 | 37.1 | 0.02 | 100 | 134 | 1,301 | 0.1076 | 7.7 | 11 | 3.19 | 0.47 | 0.48 | 56.80 | 3.49 | 152,024 | |
| F7 | 1,583,242 | 36.3 | 0.02 | 100 | 133 | 1,067 | 0.0563 | 7.6 | 7 | 3.89 | 0.82 | 0.82 | 115.94 | 6.13 | 267,023 | |
| F8 | 1,452,825 | 33.4 | 0.02 | 100 | 133 | 820 | 0.0488 | 7.5 | 7 | 3.83 | 0.82 | 0.82 | 104.75 | 5.50 | 239,580 | |
| F9 | 1,865,213 | 42.8 | 0.02 | 100 | 131 | 1,082 | 0.0370 | 7.4 | 30 | 1.90 | 0.10 | 0.12 | 9.76 | 3.13 | 136,343 | |
| F10 | 1,480,328 | 34.0 | 0.02 | 100 | 132 | 1,135 | 0.0352 | 7.1 | 30 | 1.82 | 0.10 | 0.12 | 7.42 | 2.37 | 103,237 | |
| F11 | 1,728,174 | 39.7 | 0.02 | 100 | 134 | 1,594 | 0.0251 | 6.6 | 24 | 1.89 | 0.29 | 0.30 | 22.49 | 2.92 | 127,195 | |
| F12 | 1,221,460 | 28.0 | 0.02 | 100 | 134 | 1,967 | 0.0203 | 6.2 | 30 | 1.59 | 0.22 | 0.23 | 10.25 | 1.82 | 79,279 | |
| F13 | 954,976 | 21.9 | 0.02 | 100 | 131 | 1,798 | 0.0167 | 5.7 | 30 | 1.47 | 0.10 | 0.12 | 3.87 | 1.24 | 54,014 | |
| F14 | 1,128,724 | 25.9 | 0.02 | 100 | 120 | 1,782 | 0.0898 | 7.7 | 11 | 3.19 | 0.66 | 0.66 | 54.55 | 3.07 | 133,729 | |
| F15 | 1,652,328 | 37.9 | 0.02 | 100 | 120 | 1,819 | 0.0495 | 7.6 | 12 | 3.02 | 0.65 | 0.66 | 75.61 | 4.47 | 194,713 | |
| F16 | 1,425,963 | 32.7 | 0.02 | 100 | 122 | 1,870 | 0.0321 | 7.3 | 18 | 2.38 | 0.45 | 0.46 | 35.84 | 3.05 | 132,858 | 1,725 |
| F17 | 1,894,709 | 43.5 | 0.02 | 100 | 134 | 1,983 | 0.0252 | 6.7 | 29 | 1.76 | 0.27 | 0.28 | 21.44 | 3.21 | 139,828 | |
| F18 | 1,413,938 | 32.5 | 0.02 | 100 | 134 | 2,063 | 0.0194 | 6.2 | 30 | 1.59 | 0.22 | 0.23 | 11.87 | 2.11 | 91,912 | |
| F19 | 1,235,824 | 28.4 | 0.02 | 100 | 100 | 1,564 | 0.2685 | 8.1 | 8 | 3.86 | 0.67 | 0.67 | 73.37 | 3.57 | 155,509 | |
| F20 | 1,705,140 | 39.1 | 0.02 | 100 | 100 | 785 | 0.1784 | 8.1 | 5 | 4.82 | 0.72 | 0.72 | 135.85 | 4.84 | 210,830 | |
| F21 | 1,743,464 | 40.0 | 0.02 | 100 | 106 | 1,147 | 0.1308 | 8.0 | 14 | 2.93 | 0.24 | 0.25 | 29.32 | 3.40 | 148,104 | |
| F22 | 1,699,749 | 39.0 | 0.02 | 100 | 120 | 1,000 | 0.1100 | 8.0 | 7 | 4.06 | 0.71 | 0.71 | 112.48 | 4.95 | 215,622 | |
| F23 | 1,512,402 | 34.7 | 0.02 | 100 | 114 | 3,041 | 0.1842 | 7.9 | 14 | 2.89 | 0.62 | 0.63 | 63.21 | 4.65 | 202,554 | |
| F24 | 1,493,816 | 34.3 | 0.02 | 100 | 120 | 1,672 | 0.0957 | 7.7 | 10 | 3.33 | 0.67 | 0.67 | 76.51 | 4.08 | 177,725 | |
| F25 | 1,477,735 | 33.9 | 0.02 | 100 | 120 | 1,445 | 0.0415 | 7.6 | 11 | 3.14 | 0.66 | 0.66 | 70.30 | 3.93 | 171,191 | |
| F26 | 1,685,448 | 38.7 | 0.02 | 100 | 120 | 1,365 | 0.0440 | 7.4 | 11 | 3.05 | 0.65 | 0.66 | 77.89 | 4.29 | 186,872 | |
| F27 | 2,058,417 | 47.3 | 0.02 | 100 | 120 | 1,416 | 0.0282 | 7.2 | 12 | 2.84 | 0.63 | 0.64 | 85.89 | 5.11 | 222,592 | |
| F28 | 1,926,104 | 44.2 | 0.02 | 100 | 132 | 1,543 | 0.0194 | 6.8 | 30 | 1.76 | 0.10 | 0.12 | 9.34 | 2.99 | 130,244 | |
| F29 | 1,619,674 | 37.2 | 0.02 | 100 | 134 | 1,477 | 0.0169 | 6.4 | 27 | 1.73 | 0.26 | 0.27 | 17.37 | 2.59 | 112,820 | |
| F30 | 1,245,013 | 28.6 | 0.02 | 100 | 134 | 1,767 | 0.0141 | 6.1 | 30 | 1.56 | 0.21 | 0.22 | 9.81 | 1.81 | 78,844 | |
| F31 | 1,580,064 | 36.3 | 0.02 | 100 | 122 | 1,953 | 0.0154 | 5.6 | 30 | 1.44 | 0.27 | 0.28 | 14.63 | 2.27 | 98,881 | |

# APPENDIX B.2: 50-YEAR HYDROLOGY CALCULATIONS

| TUUSSO WEST ANTELOPE PROJECT<br>EXISTING CONDITIONS<br>TC RESULTS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sub Area Name** | **Sub Area Area (sq. ft)** | **Sub Area Area (ac.)** | **% IMP** | **Frequency** | **Soil Type** | **Length (ft)** | **Slope (ft/ft)** | **Isohyet (in.)** | **Tc (min.)** | **Intensity (in./hr)** | **Cu** | **Cd** | **Flowrate (cfs)** | **Volume (acre-ft)** | **Volume (cf)** | **Total Flowrate (cfs)** |
| **50 YEAR STORM** | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | |
| A1 | 1,585,865 | 36.4 | 0.02 | 50 | 69 | 2,114 | 0.0946 | 7.2 | 14 | 2.65 | 0.53 | 0.54 | 52.09 | 4.12 | 179,467 | 1,213 |
| A2 | 1,806,019 | 41.5 | 0.02 | 50 | 75 | 821 | 0.0974 | 7.1 | 8 | 3.40 | 0.57 | 0.58 | 81.84 | 3.89 | 169,448 | |
| A3 | 1,009,163 | 23.2 | 0.02 | 50 | 100 | 673 | 0.0594 | 7.1 | 7 | 3.62 | 0.66 | 0.66 | 55.43 | 2.45 | 106,722 | |
| A4 | 1,560,947 | 35.8 | 0.02 | 50 | 100 | 779 | 0.0770 | 7.1 | 7 | 3.62 | 0.66 | 0.66 | 85.53 | 3.79 | 165,092 | |
| A5 | 2,554,864 | 58.7 | 0.02 | 50 | 100 | 817 | 0.0612 | 7.0 | 8 | 3.35 | 0.64 | 0.65 | 127.82 | 6.07 | 264,409 | |
| A6 | 574,021 | 13.2 | 0.02 | 50 | 119 | 1,007 | 0.0695 | 7.0 | 9 | 3.17 | 0.57 | 0.58 | 24.27 | 1.22 | 53,143 | |
| A7 | 2,315,850 | 53.2 | 0.02 | 50 | 78 | 2,426 | 0.2144 | 7.1 | 13 | 2.70 | 0.59 | 0.60 | 86.18 | 5.64 | 245,678 | |
| A8 | 849,604 | 19.5 | 0.02 | 50 | 105 | 1,094 | 0.1096 | 7.0 | 8 | 3.35 | 0.66 | 0.66 | 43.11 | 2.25 | 98,010 | |
| A9 | 574,021 | 13.2 | 0.02 | 50 | 133 | 515 | 0.0583 | 7.0 | 5 | 4.18 | 0.83 | 0.83 | 45.80 | 1.91 | 83,200 | |
| A10 | 1,446,874 | 33.2 | 0.02 | 50 | 79 | 1,957 | 0.2759 | 7.1 | 9 | 3.21 | 0.78 | 0.78 | 83.13 | 4.56 | 198,634 | |
| A11 | 1,787,378 | 41.0 | 0.02 | 50 | 94 | 1,256 | 0.1035 | 7.0 | 7 | 3.57 | 0.89 | 0.89 | 130.27 | 9.32 | 405,979 | |
| A12 | 524,790 | 12.0 | 0.02 | 50 | 134 | 821 | 0.0609 | 6.9 | 10 | 2.97 | 0.45 | 0.46 | 16.39 | 0.98 | 42,689 | |
| A13 | 1,579,756 | 36.3 | 0.02 | 50 | 98 | 1,916 | 0.2506 | 7.0 | 9 | 3.17 | 0.85 | 0.85 | 97.81 | 6.40 | 278,784 | |
| A14 | 1,630,631 | 37.4 | 0.02 | 50 | 131 | 1,632 | 0.1103 | 7.0 | 30 | 1.80 | 0.10 | 0.12 | 8.08 | 2.58 | 112,385 | |
| A15 | 1,342,876 | 30.8 | 0.02 | 50 | 134 | 1,281 | 0.0546 | 6.8 | 15 | 2.42 | 0.38 | 0.39 | 29.07 | 2.42 | 105,415 | |
| A16 | 1,038,729 | 23.8 | 0.02 | 50 | 133 | 1,010 | 0.0495 | 6.7 | 8 | 3.21 | 0.80 | 0.80 | 61.12 | 3.26 | 142,006 | |
| A17 | 1,738,958 | 39.9 | 0.02 | 50 | 122 | 3,124 | 0.0608 | 6.4 | 30 | 1.64 | 0.32 | 0.33 | 21.59 | 2.99 | 130,244 | |
| A18 | 1,396,803 | 32.1 | 0.02 | 50 | 121 | 3,109 | 0.0611 | 6.4 | 30 | 1.64 | 0.10 | 0.12 | 6.32 | 2.03 | 88,427 | |
| A19 | 1,099,194 | 25.2 | 0.02 | 50 | 134 | 1,309 | 0.0535 | 6.0 | 20 | 1.87 | 0.29 | 0.30 | 14.14 | 1.66 | 72,310 | |
| A20 | 1,141,335 | 26.2 | 0.02 | 50 | 120 | 2,409 | 0.0872 | 6.3 | 17 | 2.11 | 0.56 | 0.57 | 31.51 | 2.34 | 101,930 | |
| A21 | 1,444,919 | 33.2 | 0.02 | 50 | 121 | 1,673 | 0.0657 | 6.1 | 30 | 1.57 | 0.10 | 0.12 | 6.25 | 2.00 | 87,120 | |
| A22 | 1,200,702 | 27.6 | 0.02 | 50 | 127 | 745 | 0.0403 | 6.1 | 16 | 2.11 | 0.24 | 0.25 | 14.56 | 1.77 | 77,101 | |
| A23 | 1,078,039 | 24.7 | 0.02 | 50 | 131 | 1,372 | 0.0219 | 6.0 | 30 | 1.54 | 0.10 | 0.12 | 4.56 | 1.46 | 63,598 | |
| A24 | 1,266,527 | 29.1 | 0.02 | 50 | 120 | 2,874 | 0.0452 | 6.3 | 22 | 1.87 | 0.52 | 0.53 | 28.84 | 2.57 | 111,949 | |
| A25 | 1,474,213 | 33.8 | 0.02 | 50 | 123 | 2,791 | 0.0358 | 6.0 | 18 | 1.96 | 0.76 | 0.76 | 50.35 | 5.37 | 233,917 | |
| A26 | 694,722 | 15.9 | 0.02 | 50 | 134 | 1,037 | 0.0337 | 5.6 | 22 | 1.67 | 0.25 | 0.26 | 6.90 | 0.95 | 41,382 | |
| **Area B** | | | | | | | | | | | | | | | | |
| B1 | 1,719,978 | 39.5 | 0.02 | 50 | 120 | 3,286 | 0.0700 | 6.3 | 22 | 1.87 | 0.52 | 0.53 | 39.15 | 3.48 | 151,589 | 47 |
| B2 | 1,892,960 | 43.5 | 0.02 | 50 | 130 | 2,091 | 0.0316 | 5.8 | 30 | 1.49 | 0.10 | 0.12 | 7.78 | 2.49 | 108,464 | |
| **Area C** | | | | | | | | | | | | | | | | |
| C1 | 1,138,408 | 26.1 | 0.02 | 50 | 120 | 2,113 | 0.2272 | 6.9 | 12 | 2.73 | 0.62 | 0.63 | 44.95 | 2.68 | 116,741 | |
| C2 | 1,049,612 | 24.1 | 0.02 | 50 | 131 | 1,814 | 0.1985 | 6.9 | 30 | 1.77 | 0.10 | 0.12 | 5.12 | 1.64 | 71,438 | |
| C3 | 1,465,454 | 33.6 | 0.02 | 50 | 120 | 867 | 0.0462 | 6.8 | 8 | 3.25 | 0.66 | 0.66 | 72.16 | 3.41 | 148,540 | |
| C4 | 853,826 | 19.6 | 0.02 | 50 | 131 | 1,655 | 0.1046 | 6.8 | 30 | 1.75 | 0.10 | 0.12 | 4.12 | 1.32 | 57,499 | |
| C5 | 1,146,854 | 26.3 | 0.02 | 50 | 134 | 1,269 | 0.0630 | 6.7 | 14 | 2.46 | 0.39 | 0.40 | 25.91 | 2.06 | 89,734 | |
| C6 | 924,854 | 21.2 | 0.02 | 50 | 134 | 1,823 | 0.1536 | 6.9 | 15 | 2.46 | 0.39 | 0.40 | 20.89 | 1.71 | 74,488 | |

**TUUSSO WEST ANTELOPE PROJECT**
**EXISTING CONDITIONS**
**TC RESULTS**

| Sub Area Name | Sub Area Area (sq. ft) | Sub Area Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Flowrate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C7 | 1,267,824 | 29.1 | 0.02 | 50 | 126 | 884 | 0.1357 | 6.8 | 7 | 3.46 | 0.64 | 0.65 | 65.46 | 2.84 | 123,710 | 347 |
| C8 | 370,271 | 8.5 | 0.02 | 50 | 124 | 469 | 0.0853 | 6.7 | 7 | 3.41 | 0.41 | 0.42 | 12.17 | 0.66 | 28,750 | |
| C9 | 637,672 | 14.6 | 0.02 | 50 | 120 | 1,154 | 0.0693 | 6.5 | 10 | 2.80 | 0.63 | 0.64 | 26.23 | 1.36 | 59,242 | |
| C10 | 729,377 | 16.7 | 0.02 | 50 | 125 | 1,445 | 0.0415 | 6.5 | 30 | 1.67 | 0.10 | 0.12 | 3.36 | 1.07 | 46,609 | |
| C11 | 502,846 | 11.5 | 0.02 | 50 | 134 | 1,016 | 0.1900 | 6.7 | 10 | 2.89 | 0.44 | 0.45 | 15.01 | 0.91 | 39,640 | |
| C12 | 718,430 | 16.5 | 0.02 | 50 | 132 | 1,463 | 0.0957 | 6.5 | 30 | 1.67 | 0.10 | 0.12 | 3.31 | 1.06 | 46,174 | |
| C13 | 1,560,451 | 35.8 | 0.02 | 50 | 120 | 2,284 | 0.0525 | 6.3 | 18 | 2.06 | 0.55 | 0.56 | 41.33 | 3.20 | 139,392 | |
| C14 | 1,527,075 | 35.1 | 0.02 | 50 | 132 | 1,561 | 0.0365 | 6.0 | 30 | 1.54 | 0.10 | 0.12 | 6.48 | 2.08 | 90,605 | |
| **Area D** | | | | | | | | | | | | | | | | |
| D1 | 1,496,714 | 34.4 | 0.02 | 50 | 134 | 1,422 | 0.1266 | 6.6 | 13 | 2.51 | 0.40 | 0.41 | 35.36 | 2.67 | 116,305 | 255 |
| D2 | 1,806,473 | 41.5 | 0.02 | 50 | 133 | 1,028 | 0.0584 | 6.5 | 8 | 3.11 | 0.79 | 0.79 | 101.89 | 5.42 | 236,095 | |
| D3 | 1,823,295 | 41.9 | 0.02 | 50 | 132 | 1,173 | 0.0256 | 6.4 | 30 | 1.64 | 0.10 | 0.12 | 8.24 | 2.64 | 114,998 | |
| D4 | 1,754,927 | 40.3 | 0.02 | 50 | 133 | 927 | 0.0216 | 6.2 | 10 | 2.67 | 0.77 | 0.77 | 82.83 | 4.80 | 209,088 | |
| D5 | 1,652,885 | 37.9 | 0.02 | 50 | 134 | 1,057 | 0.0284 | 6.0 | 19 | 1.91 | 0.29 | 0.30 | 21.74 | 2.51 | 109,336 | |
| D6 | 824,006 | 18.9 | 0.02 | 50 | 134 | 1,258 | 0.0159 | 5.7 | 30 | 1.47 | 0.18 | 0.19 | 5.28 | 1.11 | 48,352 | |
| **Area E** | | | | | | | | | | | | | | | | |
| E1 | 1,718,474 | 39.5 | 0.02 | 50 | 100 | 1,780 | 0.1798 | 7.1 | 11 | 2.92 | 0.61 | 0.62 | 71.51 | 4.04 | 175,982 | 825 |
| E2 | 903,999 | 20.8 | 0.02 | 50 | 112 | 1,334 | 0.2549 | 7.0 | 7 | 3.57 | 0.83 | 0.83 | 61.63 | 3.46 | 150,718 | |
| E3 | 1,552,099 | 35.6 | 0.02 | 50 | 124 | 941 | 0.2339 | 6.9 | 10 | 2.97 | 0.36 | 0.37 | 39.12 | 2.75 | 119,790 | |
| E4 | 1,868,506 | 42.9 | 0.02 | 50 | 134 | 1,578 | 0.0254 | 6.8 | 23 | 1.98 | 0.30 | 0.31 | 26.33 | 3.30 | 143,748 | |
| E5 | 1,761,471 | 40.4 | 0.02 | 50 | 134 | 1,931 | 0.0518 | 6.7 | 23 | 1.95 | 0.30 | 0.31 | 24.42 | 3.05 | 132,858 | |
| E6 | 1,611,085 | 37.0 | 0.02 | 50 | 134 | 1,489 | 0.0336 | 6.3 | 23 | 1.83 | 0.28 | 0.29 | 19.64 | 2.58 | 112,385 | |
| E7 | 1,849,305 | 42.5 | 0.02 | 50 | 134 | 1,610 | 0.0249 | 6.1 | 30 | 1.57 | 0.21 | 0.22 | 14.68 | 2.73 | 118,919 | |
| E8 | 1,560,293 | 35.8 | 0.02 | 50 | 110 | 2,594 | 0.1831 | 7.0 | 11 | 2.88 | 0.85 | 0.85 | 87.64 | 10.38 | 452,153 | |
| E9 | 1,212,350 | 27.8 | 0.02 | 50 | 117 | 2,089 | 0.1340 | 7.0 | 10 | 3.02 | 0.88 | 0.88 | 73.88 | 8.12 | 353,707 | |
| E10 | 1,923,438 | 44.2 | 0.02 | 50 | 127 | 2,391 | 0.1338 | 6.8 | 30 | 1.75 | 0.17 | 0.18 | 13.92 | 3.08 | 134,165 | |
| E11 | 1,690,488 | 38.8 | 0.02 | 50 | 122 | 3,124 | 0.2113 | 6.9 | 19 | 2.20 | 0.42 | 0.43 | 36.70 | 3.33 | 145,055 | |
| E12 | 2,023,123 | 46.4 | 0.02 | 50 | 134 | 2,650 | 0.0717 | 6.7 | 30 | 1.72 | 0.26 | 0.27 | 21.55 | 3.37 | 146,797 | |
| E13 | 1,304,570 | 29.9 | 0.02 | 50 | 112 | 1,917 | 0.1774 | 7.0 | 9 | 3.17 | 0.82 | 0.82 | 77.72 | 4.93 | 214,751 | |
| E14 | 1,788,478 | 41.1 | 0.02 | 50 | 120 | 1,322 | 0.1059 | 6.9 | 9 | 3.12 | 0.65 | 0.66 | 84.63 | 4.20 | 182,952 | |
| E15 | 1,577,494 | 36.2 | 0.02 | 50 | 127 | 945 | 0.0846 | 6.8 | 12 | 2.69 | 0.33 | 0.34 | 33.11 | 2.76 | 120,226 | |
| E16 | 1,035,321 | 23.8 | 0.02 | 50 | 134 | 604 | 0.0662 | 6.7 | 8 | 3.21 | 0.48 | 0.49 | 37.44 | 1.94 | 84,506 | |
| E17 | 2,111,198 | 48.5 | 0.02 | 50 | 134 | 2,436 | 0.0862 | 6.7 | 25 | 1.88 | 0.29 | 0.30 | 27.35 | 3.60 | 156,816 | |
| E18 | 1,308,556 | 30.0 | 0.02 | 50 | 134 | 1,059 | 0.0378 | 6.5 | 15 | 2.31 | 0.36 | 0.37 | 25.64 | 2.23 | 97,139 | |
| E19 | 1,251,524 | 28.7 | 0.02 | 50 | 134 | 2,163 | 0.0277 | 6.2 | 30 | 1.59 | 0.22 | 0.23 | 10.50 | 1.88 | 81,893 | |
| E20 | 1,801,569 | 41.4 | 0.02 | 50 | 134 | 1,206 | 0.0166 | 5.9 | 30 | 1.52 | 0.20 | 0.21 | 13.21 | 2.53 | 110,207 | |
| E21 | 1,764,663 | 40.5 | 0.02 | 50 | 134 | 1,021 | 0.0196 | 5.6 | 28 | 1.49 | 0.19 | 0.20 | 12.07 | 2.35 | 102,366 | |
| E22 | 2,200,540 | 50.5 | 0.02 | 50 | 134 | 1,425 | 0.0168 | 5.4 | 30 | 1.39 | 0.16 | 0.17 | 11.93 | 2.77 | 120,661 | |

**TUUSSO WEST ANTELOPE PROJECT**
**EXISTING CONDITIONS**
**TC RESULTS**

| Sub Area Name | Sub Area Area (sq. ft) | Sub Area Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Flowrate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Area F** | | | | | | | | | | | | | | | | |
| F1 | 1,838,282 | 42.2 | 0.02 | 50 | 100 | 2,040 | 0.2058 | 7.1 | 12 | 2.81 | 0.60 | 0.61 | 72.34 | 4.38 | 190,793 | |
| F2 | 1,158,193 | 26.6 | 0.02 | 50 | 100 | 1,094 | 0.2010 | 7.0 | 7 | 3.57 | 0.66 | 0.66 | 62.65 | 2.75 | 119,790 | |
| F3 | 1,117,959 | 25.7 | 0.02 | 50 | 111 | 1,613 | 0.1240 | 6.9 | 10 | 2.97 | 0.71 | 0.71 | 54.12 | 3.15 | 137,214 | |
| F4 | 1,988,861 | 45.7 | 0.02 | 50 | 100 | 2,624 | 0.2363 | 7.1 | 13 | 2.70 | 0.59 | 0.60 | 73.97 | 4.74 | 206,474 | |
| F5 | 1,713,920 | 39.3 | 0.02 | 50 | 114 | 1,568 | 0.1403 | 7.0 | 10 | 3.02 | 0.63 | 0.64 | 76.05 | 4.46 | 194,278 | |
| F6 | 1,615,749 | 37.1 | 0.02 | 50 | 134 | 1,301 | 0.1076 | 6.9 | 12 | 2.73 | 0.42 | 0.43 | 43.54 | 3.06 | 133,294 | |
| F7 | 1,583,242 | 36.3 | 0.02 | 50 | 133 | 1,067 | 0.0563 | 6.8 | 8 | 3.25 | 0.80 | 0.80 | 94.50 | 5.10 | 222,156 | |
| F8 | 1,452,825 | 33.4 | 0.02 | 50 | 133 | 820 | 0.0488 | 6.7 | 7 | 3.41 | 0.80 | 0.80 | 90.99 | 4.58 | 199,505 | |
| F9 | 1,865,213 | 42.8 | 0.02 | 50 | 131 | 1,082 | 0.0370 | 6.6 | 30 | 1.70 | 0.10 | 0.12 | 8.74 | 2.79 | 121,532 | |
| F10 | 1,480,328 | 34.0 | 0.02 | 50 | 132 | 1,135 | 0.0352 | 6.3 | 30 | 1.62 | 0.10 | 0.12 | 6.61 | 2.11 | 91,912 | |
| F11 | 1,728,174 | 39.7 | 0.02 | 50 | 134 | 1,594 | 0.0251 | 5.9 | 30 | 1.52 | 0.20 | 0.21 | 12.66 | 2.43 | 105,851 | |
| F12 | 1,221,460 | 28.0 | 0.02 | 50 | 134 | 1,967 | 0.0203 | 5.5 | 30 | 1.41 | 0.16 | 0.17 | 6.72 | 1.57 | 68,389 | |
| F13 | 954,976 | 21.9 | 0.02 | 50 | 131 | 1,798 | 0.0167 | 5.1 | 30 | 1.31 | 0.10 | 0.12 | 3.45 | 1.10 | 47,916 | |
| F14 | 1,128,724 | 25.9 | 0.02 | 50 | 120 | 1,782 | 0.0898 | 6.9 | 12 | 2.73 | 0.62 | 0.63 | 44.57 | 2.66 | 115,870 | |
| F15 | 1,652,328 | 37.9 | 0.02 | 50 | 120 | 1,819 | 0.0495 | 6.8 | 14 | 2.50 | 0.60 | 0.61 | 57.85 | 3.77 | 164,221 | |
| F16 | 1,425,963 | 32.7 | 0.02 | 50 | 122 | 1,870 | 0.0321 | 6.5 | 22 | 1.93 | 0.38 | 0.39 | 24.64 | 2.58 | 112,385 | 1,360 |
| F17 | 1,894,709 | 43.5 | 0.02 | 50 | 134 | 1,983 | 0.0252 | 6.0 | 30 | 1.54 | 0.20 | 0.21 | 14.07 | 2.72 | 118,483 | |
| F18 | 1,413,938 | 32.5 | 0.02 | 50 | 134 | 2,063 | 0.0194 | 5.5 | 30 | 1.41 | 0.16 | 0.17 | 7.78 | 1.82 | 79,279 | |
| F19 | 1,235,824 | 28.4 | 0.02 | 50 | 100 | 1,564 | 0.2685 | 7.2 | 9 | 3.26 | 0.64 | 0.65 | 60.12 | 3.01 | 131,116 | |
| F20 | 1,705,140 | 39.1 | 0.02 | 50 | 100 | 785 | 0.1784 | 7.2 | 6 | 3.94 | 0.68 | 0.68 | 104.88 | 4.09 | 178,160 | |
| F21 | 1,743,464 | 40.0 | 0.02 | 50 | 106 | 1,147 | 0.1308 | 7.1 | 18 | 2.32 | 0.19 | 0.20 | 18.57 | 2.93 | 127,631 | |
| F22 | 1,699,749 | 39.0 | 0.02 | 50 | 120 | 1,000 | 0.1100 | 7.1 | 8 | 3.40 | 0.68 | 0.68 | 90.22 | 4.21 | 183,388 | |
| F23 | 1,512,402 | 34.7 | 0.02 | 50 | 114 | 3,041 | 0.1842 | 7.0 | 16 | 2.42 | 0.57 | 0.58 | 48.73 | 3.88 | 169,013 | |
| F24 | 1,493,816 | 34.3 | 0.02 | 50 | 120 | 1,672 | 0.0957 | 6.9 | 12 | 2.73 | 0.62 | 0.63 | 58.98 | 3.52 | 153,331 | |
| F25 | 1,477,735 | 33.9 | 0.02 | 50 | 120 | 1,445 | 0.0415 | 6.8 | 12 | 2.69 | 0.62 | 0.63 | 57.49 | 3.40 | 148,104 | |
| F26 | 1,685,448 | 38.7 | 0.02 | 50 | 120 | 1,365 | 0.0440 | 6.6 | 12 | 2.61 | 0.61 | 0.62 | 62.61 | 3.73 | 162,479 | |
| F27 | 2,058,417 | 47.3 | 0.02 | 50 | 120 | 1,416 | 0.0282 | 6.4 | 14 | 2.35 | 0.59 | 0.60 | 66.63 | 4.32 | 188,179 | |
| F28 | 1,926,104 | 44.2 | 0.02 | 50 | 132 | 1,543 | 0.0194 | 6.1 | 30 | 1.57 | 0.10 | 0.12 | 8.33 | 2.66 | 115,870 | |
| F29 | 1,619,674 | 37.2 | 0.02 | 50 | 134 | 1,477 | 0.0169 | 5.7 | 30 | 1.47 | 0.18 | 0.19 | 10.39 | 2.18 | 94,961 | |
| F30 | 1,245,013 | 28.6 | 0.02 | 50 | 134 | 1,767 | 0.0141 | 5.4 | 30 | 1.39 | 0.16 | 0.17 | 6.75 | 1.57 | 68,389 | |
| F31 | 1,580,064 | 36.3 | 0.02 | 50 | 122 | 1,953 | 0.0154 | 5.0 | 30 | 1.29 | 0.23 | 0.24 | 11.23 | 1.95 | 84,942 | |

# APPENDIX C: ON-SITE HYDROLOGY CALCULATIONS BASED ON PROPOSED CONDITION (MODIFIED RATIONAL METHOD)

# APPENDIX C.1: 50-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**PROPOSED CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | ΔFlowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Volume (cf) | ΔVolume (cf) | Total ΔVolume (cf) | Peak Flow Rate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **50 YEAR STORM** | | | | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.10 | 50 | 134 | 2,285 | 0.0136 | 5.4 | 30 | 1.39 | 0.16 | 0.23 | 8.04 | 2.10 | 2.05 | 89,298 | 576,734 | 29,185 | 190,357 | 68.2 |
| A2 | 522,233 | 12.0 | 0.10 | 50 | 134 | 948 | 0.0200 | 5.7 | 18 | 1.86 | 0.28 | 0.34 | 7.58 | 2.31 | 1.09 | 47,480 | | 15,682 | | |
| A3 | 715,877 | 16.4 | 0.10 | 50 | 134 | 1,617 | 0.0192 | 5.4 | 30 | 1.39 | 0.16 | 0.23 | 5.25 | 1.37 | 1.34 | 58,370 | | 19,166 | | |
| A4 | 517,947 | 11.9 | 0.10 | 50 | 134 | 919 | 0.0163 | 5.2 | 25 | 1.46 | 0.18 | 0.25 | 4.34 | 1.79 | 0.94 | 40,946 | | 13,939 | | |
| A5 | 392,335 | 9.0 | 0.10 | 50 | 134 | 988 | 0.0243 | 5.8 | 17 | 1.95 | 0.30 | 0.36 | 6.32 | 1.88 | 0.84 | 36,590 | | 12,197 | | |
| A6 | 1,134,501 | 26.0 | 0.10 | 50 | 134 | 1,365 | 0.0212 | 5.6 | 28 | 1.49 | 0.19 | 0.26 | 10.09 | 3.34 | 2.23 | 97,139 | | 32,234 | | |
| A7 | 475,310 | 10.9 | 0.10 | 50 | 134 | 463 | 0.0130 | 5.4 | 12 | 2.13 | 0.33 | 0.39 | 9.06 | 1.64 | 0.95 | 41,382 | | 12,632 | | |
| A8 | 1,004,776 | 23.1 | 0.10 | 50 | 134 | 1,467 | 0.0136 | 5.2 | 30 | 1.34 | 0.14 | 0.22 | 6.80 | 1.85 | 1.80 | 78,408 | | 25,700 | | |
| A9 | 440,838 | 10.1 | 0.10 | 50 | 134 | 1,136 | 0.0238 | 5.5 | 22 | 1.64 | 0.23 | 0.30 | 4.98 | 2.55 | 0.86 | 37,462 | | 12,632 | | |
| A10 | 606,228 | 13.9 | 0.10 | 50 | 134 | 945 | 0.0169 | 5.3 | 23 | 1.54 | 0.20 | 0.27 | 5.79 | 2.57 | 1.14 | 49,658 | | 16,988 | | |
| **Area B** | | | | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.10 | 50 | 134 | 1,526 | 0.0203 | 4.9 | 30 | 1.26 | 0.12 | 0.20 | 5.85 | 1.75 | 1.69 | 73,616 | 236,966 | 24,394 | 78,408 | 18.0 |
| B2 | 493,197 | 11.3 | 0.10 | 50 | 134 | 1,590 | 0.0113 | 4.7 | 30 | 1.21 | 0.10 | 0.18 | 2.47 | 0.83 | 0.79 | 34,412 | | 11,326 | | |
| B3 | 641,930 | 14.7 | 0.10 | 50 | 134 | 1,378 | 0.0189 | 4.9 | 30 | 1.26 | 0.12 | 0.20 | 3.71 | 1.11 | 1.07 | 46,609 | | 15,246 | | |
| B4 | 427,115 | 9.8 | 0.10 | 50 | 134 | 1,382 | 0.0130 | 4.7 | 30 | 1.21 | 0.10 | 0.18 | 2.14 | 0.72 | 0.68 | 29,621 | | 10,019 | | |
| B5 | 756,357 | 17.4 | 0.10 | 50 | 131 | 2,066 | 0.0155 | 4.7 | 30 | 1.21 | 0.10 | 0.18 | 3.78 | 1.26 | 1.21 | 52,708 | | 17,424 | | |
| **Area C** | | | | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.10 | 50 | 128 | 1,445 | 0.0159 | 4.8 | 30 | 1.23 | 0.10 | 0.18 | 4.54 | 1.51 | 1.46 | 63,598 | 63,598 | 21,344 | 21,344 | 4.5 |
| **Area D** | | | | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.10 | 50 | 127 | 1,194 | 0.0151 | 4.9 | 30 | 1.26 | 0.10 | 0.18 | 2.65 | 0.89 | 0.85 | 37,026 | 37,026 | 12,632 | 12,632 | 2.6 |

# APPENDIX C.2: 25-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**PROPOSED CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | ΔFlowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Volume (cf) | ΔVolume (cf) | Total ΔVolume (cf) | Peak Flow Rate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **25 YEAR STORM** | | | | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.10 | 25 | 134 | 2,285 | 0.0136 | 4.7 | 30 | 1.22 | 0.11 | 0.19 | 5.83 | 1.84 | 1.77 | 77,101 | 490,921 | 25,700 | 163,350 | 41.8 |
| A2 | 522,233 | 12.0 | 0.10 | 25 | 134 | 948 | 0.0200 | 5.0 | 26 | 1.38 | 0.15 | 0.23 | 3.81 | 1.49 | 0.90 | 39,204 | | 13,068 | | |
| A3 | 715,877 | 16.4 | 0.10 | 25 | 134 | 1,617 | 0.0192 | 4.7 | 30 | 1.22 | 0.11 | 0.19 | 3.81 | 1.20 | 1.15 | 50,094 | | 16,553 | | |
| A4 | 517,947 | 11.9 | 0.10 | 25 | 134 | 919 | 0.0163 | 4.6 | 30 | 1.17 | 0.10 | 0.18 | 2.50 | 0.83 | 0.80 | 34,848 | | 11,326 | | |
| A5 | 392,335 | 9.0 | 0.10 | 25 | 134 | 988 | 0.0243 | 5.1 | 25 | 1.43 | 0.17 | 0.24 | 3.09 | 1.32 | 0.69 | 30,056 | | 10,019 | | |
| A6 | 1,134,501 | 26.0 | 0.10 | 25 | 134 | 1,365 | 0.0212 | 4.9 | 30 | 1.26 | 0.12 | 0.20 | 6.56 | 1.97 | 1.91 | 83,200 | | 27,443 | | |
| A7 | 475,310 | 10.9 | 0.10 | 25 | 134 | 463 | 0.0130 | 4.7 | 15 | 1.69 | 0.25 | 0.32 | 5.90 | 3.34 | 0.80 | 34,848 | | 11,761 | | |
| A8 | 1,004,776 | 23.1 | 0.10 | 25 | 134 | 1,467 | 0.0136 | 4.6 | 30 | 1.17 | 0.10 | 0.18 | 4.86 | 1.62 | 1.56 | 67,954 | | 22,651 | | |
| A9 | 440,838 | 10.1 | 0.10 | 25 | 134 | 1,136 | 0.0238 | 4.8 | 30 | 1.24 | 0.11 | 0.19 | 2.38 | 0.75 | 0.73 | 31,799 | | 10,890 | | |
| A10 | 606,228 | 13.9 | 0.10 | 25 | 134 | 945 | 0.0169 | 4.7 | 30 | 1.20 | 0.10 | 0.18 | 3.01 | 1.01 | 0.96 | 41,818 | | 13,939 | | |
| **Area B** | | | | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.10 | 25 | 134 | 1,526 | 0.0203 | 4.3 | 30 | 1.11 | 0.10 | 0.18 | 4.64 | 1.55 | 1.48 | 64,469 | 207,781 | 21,344 | 68,825 | 14.9 |
| B2 | 493,197 | 11.3 | 0.10 | 25 | 134 | 1,590 | 0.0113 | 4.1 | 30 | 1.06 | 0.10 | 0.18 | 2.16 | 0.72 | 0.69 | 30,056 | | 10,019 | | |
| B3 | 641,930 | 14.7 | 0.10 | 25 | 134 | 1,378 | 0.0189 | 4.3 | 30 | 1.11 | 0.10 | 0.18 | 2.94 | 0.98 | 0.94 | 40,946 | | 13,504 | | |
| B4 | 427,115 | 9.8 | 0.10 | 25 | 134 | 1,382 | 0.0130 | 4.1 | 30 | 1.06 | 0.10 | 0.18 | 1.87 | 0.62 | 0.60 | 26,136 | | 8,712 | | |
| B5 | 756,357 | 17.4 | 0.10 | 25 | 131 | 2,066 | 0.0155 | 4.1 | 30 | 1.06 | 0.10 | 0.18 | 3.31 | 1.10 | 1.06 | 46,174 | | 15,246 | | |
| **Area C** | | | | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.10 | 25 | 128 | 1,445 | 0.0159 | 4.2 | 30 | 1.08 | 0.10 | 0.18 | 3.99 | 1.33 | 1.28 | 55,757 | 55,757 | 18,731 | 18,731 | 4.0 |
| **Area D** | | | | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.10 | 25 | 127 | 1,194 | 0.0151 | 4.3 | 30 | 1.11 | 0.10 | 0.18 | 2.33 | 0.78 | 0.74 | 32,234 | 32,234 | 10,454 | 10,454 | 2.3 |

# APPENDIX C.3: 10-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**PROPOSED CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | ΔFlowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Volume (cf) | ΔVolume (cf) | Total ΔVolume (cf) | Peak Flow Rate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **10 YEAR STORM** | | | | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.10 | 10 | 134 | 2,285 | 0.0136 | 3.9 | 30 | 0.99 | 0.10 | 0.18 | 4.48 | 1.49 | 1.44 | 62,726 | 396,396 | 20,909 | 131,116 | 28.5 |
| A2 | 522,233 | 12.0 | 0.10 | 10 | 134 | 948 | 0.0200 | 4.1 | 30 | 1.05 | 0.10 | 0.18 | 2.27 | 0.76 | 0.72 | 31,363 | | 10,454 | | |
| A3 | 715,877 | 16.4 | 0.10 | 10 | 134 | 1,617 | 0.0192 | 3.9 | 30 | 0.99 | 0.10 | 0.18 | 2.93 | 0.98 | 0.94 | 40,946 | | 13,504 | | |
| A4 | 517,947 | 11.9 | 0.10 | 10 | 134 | 919 | 0.0163 | 3.7 | 30 | 0.95 | 0.10 | 0.18 | 2.03 | 0.67 | 0.65 | 28,314 | | 9,148 | | |
| A5 | 392,335 | 9.0 | 0.10 | 10 | 134 | 988 | 0.0243 | 4.1 | 30 | 1.06 | 0.10 | 0.18 | 1.72 | 0.57 | 0.55 | 23,958 | | 7,841 | | |
| A6 | 1,134,501 | 26.0 | 0.10 | 10 | 134 | 1,365 | 0.0212 | 4.0 | 30 | 1.03 | 0.10 | 0.18 | 4.83 | 1.61 | 1.54 | 67,082 | | 22,216 | | |
| A7 | 475,310 | 10.9 | 0.10 | 10 | 134 | 463 | 0.0130 | 3.9 | 26 | 1.06 | 0.10 | 0.18 | 2.08 | 0.78 | 0.62 | 27,007 | | 8,712 | | |
| A8 | 1,004,776 | 23.1 | 0.10 | 10 | 134 | 1,467 | 0.0136 | 3.7 | 30 | 0.95 | 0.10 | 0.18 | 3.94 | 1.31 | 1.27 | 55,321 | | 18,295 | | |
| A9 | 440,838 | 10.1 | 0.10 | 10 | 134 | 1,136 | 0.0238 | 3.9 | 30 | 1.01 | 0.10 | 0.18 | 1.84 | 0.61 | 0.59 | 25,700 | | 8,712 | | |
| A10 | 606,228 | 13.9 | 0.10 | 10 | 134 | 945 | 0.0169 | 3.8 | 30 | 0.97 | 0.10 | 0.18 | 2.43 | 0.81 | 0.78 | 33,977 | | 11,326 | | |
| **Area B** | | | | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.10 | 10 | 134 | 1,526 | 0.0203 | 3.5 | 30 | 0.90 | 0.10 | 0.18 | 3.76 | 1.25 | 1.20 | 52,272 | 168,577 | 17,424 | 55,757 | 12.1 |
| B2 | 493,197 | 11.3 | 0.10 | 10 | 134 | 1,590 | 0.0113 | 3.4 | 30 | 0.86 | 0.10 | 0.18 | 1.75 | 0.58 | 0.56 | 24,394 | | 7,841 | | |
| B3 | 641,930 | 14.7 | 0.10 | 10 | 134 | 1,378 | 0.0189 | 3.5 | 30 | 0.90 | 0.10 | 0.18 | 2.39 | 0.80 | 0.76 | 33,106 | | 10,890 | | |
| B4 | 427,115 | 9.8 | 0.10 | 10 | 134 | 1,382 | 0.0130 | 3.4 | 30 | 0.86 | 0.10 | 0.18 | 1.52 | 0.51 | 0.49 | 21,344 | | 7,405 | | |
| B5 | 756,357 | 17.4 | 0.10 | 10 | 131 | 2,066 | 0.0155 | 3.4 | 30 | 0.86 | 0.10 | 0.18 | 2.69 | 0.90 | 0.86 | 37,462 | | 12,197 | | |
| **Area C** | | | | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.10 | 10 | 128 | 1,445 | 0.0159 | 3.4 | 30 | 0.88 | 0.10 | 0.18 | 3.25 | 1.08 | 1.04 | 45,302 | 45,302 | 15,246 | 15,246 | 3.2 |
| **Area D** | | | | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.10 | 10 | 127 | 1,194 | 0.0151 | 3.5 | 30 | 0.90 | 0.10 | 0.18 | 1.89 | 0.63 | 0.60 | 26,136 | 26,136 | 8,712 | 8,712 | 1.9 |

# APPENDIX C.4: 5-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**PROPOSED CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | ΔFlowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Volume (cf) | ΔVolume (cf) | Total ΔVolume (cf) | Peak Flow Rate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **5 YEAR STORM** | | | | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.10 | 5 | 134 | 2,285 | 0.0136 | 3.2 | 30 | 0.81 | 0.10 | 0.18 | 3.67 | 1.23 | 1.17 | 50,965 | 324,086 | 16,988 | 108,464 | 23.3 |
| A2 | 522,233 | 12.0 | 0.10 | 5 | 134 | 948 | 0.0200 | 3.3 | 30 | 0.86 | 0.10 | 0.18 | 1.86 | 0.62 | 0.59 | 25,700 | | 8,712 | | |
| A3 | 715,877 | 16.4 | 0.10 | 5 | 134 | 1,617 | 0.0192 | 3.2 | 30 | 0.81 | 0.10 | 0.18 | 2.40 | 0.80 | 0.77 | 33,541 | | 11,326 | | |
| A4 | 517,947 | 11.9 | 0.10 | 5 | 134 | 919 | 0.0163 | 3.0 | 30 | 0.78 | 0.10 | 0.18 | 1.67 | 0.57 | 0.53 | 23,087 | | 7,841 | | |
| A5 | 392,335 | 9.0 | 0.10 | 5 | 134 | 988 | 0.0243 | 3.4 | 30 | 0.87 | 0.10 | 0.18 | 1.41 | 0.47 | 0.45 | 19,602 | | 6,534 | | |
| A6 | 1,134,501 | 26.0 | 0.10 | 5 | 134 | 1,365 | 0.0212 | 3.3 | 30 | 0.84 | 0.10 | 0.18 | 3.94 | 1.31 | 1.26 | 54,886 | | 18,295 | | |
| A7 | 475,310 | 10.9 | 0.10 | 5 | 134 | 463 | 0.0130 | 3.2 | 29 | 0.82 | 0.10 | 0.18 | 1.61 | 0.55 | 0.51 | 22,216 | | 7,405 | | |
| A8 | 1,004,776 | 23.1 | 0.10 | 5 | 134 | 1,467 | 0.0136 | 3.0 | 30 | 0.78 | 0.10 | 0.18 | 3.24 | 1.08 | 1.04 | 45,302 | | 15,246 | | |
| A9 | 440,838 | 10.1 | 0.10 | 5 | 134 | 1,136 | 0.0238 | 3.2 | 30 | 0.83 | 0.10 | 0.18 | 1.51 | 0.50 | 0.48 | 20,909 | | 6,970 | | |
| A10 | 606,228 | 13.9 | 0.10 | 5 | 134 | 945 | 0.0169 | 3.1 | 30 | 0.80 | 0.10 | 0.18 | 2.00 | 0.66 | 0.64 | 27,878 | | 9,148 | | |
| **Area B** | | | | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.10 | 5 | 134 | 1,526 | 0.0203 | 2.9 | 30 | 0.74 | 0.10 | 0.18 | 3.09 | 1.03 | 0.98 | 42,689 | 138,085 | 13,939 | 45,302 | 10.0 |
| B2 | 493,197 | 11.3 | 0.10 | 5 | 134 | 1,590 | 0.0113 | 2.7 | 30 | 0.71 | 0.10 | 0.18 | 1.45 | 0.49 | 0.46 | 20,038 | | 6,534 | | |
| B3 | 641,930 | 14.7 | 0.10 | 5 | 134 | 1,378 | 0.0189 | 2.9 | 30 | 0.74 | 0.10 | 0.18 | 1.96 | 0.65 | 0.62 | 27,007 | | 8,712 | | |
| B4 | 427,115 | 9.8 | 0.10 | 5 | 134 | 1,382 | 0.0130 | 2.7 | 30 | 0.71 | 0.10 | 0.18 | 1.25 | 0.41 | 0.40 | 17,424 | | 5,663 | | |
| B5 | 756,357 | 17.4 | 0.10 | 5 | 131 | 2,066 | 0.0155 | 2.7 | 30 | 0.71 | 0.10 | 0.18 | 2.22 | 0.74 | 0.71 | 30,928 | | 10,454 | | |
| **Area C** | | | | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.10 | 5 | 128 | 1,445 | 0.0159 | 2.8 | 30 | 0.72 | 0.10 | 0.18 | 2.66 | 0.89 | 0.85 | 37,026 | 37,026 | 12,197 | 12,197 | 2.7 |
| **Area D** | | | | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.10 | 5 | 127 | 1,194 | 0.0151 | 2.9 | 30 | 0.74 | 0.10 | 0.18 | 1.55 | 0.51 | 0.49 | 21,344 | 21,344 | 6,970 | 6,970 | 1.6 |

# APPENDIX C.5: 2-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**PROPOSED CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | ΔFlowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Volume (cf) | ΔVolume (cf) | Total ΔVolume (cf) | Peak Flow Rate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2 YEAR STORM** | | | | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.10 | 2 | 134 | 2,285 | 0.0136 | 2.1 | 30 | 0.54 | 0.10 | 0.18 | 2.44 | 0.81 | 0.78 | 33,977 | 215,186 | 11,326 | 71,874 | 15.5 |
| A2 | 522,233 | 12.0 | 0.10 | 2 | 134 | 948 | 0.0200 | 2.2 | 30 | 0.57 | 0.10 | 0.18 | 1.23 | 0.41 | 0.39 | 16,988 | | 5,663 | | |
| A3 | 715,877 | 16.4 | 0.10 | 2 | 134 | 1,617 | 0.0192 | 2.1 | 30 | 0.54 | 0.10 | 0.18 | 1.60 | 0.54 | 0.51 | 22,216 | | 7,405 | | |
| A4 | 517,947 | 11.9 | 0.10 | 2 | 134 | 919 | 0.0163 | 2.0 | 30 | 0.52 | 0.10 | 0.18 | 1.11 | 0.38 | 0.35 | 15,246 | | 5,227 | | |
| A5 | 392,335 | 9.0 | 0.10 | 2 | 134 | 988 | 0.0243 | 2.2 | 30 | 0.58 | 0.10 | 0.18 | 0.94 | 0.31 | 0.30 | 13,068 | | 4,356 | | |
| A6 | 1,134,501 | 26.0 | 0.10 | 2 | 134 | 1,365 | 0.0212 | 2.2 | 30 | 0.56 | 0.10 | 0.18 | 2.63 | 0.88 | 0.84 | 36,590 | | 12,197 | | |
| A7 | 475,310 | 10.9 | 0.10 | 2 | 134 | 463 | 0.0130 | 2.1 | 30 | 0.54 | 0.10 | 0.18 | 1.06 | 0.35 | 0.34 | 14,810 | | 4,792 | | |
| A8 | 1,004,776 | 23.1 | 0.10 | 2 | 134 | 1,467 | 0.0136 | 2.0 | 30 | 0.52 | 0.10 | 0.18 | 2.16 | 0.72 | 0.69 | 30,056 | | 10,019 | | |
| A9 | 440,838 | 10.1 | 0.10 | 2 | 134 | 1,136 | 0.0238 | 2.1 | 30 | 0.55 | 0.10 | 0.18 | 1.00 | 0.33 | 0.32 | 13,939 | | 4,792 | | |
| A10 | 606,228 | 13.9 | 0.10 | 2 | 134 | 945 | 0.0169 | 2.1 | 30 | 0.53 | 0.10 | 0.18 | 1.33 | 0.44 | 0.42 | 18,295 | | 6,098 | | |
| **Area B** | | | | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.10 | 2 | 134 | 1,526 | 0.0203 | 1.9 | 30 | 0.49 | 0.10 | 0.18 | 2.05 | 0.68 | 0.65 | 28,314 | 91,040 | 9,583 | 30,056 | 6.6 |
| B2 | 493,197 | 11.3 | 0.10 | 2 | 134 | 1,590 | 0.0113 | 1.8 | 30 | 0.47 | 0.10 | 0.18 | 0.96 | 0.32 | 0.30 | 13,068 | | 4,356 | | |
| B3 | 641,930 | 14.7 | 0.10 | 2 | 134 | 1,378 | 0.0189 | 1.9 | 30 | 0.49 | 0.10 | 0.18 | 1.30 | 0.43 | 0.41 | 17,860 | | 5,663 | | |
| B4 | 427,115 | 9.8 | 0.10 | 2 | 134 | 1,382 | 0.0130 | 1.8 | 30 | 0.47 | 0.10 | 0.18 | 0.83 | 0.28 | 0.26 | 11,326 | | 3,485 | | |
| B5 | 756,357 | 17.4 | 0.10 | 2 | 131 | 2,066 | 0.0155 | 1.8 | 30 | 0.47 | 0.10 | 0.18 | 1.47 | 0.49 | 0.47 | 20,473 | | 6,970 | | |
| **Area C** | | | | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.10 | 2 | 128 | 1,445 | 0.0159 | 1.9 | 30 | 0.48 | 0.10 | 0.18 | 1.77 | 0.59 | 0.56 | 24,394 | 24,394 | 7,841 | 7,841 | 1.8 |
| **Area D** | | | | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.10 | 2 | 127 | 1,194 | 0.0151 | 1.9 | 30 | 0.49 | 0.10 | 0.18 | 1.03 | 0.34 | 0.33 | 14,375 | 14,375 | 4,792 | 4,792 | 1.0 |

# APPENDIX C.6: 1-YEAR HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**PROPOSED CONDITIONS**
**TC CALCULATOR RESULTS**

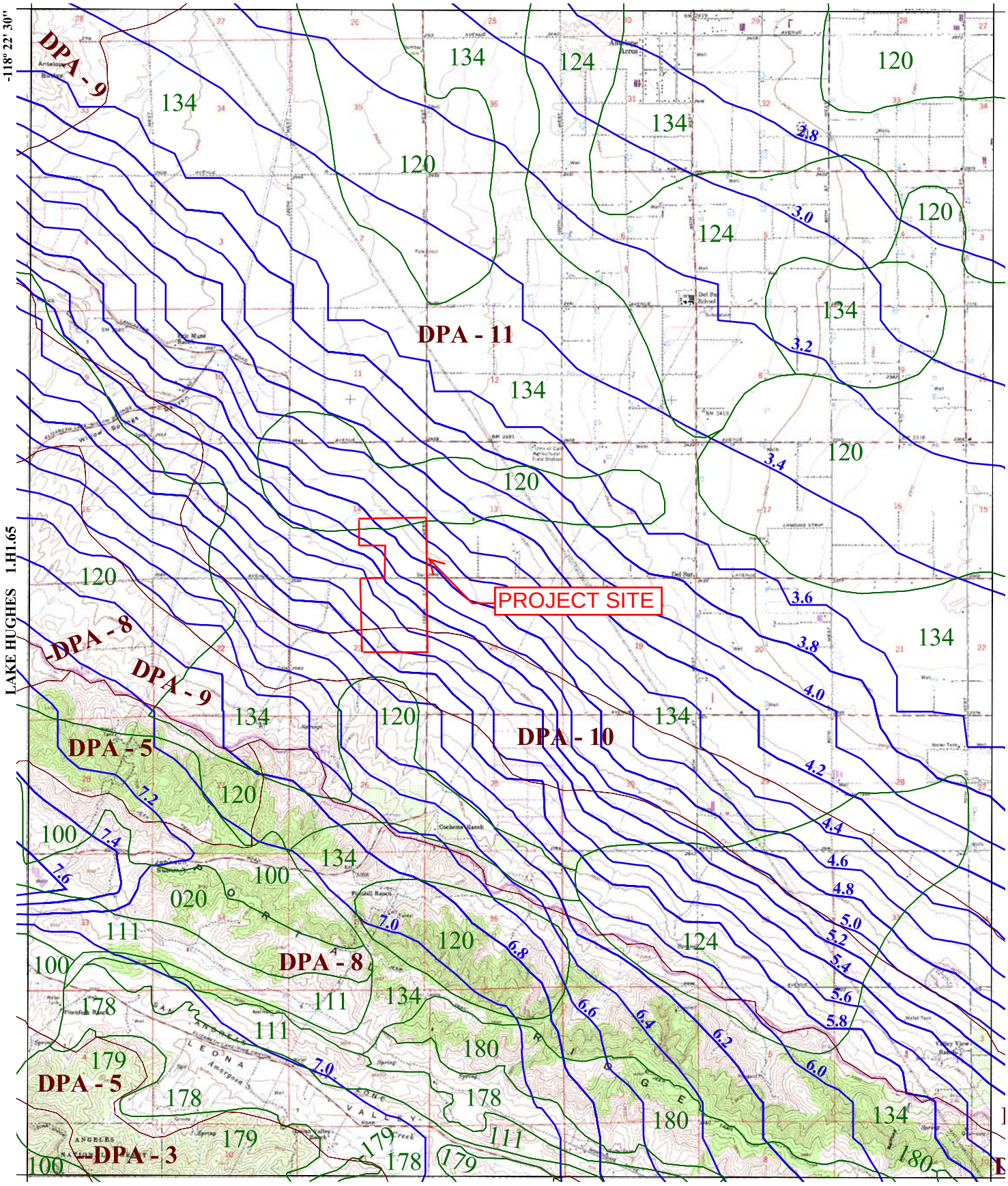
| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | ΔFlowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Volume (cf) | ΔVolume (cf) | Total ΔVolume (cf) | Peak Flow Rate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1 YEAR STORM** | | | | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.10 | 1 | 134 | 2,285 | 0.0136 | 1.5 | 30 | 0.39 | 0.10 | 0.18 | 1.77 | 0.59 | 0.57 | 24,829 | 157,252 | 8,276 | 51,836 | 11.3 |
| A2 | 522,233 | 12.0 | 0.10 | 1 | 134 | 948 | 0.0200 | 1.6 | 30 | 0.41 | 0.10 | 0.18 | 0.88 | 0.29 | 0.29 | 12,632 | | 4,356 | | |
| A3 | 715,877 | 16.4 | 0.10 | 1 | 134 | 1,617 | 0.0192 | 1.5 | 30 | 0.39 | 0.10 | 0.18 | 1.15 | 0.38 | 0.37 | 16,117 | | 5,227 | | |
| A4 | 517,947 | 11.9 | 0.10 | 1 | 134 | 919 | 0.0163 | 1.5 | 30 | 0.38 | 0.10 | 0.18 | 0.81 | 0.28 | 0.26 | 11,326 | | 3,920 | | |
| A5 | 392,335 | 9.0 | 0.10 | 1 | 134 | 988 | 0.0243 | 1.6 | 30 | 0.42 | 0.10 | 0.18 | 0.68 | 0.23 | 0.22 | 9,583 | | 3,049 | | |
| A6 | 1,134,501 | 26.0 | 0.10 | 1 | 134 | 1,365 | 0.0212 | 1.6 | 30 | 0.41 | 0.10 | 0.18 | 1.92 | 0.64 | 0.61 | 26,572 | | 8,712 | | |
| A7 | 475,310 | 10.9 | 0.10 | 1 | 134 | 463 | 0.0130 | 1.5 | 30 | 0.39 | 0.10 | 0.18 | 0.77 | 0.26 | 0.25 | 10,890 | | 3,920 | | |
| A8 | 1,004,776 | 23.1 | 0.10 | 1 | 134 | 1,467 | 0.0136 | 1.5 | 30 | 0.38 | 0.10 | 0.18 | 1.58 | 0.53 | 0.50 | 21,780 | | 6,970 | | |
| A9 | 440,838 | 10.1 | 0.10 | 1 | 134 | 1,136 | 0.0238 | 1.6 | 30 | 0.40 | 0.10 | 0.18 | 0.73 | 0.24 | 0.23 | 10,019 | | 3,049 | | |
| A10 | 606,228 | 13.9 | 0.10 | 1 | 134 | 945 | 0.0169 | 1.5 | 30 | 0.39 | 0.10 | 0.18 | 0.98 | 0.33 | 0.31 | 13,504 | | 4,356 | | |
| **Area B** | | | | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.10 | 1 | 134 | 1,526 | 0.0203 | 1.4 | 30 | 0.36 | 0.10 | 0.18 | 1.50 | 0.50 | 0.48 | 20,909 | 66,647 | 6,970 | 21,780 | 4.8 |
| B2 | 493,197 | 11.3 | 0.10 | 1 | 134 | 1,590 | 0.0113 | 1.3 | 30 | 0.34 | 0.10 | 0.18 | 0.69 | 0.23 | 0.22 | 9,583 | | 3,049 | | |
| B3 | 641,930 | 14.7 | 0.10 | 1 | 134 | 1,378 | 0.0189 | 1.4 | 30 | 0.36 | 0.10 | 0.18 | 0.95 | 0.31 | 0.30 | 13,068 | | 4,356 | | |
| B4 | 427,115 | 9.8 | 0.10 | 1 | 134 | 1,382 | 0.0130 | 1.3 | 30 | 0.34 | 0.10 | 0.18 | 0.60 | 0.20 | 0.19 | 8,276 | | 2,614 | | |
| B5 | 756,357 | 17.4 | 0.10 | 1 | 131 | 2,066 | 0.0155 | 1.3 | 30 | 0.34 | 0.10 | 0.18 | 1.06 | 0.35 | 0.34 | 14,810 | | 4,792 | | |
| **Area C** | | | | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.10 | 1 | 128 | 1,445 | 0.0159 | 1.4 | 30 | 0.35 | 0.10 | 0.18 | 1.29 | 0.43 | 0.41 | 17,860 | 17,860 | 5,663 | 5,663 | 1.3 |
| **Area D** | | | | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.10 | 1 | 127 | 1,194 | 0.0151 | 1.4 | 30 | 0.36 | 0.10 | 0.18 | 0.76 | 0.26 | 0.24 | 10,454 | 10,454 | 3,485 | 3,485 | 0.8 |

# APPENDIX C.7: SUSMP (¾") STORM HYDROLOGY CALCULATIONS

**WEST ANTELOPE VALLEY SOLAR PROJECT**
**PROPOSED CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | ΔFlowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Volume (cf) | ΔVolume (cf) | Total ΔVolume (cf) | Peak Flow Rate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3/4-INCH STORM** | | | | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.10 | - | 134 | 2,285 | 0.0136 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.86 | 0.29 | 0.28 | 12,197 | 76,230 | 3,920 | 25,265 | 5.4 |
| A2 | 522,233 | 12.0 | 0.10 | - | 134 | 948 | 0.0200 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.41 | 0.14 | 0.13 | 5,663 | | 1,742 | | |
| A3 | 715,877 | 16.4 | 0.10 | - | 134 | 1,617 | 0.0192 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.56 | 0.19 | 0.18 | 7,841 | | 2,614 | | |
| A4 | 517,947 | 11.9 | 0.10 | - | 134 | 919 | 0.0163 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.41 | 0.14 | 0.13 | 5,663 | | 1,742 | | |
| A5 | 392,335 | 9.0 | 0.10 | - | 134 | 988 | 0.0243 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.31 | 0.10 | 0.10 | 4,356 | | 1,307 | | |
| A6 | 1,134,501 | 26.0 | 0.10 | - | 134 | 1,365 | 0.0212 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.89 | 0.30 | 0.29 | 12,632 | | 4,356 | | |
| A7 | 475,310 | 10.9 | 0.10 | - | 134 | 463 | 0.0130 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.37 | 0.12 | 0.12 | 5,227 | | 1,742 | | |
| A8 | 1,004,776 | 23.1 | 0.10 | - | 134 | 1,467 | 0.0136 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.79 | 0.26 | 0.26 | 11,326 | | 3,920 | | |
| A9 | 440,838 | 10.1 | 0.10 | - | 134 | 1,136 | 0.0238 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.35 | 0.12 | 0.11 | 4,792 | | 1,742 | | |
| A10 | 606,228 | 13.9 | 0.10 | - | 134 | 945 | 0.0169 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.48 | 0.16 | 0.15 | 6,534 | | 2,178 | | |
| **Area B** | | | | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.10 | - | 134 | 1,526 | 0.0203 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.79 | 0.26 | 0.26 | 11,326 | 37,026 | 3,920 | 12,632 | 2.6 |
| B2 | 493,197 | 11.3 | 0.10 | - | 134 | 1,590 | 0.0113 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.39 | 0.13 | 0.13 | 5,663 | | 2,178 | | |
| B3 | 641,930 | 14.7 | 0.10 | - | 134 | 1,378 | 0.0189 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.50 | 0.16 | 0.16 | 6,970 | | 2,178 | | |
| B4 | 427,115 | 9.8 | 0.10 | - | 134 | 1,382 | 0.0130 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.34 | 0.12 | 0.11 | 4,792 | | 1,742 | | |
| B5 | 756,357 | 17.4 | 0.10 | - | 131 | 2,066 | 0.0155 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.59 | 0.19 | 0.19 | 8,276 | | 2,614 | | |
| **Area C** | | | | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.10 | - | 128 | 1,445 | 0.0159 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.70 | 0.23 | 0.23 | 10,019 | 10,019 | 3,485 | 3,485 | 0.7 |
| **Area D** | | | | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.10 | - | 127 | 1,194 | 0.0151 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.40 | 0.13 | 0.13 | 5,663 | 5,663 | 1,742 | 1,742 | 0.4 |

# APPENDIX D: LOS ANGELES COUNTY HYDROLOGIC SOILS AND RAINFALL MAP (PANEL 1-H1.66)




016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

N W E S

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

# DEL SUR
# 50-YEAR 24-HOUR ISOHYET

APPENDIX D

1-H1.66

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

# APPENDIX E: FLOOD HAZARD CALCULATIONS

# APPENDIX E.1: 100-YEAR AND 50-YEAR HYDRAULIC CALCULATIONS BASED ON EDWARDS AND THIELMAN METHOD

# WEST ANTELOPE VALLEY SOLAR PROJECT
# LOS ANGELES COUNTY, CA

### PRELIMINARY 100-YEAR FLOOD HAZARD ANALYSIS

### USING CLEAR-WATER FLOW

| NODAL POINT | 100-YEAR FLOW RATE (CFS) | USING EDWARDS & THIELMAN EQUATION FOR SINGLE CHANNEL REGION (ASSUMING MANNING'S n-VALUE OF 0.035) | | | USING EDWARDS & THIELMAN EQUATION FOR SINGLE CHANNEL REGION (ASSUMING MANNING'S n-VALUE OF 0.04) | | |
|---|---|---|---|---|---|---|---|
| | | WIDTH | DEPTH | VELOCITY | WIDTH | DEPTH | VELOCITY |
| Basin A | 1,523 | 162 | 1.36 | 6.93 | 170 | 1.43 | 6.27 |
| Basin B | 60 | 49 | 0.41 | 2.95 | 52 | 0.43 | 2.67 |
| Basin C | 443 | 104 | 0.87 | 4.87 | 110 | 0.92 | 4.40 |
| Basin D | 320 | 92 | 0.77 | 4.54 | 96 | 0.81 | 4.11 |
| Basin E | 1,138 | 157 | 1.31 | 5.53 | 165 | 1.38 | 5.00 |
| Basin F | 1,725 | 176 | 1.48 | 6.61 | 185 | 1.56 | 5.98 |

### PRELIMINARY 50-YEAR FLOOD HAZARD ANALYSIS

### USING CLEAR-WATER FLOW

| NODAL POINT | 50-YEAR FLOW RATE (CFS) | USING EDWARDS & THIELMAN EQUATION FOR SINGLE CHANNEL REGION (ASSUMING MANNING'S n-VALUE OF 0.035) | | | USING EDWARDS & THIELMAN EQUATION FOR SINGLE CHANNEL REGION (ASSUMING MANNING'S n-VALUE OF 0.04) | | |
|---|---|---|---|---|---|---|---|
| | | WIDTH | DEPTH | VELOCITY | WIDTH | DEPTH | VELOCITY |
| Basin A | 1,213 | 149 | 1.25 | 6.54 | 156 | 1.31 | 5.92 |
| Basin B | 47 | 45 | 0.38 | 2.78 | 47 | 0.40 | 2.51 |
| Basin C | 347 | 95 | 0.80 | 4.58 | 100 | 0.84 | 4.14 |
| Basin D | 255 | 84 | 0.71 | 4.29 | 89 | 0.74 | 3.88 |
| Basin E | 825 | 139 | 1.16 | 5.10 | 146 | 1.22 | 4.62 |
| Basin F | 1,360 | 161 | 1.35 | 6.22 | 170 | 1.42 | 5.63 |

# WEST ANTELOPE VALLEY SOLAR PROJECT
# LOS ANGELES COUNTY, CA

### PRELIMINARY 100-YEAR FLOOD HAZARD ANALYSIS

### USING BULK-WATER FLOW

| NODAL POINT | 100-YEAR FLOW RATE (CFS) | USING EDWARDS & THIELMAN EQUATION FOR SINGLE CHANNEL REGION (ASSUMING MANNING'S n-VALUE OF 0.035) | | | USING EDWARDS & THIELMAN EQUATION FOR SINGLE CHANNEL REGION (ASSUMING MANNING'S n-VALUE OF 0.04) | | |
|---|---|---|---|---|---|---|---|
| | | WIDTH | DEPTH | VELOCITY | WIDTH | DEPTH | VELOCITY |
| **Basin A** | 1,889 | 175 | 1.47 | 7.31 | 184 | 1.55 | 6.61 |
| **Basin B** | 64 | 50 | 0.42 | 3.00 | 53 | 0.45 | 2.72 |
| **Basin C** | 558 | 114 | 0.95 | 5.16 | 119 | 1.00 | 4.66 |
| **Basin D** | 378 | 98 | 0.82 | 4.73 | 103 | 0.86 | 4.28 |
| **Basin E** | 1,400 | 169 | 1.42 | 5.82 | 178 | 1.49 | 5.27 |
| **Basin F** | 2,053 | 188 | 1.58 | 6.90 | 198 | 1.66 | 6.24 |

### PRELIMINARY 50-YEAR FLOOD HAZARD ANALYSIS

### USING BULK-WATER FLOW

| NODAL POINT | 50-YEAR FLOW RATE (CFS) | USING EDWARDS & THIELMAN EQUATION FOR SINGLE CHANNEL REGION (ASSUMING MANNING'S n-VALUE OF 0.035) | | | USING EDWARDS & THIELMAN EQUATION FOR SINGLE CHANNEL REGION (ASSUMING MANNING'S n-VALUE OF 0.04) | | |
|---|---|---|---|---|---|---|---|
| | | WIDTH | DEPTH | VELOCITY | WIDTH | DEPTH | VELOCITY |
| **Basin A** | 1,504 | 161 | 1.35 | 6.90 | 169 | 1.42 | 6.25 |
| **Basin B** | 50 | 46 | 0.39 | 2.82 | 48 | 0.41 | 2.56 |
| **Basin C** | 437 | 104 | 0.87 | 4.85 | 109 | 0.91 | 4.39 |
| **Basin D** | 301 | 90 | 0.75 | 4.47 | 94 | 0.79 | 4.04 |
| **Basin E** | 1,015 | 150 | 1.26 | 5.37 | 158 | 1.32 | 4.86 |
| **Basin F** | 1,618 | 172 | 1.45 | 6.50 | 181 | 1.52 | 5.88 |

# APPENDIX E.2: HYDRAULIC CAPACITY CALCULATIONS BASED ON NORMAL DEPTH METHOD

# Worksheet for Cross Section 1

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.03170 | ft/ft |
| Normal Depth | 1.70 | ft |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 2.00 |
| 0+12 | 0.30 |
| 0+54 | 2.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 2.00) | (0+54, 2.00) | 0.035 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Discharge | 310.73 | $ft^3/s$ |
| Elevation Range | 0.30 to 2.00 ft | |
| Flow Area | 45.90 | $ft^2$ |
| Wetted Perimeter | 54.15 | ft |
| Hydraulic Radius | 0.85 | ft |
| Top Width | 54.00 | ft |
| Normal Depth | 1.70 | ft |
| Critical Depth | 1.86 | ft |
| Critical Slope | 0.01800 | ft/ft |
| Velocity | 6.77 | ft/s |

# Worksheet for Cross Section 1

## Results

| | | | |
|---|---|---|---|
| Velocity Head | | 0.71 | ft |
| Specific Energy | | 2.41 | ft |
| Froude Number | | 1.29 | |
| Flow Type | Supercritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 1.70 | ft |
| Critical Depth | 1.86 | ft |
| Channel Slope | 0.03170 | ft/ft |
| Critical Slope | 0.01800 | ft/ft |

# Worksheet for Cross Section 2

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01230 | ft/ft |
| Normal Depth | 2.40 | ft |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 2.00 |
| 0+07 | 0.00 |
| 0+12 | -0.40 |
| 0+17 | 0.00 |
| 0+47 | 1.00 |
| 0+90 | -0.10 |
| 1+08 | 2.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 2.00) | (1+08, 2.00) | 0.035 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Discharge | 971.66 | ft³/s |
| Elevation Range | -0.40 to 2.00 ft | |
| Flow Area | 159.55 | ft² |
| Wetted Perimeter | 108.46 | ft |
| Hydraulic Radius | 1.47 | ft |
| Top Width | 108.00 | ft |

# Worksheet for Cross Section 2

## Results

| | | | |
|---|---|---|---|
| Normal Depth | | 2.40 | ft |
| Critical Depth | | 2.28 | ft |
| Critical Slope | | 0.01615 | ft/ft |
| Velocity | | 6.09 | ft/s |
| Velocity Head | | 0.58 | ft |
| Specific Energy | | 2.98 | ft |
| Froude Number | | 0.88 | |
| Flow Type | Subcritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 2.40 | ft |
| Critical Depth | 2.28 | ft |
| Channel Slope | 0.01230 | ft/ft |
| Critical Slope | 0.01615 | ft/ft |

# Worksheet for Cross Section 3

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01600 | ft/ft |
| Normal Depth | 2.50 | ft |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 2.00 |
| 0+09 | 0.00 |
| 0+14 | -0.50 |
| 0+19 | 0.00 |
| 0+49 | 0.90 |
| 0+80 | 0.00 |
| 1+08 | 2.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 2.00) | (1+08, 2.00) | 0.035 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Discharge | 1045.90 | $ft^3/s$ |
| Elevation Range | -0.50 to 2.00 ft | |
| Flow Area | 154.05 | $ft^2$ |
| Wetted Perimeter | 108.37 | ft |
| Hydraulic Radius | 1.42 | ft |
| Top Width | 108.00 | ft |

# Worksheet for Cross Section 3

## Results

| | | | |
|---|---|---|---|
| Normal Depth | | 2.50 | ft |
| Critical Depth | | 2.50 | ft |
| Critical Slope | | 0.01592 | ft/ft |
| Velocity | | 6.79 | ft/s |
| Velocity Head | | 0.72 | ft |
| Specific Energy | | 3.22 | ft |
| Froude Number | | 1.00 | |
| Flow Type | Supercritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 2.50 | ft |
| Critical Depth | 2.50 | ft |
| Channel Slope | 0.01600 | ft/ft |
| Critical Slope | 0.01592 | ft/ft |

# Worksheet for Cross Section 4

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Channel Slope | 0.01650 | ft/ft |
| Normal Depth | 2.30 | ft |

Section Definitions

| Station (ft) | Elevation (ft) |
|---|---|
| 0+00 | 2.00 |
| 0+11 | 0.00 |
| 0+18 | -0.30 |
| 0+29 | 0.00 |
| 0+55 | 0.40 |
| 0+80 | 0.00 |
| 1+07 | 2.00 |

Roughness Segment Definitions

| Start Station | Ending Station | Roughness Coefficient |
|---|---|---|
| (0+00, 2.00) | (1+07, 2.00) | 0.035 |

## Options

| | |
|---|---|
| Current Roughness Weighted Method | Pavlovskii's Method |
| Open Channel Weighting Method | Pavlovskii's Method |
| Closed Channel Weighting Method | Pavlovskii's Method |

## Results

| | | |
|---|---|---|
| Discharge | 1241.69 | $ft^3/s$ |
| Elevation Range | -0.30 to 2.00 ft | |
| Flow Area | 168.50 | $ft^2$ |
| Wetted Perimeter | 107.27 | ft |
| Hydraulic Radius | 1.57 | ft |
| Top Width | 107.00 | ft |

# Worksheet for Cross Section 4

## Results

| | | | |
|---|---|---|---|
| Normal Depth | | 2.30 | ft |
| Critical Depth | | 2.34 | ft |
| Critical Slope | | 0.01529 | ft/ft |
| Velocity | | 7.37 | ft/s |
| Velocity Head | | 0.84 | ft |
| Specific Energy | | 3.14 | ft |
| Froude Number | | 1.04 | |
| Flow Type | Supercritical | | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 2.30 | ft |
| Critical Depth | 2.34 | ft |
| Channel Slope | 0.01650 | ft/ft |
| Critical Slope | 0.01529 | ft/ft |

# APPENDIX F: PIER SCOUR CALCULATIONS (HEC-18 EQUATION)

# APPENDIX F

## LOCAL SCOUR ANALYSIS (PIER SCOUR USING THE HEC-18 EQUATION) FOR WEST ANTELOPE VALLEY SOLAR PROJECT (PROPOSED CONDITION)

***Ys= Scour Depth (feet)***
Y1= Flow Depth directly Upstream of the Pier (feet)
K1= Correction Factor for Pier Nose Shape (Dimensionless Unit)
K2= Correction Factor for Angle of Attack of Flow (Dimensionless Unit)
K3= Correction Factor for Bed Condition (Dimensionless Unit)
K4= Correction Factor for Armoring by Bed Material Size (Dimensionless Unit)
a= Pier Width (feet)
Fr= Froude Number Directly Upstream of Pier = V1/(gy1)^0.5
∇1= Mean Velocity of Flow Directly Upstream of the Pier (feet/sec)
γ= Acceleration of Gravity (32.2 feet/sec2)

**> PIER SCOUR ANALYSIS BASED ON PIER DIAMETER OF 0.5 FEET WITH NO DEBRIS ALLOWANCE**

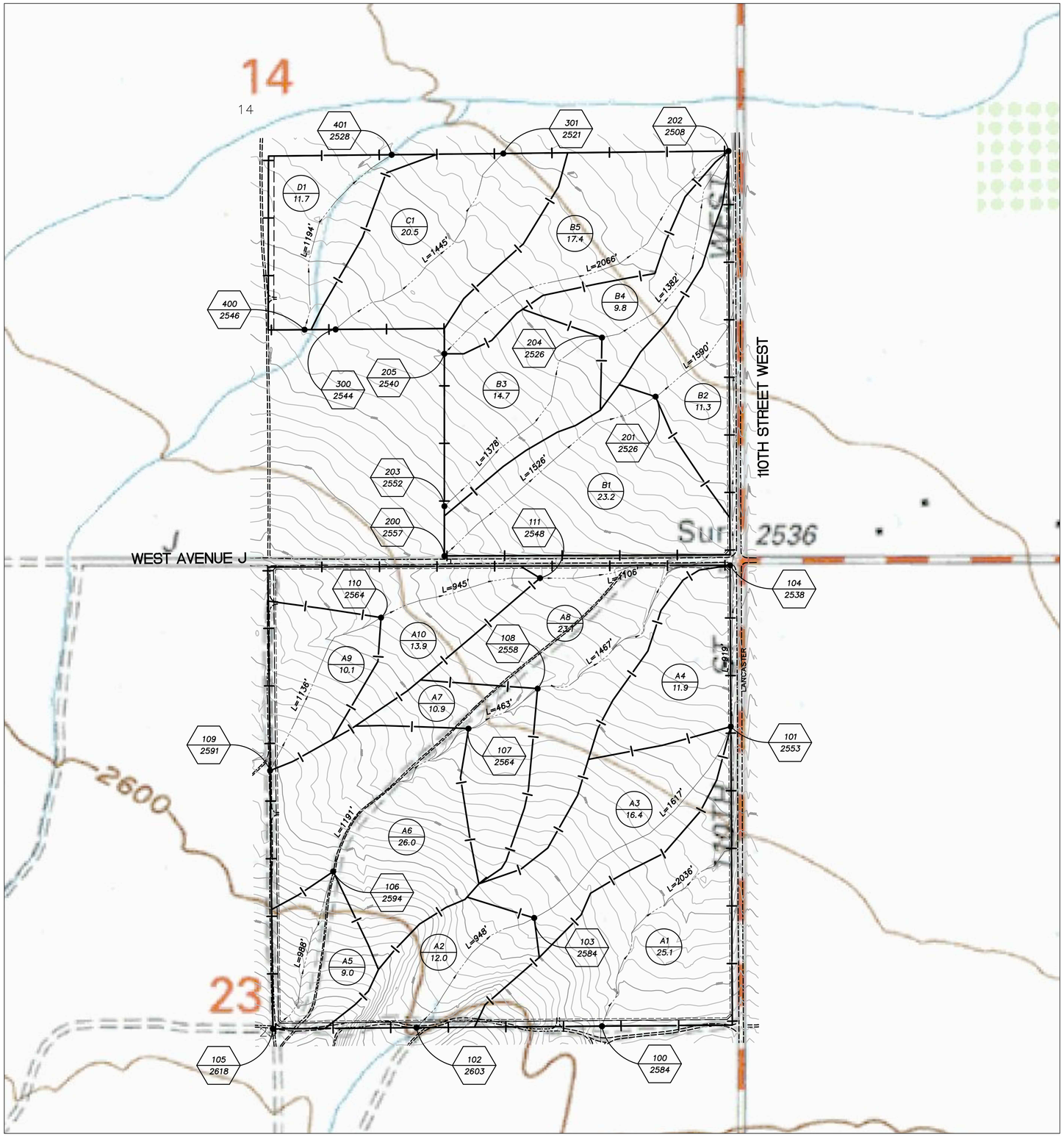
| DRAINAGE AREA | *Ys* | a | Y1 | K1 | K2 | K3 | K4 | Fr | ∇1 | γ |
|---|---|---|---|---|---|---|---|---|---|---|
| BASIN A | ***1.46*** | 0.5 | 1.43 | 1.0 | 1.0 | 1.0 | 1.0 | 1.021262 | 6.93 | 32.2 |
| BASIN B | ***0.86*** | 0.5 | 0.43 | 1.0 | 1.0 | 1.0 | 1.0 | 0.792793 | 2.95 | 32.2 |
| BASIN C | ***1.18*** | 0.5 | 0.92 | 1.0 | 1.0 | 1.0 | 1.0 | 0.894761 | 4.87 | 32.2 |
| BASIN D | ***1.13*** | 0.5 | 0.81 | 1.0 | 1.0 | 1.0 | 1.0 | 0.888967 | 4.54 | 32.2 |
| BASIN E | ***1.32*** | 0.5 | 1.38 | 1.0 | 1.0 | 1.0 | 1.0 | 0.829579 | 5.53 | 32.2 |
| BASIN F | ***1.45*** | 0.5 | 1.56 | 1.0 | 1.0 | 1.0 | 1.0 | 0.932634 | 6.61 | 32.2 |

**> PIER SCOUR ANALYSIS BASED ON PIER DIAMETER OF 0.5 FEET WITH DEBRIS ALLOWANCE**

| DRAINAGE AREA | *Ys* | a | Y1 | K1 | K2 | K3 | K4 | Fr | ∇1 | γ |
|---|---|---|---|---|---|---|---|---|---|---|
| BASIN A | ***1.51*** | 0.5 | 1.55 | 1.0 | 1.0 | 1.0 | 1.0 | 1.034722 | 7.31 | 32.2 |
| BASIN B | ***0.87*** | 0.5 | 0.45 | 1.0 | 1.0 | 1.0 | 1.0 | 0.78811 | 3.00 | 32.2 |
| BASIN C | ***1.22*** | 0.5 | 1.00 | 1.0 | 1.0 | 1.0 | 1.0 | 0.909331 | 5.16 | 32.2 |
| BASIN D | ***1.15*** | 0.5 | 0.86 | 1.0 | 1.0 | 1.0 | 1.0 | 0.898843 | 4.73 | 32.2 |
| BASIN E | ***1.36*** | 0.5 | 1.49 | 1.0 | 1.0 | 1.0 | 1.0 | 0.840237 | 5.82 | 32.2 |
| BASIN F | ***1.48*** | 0.5 | 1.66 | 1.0 | 1.0 | 1.0 | 1.0 | 0.943772 | 6.90 | 32.2 |

# EXHIBITS

**EXHIBIT A: ON-SITE HYDROLOGY MAP BASED ON EXISTING AND PROPOSED CONDITION (MODIFIED RATIONAL METHOD)**




## EXISTING CONDITION HYDROLOGY SUMMARY TABLE

| CONCENTRATION POINT | AREA (AC) | Q50(CFS) | V50(CF) | Q25(CFS) | V25(CF) | Q10(CFS) | V10(CF) | Q5(CFS) | V5(CF) |
|---|---|---|---|---|---|---|---|---|---|
| NODAL 104 | 158.5 | 46.8 | 386,377 | 26.4 | 327,571 | 19.0 | 265,280 | 15.5 | 215,622 |
| NODAL 202 | 76.4 | 12.3 | 158,558 | 10.0 | 138,956 | 8.1 | 112,820 | 6.6 | 92,783 |
| NODAL 301 | 20.5 | 3.0 | 42,253 | 2.7 | 37,026 | 2.2 | 30,056 | 1.8 | 24,829 |
| NODAL 401 | 11.7 | 1.8 | 24,394 | 1.6 | 21,780 | 1.3 | 17,424 | 1.0 | 14,375 |

| CONCENTRATION POINT | Q2(CFS) | V2(CF) | Q1(CFS) | V1(CF) | SUSMP(CFS) | VSUSMP(CF) |
|---|---|---|---|---|---|---|
| NODAL 104 | 10.3 | 143,312 | 7.5 | 105,415 | 3.6 | 50,965 |
| NODAL 202 | 4.4 | 60,984 | 3.2 | 44,867 | 1.8 | 24,394 |
| NODAL 301 | 1.2 | 16,553 | 0.9 | 12,197 | 0.5 | 6,534 |
| NODAL 401 | 0.7 | 9,583 | 0.5 | 6,970 | 0.3 | 3,920 |

## PROPOSED CONDITION HYDROLOGY SUMMARY TABLE

| CONCENTRATION POINT | AREA (AC) | Q50(CFS) | ΔV50(CF) | Q25(CFS) | ΔV25(CF) | Q10(CFS) | ΔV10(CF) | Q5(CFS) | ΔV5(CF) |
|---|---|---|---|---|---|---|---|---|---|
| NODAL 104 | 158.5 | 68.2 | 190,357 | 41.8 | 163,350 | 28.5 | 131,116 | 23.3 | 108,464 |
| NODAL 202 | 76.4 | 18.0 | 78,408 | 14.9 | 68,825 | 12.1 | 55,757 | 10.0 | 45,302 |
| NODAL 301 | 20.5 | 4.5 | 21,344 | 4.0 | 18,731 | 3.2 | 15,246 | 2.7 | 12,197 |
| NODAL 401 | 11.7 | 2.6 | 12,632 | 2.3 | 10,454 | 1.9 | 8,712 | 1.6 | 6,970 |

| CONCENTRATION POINT | Q2(CFS) | ΔV2(CF) | Q1(CFS) | ΔV1(CF) | SUSMP(CFS) | ΔVSUSMP(CF) |
|---|---|---|---|---|---|---|
| NODAL 104 | 15.5 | 71,874 | 11.3 | 51,836 | 5.4 | 25,265 |
| NODAL 202 | 6.6 | 30,056 | 4.8 | 21,780 | 2.6 | 12,632 |
| NODAL 301 | 1.8 | 7,841 | 1.3 | 5,663 | 0.7 | 3,485 |
| NODAL 401 | 1.0 | 4,792 | 0.8 | 3,485 | 0.4 | 1,742 |

LEGEND:

- XXX / XXXX — NODE/CONCENTRATION POINT / ELEVATION
- XX / XX.X — SUB AREA / ACRES
- L=XXX' — MAIN FLOW PATH LENGTH
- FLOW PATH
- WATERSHED BOUNDARY
- PROJECT BOUNDARY

SCALE: 1" = 300'

0 150 300 600 1200

SCALE IN FEET

# WEST ANTELOPE SOLAR PROJECT (ON-SITE) HYDROLOGY MAP

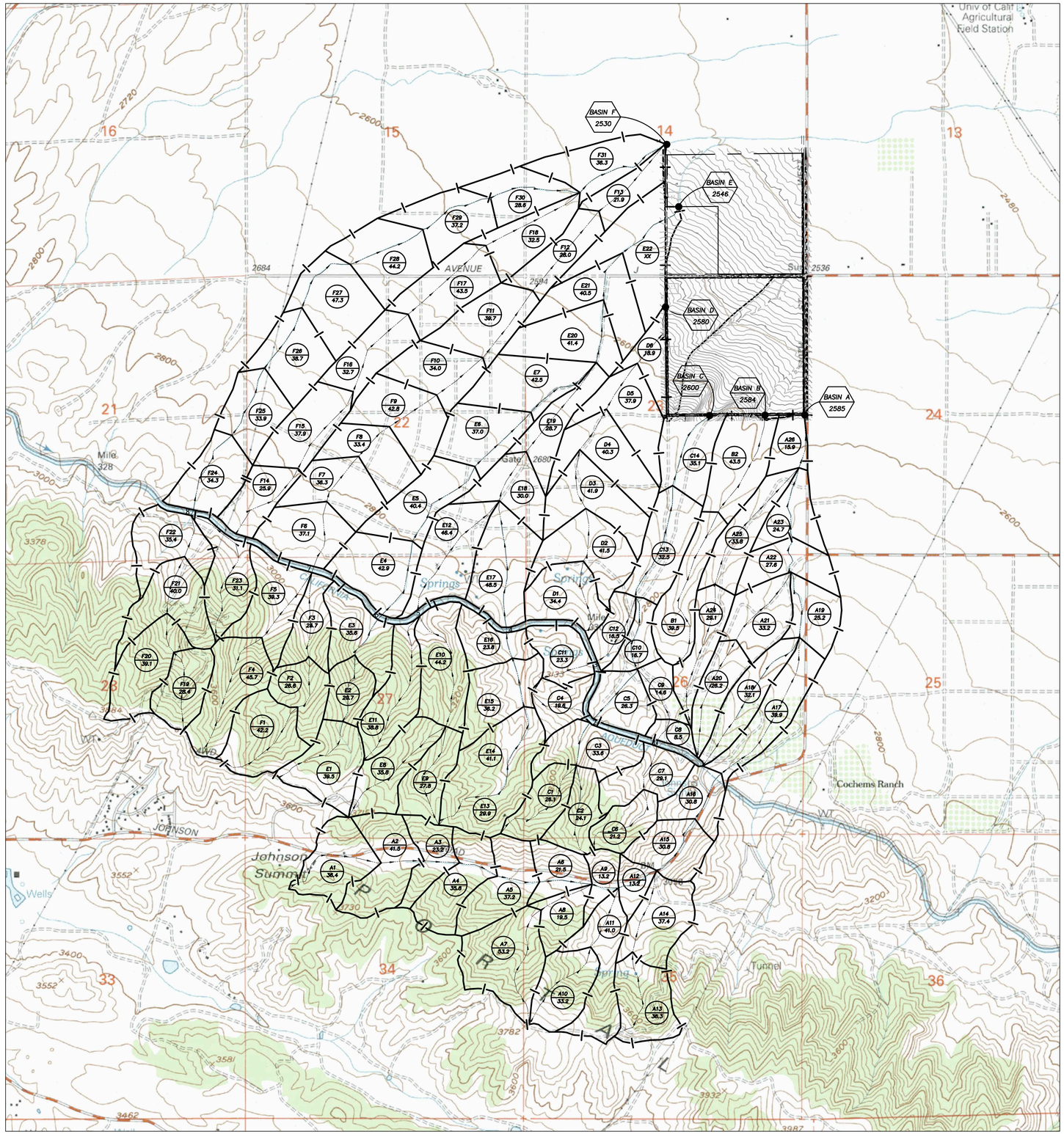
THOMAS BROS. MAP 2007 PG. 4013, E7

EXHIBIT "A"

AEI CASC ENGINEERING
937 SOUTH VIA LATA
SUITE 500
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

Drawing Name: Q:\1264-002\Master_Drainage\Exhibits\Hydrology Map (On-Site) Existing_Proposed Condition_rmc_070612.dwg
Last Opened: Jun 03, 2013 - 2:45pm by amstretto

**EXHIBIT B: OFF-SITE HYDROLOGY MAP BASED ON EXISTING AND PROPOSED CONDITION (MODIFIED RATIONAL METHOD)**




## EXISTING CONDITION HYDROLOGY SUMMARY TABLE

| CONCENTRATION POINT | CLEAR WATER FLOW | | BULK WATER FLOW | |
|---|---|---|---|---|
| | Q100(CFS) | Q50(CFS) | Q100(CFS) | Q50(CFS) |
| BASIN A | 1,523 | 1,213 | 1,889 | 1,504 |
| BASIN B | 60.0 | 47.0 | 64.0 | 47.0 |
| BASIN C | 443.0 | 347.0 | 558.0 | 437.0 |
| BASIN D | 320.0 | 255.0 | 378.0 | 301.0 |
| BASIN E | 1,138 | 825.0 | 1,400 | 1,015 |
| BASIN F | 1,725 | 1,360 | 2,053 | 1,618 |

## LEGEND:

- XXX / XXX — NODE/CONCENTRATION POINT / DISCHARGE POINT
- XX / XX — SUB AREA / ACRES
- L=XXX' — MAIN FLOW PATH
- $L_{DA}$=XXX' — FLOW DISTANCE MEASURED
- FLOW PATH
- WATERSHED BOUNDARY
- PROJECT BOUNDARY

SCALE: 1" = 1000'

0 500 1000 2000 3000

SCALE IN FEET

# WEST ANTELOPE SOLAR PROJECT (OFF-SITE) HYDROLOGY MAP

THOMAS BROS. MAP 2007 PG. 4013, E7

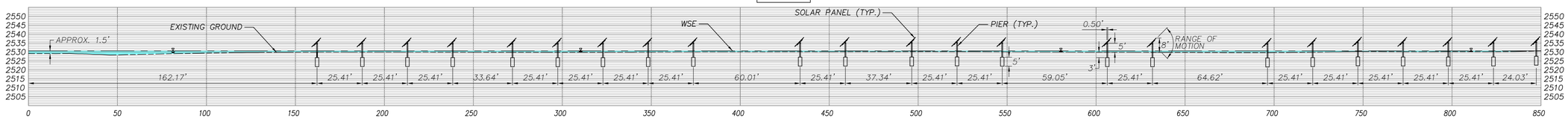
# EXHIBIT "B"

AEI CASC ENGINEERING
937 SOUTH VIA LATA
SUITE 500
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

Drawing Name: Q:\264-002\Master_Drainage\Exhibits\Hydrology Map (Off-Site) Existing Condition.dwg
Last Opened: May 28, 2013 - 12:37pm by amistretta

**EXHIBIT C: ON-SITE HYDROLOGY MAP BASED ON EXISTING AND PROPOSED CONDITION (MODIFIED RATIONAL METHOD) SHEETS 1 AND 2**

**1.05%**



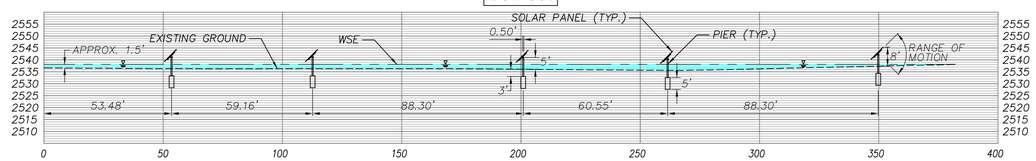

## SECTION A–A

TOTAL FLOW CONVEYANCE = 683.48 FT²

TOTAL SOLAR PANEL POST AREA = 7.19 FT²

TOTAL SOLAR PANEL POST AREA AS A PERCENTAGE OF TOTAL FLOW CONVEYANCE AREA = 1.05%

**0.68%**



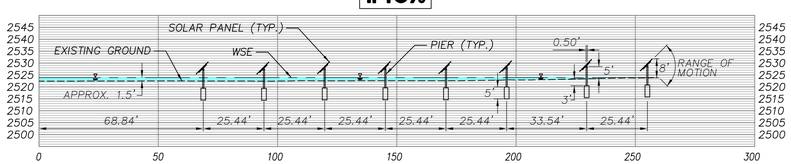

## SECTION C–C

TOTAL FLOW CONVEYANCE = 670.52 FT²

TOTAL SOLAR PANEL POST AREA = 4.55 FT²

TOTAL SOLAR PANEL POST AREA AS A PERCENTAGE OF TOTAL FLOW CONVEYANCE AREA = 0.68%

**1.40%**



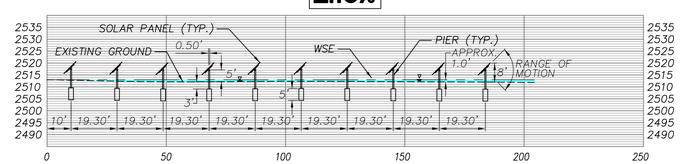

## SECTION B–B

TOTAL FLOW CONVEYANCE = 305.25 FT²

TOTAL SOLAR PANEL POST AREA = 4.26 FT²

TOTAL SOLAR PANEL POST AREA AS A PERCENTAGE OF TOTAL FLOW CONVEYANCE AREA = 1.40%

**2.16%**




## SECTION D–D

TOTAL FLOW CONVEYANCE = 152.69 FT²

TOTAL SOLAR PANEL POST AREA = 3.30 FT²

TOTAL SOLAR PANEL POST AREA AS A PERCENTAGE OF TOTAL FLOW CONVEYANCE AREA = 2.16%

**SECTION SCALES**
HORIZ.: 1"=30'
VERT.: 1"=30'

# EXHIBIT "C"

SHEET 2 OF 2

AEI CASC CONSULTING
1470 COOLEY DRIVE
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

Drawing Name: G:\264-002 Master_Drainage Exhibits\CLOMR Discussion Exhibit\Flood Hazard Map (On-Site) Existing Condition_SHT02.dwg
Last Opened: Nov 14, 2012 - 12:04pm by rcummins

# APPENDIX F-2

# LOW IMPACT DEVELOPMENT/WATER QUALITY REPORT

# Low Impact Development/Water Quality Report

For: **TA – Acacia, LLC –**
**West Antelope Solar Project**
**Located west of the City of Lancaster in unincorporated Los Angeles County**

**Prepared for:**
TA – Acacia, LLC
119 First Ave. S. - #100
Seattle, WA 98104
Phone: (925) 913-4817
Contact: Antonio Rodriguez, Senior Project Engineer
antonio.rodriguez@na.canadiansolar.com

**Prepared by:**
AEI-CASC Consulting
937 S. Via Lata, Suite 500
Colton, CA 92324
Phone: (909) 783-0101 X4130
FAX: (909) 783-0108
Contact: Mark Swanson, P.E., CPESC
Project Manager

Preparation Date: June 2013

# STATEMENT OF UNDERSTANDING

As the Engineer of Record of the Project I have reviewed the Development Planning for Storm Water Management - A manual for Standard Urban Storm Water Mitigation Plan (SUSMP), and have proposed the implementation of the Permanent Best Management Practices (BMPs) applicable to effectively minimize the negative impacts of the Project's stormwater runoff. The selected BMPs will be installed per the approved plans and as recommended by the product manufacturer as applicable.

| | |
|---|---|
| Engineer's Signature | Date |
| Mark Swanson, P.E., CPESC | Project Manager |
| Engineer's Printed Name | Title/Position |

| |
|---|
| **STAMP** |
| **Mark Swanson, P.E.**<br><br>Date and Signed |

Note: To be certified on approval documents

# Contents

1.0 Project Description and Characterization ..... 1
1.1 General Project Information ..... 1
1.2 Project Watershed ..... 2
1.3 Site Activities ..... 2
1.4 Waste Generated ..... 2
1.5 Water Quality Features ..... 3
2.0 Hydraulic and Hydrology Requirements ..... 4
2.1 Watershed Characteristics – Tributary Areas ..... 4
2.2 Precipitation Data ..... 4
2.3 Methodology ..... 4
2.4 Procedure ..... 5

## APPENDICES

A. Exhibits – Vicinity Map, Receiving Waters Map, and Site Plan

B. Soils & Percolation Reports

C. Treatment Control BMP Sizing Calculations and Design Details

D. Maintenance Covenant

# 1.0 Project Description and Characterization

## *1.1 General Project Information*

TA – Acacia, LLC proposes the development of a solar field on approximately 186 acres of a 267-acre site. The site is located on property owned and operated by TA – Acacia, LLC. The West Antelope Project (Project) site is located west of the City of Lancaster in an unincorporated portion of the County of Los Angeles, California. The Project site comprises a "North Portion" (approximately 108.6 acres) and a "South Portion" (approximately 158.5 acres). The Project site is divided by West Avenue J with the North Portion to the north of West Avenue J, and the South Portion to the south of West Avenue J. The entire Project site is bounded by West Avenue I-8 to the north, West Avenue J-8 to the south, 110th Street West to the east, and 115th Street West to the west. The Project will eventually be tied into the Antelope Substation via a 1.5 mile Generation-Tie line at the east boundary of the Project site along West Avenue J. The Vicinity Map identifies the Project site in relation to nearby geographic features (Refer to Appendix A). A SUSMP is required for this Project because the improvements propose greater than 5,000 square feet of impervious surface.

The development will comprise of construction of a solar field of approximately 84 arrays of 20 rows of polycrystalline PV panels, mounted on a single axis tracking system on steel support structures. Each row of panels typically contains approximately 60 panels for a total of approximately 99,000 solar panels. Construction will also include an electrical collection and inverter system that aggregates the output from the PV panels and converts electricity from direct current (DC) to alternating current (AC); a switchyard where all of the facility output is combined and transformed to a voltage of 66kV; a meteorological data collection system configured to collect meteorological information at the height of PV panels; and civil infrastructure including driveways, drainage design, post-construction BMP infiltration trenches, and fencing.

The Project Site Plan identifies the drainage pattern, site features, and structures incorporated into the Project (Refer to Appendix A – Site Plan). The Project Receiving Water Map[1] identifies the Project location within the Antelope Valley Watershed (Refer to Appendix A – Receiving Waters Map). Refer to Table 1 below for general project information.

| | |
|---|---|
| **Project Owner**: | TA – Acacia, LLC<br>119 First Ave. S. - #100<br>Seattle, WA 98104<br>Phone: (925) 913-4817 |
| **LID/Water Quality**: | AEI-CASC Consulting<br>937 S. Via Lata, Suite 500<br>Colton, CA 92324<br>Contact: Mark Swanson, P.E., CPESC<br>Project Manager<br>Phone: (909) 783-0101 X 4130<br>FAX: (909) 783-0108 |
| **Project Site Address:** | (Refer to Appendix A – Vicinity Map) |
| **APN Number(s):** | 3267-004-016 to 018, 3267-004-025 to 029, 3267- |

[1] California Regional Water Quality Control Board, Lahontan Region (6), Lahontan Basin Plan – Antelope Hydrologic Unit Map, Revised 08/96.

| | |
|---|---|
| | 004-044 to 046, 3267-014-017 to 020 |
| **Project Watershed:** | Antelope Valley |
| **Project Site Size:** | 267 acres gross; 186 acres disturbed. |
| **Standard Industrial Classification (SIC) Code:** | 4931 – Other Electric Power Generation |
| **North American Industry Classification System (NAICS) Code:** | 221111 – Electric Power Generation, Solar |

**Table 1 – General Project Information**

## *1.2 Project Watershed*

The proposed Project is located within the South Lahontan Hydrologic Basin Planning area, part of the Antelope Hydrologic Unit (626.5 – Lancaster Hydrologic Area), and within the jurisdiction of the Lahontan RWQCB (6V). Runoff, if any, has the potential to discharge from the northeast corner of the Project site and drain to the north; however, flows are not anticipated to reach/cross the ephemeral stream located approx. 330 ft. north of the Project site. The ephemeral stream drains to the east and terminates approximately 3.8 miles away. Refer to Section 2.1 for additional details.

Although ephemeral streams and washes do not have beneficial use designations assigned by the State of California, these systems have been known to provide natural distribution of water and sediments on floodplains, recharge for groundwater in the region, and a sporadic but local water supply for wildlife. No information is available on the surface water quality at the site during rain events. Historically this is a rural, undeveloped area; therefore, anthropogenic contaminants on the surface are not expected.

## *1.3 Site Activities*

The types of activities allowed within the Project will be limited to and in accordance with the County of Los Angeles codes, regulations, and zoning ordinances. Activities such as staging or stockpiling materials or wastes in areas where they can be discharged to storm drains or receiving waters will be prohibited. Additionally, vehicle maintenance and washing will be prohibited on site. Activities at the site will be limited to the activities appropriate for a solar field. This site will be an unmanned site during daily operations and will have limited access. Because the site is unmanned, wastes will not be generated. Site personnel will only be on-site for maintenance purposes while all other site operation will occur remotely.

## *1.4 Waste Generated*

The wastes associated with this Project are anticipated to be similar to the wastes generated by similar business developments. Wastes may include (but not limited to) debris resulting from vegetation maintenance (weed abatement), wind-blown debris, and materials resulting from maintenance, repair, and/or replacement of solar equipment.

## *1.5 Water Quality Features*

Development of this Project will feature the following water quality features: 1) preserved natural vegetation; 2) reestablished non-irrigated native vegetation throughout developed areas; and 3) multiple infiltration trenches (Refer to Appendix A). The permeable gravel ground cover areas will allow for the infiltration of run-off, as well as preserve the majority pervious footprint of the site. The infiltration trenches will promote opportunities for capturing, retaining, and treating site runoff through infiltrating. The proposed site will be approximately 99% pervious.

# 2.0 Hydraulic and Hydrology Requirements

Impacts to the hydrologic regime resulting from the Project may include increased runoff volume and velocity; reduced infiltration; increased flow frequency, duration and peaks; faster time to reach peak flow; and water quality degradation. The proximate receiving waters for this Project are dry for the majority of the year with the exception of incidental flows during the wet season. The impacts to the site will be relatively small as the ground below the solar panels will remain pervious with natural vegetation and it is anticipated that the peak flows will have little to no significant impact on the proximate and downstream receiving waters. This Project proposes the implementation of multiple infiltration trench areas which will receive onsite flows and act as a buffer prior to the discharge of peak flows; therefore, it is concluded that the Project will unlikely cause hydrologic conditions of concern.

## *2.1 Watershed Characteristics – Tributary Areas*

As stated in Section 1.5, the Project site is tributary to a proximate ephemeral stream that runs easterly along Lancaster Blvd towards 70$^{th}$ Street West in the Antelope Valley Watershed. Project run-off will terminate at a small depressed open area approximately 3.8 miles downstream of the site to the west of 70$^{th}$ Street West. This ephemeral stream is not listed as an impaired water body. The solar site will be similar to existing commercial developments, and since existing developments have apparently not impacted local West Antelope Valley ephemeral streams and lakes, this further supports that the Project is not expected to result in adverse impacts to the proximate or downstream receiving waters.

The total watershed area tributary to the Project site is approximately 5.16 square miles, in which the majority of the tributary area drains northeasterly forming several incised channels across the Project site. These channels will continue on through the site using their existing drainage patterns until the reach 110$^{th}$ Street West. The flows will then travel northerly in a channel along the street until they reach the ephemeral stream that runs easterly along Lancaster Blvd towards 70$^{th}$ Street West. This channel gradually diminishes near 70$^{th}$ Street West where flows will spread into surface flow and terminate through infiltration and evaporation.

For the purpose of this hydrology analysis, offsite flows to the Project site from the watershed generated in the area southwest of the Project site are considered to flow through the site using the existing drainage patterns. Only additional on-site flows generated from increased impervious areas will be considered when comparing pre-and post-development conditions.

## *2.2 Precipitation Data*

The 50-year, 24-hour storm information was based on the Los Angeles County Hydrology Manual. Refer to Section 2.4 for the procedure used to determine the 2-year, 5-year, 10-year, and 25-year, 24-hr events.

## *2.3 Methodology*

Drainage calculations follow the methodology used in the Los Angeles County Department of Public Works Hydrology Manual. The Modified Rational Method was used in this study to determine on-site flows.

For peak flow calculation, the LACDPW TC (TC_calc_depths.xls, June 2002) program was used to calculate the time of concentration for each sub area. Then, the WMS computer program was used for the Modified Rational Method calculations and WMS program output are provided in Appendix C, respectively. In accordance with LACDPW requirements, the 50-year, 24-hour storm event was used as the main design storm in the analysis.

## *2.4 Procedure*

As described in the Hydrology Manual for Los Angeles County, discharge was computed using the following steps.

1. On-site drainage areas were determined by a review of the grades (see Hydrology Exhibits, Appendix A).

2. Rainfall data was determined using the LACDPW Isohyetal Maps for a 50-year, 24-hour storm (See Appendix A). Reduction factors of 0.387, 0.584, 0.714, and 0.878 were used for the 2-year, 5-year, 10-year, 25-year storms, respectively.

3. Soils data was found for the Project site using the LACDPW Isohyetal Maps for a 50-year, 24 hour storm (See Appendix A). When it was feasible to do so, drainage areas were further separated by soil types for the purpose of performing hydrology calculations. In cases where no logical division of drainage areas occurred along drainage boundaries, the dominant soil type prevailed. (See Hydrology Exhibit, Appendix A).

4. The Los Angeles County Department of Public Works TC computer program was used for the Modified Rational Method calculations to find values for Time of Concentration and Intensity (see Appendix C).

5. Flows were calculated for each drainage area using:

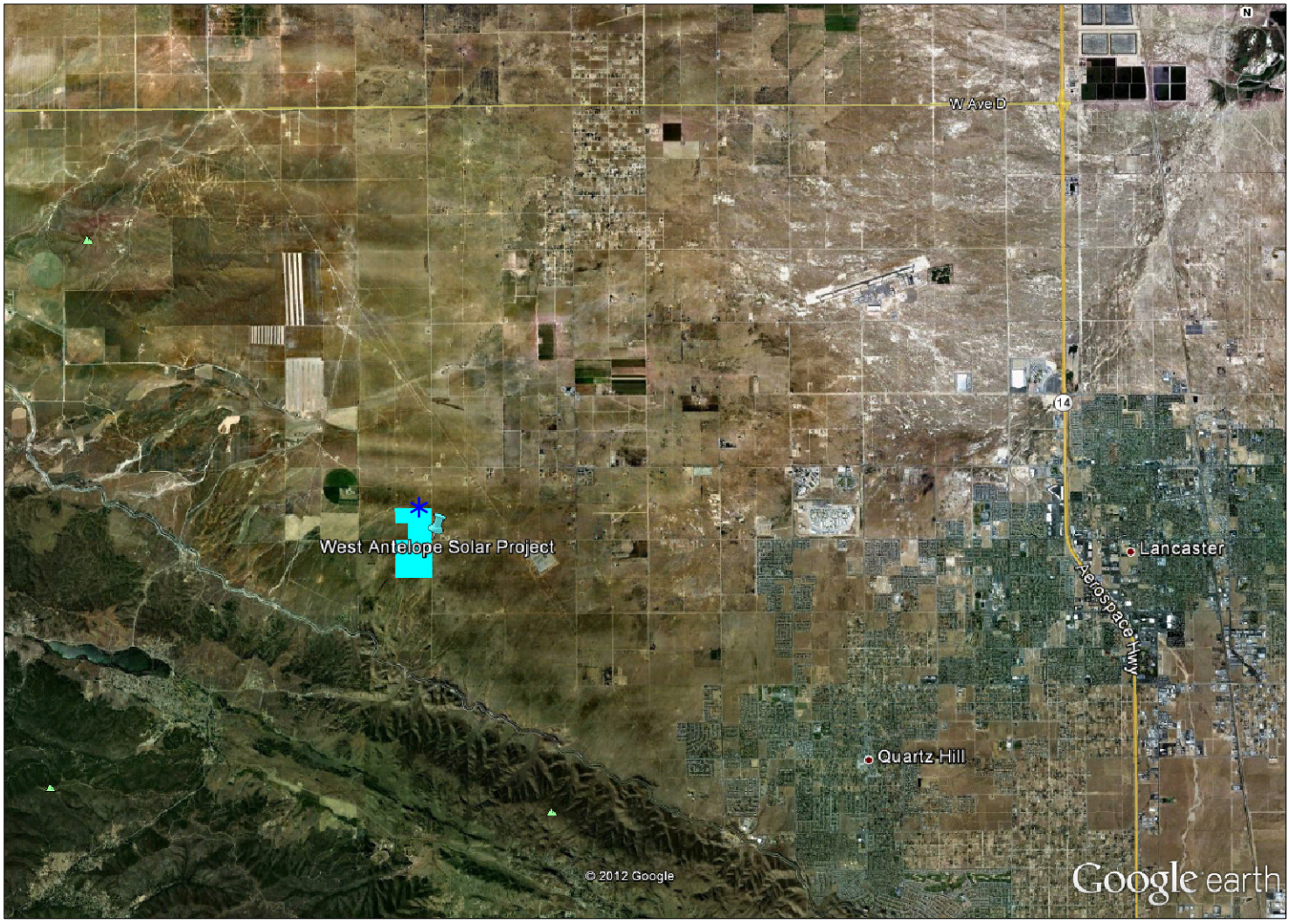
   $$Q = C*i*A$$

   Where:
   Q is the design runoff (cfs)
   C is the runoff coefficient
   i is the intensity (in/hr)
   A is the drainage area (ac)

# Appendix A

Exhibits – Vicinity Map, Receiving Waters Map, and Site Plan

# VICINITY MAP
## FOR
## WEST ANTELOPE SOLAR PROJECT
## LOCATED WEST OF THE CITY OF LANCASTER
## IN UNINCORPORATED LOS ANGELES COUNTY, CA




**LEGEND:**

PROJECT AREA

DISCHARGE POINT

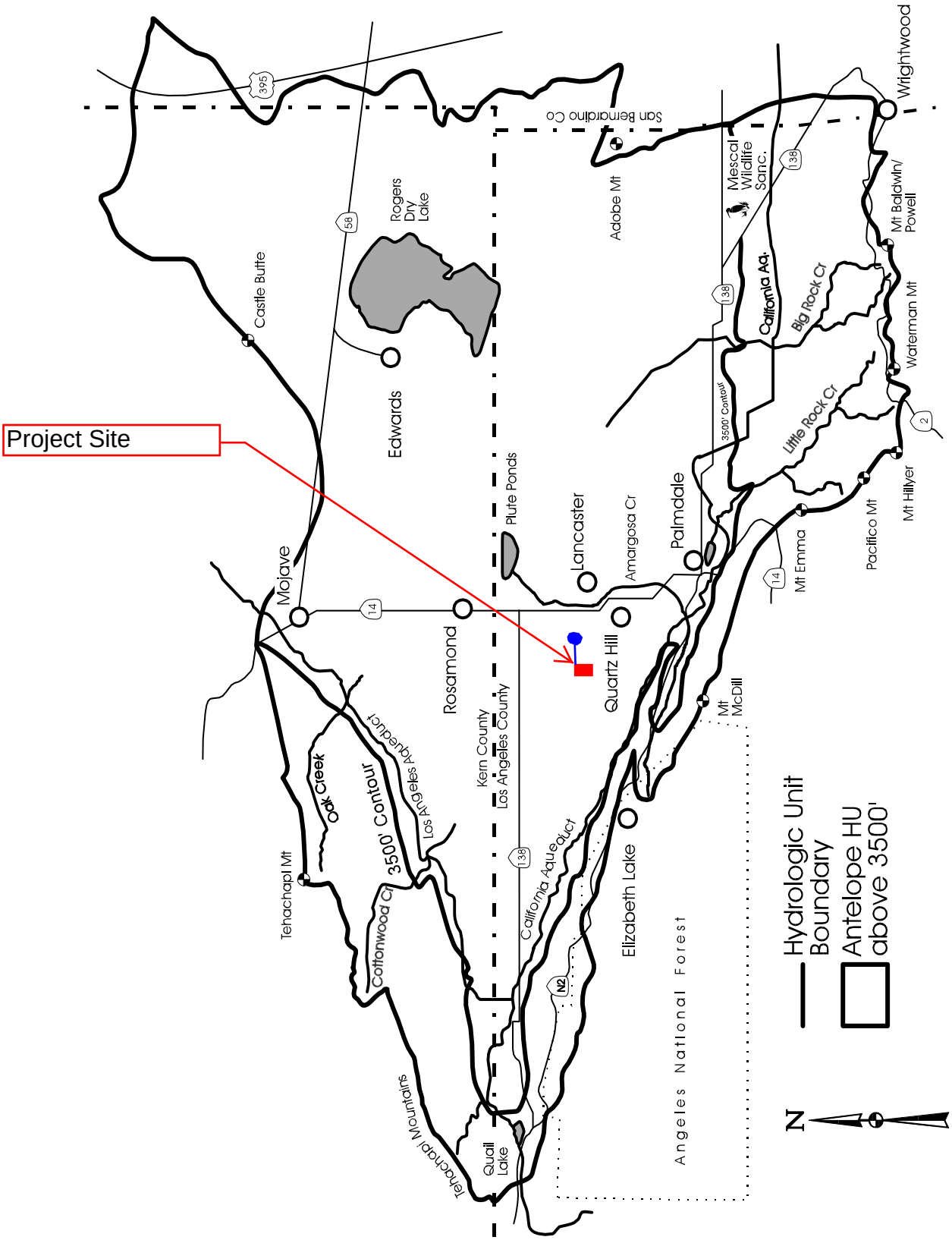
N

N.T.S.

AEI CASC CONSULTING
937 SOUTH VIA LATA, SUITE 500
COLTON, CA 92324
PH. (909) 783-0101; FAX (909) 783-0108

Receiving Water Map

**Figure 4.1-22**
**ANTELOPE HYDROLOGIC UNIT**



# LID/WATER QUALITY PRELIMINARY SITE PLAN
# FOR
# WEST ANTELOPE SOLAR PROJECT
## 110TH STREET W. AND W. AVENUE J, UNINCORPORATED LA COUNTY, CA

## LID/WATER QUALITY NOTES:

1. DETERMINE AND PROVIDE THE PRE- AND POST-DEVELOPMENT PERVIOUS AND IMPERVIOUS AREAS CREATED BY THE PROPOSED DEVELOPMENT.

| | |
|---|---|
| PRE-DEVELOPMENT<br>IMPERVIOUS AREA = 2%<br>PERVIOUS AREA = 98%<br><br>POST-DEVELOPMENT<br>IMPERVIOUS AREA = 10%<br>PERVIOUS AREA = 90% | NOTE: FOR THE PRE-DEVELOPEMENT CONDITION, 2% IMPERVIOUS AREA WAS RECOMMENDED BY LOS ANGELES COUNTY. FOR THE POST-DEVELOPEMENT CONDITION, 10% IMPERVIOUS AREA WAS ASSUMED BASED ON SIMILAR PROJECTS IN THE AREA AND ACCEPTABLE TO LOS ANGELES COUNTY. |

2. TRASH BINS MUST BE EQUIPPED WITH LIDS OR SCREENED, ROOFED OR WALLED. RUNOFF WATER SHOULD BE DIVERTED AROUND TRASH AREAS TO AVOID FLOW-THROUGH.
3. NO HOSES, HOSE BIBS OR FAUCETS SHOULD BE LOCATED OUTSIDE EXCEPT IN LANDSCAPED AREAS OR AS NEEDED FOR FIRE PROTECTION.
4. MINOR AMOUNTS OF MATERIAL STORAGE MAY PERIODICALLY BE LOCATED OUTDOORS. TYPICAL MATERIALS THAT MAY BE STORED OUTDOORS INCLUDE (BUT NOT LIMITED TO) MATERIALS THAT ARE WEATHER TOLERANT SUCH AS SPOOLS OF WIRE AND MISCELLANEOUS ELECTRICAL MAINTENANCE EQUIPMENT. THERE WILL BE NO CHEMICAL STORAGE ONSITE.

## STATEMENTS OF UNDERSTANDING

AS THE ENGINEER OF THE PROJECT, I HAVE REVIEWED THE DEVELOPMENT PLANNING FOR STORMWATER MANAGEMENT-A MANUAL FOR THE STANDARD URBAN STORMWATER MITIGATION PLAN (SUSMP), AND HAVE PROPOSED THE IMPLEMENTATION OF THE PERMANENT BEST MANAGEMENT PRACTICES (BMPs) APPLICABLE TO EFFECTIVELY MINIMIZE THE NEGATIVE IMPACTS OF THE PROJECT'S STORMWATER RUNOFF. THE SELECTED BMPs WILL BE INSTALLED PER THE APPROVED PLANS AND AS RECOMMENDED BY THE PRODUCT MANUFACTURER AS APPLICABLE.

SIGNATURE - ENGINEER OF RECORD DATE

## SOURCE CONTROL BMP's:

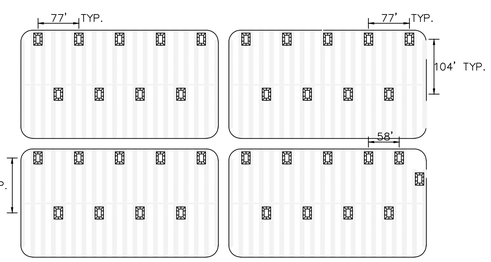
1. EDUCATION OF PROPERTY OWNERS
2. ACTIVITY RESTRICTIONS
3. SPILL CONTINGENCY PLAN
4. EMPLOYEE TRAINING/EDUCATION PROGRAM
5. TRASH AND LITTER CONTROLS
6. DRAINAGE FACILITY INSPECTIONS AND MAINTENANCE

## SITE DESIGN BMP's:

7. PERMANENT INFILTRATION TRENCHES
8. PRESERVATION OF NATURAL AREAS
9. PRESERVATION OF EXISTING DRAINAGE PATTERNS

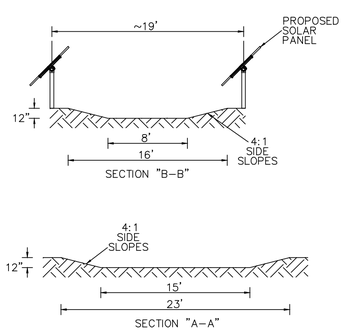
## TREATMENT CONTROL BMP's:

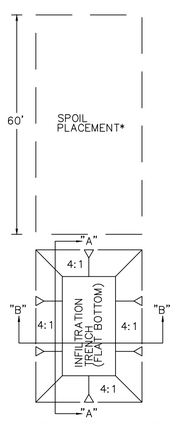
10. INFILTRATION TRENCHES




***INFILTRATION TRENCH LAYOUT FOR TYPICAL BLOCK***
N.T.S.

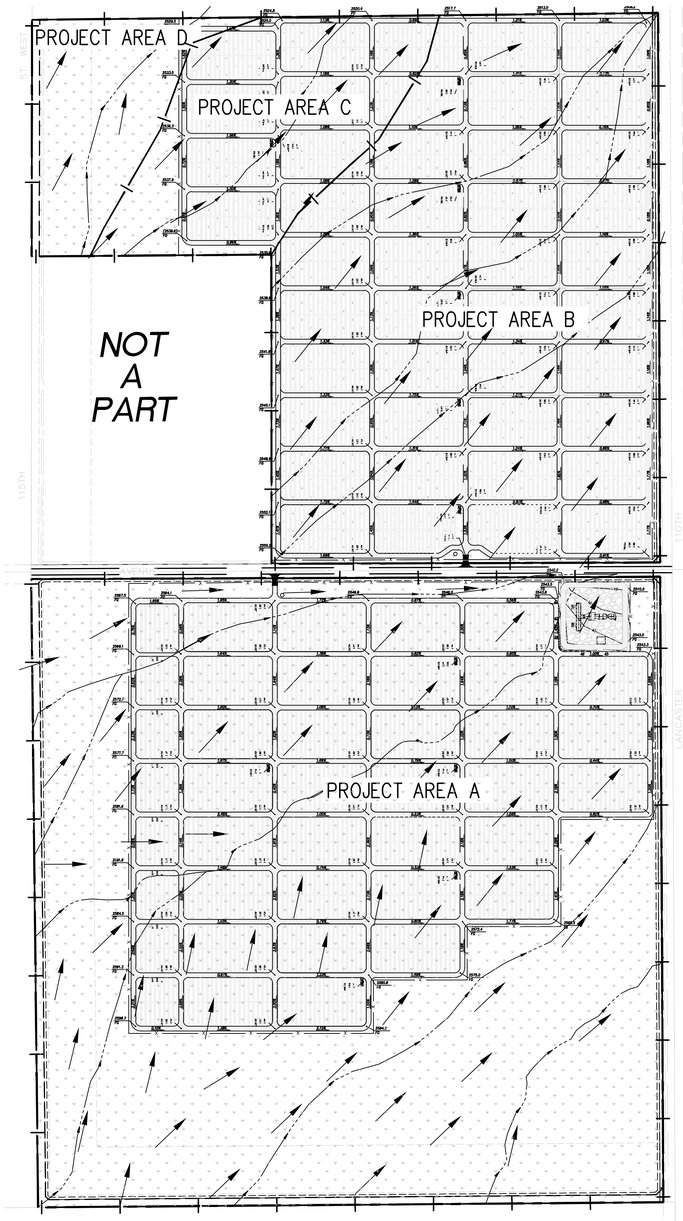
**NOTE:**
INFILTRATION TRENCH MAINTENANCE WILL BE THE RESPONSIBILITY OF THE PROPERTY OWNER.




***INFILTRATION TRENCH DETAIL***
N.T.S.

*NOTE: SOIL FROM EACH INFILTRATION TRENCH SHALL BE SPREAD OVER A 16' WIDE X 60' LONG AREA AND HYDROSEEDED WITH A NATIVE MIX.




APNs:
3267-004-016 TO 018
3267-004-025 TO 029
3267-004-044 TO 046
3267-014-017 TO 020

## PROJECT DRAINAGE AREAS:

### PROJECT AREA A

TOTAL DRAINAGE AREA
6,909,643 SQ FT (158.6 AC)
10% IMPERVIOUS
90% PERVIOUS

### PROJECT AREA B

TOTAL DRAINAGE AREA
3,330,197 SQ FT (76.5 AC)
10% IMPERVIOUS
90% PERVIOUS

### PROJECT AREA C

TOTAL DRAINAGE AREA
893,828 SQ FT (20.5 AC)
10% IMPERVIOUS
90% PERVIOUS

### PROJECT AREA D

TOTAL DRAINAGE AREA
508,393 SQ FT (11.7 AC)
10% IMPERVIOUS
90% PERVIOUS

## LEGEND

- DIRECTION OF FLOW
- PROJECT BOUNDARY
- BMP DRAINAGE AREA
- PROPOSED NATIVE GROUNDCOVER
- PROPOSED "ALL-WEATHER" ACCESS ROAD
- PROPOSED GRAVEL

N

GRAPHIC SCALE
300 0 150 300 600
1" = 300'

FOR STORMWATER QUALITY PLANNING, REFER TO CIVIL AND OTHER PLANS FOR CONSTRUCTION DETAILS.

| MARK | REVISIONS | APPR. | DATE |
|---|---|---|---|

DESIGNED BY: CLO DRAWN BY: CLO CHECKED BY: MBS

PREPARED FOR:
TA - ACACIA, LLC
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PH. (909) 783-0101 FAX (909) 783-0108


LID/WATER QUALITY PRELIMINARY SITE PLAN
WEST ANTELOPE SOLAR PROJECT

1 OF 1 SHEETS

PLAN NO. _____


Drawing Name: Q:\1264-002\SUSMP\West Antelope Solar Project_Site Plan.dwg
Last Opened: May 28, 2013 - 8:59am by amistrella

# Appendix B

## Soils & Percolation Reports

# *GEOTECHNICAL INVESTIGATION, PROPOSED 20-MWAC PHOTOVOLTAIC ARRAY, WEST OF 110TH STREET WEST, NORTH AND SOUTH OF AVENUE J, IN THE LANCASTER AREA OF LOS ANGELES COUNTY, CALIFORNIA*

Prepared for:

## *CANADIAN SOLAR (USA) INC.*

12657 Alcosta Blvd., Suite 130
San Ramon, California 94583 USA

Project No. 603455-001

June 21, 2012

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June 21, 2102

Project No. 603455-001

To: Canadian Solar (USA) Inc.
12657 Alcosta Blvd., Suite 130
San Ramon, California 94583 USA

Attention: Mr. Antonio Rodriguez
Senior Project Engineer

Subject: Geotechnical Investigation, Proposed 20-MWAC Photovoltaic Array, West of 110th Street West, North and South of Avenue J, in the Lancaster Area of Unincorporated Los Angeles County, California

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Leighton Consulting, Inc. (Leighton) has conducted a geotechnical investigation and geologic hazards review for the proposed 20-MWAC Photovoltaic Array, located west of 110th Street West, and both north and south of Avenue J in the Lancaster Area of unincorporated Los Angeles County, California, California. The purpose of this study has been to evaluate geologic and geotechnical conditions at the site with respect to the proposed improvements, and to provide preliminary geotechnical recommendations for design and construction of the proposed PV array and associated improvements.

Based upon our geotechnical investigation, the proposed improvements are feasible from a geotechnical viewpoint, provided our recommendations are incorporated into the design and construction of the project. The most significant geotechnical issues at the site are compressible soils, seismic hazards and flood hazards. These and other geotechnical issues are discussed in this report.

We appreciate the opportunity to work with Canadian Solar on this project. If you have any questions, or if we can be of further service, please call us at your convenience at (909) 484-2205.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

Jason D. Hertzberg, GE 2711
Associate Engineer

Philip A. Buchiarelli, CEG 1715
Principal Geologist

MDH/JDH/PB/rsh

Distribution: (4) Addressee

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Appendix B Exploration Logs (Borings, Infiltration Tests, and Field Elect. Resistivity)
Appendix C Geotechnical Laboratory Test Results
Appendix D Summary of Seismic Analysis
Appendix E Earthwork and Grading Guide Specifications

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# 1.0 INTRODUCTION

## 1.1 Site Location and Description

The project site is located west of 110th Street West, both north and south of Avenue J. The site is located just west of the Lancaster city limits in unincorporated Los Angeles County. The roughly 250-acre site is currently vacant and gently slopes downward to the north. The site is bounded by high-voltage power lines along the western and southern boundaries of the site, vacant land to the north, and 110th Street West to the east. The properties surrounding the site are also vacant.

The site gently descends in elevation from south to north, ranging from approximately 2,630 to 2,510 feet above mean sea level (msl) (USGS, 1974), for an average gradient of approximately 2 percent from the southwest corner to the northeast corner. The site has a light covering of seasonal grasses.

## 1.2 Proposed Improvements

Based on our review of preliminary site plans, including the Photovoltaic Array Site Plan, Sheet G-100, dated March 15, 2012, the proposed project includes construction of 155 acres of PV array, though we understand that the locations of the sub-arrays will likely shift on the site. Each sub-array (372 feet wide) will consist of 20 trackers (each typically 198 feet long), in which PV modules will be attached to torque tubes mounted on bearing beams. The modules will be rotated by a gear box. The project will include a 230/13.8kV substation with total plan dimensions of roughly 115 by 215 feet, located in the northwest corner of the portion of the site south of Avenue J.

We understand that the bearing beams (H beams) for the PV panels will be driven into the ground approximately 5 to 8 feet for foundation support. Grading plans were not available at the time of this study. However, due to the existing topography onsite, we anticipate that minor cuts and fills (generally less than 1 or 2 feet) will be needed to achieve designed grades for the improvements. We anticipate that little or no grading will be conducted for the PV array areas.

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## 1.3 Purpose of Investigation

The purpose of our study has been to evaluate the geologic and geotechnical conditions, including potential geologic hazards, as they relate to the proposed improvements, to explore the subsurface conditions, and to provide preliminary recommendations for design and construction of the proposed improvements.

## 1.4 Scope

The scope of our geotechnical investigation has included the following tasks:

- Geologic Hazards Review - We reviewed pertinent, readily available geologic and geotechnical literature covering the site. Our review included regional geologic maps and reports available from our library covering the site. Documents reviewed are listed in Appendix A, References.

- Pre-field Investigation Activities - We coordinated with Underground Service Alert to have existing underground utilities located and marked prior to our subsurface investigation.

- Field Exploration - Our field investigation included drilling, logging, and sampling nine hollow-stem auger borings (LB-1 through LB-9) throughout the site, within the presumed footprints of the PV arrays and substation. The borings were drilled to depths ranging from 11.5 feet to 51.5 feet below the existing ground surface.

  Encountered soils were logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D 2488). Relatively undisturbed soil samples were obtained at selected intervals within these borings using both a California ring-lined sampler and a Standard Penetration Test (SPT) split-spoon sampler. SPT resistance blow counts were obtained by dropping a 140 pound hammer through a 30-inch free fall. The 2-inch outside diameter SPT sampler was driven 18 inches without an inner liner and the number of blows was recorded for each 6 inches of penetration (ASTM D 1586). Representative bulk soil samples were also collected at shallow depths.

  We performed three double-ring infiltration tests at representative locations on site. The test procedure consisted of driving sets of two test cylinders

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("rings") into in-place soil, filling the rings with water, and measuring the infiltration rates over a period of time.

We also conducted field measurements of ground electrical resistivity using the Wenner 4-pin method with spacings of 5, 10, 15, and 20 feet. This testing was conducted at 6 locations onsite (two orthogonal directions at three points).

Locations of borings and field tests were reviewed by the owner and project civil engineer prior to exploration. Logs of the geotechnical borings, infiltration test results, and results of field electrical resistivity testing are presented in Appendix B. Approximate boring and test locations are shown on the accompanying *Geotechnical Map*, Figure 2.

- Laboratory Tests - Laboratory tests were conducted on selected relatively undisturbed and bulk soil samples obtained during our field investigation. The laboratory testing program was designed to evaluate engineering characteristics of the onsite soil. Laboratory tests conducted during this investigation include:

  - In situ moisture content and dry density
  - Sieve and hydrometer analysis for grain-size distribution
  - Consolidation and collapse potential
  - Expansion index
  - Direct shear
  - Maximum dry density and optimum moisture content
  - Water-soluble sulfate concentration in the soil
  - Resistivity, chloride content and pH
  - Soil thermal resistivity of three relatively undisturbed samples

  Results of the in situ dry density and moisture content tests are shown on the boring logs (Appendix B). Results of the remaining laboratory tests are provided in Appendix C.

- Engineering Analysis - Data obtained from our background review and field exploration was evaluated and analyzed to provide geotechnical conclusions and preliminary recommendations presented in the following sections.

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- Report Preparation - Results of our geologic hazards review and geotechnical investigation have been summarized in this report, presenting our findings, conclusions and preliminary recommendations for the project.

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# 2.0 FINDINGS

## 2.1 Geologic Hazards Review

We have reviewed pertinent, readily available geologic and geotechnical literature covering the site. Our review included regional geologic maps and reports available from our library. Documents reviewed are listed in Appendix A, References. Potential geologic hazards are discussed in the following sections.

## 2.2 Regional Geologic Setting

The site is located within the Antelope Valley portion of the Mojave Desert Geomorphic Province of California. The Antelope Valley lies within a wedge-shaped part of the Mojave Desert bound by the San Andreas Fault to the southwest, the Garlock Fault to the northwest and the Cottonwood-Rosamond Fault to the northeast. Onsite terrain slopes slightly to the north and is underlain by Quaternary alluvium to a thickness of several hundred feet, underlain by plutonic quartz monzonite bedrock. The majority of the site is mapped with alluvial soil at the surface, consisting of gravel, sand and silt. The far southwest portion of the site is mapped with older alluvium at the surface (Dibblee, 1961); this material also underlies the younger alluvium.

## 2.3 Subsurface Soil Conditions

Based upon our review of pertinent geotechnical literature and our current subsurface exploration, the site is underlain by alluvial fan deposits. Alluvial soils encountered in our borings generally consisted of medium dense to dense granular soils, including silty sand and clayey sand, and medium stiff to very stiff cohesive soils, including sandy lean clay and silt. Thin layers of clean sand, were encountered at depths greater than 30 feet. The soil encountered was generally visually described as dry to slightly moist. More detailed descriptions of the subsurface conditions are presented on the boring logs in Appendix B.

### 2.3.1 Compressible and Collapsible Soil

Soil compressibility refers to a soil's potential for settlement when subjected to increased loads as from a new structure or fill surcharge. Based on our investigation, the alluvial soils encountered are considered slightly to moderately compressible.

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Collapse potential (moisture sensitivity, sometimes referred to as 'hydrocollapse') refers to the potential settlement of a soil under existing stresses upon being wetted. Samples of the subsurface soil were tested for collapse potential. Test results indicate that the soil onsite has a moderate collapse potential.

2.3.2 Expansive Soils

Expansive soils contain significant amounts of clay particles that swell considerably when wetted and shrink when dried. Structures constructed on these soils are subjected to large uplifting forces caused by the swelling. Without proper measures taken, heaving and cracking of both building foundations and slabs-on-grade could result.

A representative sample of the subsurface soil was tested for expansion index, plus additional relatively undisturbed samples were tested for swell potential. Test results indicate that the onsite near-surface soils are expected to have a low to medium expansion potential.

2.3.3 Sulfate Content

Water-soluble sulfates in soil can react adversely with concrete. However, concrete in contact with soil containing sulfate concentrations of less than 0.1 percent by weight is considered to have negligible sulfate exposure based on the American Concrete Institute (ACI) publication 318-08, Section 4.2 (ACI, 2008), adopted by the 2010 CBC (Section 1904A.2).

Near-surface soil samples were tested during this investigation for soluble sulfate content. Results of these test indicated a sulfate content of less than 0.01 percent by weight, indicating negligible sulfate exposure. As such, the soils exposed at pad grade are not expected to pose a significant potential for sulfate reaction with concrete.

2.3.4 Resistivity, Chloride and pH

Soil corrosivity to ferrous metals can be estimated by the soil's electrical resistivity, chloride content and pH. In general, soil having a minimum resistivity less than 2,000 ohm-cm is considered corrosive. Soil with a chloride content of 500 parts-per-million (ppm) or more is considered corrosive to ferrous metals.

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As a screening for potentially corrosive soil, representative soil samples were tested during this investigation to determine their minimum resistivity, chloride content, and pH. These tests indicated a minimum resistivity of approximately 3,400 ohm-cm or more, a maximum chloride content of approximately 55 ppm, and pH as low as 5.9. Based on these results, the onsite soil is considered corrosive to ferrous metals. Past corrosion testing on similar soils in the vicinity has indicated soils aggressive to copper.

2.3.5 Field Electrical Resistivity Testing

Field measurements of ground electrical resistivity were conducted using the Wenner 4-pin method. Testing was conducted at 6 locations onsite (two orthogonal directions at Borings LB-2, LB-5, and LB-8). In general, resistivity in ohms-cm is the average resistivity of soil (electrolyte) to a depth equal to the spacing between adjacent electrodes (soil pins). The results of the testing, including data and graphs, are presented in Appendix B.

2.3.6 Soil Thermal Resistivity Testing

Thermal resistivity testing was conducted on three relatively undisturbed soils samples from Borings LB-2, 5, and 8 at a depth of approximately 5 feet. Samples were tested at the as-received (in situ) moisture content and again after drying the samples to approximately 0 percent moisture content. Results ranged from approximately 0.6 to 0.9 m $^{o}$C W$^{-1}$ at as-received moisture content (approximately 5 to 6 percent moisture content) and approximately 1.7 to 1.8 m $^{o}$C W$^{-1}$ at 0 percent moisture content. Results are presented in Appendix C.

## 2.4 Groundwater

Groundwater was not encountered in our nine borings excavated to a maximum depth of 51.5 feet below existing ground surface. Based on our review of groundwater data from Los Angeles County Department of Public Works, recent groundwater levels at two monitoring wells closest to the site were greater than 150 feet below existing ground surface (Los Angeles County, 2012). The California Geological Survey considers the historically highest groundwater level at the site to be greater than 250 feet below the ground surface (CGS, 2005). We have assumed deep groundwater conditions in excess of 150 feet below existing ground surface in our analysis of the site.

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## 2.5 Faulting and Seismicity

In general, the primary seismic hazards for sites in the region could include strong ground shaking and fault rupture. The potential for fault rupture and seismic shaking are discussed below.

### 2.5.1 Surface Faulting

Our review of available in-house literature indicates that there are no known active or potentially active faults that traverse the site, and the site is not located within a currently designated Alquist-Priolo (A-P) Earthquake Fault Zone (CGS, 2000). The closest active fault to the site is the San Andreas fault, located approximately 3¼ miles south of the site.

The site is not known to be located on or near a pressure ridge. Based on our understanding of the current geologic framework, the potential for future surface rupture of active faults onsite is considered low.

### 2.5.2 Seismic Design Parameters

The principal seismic hazard that could affect the site is ground shaking resulting from an earthquake occurring along several major active or potentially active faults in southern California. Design of the proposed improvements in accordance with current CBC requirements is intended to reduce the impact of seismic shaking on the proposed improvements.

Recommended seismic design acceleration parameters in accordance with the 2010 CBC are presented in Table 1 below.

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Table 1 - 2010 CBC Seismic Design Parameters

| Description (2010 CBC reference) | Parameter | Design Value |
|---|---|---|
| Site Longitude, degrees | | -118.330 |
| Site Latitude, degrees | | 34.684 |
| Site Class Definition (Table 1613.5.2) | | D |
| Mapped MCE Spect Resp Accel at 0.2s for Site Cls B (Fig 1613.5(3)), using USGS, 2011 | $S_S$ | 1.77 |
| Mapped MCE Spect Resp Accel at 1.0s for Site Cls B (Fig 1613.5(4)) using USGS, 2011 | $S_1$ | 0.88 |
| Short Period Site Coefficient (Table 1613.5.3(1)) | $F_a$ | 1.0 |
| Long Period Site Coefficient (Table 1613.5.3(2)) | $F_v$ | 1.5 |
| Adjusted MCE Spectral Response Acceleration at 0.2s Period [$=F_aS_S$] (1613.5.3) | $S_{MS}$ | 1.77 |
| Adjusted MCE Spectral Response Acceleration at 1s Period [$=F_vS_1$] (1613.5.3) | $S_{M1}$ | 1.32 |
| Design Spectral Response Acceleration at 0.2s Period, 5% damped [$=2/3S_{MS}$] (1613.5.4) | $S_{DS}$ | 1.18 |
| Design Spectral Response Acceleration at 1s Period, 5% damped [$=2/3S_{M1}$] (1613.5.4) | $S_{D1}$ | 0.88 |
| Is $S_1$ greater than or equal to 0.75? | | Yes |
| Seismic Design Category (1613.5.6) | | E or F |

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2.5.3 Seismic Parameters for Geotechnical Evaluation

Peak horizontal ground acceleration (PHGA) and hazard deaggregation were estimated using the United States Geological Survey's (USGS) 2008 Interactive Deaggregations utility. The results of this analysis indicate that the predominant modal earthquake has a PHGA of 1.04g with magnitude of approximately 7.8 ($M_W$) at a distance on the order of 5.2 kilometers for the Maximum Considered Earthquake (2% probability of exceedance in 50 years); results are included in Appendix D. Based on this, the corresponding PHGA for the design earthquake (2/3 of the MCE) is 0.69g. This is not an exhaustive site-specific analysis, yet it is useful in evaluating the general seismic potential at the site.

Based on the above, we have selected a design PHGA of 0.69g for seismic analysis of the onsite soils (seismic settlement).

2.5.4 Historic Seismicity

The site has been exposed to relatively significant seismic events. We are unaware of documentation that indicates that past earthquake damage in the site vicinity as the result of liquefaction, lateral spreading, or other related phenomenon.

We performed an evaluation of site historical seismicity with respect to significant past earthquakes (those recorded from the mid 1800's to 2012 with magnitudes 5 or greater) using the EQSEARCH computer program (Blake, 2000). This is a relatively simple analysis, based on epicenters, and does not include more complex characteristics of earthquakes, such as rupture length and direction; however, it gives an idea of past seismicity at the site. This analysis suggests that the largest ground acceleration at the site from historical earthquakes is estimated to have been roughly 0.13g.

## 2.6 Secondary Seismic Hazards

In general, secondary seismic hazards for sites in the region could include soil liquefaction, earthquake-induced settlement, lateral displacement, landsliding, and earthquake induced flooding. The potential for secondary seismic hazards at the site is discussed below.

### 2.6.1 Liquefaction Potential

Liquefaction is the loss of soil strength or stiffness due to a buildup of excess pore-water pressure during strong ground shaking. Liquefaction is associated primarily with loose (low density), granular, saturated soil. Effects of severe liquefaction can include sand boils, excessive settlement, bearing capacity failures, and lateral spreading.

The site is not mapped in an area considered to have a potential for liquefaction on the Seismic Hazards Zones Map for the Del Sur Quadrangle (CGS, 2005). Groundwater data indicate that groundwater levels are deep in the region currently and historically (see Section 2.3, Groundwater). In addition, the granular soils encountered at depth were found to range in consistency from dense to very dense. Based on these findings, the potential for liquefaction onsite (including effects of liquefaction, such as lateral spreading) is considered low.

### 2.6.2 Seismically Induced Settlement

Seismically induced settlement consists of dry dynamic settlement (above groundwater) and liquefaction-induced settlement (below groundwater). During a strong seismic event, seismically induced settlement can occur within loose to moderately dense sandy soil due to reduction in volume during, and shortly after, an earthquake event. Settlement caused by

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ground shaking is often nonuniformly distributed, which can result in differential settlement.

We have performed analyses to estimate the seismically induced settlement using the LiquefyPro computer program by CivilTech Software (2008). The results of our analyses suggest that the onsite soils are susceptible to be less than 1 inch of seismic settlement based on the design earthquake. Due to the relatively laterally uniform nature of soils, differential settlement due to seismic loading is assumed to be less than ½ inch over a horizontal distance of 40 feet. A summary of seismic settlement analysis is included in Appendix D.

#### 2.6.3 Seiches and Tsunamis

Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. Based on the inland and elevated location of the site and its distance from contained water facilities, seiches and tsunamis are not a hazard to the site.

### 2.7 Slope Stability and Landslides

Since significant slopes are not located on or near the site, slope instability and landslides are not an issue at the site.

### 2.8 Flooding Potential

The northern portion of the site is partially located within a 100-year flood zone (Zone A) on the Federal Emergency Management Agency (FEMA) Flood Map for the site. No base flood elevation has been determined for this area. The remainder of the site is outside of 100-year and 500-year flood zones. Flooding potential should be considered during civil design of the project.

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# 3.0 CONCLUSIONS AND RECOMMENDATIONS

## 3.1 General Conclusions

Based on this investigation, construction of the proposed PV array, substation, and related improvements appears feasible from a geotechnical standpoint. The site is not expected to be prone to adverse effects of: liquefaction, slope instability, or adverse differential settlement from cut/fill transitions (significant cuts and fills are not proposed).

The proposed substation can be founded on shallow conventional spread footings bearing on a zone of newly excavated and recompacted fill soils, derived from site soils. The proposed PV array may be founded on driven piles or shallow foundations. Following our recommendations, the proposed improvements are not anticipated to be susceptible to adverse settlement/differential settlement or bearing capacity failures due to weak or compressible soils. Based on the soil conditions encountered during this investigation, conventional grading equipment in good working order is considered appropriate for this project; bedrock or other earth materials difficult to excavate are not anticipated. Observations during excavation of our small-diameter borings do not suggest that oversize rock is an issue on this site.

## 3.2 Earthwork and Grading

Grading should be performed in accordance with the General Earthwork and Grading Specifications presented in Appendix E, unless specifically revised or amended below or by future recommendations based on final development plans.

### 3.2.1 Site Preparation

Prior to construction, the areas of the proposed improvements should be cleared of vegetation, trash, and debris. Any underground obstructions onsite that interfere with the proposed foundations should be removed. Efforts should be made to locate any existing utility lines. Those lines should be removed or rerouted if they interfere with the proposed construction, and the resulting cavities should be backfilled and compacted as recommended in Sections 3.2.3 and 3.12.

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3.2.2 Overexcavation and Recompaction

To reduce the potential for adverse total and differential settlement of the proposed substation, the underlying subgrade soil should be prepared in such a manner that a uniform response to the applied loads is achieved.

For the proposed substation, we recommend that the onsite soils be removed to a minimum depth of 5 feet below the existing ground surface or 3 feet below the bottom of the proposed footings, whichever is deeper. The removal bottom should extend horizontally beyond the proposed structure a minimum of 5 feet from the outside edges of the footings, or distance equal to the depth of overexcavation below the footings, whichever is farther. During overexcavation, the soil conditions should be observed by Leighton to further evaluate these recommendations based on actual field conditions encountered. If additional undocumented artificial fill is encountered, additional overexcavation should be conducted to remove the soil.

A firm removal bottom should be established across the building/equipment footprint to provide uniform foundation support for the proposed structure. Leighton should observe and test the removal bottom prior to placing fill. Deeper overexcavation and recompaction may be recommended locally until a firm removal bottom is achieved.

Areas outside of the proposed structures planned for asphalt or concrete pavement (such as parking areas or fire lanes), flatwork (such as sidewalks), site walls and low retaining walls, and areas to receive fill should be overexcavated to a minimum depth of 24 inches below existing grade or 12 inches below proposed subgrade, whichever is deeper.

Pile foundations do not require overexcavation.

After completion of the overexcavation, and prior to fill placement, the exposed surfaces should be scarified to a minimum depth of 6 inches, moisture conditioned to or slightly above optimum moisture content, and recompacted to a minimum 90 percent relative compaction, relative to the ASTM D 1557 laboratory maximum density.

3.2.3 Fill Placement and Compaction

The onsite soil is suitable for use as compacted structural fill, provided it is free of debris and oversized material (greater than 8 inches in largest

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dimension). Any soil to be placed as fill, whether onsite or imported material, should be accepted by Leighton Consulting.

All fill soil should be placed in thin, loose lifts, moisture-conditioned, as necessary, with moisture contents of at least optimum, and compacted to a minimum 90 percent relative compaction as determined by ASTM Test Method D1557. Aggregate base for pavement should be compacted to a minimum of 95 percent relative compaction.

3.2.4 Import Fill Soil

If import soil is to be placed as fill, it should be geotechnically accepted by Leighton. Preferably at least 3 working days prior to proposed import to the site, the contractor should provide Leighton pertinent information of the proposed import soil, such as location of the soil, whether stockpiled or native in place, and pertinent geotechnical reports if available. We recommend that a Leighton representative visit the proposed import site to observe the soil conditions and obtain representative soil samples. Potential issues may include soil that is more expansive than onsite soil, soil that is too wet, soil that is too rocky or too dissimilar to onsite soils, oversize material, organics, debris, etc.

3.2.5 Shrinkage and Subsidence

The change in volume of excavated and recompacted soil varies according to soil type and location. This volume change is represented as a percentage increase (bulking) or decrease (shrinkage) in volume of fill after removal and recompaction. Field and laboratory data used in our calculations included laboratory-measured maximum dry densities for soil types encountered at the subject site and the measured in-place densities of soils encountered. We preliminarily estimate the following earth volume changes will occur during grading. These are rough estimates:

| | |
|---|---|
| Shrinkage (Approximate) | 15 percent |
| Subsidence (Approximate) | 0.15 foot |

These shrinkage estimates do not include any loss due to rock removal. The level of fill compaction, variations in the dry density of the existing soils and other factors influence the amount of volume change.

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It should be noted that subsidence, as referred to above, is settlement of in-place earth materials due to heavy equipment processing. It does not refer to potential settlement due to placement of additional loads from new fill (i.e., raising of grades).

These shrinkage values are general guide values. Actual values will vary, due to the varying soil conditions and varying construction techniques. It is not possible to estimate exact values. Therefore, as with any grading project, some earthwork volume adjustments should be anticipated during grading.

#### 3.2.6 Moisture Sensitivity of Site Soils

Based on our experience in the area, the site soils are anticipated to be highly sensitive to overly moist conditions. Grading during wet months of the year is anticipated to experience delays due to wet, soft, pumping soils. Attention should be given during grading and construction to reducing the possibility of ponding, which would allow the soil to become overly moist and unable to be worked. Overly moist soils will require removal and aeration prior to being placed as compacted fill. It is critical that all trench and equipment backfill be properly compacted, since loose backfill is particularly susceptible to becoming moisture sensitive.

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## 3.3 Foundations

The proposed substation building may be founded on shallow foundations. Either deep foundations, such as cast-in-drilled-hole (CIDH) piles and driven piles, or shallow foundations may be used to support the proposed solar array structures.

### 3.3.1 Shallow Foundations

Minimum Embedment and Width

Based on our investigation, footings for conventional one- to two-story structures should have a minimum embedment of 12 inches, with a minimum width of 24 and 15 inches for isolated and continuous footings, respectively.

Allowable Bearing

An allowable bearing pressure of 1,800 pounds-per-square-foot (psf) may

be used, based on the minimum embedment depth and width above. This allowable bearing value may be increased by 250 psf per foot increase in depth or width to a maximum allowable bearing pressure of 3,500 psf. These allowable bearing pressures are for total dead load and sustained live loads. Footing reinforcement should be designed by the structural engineer.

Lateral Load Resistance

Soil resistance available to withstand lateral loads on a shallow foundation is a function of the frictional resistance along the base of the footing and the passive resistance that may develop as the face of the structure tends to move into the soil. The frictional resistance between the base of the foundation and the subgrade soil may be computed using an allowable coefficient of friction of 0.35. The passive resistance may be computed using an allowable (factor of safety of 1.5 applied) equivalent fluid pressure of 250 pounds per cubic foot (pcf), assuming there is constant contact between the footing and undisturbed soil. Friction and passive pressure may be combined without reduction, provided the footings can move laterally sufficiently to develop passive pressure (approximately ¼ inch); otherwise, friction alone should be assumed.

Increase in Bearing and Friction – Short Duration Loads

For the case of short term loading (seismic and wind loading), an increase of 1/3 would apply to the bearing pressure and friction values. The ultimate bearing pressure is assumed to be roughly three times the allowable bearing pressure. However, this ultimate pressure only considers structural failure/collapse (life safety) and not structural damage or significant cosmetic damage. Excessive settlement may occur before the ultimate bearing pressure is attained.

Settlement Estimates

The recommended overexcavation, relative compaction and allowable bearing pressure are based on a total allowable, post construction settlement of 1 inch. Differential settlement due to static loading is estimated at ½ inch over a horizontal distance of 30 feet between or along similarly loaded footings. Since settlement is a function of footing sustained load, size and contact bearing pressure, differential settlement can be expected between adjacent columns or walls where a large differential loading condition exists.

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## 3.4 Pile Foundations

Driven piles or drilled cast-in-place concrete piles can be used to support the PV array structures. Pile capacities and settlement estimates are discussed in the following subsections.

### 3.4.1 Vertical Capacity

Piles should have a minimum embedment of 8 feet below lowest adjacent final grade. We recommend a skin friction of 250 psf for axial loads, assuming friction piles. These capacities are for combined dead plus live loads with a one-third increase allowed for either transient wind or seismic loading. Resistance to uplift loads will be developed in friction along the piles. An allowable uplift capacity of half the downward capacity can be used. Soil capacities are provided, which are not necessarily the capacities of the piles as a structural element. Piles should have a minimum center-to-center spacing of at least three pile diameters on center. Otherwise, a group action reduction in capacity will be required for piles spaced closer.

### 3.4.2 Lateral Load Capacities

Short duration lateral wind and seismic loads exerted on the light poles supported on piles may be resisted by passive pressures against both the piles and grade beams. A passive equivalent fluid pressure of 250 pounds-per-square-foot per foot embedment (pcf) acting against the grade beams can be used, not to exceed total passive pressure of 4,500 psf. Sliding fiction under pile caps should not be used in design, since the subgrade may settle below the pile-supported cap. A passive resistance based on an equivalent fluid pressure of 400 pcf acting against the projected area of an individual pile below lowest adjacent grade, can also be used for design, assuming ½-inch lateral deflection of a free pile head. This maximum passive pressure on piles, however, should not exceed 6,000 psf.

For design of pile lateral-load resistance during short duration wind and/or seismic loads, laterally loaded pile design capacities are present in Table 2, below. These capacities are for a ¼-inch deflection at the top of 24- and 30-inch diameter drilled cast-in-place concrete piles, with a 28-day concrete compressive strength of 3,000 pounds-per-square-inch (psi). Free head (no moment at head) lateral capacities are provided. For this analysis, a 20-foot long pile was modeled with level ground around the pile in the direction of loading. A factor of safety has not been applied to these

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capacities. Individual pile lateral load/deflection criteria can also be developed upon request, based upon the pile stiffness (EI) and sustained vertical load.

Table 2 - Drilled Cast-In-Place Pile Lateral Capacities

| *Lateral Load Parameter As A Function Of Pile Diameter (inches)* | *24-Inch* | *30-Inch* |
|---|---|---|
| Maximum Lateral Load for ¼-inch Deflection At Head (kips) | 12 | 18 |
| Maximum Moment (kip-feet) | 60 | 100 |
| Depth To Maximum Moment (feet) | 7.6 | 7.6 |

3.4.3 Settlement Estimates

Total post construction settlement for the recommended pile foundations should not exceed 1 inch.

## 3.5 Recommendations for Slabs-On-Grade

Concrete slabs-on-grade should be designed by the structural engineer in accordance with the current CBC for a soil with a medium expansion potential. Observation and possibly testing to confirm the expansion potential of the near surface soil should be conducted during site grading.

The following minimum slab recommendations should be used. More stringent requirements may be required by agencies, the structural engineer, the architect, or the CBC. Slabs-on-grade should have the following minimum recommended components:

Subgrade Moisture Conditioning: The subgrade soil should be moisture conditioned to at least 2 percentage points above optimum moisture content to a minimum depth of 18 inches prior to placing steel or concrete.

Concrete Thickness and Structural Design: Thickness of slabs-on-grade should be designed by the structural engineer, but should be at least 4 inches thick (this is referring to the actual minimum thickness, not the nominal thickness). Reinforcing steel should be designed by the structural engineer, but as a minimum (for conventionally reinforced slabs) should be No. 4 rebar placed at 18 inches on center, each direction, mid-depth in the slab.

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Minor cracking of the concrete as it cures, due to drying and shrinkage is normal and should be expected. However, cracking is often aggravated by a high water/cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, aggregate that is not sufficiently clean, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. Low slump concrete can reduce the potential for shrinkage cracking. Additionally, reinforcement in slabs and foundations can generally reduce the potential for shrinkage cracking. The structural engineer should consider these and other pertinent concrete design and construction considerations in slab design and specifications.

3.5.1 Slab Underlayment for Moisture Vapor Retarding

Because moisture vapor from the underlying soils will be transmitted through slabs-on-grade without preventive measures, slab underlayment for moisture vapor retarding should be designed by qualified professionals (such as the structural engineer and/or architect) where control of moisture vapor transmission through slabs is considered important to this project (such as where moisture-sensitive floor coverings or equipment are planned). Slab underlayment typically includes a moisture vapor retarder membrane (such as 10-mil thick or greater), a capillary break (such as clean sand or crushed stone), and provisions for protection of the vapor retarder during construction (such as sand under and possibly over the vapor retarder). The structural engineer and/or architect should specify pertinent slab and concrete design parameters, such as whether a sand blotter/capillary break layer should be placed over the vapor retarder, and details of a capillary break system.

Moisture retarders can reduce, but not eliminate moisture vapor rise from the underlying soils up through the slab. Moisture retarders should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Institute, ASTM International, and California Building Code requirements and guidelines.

Leighton does not practice in the field of moisture vapor transmission evaluation/mitigation, since this does not fall under the geotechnical discipline. Therefore, we recommend that a qualified person, such as the

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flooring subcontractor, structural engineer, and/or architect, be consulted to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. That person (or persons) should provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structures as deemed appropriate. In addition, the recommendations in this report and our services in general are not intended to address mold prevention, since we, along with geotechnical consultants in general, do not practice in the area of mold prevention. If specific recommendations are desired, a professional mold prevention consultant should be contacted.

## 3.6 Seismic Design Parameters

Seismic parameters presented in this report should be considered during project design. In order to reduce the effects of ground shaking produced by regional seismic events, seismic design should be performed in accordance with the 2010 CBC. The 2010 seismic design parameters listed in Table 1 of Section 2.5.2 of this report should be considered for the seismic analysis of the subject site.

## 3.7 Lateral Earth Pressures

We recommend that retaining walls be backfilled with onsite, very low expansive soil and constructed with a backdrain in accordance with the recommendations provided on Figure 3, *Retaining Wall Backfill and Subdrain Detail*. Using expansive soil as retaining wall backfill will result in higher lateral earth pressures exerted on the wall and are, therefore, not recommended. Based on these recommendations, the following parameters may be used for the design of conventional retaining walls.

Table 3 - Retaining Wall Design Parameters

| ***Static Equivalent Fluid Pressure (pcf)*** | |
|---|---|
| Condition | Level Backfill |
| Active | 35 |
| At-Rest | 55 |
| Passive (ultimate) | 375<br>(Maximum 5,000 psf) |

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The above values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

Cantilever walls that are designed to yield at least 0.001H, where H is equal to the wall height, may be designed using the active condition. Rigid walls and walls braced at the top should be designed using the at-rest condition.

Passive pressure is used to compute soil resistance to lateral structural movement. In addition, for sliding resistance, a frictional resistance coefficient of 0.35 may be used at the concrete and soil interface. The lateral passive resistance should be taken into account only if it is ensured that the soil providing passive resistance, embedded against the foundation elements, will remain intact with time. A soil unit weight of 120 pcf may be assumed for calculating the actual weight of the soil over the wall footing.

In addition to the above lateral forces due to retained earth, surcharge due to improvements, such as an adjacent structure or traffic loading, should be considered in the design of the retaining wall. Loads applied within a 1:1 projection from the surcharging structure on the stem of the wall should be considered in the design. A third of uniform vertical surcharge-loads should be applied at the surface as a horizontal pressure on cantilever (active) retaining walls, while half of uniform vertical surcharge-loads should be applied as a horizontal pressure on braced (at-rest) retaining walls. To account for automobile parking surcharge, we suggest that a uniform horizontal pressure of 100 psf (for restrained walls) or 70 psf (for cantilever walls) be added for design, where autos are parked within a horizontal distance behind the retaining wall less than the height of the retaining wall stem.

Conventional retaining wall footings should have a minimum width of 24 inches and a minimum embedment of 12 inches below the lowest adjacent grade. An allowable bearing pressure of 2,000 psf may be used for retaining wall footing design, based on the minimum footing width and depth. This bearing value may be increased by 350 psf per foot increase in width or depth to a maximum allowable bearing pressure of 4,500 psf.

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## 3.8 Cement Type and Corrosion Protection

Based on the results of laboratory testing, concrete structures in contact with the onsite soil will have negligible exposure to water-soluble sulfates in the soil. Therefore, common Type II cement may be used for concrete construction. Concrete should be designed in accordance with ACI 318-08, Section 4.2 (ACI, 2008), adopted by the 2010 CBC (Section 1904A.2).

The soils are considered corrosive to ferrous metals and aggressive to copper. Corrosion protection of underground ferrous utilities will be required. A corrosion engineer can be consulted if specific recommendations are desired. Corrosion information presented in this report should be provided to your underground utility contractors.

## 3.9 Pavement Design

Based on the design procedures outlined in the current Caltrans Highway Design Manual, our geotechnical experience in the site vicinity, and using an R-value of 14 based on experience with local soils, preliminary flexible pavement sections may consist of the following for the Traffic Indices (TI) indicated. Final pavement design should be based on the Traffic Index determined by the project civil engineer and R-value testing provided near the end of grading.

Table 4 - Asphalt Pavement Section Thickness

| Traffic Index | Asphaltic Concrete (AC) Thickness (inches) | Class 2 Aggregate Base (AB) Thickness (inches) |
|---|---|---|
| 5 (auto access) | 4 | 6 |
| 7 (truck access) | 5.5 | 10 |

If asphalt pavement is to be constructed prior to construction, the full pavement thickness should be placed to support heavy construction traffic.

In areas where rigid concrete pavement is planned and trucks may drive on this pavement, we recommend 7 inches of Portland Cement Concrete (PCC) with a 28-day compressive strength of 4,000 psi over 6 inches of aggregate base placed on prepared subgrade soil (see Section 3.2.2). Reinforcement should be specified by the structural engineer, but should be a minimum of #3 rebar at 18 inches on center each way. The PCC pavement sections should be provided

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with crack-control joints spaced no more than 14 feet on center each way. If sawcuts are used, they should have a minimum depth of ¼ of the slab thickness and made within 24 hours of concrete placement. We recommend that sections be as nearly square as possible.

PCC sidewalks should be at least 4 inches thick over prepared subgrade soil, with construction joints no more than 8 feet on center each way, with sections as nearly square as possible. Use of reinforcing, such as welded-wire mesh, will help reduce severity of cracking.

All pavement construction should be performed in accordance with the Standard Specifications for Public Works Construction. Field observations and periodic testing, as needed during placement of the base course materials, should be undertaken to ensure that the requirements of the standard specifications are fulfilled. Prior to placement of aggregate base, the subgrade soil should be processed to a minimum depth of 6 inches, moisture-conditioned, as necessary, and recompacted to a minimum of 90 percent relative compaction. Aggregate base should be moisture conditioned, as necessary, and compacted to a minimum of 95 percent relative compaction.

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## 3.10 Infiltration Facilities

Based on the results of our in-situ infiltration tests, a generalized infiltration rate of 1.5 inches per hour may be assumed for subgrade soil used to infiltrate storm water, such as in infiltration tanks, infiltration trenches, or a retention basin in undisturbed native soils. This value does not contain a factor of safety. In addition, we recommend that a factor of safety of 3 be applied to that value. Any infiltration facilities must be constructed in native alluvial soil, since compacted fill typically does not infiltrate well. These values are for clean, unsilted infiltration surfaces without significant compaction. These values are expected to reduce over time due to siltation. It should be noted that during periods of prolonged precipitation, the underlying soils tend to become saturated to greater and greater depths/extents. Therefore, infiltration rates tend to decrease with prolonged rainfall.

Design of proposed infiltration facilities should be reviewed by Leighton prior to construction to evaluate whether these recommendations have been properly implemented in the design.

## 3.11 Temporary Excavations

All temporary excavations, including utility trenches, retaining wall excavations and other excavations should be performed in accordance with project plans, specifications and all OSHA requirements, and the current edition of the California Construction Safety Orders, latest edition.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the slope, unless the cut is shored appropriately. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing site foundation should be properly shored to maintain support of the adjacent structures.

Cantilever shoring should be designed based on the active fluid pressure presented in the retaining wall section. If excavations are braced at the top and at specific design intervals, the active pressure may then be approximated by a rectangular soil pressure distribution with the pressure per foot of width equal to 25H, where H (feet) is equal to the depth of the excavation being shored.

During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor should be responsible for providing the "competent person" required by OSHA, standards to evaluate soil conditions. Close coordination between the competent person and Leighton Consulting should be maintained to facilitate construction while providing safe excavations.

## 3.12 Trench Backfill

Utility-type trenches onsite can be backfilled with onsite material, provided it is free of debris, significant organic material and oversized material (greater than 3 inches for trench backfill within 3 feet of a pipe, and 6 inches for trench backfill above). Prior to backfilling the trench, pipes should be bedded and shaded in a granular material that has a sand equivalent of 30 or greater. We recommend that open-graded crushed rock or similar material not be used as bedding material, unless special provisions are implemented to limit the migration of surrounding soil into the open-graded material, such as the use of filter fabric around the open-graded material. The bedding material should extend 12 inches above the top of the pipe. The bedding/shading sand should be densified in-place by mechanical means, or in areas where the trench walls and bottom soil

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have a minimum sand equivalent of 15, the bedding sand may be jetted; this is not anticipated at this site. Bedding sand should be placed in accordance with the Standard Specifications for Public Works Construction – Greenbook (Public Works Standard, Inc., 2009), current edition. The native soil fill should be placed in loose layers, moisture conditioned, as necessary, and mechanically compacted using a minimum standard of 90 percent relative compaction based on ASTM D 1557. The thickness of layers should be based on the compaction equipment used in accordance with the current Greenbook.

### 3.13 Surface Drainage

Positive surface drainage should be provided to direct surface water away from structures and towards suitable collective drainage facilities. Surface drainage should be provided to prevent ponding of water adjacent to the structures. In general, the area around the buildings should slope away from the buildings. Care should be taken to avoid heavy irrigation, and under-irrigation should also be avoided.

### 3.14 Limitations and Additional Geotechnical Services

The geotechnical recommendations presented in this report are based on subsurface conditions as interpreted from limited subsurface explorations and limited laboratory testing. Our geotechnical recommendations provided in this report are based on information available at the time the report was prepared and may change as plans are developed. However, additional geotechnical study and analysis may be required based on final development plans. Leighton Consulting should review the site and grading plans when available and comment further on the geotechnical aspects of the project. Geotechnical observation and testing should be conducted during excavation and all phases of grading operations. Our conclusions and preliminary recommendations should be reviewed and verified by Leighton Consulting during construction and revised accordingly if geotechnical conditions encountered vary from our findings and interpretations. Changes in subsurface conditions can and do occur over time. Therefore, our findings, conclusions, and recommendations presented in this report are based on the assumption that Leighton Consulting will provide geotechnical observation and testing during construction. Please refer to the ASFE “Important Information about Your Geotechnical Engineering Report” presented at the end of this report.

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Environmental services were not included as part of this study. This report was prepared for the sole use of Canadian Solar (USA) Inc.
for application to the design of the proposed project in accordance with generally accepted geotechnical engineering practices at this time in California.

Geotechnical observation and testing should be provided:

- After completion of site clearing.
- During overexcavation of compressible soil.
- During compaction of all fill materials.
- After excavation of all footings and prior to placement of concrete.
- During utility trench backfilling and compaction.
- During pavement subgrade and base preparation.
- When any unusual conditions are encountered.

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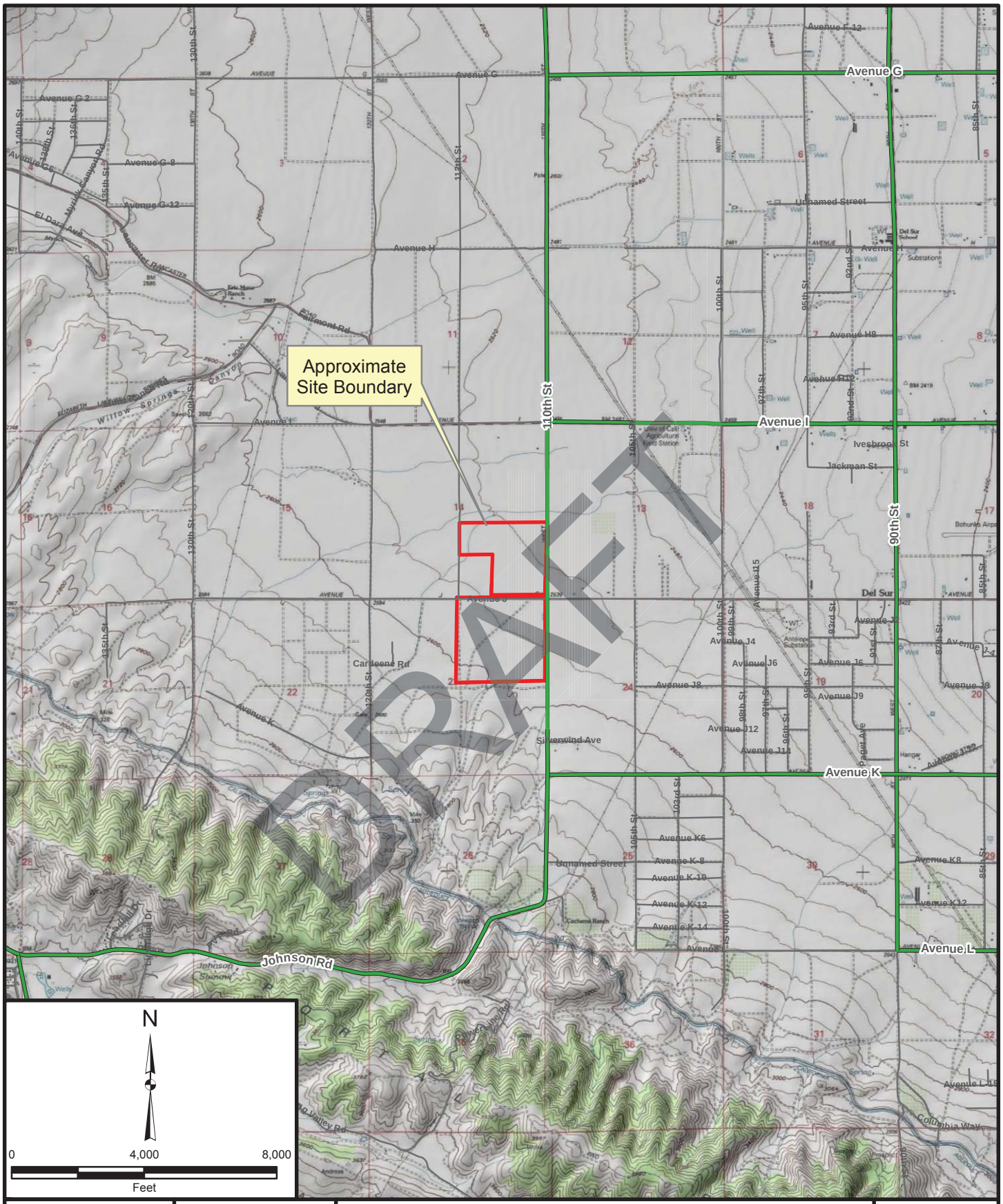


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|---|---|
| Project: 603455-001 | Eng/Geol: JDH/PB |
| Scale: 1 " = 4,000 ' | Date: June, 2012 |

Base Map: ESRI Resource Center, 2012
Thematic Info: Leighton
Author: (kmanchikanti)

# SITE LOCATION MAP

20-MWAC Photovoltaic Array
West of 110th Street West, North and South of Avenue J
Lancaster Area of Los Angeles County, California

Figure 1

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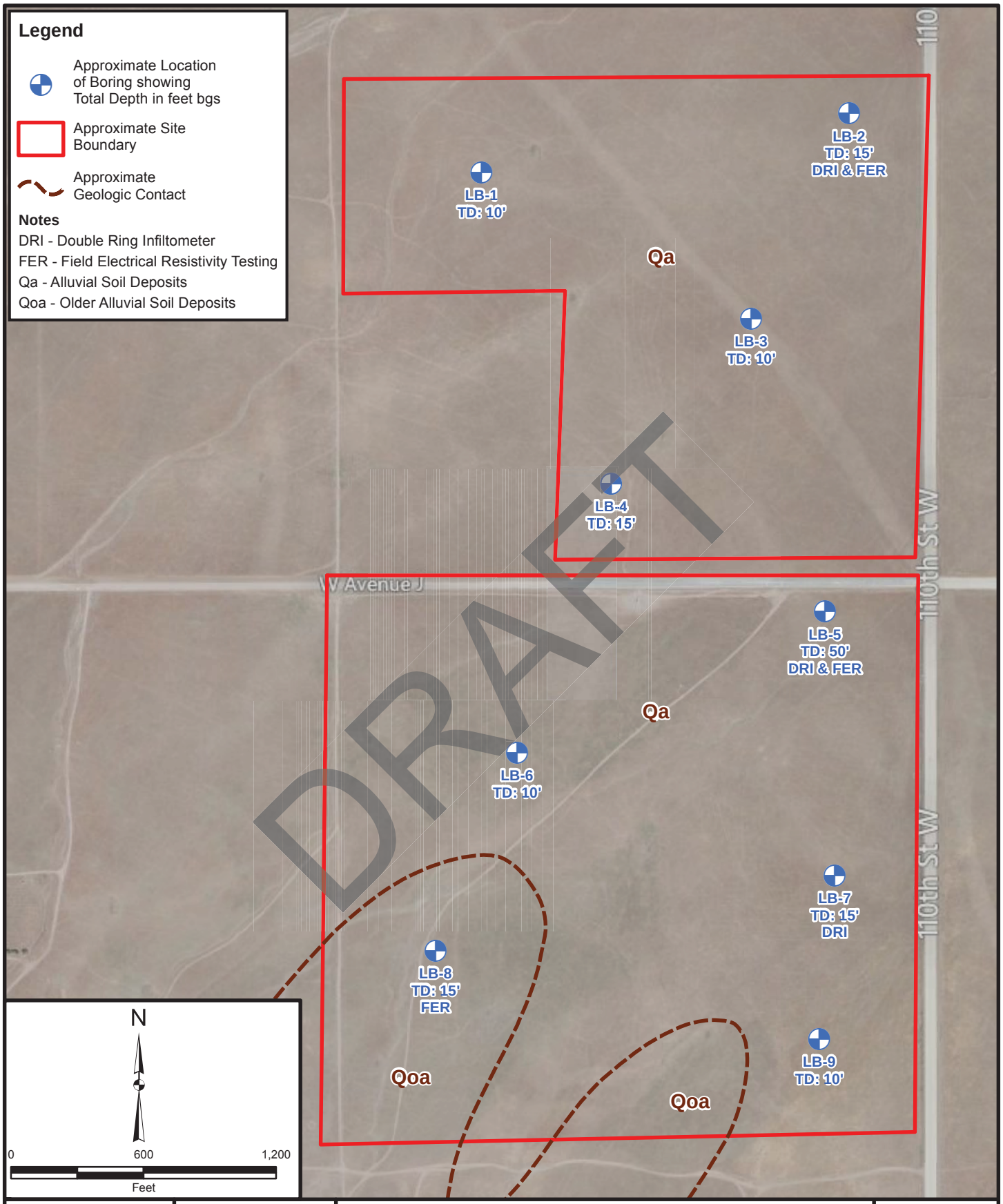


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| Scale: 1 " = 600 ' | Date: June, 2012 |

Base Map: ESRI Resource Center, 2012
Thematic Info: Leighton
Author: (kmanchikanti)

# GEOTECHNICAL MAP

20-MWAC Photovoltaic Array
West of 110th Street West, North and South of Avenue J
Lancaster Area of Los Angeles County, California

Figure 2

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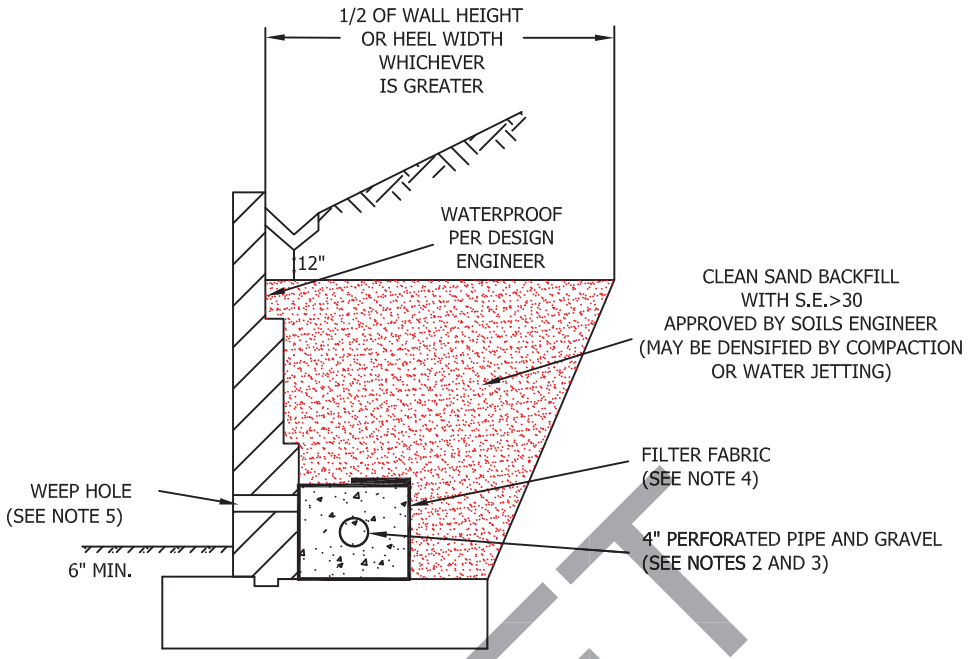
## SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF >50




NOTE: AS AN ALTERNATE TO CLEAN SAND BACKFILL, CLEAN GRAVEL MAY BE UTILIZED WITH APPROVED FILTER FABRIC. A SECOND ALTERNATE IS TO UTILIZE AN AGGREGATE BASE MATERIAL COMPACTED TO 90% RELATIVE COMPACTION. A SAMPLE OF THE PROPOSED BASE MUST BE APPROVED BY THE GEOTECHNICAL CONSULTANT PRIOR TO BACKFILL FOR SUITABILITY. COMPACTION SHOULD BE ACHIEVED WITHOUT DAMAGING THE WALL.

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GENERAL NOTES:

* Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
* Water proofing of the walls is not under purview of the geotechnical engineer
* All drains should have a gradient of 1 percent minimum
*Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
*Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:
1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
4) Filter fabric should be Mirafi 140NC or approved equivalent.
5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

# RETAINING WALL BACKFILL AND SUBDRAIN DETAIL

## WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF >50

Leighton

Figure 3

# Important Information about Your

# Geotechnical Engineering Report

*Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.*

*While you cannot eliminate all such risks, you can manage them. The following information is provided to help.*

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## Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

## Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

## A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

## Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

## Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

## A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

## A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

## Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

## Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

## Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

## Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

## Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

## Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

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ASFE

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# *APPENDIX A*

# *REFERENCES*

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# APPENDIX A

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# *APPENDIX B*

# *GEOTECHNICAL EXPLORATION AND FIELD TESTING*

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# APPENDIX B

## GEOTECHNICAL BORING LOGS

The field investigation consisted of a surface reconnaissance and a subsurface exploration program. Encountered soils were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D 2488). Logs of these subsurface explorations are included as part of this appendix.

Borings were drilled with a truck-mounted hollow-stem drill rig. Relatively undisturbed soil samples were obtained at selected intervals within the borings using a California Ring Sampler. Bulk samples of representative soil types were also obtained from the borings. These samples were transported to our geotechnical laboratory for evaluation and appropriate testing. Borings were backfilled with the excavated earth materials after logging and sampling was completed.

The attached subsurface exploration logs and related information depict subsurface conditions only at the locations indicated and at the particular date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

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# GEOTECHNICAL BORING LOG LB-1

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2532' |
| **Location** | NW quarter of northern half of property (34.6943°, -118.3307°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | B-1 | | | | | **Alluvium** | |
| 2530 | | | | R-1 | 8<br>8<br>8 | 130 | 5 | CL | @2.5': SANDY CLAY, medium stiff, brown to grayish brown, dry, medium dry strength | CO |
| | 5 | | | S-2 | 4<br>6<br>9 | | | CL | @5': SANDY CLAY, stiff, brown to grayish brown, dry, medium dry strength | |
| 2525 | | | | | | | | | | |
| | 10 | | | R-3 | 15<br>17<br>25 | 123 | 10 | CL | @10': SANDY CLAY, stiff, brown to grayish brown, moist | |
| 2520 | | | | | | | | | **Total depth of boring 11.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| | 15 | | | | | | | | | |
| 2515 | | | | | | | | | | |
| | 20 | | | | | | | | | |
| 2510 | | | | | | | | | | |
| | 25 | | | | | | | | | |
| 2505 | | | | | | | | | | |
| | 30 | | | | | | | | | |

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**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# GEOTECHNICAL BORING LOG LB-2

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2510' |
| **Location** | NE quarter of northern half of property (34.6952°, -118.3253°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| 2510 | 0 | | | B-1 | | | | | **Alluvium** | CR |
| | | | | R-1 | 11<br>40<br>50/4" | 121 | 4 | SC | @2.5': CLAYEY SAND, very dense, brown, dry, fine sand, gravel 3%, sand 66%, fines 31% | SA |
| | | | | | | | | SC | @3.5': CLAYEY SAND, fine to medium sand, high dry strength | |
| 2505 | 5 | | | R-2 | 35<br>35<br>30 | | | SC | @5': CLAYEY SAND, dense, brown, dry, fine sand, high dry strength | |
| 2500 | 10 | | | S-3 | 9<br>11<br>10 | | 7 | SC | @10': CLAYEY SAND, dense, brown, slightly moist, fine sand, high dry strength | |
| 2495 | 15 | | | R-4 | 12<br>16<br>17 | 112 | 4 | SW | @15': Well-graded SAND, medium dense, olive brown to brown, moist, fine to coarse sand | |
| | | | | | | | | | **Total depth of boring 16.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| 2490 | 20 | | | | | | | | | |
| 2485 | 25 | | | | | | | | | |
| 2480 | 30 | | | | | | | | | |

*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*

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**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# GEOTECHNICAL BORING LOG LB-3

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2526' |
| **Location** | East side of northern half of property (34.6926°, -118.3261°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.* | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | | **Alluvium** | |
| 2525 | | | | R-1 | 7 7 7 | 100 | 4 | CL | @2.5': SANDY CLAY, medium stiff, brown to grayish brown, dry, fine sand, medium dry strength | DS |
| | 5 | | | S-2 | 5 7 8 | | | SC | @5': CLAYEY SAND, medium dense, olive brown, dry, fine to medium sand, medium dry strength | |
| 2520 | | | | | | | | | | |
| | 10 | | | R-3 | 8 11 12 | 114 | 6 | SC | @10': CLAYEY SAND, medium dense, olive brown, dry, fine to medium sand, low dry strength | CO |
| 2515 | | | | | | | | | **Total depth of boring 11.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| | 15 | | | | | | | | | |
| 2510 | | | | | | | | | | |
| | 20 | | | | | | | | | |
| 2505 | | | | | | | | | | |
| | 25 | | | | | | | | | |
| 2500 | | | | | | | | | | |
| | 30 | | | | | | | | | |

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**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# GEOTECHNICAL BORING LOG LB-4

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2542' |
| **Location** | South side of northern half of property (34.6905°, -118.3289°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | B-1 | | | | | **Alluvium** | |
| 2540 | | | | R-1 | 6<br>9<br>14 | 114 | 4 | CL | @2.5': SANDY CLAY, very stiff, grayish brown, dry, fine to medium sand, high dry strength | |
| | 5 | | | R-2 | 16<br>18<br>20 | 116 | 5 | SC | @5': CLAYEY SAND, medium dense, brown, dry, fine sand | |
| 2535 | | | | | | | | | | |
| | 10 | | | S-3 | 6<br>8<br>9 | | | SC | @10': CLAYEY SAND, medium dense, brown, moist, fine sand | |
| 2530 | | | | | | | | | | |
| | 15 | | | R-4 | 9<br>19<br>25 | | | SC | @15': CLAYEY SAND, medium dense, brown, moist, fine sand | |
| 2525 | | | | | | | | | **Total depth of boring 16.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| | 20 | | | | | | | | | |
| 2520 | | | | | | | | | | |
| | 25 | | | | | | | | | |
| 2515 | | | | | | | | | | |
| | 30 | | | | | | | | | |

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**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# GEOTECHNICAL BORING LOG LB-5

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2542' |
| **Location** | NE quarter of southern half of property (34.6888°, -118.3252°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N / S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.* | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | B-1 | | | | | **Alluvium** | SA, EI, MD, CR |
| 2540 | | | | R-1 | 10 10 7 | 108 | 9 | SC | @2.5': CLAYEY SAND, medium stiff, brown, dry, fine to medium sand, medium plasticity, medium dry strength, gravel 3%, sand 48%, fines 49% | CN |
| | 5 | | | R-2 | 7 11 23 | | | SC | @5': CLAYEY SAND, medium dense, light reddish brown, dry, fine to coarse sand, trace gravel, fines 45% (field estimate) | |
| 2535 | | | | S-3 | 13 14 13 | | 6 | SC | @7.5': CLAYEY SAND, medium dense, light reddish brown, dry, fine to coarse sand | |
| | 10 | | | R-4 | 16 19 14 | 114 | 7 | SC | @10': CLAYEY SAND, medium dense, light reddish brown, dry, fine to coarse sand | |
| 2530 | | | | S-5 | 10 10 13 | | | SC | @12.5': CLAYEY SAND, medium dense, light reddish brown, dry, fine to coarse sand | |
| | 15 | | | R-6 | 18 23 33 | 123 | 9 | SC | @15': CLAYEY SAND, dense, light reddish brown, slightly moist, fine to coarse sand | |
| 2525 | | | | S-7 | 8 11 18 | | | SM | @17.5': SILTY SAND, medium dense, brown, slightly moist, fine to medium sand | |
| | 20 | | | R-8 | 14 26 33 | | | SM | @20': SILTY SAND, dense, brown, slightly moist, fine to medium sand, fines 15% (field estimate) | |
| 2520 | | | | | | | | | | |
| | 25 | | | S-9 | 8 10 16 | | | SM | @25': SILTY SAND, dense, brown, slightly moist, fine to medium sand, fines 15% (field estimate) | |
| 2515 | | | | | | | | CL | @25.5': SANDY LEAN CLAY, stiff, brown, slightly moist, fine to medium sand, medium plasticity, medium dry strength | |
| | 30 | | | | | | | | | |

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**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
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- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# GEOTECHNICAL BORING LOG LB-5

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2542' |
| **Location** | NE quarter of southern half of property (34.6888°, -118.3252°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N / S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 30 | | | R-10 | 13 24 50 | | | SP-SM | @30': Poorly graded SAND with silt, very dense, olive brown, slightly moist, fine to coarse sand | |
| 2510 | | | | | | | | | | |
| | 35 | | | S-11 | 13 17 18 | | | SP | @35': Poorly graded SAND, dense, light brown, dry, fine sand, trace silt | |
| 2505 | | | | | | | | | | |
| | | | | | | | | ML | @39': SILT, brown, slightly moist | |
| | 40 | | | R-12 | 11 40 50 | | | SW | @40': Well-graded SAND, very dense, light brown, dry | |
| | | | | | | | | SM | @41': SILTY SAND, very dense, olive brown, slightly moist, fine to coarse sand | |
| 2500 | | | | | | | | | | |
| | 45 | | | S-13 | 15 15 16 | | | SP-SM | @45': Poorly graded SAND with silt, dense, light brown, dry, fine to coarse sand, trace gravel | |
| 2495 | | | | | | | | | | |
| | 50 | | | R-14 | 16 37 40 | | | SW | @50': Well-graded SAND, reddish brown, slightly moist | |
| | | | | | | | | SM | @50.5': SILTY SAND, very dense, reddish brown, slightly moist, fine to coarse sand | |
| 2490 | | | | | | | | | **Total depth of boring 51.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| | 55 | | | | | | | | | |
| 2485 | | | | | | | | | | |
| | 60 | | | | | | | | | |

*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*

DRAFT

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

# GEOTECHNICAL BORING LOG LB-6

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2567' |
| **Location** | NW quarter of southern half of property (34.6870°, -118.3298) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N / S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION *This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.* | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | | **Alluvium** | |
| 2565 | | | | R-1 | 50/6" | 108 | 4 | SM | @2.5': SILTY SAND, very dense, light brown, dry, fine sand, trace roots | |
| | 5 | | | S-2 | 9<br>11<br>12 | | | CL | @5': SANDY CLAY, very stiff, grayish brown, dry, fine to medium sand, medium dry strength, fines 60% (field estimate) | |
| 2560 | | | | | | | | | | |
| | 10 | | | R-3 | 10<br>30<br>35 | 126 | 8 | SC | @10': CLAYEY SAND, dense, grayish brown, slightly moist, fine to coarse sand, medium dry strength | |
| 2555 | | | | | | | | | **Total depth of boring 11.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| | 15 | | | | | | | | | |
| 2550 | | | | | | | | | | |
| | 20 | | | | | | | | | |
| 2545 | | | | | | | | | | |
| | 25 | | | | | | | | | |
| 2540 | | | | | | | | | | |
| | 30 | | | | | | | | | |

DRAFT

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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# GEOTECHNICAL BORING LOG LB-7

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2560' |
| **Location** | East side of southern half of property (34.6853°, -118.3253°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N / S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| 2560 | 0 | | | B-1 | | | | | **Alluvium** | |
| | | | | R-1 | 30<br>50/5" | 124 | 5 | SC | @2.5': CLAYEY SAND, very dense, grayish brown, dry, fine to coarse sand, gravel 3%, sand 69%, fines 28% | SA |
| 2555 | 5 | | | R-2 | 14<br>15<br>16 | 117 | 8 | SC | @5': CLAYEY SAND, medium dense, grayish brown, slightly moist, fine to coarse sand, trace gravel | |
| 2550 | 10 | | | S-3 | 4<br>5<br>6 | | 5 | SW-SC | @10': Well-graded SAND with clay, medium dense, reddish brown, slightly moist, interbedded layers of clayey sand | |
| 2545 | 15 | | | R-4 | 50/6" | 100 | 5 | SC | @15': CLAYEY SAND, very dense, reddish brown, slightly moist, fine to coarse sand, fines 45% (field estimate) | |
| 2540 | 20 | | | | | | | | **Total depth of boring 15.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| 2535 | 25 | | | | | | | | | |
| 2530 | 30 | | | | | | | | | |

DRAFT

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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# GEOTECHNICAL BORING LOG LB-8

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2595' |
| **Location** | SW side of southern half of property (34.6841°, -118.3320°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N–S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| 2595 | 0 | | | B-1 | | | | | **Alluvium** | |
| | | | | R-1 | 10<br>15<br>10 | 113 | 5 | SM | @2.5': SILTY SAND, medium dense, brown to reddish brown, dry, fine to medium sand | |
| 2590 | 5 | | | R-2 | 8<br>12<br>20 | | | SC | @5': CLAYEY SAND, medium dense, brown, dry, fine sand, medium dry strength | |
| 2585 | 10 | | | S-3 | 6<br>8<br>8 | | 7 | SC | @10': CLAYEY SAND, brown, dry, fine sand, medium dry strength | |
| | | | | | | | | SM | @11': SILTY SAND, medium dense, brown, moist, fine to medium sand | |
| 2580 | 15 | | | R-4 | 16<br>18<br>18 | | | SC | @15': CLAYEY SAND, medium dense, olive brown, moist, less fines than above | |
| | | | | | | | | | **Total depth of boring 16.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| 2575 | 20 | | | | | | | | | |
| 2570 | 25 | | | | | | | | | |
| 2565 | 30 | | | | | | | | | |

*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*

DRAFT

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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# GEOTECHNICAL BORING LOG LB-9

| | | | |
|---|---|---|---|
| **Project No.** | 603455-001 | **Date Drilled** | 5-24-12 |
| **Project** | Canadian Solar (USA) Inc., Photovoltaic Array, Lancaster | **Logged By** | M. Hintz |
| **Drilling Co.** | 2R Drilling, Inc. | **Hole Diameter** | 8" |
| **Drilling Method** | Hollow Stem Auger - 140lb - Autohammer - 30" Drop | **Ground Elevation** | 2574' |
| **Location** | SE side of southern half of property (34.6833°, -118.3259°) | **Sampled By** | M. Hintz |

| Elevation Feet | Depth Feet | Graphic Log (N–S) | Attitudes | Sample No. | Blows Per 6 Inches | Dry Density pcf | Moisture Content, % | Soil Class. (U.S.C.S.) | SOIL DESCRIPTION | Type of Tests |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | B-1 | | | | | **Alluvium** | |
| | | | | R-1 | 9<br>13<br>15 | 129 | 7 | CL | @2.5': SANDY CLAY, stiff, grayish brown, dry, high dry strength | CO |
| 2570 | | | | | | | | | | |
| | 5 | | | S-2 | 10<br>12<br>17 | | 5 | SC | @5': CLAYEY SAND, medium dense, grayish brown, dry, medium dry strength | |
| 2565 | | | | | | | | | | |
| | 10 | | | R-3 | 50/6" | 111 | 6 | SM | @10': SILTY SAND, very dense, olive brown, dry, fine to medium sand | |
| | | | | | | | | | **Total depth of boring 10.5 feet**<br>**Groundwater not encountered**<br>**Backfilled with cuttings 5/24/2012** | |
| 2560 | | | | | | | | | | |
| | 15 | | | | | | | | | |
| 2555 | | | | | | | | | | |
| | 20 | | | | | | | | | |
| 2550 | | | | | | | | | | |
| | 25 | | | | | | | | | |
| 2545 | | | | | | | | | | |
| | 30 | | | | | | | | | |

*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*

DRAFT

**SAMPLE TYPES:**
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

**TYPE OF TESTS:**
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

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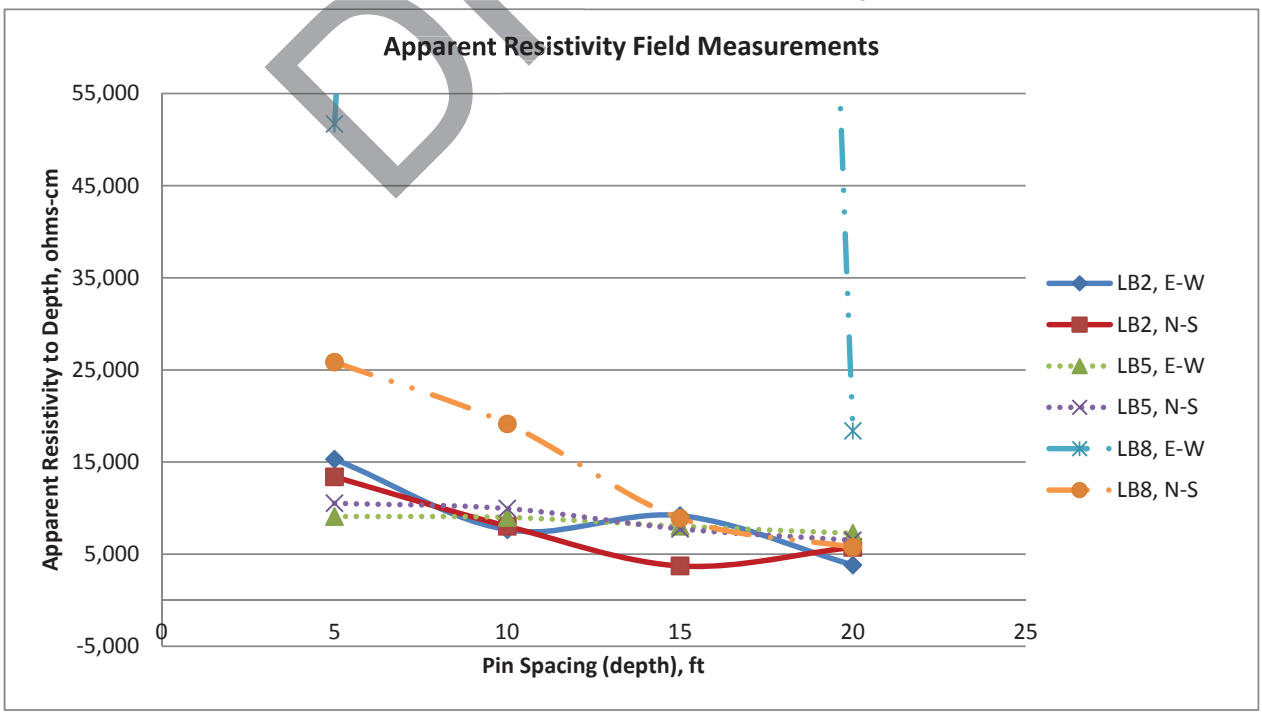
## ***Results of Field Electrical Resistivity Testing Using Wenner 4-Pin Method***

***Canadian Solar, Lancaster; 603455-001*** ***5/24/2012***

| Location | Orientation | Test Spacing (ft) | Guage Reading | Spacing Factor | Ohms-cm |
|---|---|---|---|---|---|
| LB-2 | East-West | 5 | 16 | 957.5 | 15,320 |
| LB-2 | East-West | 10 | 4 | 1915 | 7,660 |
| LB-2 | East-West | 15 | 3.2 | 2872 | 9,190 |
| LB-2 | East-West | 20 | 1 | 3830 | 3,830 |
| LB-2 | North-South | 5 | 14 | 957.5 | 13,405 |
| LB-2 | North-South | 10 | 4.2 | 1915 | 8,043 |
| LB-2 | North-South | 15 | 1.3 | 2872 | 3,734 |
| LB-2 | North-South | 20 | 1.5 | 3830 | 5,745 |
| LB-5 | East-West | 5 | 9.5 | 957.5 | 9,096 |
| LB-5 | East-West | 10 | 4.7 | 1915 | 9,001 |
| LB-5 | East-West | 15 | 2.8 | 2872 | 8,042 |
| LB-5 | East-West | 20 | 1.9 | 3830 | 7,277 |
| LB-5 | North-South | 5 | 11 | 957.5 | 10,533 |
| LB-5 | North-South | 10 | 5.2 | 1915 | 9,958 |
| LB-5 | North-South | 15 | 2.7 | 2872 | 7,754 |
| LB-5 | North-South | 20 | 1.7 | 3830 | 6,511 |
| LB-8 | East-West | 5 | 54 | 957.5 | 51,705 |
| LB-8 | East-West | 10 | 210 | 1915 | 402,150 |
| LB-8 | East-West | 15 | 170 | 2872 | 488,240 |
| LB-8 | East-West | 20 | 4.8 | 3830 | 18,384 |
| LB-8 | North-South | 5 | 27 | 957.5 | 25,853 |
| LB-8 | North-South | 10 | 10 | 1915 | 19,150 |
| LB-8 | North-South | 15 | 3.1 | 2872 | 8,903 |
| LB-8 | North-South | 20 | 1.5 | 3830 | 5,745 |

Equipment: Nilsson Model 400, solid state, 4-pin soil resistance meter (low voltage 97 Hz sq wave current)




DRAFT

Location: LB-2

Depth to Water Table:

Date Tested, start: 5/24/2012 Date Finished: 5/24/2012

Tested by: M. Hintz

Soil Description: Clayey sand

USCS Soil Type: SC

Inner Ring Height (in.): 18 * Outer Ring Height (in.): 18

Inner Ring Penetration (in.): 2 * Outer Ring Penetration: 2

*(inner ring height and penetration used for depth of water calculation for both inner and outer rings)*

Liquid Used/pH: 7

Diam. Inner Ring, in.: 12 (113 in.$^2$area) (Beaker for inner ring is 3.5" ID, so 11.8" drop in beaker = 1" drop in ring; 1000mL=6.3" high)

Diam. Outer Ring, in.: 24 (339 in.$^2$ area of annular space, subtracting inner ring area)

Weather (start to finish): Fair, windy

Temperature of air, soil, and water (start to finish): 70 F

| Field Data | | | | | Calculations | | | | Inner Ring | | | | | | | Outer Ring (Annluar Space) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Inner Beaker Vol. Reading (cm^3)* | Outer Beaker Vol. Reading (cm^3)* | Dist top of ring to water, Inner Ring (in.) | Dist top of ring to water, Outer Ring (in.) | Depth of Water in Inner Ring (in.) | Depth of Water in Outer Ring (in.) | Total Elasped Time (h:m) | Δt (min) | Beaker Vol Change (vol. added) (in.^3) | Infiltr rate from beaker (in./hr) | Average Depth of Water (in.) | Change of Depth (in.) | Infiltr rate from Δ depth (in./hr) | Combined Infiltr rate (in./hr) | Ratio of Infiltr Rate to Depth Water | Beaker Vol Change (vol. added) (in.^3) | Infiltr rate from beaker (in./hr) | Average Depth of Water (in.) | Change of Depth (in.) | Infiltr rate from Δ depth (in./hr) | Combined Infiltr rate (in./hr) | Remarks |
| A | B | C | D | E | | | F | G | H | J | K | L | M | | | P | Q | R | S | T | U | |
| 17:20 | Presoak | | | | 16.00 | 16.00 | 0 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| 17:40 | 0 | 500 | 15.00 | 15.00 | 1.00 | 1.00 | 0:20 | | | | | | | | | | | | | | | |
| 17:42 | 600 | 2100 | 15.00 | 15.00 | 1.00 | 1.00 | 0:22 | 2 | 37 | 9.7 | 1.0 | 0.00 | 0.0 | 9.71 | 9.71 | 98 | 8.6 | 1.0 | 0.00 | 0.0 | 8.6 | |
| 17:44 | 800 | 3750 | 15.00 | 15.00 | 1.00 | 1.00 | 0:24 | 2 | 12 | 3.2 | 1.0 | 0.00 | 0.0 | 3.24 | 3.24 | 101 | 8.9 | 1.0 | 0.00 | 0.0 | 8.9 | |
| 18:02 | 2300 | 5000 | 15.00 | 15.00 | 1.00 | 1.00 | 0:42 | 18 | 92 | 2.7 | 1.0 | 0.00 | 0.0 | 2.70 | 2.70 | 76 | 0.7 | 1.0 | 0.00 | 0.0 | 0.7 | |
| 18:16 | 3150 | 5000 | 15.00 | 15.75 | 1.00 | 0.25 | 0:56 | 14 | 52 | 2.0 | 1.0 | 0.00 | 0.0 | 1.97 | 1.97 | 0 | 0.0 | 0.6 | 0.75 | 3.2 | 3.2 | |
| 18:26 | 3650 | 5000 | 15.00 | 16.00 | 1.00 | 0.00 | 1:06 | 10 | 31 | 1.6 | 1.0 | 0.00 | 0.0 | 1.62 | 1.62 | 0 | 0.0 | 0.1 | 0.25 | 1.5 | 1.5 | |
| 18:40 | 4400 | 5000 | 15.00 | 16.00 | 1.00 | 0.00 | 1:20 | 14 | 46 | 1.7 | 1.0 | 0.00 | 0.0 | 1.73 | 1.73 | 0 | 0.0 | 0.0 | 0.00 | 0.0 | 0.0 | |

*Constant-head test only

DRAFT

***Results of Double Ring Infiltrometer, Falling Head Method or Constant Head Method***
***ASTM D 3385***

Project Number 603455-001

Project Name Canadian Solar Lancaster

**Leighton**

Location: LB-5

Depth to Water Table:

Date Tested, start: 5/24/2012 Date Finished: 5/24/2012

Tested by: M. Hintz / J. Hertzberg

Soil Description: Clayey sand

USCS Soil Type: SC

Inner Ring Height (in.): 20 * Outer Ring Height (in.): 20

Inner Ring Penetration (in.): 2 * Outer Ring Penetration: 2

*(inner ring height and penetration used for depth of water calculation for both inner and outer rings)*

Liquid Used/pH: 7

Diam. Inner Ring, in.: 12 (113 in.$^2$area) (Beaker for inner ring is 3.5" ID, so 11.8" drop in beaker = 1" drop in ring; 1000mL=6.3" high)

Diam. Outer Ring, in.: 24 (339 in.$^2$ area of annular space, subtracting inner ring area)

Weather (start to finish): Windy

Temperature of air, soil, and water (start to finish): 70 F

| Field Data | | | | | Calculations | | | | Inner Ring | | | | | | | Outer Ring (Annluar Space) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Inner Beaker Vol. Reading (cm^3)* | Outer Beaker Vol. Reading (cm^3)* | Dist top of ring to water, Inner Ring (in.) | Dist top of ring to water, Outer Ring (in.) | Depth of Water in Inner Ring (in.) | Depth of Water in Outer Ring (in.) | Total Elasped Time (h:m) | Δt (min) | Beaker Vol Change (vol. added) (in.^3) | Infiltr rate from beaker (in./hr) | Average Depth of Water (in.) | Change of Depth (in.) | Infiltr rate from Δ depth (in./hr) | Combined Infiltr rate (in./hr) | Ratio of Infiltr Rate to Depth Water | Beaker Vol Change (vol. added) (in.^3) | Infiltr rate from beaker (in./hr) | Average Depth of Water (in.) | Change of Depth (in.) | Infiltr rate from Δ depth (in./hr) | Combined Infiltr rate (in./hr) | Remarks |
| A | B | C | D | E | | | F | G | H | I | K | L | M | N | | P | Q | R | S | T | U | |
| 10:30 | | | 8.50 | 8.50 | 9.50 | 9.50 | 0 | | | | | | | | | | | | | | | |
| 10:35 | | | 9.50 | 9.75 | 8.50 | 8.25 | 0:05 | 5 | 0 | 0.0 | 9.0 | 1.00 | 12.0 | 12.00 | 1.33 | 0 | 0.0 | 8.9 | 1.25 | 15.0 | 15.0 | |
| 10:42 | | | 10.50 | 11.00 | 7.50 | 7.00 | 0:12 | 7 | 0 | 0.0 | 8.0 | 1.00 | 8.6 | 8.57 | 1.07 | 0 | 0.0 | 7.6 | 1.25 | 10.7 | 10.7 | |
| 10:48 | | | 11.00 | 12.00 | 7.00 | 6.00 | 0:18 | 6 | 0 | 0.0 | 7.3 | 0.50 | 5.0 | 5.00 | 0.69 | 0 | 0.0 | 6.5 | 1.00 | 10.0 | 10.0 | |
| 10:58 | | | 12.00 | 13.25 | 6.00 | 4.75 | 0:28 | 10 | 0 | 0.0 | 6.5 | 1.00 | 6.0 | 6.00 | 0.92 | 0 | 0.0 | 5.4 | 1.25 | 7.5 | 7.5 | |
| 11:07 | | | 12.75 | 14.25 | 5.25 | 3.75 | 0:37 | 9 | 0 | 0.0 | 5.6 | 0.75 | 5.0 | 5.00 | 0.89 | 0 | 0.0 | 4.3 | 1.00 | 6.7 | 6.7 | |
| 11:13 | | | 13.25 | 14.75 | 4.75 | 3.25 | 0:43 | 6 | 0 | 0.0 | 5.0 | 0.50 | 5.0 | 5.00 | 1.00 | 0 | 0.0 | 3.5 | 0.50 | 5.0 | 5.0 | |
| 11:19 | | | 13.50 | 15.50 | 4.50 | 2.50 | 0:49 | 6 | 0 | 0.0 | 4.6 | 0.25 | 2.5 | 2.50 | 0.54 | 0 | 0.0 | 2.9 | 0.75 | 7.5 | 7.5 | |
| 11:23 | | | 13.75 | 15.75 | 4.25 | 2.25 | 0:53 | 4 | 0 | 0.0 | 4.4 | 0.25 | 3.8 | 3.75 | 0.86 | 0 | 0.0 | 2.4 | 0.25 | 3.8 | 3.8 | |
| 11:30 | | | 14.00 | 16.25 | 4.00 | 1.75 | 1:00 | 7 | 0 | 0.0 | 4.1 | 0.25 | 2.1 | 2.14 | 0.52 | 0 | 0.0 | 2.0 | 0.50 | 4.3 | 4.3 | |
| | | | | | | | | | | | | | | | | | | | | | | |
| 17:46 | | | 5.00 | 6.00 | 13.00 | 12.00 | 7:16 | | | | | | | | | | | | | | | |
| 18:03 | | | 5.75 | 6.50 | 12.25 | 11.50 | 7:33 | 17 | 0 | 0.0 | 12.6 | 0.75 | 2.6 | 2.65 | 0.21 | 0 | 0.0 | 11.8 | 0.50 | 1.8 | 1.8 | |
| 18:22 | | | 7.00 | 7.25 | 11.00 | 10.75 | 7:52 | 19 | 0 | 0.0 | 11.6 | 1.25 | 3.9 | 3.95 | 0.34 | 0 | 0.0 | 11.1 | 0.75 | 2.4 | 2.4 | |
| 18:36 | | | 7.75 | 8.25 | 10.25 | 9.75 | 8:06 | 14 | 0 | 0.0 | 10.6 | 0.75 | 3.2 | 3.21 | 0.30 | 0 | 0.0 | 10.3 | 1.00 | 4.3 | 4.3 | |

*Constant-head test only

DRAFT

***Results of Double Ring Infiltrometer, Falling Head Method or Constant Head Method***
***ASTM D 3385***

Project Number 603455-001

Project Name Canadian Solar Lancaster

**Leighton**

# *Results of Double Ring Infiltrometer, Falling Head Method or Constant Head Method, ASTM 3385*

***Project:*** **Oakville Reserve, Chino**

***LEIGHTON***

| | | | |
|---|---|---|---|
| Exploration #/Location: | LB-7 | | |
| | | Depth to Water Table: | |
| Date Tested, start: | 5/24/2012 | Date Finished: | 5/24/2012 |
| Tested by: | M. Hintz; JDH | | |
| Soil Description: | Clayey sand | | |
| USCS Soil Type: | SC | | |
| Surface Preparation: | | | |

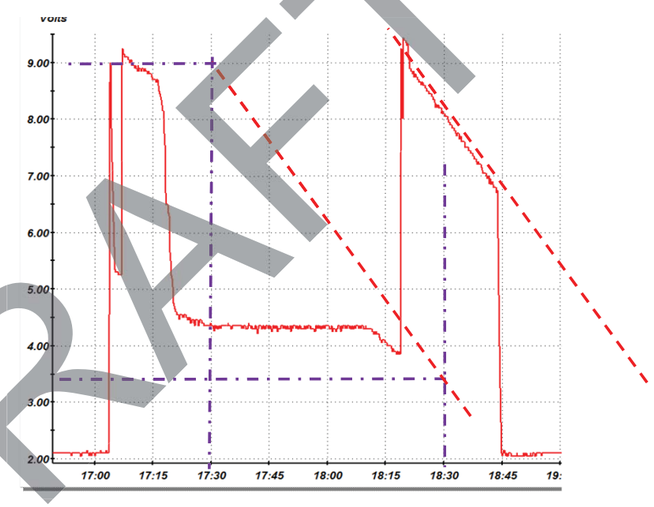
| | | | |
|---|---|---|---|
| Inner Ring Height (in.): | 20 | Outer Ring Height (in.): | 20 |
| Inner Ring Penetration (in.): | 2 | Outer Ring Penetration: | 2 |

*(inner ring height and penetration used for depth of water calculation for both inner and outer rings)*

| | | |
|---|---|---|
| Liquid Used/pH: | 7 | |
| Diam. Inner Ring, in.: | 12.3 | (119 in.$^2$ area) (Beaker for inner ring is 3.5" ID, so 11.8" drop in beaker = 1" drop in ring; 1000mL=6.3" high) |
| Diam. Outer Ring, in.: | 24 | (333 in.$^2$ area of annular space, subtracting inner ring area) |
| Weather (start to finish): | Windy | |
| Tempure of air, soil, and water (start to finish): | 70 F | |

| **Calculation of Infiltration Rate from Graphs:** | **Inner** | Outer | |
|---|---|---|---|
| Color of depth data line on graph to right: | red | | |
| Data Logger: | EL-USB-3 | | |
| Sensor: | S1 | | |
| Diameter of each supply cylinder: | 5.8 | | in. |
| Number of Supply cylinders for the ring: | 1 | | in. |
| Density of H2O used: | 62.4 | | pcf |
| Seletected time period on graph for slope calc: | 1 | | hour |
| Reading, start of selected period (red line): | 9 | | (volts or reading units) |
| Reading, end of selected period (red line): | 3.4 | | (volts or reading units) |
| Slope of red dashed line: | 5.6 | #DIV/0! | reading units/hr |
| Conversion of data logger reading units to volts: | 0.0765 | #N/A | |
| Slope of red dashed line: | 0.4284 | #DIV/0! | change in volts/hr |
| Conversion of sensor volts to ft H2O: | 3.8 | #N/A | ftH2O/volts |
| Change in depth/hr in cylinders: | 1.628 | #DIV/0! | |
| Change in depth/hr in cylinders: | 19.54 | #DIV/0! | in.H2O/hr |
| Cross sectional area of supply cyl.: | 26.4 | 0.0 | in.^2 |
| Cross sectional area of ring: | 119 | 333 | in.^2 |
| Ratio of Ring area to supply cylinders area: | 4.5 | #DIV/0! | |
| **Raw Infiltration Rate:** | **4.34** | #DIV/0! | in./hr |

**Data graphs from data logger(s) (data proportional to depth):**

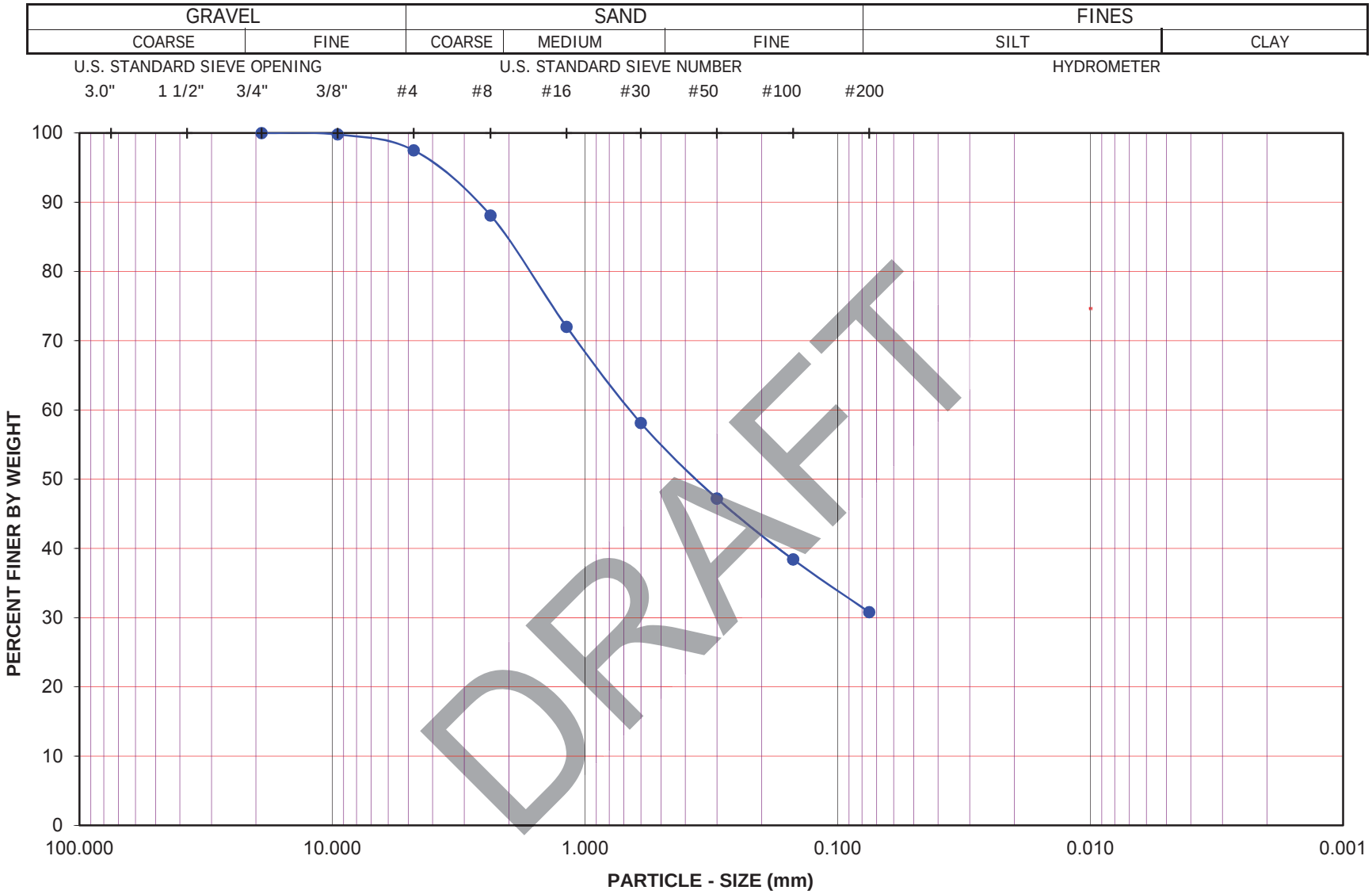



DRAFT

# *APPENDIX C*

# *GEOTECHNICAL LABORATORY TEST RESULTS*

DRAFT




Project Name: Canadian Solar/Lancaster Geo Inv

Project No.: 603455-001

Exploration No.: LB-2 Sample No.: R-1

Depth (feet): 2.5 Soil Type : SC

Soil Identification: Brown clayey sand (SC)

**GR:SA:FI : (%) 3 : 66 : 31**

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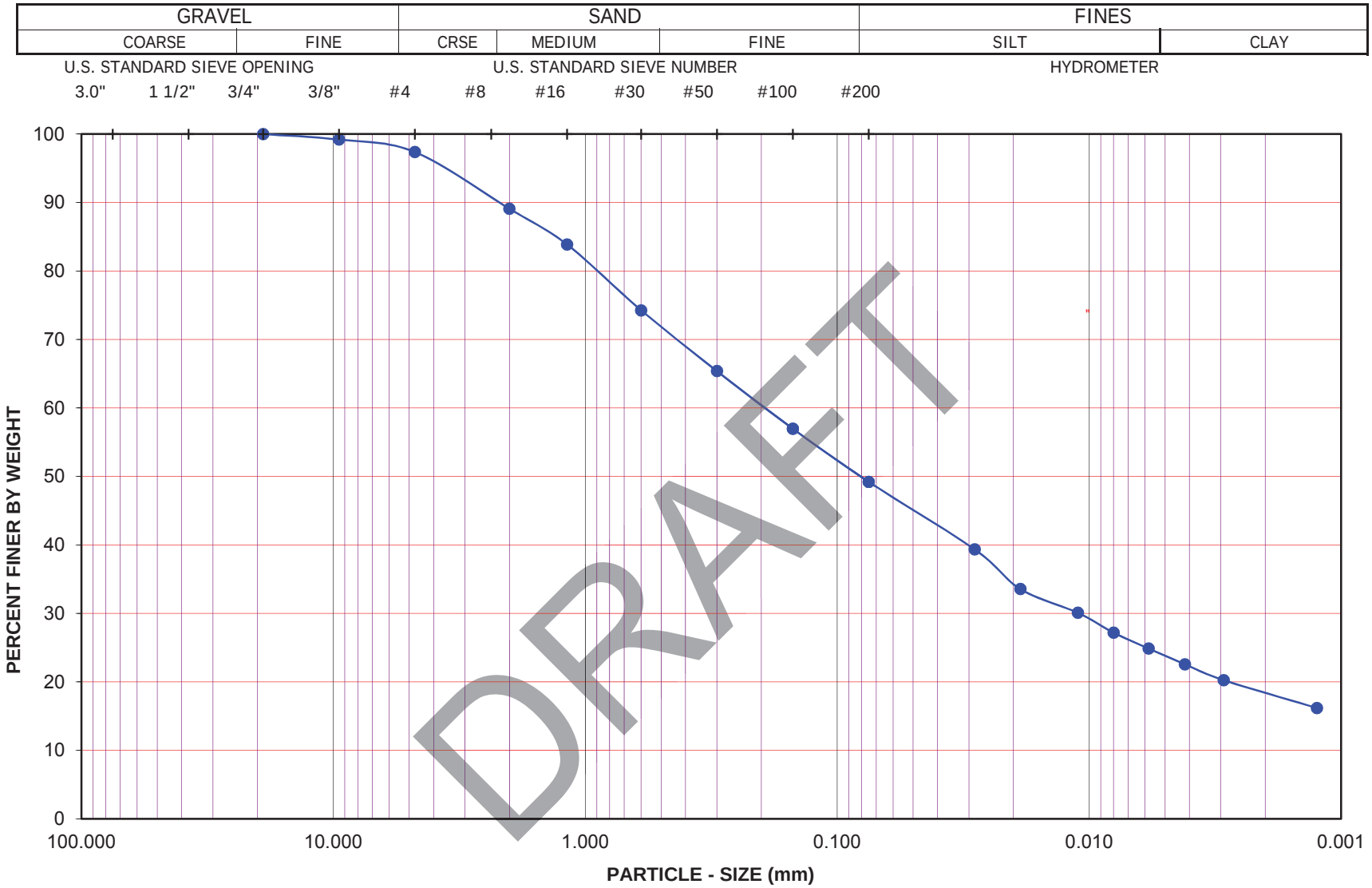
**PARTICLE - SIZE DISTRIBUTION ASTM D 6913**

Jun-12

*SA LB-2, R-1 @ 2.5*




Project Name: Canadian Solar/Lancaster Geo Inv

Project No.: 603455-001

Exploration No.: LB-5 Sample No.: B-1

Depth (feet) : 0.0 Soil Type : SC

Soil Identification: Olive brown clayey sand (SC)

**GR:SA:FI : (%) 3 : 48 : 49**

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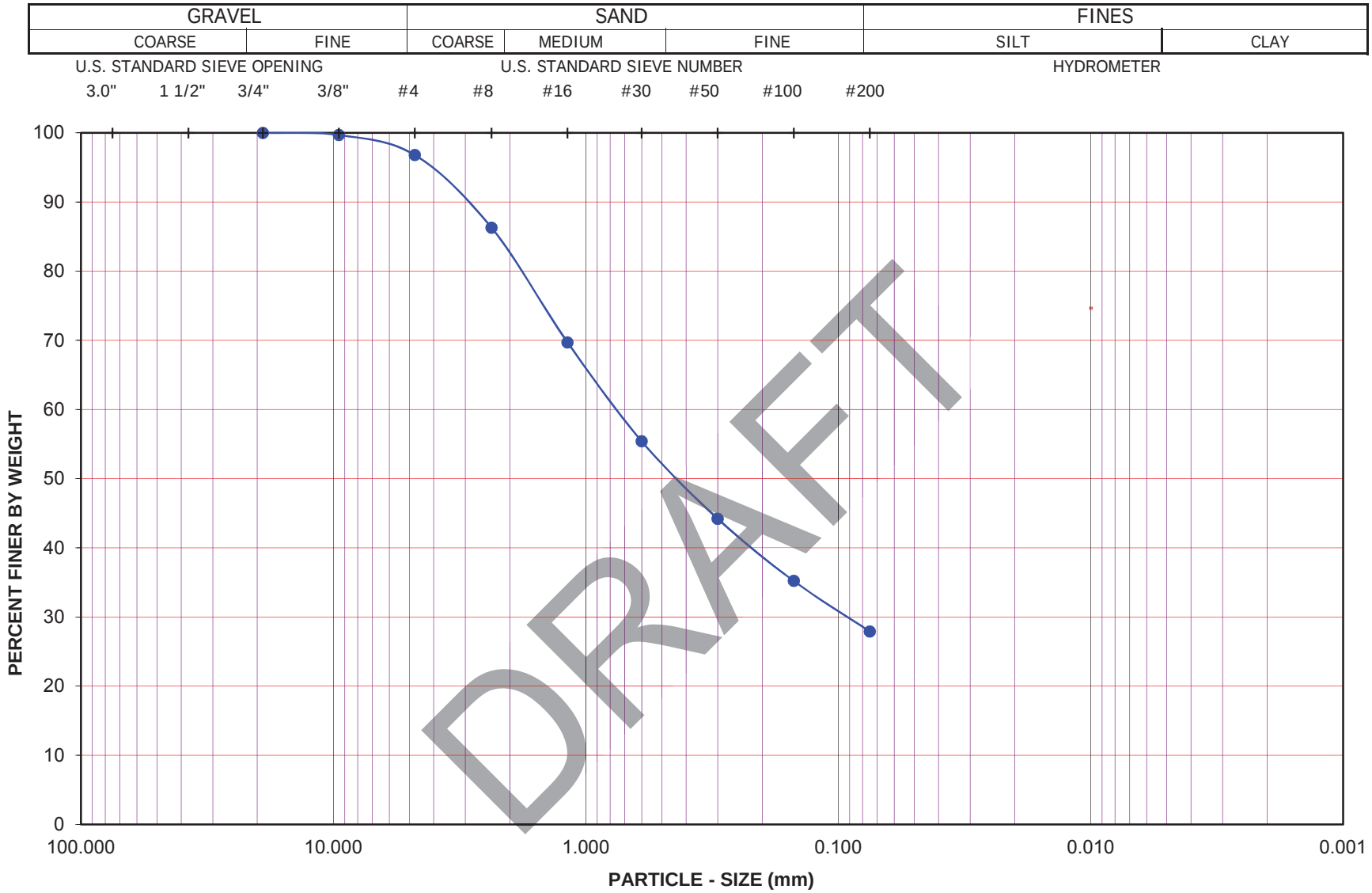
**PARTICLE - SIZE DISTRIBUTION ASTM D 422**

Jun-12

*SA & Hyd LB-5, B-1 @ 0*




Project Name: Canadian Solar/Lancaster Geo Inv

Project No.: 603455-001

Exploration No.: LB-7 Sample No.: R-1

Depth (feet): 2.5 Soil Type : SC

Soil Identification: Brown clayey sand (SC)

**GR:SA:FI : (%) 3 : 69 : 28**

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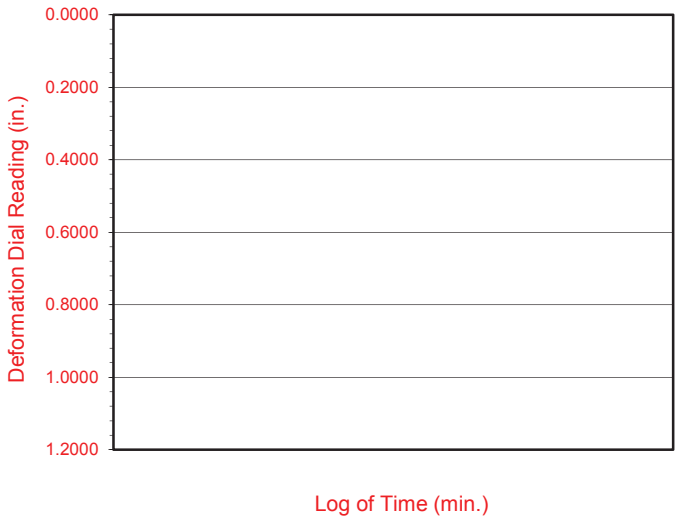
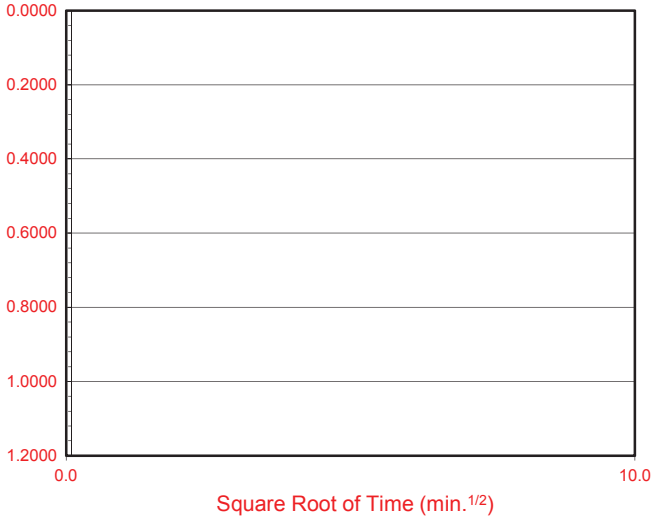
**PARTICLE - SIZE DISTRIBUTION ASTM D 6913**

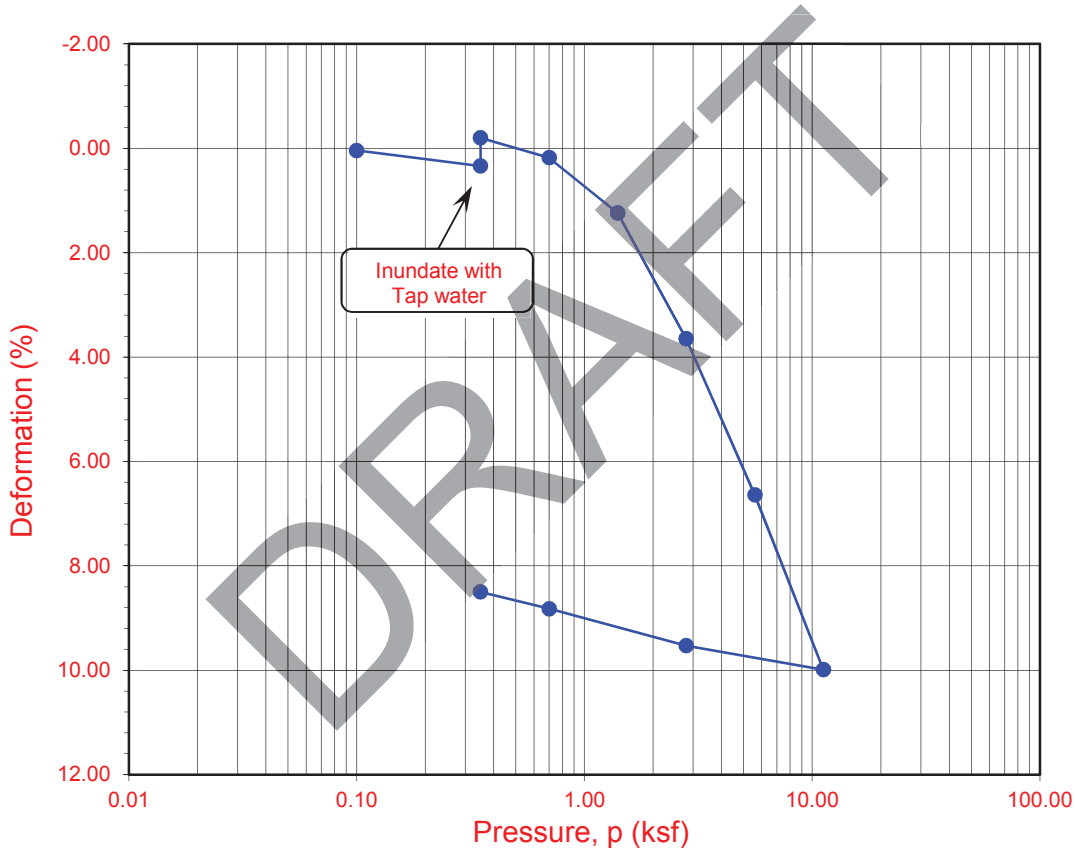
Jun-12

*SA LB-7, R-1 @ 2.5*

No Time Readings




| Boring No. | Sample No. | Depth (ft.) | Moisture Content (%) | | Dry Density (pcf) | | Void Ratio | | Degree of Saturation (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial | Final | Initial | Final | Initial | Final | Initial | Final |
| **LB-5** | **R-1** | **2.5** | **8.8** | **14.2** | **108.9** | **118.7** | **0.548** | **0.416** | **43** | **91** |

Soil Identification: Brown clayey sand (SC)

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**ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS**
**ASTM D 2435**

Project No.: 603455-001

Canadian Solar/Lancaster Geo Inv

06-12

# One-Dimensional Swell or Settlement Potential of Cohesive Soils

**(ASTM D 4546)**

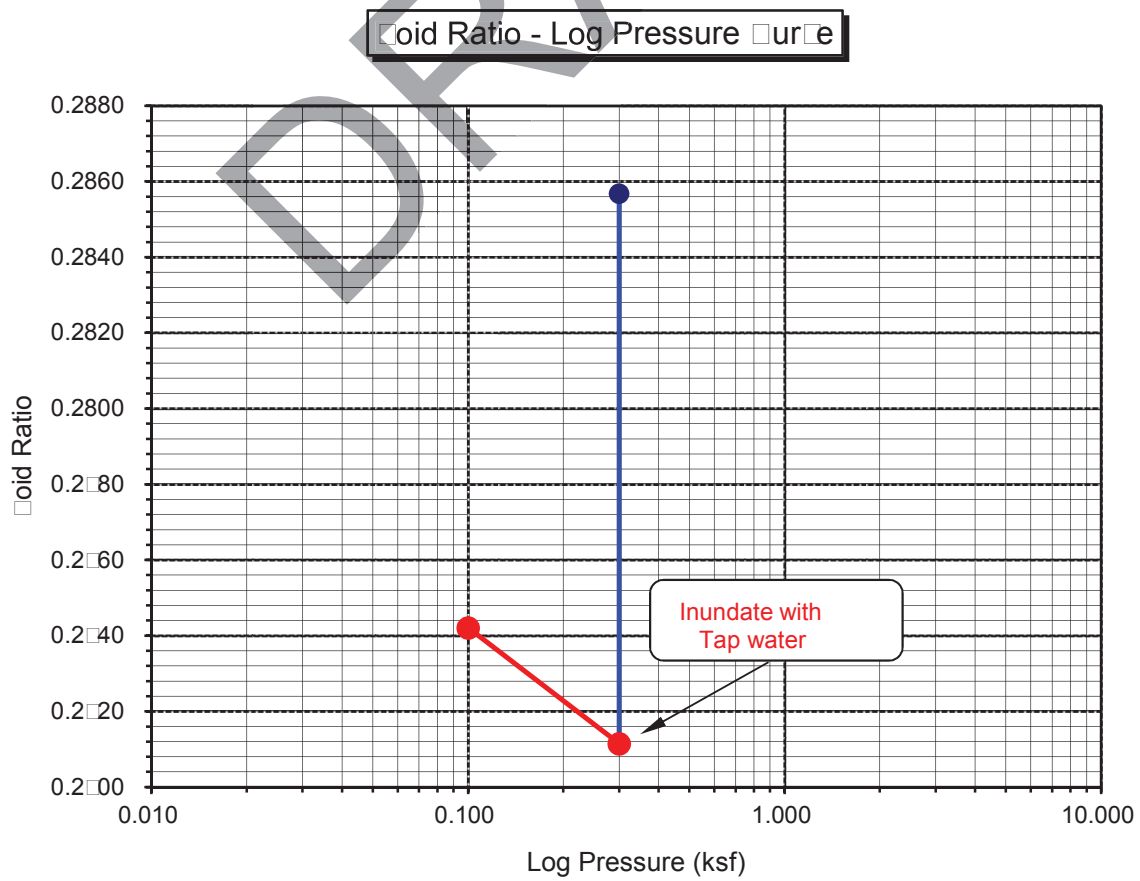
| | | | | | |
|---|---|---|---|---|---|
| Pro□e□t □ame□ | □anadian Solar/Lan□aster □eo In□ | Tested □□□ | □. Ta□□khoei | Date□ | 06/04/12 |
| Pro□e□t □o.□ | 60□4□□-001 | □he□ked □□□ | □. □ ard | Date□ | 06/0□/12 |
| □oring □o.□ | L□-1 | Sample T□pe□ | Dri□e | | |
| Sample □o.□ | R-1 | Depth (ft.) | 2.□ | | |
| Sample Des□ription□ | □rown sand□lean □la□/□la□e□sand s(□L)/S□ | | | | |

| | |
|---|---|
| Initial Dr□Densit□(p□f)□ | 1□2.2 |
| Initial □oisture (%)□ | 4.□□ |
| Initial Length (in.)□ | 1.0000 |
| Initial Dial Reading□ | 0.11□□ |
| Diameter(in)□ | 2.416 |

| | |
|---|---|
| □inal Dr□Densit□(p□f)□ | 1□1.1 |
| □inal □oisture (%) □ | 14.□ |
| Initial □oid ratio□ | 0.2□46 |
| Spe□ifi□□ra□it□(assumed)□ | 2.□0 |
| Initial Saturation (%) | 44.□ |

| Pressure (p) (ksf) | □inal Reading (in) | □pparent Thi□kness (in) | Load □omplian□e (%) | Swell (□) Settlement (-) % of Sample Thi□kness | □oid Ratio | □orre□ted Deformation (%) |
|---|---|---|---|---|---|---|
| 0.100 | 0.1200 | 0.□□□□ | 0.00 | -0.0□ | 0.2□42 | -0.0□ |
| 0.□00 | 0.1224 | 0.□□□□ | 0.00 | -0.2□ | 0.2□11 | -0.2□ |
| □2□ | 0.1110 | 1.008□ | 0.00 | 0.8□ | 0.28□□ | 0.8□ |

**Percent Swell (+) / Settlement (-) After Inundation = 1.14**

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# One-Dimensional Swell or Settlement Potential of Cohesive Soils

**(ASTM D 4546)**

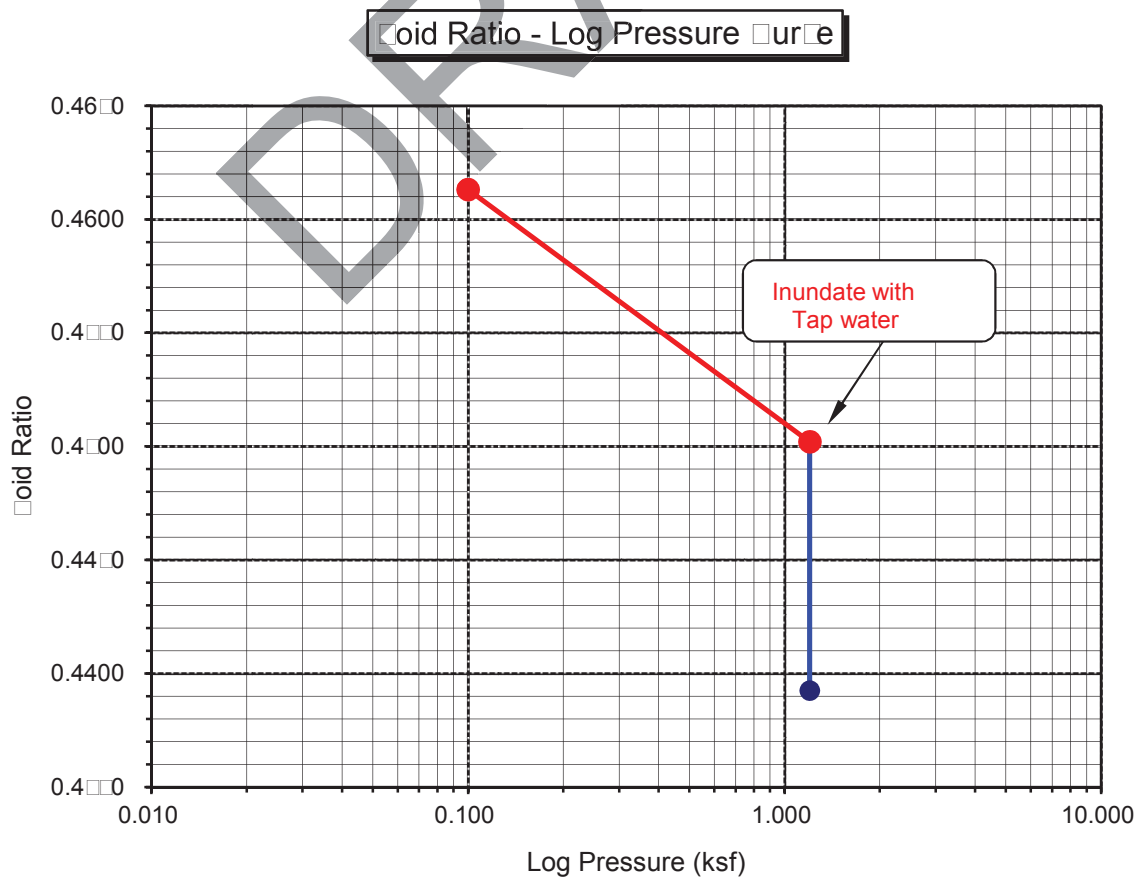
| | | | | | |
|---|---|---|---|---|---|
| Project Name | Canadian Solar/Lancaster Geo Inc | Tested | Ta khoei | Date | 06/04/12 |
| Project No. | 604-001 | Checked | Ward | Date | 06/07/12 |
| Boring No. | LB-3 | Sample Type | Drive | | |
| Sample No. | R-3 | Depth (ft.) | 10.0 | | |
| Sample Description | Brown Lake sand (SP) | | | | |

| | |
|---|---|
| Initial Dry Density (pcf) | 113.3 |
| Initial Moisture (%) | 3.6 |
| Initial Length (in.) | 1.0000 |
| Initial Dial Reading | 0.1033 |
| Diameter(in) | 2.416 |

| | |
|---|---|
| Final Dry Density (pcf) | 113.1 |
| Final Moisture (%) | 13.1 |
| Initial Void ratio | 0.4613 |
| Specific Gravity (assumed) | 2.70 |
| Initial Saturation (%) | 63.3 |

| Pressure (p) (ksf) | Final Reading (in) | Apparent Thickness (in) | Load Compliance (%) | Swell (+) Settlement (-) % of Sample Thickness | Void Ratio | Corrected Deformation (%) |
|---|---|---|---|---|---|---|
| 0.100 | 0.1034 | 0.9966 | 0.00 | -0.01 | 0.4613 | -0.01 |
| 1.200 | 0.1130 | 0.9872 | 0.00 | -0.76 | 0.4702 | -0.76 |
| 72 | 0.1248 | 0.9848 | 0.00 | -1.72 | 0.4772 | -1.72 |

**Percent Swell (+) / Settlement (-) After Inundation = -0.76**

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# One-Dimensional Swell or Settlement Potential of Cohesive Soils

**(ASTM D 4546)**

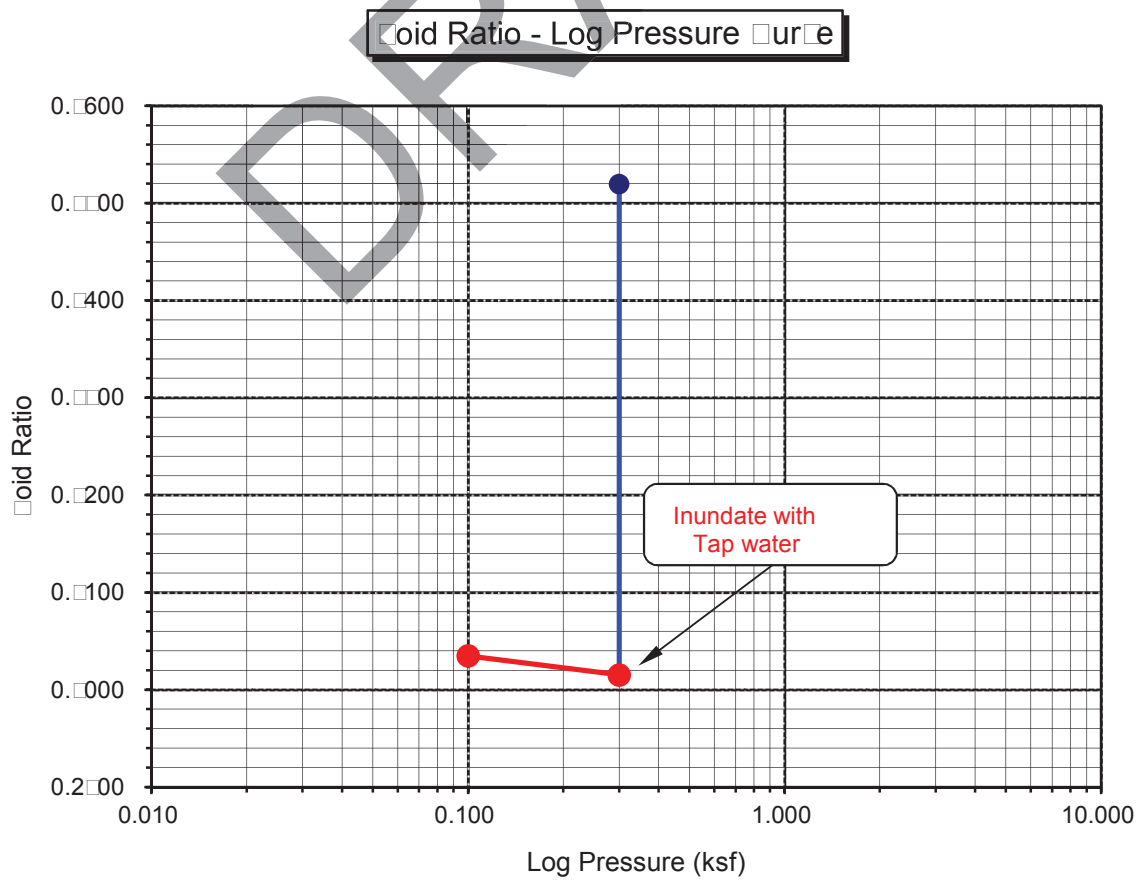
| | | | | | |
|---|---|---|---|---|---|
| Project Name | Canadian Solar/Lancaster Geo Inc | Tested By | Ta khoei | Date | 06/04/12 |
| Project No. | 604400-001 | Checked By | Ward | Date | 06/07/12 |
| Boring No. | LB-9 | Sample Type | Drive | | |
| Sample No. | R-1 | Depth (ft.) | 2.0 | | |
| Sample Description | Brown lean clay with sand (CL)s | | | | |

| | |
|---|---|
| Initial Dry Density (pcf) | 120.0 |
| Initial Moisture (%) | 8.1 |
| Initial Length (in.) | 1.0000 |
| Initial Dial Reading | 0.1148 |
| Diameter(in) | 2.416 |

| | |
|---|---|
| Final Dry Density (pcf) | 124.0 |
| Final Moisture (%) | 10.1 |
| Initial Void ratio | 0.806 |
| Specific Gravity (assumed) | 2.70 |
| Initial Saturation (%) | 66.6 |

| Pressure (p) (ksf) | Final Reading (in) | Apparent Thickness (in) | Load Compliance (%) | Swell (+) Settlement (-) % of Sample Thickness | Void Ratio | Corrected Deformation (%) |
|---|---|---|---|---|---|---|
| 0.100 | 0.1140 | 0.0000 | 0.00 | -0.01 | 0.800 | -0.01 |
| 0.500 | 0.1164 | 0.0084 | 0.00 | -0.16 | 0.801 | -0.16 |
| 1.200 | 0.0000 | 1.0001 | 0.00 | 0.01 | 0.720 | 0.01 |

**Percent Swell (+) / Settlement (-) After Inundation = 3.88**

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# EXPANSION INDEX of SOILS

**ASTM D 4829**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Canadian Solar/Lancaster Geo Inv | Tested By: | G. Berdy | Date: | 06/04/12 |
| Project No. : | 603455-001 | Checked By: | J. Ward | Date: | 06/08/12 |
| Boring No.: | LB-5 | Depth (ft.) | 0.0 | | |
| Sample No. : | B-1 | | | | |
| Soil Identification: | Olive brown clayey sand (SC) | | | | |

| | |
|---|---|
| Dry Wt. of Soil + Cont. (g) | 1000.00 |
| Wt. of Container No. (g) | 0.00 |
| Dry Wt. of Soil (g) | 1000.00 |
| Weight Soil Retained on #4 Sieve | 0.00 |
| Percent Passing # 4 | 100.00 |

| **MOLDED SPECIMEN** | Before Test | After Test |
|---|---|---|
| Specimen Diameter (in.) | 4.01 | 4.01 |
| Specimen Height (in.) | 1.0000 | 1.0225 |
| Wt. Comp. Soil + Mold (g) | 592.50 | 437.71 |
| Wt. of Mold (g) | 181.30 | 0.00 |
| Specific Gravity (Assumed) | 2.70 | 2.70 |
| Container No. | O | O |
| Wet Wt. of Soil + Cont. (g) | 815.20 | 619.01 |
| Dry Wt. of Soil + Cont. (g) | 746.50 | 557.86 |
| Wt. of Container (g) | 0.00 | 181.30 |
| Moisture Content (%) | 9.20 | 16.24 |
| Wet Density (pcf) | 124.0 | 129.1 |
| Dry Density (pcf) | 113.6 | 111.1 |
| Void Ratio | 0.484 | 0.518 |
| Total Porosity | 0.326 | 0.341 |
| Pore Volume (cc) | 67.5 | 72.2 |
| Degree of Saturation (%) [ $S_{meas}$] | **51.3** | 84.7 |

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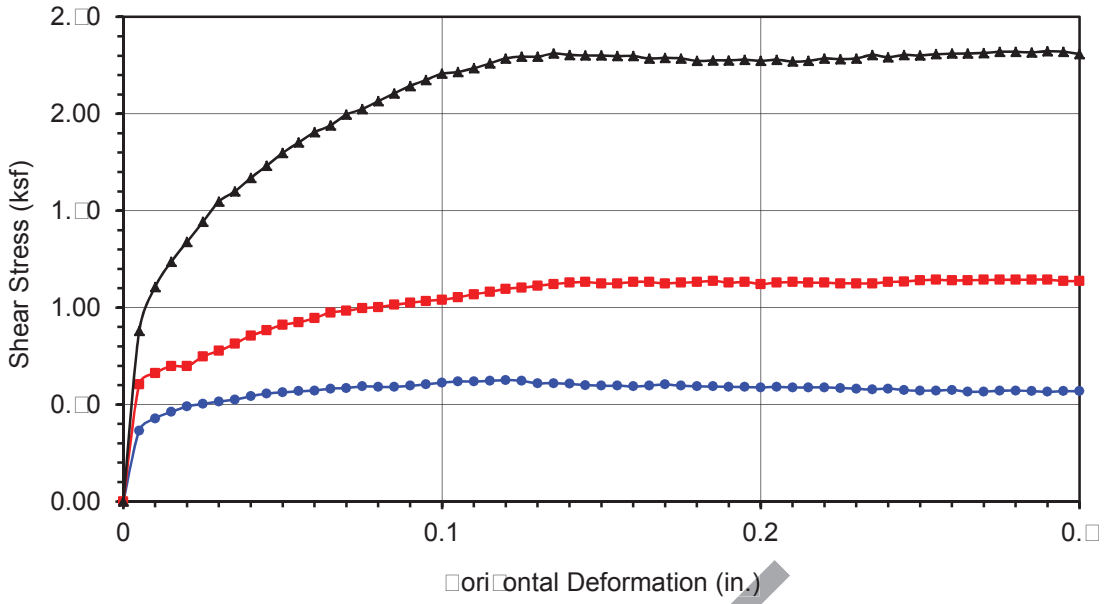
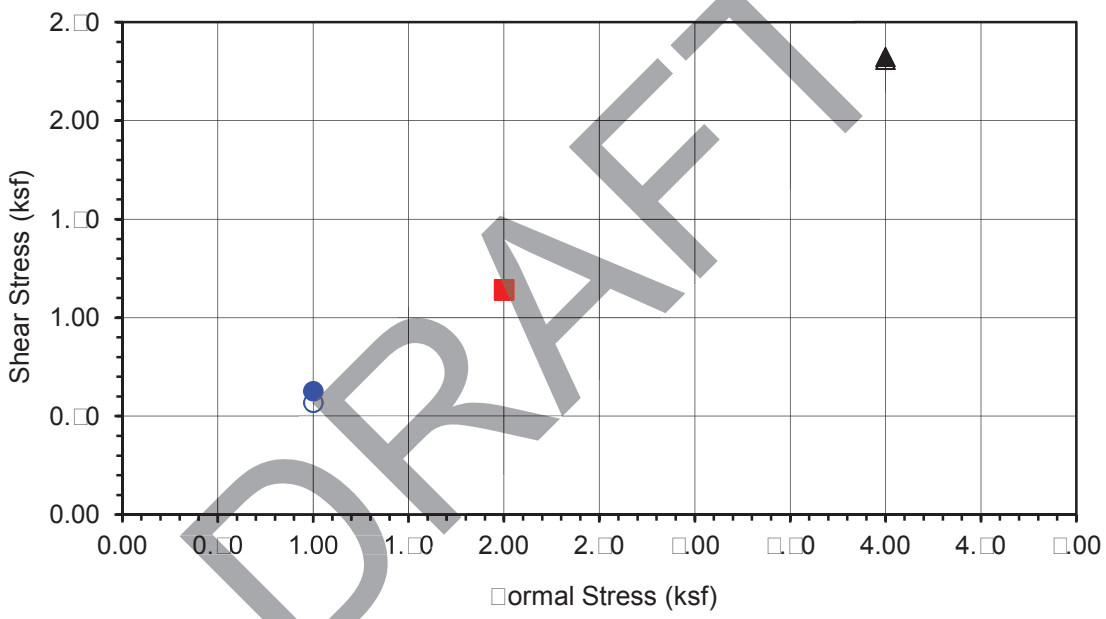
**SPECIMEN INUNDATION** in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

| Date | Time | Pressure (psi) | Elapsed Time (min.) | Dial Readings (in.) |
|---|---|---|---|---|
| 06/04/12 | 11:37 | 1.0 | 0 | 0.1210 |
| 06/04/12 | 11:47 | 1.0 | 10 | 0.1200 |
| Add Distilled Water to the Specimen | | | | |
| 06/04/12 | 12:38 | 1.0 | 51 | 0.1370 |
| 06/05/12 | 7:32 | 1.0 | 1185 | 0.1435 |
| 06/05/12 | 8:55 | 1.0 | 1268 | 0.1435 |
| | | | | |

| | |
|---|---|
| Expansion Index ($EI_{meas}$) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000 | **24** |




DRAFT

| | |
|---|---|
| **Boring No.** | **LB-3** |
| **Sample No.** | **R-1** |
| **Depth (ft)** | **2.5** |

Sample Type:

Drive

Soil Identification:
Brown clayey sand (SC)

| Normal Stress (kip/ft²) | 1.000 | 2.000 | 4.000 |
|---|---|---|---|
| Peak Shear Stress (kip/ft²) | ● 0.626 | ■ 1.144 | ▲ 2.323 |
| Shear Stress @ End of Test (ksf) | ○ 0.569 | □ 1.138 | △ 2.308 |
| Deformation Rate (in./min.) | 0.0500 | 0.0500 | 0.0500 |
| Initial Sample Height (in.) | 1.000 | 1.000 | 1.000 |
| Diameter (in.) | 2.415 | 2.415 | 2.415 |
| Initial Moisture Content (%) | 4.21 | 4.21 | 4.21 |
| Dry Density (pcf) | 103.2 | 105.3 | 108.6 |
| Saturation (%) | 18.0 | 18.9 | 20.6 |
| Soil Height Before Shearing (in.) | 0.9210 | 0.9045 | 0.8903 |
| Final Moisture Content (%) | 16.4 | 16.0 | 14.2 |

Leighton

**DIRECT SHEAR TEST RESULTS**
**Consolidated Undrained**

Project No.: 603455-001

Canadian Solar/Lancaster Geo Inv

06-12

Leighton

# MODIFIED PROCTOR COMPACTION TEST

**ASTM D 1557**

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Canadian Solar/Lancaster Geo Inv | Tested By : | G. Berdy | Date: | 06/04/12 |
| Project No.: | 603455-001 | Input By : | J. Ward | Date: | 06/08/12 |
| Boring No.: | LB-5 | Depth (ft.) | 0.0 | | |
| Sample No. : | B-1 | | | | |
| Soil Identification: | Olive brown clayey sand (SC) | | | | |

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

**Mold Volume (ft³)** 0.03340

*Ram Weight = 10 lb.; Drop = 18 in.*

| TEST NO. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Compacted Soil + Mold (g) | 3856.0 | 3968.0 | 3971.0 | | | |
| Weight of Mold (g) | 1894.0 | 1894.0 | 1894.0 | | | |
| Net Weight of Soil (g) | 1962.0 | 2074.0 | 2077.0 | | | |
| Wet Weight of Soil + Cont. (g) | 519.10 | 459.80 | 528.10 | | | |
| Dry Weight of Soil + Cont. (g) | 493.60 | 429.50 | 481.00 | | | |
| Weight of Container (g) | 50.90 | 51.10 | 51.30 | | | |
| Moisture Content (%) | 5.76 | 8.01 | 10.96 | | | |
| Wet Density (pcf) | 129.5 | 136.9 | 137.1 | | | |
| Dry Density (pcf) | 122.4 | 126.7 | 123.6 | | | |

**Maximum Dry Density (pcf)** 127.0 **Optimum Moisture Content (%)** 8.5

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**PROCEDURE USED**

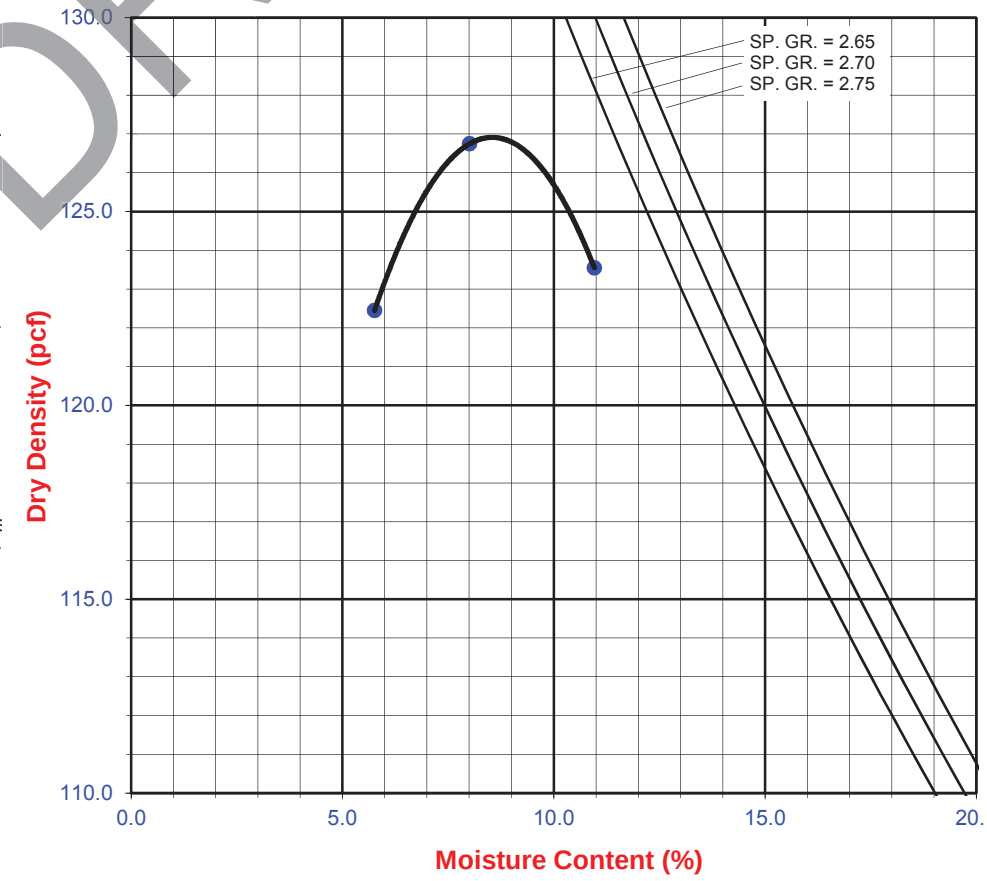
[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

**Particle-Size Distribution:**
3:48:49
GR:SA:FI

**Atterberg Limits:**
LL,PL,PI



Leighton

# SOIL RESISTIVITY TEST

## DOT CA TEST 532 / 643

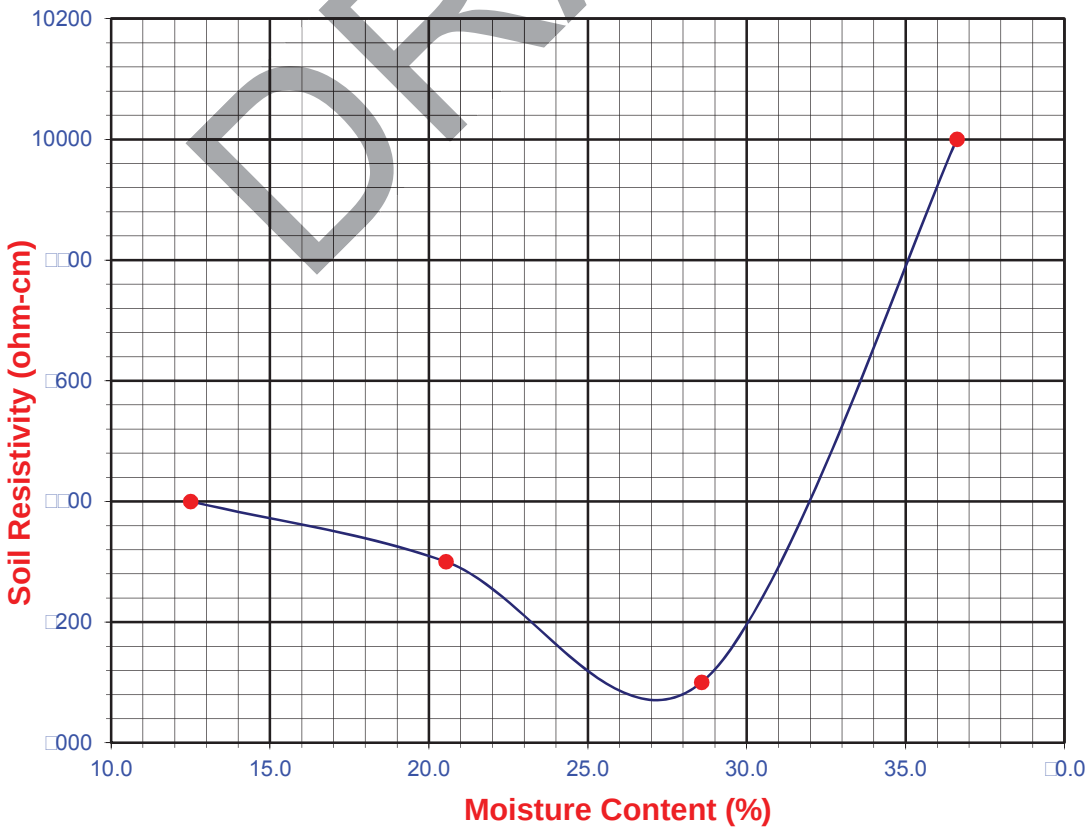
| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Canadian Solar/Lancaster Geo Inv | Tested By : | V. Juliano | Date: | 06/06/12 |
| Project No. : | 603455-001 | Data Input By: | J. Ward | Date: | 06/08/12 |
| Boring No.: | LB-2 | Depth (ft.) : | 0.0 | | |
| Sample No. : | B-1 | | | | |
| Soil Identification:* | Brown SM | | | | |

[illegible] 6 3 [illegible] S S [illegible] S [illegible]

| Specimen No. | Water Added (ml) (Wa) | Adjusted Moisture Content (MC) | Resistance Reading (ohm) | Soil Resistivity (ohm-cm) |
|---|---|---|---|---|
| 1 | 10 | 12.51 | 9400 | 9400 |
| 2 | 20 | 20.54 | 9300 | 9300 |
| 3 | 30 | 28.58 | 9100 | 9100 |
| 4 | 40 | 36.62 | 10000 | 10000 |
| 5 | | | | |

| | |
|---|---|
| Moisture Content (%) (MCi) | 4.47 |
| Wet Wt. of Soil + Cont. (g) | 190.87 |
| Dry Wt. of Soil + Cont. (g) | 185.60 |
| Wt. of Container (g) | 67.74 |
| Container No. | |
| Initial Soil Wt. (g) (Wt) | 130.00 |
| Box Constant | 1.000 |
| MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100 | |

| Min. Resistivity (ohm-cm) | Moisture Content (%) | Sulfate Content (ppm) | Chloride Content (ppm) | Soil pH | |
|---|---|---|---|---|---|
| | | | | pH | Temp. (°C) |
| DOT CA Test 532 / 643 | | DOT CA Test 417 Part II | DOT CA Test 422 | DOT CA Test 532 / 643 | |
| **9070** | **27.2** | **60** | **52** | **6.20** | **20.4** |

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Leighton

# SOIL RESISTIVITY TEST

## DOT CA TEST 532 / 643

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | Canadian Solar/Lancaster Geo Inv | Tested By : | V. Juliano | Date: | 06/06/12 |
| Project No. : | 603455-001 | Data Input By: | J. Ward | Date: | 06/08/12 |
| Boring No.: | LB-5 | Depth (ft.) : | 0.0 | | |
| Sample No. : | B-1 | | | | |

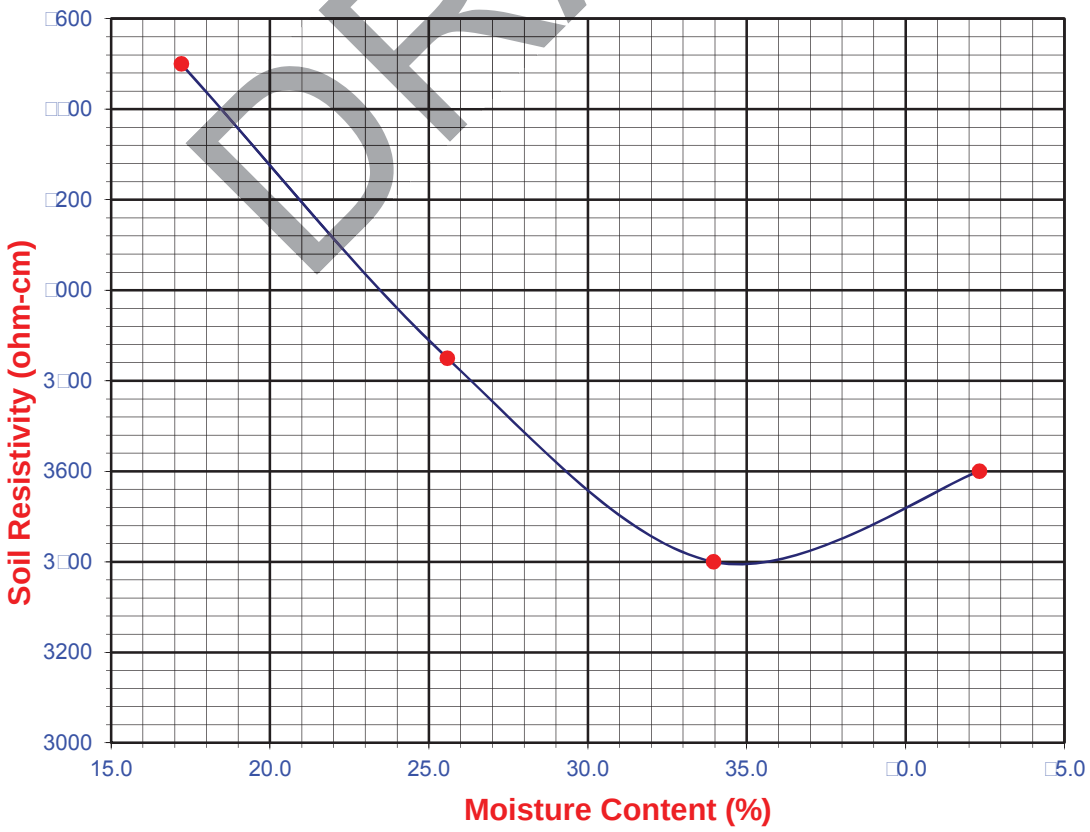
Soil Identification:* Brown SC

[illegible] 6 3 [illegible] S S [illegible] S [illegible]

| Specimen No. | Water Added (ml) (Wa) | Adjusted Moisture Content (MC) | Resistance Reading (ohm) | Soil Resistivity (ohm-cm) |
|---|---|---|---|---|
| 1 | 10 | 17.21 | 4500 | 4500 |
| 2 | 20 | 25.58 | 3850 | 3850 |
| 3 | 30 | 33.95 | 3400 | 3400 |
| 4 | 40 | 42.33 | 3600 | 3600 |
| 5 | | | | |

| | |
|---|---|
| Moisture Content (%) (MCi) | 8.84 |
| Wet Wt. of Soil + Cont. (g) | 164.50 |
| Dry Wt. of Soil + Cont. (g) | 157.17 |
| Wt. of Container (g) | 74.23 |
| Container No. | |
| Initial Soil Wt. (g) (Wt) | 130.00 |
| Box Constant | 1.000 |
| MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100 | |

| Min. Resistivity (ohm-cm) | Moisture Content (%) | Sulfate Content (ppm) | Chloride Content (ppm) | Soil pH | |
|---|---|---|---|---|---|
| | | | | pH | Temp. (°C) |
| DOT CA Test 532 / 643 | | DOT CA Test 417 Part II | DOT CA Test 422 | DOT CA Test 532 / 643 | |
| **3395** | **34.8** | **54** | **55** | **5.88** | **21.2** |

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## Table 4 - Thermal Resistivity Tests on Soil Sample(s)

***Leighton Consulting, Inc.***
***Lancaster Solar***
***Your #603455-001, HDR|Schiff #12-0475LAB***
***1-Jun-12***

| **Sample ID** | | LB-2 R-2 @ 5' Ring | LB-5 R-2 @ 5' Ring | LB-8 R-2 @ 5' Ring |
|---|---|---|---|---|
| **Thermal Resistivity** | **Units** | | | |
| as-received | m °C $W^{-1}$ | 0.87 | 0.87 | 0.55 |
| 0% Moisture | m °C $W^{-1}$ | 1.66 | 1.57 | 1.78 |
| **Moisture Content** | | | | |
| as-received | % | 5.5% | 5.1% | 6.1% |

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Thermal Resistivity in general accordance with ASTM D5334-08
ND = not detected
na = not analyzed

# *APPENDIX D*

# *SUMMARY OF SEISMIC ANALYSIS*

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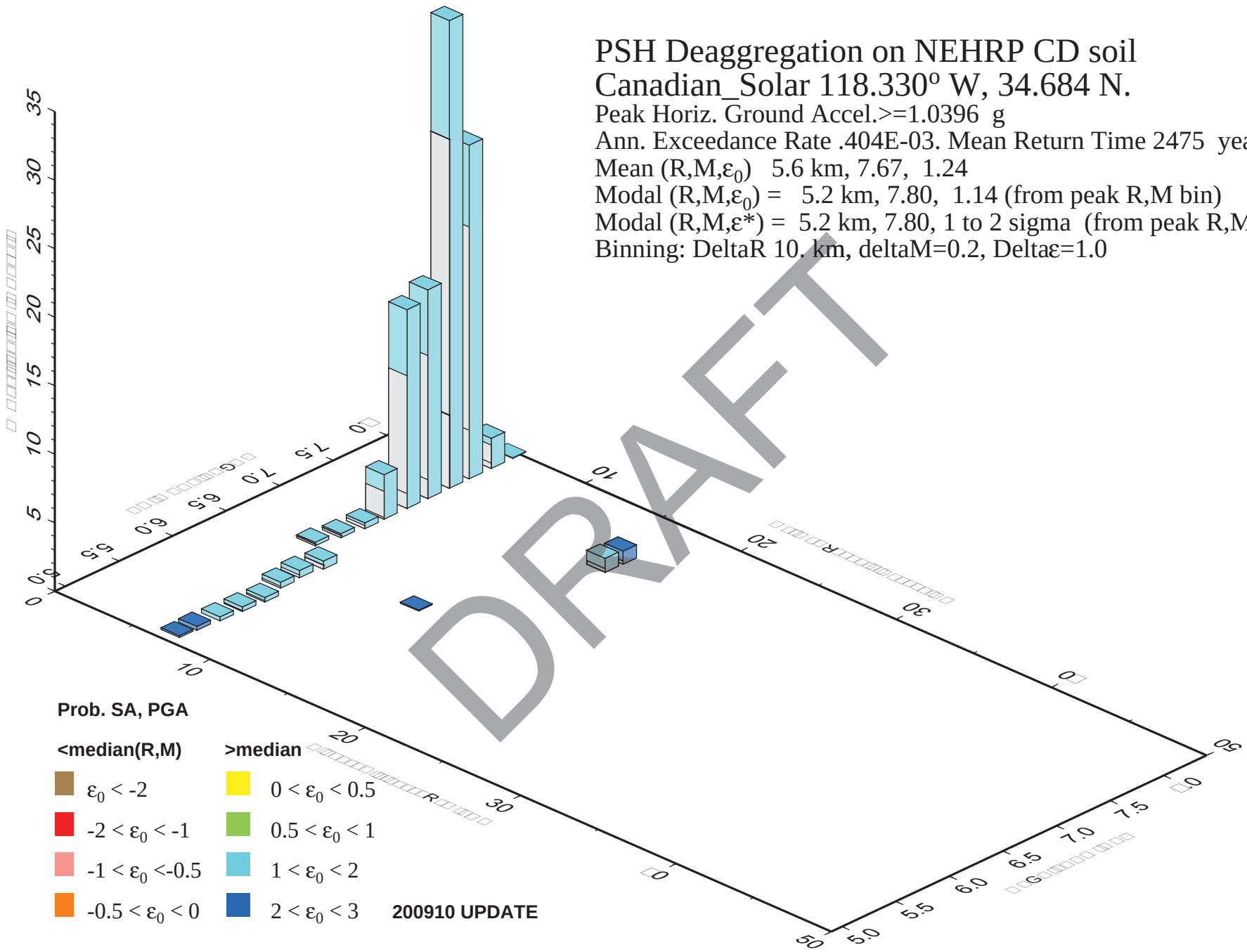
# PSH Deaggregation on NEHRP CD soil
## Canadian_Solar 118.330º W, 34.684 N.

Peak Horiz. Ground Accel.>=1.0396 g
Ann. Exceedance Rate .404E-03. Mean Return Time 2475 years
Mean (R,M,$\varepsilon_0$) 5.6 km, 7.67, 1.24
Modal (R,M,$\varepsilon_0$) = 5.2 km, 7.80, 1.14 (from peak R,M bin)
Modal (R,M,$\varepsilon$*) = 5.2 km, 7.80, 1 to 2 sigma (from peak R,M,$\varepsilon$ bin)
Binning: DeltaR 10. km, deltaM=0.2, Delta$\varepsilon$=1.0




GMT 2012 2 21 25 21 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on soil with average vs= 360. m/s top 30 m. USGS CGHT PSHA2008 UPDATE Bins with lt 0.05% contrib. omitted

| Distance in Miles | Name | Slip Sense | Rupture Top (km) | Rupture Bottom (km) | Length (km) |
|---|---|---|---|---|---|
| 3.28 | S. San Andreas;SM+NSB+SSB+BG | strike slip | 0 | 12.8 | 234 |
| 3.28 | S. San Andreas;NM+SM+NSB+SSB+BG | strike slip | 0 | 13.9 | 271 |
| 3.28 | S. San Andreas;SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13 | 304 |
| 3.28 | S. San Andreas;BB+NM+SM+NSB+SSB+BG | strike slip | 0 | 13.9 | 321 |
| 3.28 | S. San Andreas;NM+SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13 | 341 |
| 3.28 | S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG | strike slip | 0 | 13.9 | 380 |
| 3.28 | S. San Andreas;BB+NM+SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13.1 | 391 |
| 3.28 | S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG | strike slip | 0 | 14 | 443 |
| 3.28 | S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13.1 | 450 |
| 3.28 | S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG | strike slip | 0.1 | 13.1 | 479 |
| 3.28 | S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13.1 | 512 |
| 3.28 | S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG+CO | strike slip | 0.1 | 13.1 | 549 |
| 3.28 | S. San Andreas;SM | strike slip | 0 | 13 | 98 |
| 3.28 | S. San Andreas;SM+NSB | strike slip | 0 | 13 | 133 |
| 3.28 | S. San Andreas;NM+SM+NSB | strike slip | 0 | 13 | 170 |
| 3.28 | S. San Andreas;SM+NSB+SSB | strike slip | 0 | 13 | 177 |
| 3.28 | S. San Andreas;NM+SM+NSB+SSB | strike slip | 0 | 13 | 214 |
| 3.28 | S. San Andreas;NM+SM | strike slip | 0 | 14 | 135 |
| 3.28 | S. San Andreas;BB+NM+SM | strike slip | 0 | 14 | 185 |
| 3.28 | S. San Andreas;BB+NM+SM+NSB | strike slip | 0 | 14 | 220 |
| 3.28 | S. San Andreas;CC+BB+NM+SM | strike slip | 0 | 14 | 244 |
| 3.28 | S. San Andreas;BB+NM+SM+NSB+SSB | strike slip | 0 | 14 | 263 |
| 3.28 | S. San Andreas;CC+BB+NM+SM+NSB | strike slip | 0 | 14 | 279 |
| 3.28 | S. San Andreas;CH+CC+BB+NM+SM | strike slip | 0 | 14 | 306 |
| 3.28 | S. San Andreas;CC+BB+NM+SM+NSB+SSB | strike slip | 0 | 14 | 323 |
| 3.28 | S. San Andreas;CH+CC+BB+NM+SM+NSB | strike slip | 0 | 14 | 342 |
| 3.28 | S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB | strike slip | 0 | 14 | 385 |
| 3.28 | S. San Andreas;PK+CH+CC+BB+NM+SM | strike slip | 0.1 | 13.1 | 343 |
| 3.28 | S. San Andreas;PK+CH+CC+BB+NM+SM+NSB | strike slip | 0.1 | 13.1 | 378 |
| 3.28 | S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB | strike slip | 0.1 | 13.1 | 422 |
| 10.26 | S. San Andreas;NM | strike slip | 0 | 15 | 37 |
| 10.26 | S. San Andreas;CH+CC+BB+NM | strike slip | 0 | 14 | 208 |
| 10.26 | S. San Andreas;BB+NM | strike slip | 0 | 15 | 87 |
| 10.26 | S. San Andreas;CC+BB+NM | strike slip | 0 | 15 | 146 |
| 10.26 | S. San Andreas;PK+CH+CC+BB+NM | strike slip | 0.1 | 12.1 | 245 |
| 21.2 | San Gabriel | strike slip | 0 | 14.9 | 71 |
| 22.25 | Holser, alt 1 | reverse | 0 | 18.7 | 20 |
| 23.07 | Garlock;GE+GC+GW | strike slip | 0.3 | 12.3 | 256 |
| 23.07 | Garlock;GC+GW | strike slip | 0.4 | 12.4 | 211 |
| 23.07 | Garlock;GW | strike slip | 0.7 | 13.7 | 98 |
| 25.07 | Northridge | thrust | 7.4 | 16.6 | 33 |
| 26.6 | Santa Susana, alt 1 | reverse | 0 | 16.4 | 27 |
| 26.74 | Sierra Madre (San Fernando) | reverse | 0 | 12.7 | 18 |
| 26.74 | Sierra Madre Connected | reverse | 0 | 14 | 76 |
| 28.34 | Sierra Madre | reverse | 0 | 14.4 | 57 |
| 29.67 | Verdugo | reverse | 0 | 14.7 | 29 |
| 29.88 | Oak Ridge Connected | reverse | 0.6 | 15 | 94 |
| 29.88 | Oak Ridge (Onshore) | reverse | 1 | 19.1 | 49 |
| 30 | San Cayetano | thrust | 0 | 16.1 | 42 |
| 32.98 | S. San Andreas;BB | strike slip | 0 | 15 | 50 |
| 32.98 | S. San Andreas;CH+CC+BB | strike slip | 0 | 14 | 171 |
| 32.98 | S. San Andreas;CC+BB | strike slip | 0 | 15 | 109 |
| 32.98 | S. San Andreas;PK+CH+CC+BB | strike slip | 0.1 | 12.1 | 208 |
| 33.41 | Santa Ynez Connected | strike slip | 0 | 11.3 | 132 |
| 33.41 | Santa Ynez (East) | strike slip | 0 | 13.2 | 69 |

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| | | | | | |
|---|---|---|---|---|---|
| 33.56 | Simi-Santa Rosa | strike slip | 1 | 12.3 | 39 |
| 35.7 | Pleito | reverse | 0 | 13.7 | 44 |
| 39.32 | Raymond | strike slip | 0 | 15.7 | 23 |
| 39.41 | Hollywood | strike slip | 0 | 16.9 | 17 |
| 39.48 | Clamshell-Sawpit | reverse | 0 | 13.8 | 16 |
| 39.52 | Elysian Park (Upper) | reverse | 3 | 15.3 | 20 |
| 39.79 | Santa Monica Connected alt 2 | strike slip | 0.8 | 11.2 | 93 |
| 42.03 | White Wolf | reverse | 0 | 14.5 | 63 |
| 42.75 | Santa Monica Connected alt 1 | strike slip | 0 | 16.3 | 80 |
| 42.75 | Santa Monica, alt 1 | strike slip | 0 | 18.4 | 14 |
| 44.4 | Newport-Inglewood, alt 1 | strike slip | 0 | 15 | 65 |
| 44.4 | Newport Inglewood Connected alt 1 | strike slip | 0 | 11 | 208 |
| 44.4 | Newport Inglewood Connected alt 2 | strike slip | 0 | 11 | 208 |
| 44.88 | Garlock;GC | strike slip | 0 | 12 | 111 |
| 44.88 | Garlock;GE+GC | strike slip | 0 | 12 | 157 |
| 45 | Puente Hills (LA) | thrust | 2.1 | 14.8 | 22 |
| 45.59 | So Sierra Nevada | normal | 0 | 13.8 | 112 |
| 46.64 | Malibu Coast, alt 2 | strike slip | 0 | 16.3 | 38 |
| 46.64 | Malibu Coast, alt 1 | strike slip | 0 | 7.7 | 38 |
| 47.59 | Anacapa-Dume, alt 2 | thrust | 1.2 | 11.7 | 65 |
| 48.27 | Lenwood-Lockhart-Old Woman Springs | strike slip | 0 | 13 | 145 |
| 49.84 | Mission Ridge-Arroyo Parida-Santa Ana | reverse | 0 | 7.5 | 69 |
| 50.23 | Elsinore;W | strike slip | 0 | 14.5 | 46 |
| 50.23 | Elsinore;W+GI | strike slip | 0 | 13.8 | 83 |
| 50.23 | Elsinore;W+GI+T | strike slip | 0 | 13.9 | 124 |
| 50.23 | Elsinore;W+GI+T+J | strike slip | 0 | 15.9 | 200 |
| 50.23 | Elsinore;W+GI+T+J+CM | strike slip | 0 | 15.9 | 242 |
| 50.82 | Helendale-So Lockhart | strike slip | 0 | 13 | 114 |
| 51 | Palos Verdes Connected | strike slip | 0 | 10 | 285 |
| 51 | Palos Verdes | strike slip | 0 | 14 | 99 |
| 51.17 | S. San Andreas;NSB+SSB+BG | strike slip | 0 | 13.5 | 137 |
| 51.17 | S. San Andreas;NSB+SSB+BG+CO | strike slip | 0.2 | 12 | 206 |
| 51.17 | S. San Andreas;NSB | strike slip | 0 | 13 | 35 |
| 51.17 | S. San Andreas;NSB+SSB | strike slip | 0 | 13 | 79 |
| 51.19 | San Jacinto;SBV | strike slip | 0 | 16 | 45 |
| 51.19 | San Jacinto;SBV+SJV | strike slip | 0 | 16 | 88 |
| 51.19 | San Jacinto;SBV+SJV+A | strike slip | 0 | 16 | 134 |
| 51.19 | San Jacinto;SBV+SJV+A+CC | strike slip | 0 | 16 | 181 |
| 51.19 | San Jacinto;SBV+SJV+A+C | strike slip | 0 | 17 | 181 |
| 51.19 | San Jacinto;SBV+SJV+A+CC+B | strike slip | 0.1 | 15.1 | 215 |
| 51.19 | San Jacinto;SBV+SJV+A+CC+B+SM | strike slip | 0.1 | 15.1 | 242 |
| 51.38 | San Jose | strike slip | 0 | 15.4 | 20 |
| 51.59 | Cucamonga | reverse | 0 | 7.8 | 28 |
| 51.87 | Pitas Point Connected | reverse | 1.2 | 12.7 | 79 |
| 51.87 | Ventura-Pitas Point | reverse | 1 | 15.4 | 44 |
| 52.72 | Anacapa-Dume, alt 1 | reverse | 0 | 15.6 | 51 |
| 54.77 | Puente Hills (Santa Fe Springs) | thrust | 2.8 | 14.9 | 11 |
| 55.57 | Cleghorn | strike slip | 0 | 16 | 25 |
| 55.94 | Chino, alt 2 | strike slip | 0 | 13.6 | 29 |
| 56.06 | Chino, alt 1 | strike slip | 0 | 9.2 | 24 |
| 57.04 | Puente Hills (Coyote Hills) | thrust | 2.8 | 14.6 | 17 |
| 60.42 | Red Mountain | reverse | 0 | 14.1 | 101 |
| 61.52 | Oak Ridge (Offshore) | thrust | 0 | 7.9 | 38 |

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```
*************************
*                       *
*    E Q S E A R C H    *
*                       *
*     Version 3.00      *
*                       *
*************************
```

ESTIMATION OF
PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS

JOB NUMBER: 603455-001

DATE: 05-29-2012

JOB NAME: Lancaster Canadian Solar

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT

MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  5.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  34.6840
   SITE LONGITUDE:  118.3300

SEARCH DATES:
           START DATE:   1800
           END DATE:   2012

SEARCH RADIUS:
           62.1 mi
           99.9 km

ATTENUATION RELATION:  20) Sadigh et al. (1997) Horiz. - Soil
   UNCERTAINTY (M=Median, S=Sigma): M       Number of Sigmas:  0.0
   ASSUMED SOURCE TYPE:  DS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   0  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:        Campbell SHR:
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km):  0.0

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EARTHQUAKE SEARCH RESULTS

Page 1

| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| DMG | 34.5190 | 118.1980 | 08/23/1952 | 10 9 7.1 | 13.1 | 5.00 | 0.058 | VI | 13.6( 21.9) |
| DMG | 34.4110 | 118.4010 | 02/09/1971 | 14 244.0 | 8.0 | 5.80 | 0.075 | VII | 19.3( 31.0) |
| DMG | 34.4110 | 118.4010 | 02/09/1971 | 14 1 8.0 | 8.0 | 5.80 | 0.075 | VII | 19.3( 31.0) |
| DMG | 34.4110 | 118.4010 | 02/09/1971 | 141028.0 | 8.0 | 5.30 | 0.049 | VI | 19.3( 31.0) |
| DMG | 34.4110 | 118.4010 | 02/09/1971 | 14 041.8 | 8.4 | 6.40 | 0.122 | VII | 19.3( 31.0) |
| T-A | 34.8300 | 118.7500 | 11/27/1852 | 0 0 0.0 | 0.0 | 7.00 | 0.133 | VIII | 25.9( 41.6) |
| GSP | 34.3780 | 118.6180 | 01/19/1994 | 211144.9 | 11.0 | 5.10 | 0.027 | V | 26.7( 43.0) |
| DMG | 34.3080 | 118.4540 | 02/09/1971 | 144346.7 | 6.2 | 5.20 | 0.029 | V | 26.9( 43.3) |
| GSP | 34.3940 | 118.6690 | 06/26/1995 | 084028.9 | 13.0 | 5.00 | 0.024 | IV | 27.8( 44.7) |
| GSP | 34.3690 | 118.6720 | 04/26/1997 | 103730.7 | 16.0 | 5.10 | 0.024 | V | 29.2( 47.0) |
| PAS | 34.9430 | 118.7430 | 06/10/1988 | 23 643.0 | 6.8 | 5.40 | 0.031 | V | 29.5( 47.4) |
| GSB | 34.3010 | 118.5650 | 01/17/1994 | 204602.4 | 9.0 | 5.20 | 0.026 | V | 29.6( 47.7) |
| GSP | 34.3050 | 118.5790 | 01/29/1994 | 112036.0 | 1.0 | 5.10 | 0.023 | IV | 29.8( 47.9) |
| GSP | 34.3770 | 118.6980 | 01/18/1994 | 004308.9 | 11.0 | 5.20 | 0.026 | V | 29.8( 47.9) |
| GSB | 34.3790 | 118.7110 | 01/19/1994 | 210928.6 | 14.0 | 5.50 | 0.033 | V | 30.2( 48.6) |
| DMG | 34.3000 | 118.6000 | 04/04/1893 | 1940 0.0 | 0.0 | 6.00 | 0.050 | VI | 30.6( 49.3) |
| GSP | 34.2310 | 118.4750 | 03/20/1994 | 212012.3 | 13.0 | 5.30 | 0.025 | V | 32.3( 52.1) |
| GSP | 34.3260 | 118.6980 | 01/17/1994 | 233330.7 | 9.0 | 5.60 | 0.033 | V | 32.4( 52.1) |
| GSP | 34.2130 | 118.5370 | 01/17/1994 | 123055.4 | 18.0 | 6.70 | 0.077 | VII | 34.6( 55.7) |
| GSP | 34.2620 | 118.0020 | 06/28/1991 | 144354.5 | 11.0 | 5.40 | 0.025 | V | 34.6( 55.7) |
| DMG | 34.9500 | 118.8670 | 07/21/1952 | 121936.0 | 0.0 | 5.30 | 0.022 | IV | 35.5( 57.2) |
| DMG | 34.9000 | 118.9000 | 10/23/1916 | 244 0.0 | 0.0 | 6.00 | 0.041 | V | 35.6( 57.3) |
| DMG | 35.0000 | 118.8330 | 07/23/1952 | 181351.0 | 0.0 | 5.20 | 0.020 | IV | 35.9( 57.8) |
| DMG | 35.0000 | 118.8330 | 07/23/1952 | 75319.0 | 0.0 | 5.40 | 0.024 | IV | 35.9( 57.8) |
| DMG | 34.8670 | 118.9330 | 09/21/1941 | 1953 7.2 | 0.0 | 5.20 | 0.019 | IV | 36.5( 58.7) |
| DMG | 35.1500 | 118.6330 | 01/27/1954 | 141948.0 | 0.0 | 5.00 | 0.016 | IV | 36.5( 58.7) |
| T-A | 34.9200 | 118.9200 | 01/20/1857 | 0 0 0.0 | 0.0 | 5.00 | 0.016 | IV | 37.2( 59.9) |
| T-A | 34.9200 | 118.9200 | 05/23/1857 | 0 0 0.0 | 0.0 | 5.00 | 0.016 | IV | 37.2( 59.9) |
| DMG | 34.7000 | 119.0000 | 10/23/1916 | 254 0.0 | 0.0 | 5.50 | 0.024 | IV | 38.0( 61.2) |
| DMG | 34.9000 | 118.9500 | 08/01/1952 | 13 430.0 | 0.0 | 5.10 | 0.016 | IV | 38.2( 61.4) |
| DMG | 35.1830 | 118.6500 | 07/21/1952 | 151358.0 | 0.0 | 5.10 | 0.016 | IV | 38.9( 62.6) |
| GSP | 35.2100 | 118.0660 | 07/11/1992 | 181416.2 | 10.0 | 5.70 | 0.027 | V | 39.3( 63.2) |
| DMG | 35.2330 | 118.5330 | 07/21/1952 | 174244.0 | 0.0 | 5.10 | 0.016 | IV | 39.6( 63.7) |
| DMG | 35.1330 | 118.7670 | 07/21/1952 | 194122.0 | 0.0 | 5.50 | 0.023 | IV | 39.7( 63.8) |
| DMG | 34.9320 | 118.9760 | 03/01/1963 | 02557.9 | 13.9 | 5.00 | 0.014 | IV | 40.4( 65.1) |
| DMG | 34.9410 | 118.9870 | 11/15/1961 | 53855.5 | 10.7 | 5.00 | 0.013 | III | 41.3( 66.4) |
| DMG | 34.2000 | 117.9000 | 08/28/1889 | 215 0.0 | 0.0 | 5.50 | 0.021 | IV | 41.4( 66.7) |
| MGI | 34.0800 | 118.2600 | 07/16/1920 | 18 8 0.0 | 0.0 | 5.00 | 0.013 | III | 41.9( 67.4) |
| DMG | 34.9830 | 118.9830 | 05/23/1954 | 235243.0 | 0.0 | 5.10 | 0.014 | IV | 42.4( 68.2) |
| MGI | 34.1000 | 118.1000 | 07/11/1855 | 415 0.0 | 0.0 | 6.30 | 0.042 | VI | 42.4( 68.2) |
| DMG | 35.0000 | 119.0000 | 07/21/1952 | 12 531.0 | 0.0 | 6.40 | 0.044 | VI | 43.8( 70.5) |
| DMG | 35.0000 | 119.0000 | 02/16/1919 | 1557 0.0 | 0.0 | 5.00 | 0.012 | III | 43.8( 70.5) |
| PAS | 34.0730 | 118.0980 | 10/04/1987 | 105938.2 | 8.2 | 5.30 | 0.016 | IV | 44.2( 71.1) |
| DMG | 35.3110 | 118.4990 | 07/25/1952 | 1313 8.2 | 2.8 | 5.00 | 0.012 | III | 44.3( 71.3) |
| DMG | 34.3700 | 117.6500 | 12/08/1812 | 15 0 0.0 | 0.0 | 7.00 | 0.070 | VI | 44.3( 71.4) |
| DMG | 34.8000 | 119.1000 | 09/05/1883 | 1230 0.0 | 0.0 | 6.00 | 0.030 | V | 44.4( 71.5) |
| DMG | 35.0000 | 119.0170 | 01/12/1954 | 233349.0 | 0.0 | 5.90 | 0.027 | V | 44.6( 71.8) |
| DMG | 35.0000 | 119.0170 | 07/21/1952 | 115214.0 | 0.0 | 7.70 | 0.114 | VII | 44.6( 71.8) |
| DMG | 35.3170 | 118.4940 | 07/25/1952 | 19 944.6 | 5.5 | 5.70 | 0.023 | IV | 44.7( 71.9) |
| DMG | 35.3150 | 118.5160 | 07/25/1952 | 194323.7 | 11.2 | 5.70 | 0.023 | IV | 44.8( 72.1) |
| PAS | 34.0610 | 118.0790 | 10/01/1987 | 144220.0 | 9.5 | 5.90 | 0.027 | V | 45.3( 72.9) |
| DMG | 35.0000 | 119.0330 | 07/21/1952 | 12 2 0.0 | 0.0 | 5.60 | 0.020 | IV | 45.4( 73.1) |
| DMG | 35.2170 | 118.8170 | 07/23/1952 | 1317 5.0 | 0.0 | 5.70 | 0.022 | IV | 46.0( 74.0) |

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EARTHQUAKE SEARCH RESULTS

Page 2

| FILE CODE | LAT. NORTH | LONG. WEST | DATE | TIME (UTC) H M Sec | DEPTH (km) | QUAKE MAG. | SITE ACC. g | SITE MM INT. | APPROX. DISTANCE mi [km] |
|---|---|---|---|---|---|---|---|---|---|
| MGI | 34.0000 | 118.3000 | 09/03/1905 | 540 0.0 | 0.0 | 5.30 | 0.015 | IV | 47.3( 76.0) |
| DMG | 35.3330 | 118.6000 | 07/31/1952 | 12 9 9.0 | 0.0 | 5.80 | 0.023 | IV | 47.3( 76.2) |
| T-A | 34.0000 | 118.2500 | 09/23/1827 | 0 0 0.0 | 0.0 | 5.00 | 0.011 | III | 47.4( 76.3) |
| T-A | 34.0000 | 118.2500 | 03/26/1860 | 0 0 0.0 | 0.0 | 5.00 | 0.011 | III | 47.4( 76.3) |
| T-A | 34.0000 | 118.2500 | 01/10/1856 | 0 0 0.0 | 0.0 | 5.00 | 0.011 | III | 47.4( 76.3) |
| MGI | 34.0000 | 118.5000 | 11/19/1918 | 2018 0.0 | 0.0 | 5.00 | 0.011 | III | 48.2( 77.6) |
| DMG | 34.0000 | 118.5000 | 08/04/1927 | 1224 0.0 | 0.0 | 5.00 | 0.011 | III | 48.2( 77.6) |
| DMG | 35.3670 | 118.5830 | 07/23/1952 | 31923.0 | 0.0 | 5.00 | 0.010 | III | 49.3( 79.3) |
| DMG | 35.3670 | 118.5830 | 07/23/1952 | 03832.0 | 0.0 | 6.10 | 0.029 | V | 49.3( 79.3) |
| DMG | 34.3000 | 117.6000 | 07/30/1894 | 512 0.0 | 0.0 | 6.00 | 0.026 | V | 49.3( 79.3) |
| DMG | 35.3000 | 118.8000 | 12/23/1905 | 2223 0.0 | 0.0 | 5.00 | 0.010 | III | 50.2( 80.7) |
| MGI | 34.0000 | 118.0000 | 12/25/1903 | 1745 0.0 | 0.0 | 5.00 | 0.010 | III | 50.8( 81.8) |
| GSP | 35.3900 | 118.6230 | 09/29/2004 | 225454.2 | 3.0 | 5.00 | 0.010 | III | 51.5( 82.8) |
| GSP | 34.1400 | 117.7000 | 02/28/1990 | 234336.6 | 5.0 | 5.20 | 0.012 | III | 51.9( 83.6) |
| DMG | 34.2700 | 117.5400 | 09/12/1970 | 143053.0 | 8.0 | 5.40 | 0.013 | III | 53.3( 85.7) |
| DMG | 33.9500 | 118.6320 | 08/31/1930 | 04036.0 | 0.0 | 5.20 | 0.011 | III | 53.5( 86.1) |
| DMG | 34.3000 | 117.5000 | 07/22/1899 | 2032 0.0 | 0.0 | 6.50 | 0.036 | V | 54.2( 87.2) |
| GSP | 35.1490 | 119.1040 | 05/28/1993 | 044740.6 | 21.0 | 5.20 | 0.011 | III | 54.3( 87.4) |
| PAS | 33.9440 | 118.6810 | 01/01/1979 | 231438.9 | 11.3 | 5.00 | 0.009 | III | 54.9( 88.3) |
| PAS | 33.9190 | 118.6270 | 01/19/1989 | 65328.8 | 11.9 | 5.00 | 0.009 | III | 55.5( 89.3) |
| DMG | 35.3330 | 118.9170 | 08/22/1952 | 224124.0 | 0.0 | 5.80 | 0.018 | IV | 55.8( 89.7) |
| DMG | 35.3830 | 118.8500 | 07/29/1952 | 7 347.0 | 0.0 | 6.10 | 0.023 | IV | 56.5( 90.9) |
| DMG | 35.4000 | 118.8170 | 07/29/1952 | 8 146.0 | 0.0 | 5.10 | 0.009 | III | 56.6( 91.1) |
| DMG | 33.8500 | 118.2670 | 03/11/1933 | 1425 0.0 | 0.0 | 5.00 | 0.008 | III | 57.7( 92.8) |
| DMG | 34.0650 | 119.0350 | 02/21/1973 | 144557.3 | 8.0 | 5.90 | 0.018 | IV | 58.7( 94.4) |
| GSG | 33.9530 | 117.7610 | 07/29/2008 | 184215.7 | 14.0 | 5.30 | 0.010 | III | 60.0( 96.6) |
| DMG | 35.5000 | 118.7000 | 01/06/1905 | 1430 0.0 | 0.0 | 5.00 | 0.008 | II | 60.1( 96.7) |
| DMG | 34.0000 | 119.0000 | 09/24/1827 | 4 0 0.0 | 0.0 | 7.00 | 0.046 | VI | 60.7( 97.7) |
| MGI | 34.0000 | 119.0000 | 12/14/1912 | 0 0 0.0 | 0.0 | 5.70 | 0.015 | IV | 60.7( 97.7) |

-END OF SEARCH- 82 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2012

LENGTH OF SEARCH TIME: 213 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 13.6 MILES (21.9 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.7

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.133 g

COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 1.230
b-value= 0.374
beta-value= 0.862

TABLE OF MAGNITUDES AND EXCEEDANCES:

| Earthquake Magnitude | Number of Times Exceeded | Cumulative No. / Year |
|---|---|---|
| 4.0 | 82 | 0.38679 |
| 4.5 | 82 | 0.38679 |
| 5.0 | 82 | 0.38679 |
| 5.5 | 33 | 0.15566 |
| 6.0 | 15 | 0.07075 |
| 6.5 | 6 | 0.02830 |
| 7.0 | 4 | 0.01887 |
| 7.5 | 1 | 0.00472 |

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# *APPENDIX E*

## *EARTHWORK AND GRADING GUIDE SPECIFICATIONS*

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# APPENDIX E

# LEIGHTON CONSULTING, INC.
# EARTHWORK AND GRADING GUIDE SPECIFICATIONS

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# E-1.0 GENERAL

## E-1.1 Intent

These Earthwork and Grading Guide Specifications are for grading and earthwork shown on the current, approved grading plan(s) and/or indicated in the Leighton Consulting, Inc. geotechnical report(s). These Guide Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the project-specific recommendations in the geotechnical report shall supersede these Guide Specifications. Leighton Consulting, Inc. shall provide geotechnical observation and testing during earthwork and grading. Based on these observations and tests, Leighton Consulting, Inc. may provide new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

## E-1.2 Role of Leighton Consulting, Inc.

Prior to commencement of earthwork and grading, Leighton Consulting, Inc. shall meet with the earthwork contractor to review the earthwork contractor's work plan, to schedule sufficient personnel to perform the appropriate level of observation, mapping and compaction testing. During earthwork and grading, Leighton Consulting, Inc. shall observe, map, and document subsurface exposures to verify geotechnical design assumptions. If observed conditions are found to be significantly different than the interpreted assumptions during the design phase, Leighton Consulting, Inc. shall inform the owner, recommend appropriate changes in design to accommodate these observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include (1) natural ground after clearing to receiving fill but before fill is placed, (2) bottoms of all "remedial removal" areas, (3) all key bottoms, and (4) benches made on sloping ground to receive fill.

Leighton Consulting, Inc. shall observe moisture-conditioning and processing of the subgrade and fill materials, and perform relative compaction testing of fill to determine the attained relative compaction. Leighton Consulting, Inc. shall provide *Daily Field Reports* to the owner and the Contractor on a routine and frequent basis.

## E-1.3 The Earthwork Contractor

The earthwork contractor (Contractor) shall be qualified, experienced and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Guide Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing grading and backfilling in accordance with the current, approved plans and specifications.

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The Contractor shall inform the owner and Leighton Consulting, Inc. of changes in work schedules at least one working day in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that Leighton Consulting, Inc. is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish earthwork and grading in accordance with the applicable grading codes and agency ordinances, these Guide Specifications, and recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of Leighton Consulting, Inc., unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, Leighton Consulting, Inc. shall reject the work and may recommend to the owner that earthwork and grading be stopped until unsatisfactory condition(s) are rectified.

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## E-2.0 PREPARATION OF AREAS TO BE FILLED

### E-2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies and Leighton Consulting, Inc. Care should be taken not to encroach upon or otherwise damage native and/or historic trees designated by the Owner or appropriate agencies to remain. Pavements, flatwork or other construction should not extend under the “drip line” of designated trees to remain.

Leighton Consulting, Inc. shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 3 percent of organic materials (by dry weight: ASTM D 2974). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area. As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

### E-2.2 Processing

Existing ground that has been declared satisfactory for support of fill, by Leighton Consulting, Inc., shall be scarified to a minimum depth of 6 inches (15 cm). Existing ground that is not satisfactory shall be overexcavated as specified in the following Section E-2.3. Scarification

shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

### E-2.3 Overexcavation

In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by Leighton Consulting, Inc. during grading. All undocumented fill soils under proposed structure footprints should be excavated

### E-2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), (>20 percent grade) the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet (4.5 m) wide and at least 2 feet (0.6 m) deep, into competent material as evaluated by Leighton Consulting, Inc. Other benches shall be excavated a minimum height of 4 feet (1.2 m) into competent material or as otherwise recommended by Leighton Consulting, Inc. Fill placed on ground sloping flatter than 5:1 (horizontal to vertical units), (<20 percent grade) shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

### E-2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by Leighton Consulting, Inc. as suitable to receive fill. The Contractor shall obtain a written acceptance (*Daily Field Report*) from Leighton Consulting, Inc. prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

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## E-3.0 FILL MATERIAL

### E-3.1 Fill Quality

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by Leighton Consulting, Inc. prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to Leighton Consulting, Inc. or mixed with other soils to achieve satisfactory fill material.

### E-3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 6 inches (15 cm), shall not be buried or placed in fill unless location, materials and

placement methods are specifically accepted by Leighton Consulting, Inc. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet (3 m) measured vertically from finish grade, or within 2 feet (0.61 m) of future utilities or underground construction.

### E-3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section E-3.1, and be free of hazardous materials ("contaminants") and rock larger than 3-inches (8 cm) in largest dimension. All import soils shall have an Expansion Index (EI) of 20 or less and a sulfate content no greater than (≤) 500 parts-per-million (ppm). A representative sample of a potential import source shall be given to Leighton Consulting, Inc. at least four full working days before importing begins, so that suitability of this import material can be determined and appropriate tests performed.

## E-4.0 FILL PLACEMENT AND COMPACTION

### E-4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill, as described in Section E-2.0, above, in near-horizontal layers not exceeding 8 inches (20 cm) in loose thickness. Leighton Consulting, Inc. may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers, and only if the building officials with the appropriate jurisdiction approve. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

### E-4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM) Test Method D 1557.

### E-4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density as determined by ASTM Test Method D 1557. For fills thicker than 15 feet (4.5 m), the portion of the fill deeper than 15 feet below proposed finish grade shall be compacted to 95 percent of the ASTM D 1557 laboratory maximum density. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

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### E-4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet (1 to 1.2 m) in fill elevation, or by other methods producing satisfactory results acceptable to Leighton Consulting, Inc. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of the ASTM D 1557 laboratory maximum density.

### E-4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by Leighton Consulting, Inc. Location and frequency of tests shall be at our field representative(s) discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

### E-4.6 Compaction Test Locations

Leighton Consulting, Inc. shall document the approximate elevation and horizontal coordinates of each density test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that Leighton Consulting, Inc. can determine the test locations with sufficient accuracy. Adequate grade stakes shall be provided.

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## E-5.0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by Leighton Consulting, Inc. during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by Leighton Consulting, Inc. based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by Leighton Consulting, Inc. prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by Leighton Consulting, Inc.

## E-6.0 TRENCH BACKFILLS

### E-6.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations. Work should be performed in accordance with Article 6 of the *California Construction Safety Orders*, latest edition (see also: http://www.dir.ca.gov/title8/sb4a6.html ).

### E-6.2 Bedding and Backfill

All utility trench bedding and backfill shall be performed in accordance with applicable provisions of the latest edition of the *Standard Specifications for Public Works Construction*

(Green Book). Bedding material shall have a Sand Equivalent greater than 30 (SE>30). Bedding shall be placed to 1-foot (0.3 m) over the top of the conduit, and densified by jetting in areas of granular soils, if allowed by the permitting agency. Otherwise, the pipe bedding zone should be backfilled with Controlled Low Strength Material (CLSM) consisting of at least one sack of Portland cement per cubic-yard of sand, and conforming to Section 201-6 of the 2009 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Backfill over the bedding zone shall be placed and densified mechanically to a minimum of 90 percent of relative compaction (ASTM D 1557) from 1 foot (0.3 m) above the top of the conduit to the surface. Backfill above the pipe zone shall **not** be jetted. Jetting of the bedding around the conduits shall be observed by Leighton Consulting, Inc. and backfill above the pipe zone (bedding) shall be observed and tested by Leighton Consulting, Inc.

### E-6.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to Leighton Consulting, Inc. that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method, and only if the building officials with the appropriate jurisdiction approve.

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# Appendix C

## Treatment Control BMP Sizing Calculations and Design Details

**Area A**

| | | | | | |
|---|---|---|---|---|---|
| Existing Area = | 158.6 | ac | 50 Yr Existing Runoff Volume = | 386,377 | cf |
| Proposed Area = | 158.6 | ac | 50 Yr Proposed Runoff Volume = | 576,734 | cf |
| *Effective Area = | 96 | ac | Δ Runoff Volume = | 190,357 | cf |

*Area within Area A to be disturbed for construction (access roads, substation, water tank, solar panels and ancillary equipment)

Effective Area is approximately 60.5% of Total Area A.
0.605 X 190,357cf = 115,166 cf therefore,
Effective Δ Runoff Volume = 115,166 cf

Impervious Area in Area A = 0.10 X 96.0 = 9.6 ac

**Area B**

| | | | | | |
|---|---|---|---|---|---|
| Existing Area = | 76.4 | ac | 50 Yr Existing Runoff Volume = | 158,558 | cf |
| Proposed Area = | 76.4 | ac | 50 Yr Proposed Runoff Volume = | 236,966 | cf |
| *Effective Area = | 76.4 | ac | Δ Runoff Volume = | 78,408 | cf |

*Area within Area B to be disturbed for construction (access roads, water tank, solar panels and ancillary equipment)

Effective Area is 100% of Total Area B.
1 X 78,408cf = 78,408 cf therefore,
Effective Δ Runoff Volume = 78,408 cf

Impervious Area in Area B = 0.10 X 76.4 = 7.6 ac

**Area C**

| | | | |
|---|---|---|---|
| Existing Area = | 20.5 ac | 50 Yr Existing Runoff Volume = | 42,253 cf |
| Proposed Area = | 20.5 ac | 50 Yr Proposed Runoff Volume = | 63,598 cf |
| *Effective Area = | 20.5 ac | Δ Runoff Volume = | 21,345 cf |

*Area within Area C to be disturbed for construction (access roads, solar panels and ancillary equipment)

Effective Area is 100% of Total Area C.
1 X 21,345cf = 21,345 cf therefore,
Effective Δ Runoff Volume = 21,345 cf

Impervious Area in Area A = 0.10 X 20.5 = 2.1 ac

**Area D**

| | | | |
|---|---|---|---|
| Existing Area = | 11.7 ac | 50 Yr Existing Runoff Volume = | 24,394 cf |
| Proposed Area = | 11.7 ac | 50 Yr Proposed Runoff Volume = | 37,026 cf |
| *Effective Area = | 11.7 ac | Δ Runoff Volume = | 12,632 cf |

*Area within Area D to be disturbed for construction (access roads, solar panels and ancillary equipment)

Effective Area is approximately 10% of Total Area D.
0.1 X 12,632cf = 1,263 cf therefore,
Effective Δ Runoff Volume = 1,263 cf

Impervious Area in Area D = 0.10 X 1.17 ac = 0.12

Note: 50 Yr Runoff Volumes for existing and proposed conditions were calculated using the Los Angeles County Tc calculator and can be found in the Project Drainage Report.

Effective Impervious Areas
Area A = 9.6 ac
Area B = 7.6 ac
Area C = 2.1 ac
Area D = 0.12 ac
Impervious Area Total = 19.4 ac

Effective Area Total = 194 ac
Effective Impervious % =
19.4/194 = 0.10 = 10%

Overall Impervious % = 19.4/267.1 = 0.073 = 7.3%*
*Includes pervious undisturbed areas within property in overall area.

ΔVd = Effective Δ Runoff Volume
Vt = Required Treatment Volume
Vi = Infiltration Trench Volume

**Area A**

96.00 Acres ΔVd = 115,166 cu.ft.

$$\frac{\Delta Vd}{\text{Area (Ac)}} = \frac{115{,}166 \text{ cu.ft.}}{96.00 \text{ Ac}} = 1{,}199.65 \text{ cu.ft./Ac}$$

(Therefore, 5 trenches per acre)

Typical block must treat:

Vt = 7.54 acre block x 1199.65 cu.ft./acre = 9,045.33 cu.ft.

Trench Storage:

Bottom = 8 ft.x 15 ft.
Top = 16 ft. x 23 ft.
Depth = 1 ft.
Slope = 1:4
Storage = 244 cu.ft. Vi

# Trenches required per 7.54 ac block:

$$\frac{Vt}{Vi} = 37.07$$

**37 Trenches per block**
**9 blocks = 333 trenches in Area A**

**Area B**

76.40 Acres ΔVd = 78,408 cu.ft.

$$\frac{\Delta Vd}{\text{Area (Ac)}} = \frac{78{,}408 \text{ cu.ft.}}{76.40 \text{ Ac}} = 1{,}026.28 \text{ cu.ft./Ac}$$

(Therefore, 5 trenches per acre)

Typical block must treat:

Vt = 7.54 acre block x 1026.28 cu.ft./acre = 7,738.17 cu.ft.

Trench Storage:

Bottom = 8 ft.x 15 ft.
Top = 16 ft. x 23 ft.
Depth = 1 ft.
Slope = 1:4
Storage = 244 cu.ft. Vi

# Trenches required per 7.54 ac block:

$$\frac{Vt}{Vi} = 31.71$$

**32 Trenches per block**
**9 blocks = 288 trenches in Area B**

**Area C**

20.50 Acres ΔVd = 21,344 cu.ft.

$$\frac{\Delta Vd}{\text{Area (Ac)}} = \frac{21{,}344 \text{ cu.ft.}}{20.50 \text{ Ac}} = 1{,}041.17 \text{ cu.ft./Ac}$$

(Therefore, 5 trenches per acre)

Typical block must treat:

Vt = 7.54 acre block x 1041.17 cu.ft./acre = 7,850.43 cu.ft.

Trench Storage:

Bottom = 8 ft.x 15 ft.
Top = 16 ft. x 23 ft.
Depth = 1 ft.
Slope = 1:4
Storage = 244 cu.ft. Vi

# Trenches required per 7.54 ac block:

$$\frac{Vt}{Vi} = 32.17$$

**33 Trenches per block**
**2 blocks = 66 trenches in Area C**

**Area D**

1.17 Acres ΔVd = 1,263 cu.ft.

$$\frac{\Delta Vd}{\text{Area (Ac)}} = \frac{1{,}263 \text{ cu.ft.}}{1.17 \text{ Ac}} = 1{,}079.66 \text{ cu.ft./Ac}$$

(Therefore, 5 trenches per acre)

Typical block must treat:

Vt = 7.54 acre block x 1,079.66 cu.ft./acre = 8,140.62 cu.ft.

Trench Storage:

Bottom = 8 ft.x 15 ft.
Top = 16 ft. x 23 ft.
Depth = 1 ft.
Slope = 1:4
Storage = 244 cu.ft. Vi

Assume ONLY 10% of a typical block requires treatment within this effective area.

# Trenches required per 7.54 ac block:

$$\frac{Vt}{Vi} = 33.36 \text{ * X 10\% =}$$

**3.34 Trenches for Area D**

use **6 Trenches in Area D (Conservative Value)**

*Note: Tributary Area D is 11.70 acres; however, only approx. 1.17 acre will be disturbed and there is only 10% of a typical block within that area for project development; therefore, for this area 6 trenches per acre will be installed. Flows from the remaining 10.53 acres will not be conveyed through undisturbed areas of the site therefore, do not require treatement.

**Verification of Infiltration Draw-down**

I = Infiltration rate* d = depth
SF = Safety Factor t = draw down time
If = Final Infiltration Rate

$$If = \frac{I}{SF} = \frac{1.5}{3} \text{ in./hr} = 0.50 \text{ in./hr}$$

d = 12 inches

$$t = (d)(If) = (12 \text{ in.})(0.5 \text{ in./hr}) = 24 \text{ hours}$$

*Note: Infiltration Rate (I) determined from Double-Ring Infiltrometer Test.
See "Geotechnical Investigation, Proposed 20-MWAC Photovoltaic Array";
By Leighton Consulting, Inc; Dated June 21,2012.

**WEST ANTELOPE SOLAR PROJECT**
**EXISTING CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Peak Flow Rate (cfs) | Total Volume (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3/4" STORM** | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.02 | - | 134 | 2,285 | 0.0136 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.57 | 0.19 | 8,276 | 3.6 | 50,965 |
| A2 | 522,233 | 12.0 | 0.02 | - | 134 | 948 | 0.0200 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.27 | 0.09 | 3,920 | | |
| A3 | 715,877 | 16.4 | 0.02 | - | 134 | 1,617 | 0.0192 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.37 | 0.12 | 5,227 | | |
| A4 | 517,947 | 11.9 | 0.02 | - | 134 | 919 | 0.0163 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.27 | 0.09 | 3,920 | | |
| A5 | 392,335 | 9.0 | 0.02 | - | 134 | 988 | 0.0243 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.21 | 0.07 | 3,049 | | |
| A6 | 1,134,501 | 26.0 | 0.02 | - | 134 | 1,365 | 0.0212 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.59 | 0.19 | 8,276 | | |
| A7 | 475,310 | 10.9 | 0.02 | - | 134 | 463 | 0.0130 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.25 | 0.08 | 3,485 | | |
| A8 | 1,004,776 | 23.1 | 0.02 | - | 134 | 1,467 | 0.0136 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.53 | 0.17 | 7,405 | | |
| A9 | 440,838 | 10.1 | 0.02 | - | 134 | 1,136 | 0.0238 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.23 | 0.07 | 3,049 | | |
| A10 | 606,228 | 13.9 | 0.02 | - | 134 | 945 | 0.0169 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.32 | 0.10 | 4,356 | | |
| **Area B** | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.02 | - | 134 | 1,526 | 0.0203 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.53 | 0.17 | 7,405 | 1.8 | 24,394 |
| B2 | 493,197 | 11.3 | 0.02 | - | 134 | 1,590 | 0.0113 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.26 | 0.08 | 3,485 | | |
| B3 | 641,930 | 14.7 | 0.02 | - | 134 | 1,378 | 0.0189 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.34 | 0.11 | 4,792 | | |
| B4 | 427,115 | 9.8 | 0.02 | - | 134 | 1,382 | 0.0130 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.22 | 0.07 | 3,049 | | |
| B5 | 756,357 | 17.4 | 0.02 | - | 131 | 2,066 | 0.0155 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.40 | 0.13 | 5,663 | | |
| **Area C** | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.02 | - | 128 | 1,445 | 0.0159 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.47 | 0.15 | 6,534 | 0.5 | 6,534 |
| **Area D** | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.02 | - | 127 | 1,194 | 0.0151 | 0.75 | 30 | 0.19 | 0.10 | 0.12 | 0.27 | 0.09 | 3,920 | 0.3 | 3,920 |

**WEST ANTELOPE SOLAR PROJECT**
**PROPOSED CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | ΔFlowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Volume (cf) | ΔVolume (cf) | Total ΔVolume (cf) | Peak Flow Rate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3/4-INCH STORM** | | | | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.10 | - | 134 | 2,285 | 0.0136 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.86 | 0.29 | 0.28 | 12,197 | 76,230 | 3,920 | 25,265 | 5.4 |
| A2 | 522,233 | 12.0 | 0.10 | - | 134 | 948 | 0.0200 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.41 | 0.14 | 0.13 | 5,663 | | 1,742 | | |
| A3 | 715,877 | 16.4 | 0.10 | - | 134 | 1,617 | 0.0192 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.56 | 0.19 | 0.18 | 7,841 | | 2,614 | | |
| A4 | 517,947 | 11.9 | 0.10 | - | 134 | 919 | 0.0163 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.41 | 0.14 | 0.13 | 5,663 | | 1,742 | | |
| A5 | 392,335 | 9.0 | 0.10 | - | 134 | 988 | 0.0243 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.31 | 0.10 | 0.10 | 4,356 | | 1,307 | | |
| A6 | 1,134,501 | 26.0 | 0.10 | - | 134 | 1,365 | 0.0212 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.89 | 0.30 | 0.29 | 12,632 | | 4,356 | | |
| A7 | 475,310 | 10.9 | 0.10 | - | 134 | 463 | 0.0130 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.37 | 0.12 | 0.12 | 5,227 | | 1,742 | | |
| A8 | 1,004,776 | 23.1 | 0.10 | - | 134 | 1,467 | 0.0136 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.79 | 0.26 | 0.26 | 11,326 | | 3,920 | | |
| A9 | 440,838 | 10.1 | 0.10 | - | 134 | 1,136 | 0.0238 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.35 | 0.12 | 0.11 | 4,792 | | 1,742 | | |
| A10 | 606,228 | 13.9 | 0.10 | - | 134 | 945 | 0.0169 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.48 | 0.16 | 0.15 | 6,534 | | 2,178 | | |
| **Area B** | | | | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.10 | - | 134 | 1,526 | 0.0203 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.79 | 0.26 | 0.26 | 11,326 | 37,026 | 3,920 | 12,632 | 2.6 |
| B2 | 493,197 | 11.3 | 0.10 | - | 134 | 1,590 | 0.0113 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.39 | 0.13 | 0.13 | 5,663 | | 2,178 | | |
| B3 | 641,930 | 14.7 | 0.10 | - | 134 | 1,378 | 0.0189 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.50 | 0.16 | 0.16 | 6,970 | | 2,178 | | |
| B4 | 427,115 | 9.8 | 0.10 | - | 134 | 1,382 | 0.0130 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.34 | 0.12 | 0.11 | 4,792 | | 1,742 | | |
| B5 | 756,357 | 17.4 | 0.10 | - | 131 | 2,066 | 0.0155 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.59 | 0.19 | 0.19 | 8,276 | | 2,614 | | |
| **Area C** | | | | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.10 | - | 128 | 1,445 | 0.0159 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.70 | 0.23 | 0.23 | 10,019 | 10,019 | 3,485 | 3,485 | 0.7 |
| **Area D** | | | | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.10 | - | 127 | 1,194 | 0.0151 | 0.75 | 30 | 0.19 | 0.10 | 0.18 | 0.40 | 0.13 | 0.13 | 5,663 | 5,663 | 1,742 | 1,742 | 0.4 |

**WEST ANTELOPE SOLAR PROJECT**
**EXISTING CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Peak Flow Rate (cfs) | Total Volume (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **85TH PERCENTILE STORM** | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.02 | - | 134 | 2,285 | 0.0136 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.69 | 0.22 | 9,583 | 4.4 | 61,855 |
| A2 | 522,233 | 12.0 | 0.02 | - | 134 | 948 | 0.0200 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.33 | 0.11 | 4,792 | | |
| A3 | 715,877 | 16.4 | 0.02 | - | 134 | 1,617 | 0.0192 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.45 | 0.15 | 6,534 | | |
| A4 | 517,947 | 11.9 | 0.02 | - | 134 | 919 | 0.0163 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.33 | 0.11 | 4,792 | | |
| A5 | 392,335 | 9.0 | 0.02 | - | 134 | 988 | 0.0243 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.25 | 0.08 | 3,485 | | |
| A6 | 1,134,501 | 26.0 | 0.02 | - | 134 | 1,365 | 0.0212 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.72 | 0.23 | 10,019 | | |
| A7 | 475,310 | 10.9 | 0.02 | - | 134 | 463 | 0.0130 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.30 | 0.10 | 4,356 | | |
| A8 | 1,004,776 | 23.1 | 0.02 | - | 134 | 1,467 | 0.0136 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.64 | 0.21 | 9,148 | | |
| A9 | 440,838 | 10.1 | 0.02 | - | 134 | 1,136 | 0.0238 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.28 | 0.09 | 3,920 | | |
| A10 | 606,228 | 13.9 | 0.02 | - | 134 | 945 | 0.0169 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.38 | 0.12 | 5,227 | | |
| **Area B** | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.02 | - | 134 | 1,526 | 0.0203 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.64 | 0.21 | 9,148 | 2.1 | 29,621 |
| B2 | 493,197 | 11.3 | 0.02 | - | 134 | 1,590 | 0.0113 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.31 | 0.10 | 4,356 | | |
| B3 | 641,930 | 14.7 | 0.02 | - | 134 | 1,378 | 0.0189 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.41 | 0.13 | 5,663 | | |
| B4 | 427,115 | 9.8 | 0.02 | - | 134 | 1,382 | 0.0130 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.27 | 0.09 | 3,920 | | |
| B5 | 756,357 | 17.4 | 0.02 | - | 131 | 2,066 | 0.0155 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.48 | 0.15 | 6,534 | | |
| **Area C** | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.02 | - | 128 | 1,445 | 0.0159 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.57 | 0.18 | 7,841 | 0.6 | 7,841 |
| **Area D** | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.02 | - | 127 | 1,194 | 0.0151 | 0.9 | 30 | 0.23 | 0.10 | 0.12 | 0.32 | 0.10 | 4,356 | 0.3 | 4,356 |

**WEST ANTELOPE SOLAR PROJECT**
**PROPOSED CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | ΔFlowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Volume (cf) | ΔVolume (cf) | Total ΔVolume (cf) | Peak Flow Rate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **85TH PERCENTILE STORM** | | | | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.10 | - | 134 | 2,285 | 0.0136 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 1.04 | 0.35 | 0.33 | 14,375 | 92,347 | 4,792 | 30,492 | 6.6 |
| A2 | 522,233 | 12.0 | 0.10 | - | 134 | 948 | 0.0200 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.50 | 0.17 | 0.16 | 6,970 | | 2,178 | | |
| A3 | 715,877 | 16.4 | 0.10 | - | 134 | 1,617 | 0.0192 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.68 | 0.23 | 0.22 | 9,583 | | 3,049 | | |
| A4 | 517,947 | 11.9 | 0.10 | - | 134 | 919 | 0.0163 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.49 | 0.16 | 0.16 | 6,970 | | 2,178 | | |
| A5 | 392,335 | 9.0 | 0.10 | - | 134 | 988 | 0.0243 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.37 | 0.12 | 0.12 | 5,227 | | 1,742 | | |
| A6 | 1,134,501 | 26.0 | 0.10 | - | 134 | 1,365 | 0.0212 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 1.08 | 0.36 | 0.35 | 15,246 | | 5,227 | | |
| A7 | 475,310 | 10.9 | 0.10 | - | 134 | 463 | 0.0130 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.45 | 0.15 | 0.15 | 6,534 | | 2,178 | | |
| A8 | 1,004,776 | 23.1 | 0.10 | - | 134 | 1,467 | 0.0136 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.96 | 0.32 | 0.31 | 13,504 | | 4,356 | | |
| A9 | 440,838 | 10.1 | 0.10 | - | 134 | 1,136 | 0.0238 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.42 | 0.14 | 0.13 | 5,663 | | 1,742 | | |
| A10 | 606,228 | 13.9 | 0.10 | - | 134 | 945 | 0.0169 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.58 | 0.20 | 0.19 | 8,276 | | 3,049 | | |
| **Area B** | | | | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.10 | - | 134 | 1,526 | 0.0203 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.96 | 0.32 | 0.31 | 13,504 | 44,431 | 4,356 | 14,810 | 3.2 |
| B2 | 493,197 | 11.3 | 0.10 | - | 134 | 1,590 | 0.0113 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.47 | 0.16 | 0.15 | 6,534 | | 2,178 | | |
| B3 | 641,930 | 14.7 | 0.10 | - | 134 | 1,378 | 0.0189 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.61 | 0.20 | 0.20 | 8,712 | | 3,049 | | |
| B4 | 427,115 | 9.8 | 0.10 | - | 134 | 1,382 | 0.0130 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.41 | 0.14 | 0.13 | 5,663 | | 1,742 | | |
| B5 | 756,357 | 17.4 | 0.10 | - | 131 | 2,066 | 0.0155 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.72 | 0.24 | 0.23 | 10,019 | | 3,485 | | |
| **Area C** | | | | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.10 | - | 128 | 1,445 | 0.0159 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.85 | 0.28 | 0.27 | 11,761 | 11,761 | 3,920 | 3,920 | 0.9 |
| **Area D** | | | | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.10 | - | 127 | 1,194 | 0.0151 | 0.90 | 30 | 0.23 | 0.10 | 0.18 | 0.48 | 0.16 | 0.15 | 6,534 | 6,534 | 2,178 | 2,178 | 0.5 |

**WEST ANTELOPE SOLAR PROJECT**
**EXISTING CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | Volume (acre-ft) | Volume (cf) | Peak Flow Rate (cfs) | Total Volume (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **50 YEAR STORM** | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.02 | 50 | 134 | 2,285 | 0.0136 | 5.4 | 30 | 1.39 | 0.16 | 0.17 | 5.94 | 1.38 | 60,113 | 46.8 | 386,377 |
| A2 | 522,233 | 12.0 | 0.02 | 50 | 134 | 948 | 0.0200 | 5.7 | 22 | 1.69 | 0.25 | 0.26 | 5.27 | 0.73 | 31,799 | | |
| A3 | 715,877 | 16.4 | 0.02 | 50 | 134 | 1,617 | 0.0192 | 5.4 | 30 | 1.39 | 0.16 | 0.17 | 3.88 | 0.90 | 39,204 | | |
| A4 | 517,947 | 11.9 | 0.02 | 50 | 134 | 919 | 0.0163 | 5.1 | 30 | 1.34 | 0.14 | 0.16 | 2.55 | 0.62 | 27,007 | | |
| A5 | 392,335 | 9.0 | 0.02 | 50 | 134 | 988 | 0.0243 | 5.8 | 21 | 1.76 | 0.27 | 0.28 | 4.44 | 0.56 | 24,394 | | |
| A6 | 1,134,501 | 26.0 | 0.02 | 50 | 134 | 1,365 | 0.0212 | 5.6 | 30 | 1.44 | 0.17 | 0.18 | 6.75 | 1.49 | 64,904 | | |
| A7 | 475,310 | 10.9 | 0.02 | 50 | 134 | 463 | 0.0130 | 5.4 | 13 | 2.06 | 0.32 | 0.33 | 7.42 | 0.66 | 28,750 | | |
| A8 | 1,004,776 | 23.1 | 0.02 | 50 | 134 | 1,467 | 0.0136 | 5.2 | 30 | 1.34 | 0.14 | 0.16 | 4.95 | 1.21 | 52,708 | | |
| A9 | 440,838 | 10.1 | 0.02 | 50 | 134 | 1,136 | 0.0238 | 5.5 | 30 | 1.41 | 0.16 | 0.17 | 2.43 | 0.57 | 24,829 | | |
| A10 | 606,228 | 13.9 | 0.02 | 50 | 134 | 945 | 0.0169 | 5.3 | 30 | 1.36 | 0.15 | 0.17 | 3.22 | 0.75 | 32,670 | | |
| **Area B** | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.02 | 50 | 134 | 1,526 | 0.0203 | 4.9 | 30 | 1.26 | 0.12 | 0.14 | 4.10 | 1.13 | 49,223 | 12.3 | 158,558 |
| B2 | 493,197 | 11.3 | 0.02 | 50 | 134 | 1,590 | 0.0113 | 4.7 | 30 | 1.21 | 0.10 | 0.12 | 1.64 | 0.53 | 23,087 | | |
| B3 | 641,930 | 14.7 | 0.02 | 50 | 134 | 1,378 | 0.0189 | 4.9 | 30 | 1.26 | 0.12 | 0.14 | 2.60 | 0.72 | 31,363 | | |
| B4 | 427,115 | 9.8 | 0.02 | 50 | 134 | 1,382 | 0.0130 | 4.7 | 30 | 1.21 | 0.10 | 0.12 | 1.42 | 0.45 | 19,602 | | |
| B5 | 756,357 | 17.4 | 0.02 | 50 | 131 | 2,066 | 0.0155 | 4.7 | 30 | 1.21 | 0.10 | 0.12 | 2.52 | 0.81 | 35,284 | | |
| **Area C** | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.02 | 50 | 128 | 1,445 | 0.0159 | 4.8 | 30 | 1.23 | 0.10 | 0.12 | 3.03 | 0.97 | 42,253 | 3.0 | 42,253 |
| **Area D** | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.02 | 50 | 127 | 1,194 | 0.0151 | 4.9 | 30 | 1.26 | 0.10 | 0.12 | 1.76 | 0.56 | 24,394 | 1.8 | 24,394 |

**WEST ANTELOPE SOLAR PROJECT**
**PROPOSED CONDITIONS**
**TC CALCULATOR RESULTS**

| Sub Area | Area (sq. ft) | Area (ac.) | % IMP | Frequency | Soil Type | Length (ft) | Slope (ft/ft) | Isohyet (in.) | Tc (min.) | Intensity (in./hr) | Cu | Cd | Flowrate (cfs) | ΔFlowrate (cfs) | Volume (acre-ft) | Volume (cf) | Total Volume (cf) | ΔVolume (cf) | Total ΔVolume (cf) | Peak Flow Rate (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **50 YEAR STORM** | | | | | | | | | | | | | | | | | | | | |
| **Area A** | | | | | | | | | | | | | | | | | | | | |
| A1 | 1,095,287 | 25.1 | 0.10 | 50 | 134 | 2,285 | 0.0136 | 5.4 | 30 | 1.39 | 0.16 | 0.23 | 8.04 | 2.10 | 2.05 | 89,298 | 576,734 | 29,185 | 190,357 | 68.2 |
| A2 | 522,233 | 12.0 | 0.10 | 50 | 134 | 948 | 0.0200 | 5.7 | 18 | 1.86 | 0.28 | 0.34 | 7.58 | 2.31 | 1.09 | 47,480 | | 15,682 | | |
| A3 | 715,877 | 16.4 | 0.10 | 50 | 134 | 1,617 | 0.0192 | 5.4 | 30 | 1.39 | 0.16 | 0.23 | 5.25 | 1.37 | 1.34 | 58,370 | | 19,166 | | |
| A4 | 517,947 | 11.9 | 0.10 | 50 | 134 | 919 | 0.0163 | 5.2 | 25 | 1.46 | 0.18 | 0.25 | 4.34 | 1.79 | 0.94 | 40,946 | | 13,939 | | |
| A5 | 392,335 | 9.0 | 0.10 | 50 | 134 | 988 | 0.0243 | 5.8 | 17 | 1.95 | 0.30 | 0.36 | 6.32 | 1.88 | 0.84 | 36,590 | | 12,197 | | |
| A6 | 1,134,501 | 26.0 | 0.10 | 50 | 134 | 1,365 | 0.0212 | 5.6 | 28 | 1.49 | 0.19 | 0.26 | 10.09 | 3.34 | 2.23 | 97,139 | | 32,234 | | |
| A7 | 475,310 | 10.9 | 0.10 | 50 | 134 | 463 | 0.0130 | 5.4 | 12 | 2.13 | 0.33 | 0.39 | 9.06 | 1.64 | 0.95 | 41,382 | | 12,632 | | |
| A8 | 1,004,776 | 23.1 | 0.10 | 50 | 134 | 1,467 | 0.0136 | 5.2 | 30 | 1.34 | 0.14 | 0.22 | 6.80 | 1.85 | 1.80 | 78,408 | | 25,700 | | |
| A9 | 440,838 | 10.1 | 0.10 | 50 | 134 | 1,136 | 0.0238 | 5.5 | 22 | 1.64 | 0.23 | 0.30 | 4.98 | 2.55 | 0.86 | 37,462 | | 12,632 | | |
| A10 | 606,228 | 13.9 | 0.10 | 50 | 134 | 945 | 0.0169 | 5.3 | 23 | 1.54 | 0.20 | 0.27 | 5.79 | 2.57 | 1.14 | 49,658 | | 16,988 | | |
| **Area B** | | | | | | | | | | | | | | | | | | | | |
| B1 | 1,011,362 | 23.2 | 0.10 | 50 | 134 | 1,526 | 0.0203 | 4.9 | 30 | 1.26 | 0.12 | 0.20 | 5.85 | 1.75 | 1.69 | 73,616 | 236,966 | 24,394 | 78,408 | 18.0 |
| B2 | 493,197 | 11.3 | 0.10 | 50 | 134 | 1,590 | 0.0113 | 4.7 | 30 | 1.21 | 0.10 | 0.18 | 2.47 | 0.83 | 0.79 | 34,412 | | 11,326 | | |
| B3 | 641,930 | 14.7 | 0.10 | 50 | 134 | 1,378 | 0.0189 | 4.9 | 30 | 1.26 | 0.12 | 0.20 | 3.71 | 1.11 | 1.07 | 46,609 | | 15,246 | | |
| B4 | 427,115 | 9.8 | 0.10 | 50 | 134 | 1,382 | 0.0130 | 4.7 | 30 | 1.21 | 0.10 | 0.18 | 2.14 | 0.72 | 0.68 | 29,621 | | 10,019 | | |
| B5 | 756,357 | 17.4 | 0.10 | 50 | 131 | 2,066 | 0.0155 | 4.7 | 30 | 1.21 | 0.10 | 0.18 | 3.78 | 1.26 | 1.21 | 52,708 | | 17,424 | | |
| **Area C** | | | | | | | | | | | | | | | | | | | | |
| C1 | 893,828 | 20.5 | 0.10 | 50 | 128 | 1,445 | 0.0159 | 4.8 | 30 | 1.23 | 0.10 | 0.18 | 4.54 | 1.51 | 1.46 | 63,598 | 63,598 | 21,344 | 21,344 | 4.5 |
| **Area D** | | | | | | | | | | | | | | | | | | | | |
| D1 | 508,393 | 11.7 | 0.10 | 50 | 127 | 1,194 | 0.0151 | 4.9 | 30 | 1.26 | 0.10 | 0.18 | 2.65 | 0.89 | 0.85 | 37,026 | 37,026 | 12,632 | 12,632 | 2.6 |

# Appendix D

## Maintenance Covenant

RECORDING REQUESTED BY AND MAIL TO:

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS
BUILDING AND SAFETY DIVISION
900 S. FREMONT AVENUE, 3RD FLOOR
ALHAMBRA, CA 91803-1331

Space above this line is for Recorder's use

# MAINTENANCE COVENANT FOR STANDARD URBAN STORMWATER MITIGATION PLAN (SUSMP) REQUIREMENTS

Pursuant to Section 106.4.3 of the County of Los Angeles Building Code and Title 12, Chapter 12.80 of the Los Angeles County Code relating to the control of pollutants carried by stormwater runoff, structural and/or treatment control Best Management Practices (BMPs) have been installed on the following property:

LEGAL DESCRIPTION

ASSESSOR'S ID #_____TRACT NO._____LOT NO._____

ADDRESS: _____

_____

REFERENCE

PLAN CHECK NO.: _____ DISTRICT OFFICE NO.: _____

I (we)_____, hereby certify that I (we) am (are) the legal owner(s) of
(Legal Name of Property Owners)
property indicated above, and as such owners for the mutual benefit of future purchasers, their heirs, successors, and assigns, do hereby fix the following protective conditions to which their property, or portions thereof, shall be held, sold and/or conveyed.

That owner(s) shall maintain the drainage devices such as paved swales, bench drains, inlets, catch basins, downdrains, pipes, and water quality devices on the property indicated above and as shown on plans permitted by the Los Angeles County Department of Public Works and as outlined in the attached "OPERATION AND MAINTENANCE GUIDELINES", in a good and functional condition to safeguard the property owners and adjoining properties from damage and pollution.

That owner(s) shall conduct maintenance inspection of all Structural or Treatment Control BMPs on the property at least once a year and retain proof of the inspection. Said maintenance inspection shall verify the legibility of all required stencils and signs and shall repaint and label as necessary.

That owner(s) shall provide printed educational materials with any sale of the property that provide information on what stormwater management facilities are present, the type(s) and location(s) of maintenance signs that are required, and how the necessary maintenance can be performed.

Owner(s):

By:_____ Date:_____

By:_____ Date:_____

(PLEASE ATTACH NOTARY)

# APPENDIX F-3

# PRELIMINARY STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

# STORMWATER POLLUTION PREVENTION PLAN

**for**

# West Antelope Solar Project

**RISK LEVEL** ***1***

## Legally Responsible Person (LRP):

TA – Acacia, LLC
119 First Ave. S. - #100
Seattle, WA 98104
Antonio Rodriguez
Phone: (925) 913-4817

## Prepared for:

TA – Acacia, LLC
119 First Ave. S. - #100
Seattle, WA 98104
Phone: (925) 913-4817
Fax: (925) 866-2704

## Project Address:

110th St. W. & W. Ave. J
Unincorporated Los Angeles County, CA (near west boundary of Lancaster)

## SWPPP Prepared by:

AEI-CASC Consulting
937 S. Via Lata, Suite 500
Colton, CA 92324
Mark Swanson, P.E., CPESC, QSD/P

## SWPPP Preparation Date

March 2013

## Estimated Project Dates:

| | | | |
|---|---|---|---|
| Start of Construction | **October 01, 2013** | Completion of Construction | **July 01, 2014** |

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# Qualified SWPPP Developer

Approval and Certification of the Stormwater Pollution Prevention Plan

Project Name: *West Antelope Solar Project*

WDID #:

"This Stormwater Pollution Prevention Plan and Attachments were prepared under my direction to meet the requirements of the California Construction General Permit (SWRCB Orders No. 2009-009-DWQ as amended by Order 2010-0014-DWQ and 2012-0006-DWQ). I certify that I am a Qualified SWPPP Developer in good standing as of the date signed below."

| | |
|---|---|
| *QSD Signature* | *Date* |
| Mark Swanson, P.E. | 00457 |
| *QSD Name* | *QSD Certificate Number* |
| Project Manager | (909) 783-0101 ext. 4130 |
| *Title and Affiliation* | *Telephone Number* |
| mswanson@aei-casc.com | |
| *Email* | |

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# Legally Responsible Person

Approval and Certification of the Stormwater Pollution Prevention Plan

Project Name: West Antelope Solar Project

WDID # _____

"I certify under penalty of law that this document and all Attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

_____
Legally Responsible Person

| | |
|---|---|
| Signature of Legally Responsible Person or Approved Signatory | Date |
| Name of Legally Responsible Person or Approved Signatory | Telephone Number |

PRELIMINARY

# Section 1 SWPPP Requirements

## 1.1 INTRODUCTION

This Stormwater Pollution Prevention Plan (SWPPP) is designed to comply with California's General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit) Order No. 2009-0009-DWQ as amended by Order No. 2010-0014-DWQ and 2012-0006-DWQ (NPDES No. CAS000002), issued by the State Water Resources Control Board (State Water Board). This SWPPP has been prepared following the SWPPP Template provided on the California Stormwater Quality Association Stormwater *Best Management Practice Handbook Portal: Construction* (CASQA, 2010). In accordance with the General Permit, Section XIV, this SWPPP is designed to address the following:

- Pollutants and their sources, including sources of sediment associated with construction, construction site erosion and other activities associated with construction activity are controlled;
- Where not otherwise required to be under a Regional Water Quality Control Board (Regional Water Board) permit, all non-stormwater discharges are identified and either eliminated, controlled, or treated;
- Site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity to the Best Available Technology/Best Control Technology (BAT/BCT) standard;

## 1.2 PERMIT REGISTRATION DOCUMENTS

Required Permit Registration Documents (PRDs) shall be submitted to the State Water Board via the Stormwater Multi Application and Report Tracking System (SMARTS) by the Legally Responsible Person (LRP), or authorized personnel (i.e., Approved Signatory) under the direction of the LRP. The Project-specific PRDs include:

1. Notice of Intent (NOI);
2. Risk Assessment (Construction Site Sediment and Receiving Water Risk Determination);
3. Site Map;
4. Annual Fee;
5. Signed Certification Statement ( Certification is provided electronically with SMARTS PRD submittal); and
6. SWPPP.

Site Maps can be found in Appendix B. A copy of the submitted PRDs shall also be kept in Appendix C along with the Waste Discharge Identification (WDID) confirmation.

## 1.3 SWPPP AVAILABILITY AND IMPLEMENTATION

The discharger shall make the SWPPP available at the construction site during working hours (see Section 7.5 for working hours) while construction is occurring and shall be made available

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upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and map/drawing will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone. (CGP Section XIV.C)

The SWPPP shall be implemented concurrently with the start of ground disturbing activities.

## 1.4 SWPPP AMENDMENTS

The SWPPP should be revised under the following conditions:

- If there is a General Permit violation.
- If there is a reduction or increase in total disturbed acreage (General Permit Section II Part C).

BMPs do not meet the objectives of reducing or eliminating pollutants in stormwater discharges.

Additionally, the SWPPP shall be amended when:

- There is a change in construction or operations which may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4);
- When there is a change in the Project duration that changes the Project's risk level; or
- When deemed necessary by the QSD. The QSD has determined that the changes listed in Table 1.1 can be field determined by the QSP. All other changes shall be made by the QSD as formal amendments to the SWPPP.

The following items shall be included in each amendment:

- Who requested the amendment;
- The location of proposed change;
- The reason for change;
- The original BMP proposed, if any; and
- The new BMP proposed.

Amendment shall be logged and certifications shall be kept in Appendix D. The SWPPP text shall be revised replaced, and/or hand annotated as necessary to properly convey the amendment. SWPPP amendments must be made by a QSD. The following changes have been designated by the QSD as "to be field determined" and constitute minor changes that the QSP or QSP's designee may implement based on field conditions.

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**Table 1.1 List of Changes to be Field Determined**

| Candidate changes for field location or determination by QSP(1) | Check changes that can be field located or field determined by QSP |
|---|---|
| Increase quantity of an Erosion or Sediment Control Measure | ✓ |
| Relocate/Add stockpiles or stored materials | ✓ |
| Relocate or add toilets | ✓ |
| Relocate vehicle storage and/or fueling locations | ✓ |
| Relocate areas for waste storage | ✓ |
| Relocate water storage and/or water transfer location | ✓ |
| Changes to access points (entrance/exits) | ✓ |
| Change type of Erosion or Sediment Control Measure | ✓ |
| Changes to location of erosion or sediment control | ✓ |
| Minor changes to schedule or phases | ✓ |
| Changes in construction materials | ✓ |
| *(1) Any field changes not identified for field location or field determination by QSP must be approved by QSD* | |

## 1.5 RETENTION OF RECORDS

Paper or electronic records of documents required by this SWPPP shall be retained for a minimum of three years from the date generated or date submitted, whichever is later, for the following items:

- Site inspections
- Compliance certifications
- Discharge reports
- Approved SWPPP documents and amendments

These records shall be available at the Site until construction is complete. Records assisting in the determination of compliance with the General Permit shall be made available within a reasonable time, to the Regional Water Board, State Water Board or U.S. Environmental Protection Agency (EPA) upon request. Requests by the Regional Water Board for retention of records for a period longer than three years shall be adhered to.

## 1.6 REQUIRED NON-COMPLIANCE REPORTING

If a discharge violation occurs the QSP or QSP's designee shall immediately notify the LRP and the LRP shall file a violation report electronically to the Regional Water Board within 30 days of identification of non-compliance using SMARTS. Corrective measures will be implemented immediately following the discharge or written notice of non-compliance from the Regional Water Board.

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The report to the LRP and to the Regional Water Board will contain the following items:

- The date, time, location, nature of operation and type of unauthorized discharge.
- The cause or nature of the notice or order.
- The control measures (BMPs) deployed before the discharge event, or prior to receiving notice or order.
- The date of deployment and type of control measures (BMPs) deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent re-occurrence.

## 1.7 ANNUAL REPORT

The Discharger is responsible for preparing, certifying, and electronically submitting an Annual Report no later than September 1st of each year and prior to submitting a Notice of Termination (NOT). Reporting requirements are identified in Section XVI of the General Permit. Annual reports will be filed in SMARTS and in accordance with information required by the on-line forms.

## 1.8 CHANGES TO PERMIT COVERAGE

The General Permit allows for the reduction or increase of the total acreage covered under the General Permit when: a portion of the Project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the Project is purchased by a different entity; or when new acreage is added to the Project.

Modified PRDs shall be filed electronically within 30 days of a reduction or increase in total disturbed area if a change in permit covered acreage is to be sought. The SWPPP shall be modified appropriately, shall be logged at the front of the SWPPP and cetrification of SWPPP amendments are to be kept in Appendix D. Updated PRDs submitted electronically via SMARTS can be found in Appendix E.

## 1.9 NOTICE OF TERMINATION

Prior to submitting a Notice of Termination (NOT) an annual report must be submitted (see Section 1.7). Within 90 days of when construction is complete or ownership has been transferred, TA - Acacia, LLC shall electronically file an NOT, a final Site Plan, and photos via SMARTS, to terminate coverage under the General Permit. Construction is considered complete when all of the following conditions are met:

- The site will not pose any additional sediment discharge risk than it did prior to construction activity;
- There is no potential for construction-related storm water pollutants to be discharged into site runoff;
- Final stabilization has been reached;
- Construction materials and wastes have been disposed of properly; and
- Post-construction storm water management measures are installed and a long-term maintenance plan has been developed.

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# Section 2 Project Information

## 2.1 PROJECT AND SITE DESCRIPTION

### 2.1.1 Site Description

The West Antelope Solar Project (Project) site comprises approximately 267 acres and is located at the corner of 110th Street West and West Avenue J, in unincorporated Los Angeles County, near the west boundary of Lancaster, California. The Project site is bordered by Lancaster Boulevard approximately 300 feet to the north, 115th Street W. to the west, 110th Street W. to the east, and with W. Avenue J intersecting the Project site. The property is being developed by TA - Acacia, LLC. The Project site is located at 34.68984°, -118.32975°; approximately 10 miles west of California State Highway 14. The proposed Project is located within the South Lahontan Hydrologic Basin Planning area, part of the Antelope Hydrologic Unit (626.5 – Lancaster Hydrologic Area), and within the jurisdiction of the Lahontan RWQCB (6V). Refer to Appendix B for the Project Site Maps and Vicinity Map.

### 2.1.2 Existing Conditions

Currently, the Project site is ungraded and relatively flat with minimal sparse and dry vegetation. The Project development area consists of annual grassland with patches of native perennial grasses. Overall, the species composition is coastal-like in its makeup with very few desert elements. The Project site has not been previously developed and does not currently contain any impervious areas. There are no known historic sources of contamination at this site.

### 2.1.3 Existing Drainage

The project site is relatively flat. The elevation ranges from 2,620 feet to 2,480 feet above mean sea level (msl) with a maximum flow length of approximately 6,000 feet. Surface drainage at the site currently flows northeasterly, towards an existing ephemeral stream approximately 330 ft. north of the Project site which terminates approximately 3.8 miles downstream of the site at a small depressed open area prior to reaching additional water bodies. Runoff, if any, has the potential to discharge from the southeast corner of the Project site and drain to the northeast; however, flows are not anticipated to reach/cross the ephemeral stream. The Project flows do not discharge to any receiving water body that is listed for water quality impairment on the most recent 303(d) list.

### 2.1.4 Geology and Groundwater

The site is underlain by alluvial fan deposits consisting primarily of sandy loam and coarse sandy loam soils. Groundwater occurs beneath the site at a depth greater than 150 feet (Geotechnical Investigation, June 2012).

### 2.1.5 Project Description

This Project is the construction of approximately 84 arrays of polycrystalline PV panels and ancillary facilities; including a storage shed approximately 20 by 30 feet in size, inverter enclosures approximately 12 by 35 feet in size, and a substation approximately 1.5 to 2 acres in

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size. The facility will directly produce renewable electricity and will operate year round. The site will comprise of approximately 267 acres. The main construction activities include:

- Minimal clearing and grubbing;
- Minimal grading;
- Minor drainage installation;
- Foundation driving operations;
- Concrete foundation construction;
- Solar panel erection;
- Switchyard construction;
- Electrical wiring installation; and
- Implementing water pollution control measures year round.

The Project will incorporate the installation of solar panel arrays and ancillary facilities on the currently undeveloped area. Grading will occur on the locations listed below totaling approximately 30 acres, which comprises approximately 11 percent of the total area. Graded materials are expected to be balanced onsite. Excavated soil will be redistributed throughout the site.

| | |
|---|---|
| *Inverters* | *0.11 acres* |
| *Access Roads* | *27.03 acres* |
| *Substation* | *2.02 acres* |

### 2.1.6 Developed Condition

Runoff, if any, has the potential to discharge from the northeast corner of the Project site and drain to the north; however, flows are not anticipate to reach/cross the ephemeral stream located approximately 330 ft. north of the Project site. On site runoff will be collected in individual infiltration trenches, provided for each array. Runoff not collected in the infiltration trenches will continue northeasterly along the existing drainage path toward the existing ephemeral stream which terminates prior to reaching additional water bodies. Pursuant to the Standard Urban Stormwater Mitigation Plan (dated July 2012), the development of the site is not expected to present significant impacts to water quality, as the ground below the solar panels will remain pervious with natural vegetation allowing for the infiltration of stormwater flows. The site will not be mass graded. Post construction drainage patterns will remain as shown on the Site Maps in Appendix B.

## 2.2 STORMWATER RUN-ON FROM OFFSITE AREAS

The Project site is partially located within a floodplain. Possible run-on flows from off site areas will come from the southwest direction. During construction activities, BMPs be implemented to direct offsite run-on away from disturbed areas through the use of runoff controls. Linear barriers will be implemented prior to construction and check dams will be implemented as needed. Refer to Section 3 for a detailed description of the proposed BMPs.

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## 2.3 FINDINGS OF THE CONSTRUCTION SITE SEDIMENT AND RECEIVING WATER RISK DETERMINATION

The Project was determined to be a Risk Level 1 project though the use of the Revised Universal Soil Loss Equation (RUSLE) method. The risk level is based on Project duration, location, soil conditions, and proximity to impaired receiving waters. A copy of the Risk Level determination submitted on SMARTS with the PRDs is included in Appendix C.

Table 2.1 and Table 2.2 summarize the sediment and receiving water risk factors and document the sources of information used to derive the factors.

**Table 2.1 Summary of Sediment Risk**

| RUSLE Factor | Value | Method for establishing value |
|---|---|---|
| R | 5.34 | Populated based on criteria set forth in the EPA Construction Rainfall Erosivity Factsheet |
| K | 0.20 | Populated in SMARTS NOI Risk Tab. |
| LS | 1.41 | Populated in SMARTS NOI Risk Tab. |
| **Total Predicted Sediment Loss (tons/acre)** | | **1.51** |
| **Overall Sediment Risk**<br>Low Sediment Risk < 15 tons/ acre<br>Medium Sediment Risk >= 15 and < 75 tons/acre<br>High Sediment Risk >= 75 tons/acre | | ☒ **Low**<br>☐ **Medium**<br>☐ **High** |

**Table 2.2 Summary of Receiving Water Risk**

| Receiving Water Name | 303(d) Listed for Sediment Related Pollutant(1) | TMDL for Sediment Related Pollutant(1) | Beneficial Uses of COLD, SPAWN, and MIGRATORY(1) |
|---|---|---|---|
| West Antelope Valley ephemeral streams | ☐ Yes ☒ No | ☐ Yes ☒ No | ☐ Yes ☒ No |
| **Overall Receiving Water Risk** | | | ☒ **Low**<br>☐ **High** |
| (1) If yes is selected for any option the Receiving Water Risk is High | | | |

Risk Level 1 sites are subject to the narrative effluent limitations specified in the General Permit. The narrative effluent limitations require stormwater discharges associated with construction activity to minimize or prevent pollutants in stormwater and authorized non-stormwater through the use of controls, structures, and best management practices. This SWPPP has been prepared to address Risk Level 1 requirements (General Permit Attachment C).

## 2.4 CONSTRUCTION SCHEDULE

The Project sediment risk was determined based on construction taking place between October 1, 2013 and July 1, 2014. Modification or extension of the schedule (start and end dates) may affect risk determination and permit requirements. The LRP shall contact the QSD if the schedule changes during construction to address potential impact to the SWPPP. The estimated schedule for planned work can be found in Appendix F.

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| | |
|---|---|
| CUP approved | *2nd quarter - 2013* |
| Acquisition of additional required permits | *2nd quarter - 2013* |
| ROW/property acquisition | *3rd quarter - 2013* |
| Construction begins | *4th quarter - 2013* |
| Completion of construction | *2nd quarter - 2014* |
| Project operation | *3rd quarter - 2014* |

## 2.5 POTENTIAL CONSTRUCTION ACTIVITY AND POLLUTANT SOURCES

Appendix G includes a list of construction activities and associated materials that are anticipated to be used onsite. These activities and associated materials will or could potentially contribute pollutants, other than sediment, to stormwater runoff.

The anticipated activities and associated pollutants were used in Section 3 to select the Best Management Practices for the Project. Location of anticipated pollutants and associated BMPs are show on the Site Maps in Appendix B.

For sampling requirements for non-visible pollutants associated with construction activity please refer to Section 7.7.1.

## 2.6 IDENTIFICATION OF NON-STORMWATER DISCHARGES

Non-stormwater discharges consist of discharges which do not originate from precipitation events. The General Permit provides allowances for specified non-stormwater discharges that do not cause erosion or carry other pollutants.

Non-stormwater discharges into storm drainage systems or waterways, which are not authorized under the General Permit and listed in the SWPPP, or authorized under a separate NPDES permit, are prohibited.

Non-stormwater discharges that are authorized from this Project site include the following:

- Irrigation runoff, and
- Water to control dust.

These authorized non-stormwater discharges will be managed with the stormwater and non-stormwater BMPs described in Section 3 of this SWPPP and will be minimized by the QSP.

Activities at this site that may result in unauthorized non-stormwater discharges include:

- Vehicle and equipment fueling and maintenance
- Grading
- Runoff from dust control applications of water or dust palliatives
- Sanitary and septic wastes
- Cement materials associated with foundations
- Concrete curing compounds

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- BMP materials
- General litter
- Metals and plated products
- Sanitary and septic wastes

Steps will be taken, including the implementation of appropriate BMPs, to ensure that unauthorized discharges are eliminated, controlled, disposed, or treated on site.

Discharges of construction materials and wastes, such as fuel or paint, resulting from dumping, spills, or direct contact with rainwater or stormwater runoff, are also prohibited.

## 2.7 REQUIRED SITE MAP INFORMATION

The construction Project's Site Maps showing the Project location, surface water boundaries, geographic features, construction site perimeter and general topography and other requirements identified in Attachment B of the General Permit is located in Appendix B.

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# Section 3 Best Management Practices

## 3.1 SCHEDULE FOR BMP IMPLEMENTATION

**Table 3.1 BMP Implementation Schedule**

| | BMP | Implementation | Duration |
|---|---|---|---|
| Erosion Control | EC-1, Scheduling | Prior to Construction | Entirety of Project |
| | EC-2, Preservation of Existing Vegetation | Prior to Construction | Entirety of Project |
| | EC-4, Hydroseed | When Necessary | As needed |
| | EC-5, Soil Binders | When Necessary | As needed |
| **Sediment Control** | SE-1, Silt Fence | Prior to Construction | Entirety of Project |
| | SE-4, Check Dams | When Necessary | As needed |
| | SE-5, Fiber Rolls | Prior to Construction | Entirety of Project |
| | SE-7, Street Sweeping | When Necessary | As needed |
| **Tracking Control** | TC-1, Stabilized Construction Entrance and Exit | Prior to Construction | Entirety of Project |
| **Wind Erosion** | WE-1, Wind Erosion Control | As Needed | Entirety of Project |
| **Non-Stormwater** | NS-1, Water Conservation Practices | Start of Construction | Entirety of Project |
| | NS-3, Paving and Grinding Operation | Start of Paving | During Paving |
| | NS-6, Illicit Connection- Illegal Discharge Connection | Start of Construction | Entirety of Project |
| | NS-7, Potable Water Irrigation Discharge Detection | Start of Construction | Entirety of Project |
| | NS-9, Vehicle and Equipment Fueling | Start of Construction | Entirety of Project |
| | NS-10, Vehicle and Equipment Maintenance | Start of Construction | Entirety of Project |
| | NS-11, Pile Driving Operation | Start of Pile Driving | During Pile Driving |
| | NS-12, Concrete Curing | Start of Concrete Curing | During Concrete Curing |
| | NS-13, Concrete Finishing | Start of Concrete Finishing | During Concrete Finishing |
| **Equipment/Materials Management** | WM-1, Material Delivery and Storage | Start of Construction | Entirety of Project |
| | WM-2, Material Use | Start of Construction | Entirety of Project |
| | WM-3, Stockpile Management | Start of Construction | Entirety of Project |

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**Table 3.1 BMP Implementation Schedule**

| | BMP | Implementation | Duration |
|---|---|---|---|
| | WM-4, Spill Prevention and Control | Start of Construction | Entirety of Project |
| | WM-5, Solid Waste Management | Start of Construction | Entirety of Project |
| | WM-6, Hazardous Waste Management | If Necessary | As needed |
| | WM-7, Contaminated Soil Management | If Necessary | As needed |
| | WM-8, Concrete Waste Management | When Necessary | Entirety of Project |
| | WM-9, Sanitary-Septic Waste Management | Start of Construction | Entirety of Project |

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## 3.2 EROSION AND SEDIMENT CONTROL

Erosion and sediment controls are required by the General Permit to provide effective reduction or elimination of sediment related pollutants in stormwater discharges and authorized non-stormwater discharges from the Site. Applicable BMPs are identified in this section for erosion control, sediment control, tracking control, and wind erosion control.

### 3.2.1 Erosion Control

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in stormwater runoff. Erosion control BMPs protect the soil surface by covering and/or binding soil particles.

This construction Project will implement the following practices to provide effective temporary and final erosion control during construction:

1. Protect and preserve existing vegetation in work areas as long as practicable before disturbing them. Also, preserve and protect existing vegetation adjacent to work areas.
2. The area of soil disturbing operations shall be controlled such that the Contractor is able to implement erosion control BMPs quickly and effectively.
3. Stabilize non-active areas within 14 days of cessation of construction activities or sooner if stipulated by local requirements.
4. Control erosion in concentrated flow paths by applying erosion control blankets, check dams, erosion control seeding or alternate methods.
5. Prior to the completion of construction, apply permanent erosion control to remaining disturbed soil areas.
6. The QSP shall ensure the reduction of discharge of pollutants to storm drain facilities or water courses caused by construction activities by scheduling said activities in a manner that will limit exposure of disturbed soil to wind, rain, and storm water run-on and runoff. Sequence construction activities and the implementation of BMPs, while taking local climate (rainfall, wind, etc.) into consideration.

Sufficient erosion control materials shall be maintained onsite to allow implementation in conformance with this SWPPP.

The following temporary erosion control BMP selection table indicates the BMPs that shall be implemented to control erosion on the construction site. Fact Sheets for temporary erosion control BMPs are provided in Appendix H.

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**Table 3.2 Temporary Erosion Control BMPs**

| CASQA Fact Sheet | BMP Name | Meets a Minimum Requirement[1] | BMP Used | | If not used, state reason |
|---|---|---|---|---|---|
| | | | YES | NO | |
| EC-1 | Scheduling | ✓ | ✓ | | |
| EC-2 | Preservation of Existing Vegetation | ✓ | ✓ | | |
| EC-3 | Hydraulic Mulch | ✓[2] | | ✓ | Using EC-4 and/or EC-5 |
| EC-4 | Hydroseed | ✓[2] | ✓ | | |
| EC-5 | Soil Binders | ✓[2] | ✓ | | |
| EC-6 | Straw Mulch | ✓[2] | | ✓ | Using EC-4 and/or EC-5 |
| EC-7 | Geotextiles and Mats | ✓[2] | | ✓ | Using EC-4 and/or EC-5 |
| EC-8 | Wood Mulching | ✓[2] | | ✓ | Using EC-4 and/or EC-5 |
| EC-9 | Earth Dike and Drainage Swales | ✓[3] | | ✓ | Using EC-4 and/or EC-5 |
| EC-10 | Velocity Dissipation Devices | | | ✓ | Not applicable |
| EC-11 | Slope Drains | | | ✓ | Not applicable |
| EC-12 | Stream Bank Stabilization | | | ✓ | Not applicable |
| EC-14 | Compost Blankets | ✓[2] | | ✓ | Not applicable |
| EC-15 | Soil Preparation-Roughening | | | ✓ | Not applicable |
| EC-16 | Non-Vegetated Stabilization | ✓[2] | | ✓ | Not applicable |
| WE-1 | Wind Erosion Control | ✓ | ✓ | | |
| **Alternate BMPs Used:** | | | | | **If used, state reason:** |
| | | | | | |
| | | | | | |

[1] Applicability to a specific project shall be determined by the QSD.
[2] The QSD shall ensure implementation of one of the minimum measures listed or a combination thereof to achieve and maintain the Risk Level requirements.
[3] Run-on from offsite shall be directed away from all disturbed areas, diversion of offsite flows may require design/analysis by a licensed civil engineer and/or additional environmental permitting

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The temporary erosion control BMPs listed in Table 3.2 shall be implemented in conformance with the following guidelines. For additional reference see the BMP Factsheets provided in Appendix H. Refer to Appendix B for respective BMP locations.

#### *3.2.1.1 Wind Erosion Control*

The Project shall use water to suppress fugitive dust during clearing and grubbing, grading, trenching, and soil compaction activities. At a minimum the following wind erosion control measures shall be implemented:

- Provide Dust Control and prevent discharges from dust control activities and water supply equipment.
- Potable water will be applied at 4,000 gallons of water per acre to disturbed soil areas of the Project site to control dust and maintain optimum moisture levels for compaction. The water will be applied using water trucks. Water equipment leaks will be repaired immediately. Water application rates will be minimized, as necessary, to prevent runoff and ponding.
- During windy conditions (forecast or actual wind conditions of approximately 25 mph or greater), dust control will be applied to disturbed areas to adequately control wind erosion.
- Also refer to Appendix H for related BMP guidance factsheets:
    - WE-1 – Wind Erosion Control
    - NS-1 – Water Conservation Practices
    - WM-3 – Stockpile Management

#### *3.2.1.2 Inactive Areas and Finished Slopes*

The Project area is relatively flat. The construction activities will be scheduled and sequenced, such that any disturbed areas will undergo construction until final stabilization. At a minimum the following measures shall be implemented to control non-active areas:

- Provide soil cover using a mixture of non-irrigated, native species hydroseed for areas of solar panel construction that have been disturbed and are not scheduled to be re-disturbed for at least 14 days.
- Apply a nontoxic soil binding agent during areas of construction for all graded areas that have been disturbed and are not scheduled to be re-disturbed for at least 14 days.
- Also refer to Attachment H for related BMP guidance factsheets:
    - EC-1 – Scheduling
    - EC-4 – Hydroseed
    - EC-5 – Soil Binders

#### *3.2.1.3 Inactive Areas and Finished Slopes*

The QSP shall ensure that existing vegetation is protected and preserved where possible to control erosion and filter out sediment.

- EC-2 – Preservation of Existing Vegetation

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### 3.2.2 Sediment Controls

Sediment controls are temporary or permanent structural measures that are intended to complement the selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water.

The following sediment control BMP selection table indicates the BMPs that shall be implemented to control sediment on the construction site. Fact Sheets for temporary sediment control BMPs are provided in Appendix H.

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**Table 3.3 Temporary Sediment Control BMPs**

| CASQA Fact Sheet | BMP Name | Meets a Minimum Requirement[1] | BMP used | | If not used, state reason |
|---|---|---|---|---|---|
| | | | YES | NO | |
| SE-1 | Silt Fence | ✓[2] [3] | ✓ | | |
| SE-2 | Sediment Basin | | | ✓ | Using SE-1, SE-5, and/or SE-6 |
| SE-3 | Sediment Trap | | | ✓ | Using SE-1, SE-5, and/or SE-6 |
| SE-4 | Check Dams | | ✓ | | |
| SE-5 | Fiber Rolls | ✓[2][3] | ✓ | | |
| SE-6 | Gravel Bag Berm | ✓[3] | ✓ | | |
| SE-7 | Street Sweeping | ✓ | ✓ | | |
| SE-8 | Sandbag Barrier | | | ✓ | Using SE-1, SE-5, and/or SE-6 |
| SE-9 | Straw Bale Barrier | | | ✓ | Using SE-1, SE-5, and/or SE-6 |
| SE-10 | Storm Drain Inlet Protection | ✓ RL2&3 | | ✓ | Not Applicable |
| SE-11 | ATS | | | ✓ | Not Applicable |
| SE-12 | Temporary Silt Dike | | | ✓ | Not Applicable |
| SE-13 | Compost Sock and Berm | ✓[3] | | ✓ | Using SE-1, SE-5, and/or SE-6 |
| SE-14 | Biofilter Bags | ✓[3] | | ✓ | Not Applicable |
| TC-1 | Stabilized Construction Entrance and Exit | ✓ | ✓ | | |
| TC-2 | Stabilized Construction Roadway | | | ✓ | Using TC-1 |
| TC-3 | Entrance Outlet Tire Wash | | | ✓ | Using TC-1 |
| **Alternate BMPs Used:** | | | | | **If used, state reason:** |
| | | | | | |

[1] Applicability to a specific project shall be determined by the QSD
[2] The QSD shall ensure implementation of one of the minimum measures listed or a combination thereof to achieve and maintain the Risk Level requirements
[3] Risk Level 2 &3 shall provide linear sediment control along toe of slope, face of slope, and at the grade breaks of exposed slope

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The temporary sediment control BMPs listed in Table 3.3 shall be implemented in conformance with the following. For additional reference see the BMP Factsheets provided in Appendix H. Refer to Appendix B for respective BMP locations.

#### *3.2.2.1 Perimeter Controls*

At a minimum the following measures shall be implemented to control sediment from discharging from the perimeter of the site, site entrances and exits, storm drain facilities and watercourses:

- Install temporary linear barriers (silt fence and/or fiber rolls) for protection at the Project site's perimeters. Linear barriers shall be maintained to provide adequate sediment holding capacity. These barriers will be placed to prevent sheet flow from running uninterrupted. Sediment shall be removed prior to reaching approximately 1/3 of the barrier height. Barriers shall be removed from the site when no longer required. Refer to the Site Maps in Appendix B for respective locations.
- Also refer to Appendix H for related BMP guidance factsheets:
    - SE-1 – Silt Fence
    - SE-5 – Fiber Rolls

At a minimum the following measures shall be implemented to reduce sediment tracking from the construction site onto private or public roads:

- Implement sweeping and vacuuming at points of ingress and egress to the Project site, as necessary, to control sediment that is tracked onto public roads. Refer to the Site Maps in Appendix B. At the Project site, sweeping of streets will be conducted immediately after construction operations.
- Install a stabilized construction entrance/exit at the locations shown on the Site Maps in Appendix B. The site entrance/exit will be stabilized to reduce tracking of sediment as a result of construction traffic. The entrance will be designated and graded to prevent runoff from leaving the site. Stabilization material will be 3 to 6-inch aggregate. The entrance/exit must have rumble plates.
- Also refer to Appendix H for related BMP guidance factsheets:
    - SE-7 – Sediment Sweeping and Vacuuming
    - TC-1 – Stabilized Construction Entrance/Exit

#### *3.2.2.2 Sediment Basins and Traps*

A combination of the controls described herein Section 3.2.2 will be utilized to control sediment from discharging from the site during construction.

#### *3.2.2.3 Run-on and Runoff Controls*

The following measures shall be implemented in addition to the perimeters controls discussed in Section 3.3.2.1 to control run-on from entering the construction site and runoff from discharging sediment off of the construction site:

- Prior to construction activities, install linear barriers (fiber rolls and/or silt fence) in order

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to reduce the potential of sediment discharges from the Project site. The fiber rolls and/or silt fence will be placed strategically in order to impede the flow of sediment laden runoff. The fiber rolls and/or silt fence will allow sediment to fall out of the suspension and thus allow cleaner water to flow. The QSP will periodically inspect the fiber rolls and/or silt fence in order to remove sediment built-up behind the BMP. Refer to the Site Maps in Appendix B for respective locations.

- Temporary gravel bag check dam(s) may be used, as needed, in order to reduce the potential of sediment discharges from the Project site. Based on the QSP's routine observations, check dams shall be implemented as necessary to impede the flow of silty runoff. The check dam(s) will allow sediment to fall out of the suspension and thus allow cleaner water to flow. Periodically inspect the check dam(s) in order to remove sediment built-up behind gravel bags. If additional check dams become necessary, the QSP or QSP's designee will update additional locations on the Site Map in Appendix B. Check dams shall be removed when no longer needed, as deemed by the QSD.
- Also refer to Appendix H for the related BMP Guidance Factsheets:
    - SE-1 – Silt Fence
    - SE-4 – Check Dams
    - SE-5 – Fiber Rolls

## 3.3 NON-STORMWATER CONTROLS AND WASTE AND MATERIALS MANAGEMENT

### 3.3.1 Non-Stormwater Controls

Non-stormwater discharges into storm drainage systems or waterways, which are not authorized under the General Permit, are prohibited. Non-stormwater discharges for which a separate NPDES permit is required by the local Regional Water Board are prohibited unless coverage under the separate NPDES permit has been obtained for the discharge. The selection of non-stormwater BMPs is based on the list of construction activities with a potential for non-stormwater discharges identified in Section 2.6 of this SWPPP.

The following non-stormwater control BMP selection table indicates the BMPs that shall be implemented to control sediment on the construction site. Fact Sheets for temporary non-stormwater control BMPs are provided in Appendix H.

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**Table 3.4 Temporary Non-Stormwater BMPs**

| CASQA Fact Sheet | BMP Name | Meets a Minimum Requirement[1] | BMP used | | If not used, state reason |
|---|---|---|---|---|---|
| | | | YES | NO | |
| NS-1 | Water Conservation Practices | ✓ | ✓ | | |
| NS-2 | Dewatering Operation | | | ✓ | Not Applicable |
| NS-3 | Paving and Grinding Operation | | ✓ | | |
| NS-4 | Temporary Stream Crossing | | | ✓ | Not Applicable |
| NS-5 | Clear Water Diversion | | | ✓ | Not Applicable |
| NS-6 | Illicit Connection- Illegal Discharge Connection | ✓ | ✓ | | |
| NS-7 | Potable Water Irrigation Discharge Detection | | ✓ | | |
| NS-8 | Vehicle and Equipment Cleaning | ✓ | | ✓ | To Be Conducted Off Site |
| NS-9 | Vehicle and Equipment Fueling | ✓ | ✓ | | |
| NS-10 | Vehicle and Equipment Maintenance | ✓ | ✓ | | |
| NS-11 | Pile Driving Operation | | ✓ | | |
| NS-12 | Concrete Curing | | ✓ | | |
| NS-13 | Concrete Finishing | | ✓ | | |
| NS-14 | Material and Equipment Use Over Water | | | ✓ | No On-site Water Bodies |
| NS-15 | Demolition Removal Adjacent to Water | | | ✓ | No On-site Water Bodies |
| NS-16 | Temporary Batch Plants | | | ✓ | No On-site Water Bodies |
| **Alternate BMPs Used:** | | | **If used, state reason:** | | |
| | | | | | |

[1] Applicability to a specific project shall be determined by the QSD

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Non-stormwater BMPs listed in Table 3.4 shall be implemented in conformance with the following. For additional reference see the BMP Factsheets provided in Appendix H. Refer to Appendix B for respective BMP locations.

At a minimum the following measures shall be implemented to control non-stormwater discharges during construction:

- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.
- Use water in a manner, which will not cause erosion or transport pollutants off site. Water application rates will be minimized as necessary to prevent runoff and ponding and water equipment leaks will be repaired immediately.
- Prevent oil, grease, or fuel to leak in to the ground, storm drains or surface waters.
- Place all equipment or vehicles, which are to be fueled, maintained and stored in a designated area fitted with appropriate BMPs. If on-site mobile fueling is necessary, construct a temporary fueling area in designated location to be field located by the QSP or QSP's designee. As construction progresses the QSP or QSP's designee will update the Site Maps in Appendix B to show the respective location(s).
- Clean leaks immediately and disposing of leaked materials properly. Mobile fuel trucks, each equipped with absorbent spill clean-up materials, will be used for on-site fueling.
- Clean paved surfaces in such a manner to prevent unauthorized non-stormwater discharges from entering the storm drain system or receiving water.
- Implement controls during paving operations to prevent paving materials from being discharged off site. Paving operations will generally be conducted as shown on the Project schedule in Appendix F. Immediately following construction operations, the area will be swept and inspected for debris.
- Employ proper procedures to reduce or eliminate the contamination of stormwater runoff during concrete curing and finishing operations.
- During vehicle maintenance activities, prevent fluids from leaking into the ground and discharging to storm drain conveyances. Place all equipment or vehicles, which are to be maintained and stored in a designated area fitted with appropriate BMPs. Vehicle maintenance will be conducted at least 50 feet away from storm drain facilities and on a level graded area.
- When it is necessary to park paving machines and other construction equipment at the Project site, the equipment shall be parked on plastic (10 mL) and located on a surface that will be paved as part of the Project. Protective plastic shall be removed and replaced daily. Place drip pans, plastic sheeting, or absorbent material under vehicles and equipment while parked and when requiring maintenance activities that involve grease, oil, solvents, or other vehicle fluids.
- Clean leaks immediately and disposing of leaked materials properly. Refer to Section 3.3.2 for the Project's spill response guidelines.

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- Also refer to Appendix H for related BMP guidance factsheets:
  - NS-1 – Water Conservation Practices
  - NS-3 – Paving and Grinding Operations
  - NS-6 – Illicit Discharge/Illegal Dumping Reporting
  - NS-7 – Potable Water/Irrigation
  - NS-9 – Vehicle and Equipment Fueling
  - NS-10 – Vehicle and Equipment Maintenance
  - NS-11 – Pile Driving Operations
  - NS-12 – Concrete Curing
  - NS-13 – Concrete Finishing

### 3.3.2 Materials Management and Waste Management

Materials management control practices consist of implementing procedural and structural BMPs for handling, storing and using construction materials to prevent the release of those materials into stormwater discharges. The amount and type of construction materials to be utilized at the Site will depend upon the type of construction and the length of the construction period. The materials may be used continuously, such as fuel for vehicles and equipment, or the materials may be used for a discrete period, such as soil binders for temporary stabilization.

Waste management consists of implementing procedural and structural BMPs for handling, storing and ensuring proper disposal of wastes to prevent the release of those wastes into stormwater discharges.

Materials and waste management pollution control BMPs shall be implemented to minimize stormwater contact with construction materials, wastes and service areas; and to prevent materials and wastes from being discharged off site. The primary mechanisms for stormwater contact that shall be addressed include:

- Direct contact with precipitation
- Contact with stormwater run-on and runoff
- Wind dispersion of loose materials
- Direct discharge to the storm drain system through spills or dumping
- Extended contact with some materials and wastes, such as asphalt cold mix and treated wood products, which can leach pollutants into stormwater.

A list of construction activities is provided in Section 2.5. The following Materials and Waste Management BMP selection table indicates the BMPs that shall be implemented to handle materials and control construction site wastes associated with these construction activities. Fact Sheets for Materials and Waste Management BMPs are provided in Appendix H.

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**Table 3.5 Temporary Materials Management BMPs**

| CASQA Fact Sheet | BMP Name | Meets a Minimum Requirement[1] | BMP used | | If not used, state reason |
|---|---|---|---|---|---|
| | | | YES | NO | |
| WM-01 | Material Delivery and Storage | ✓ | ✓ | | |
| WM-02 | Material Use | ✓ | ✓ | | |
| WM-03 | Stockpile Management | ✓ | ✓ | | |
| WM-04 | Spill Prevention and Control | ✓ | ✓ | | |
| WM-05 | Solid Waste Management | ✓ | ✓ | | |
| WM-06 | Hazardous Waste Management | ✓ | ✓ | | If Necessary |
| WM-07 | Contaminated Soil Management | ✓ | ✓ | | If Necessary |
| WM-08 | Concrete Waste Management | ✓ | ✓ | | |
| WM-09 | Sanitary-Septic Waste Management | ✓ | ✓ | | |
| WM-10 | Liquid Waste Management | | | ✓ | Not Applicable |
| **Alternate BMPs Used:** | | | | **If used, state reason:** | |
| | | | | | |
| | | | | | |

[1] Applicability to a specific project shall be determined by the QSD.

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#### *3.3.2.1 Construction Materials*

At a minimum the following good housekeeping measures shall be implemented for handling construction materials:

- Cover and berm loose stockpiled construction materials that are not actively being used (i.e. soil, spoils, aggregate, fly-ash, hydrated lime, etc.).
- Store chemicals in water tight containers with appropriate secondary containment to prevent spills or leaks, or store in a completely enclosed, lockable, storage shed.
- Minimize exposure of construction materials to precipitation, excluding materials designed to be outdoors, exposed to environmental conditions.
- Implement BMPs to prevent off-site tracking of loose construction materials.
- Also refer to Appendix H for related BMP Guidance Factsheets:
    - WM-1 – Material Delivery and Storage

#### *3.3.2.2 Waste Management Controls*

At a minimum the following good housekeeping measures shall be implemented for waste management:

- Prevent disposal of rinse or materials on impervious or pervious site surfaces or into the storm drain system.
- Ensure the containment of sanitation facilities to prevent the discharges of pollutants to the storm drain system or receiving water. Portable toilets will be located on level ground. The toilets will be located at minimum 50 feet away from concentrated flow paths and flood plain paths. Refer to Site Maps in Appendix B.
- Clean or replace sanitation facilities and inspect them regularly for leaks and spills. Weekly maintenance shall be provided and wastes will be properly disposed off site. The portable toilets will be equipped with secondary containment drip pans to prevent spills or leaks of sanitary/septic wastes.
- Cover waste disposal containers at the end of every business day and during a rain event. Solid waste, including rubble stockpiles, will be removed and disposed off-site at least weekly.
- Prevent discharges of waste disposal containers to the storm drain system or receiving water.
- Contain and securely protect stockpiled waste material from wind and rain at all times unless actively being used. Stockpiles shall be protected with plastic cover and surrounded by gravel bag berm. Stockpiles of construction materials, rubble, and BMP materials will be field located by the QSP. The QSP shall update the Site Maps in Appendix B to show the respective locations.
- Implement procedures that effectively address hazard and non-hazardous spills. Refer to Section 3.3.2 for the Project's spill response guidelines.
- Ensure the containment of concrete washout areas and other washout areas that may

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contain additional pollutants so there is no discharge into the underlying soil and onto surrounding areas. Concrete washout facilities will be field located by QSP and placed a minimum of 50 feet from storm drain facilities, and apart from construction traffic areas. A sign shall be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities. The QSP or QSP's designee shall update the Site Maps to show respective locations.

- Also refer to Appendix H for related BMP Guidance Factsheets:
  - WM-2 – Material Use
  - WM-3 – Stockpile Management
  - WM-4 – Spill Prevention and Control
  - WM-5 – Solid Waste Management
  - WM-6 – Hazardous Waste Management
  - WM-7 – Contaminated Soil Management
  - WM-8 – Concrete Waste Management
  - WM-9 – Sanitary/Septic Waste Management

#### *3.3.2.3 Spill Prevention Controls*

At a minimum the following measures shall be implemented to address hazardous and non-hazardous spills at the construction site:

- Maintain equipment and spill clean-up materials available on site, including, but not limited to shovels, brooms, spill absorbent, rags, and proper waste containment (i.e. non-permeable, water proof spill containment bin). Waste materials shall be labeled and disposed of properly in accordance with local, state, and federal requirements.
- Maintain Project-specific material safety data sheets, material inventory, and emergency contact numbers readily available on site.
- Implement proper spill clean-up procedures to prevent pollutant discharges to storm drain systems in the event of a leak or spill of hazardous substances used, stored, or generated on site. Spills of oil, petroleum products, and substances listed under 40 CFR parts 11, 117, and 302, and sanitary and septic wastes shall be contained and cleaned up immediately.
- Also refer to Appendix H for related BMP Guidance Factsheets:
  - WM-4 – Spill Prevention and Control
  - WM-5 – Solid Waste Management
  - WM-6 – Hazardous Waste Management
  - WM-7 – Contaminated Soil Managment
  - WM-8 – Concrete Waste Management
  - WM-9 – Sanitary/Septic Waste Management

## 3.4 POST CONSTRUCTION STORMWATER MANAGEMENT MEASURES

Post construction BMPs are permanent measures installed during construction, designed to reduce or eliminate pollutant discharges from the site after construction is completed.

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This site is located within an unincorporated area of Los Angeles County and is not subject to a Municipal Separate Storm Sewer System (MS4) permit approved Stormwater Management Plan.

The Project will conform to specific Standard Urban Stormwater Mitigation Plan (SUSMP) requirements.

The following source control post construction BMPs have been identified for the site to comply with General Permit Section XIII.B and local requirements:

- Education of Property Owners
- Activity Restrictions
- Employee Training/Education Program
- Street Sweeping Private Streets
- Litter Control
- Drainage Facility Inspections and Maintenance

The following treatment control post construction BMPs have been identified for the site to comply with General Permit Section XIII.B and local requirements have:

- Permanent Infiltration Trenches

The following site design post construction BMPs been identified for the site to comply with General Permit Section XIII.B and local requirements have:

- Native Vegetation
- Preservation of Natural Areas
- Preserve Existing Drainage Patterns

A plan for the post construction funding and maintenance of these BMPs has been developed to address at minimum five years following construction. The post construction BMPs that are described above shall be funded and maintained by TA - Acacia, LLC.

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# Section 4 BMP Inspection and Maintenance

## 4.1 BMP INSPECTION AND MAINTENANCE

The General Permit requires routine weekly inspections of BMPs, along with inspections before, during, and after qualifying rain events. A BMP inspection checklist must be filled out for inspections and maintained on-site with the SWPPP. The inspection checklist includes the necessary information covered in Section 7.6. A blank inspection checklist can be found in Appendix I. Completed checklists shall be kept in CSMP Attachment 2 "Monitoring Records."

BMPs shall be maintained regularly to ensure proper and effective functionality. If necessary, corrective actions shall be implemented within 72 hours of identified deficiencies and associated amendments to the SWPPP shall be prepared by the QSD.

Specific details for maintenance, inspection, and repair of Construction Site BMPs can be found in the BMP Factsheets in Appendix H.

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# Section 5 Training

Appendix K identifies the QSPs for the Project. To promote stormwater management awareness specific for this Project, periodic training of job-site personnel shall be included as part of routine Project meetings (e.g. daily/weekly tailgate safety meetings), or task specific trainings as needed.

The QSP shall be responsible for providing this information at the meetings, and subsequently completing the training logs shown in Appendix J, which identifies the site-specific stormwater topics covered as well as the names of site personnel who attended the meeting. Tasks may be delegated to trained employees by the QSP provided adequate supervision and oversight is provided. Training shall correspond to the specific task delegated including: SWPPP implementation; BMP inspection and maintenance; and record keeping.

Documentation of training activities (formal and informal) is retained in SWPPP Appendix J.

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# Section 6 Responsible Parties and Operators

## 6.1 RESPONSIBLE PARTIES

The LRP who is responsible for SWPPP implementation and has authority to sign permit-related documents is listed below.

| *Name* | *Title* | *Phone Number* |
|---|---|---|
| *Antonio Rodriguez* | *Senior Project Engineer* | *(925) 913-4817* |

The QSP identified for the Project is identified in Appendix K. The QSP and QSP's designee shall have primary responsibility and significant authority for the implementation of SWPPP requirements described below. The QSP is responsible for non-storm water and storm water visual observations, sampling and analysis, and responsibility to ensure full compliance with the permit and implementation of all elements of the SWPPP, including the preparation of the annual compliance evaluation and the elimination of all unauthorized discharges. The QSP will be available via phone contact, at all times throughout the duration of the Project. Duties of QSP include but are not limited to:

- Ensuring full compliance with the SWPPP and the Permit
- Implementing all elements of the SWPPP, including but not limited to:
  - Implementation of prompt and effective erosion and sediment control measures
  - Implementing all non-storm water management, and materials and waste management activities such as monitoring discharges (dewatering, diversion devices)
  - General site clean-up
  - Vehicle and equipment cleaning, fueling and maintenance
  - Spill control
  - Ensuring that no materials other than storm water are discharged in quantities that will have an adverse effect on receiving waters or storm drain systems, etc.
- Weekly inspections
- Pre-storm inspections
- Post-storm inspections
- Storm event inspections
- Quarterly non-storm water discharges
- Retaining documentation necessary for the preparation of the annual report
- Ensuring elimination of all unauthorized discharges
- The QSP shall be assigned authority by the Esri Project Manager to mobilize crews in order to make immediate repairs to the control measures

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- Coordinate with the Esri Project Manager to assure all of the necessary corrections/repairs are made immediately, and that the Project complies with the SWPPP, the Permit and approved plans at all times
- Submitting Notices of Discharge and reports of Illicit Connections or Illegal Discharges

## 6.2 CONTRACTOR LIST

**Contractor (TBD)**

Name:

Title:

Company:

Address:

Phone Number:

Number (24/7):

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# Section 7 Construction Site Monitoring Program

## 7.1 PURPOSE

This Construction Site Monitoring Program was developed to address the following objectives:

1. To demonstrate that the site is in compliance with the Discharge Prohibitions of the Construction General Permit;
2. To determine whether non-visible pollutants are present at the construction site and are causing or contributing to exceedances of water quality objectives;
3. To determine whether immediate corrective actions, additional Best Management Practices (BMP) implementation, or SWPPP revisions are necessary to reduce pollutants in stormwater discharges and authorized non-stormwater discharges;
4. To determine whether BMPs included in the SWPPP are effective in preventing or reducing pollutants in stormwater discharges and authorized non-stormwater discharges.

## 7.2 APPLICABILITY OF PERMIT REQUIREMENTS

This Project has been determined to be a Risk Level 1 Project. The General Permit identifies the following types of monitoring as being applicable for a Risk Level 1 Project.

- Visual inspections of Best Management Practices (BMPs);
- Visual monitoring of the site related to qualifying storm events;
- Visual monitoring of the site for non-stormwater discharges;
- Sampling and analysis of construction site runoff for non-visible pollutants when applicable; and
- Sampling and analysis of construction site runoff as required by the Regional Water Board when applicable.

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## 7.3. WEATHER AND RAIN EVENT TRACKING

Visual monitoring and inspections requirements of the General Permit are triggered by a qualifying rain event. The General Permit defines a qualifying rain event as any event that produces ½ inch of precipitation. A minimum of 48 hours of dry weather will be used to distinguish between separate qualifying storm events.

### 7.3.1 Weather Tracking

The QSP should daily consult the National Oceanographic and Atmospheric Administration (NOAA) for the weather forecasts. These forecasts shall be obtained only from the National Oceanographic Atmospheric Administration (NOAA) at the following website: http://www.srh.noaa.gov/. Weather reports should be printed and maintained with the SWPPP in CSMP Attachment 1 "Weather Reports".

According to the General Permit, a qualifying rain event produces ½ inch or more of precipitation within a 48 hour or greater period between events. **Per the State Water Resources Control Board (SWRCB) website's General Construction "Frequently Asked Questions," No. 49, an adequate trigger for a pre-storm event visual inspection is a 50% or greater probability of producing precipitation based on NOAA's forecast.** This guideline shall be utilized for this Project.

#### *7.3.2 Rain Gauges*

The QSP shall install a rain gauge on the Project site. Locate the gauge in an open area away from obstructions such as trees or overhangs. Mount the gauge on a post at a height of 3 to 5 feet with the gauge extending several inches beyond the post. Make sure that the top of the gauge is level. Make sure the post is not in an area where rainwater can indirectly splash from sheds, equipment, trailers, etc.

The rain gauge(s) shall be read daily during normal site scheduled hours. The rain gauge should be read at approximately the same time every day and the date and time of each reading recorded. Log rain gauge readings in CSMP Attachment 1 "Weather Records". Follow the rain gauge instructions to obtain accurate measurements.

If the option to a site rain gauge is chosen, refer to the chosen governmental rain gauge for comparison. Once the rain gauge reading has been recorded, accumulated rain shall be emptied and the gauge reset.

## 7.4 Monitoring Locations

Monitoring locations are shown on the Site Maps in Appendix B. Monitoring locations are described in the Sections 7.6 and 7.7.

Whenever changes in the construction site might affect the appropriateness of sampling locations, the sampling locations shall be revised accordingly. All such revisions shall be implemented as soon as feasible and the SWPPP amended. Temporary changes that result in a one-time additional sampling location do not require a SWPPP amendment.

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## 7.5 Safety and Monitoring Exemptions

Safety practices for sample collection will be in accordance with the QSP's or the sampling personnel designated by the QSP's Health and Safety Plan. A summary of the safety requirements that apply to sampling personnel is provided below.

- **Animals and Plants** – Be alert for the presence of snakes, rodents, insects, and poisonous plants and avoid contact. Long pants are recommended for all field crews.
- **Construction Operations** – Follow construction site safety protocols. Be aware of trip and slip hazards and confirm activities before entering constructions zones. Obey all caution and danger signage.
- **Lifting heavy objects** – Use proper lifting techniques.
- **Rough terrain** – Wear boots with non-slip soles. Use appropriate caution when walking in rough terrain. Two person-sampling crews are recommended when working from or descending steep banks where the water is greater than knee deep.
- **Weather** – Observe weather conditions, avoid lightning strike prone features, wear appropriate clothing, and be aware of flash flood dangers.
- **Reagents, preservatives** – Wear appropriate personal protective equipment (PPE) when using reagents or preservatives.

This Project is not required to collect samples or conduct visual observations (inspections) under the following conditions:

- During dangerous weather conditions such as flooding and electrical storms.
- Outside of scheduled site business hours.

**Scheduled site business hours are: Monday-Friday, 7a.m. – 7p.m.**

If monitoring (visual monitoring or sample collection) of the site is unsafe because of the dangerous conditions noted above then the QSP shall document the conditions for why an exception to performing the monitoring was necessary. The exemption documentation shall be filed in CSMP Attachment 2 "Monitoring Records".

## 7.6 Visual Monitoring

Visual monitoring includes observations and inspections. Inspections of BMPs are required to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Visual observations of the site are required to observe storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources.

Table 7.1 identifies the required frequency of visual observations and inspections. Inspections and observations will be conducted at the locations identified in Section 7.6.3.

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**Table 7.1 Summary of Visual Monitoring and Inspections**

| Type of Inspection | Frequency |
|---|---|
| *Routine Inspections* | |
| BMP Inspections | Weekly[1] |
| BMP Inspections – Tracking Control | Daily |
| BMP Inspections – Sediment Control | Weekly |
| Non-Stormwater Discharge Observations | Quarterly during daylight hours |
| *Rain Event Triggered Inspections* | |
| Site Inspections Prior to a Qualifying Event | Within 48 hours of a qualifying event [2] |
| BMP Inspections During an Extended Storm Event | Every 24-hour period of a rainevent[2] |
| Site Inspections Following a Qualifying Event | Within 48 hours of a qualifying event[2] |

[1] Most BMPs must be inspected weekly; those identified below must be inspected more frequently.

[2] Inspections are only required during scheduled site operating hours. Note however, these inspections are required daily regardless of the amount of precipitation.

### *7.6.1 Routine Observations and Inspections*

Routine site inspections and visual monitoring are necessary to ensure that the Project is in compliance with the requirements of the Construction General Permit.

#### *7.6.1.1 Routine BMP Inspections*

Inspections of BMPs are conducted to identify and record:

- BMPs that are properly installed;
- BMPs that need maintenance to operate effectively;
- BMPs that have failed; or
- BMPs that could fail to operate as intended.

#### *7.6.1.2 Quarterly Non-Stormwater Discharge Observations*

Non-stormwater discharge inspections will be conducted at each drainage area per quarter at the construction site during normal daylight business hours within the following periods:

- January – March,
- April – June,
- July – September, and
- October – December.

Quarterly inspections will be documented using the Visual Inspection Field Log, provided in Attachment 3 “Example Forms”, and maintained on-site with the SWPPP. Refer to Section 7.5 for typical business hours. Inspections will record:

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### 7.6.2 Rain-Event Triggered Observations and Inspections

The QSP shall visually inspect the construction site and the BMPs in place within two days (48 hours) prior to a qualifying rain event, and within two days (48 hours) after a qualifying rain event. In order to satisfy the Permit requirements, pre-rain inspections will be conducted after consulting NOAA and determining that a precipitation event with a 50% or greater probability of precipitation has been predicted. This will ensure that a qualifying rain event is properly documented. These inspections are only required within normal business hours of the construction site.

#### *7.6.2.1 Visual Observations Prior to a Forecasted Qualifying Rain Event*

Within 48-hours prior to a qualifying event a stormwater visual monitoring site inspection will include observations of the following locations:

- Stormwater drainage areas to identify any spills, leaks, or uncontrolled pollutant sources;
- BMPs to identify if they have been properly implemented;
- Any stormwater storage and containment areas to detect leaks and ensure maintenance of adequate freeboard.

Consistent with guidance from the State Water Resources Control Board, pre-rain BMP inspections and visual monitoring will be triggered by a NOAA forecast that indicates a probability of precipitation of 50% or more in the Project area.

#### *7.6.2.2 BMP Inspections During an Extended Storm Event*

During an extended rain event BMP inspections will be conducted to identify and record:

- BMPs that are properly installed;
- BMPs that need maintenance to operate effectively;
- BMPs that have failed; or
- BMPs that could fail to operate as intended.

If the construction site is not accessible during the rain event, the visual inspections shall be performed at all relevant outfalls, discharge points, downstream locations. The inspections should record any projected maintenance activities.

#### 7.6.2.3 Visual Observations Following a Qualifying Rain Event

Within 48 hours following a qualifying rain event (0.5 inches of rain) a stormwater visual monitoring site inspection is required to observe:

- Stormwater drainage areas to identify any spills, leaks, or uncontrolled pollutant sources;
- BMPs to identify if they have been properly designed, implemented, and effective;
- Need for additional BMPs;
- Any stormwater storage and containment areas to detect leaks and ensure maintenance of adequate freeboard; and
- Discharge of stored or contained rain water.

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### 7.6.3 Visual Monitoring Procedures

Visual monitoring shall be conducted by the QSP or staff trained by and under the supervision of the QSP.

The name(s) and contact number(s) of the site visual monitoring personnel will be listed below when determined and their training qualifications provided in Appendix J.

Assigned inspector: Contact phone:

Alternate inspector: Contact phone:

Stormwater observations shall be documented on the *Visual Inspection Field Log Sheet* (see CSMP Attachment 3 "Example Forms"). BMP inspections shall be documented on the site specific BMP inspection checklist. Any photographs used to document observations will be referenced on stormwater site inspection report and maintained with the Monitoring Records in Attachment 2.

The completed reports will be kept in CSMP Attachment 2 "Monitoring Records".

### 7.6.4 Visual Monitoring Follow-Up and Reporting

Correction of deficiencies identified by the observations or inspections, including required repairs or maintenance of BMPs, shall be initiated and completed as soon as possible.

If identified deficiencies require design changes, including additional BMPs, the implementation of changes will be initiated within 72 hours of identification and be completed as soon as possible. When design changes to BMPs are required, the SWPPP shall be amended to reflect the changes.

Deficiencies identified in site inspection reports and correction of deficiencies will be tracked on the *Inspection Field Log Sheet* or *BMP Inspection Report* and shall be submitted to the QSP and shall be kept in CSMP Attachment 2 "Monitoring Records".

The QSP shall within 3 days of the inspection submit copies of the completed *Inspection Field Log Sheet* or *BMP Inspection Report* with the corrective actions.

Results of visual monitoring must be summarized and reported in the Annual Report.

### 7.6.5 Visual Monitoring Locations

The inspections and observations identified in Sections 7.6.1 and 7.6.2 will be conducted at the locations identified in this section.

BMP locations are shown on the Site Maps in Appendix B.

There are three (3) drainage areas on the Project site and the contractor's yard, staging areas, and storage areas. A fourth drainage area runs through a small portion of the undisturbed area of the Project site and was subsequently not included. Table 7.2 identifies each drainage area by location.

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**Table 7.2 Site Drainage Areas**

| Location No. | Location |
|---|---|
| 1 | Southwest portion of the site traveling northeast to Avenue J. |
| 2 | Center portion of the site started just southwest of Avenue J and traveling Northeast to the far corner of the site. |
| 3 | Northwest portion of the site traveling northeast to the northern portion of the site.. |

There are two (2) discharge locations on the Project site. Site stormwater discharge locations are shown on the Site Maps in Appendix B and Table 7.3 identifies each stormwater discharge location.

**Table 7.3 Site Stormwater Discharge Locations**

| Location No. | Location |
|---|---|
| 1 | Northeast corner of the southern portion of the site. |
| 2 | Northeast corner of the northern portion of the site. |

## 7.7 WATER QUALITY SAMPLING AND ANALYSIS

### 7.7.1 Sampling and Analysis Plan for Non-Visible Pollutants in Stormwater Runoff Discharges

This Sampling and Analysis Plan for Non-Visible Pollutants describes the sampling and analysis strategy and schedule for monitoring non-visible pollutants in stormwater runoff discharges from the Project site.

Sampling for non-visible pollutants will be conducted when (1) a breach, leakage, malfunction, or spill is observed; and (2) the leak or spill has not been cleaned up prior to the rain event; and (3) there is the potential for discharge of non-visible pollutants to surface waters or drainage system.

Construction materials, wastes, or activities, as identified in Section 2.5, are potential sources of non-visible pollutants to stormwater discharges from the Project. Storage, use, and operational locations are shown on the Site Maps in Appendix B.

The following is a list of construction materials that will be used on site that may have the potential to contribute to pollutants in stormwater discharges:

- Vehicle fluids, including (but not limited to) oil, grease, petroleum, and coolants
- Asphaltic emulsions associated with asphalt-concrete paving operations
- Cement materials associated with PCC paving operations
- Base and sub base material
- Joint and curing compounds

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- Concrete curing compounds
- BMP materials
- General litter
- Metals and plated products

The following is a list of solid or construction wastes that will be (or may be) created on site that may have the potential to contribute to pollutants in stormwater discharges:

- Packaging materials including wood, paper and plastic
- Scrap metals
- Rubber
- Plastic
- Glass
- Food wastes
- Steel
- Non-hazardous equipment parts
- Styrofoam
- Hazardous wastes
- Concrete wastes

The following is a list of construction activities that will be performed on site that may have the potential to contribute to sediment in stormwater discharges:

- Minimal clearing and grubbing
- Minimal grading
- Foundation driving operations
- Switchyard construction

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#### *7.7.1.1 Sampling Schedule*

Samples for the potential non-visible pollutant(s) and a sufficiently large unaffected background sample shall be collected during the first two hours of discharge from rain events that result in a sufficient discharge for sample collection. Samples shall be collected during the site's scheduled hours and shall be collected regardless of the time of year and phase of the construction.

Collection of discharge samples for non-visible pollutant monitoring will be triggered when any of the following conditions are observed during site inspections conducted prior to or during a rain event.

- Materials or wastes containing potential non-visible pollutants are not stored under watertight conditions. Watertight conditions are defined as (1) storage in a watertight container, (2) storage under a watertight roof or within a building, or (3) protected by temporary cover and containment that prevents stormwater contact and runoff from the storage area.
- Materials or wastes containing potential non-visible pollutants are stored under watertight conditions, but (1) a breach, malfunction, leakage, or spill is observed, (2) the leak or spill is not cleaned up prior to the rain event, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- A construction activity, including but not limited to those in Section 2.5, with the potential to contribute non-visible pollutants (1) was occurring during or within 24 hours prior to the rain event, (2) BMPs were observed to be breached, malfunctioning, or improperly implemented, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- Soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied, and there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- Stormwater runoff from an area contaminated by historical usage of the site has been observed to combine with stormwater runoff from the site, and there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.

#### *7.7.1.2 Sampling Locations*

Sampling locations are based on proximity to planned non-visible pollutant storage, occurrence or use; accessibility for sampling, and personnel safety. Planned non-visible pollutant sampling locations are shown on the Site Maps in Appendix B and include the following:

- Based on the QSP's routine monitoring inspections, sampling will be conducted when it is evident that a breach, malfunction, or spill has occurred. The sampling location(s) will be field located down-gradient from the area(s) and from runoff that has come into contact with the pollutant material.
    - The down-gradient sample location(s), will be designated as D1, D2, etc. as appropriate, and will be field located depending on construction phasing and

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location of materials and equipment, and will be shown on the Site Maps at the time the location is identified.

- Up-gradient sampling locations will be identified for the collection of an uncontaminated runoff sample (background sample) for comparison with the down-gradient samples. The up-gradient samples will be analyzed for the same non-visible pollutants as the down-gradient samples. The location(s) will be selected so that the runoff sample will not have come in contact with the pollutant material.
    - The up-gradient sample location(s), will be designated as U1, U2, etc. as appropriate, and will be field located depending on construction phasing and location of materials and equipment, and will be shown on the Site Maps at the time the location is identified.
- Since there are no known areas of historical contamination at this site, there are no designated sampling locations. If areas of contamination are subsequently discovered during construction activities, the SWPPP shall be amended by a QSD.

#### *7.7.1.3 Monitoring Preparation*

Non-visible pollutant samples will be collected by the designated consultant.

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the Project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool temperature environment that will not come into contact with rain or direct sunlight. Sampling personnel will be available to collect samples in accordance with the sampling schedule. Supplies maintained at the Project site will include, but are not limited to, clean powder-free nitrile gloves, sample collection equipment, coolers, appropriate number and volume of sample bottles, identification labels, re-sealable storage bags, paper towels, personal rain gear, ice, and *Effluent Sampling Field Log Sheets* and Chain of Custody (CoC) forms, which are provided in CSMP Attachment 3 “Example Forms”.

Samples on the Project site will be collected by the following (TBD):

*Company Name:*

*Street Address:*

*City, State Zip:*

*Telephone Number:*

*Point of Contact:*

The QSP or his/her designee will contact the contracted sampler (TBD) 24 hours prior to a predicted rain event or for an unpredicted event, as soon as a rain event begins if one of the triggering conditions is identified during an inspection to ensure that adequate sample collection personnel and supplies for monitoring non-visible pollutants are available and will be mobilized to collect samples on the Project site in accordance with the sampling schedule.

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#### *7.7.1.4 Analytical Constituents*

Table 7.4 lists the specific sources and types of potential non-visible pollutants on the Project site and the water quality indicator constituent(s) for that pollutant.

**Table 7.4 Potential Non-Visible Pollutants and Water Quality Indicator Constituents**

| Pollutant Source | Pollutant | Water Quality Indicator Constituent |
|---|---|---|
| Cleaning products | Acids/ Bleaches/ Solvents | pH/ chlorine/ VOC, SVOC |
| Agriculture | Pesticides, Herbicides, Fertilizers, and other Soil Amendments | Pesticides, Herbicides, Nitrate |
| Line Flushing | Chlorinated Water | Total chlorine |
| Adhesives | Adhesives | COD/ Phenols/ SVOC |
| Vehicle | Batteries | Sulfuric Acid, Lead, pH |

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#### *7.7.1.5 Sample Collection*

Samples of discharge shall be collected at the designated non-visible pollutant sampling locations shown on the Site Maps in Appendix B or in the locations determined by observed breaches, malfunctions, leakages, spills, operational areas, soil amendment application areas, and historical site usage areas that triggered the sampling event.

Grab samples shall be collected and preserved in accordance with the methods identified in Table 7.5, "Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants" provided in Section 7.7.1.6. Only the QSP, or personnel trained in water quality sampling under the direction of the QSP shall collect samples.

Sample collection and handling requirements are described in Section 7.7.7.

#### *7.7.1.6 Sample Analysis*

Samples shall be analyzed using the analytical methods identified in the Table 7.5.

Samples will be analyzed by the following contracted laboratory:

| | |
|---|---|
| Laboratory Name: | Pat-Chem Laboratories |
| Street Address: | 11990 Discovery Court Moorpark, CA 93021 |
| City, State Zip: | Moorpark, CA 93021 |
| Telephone Number: | (805) 532-0012 |
| Point of Contact: | Gary Goodwin |
| ELAP Certification Number: | 1531 |

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**Table 7.5 Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants**

| Constituent | Analytical Method | Minimum Sample Volume | Sample Containers | Sample Preservation | Reporting Limit | Maximum Holding Time |
|---|---|---|---|---|---|---|
| VOCs-Solvents | EPA 8260B | 3 x 40 mL | VOA-glass | Store at 4˚ C, HCl to pH<2 | 1 mg/L | 14 days |
| SVOCs | EPA 8270C | 1 x 1 L | Glass-amber | Store at 4˚ C | 10 mg/L | 7 days |
| Pesticides/PCBs | EPA 8081A/8082 | 1 x 1 L | Glass-amber | Store at 4˚ C | 0.1 mg/L | 7 days |
| Herbicides | EPA 8151A | 1 x 1 L | Glass-amber | Store at 4˚ C | Check Lab | 7 days |
| BOD | EPA 405.1 | 1 x 500 mL | Polypropylene | Store at 4˚ C | 1 mg/L | 48 hours |
| COD | EPA 410.4 | 1 x 250 mL | Glass-Amber | Store at 4˚ C, H2SO4 to pH<2 | 5 mg/L | 28 days |
| DO | SM 4500-O G | 1 x 250 mL | Glass-Amber | Store at 4˚ C | Check Lab | 8 hours |
| pH | EPA 150.1 | 1 x 100 mL | Polypropylene | None | unitless | Immediate |
| Alkalinity | SM 2320B | 1 x 250 mL | Polypropylene | Store at 4˚ C | 1 mg/L | 14 days |
| Metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Na, Th, Va, Zn) | EPA 6010B/7470A | 1 x 250 mL | Polypropylene | Store at 4˚ C, HNO3 to pH<2 | 0.1 mg/L | 6 months |
| Metals (Chromium VI) | EPA 7199 | 1 x 500 mL | Polypropylene | Store at 4˚ C | 0.1mg/L | 24 hours |

Notes:

| | | | | | |
|---|---|---|---|---|---|
| °C | – | Degrees Celsius | mg/L | – | Micrograms per Liter |
| BOD | – | Biological Oxygen Demand | ml | – | Milliliter |
| COD | – | Chemical Oxygen Demand | PCB | – | Polychlorinated Biphenyl |
| DO | – | Dissolved Oxygen | SVOC | – | Semi-Volatile Organic Compound |
| EPA | – | Environmental Protection Agency | SM | – | Standard Method |
| HCl | – | Hydrogen Chloride | TPH | – | Total Petroleum Hydrocarbons |
| $H_2SO_4$ | – | Hydrogen Sulfide | TRPH | – | Total Recoverable Petroleum Hydrocarbons |
| $HNO_3$ | – | Nitric Acid | VOA | – | Volatile Organic Analysis |
| L | – | Liter | VOC | – | Volatile Organic Compound |
| mg/L | – | Milligrams per Liter | | | |

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#### *7.7.1.7 Data Evaluation and Reporting*

The QSP shall complete an evaluation of the water quality sample analytical results.

Runoff/downgradient results shall be compared with the associated upgradient/unaffected results and any associated run-on results. Should the runoff/downgradient sample show an increased level of the tested analyte relative to the unaffected background sample, which cannot be explained by run-on results, the BMPs, site conditions, and surrounding influences shall be assessed to determine the probable cause for the increase.

As determined by the site and data evaluation, appropriate BMPs shall be repaired or modified to mitigate discharges of non-visible pollutant concentrations. Any revisions to the BMPs shall be recorded as an amendment to the SWPPP.

The General Permit prohibits the storm water discharges that contain hazardous substances equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4. The results of any non-stormwater discharge results that indicate the presence of a hazardous substance in excess of established reportable quantities shall be immediately reported to the Regional Water Board and other agencies as required by 40 C.F.R. §§ 117.3 and 302.4.

Results of non-visible pollutant monitoring shall be reported in the Annual Report.

### 7.7.2 Sampling and Analysis Plan for pH and Turbidity in Stormwater Runoff Discharges

Sampling and analysis of runoff for pH and turbidity is not required for Risk Level 1 projects.

### 7.7.3 Additional Monitoring Following an NEL Exceedance

This Project is not subject to NELs.

### 7.7.4 Sampling and Analysis Plan for Non-Stormwater Discharges

This Project is not subject to the non-stormwater sampling and analysis requirements of the General Permit because it is a Risk Level 1 project.

### 7.7.5 Sampling and Analysis Plan for Other Pollutants Required by the Regional Water Board

The Regional Water Board has not specified monitoring for additional pollutants.

### 7.7.6 Training of Sampling Personnel

Sampling personnel shall be trained to collect, maintain, and ship samples in accordance with the Surface Water Ambient Monitoring program (SWAMP) 2008 Quality Assurance Program Plan (QAPrP). Training records of designated contractor sampling personnel are provided in Appendix J.

Properly trained sampling personnel have been contracted through Pat-Chem Laboratories.

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## 7.7.7 Sample Collection and Handling

### *7.7.7.1 Sample Collection*

Samples shall be collected at the designated sampling locations shown on the Site Maps and listed in the preceding sections. Samples shall be collected, maintained and shipped in accordance with the SWAMP 2008 Quality Assurance Program Plan (QAPrP).

Grab samples shall be collected and preserved in accordance with the methods identified in preceding sections.

To maintain sample integrity and prevent cross-contamination, sample collection personnel shall follow the protocols below.

- Collect samples (for laboratory analysis) only in analytical laboratory-provided sample containers;
- Wear clean, powder-free nitrile gloves when collecting samples;
- Change gloves whenever something not known to be clean has been touched;
- Change gloves between sites;
- Decontaminate all equipment (e.g. bucket, tubing) prior to sample collection using a trisodium phosphate water wash, distilled water rinse, and final rinse with distilled water. (Dispose of wash and rinse water appropriately, i.e., do not discharge to storm drain or receiving water). Do not decontaminate laboratory provided sample containers;
- Do not smoke during sampling events;
- Never sample near a running vehicle;
- Do not park vehicles in the immediate sample collection area (even non-running vehicles);
- Do not eat or drink during sample collection; and
- Do not breathe, sneeze, or cough in the direction of an open sample container.

The most important aspect of grab sampling is to collect a sample that represents the entire runoff stream. Typically, samples are collected by dipping the collection container in the runoff flow paths and streams as noted below.

i. For small streams and flow paths, simply dip the bottle facing upstream until full.
ii. For larger stream that can be safely accessed, collect a sample in the middle of the flow stream by directly dipping the mouth of the bottle. Once again making sure that the opening of the bottle is facing upstream as to avoid any contamination by the sampler.
iii. For larger streams that cannot be safely waded, pole-samplers may be needed to safely access the representative flow.
iv. Avoid collecting samples from ponded, sluggish or stagnant water.
v. Avoid collecting samples directly downstream from a bridge as the samples can be affected by the bridge structure or runoff from the road surface.

Note, that depending upon the specific analytical test, some containers may contain preservatives. These containers should **never** be dipped into the stream, but filled indirectly from the collection container.

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#### *7.7.7.2 Sample Handling*

Turbidity and pH measurements must be conducted immediately. Do not store turbidity or pH samples for later measurement.

Samples for laboratory analysis must be handled as follows. Immediately following sample collection:

- Cap sample containers;
- Complete sample container labels;
- Sealed containers in a re-sealable storage bag;
- Place sample containers into an ice-chilled cooler;
- Document sample information on the *Effluent Sampling Field Log Sheet*; and
- Complete the CoC.

All samples for laboratory analysis must be maintained between 0-6 degrees Celsius during delivery to the laboratory. Samples must be kept on ice, or refrigerated, from sample collection through delivery to the laboratory. Place samples to be shipped inside coolers with ice. Make sure the sample bottles are well packaged to prevent breakage and secure cooler lids with packaging tape.

Ship samples that will be laboratory analyzed to the analytical laboratory right away. Hold times are measured from the time the sample is collected to the time the sample is analyzed. The General Permit requires that samples be received by the analytical laboratory within 48 hours of the physical sampling (unless required sooner by the analytical laboratory).

| | |
|---|---|
| Laboratory Name: | Pat-Chem Laboratories |
| Address: | 11990 Discovery Court Moorpark, CA 93021 |
| City, State Zip: | Moorpark, CA 93021 |
| Telephone Number: | (805) 532-0012 |
| Point of Contact: | Gary Goodwin |

#### *7.7.7.3 Sample Documentation Procedures*

All original data documented on sample bottle identification labels, *Effluent Sampling Field Log Sheet*, and CoCs shall be recorded using waterproof ink. These shall be considered accountable documents. If an error is made on an accountable document, the individual shall make corrections by lining through the error and entering the correct information. The erroneous information shall not be obliterated. All corrections shall be initialed and dated.

Duplicate samples shall be identified consistent with the numbering system for other samples to prevent the laboratory from identifying duplicate samples. Duplicate samples shall be identified in the Effluent Sampling Field Log Sheet.

Sample documentation procedures include the following:

<u>Sample Bottle Identification Labels:</u> Sampling personnel shall attach an identification label to each sample bottle. Sample identification shall uniquely identify each sample location.

PRELIMINARY

Field Log Sheets: Sampling personnel shall complete the *Effluent Sampling Field Log Sheet* and *Receiving Water Sampling Field Log Sheet* for each sampling event, as appropriate.

Chain of Custody: Sampling personnel shall complete the CoC for each sampling event for which samples are collected for laboratory analysis. The sampler will sign the CoC when the sample(s) is turned over to the testing laboratory or courier.

## 7.8 ACTIVE TREATMENT SYSTEM MONITORING

An Active Treatment System (ATS) will be deployed on the site?

☐ Yes ☒ No

This Project does not require a Project specific Sampling and Analysis Plan for an ATS because deployment of an ATS is not planned.

## 7.9 BIOASSESSMENT MONITORING

This Project is not subject to bioassessment monitoring because it is not a Risk Level 3 project.

## 7.10 WATERSHED MONITORING OPTION

This Project is not participating in a watershed monitoring option.

## 7.11 QUALITY ASSURANCE AND QUALITY CONTROL

An effective Quality Assurance and Quality Control (QA/QC) plan shall be implemented as part of the CSMP to ensure that analytical data can be used with confidence. QA/QC procedures to be initiated include the following:

- Field logs;
- Clean sampling techniques;
- CoCs;
- QA/QC Samples; and
- Data verification.

Each of these procedures is discussed in more detail in the following sections.

### 7.11.1 Field Logs

The purpose of field logs is to record sampling information and field observations during monitoring that may explain any uncharacteristic analytical results. Sampling information to be included in the field log include the date and time of water quality sample collection, sampling personnel, sample container identification numbers, and types of samples that were collected. Field observations should be noted in the field log for any abnormalities at the sampling location (color, odor, BMPs, etc.). Field measurements for pH and turbidity should also be recorded in the field log. A Visual Inspection Field Log and an Effluent Sampling Field Log Sheet are included in CSMP Attachment 3 “Example Forms”.

### 7.11.2 Clean Sampling Techniques

Clean sampling techniques involve the use of certified clean containers for sample collection and clean powder-free nitrile gloves during sample collection and handling. As discussed in Section

PRELIMINARY

7.7.7, adoption of a clean sampling approach will minimize the chance of field contamination and questionable data results.

### 7.11.3 Chain of Custody

The sample CoC is an important documentation step that tracks samples from collection through analysis to ensure the validity of the sample. Sample CoC procedures include the following:

- Proper labeling of samples;
- Use of CoC forms for all samples; and
- Prompt sample delivery to the analytical laboratory.

Analytical laboratories usually provide CoC forms to be filled out for sample containers. An example CoC is included in CSMP Attachment 3 "Example Forms".

### 7.11.4 QA/QC Samples

QA/QC samples provide an indication of the accuracy and precision of the sample collection; sample handling; field measurements; and analytical laboratory methods. The following types of QA/QC will be conducted for this Project:

☒ Field Duplicates at a frequency of 10 percent or 1 duplicate minimum per sampling event.

☒ Field Blanks at a frequency of 10 percent or 1 duplicate minimum per sampling event.

#### *7.11.4.1 Field Duplicates*

Field duplicates provide verification of laboratory or field analysis and sample collection. Duplicate samples shall be collected, handled, and analyzed using the same protocols as primary samples. The sample location where field duplicates are collected shall be randomly selected from the discharge locations. Duplicate samples shall be collected immediately after the primary sample has been collected. Duplicate samples must be collected in the same manner and as close in time as possible to the original sample. Duplicate samples shall not influence any evaluations or conclusion.

#### *7.11.4.2 Field Blanks*

Field blanks assess potential sample contamination levels that occur during field sampling activities. De-ioninzed water field blanks are taken to the field, transferred to the appropriate container, and treated the same as the corresponding sample type during the course of a sampling event.

### 7.11.5 Data Verification

After results are received from the analytical laboratory, the QSP shall verify the data to ensure that it is complete, accurate, and the appropriate QA/QC requirements were met. Data must be verified as soon as the data reports are received. Data verification shall include:

- Check the CoC and laboratory reports.
  *Make sure all requested analyses were performed and all samples are accounted for in the reports.*

PRELIMINARY

- Check laboratory reports to make sure hold times were met and that the reporting levels meet or are lower than the reporting levels agreed to in the contract.
- Check data for outlier values and follow up with the laboratory.
  *Occasionally typographical errors, unit reporting errors, or incomplete results are reported and should be easily detected. These errors need to be identified, clarified, and corrected quickly by the laboratory. The QSP should especially note data that is an order of magnitude or more different than similar locations, or is inconsistent with previous data from the same location.*
- Check laboratory QA/QC results.
  *EPA establishes QA/QC checks and acceptable criteria for laboratory analyses. These data are typically reported along with the sample results. The QSP shall evaluate the reported QA/QC data to check for contamination (method, field, and equipment blanks), precision (laboratory matrix spike duplicates), and accuracy (matrix spikes and laboratory control samples). When QA/QC checks are outside acceptable ranges, the laboratory must flag the data, and usually provides an explanation of the potential impact to the sample results.*
- Check the data set for outlier values and, accordingly, confirm results and re-analyze samples where appropriate.
  *Sample re-analysis should only be undertaken when it appears that some part of the QA/QC resulted in a value out of the accepted range. Sample results may not be discounted unless the analytical laboratory identifies the required QA/QC criteria were not met and confirms this in writing.*

Field data including inspections and observations must be verified as soon as the field logs are received, typically at the end of the sampling event. Field data verification shall include:

- Check field logs to make sure all required measurements were completed and appropriately documented;
- Check reported values that appear out of the typical range or inconsistent;
  Follow-up immediately to identify potential reporting or equipment problems, if appropriate, recalibrate equipment after sampling;
- Verify equipment calibrations;
- Review observations noted on the field logs; and
- Review notations of any errors and actions taken to correct the equipment or recording errors.

## 7.12 RECORDS RETENTION

All records of stormwater monitoring information and copies of reports (including Annual Reports) must be retained for a period of at least three years from date of submittal or longer if required by the Regional Water Board.

Results of visual monitoring, field measurements, and laboratory analyses must be kept in the SWPPP along with CoCs, and other documentation related to the monitoring.

Records are to be kept onsite while construction is ongoing. Records to be retained include:

- The date, place, and time of inspections, sampling, visual observations, and/or measurements, including precipitation;

PRELIMINARY

- The individual(s) who performed the inspections, sampling, visual observation, and/or field measurements;
- The date and approximate time of field measurements and laboratory analyses;
- The individual(s) who performed the laboratory analyses;
- A summary of all analytical results, the method detection limits and reporting limits, and the analytical techniques or methods used;
- Rain gauge readings from site inspections;
- QA/QC records and results;
- Calibration records;
- Visual observation and sample collection exemption records; and
- The records of any corrective actions and follow-up activities that resulted from analytical results, visual observations, or inspections.

PRELIMINARY

# Section 8 References

Leighton Consulting, Inc., *Geotechnical Investigation (DRAFT)*, June 2012.

State Water Resources Control Board (2009). Order 2009-0009-DWQ, NPDES General Permit No. CAS000002: National Pollutant Discharges Elimination System (NPDES) California General Permit for Storm Water Discharge Associated with Construction and Land Disturbing Activities. Available on-line at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

State Water Resources Control Board (2010). Order 2010-0014-DWQ, NPDES General Permit No. CAS000002: National Pollutant Discharges Elimination System (NPDES) California General Permit for Storm Water Discharge Associated with Construction and Land Disturbing Activities. Available on-line at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

State Water Resources Control Board (2012). Order 2012-0006-DWQ, NPDES General Permit No. CAS000002: National Pollutant Discharges Elimination System (NPDES) California General Permit for Storm Water Discharge Associated with Construction and Land Disturbing Activities. Available on-line at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

CASQA 2009, *Stormwater BMP Handbook Portal: Construction*, November 2009, www.casqa.org

PRELIMINARY

# CSMP Attachment 1: Weather Reports

Place printed NOAA weather forecasts in this Attachment.

PRELIMINARY

# CSMP Attachment 2: Monitoring Records

Place completed BMP Inspection Forms, Visual Monitoring, Effluent Sampling and Receiving Water Field Logs, and Monitoring Exceptions in this Attachment.

PRELIMINARY

# CSMP Attachment 3: Example Forms

PRELIMINARY

| **Rain Gauge Log Sheet** | | | | |
|---|---|---|---|---|
| Construction Site Name: ***West Antelope Solar Project*** | | | | |
| WDID #: | | | | |
| Date (mm/dd/yy) | Time (24-hr) | Initials | Rainfall Depth (Inches) | Notes: |
| | | | | |
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PRELIMINARY

| ***Risk Level 1*** ***Visual Inspection Field Log Sheet*** | | | | | | |
|---|---|---|---|---|---|---|
| Date and Time of Inspection: | | | | Report Date: | | |
| Inspection Type: | ☐ Weekly | ☐ Before predicted rain | ☐ During rain event | ☐ Following qualifying rain event | ☐ Contained stormwater release | ☐ Quarterly non-stormwater |

| **Site Information** | |
|---|---|
| Construction Site Name: | |
| Construction stage and completed activities: | Approximate area of exposed site: |

| **Weather and Observations** | | | |
|---|---|---|---|
| Date Rain Predicted to Occur: | | Predicted % chance of rain: | |
| Estimate storm beginning: _____ (date and time) | Estimate storm duration:_____ (hours) | Estimate time since last storm: _____ (days or hours) | Rain gauge reading:_____ (inches) |

| Observations: If yes identify location | | |
|---|---|---|
| Odors | Yes ☐ | No ☐ |
| Floating material | Yes ☐ | No ☐ |
| Suspended Material | Yes ☐ | No ☐ |
| Sheen | Yes ☐ | No ☐ |
| Discolorations | Yes ☐ | No ☐ |
| Turbidity | Yes ☐ | No ☐ |

| **Site Inspections** | | | |
|---|---|---|---|
| **Outfalls or BMPs Evaluated** | | **Deficiencies Noted** | |
| (add additional sheets or attached detailed BMP Inspection Checklists) | | | |
| | | | |
| | | | |
| | | | |
| Photos Taken: | Yes ☐ | No ☐ | Photo Reference IDs: |

| **Corrective Actions Identified (note if SWPPP/REAP change is needed)** |
|---|
| |

| **Inspector Information** | |
|---|---|
| Inspector Name: | Inspector Title: |
| Signature: | Date: |

PRELIMINARY

**CHAIN-OF-CUSTODY** **DATE:** **Lab ID:**

**DESTINATION LAB:**

ATTN:

**ADDRESS:**

**Office Phone:**

**Cell Phone:**

**SAMPLED BY:**

**Contact:**

**Project Name**

REQUESTED ANALYSIS

Notes:

| Client Sample ID | Sample Date | Sample Time | Sample Matrix | Container # | Container Type | Container Pres. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| | | | | | | | | | | |
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SENDER COMMENTS:

**RELINQUISHED BY**

Signature:

Print:

Company:

Date: TIME:

LABORATORY COMMENTS:

**RECEIVED BY**

Signature:

Print:

Company:

Date: TIME:

PRELIMINARY

Pat-Chem Laboratories
11990 Discovery Court
Moorpark, CA 93021

# CHAIN OF CUSTODY RECORD

Phone (805) 532-0012
Fax (805) 532-0016

Sample I.D.#: _____

| | | |
|---|---|---|
| Customer Name | P.O.# | Project Location |
| Address | Phone # | Sampled by |
| City, State, Zip | Report Attention | |

| Lab # | Date Sampled | Time Sampled | Comp or Grab | Type **see below | SAMPLE DESCRIPTION | No. Rec. | Required Tests | Preservatives | Bottle Type |
|---|---|---|---|---|---|---|---|---|---|
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| | Signature | Print Name | Company | Date | Time |
|---|---|---|---|---|---|
| Relinquished by | | | | | |
| Received by | | | | | |
| Relinquished by | | | | | |
| Received by | | | | | |
| Relinquished by | | | | | |
| Received by | | | | | |

pH: _____

Temperature: _____

Initial Flow: _____

Final Flow: _____

** Type: AQ = aqueous NA = Nonaqueous SL = Sludge
SO = Soil PE = Petroleum OT = Other

Note: Samples are discarded 30 days after results are reported, unless other arrangements are made. Hazardous samples will be returned to client, or disposed at the CLIENTS expense.

Composite Sampler Setup Date: ___ / ___ / ___ Composite Sampler Setup Time: ___ : ___

# *Appendix A: Construction General Permit*

The complete document can be found at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo_2009_0009_complete.pdf

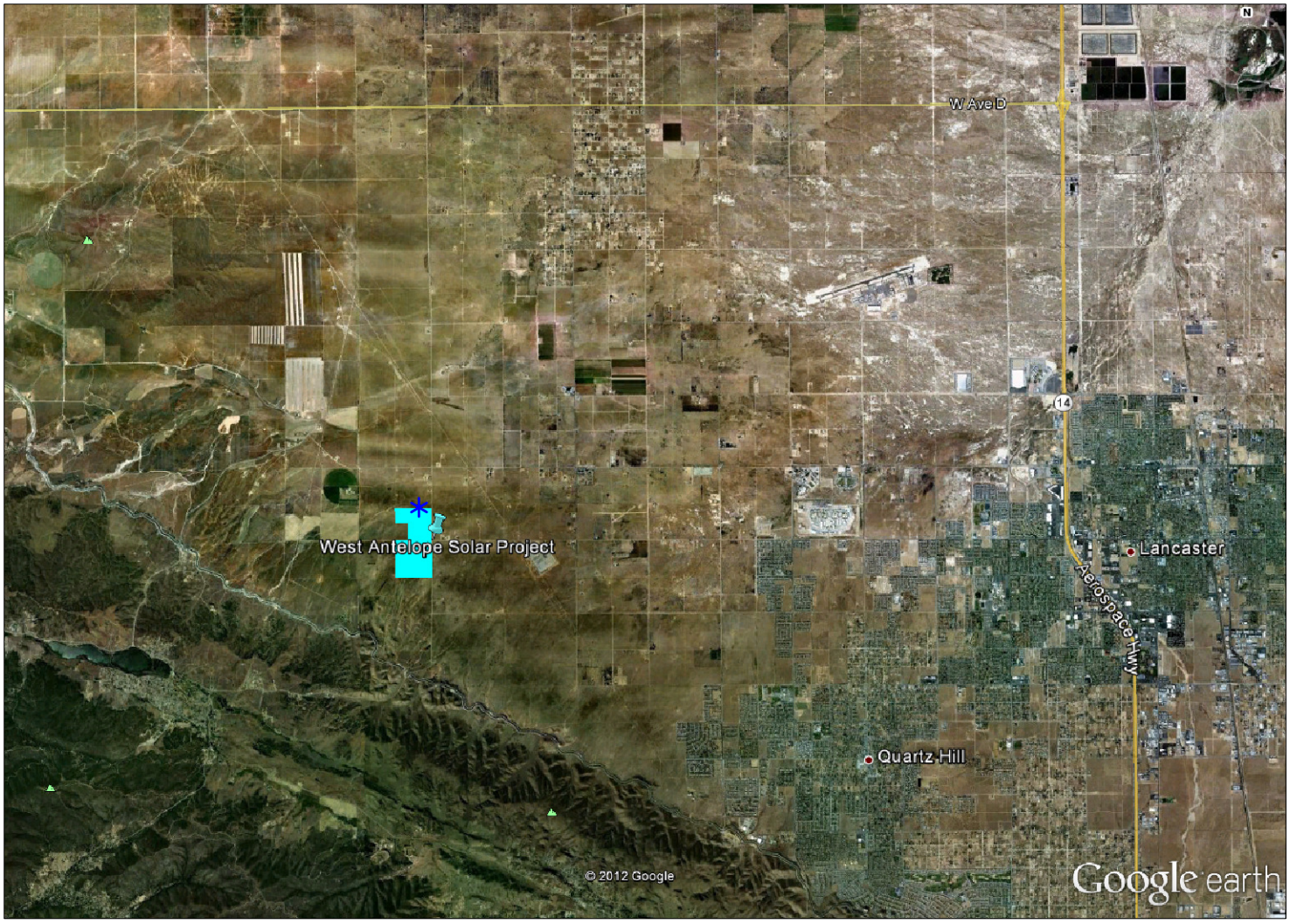
**Will be placed in field SWPPP**

PRELIMINARY

# *Appendix B: Site Maps*

PRELIMINARY

# VICINITY MAP
## FOR
## WEST ANTELOPE SOLAR PROJECT
## LOCATED WEST OF THE CITY OF LANCASTER
## IN UNINCORPORATED LOS ANGELES COUNTY, CA




**LEGEND:**

PROJECT AREA

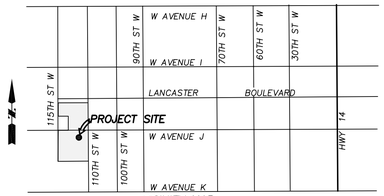
DISCHARGE POINT

N

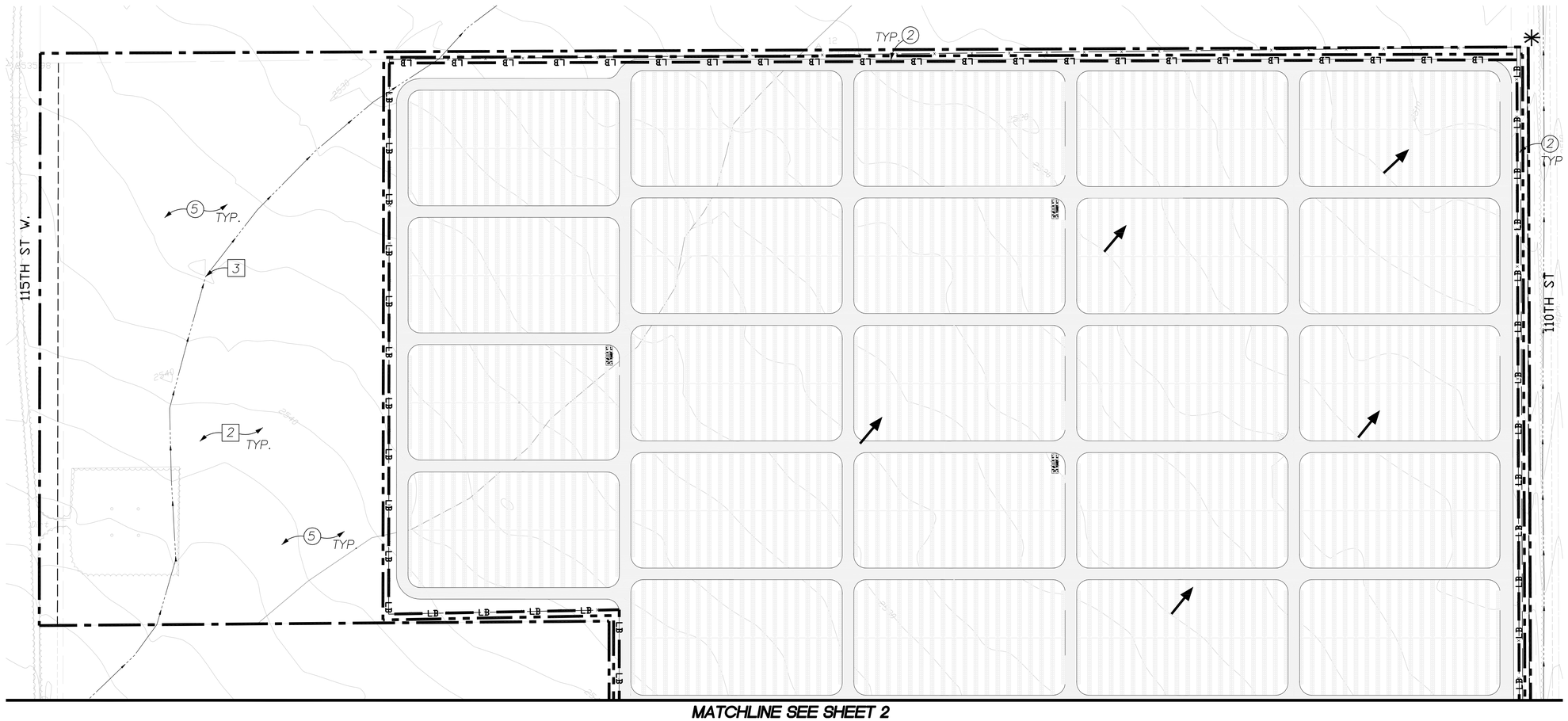
N.T.S.

AEI CASC CONSULTING
937 SOUTH VIA LATA, SUITE 500
COLTON, CA 92324
PH. (909) 783-0101; FAX (909) 783-0108

# STORM WATER POLLUTION PREVENTION PLAN
## PRELIMINARY SITE MAP
## FOR
# WEST ANTELOPE SOLAR PROJECT (RISK LEVEL 1)
## 110TH STREET W. AND W. AVENUE J, UNINCORPORATED LOS ANGELES COUNTY, CA




VICINITY MAP
NTS



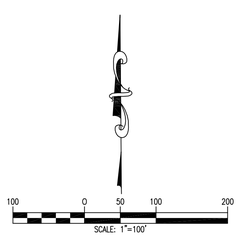

MATCHLINE SEE SHEET 2

## LEGEND

| | |
|---|---|
| MS | MATERIAL STORAGE (WM-1, WM-2), FIELD LOCATED BY QSP. |
| SP | STOCKPILE MANAGEMENT (WM-3), FIELD LOCATED BY QSP. |
| SW | SOLID WASTE MANAGEMENT (WM-5), FIELD LOCATED BY QSP. |
| HWM | HAZARDOUS WASTE MANAGEMENT (WM-6, IF NECESSARY), FIELD LOCATED BY QSP. |
| CW | CONCRETE WASHOUT (WM-8), FIELD LOCATED BY QSP. |
| SWM | SANITARY WASTE MANAGEMENT (WM-9), FIELD LOCATED BY QSP. |
| VEF | VEHICLE AND EQUIPMENT FUELING (NS-9), FIELD LOCATED BY QSP. |
| VES | VEHICLE AND EQUIPMENT MAINTENANCE (NS-10), FIELD LOCATED BY QSP. |
| | CONSTRUCTION ENTRANCE (TC-1) |
| | PROJECT BOUNDARY |
| | LIMITS OF DISTURBANCE |
| LB LB | SILT FENCE AND/OR FIBER ROLL (SE-1 AND/OR SE-5) |
| | FLOW LINE |
| | CHECK DAMS (SE-4, AS NEEDED) |
| | FLOW DIRECTION |
| | DISCHARGE POINTS |
| SL | UPSTREAM/DOWNSTREAM SAMPLE LOCATION, EXAMPLE SHOWN ON PLAN. QSP TO FIELD LOCATE AS NECESSARY. |

NOTE: RISK LEVEL 1 PROJECTS DO NOT NEED TO SAMPLE FOR pH AND TURBIDITY.

RISK LEVEL 1 PROJECTS SAMPLE WHEN THERE IS A NON-STORM WATER DISCHARGE. UPSTREAM AND DOWNSTREAM POINT(S) WILL VARY DEPENDING ON THE LOCATION OF THE SOURCE. THE QSP SHALL IDENTIFY THE UPSTREAM AND DOWNSTREAM LOCATIONS HEREON SHOULD A NON-STORM WATER DISCHARGE OCCUR.




## GENERAL NOTES

1. THIS PLAN IS ACCURATE FOR STORMWATER POLLUTION PREVENTION PURPOSES ONLY.
2. THE INFORMATION ON THIS PLAN IS INTENDED TO BE USED AS A GUIDELINE FOR THE QSP AND CONTRACTOR TO COMPLY WITH THE REQUIREMENTS OF THE STATE WATER RESOURCES CONTROL BOARD. FIELD CONDITIONS MAY NECESSITATE MODIFICATIONS TO THIS PLAN.

## POST CONSTRUCTION BMP'S

### SITE DESIGN BMP'S

1 PERMANENT INFILTRATION TRENCHES (THROUGHOUT THE SITE).

2 PRESERVATION OF NATURAL AREAS (THROUGHOUT THE SITE).

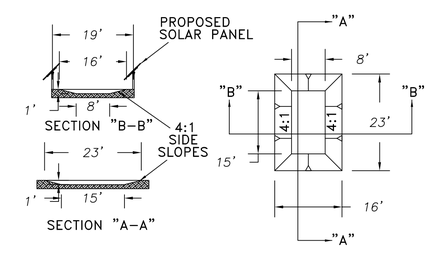
3 PRESERVATION OF EXISTING DRAINAGE PATTERNS.

### SOURCE CONTROL BMP'S

- EDUCATION OF PROPERTY OWNERS.
- ACTIVITY RESTRICTIONS.
- SPILL CONTINGENCY PLAN.
- EMPLOYEE TRAINING/EDUCATION PROGRAM.
- STREET SWEEPING PRIVATE STREETS.
- TRASH AND LITTER CONTROLS.
- DRAINAGE FACILITY INSPECTIONS AND MAINTENANCE.

## WATER POLLUTION CONTROL NOTES

1. INSTALL STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA BMP TC-1.
2. INSTALL SILT FENCE AND/OR FIBER ROLLS PER CASQA BMP SE-1 AND/OR SE-5, RESPECTIVELY.
3. INSTALL GRAVEL BAG BERM LINEAR BARRIER PER CASQA BMP SE-6.
4. IMPLEMENT STREET SWEEPING AND VACUUMING PER CASQA BMP SE-7.
5. PRESERVATION OF EXISTING VEGETATION PER CASQA BMP C-2.
6. APPLY HYDROSEED PER CASQA BMP EC-4.




1 TYPICAL INFILTRATION TRENCH DETAIL
N.T.S.

Know what's below. Call before you dig.

AEI CASC CONSULTING
937 SOUTH VIA LATA, SUITE 500
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

LOCATION:
110TH ST. W. AND W. AVE. J
UNINCORPORATED LA COUNTY

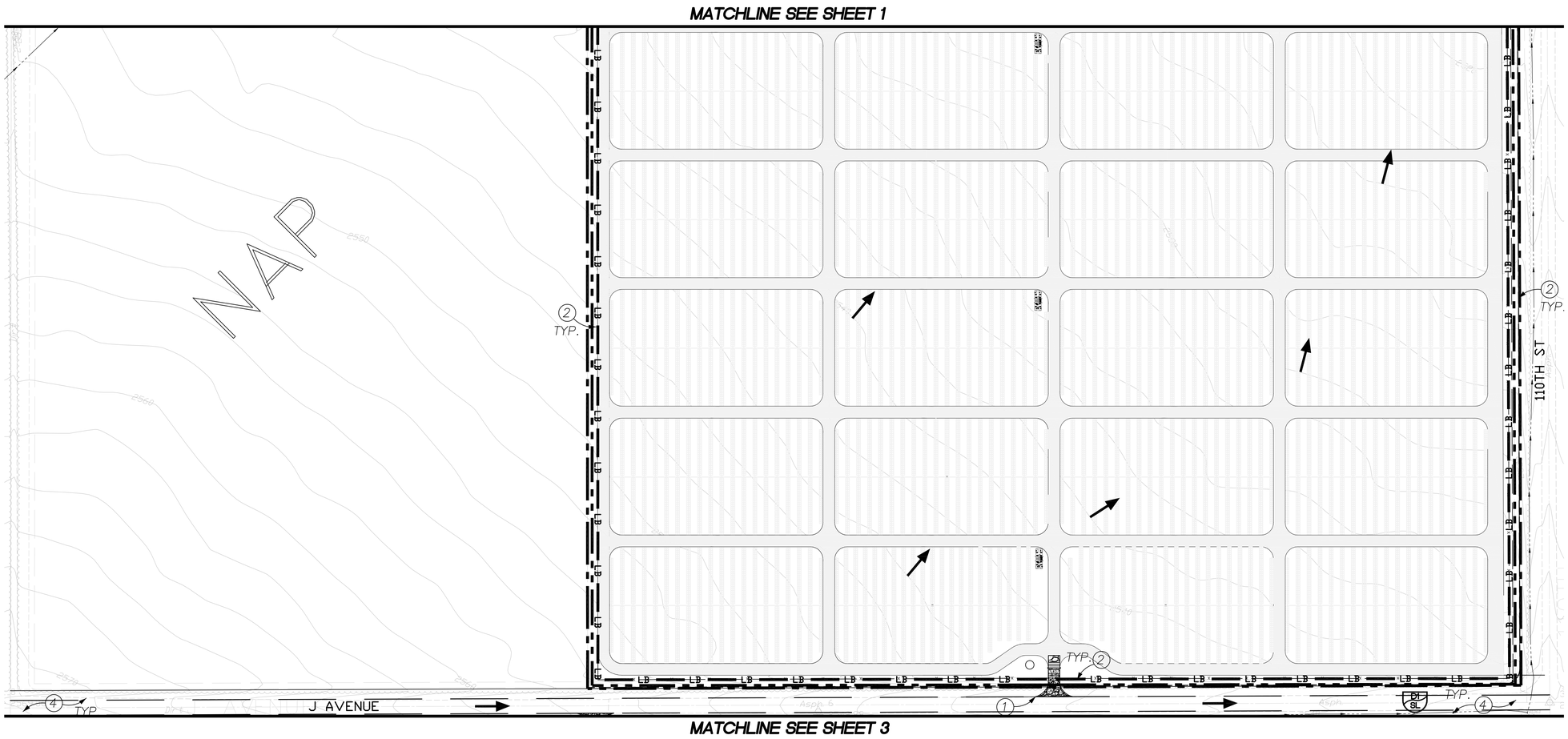
SWPPP (PRELIMINARY)
WEST ANTELOPE
SOLAR PROJECT
RISK LEVEL 1

SITE MAP-01

SHEET 1 OF 4

Drawing Name: Q:\1264-1001\SWPPP (Preliminary)\SWPPP_West Antelope Solar (Preliminary).dwg
Last Opened: Mar 20, 2013 - 2:39pm by jcopp

# STORM WATER POLLUTION PREVENTION PLAN
## PRELIMINARY SITE MAP
## FOR
# WEST ANTELOPE SOLAR PROJECT (RISK LEVEL 1)
## 110TH STREET W. AND W. AVENUE J, UNINCORPORATED LOS ANGELES COUNTY, CA




## LEGEND

| | |
|---|---|
| MS | MATERIAL STORAGE (WM-1, WM-2), FIELD LOCATED BY QSP. |
| SP | STOCKPILE MANAGEMENT (WM-3), FIELD LOCATED BY QSP. |
| SW | SOLID WASTE MANAGEMENT (WM-5), FIELD LOCATED BY QSP. |
| HWM | HAZARDOUS WASTE MANAGEMENT (WM-6, IF NECESSARY), FIELD LOCATED BY QSP. |
| CW | CONCRETE WASHOUT (WM-8), FIELD LOCATED BY QSP. |
| SWM | SANITARY WASTE MANAGEMENT (WM-9), FIELD LOCATED BY QSP. |
| VEF | VEHICLE AND EQUIPMENT FUELING (NS-9), FIELD LOCATED BY QSP. |
| VES | VEHICLE AND EQUIPMENT MAINTENANCE (NS-10), FIELD LOCATED BY QSP. |
| | CONSTRUCTION ENTRANCE (TC-1) |
| | PROJECT BOUNDARY |
| | LIMITS OF DISTURBANCE |
| LB LB | SILT FENCE AND/OR FIBER ROLL (SE-1 AND/OR SE-5) |
| | FLOW LINE |
| | CHECK DAMS (SE-4, AS NEEDED) |
| | FLOW DIRECTION |
| | DISCHARGE POINTS |
| X SL | UPSTREAM/DOWNSTREAM SAMPLE LOCATION, EXAMPLE SHOWN ON PLAN. QSP TO FIELD LOCATE AS NECESSARY. |

NOTE: RISK LEVEL 1 PROJECTS DO NOT NEED TO SAMPLE FOR pH AND TURBIDITY.

RISK LEVEL 1 PROJECTS SAMPLE WHEN THERE IS A NON-STORM WATER DISCHARGE. UPSTREAM AND DOWNSTREAM POINT(S) WILL VARY DEPENDING ON THE LOCATION OF THE SOURCE. THE QSP SHALL IDENTIFY THE UPSTREAM AND DOWNSTREAM LOCATIONS HEREON SHOULD A NON-STORM WATER DISCHARGE OCCUR.

100 0 50 100 200
SCALE: 1"=100'

## GENERAL NOTES

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3. INSTALL GRAVEL BAG BERM LINEAR BARRIER PER CASQA BMP SE-6.
4. IMPLEMENT STREET SWEEPING AND VACUUMING PER CASQA BMP SE-7.
5. PRESERVATION OF EXISTING VEGETATION PER CASQA BMP C-2.
6. APPLY HYDROSEED PER CASQA BMP EC-4.

811 Know what's below. Call before you dig.


AEI CASC CONSULTING
937 SOUTH VIA LATA, SUITE 500
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108


LOCATION:
110TH ST. W. AND W. AVE. J
UNINCORPORATED LA COUNTY

SWPPP (PRELIMINARY)
WEST ANTELOPE
SOLAR PROJECT
RISK LEVEL 1

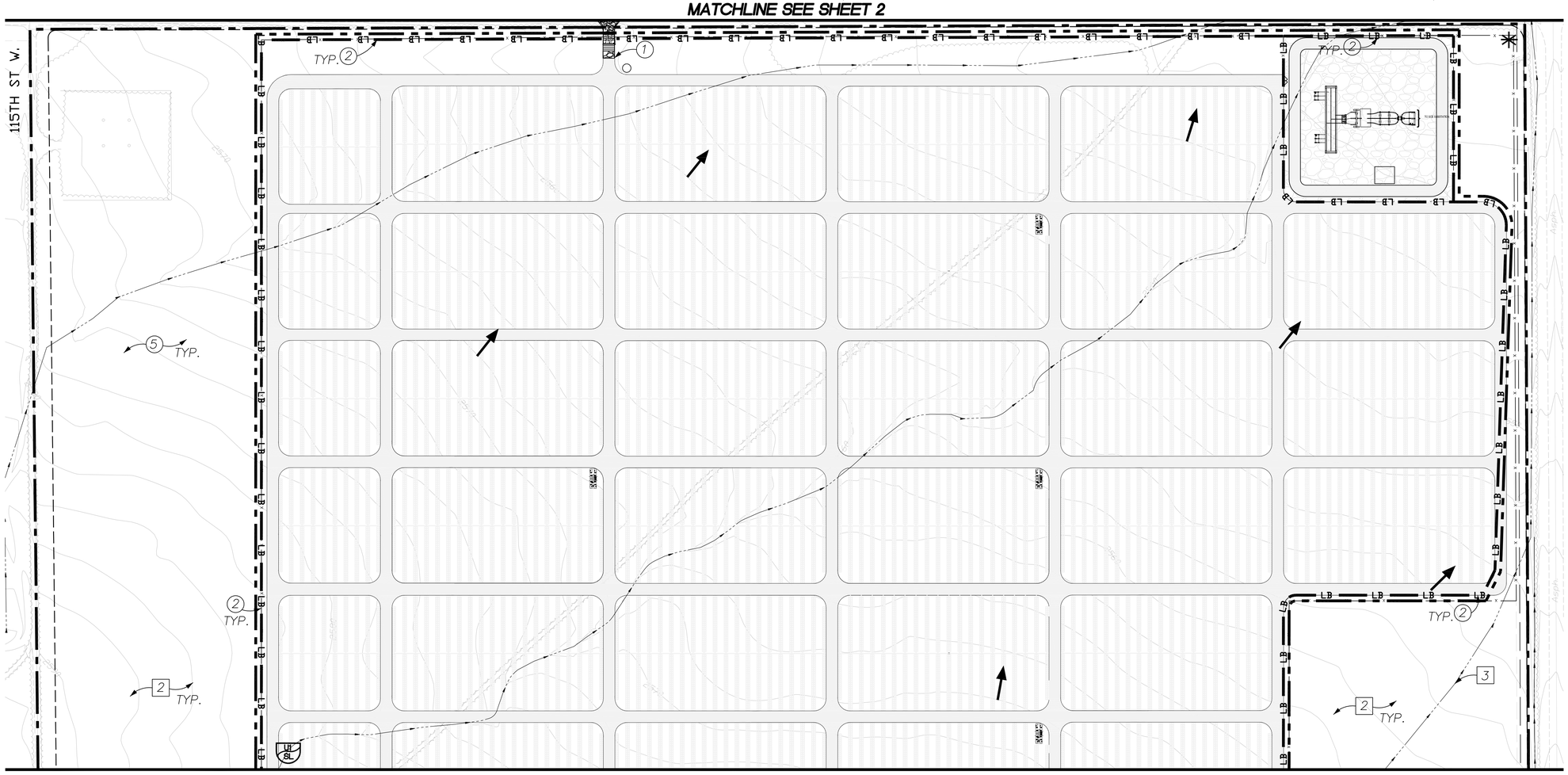
SITE MAP-02



Drawing Name: Q:\354-001\SWPPP (Preliminary)\SWPPP_West Antelope Solar (Preliminary).dwg
Last Opened: Mar 28, 2012 - 2:39pm by rcarey

# STORM WATER POLLUTION PREVENTION PLAN
## PRELIMINARY SITE MAP
## FOR
# WEST ANTELOPE SOLAR PROJECT (RISK LEVEL 1)
## 110TH STREET W. AND W. AVENUE J, UNINCORPORATED LOS ANGELES COUNTY, CA

MATCHLINE SEE SHEET 2




MATCHLINE SEE SHEET 4

## LEGEND

| | |
|---|---|
| MS | MATERIAL STORAGE (WM-1, WM-2), FIELD LOCATED BY QSP. |
| SP | STOCKPILE MANAGEMENT (WM-3), FIELD LOCATED BY QSP. |
| SW | SOLID WASTE MANAGEMENT (WM-5), FIELD LOCATED BY QSP. |
| HWM | HAZARDOUS WASTE MANAGEMENT (WM-6, IF NECESSARY), FIELD LOCATED BY QSP. |
| CW | CONCRETE WASHOUT (WM-8), FIELD LOCATED BY QSP. |
| SWM | SANITARY WASTE MANAGEMENT (WM-9), FIELD LOCATED BY QSP. |
| VEF | VEHICLE AND EQUIPMENT FUELING (NS-9), FIELD LOCATED BY QSP. |
| VES | VEHICLE AND EQUIPMENT MAINTENANCE (NS-10), FIELD LOCATED BY QSP. |
| | CONSTRUCTION ENTRANCE (TC-1) |
| | PROJECT BOUNDARY |
| | LIMITS OF DISTURBANCE |
| LB | SILT FENCE AND/OR FIBER ROLL (SE-1 AND/OR SE-5) |
| | FLOW LINE |
| | CHECK DAMS (SE-4, AS NEEDED) |
| | FLOW DIRECTION |
| | DISCHARGE POINTS |
| SL | UPSTREAM/DOWNSTREAM SAMPLE LOCATION, EXAMPLE SHOWN ON PLAN. QSP TO FIELD LOCATE AS NECESSARY. |

NOTE: RISK LEVEL 1 PROJECTS DO NOT NEED TO SAMPLE FOR pH AND TURBIDITY.

RISK LEVEL 1 PROJECTS SAMPLE WHEN THERE IS A NON-STORM WATER DISCHARGE. UPSTREAM AND DOWNSTREAM POINT(S) WILL VARY DEPENDING ON THE LOCATION OF THE SOURCE. THE QSP SHALL IDENTIFY THE UPSTREAM AND DOWNSTREAM LOCATIONS HEREON SHOULD A NON-STORM WATER DISCHARGE OCCUR.

100 0 50 100 200
SCALE: 1"=100'

## GENERAL NOTES

1. THIS PLAN IS ACCURATE FOR STORMWATER POLLUTION PREVENTION PURPOSES ONLY.
2. THE INFORMATION ON THIS PLAN IS INTENDED TO BE USED AS A GUIDELINE FOR THE QSP AND CONTRACTOR TO COMPLY WITH THE REQUIREMENTS OF THE STATE WATER RESOURCES CONTROL BOARD. FIELD CONDITIONS MAY NECESSITATE MODIFICATIONS TO THIS PLAN.

## WATER POLLUTION CONTROL NOTES

1. INSTALL STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA BMP TC-1.
2. INSTALL SILT FENCE AND/OR FIBER ROLLS PER CASQA BMP SE-1 AND/OR SE-5, RESPECTIVELY.
3. INSTALL GRAVEL BAG BERM LINEAR BARRIER PER CASQA BMP SE-6.
4. IMPLEMENT STREET SWEEPING AND VACUUMING PER CASQA BMP SE-7.
5. PRESERVATION OF EXISTING VEGETATION PER CASQA BMP C-2.
6. ~~APPLY HYDROSEED PER CASQA BMP EC-4.~~

811 Know what's below. Call before you dig.

AEI CASC CONSULTING
937 SOUTH VIA LATA, SUITE 500
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

LOCATION:
110TH ST. W. AND W. AVE. J
UNINCORPORATED LA COUNTY

SWPPP (PRELIMINARY)
WEST ANTELOPE
SOLAR PROJECT
RISK LEVEL 1

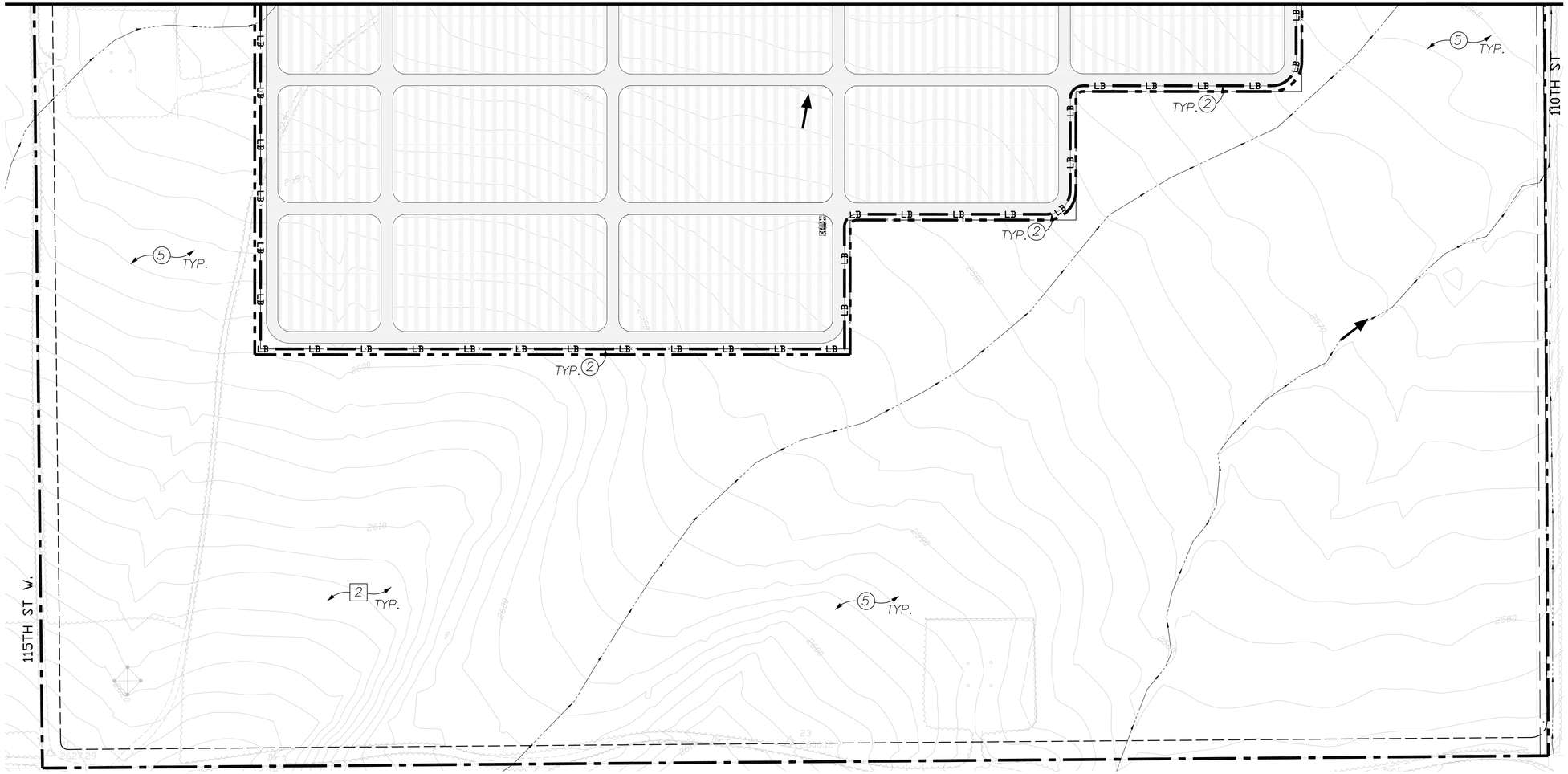
SITE MAP-03



Drawing Name: Q:\1264-0001\SWPPP (Preliminary)\SWPPP_West Antelope Solar (Preliminary).dwg
Last Opened: Mar 26, 2013 - 2:41pm by rodolfo

# STORM WATER POLLUTION PREVENTION PLAN
## PRELIMINARY SITE MAP
## FOR
# WEST ANTELOPE SOLAR PROJECT (RISK LEVEL 1)
## 110TH STREET W. AND W. AVENUE J, UNINCORPORATED LA COUNTY, CA

**MATCHLINE SEE SHEET 3**




## LEGEND

| | |
|---|---|
| MS | MATERIAL STORAGE (WM-1, WM-2), FIELD LOCATED BY QSP. |
| SP | STOCKPILE MANAGEMENT (WM-3), FIELD LOCATED BY QSP. |
| SW | SOLID WASTE MANAGEMENT (WM-5), FIELD LOCATED BY QSP. |
| HWM | HAZARDOUS WASTE MANAGEMENT (WM-6, IF NECESSARY), FIELD LOCATED BY QSP. |
| CW | CONCRETE WASHOUT (WM-8), FIELD LOCATED BY QSP. |
| SWM | SANITARY WASTE MANAGEMENT (WM-9), FIELD LOCATED BY QSP. |
| VEF | VEHICLE AND EQUIPMENT FUELING (NS-9), FIELD LOCATED BY QSP. |
| VES | VEHICLE AND EQUIPMENT MAINTENANCE (NS-10), FIELD LOCATED BY QSP. |
| | CONSTRUCTION ENTRANCE (TC-1) |
| | PROJECT BOUNDARY |
| | LIMITS OF DISTURBANCE |
| LB LB | SILT FENCE AND/OR FIBER ROLL (SE-1 AND/OR SE-5) |
| | FLOW LINE |
| | CHECK DAMS (SE-4, AS NEEDED) |
| | FLOW DIRECTION |
| | DISCHARGE POINTS |
| X SL | UPSTREAM/DOWNSTREAM SAMPLE LOCATION, EXAMPLE SHOWN ON PLAN. QSP TO FIELD LOCATE AS NECESSARY. |

NOTE: RISK LEVEL 1 PROJECTS DO NOT NEED TO SAMPLE FOR pH AND TURBIDITY.

RISK LEVEL 1 PROJECTS SAMPLE WHEN THERE IS A NON-STORM WATER DISCHARGE. UPSTREAM AND DOWNSTREAM POINT(S) WILL VARY DEPENDING ON THE LOCATION OF THE SOURCE. THE QSP SHALL IDENTIFY THE UPSTREAM AND DOWNSTREAM LOCATIONS HEREON SHOULD A NON-STORM WATER DISCHARGE OCCUR.

100 0 50 100 200
SCALE: 1"=100'

## GENERAL NOTES

1. THIS PLAN IS ACCURATE FOR STORMWATER POLLUTION PREVENTION PURPOSES ONLY.
2. THE INFORMATION ON THIS PLAN IS INTENDED TO BE USED AS A GUIDELINE FOR THE QSP AND CONTRACTOR TO COMPLY WITH THE REQUIREMENTS OF THE STATE WATER RESOURCES CONTROL BOARD. FIELD CONDITIONS MAY NECESSITATE MODIFICATIONS TO THIS PLAN.

## WATER POLLUTION CONTROL NOTES

1. INSTALL STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA BMP TC-1.
2. INSTALL SILT FENCE AND/OR FIBER ROLLS PER CASQA BMP SE-1 AND/OR SE-5, RESPECTIVELY.
3. INSTALL GRAVEL BAG BERM LINEAR BARRIER PER CASQA BMP SE-6.
4. IMPLEMENT STREET SWEEPING AND VACUUMING PER CASQA BMP SE-7.
5. PRESERVATION OF EXISTING VEGETATION PER CASQA BMP C-2.
6. APPLY HYDROSEED PER CASQA BMP EC-4.

811 Know what's below. Call before you dig.

AEI CASC CONSULTING
937 SOUTH VIA LATA, SUITE 500
COLTON, CA 92324
PH. (909) 783-0101 FAX (909) 783-0108

LOCATION:
110TH ST. W. AND W. AVE. J
UNINCORPORATED LA COUNTY

SWPPP (PRELIMINARY)
WEST ANTELOPE
SOLAR PROJECT
RISK LEVEL 1

SITE MAP-04



Drawing Name: Q:\1264-005\SWPPP (Preliminary)\SWPPP_West Antelope Solar (Preliminary).dwg
Last Opened: Mar 28, 2012 - 2:45pm by rosbo

# *Appendix C: Permit Registration Documents*

PRELIMINARY

| Sediment Risk Factor Worksheet | Entry |
|---|---|

**A) R Factor**

Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.

http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm

| | |
|---|---|
| **R Factor Value** | 5.34 |

**B) K Factor (weighted average, by area, for all site soils)**

The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.

Site-specific K factor guidance

| | |
|---|---|
| **K Factor Value** | 0.2 |

**C) LS Factor (weighted average, by area, for all slopes)**

The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.

| | |
|---|---|
| **LS Factor Value** | 1.41 |
| **Watershed Erosion Estimate (=RxKxLS) in tons/acre** | 1.51 |
| **Site Sediment Risk Factor**<br>Low Sediment Risk: < 15 tons/acre<br>Medium Sediment Risk: >=15 and <75 tons/acre<br>High Sediment Risk: >= 75 tons/acre | **Low** |

| Receiving Water (RW) Risk Factor Worksheet | Entry | Score |
|---|---|---|
| **A. Watershed Characteristics** | **yes/no** | |
| A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? For help with impaired waterbodies please check the attached worksheet or visit the link below:<br>2006 Approved Sediment-impared WBs Worksheet<br>http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml<br>**OR** | **No** | **Low** |
| A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY?<br>http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp | | |

# Combined Risk Level Matrix

| Receiving Water Risk | Sediment Risk: Low | Sediment Risk: Medium | Sediment Risk: High |
|---|---|---|---|
| Low | Level 1 | Level 2 | |
| High | Level 2 | | Level 3 |

**Project Sediment Risk:** **Low**

**Project RW Risk:** **Low**

**Project Combined Risk:** **Level 1**

| | | | | | |
|---|---|---|---|---|---|
| Preparer: | CO | Date: | 3/28/2013 | Calc by: | CO |
| Subject: | **West Antelope Solar Project** | | | Checked by: | MS |

| | | | |
|---|---|---|---|
| Begin Assessment Date: | 10/1/2013 | I= | 10 |
| End Date: | 7/1/2014 | EI= | 26 |

**Risk Assessment**

| Year | Month 1 | Month 2 | Diff. | Isoerodent Value | Weighted value |
|---|---|---|---|---|---|
| 2013 | 10/1/2013 | 12/31/2013 | | | |
| | 0.797 | 1.000 | 0.203 | 10 | 2.03 |
| 2014 | 1/31/2014 | 7/1/2014 | | | |
| | 0.000 | 0.331 | 0.331 | 10 | 3.31 |

| | |
|---|---|
| Sum = | 5.34 |
| R= | 5.34 |

| | |
|---|---|
| R= | 5.34 |
| K= | 0.2 |
| LS= | 1.41 |

Site Sediment Risk Value = R x K x LS

Sediment Risk = **1.51**

Low Sediment Risk: < 15

Medium Sediment Risk: >=15

High Sediment Risk: >= 75

| | |
|---|---|
| Sediment risk = | Low |
| Receiving water risk = | Low |

This is a Risk Level 1 Project.

| | |
|---|---|
| | User Input |

| | | | | | |
|---|---|---|---|---|---|
| Preparer: | CO | Date: | 3/28/2013 | Calc by: | CO |
| Subject: | **West Antelope Solar Project** | | | Checked by: | MS |

Begin Assessment Date: 10/1/2013
End Date: 7/1/2014

**EI Linear Interpolation**

| Variables | | Example | | |
|---|---|---|---|---|
| X0 = | First Date (Day 1) | 6/29/2014 | 1 | |
| X1 = | Last Date (Day 15) | 7/14/2014 | 15 | |
| X = | Date Trying to Find (Day 2-14) | 7/1/2014 | 3 | |
| Y0 = | First EI | 6/29/2014 | 32.5 | % |
| Y1 = | Last EI | 7/14/2014 | 36.6 | % |
| Y = | EI trying to find | 7/1/2014 | **33.1** | % |

| Variables | | Example | | |
|---|---|---|---|---|
| X0 = | First Date (Day 1) | 9/27/2013 | 1 | |
| X1 = | Last Date (Day 15) | 10/12/2013 | 15 | |
| X = | Date Trying to Find (Day 2-14) | 10/1/2013 | 5 | |
| Y0 = | First EI | 9/27/2013 | 77.8 | % |
| Y1 = | Last EI | 10/12/2013 | 84.4 | % |
| Y = | EI trying to find | 10/1/2013 | **79.7** | % |

| | |
|---|---|
| | User Input 2012 |
| | User Input 2013 |

# Table 1. Erosivity Index (%EI Values extracted from USDA Manual 703)

All values are at the end of the day listed below - Linear interpolation between dates is acceptable.

EI as a percentage of Average Annual R Value Computed for Geographic Areas Shown in Figure 1

| EI # | Jan 1 | Jan 16 | Jan 31 | Feb 15 | Mar 1 | Mar 16 | Mar 31 | Apr 15 | Apr 30 | May 15 | May 30 | Jun 14 | Jun 29 | Jul 14 | Jul 29 | Aug 13 | Aug 28 | Sep 12 | Sep 27 | Oct 12 | Oct 27 | Nov 11 | Nov 26 | Dec 11 | Dec 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0 | 4.3 | 8.3 | 12.8 | 17.3 | 21.6 | 25.1 | 28.0 | 30.9 | 34.9 | 39.1 | 42.6 | 45.4 | 48.2 | 50.8 | 53.0 | 56.0 | 60.8 | 66.8 | 71.0 | 75.7 | 82.0 | 89.1 | 95.2 | 100.0 |
| 2 | 0.0 | 4.3 | 8.3 | 12.8 | 17.3 | 21.6 | 25.1 | 28.0 | 30.9 | 34.9 | 39.1 | 42.6 | 45.4 | 48.2 | 50.8 | 53.0 | 56.0 | 60.8 | 66.8 | 71.0 | 75.7 | 82.0 | 89.1 | 95.2 | 100.0 |
| 3 | 0.0 | 7.4 | 13.8 | 20.9 | 26.5 | 31.8 | 35.3 | 38.5 | 40.2 | 41.6 | 42.5 | 43.6 | 44.5 | 45.1 | 45.7 | 46.4 | 47.7 | 49.4 | 52.8 | 57.0 | 64.5 | 73.1 | 83.3 | 92.3 | 100.0 |
| 4 | 0.0 | 3.9 | 7.9 | 12.6 | 17.4 | 21.6 | 25.2 | 28.7 | 31.9 | 35.1 | 38.2 | 42.0 | 44.9 | 46.7 | 48.2 | 50.1 | 53.1 | 56.6 | 62.2 | 67.9 | 75.2 | 83.5 | 90.5 | 96.0 | 100.0 |
| 5 | 0.0 | 2.3 | 3.6 | 4.7 | 6.0 | 7.7 | 10.7 | 13.9 | 17.8 | 21.2 | 24.5 | 28.1 | 31.1 | 33.1 | 35.3 | 38.2 | 43.2 | 48.7 | 57.3 | 67.8 | 77.9 | 86.0 | 91.3 | 96.9 | 100.0 |
| 6 | 0.0 | 0.0 | 0.0 | 0.5 | 2.0 | 4.1 | 8.1 | 12.6 | 17.6 | 21.6 | 25.5 | 29.6 | 34.5 | 40.0 | 45.7 | 50.7 | 55.6 | 60.2 | 66.5 | 75.5 | 85.6 | 95.9 | 99.5 | 99.9 | 100.0 |
| 7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 4.9 | 8.5 | 13.9 | 19.0 | 26.0 | 35.4 | 43.9 | 48.8 | 53.9 | 64.5 | 73.4 | 77.5 | 80.4 | 84.8 | 89.9 | 96.6 | 99.2 | 99.7 | 100.0 |
| 8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 3.6 | 7.8 | 15.0 | 20.2 | 27.4 | 38.1 | 49.8 | 57.9 | 65.0 | 75.6 | 82.7 | 86.8 | 89.4 | 93.4 | 96.3 | 99.1 | 100.0 | 100.0 | 100.0 |
| 9 | 0.0 | 0.8 | 3.1 | 4.7 | 7.4 | 11.7 | 17.8 | 22.5 | 27.0 | 31.4 | 36.0 | 41.6 | 46.4 | 50.1 | 53.4 | 57.4 | 61.7 | 64.9 | 69.7 | 79.0 | 89.6 | 97.4 | 100.0 | 100.0 | 100.0 |
| 10 | 0.0 | 0.3 | 0.5 | 0.9 | 2.0 | 4.3 | 9.2 | 13.1 | 18.0 | 22.7 | 29.2 | 39.5 | 46.3 | 48.8 | 51.1 | 57.2 | 64.4 | 67.7 | 71.1 | 77.2 | 85.1 | 92.5 | 96.5 | 99.0 | 100.0 |
| 11 | 0.0 | 5.4 | 11.3 | 18.8 | 26.3 | 33.2 | 37.4 | 40.7 | 42.5 | 44.3 | 45.4 | 46.5 | 47.1 | 47.4 | 47.8 | 48.3 | 49.4 | 50.7 | 53.6 | 57.5 | 65.5 | 76.2 | 87.4 | 94.8 | 100.0 |
| 12 | 0.0 | 3.5 | 7.8 | 14.0 | 21.1 | 27.4 | 31.5 | 35.0 | 37.3 | 39.8 | 41.9 | 44.3 | 45.6 | 46.3 | 46.8 | 47.9 | 50.0 | 52.9 | 57.9 | 62.3 | 69.3 | 81.3 | 91.5 | 96.7 | 100.0 |
| 13 | 0.0 | 0.0 | 0.0 | 1.8 | 7.2 | 11.9 | 16.7 | 19.7 | 24.0 | 31.2 | 42.4 | 55.0 | 60.0 | 60.8 | 61.2 | 62.6 | 65.3 | 67.6 | 71.6 | 76.1 | 83.1 | 93.3 | 98.2 | 99.6 | 100.0 |
| 14 | 0.0 | 0.7 | 1.8 | 3.3 | 6.9 | 16.5 | 26.6 | 29.9 | 32.0 | 35.4 | 40.2 | 45.1 | 51.9 | 61.1 | 67.5 | 70.7 | 72.8 | 75.4 | 78.6 | 81.9 | 86.4 | 93.6 | 97.7 | 99.3 | 100.0 |
| 15 | 0.0 | 0.0 | 0.0 | 0.5 | 2.0 | 4.4 | 8.7 | 12.0 | 16.6 | 21.4 | 29.7 | 44.5 | 56.0 | 60.8 | 63.9 | 69.1 | 74.5 | 79.1 | 83.1 | 87.0 | 90.9 | 96.6 | 99.1 | 99.8 | 100.0 |
| 16 | 0.0 | 0.0 | 0.0 | 0.5 | 2.0 | 5.5 | 12.3 | 16.2 | 20.9 | 26.4 | 35.2 | 48.1 | 58.1 | 63.1 | 66.5 | 71.9 | 77.0 | 81.6 | 85.1 | 88.4 | 91.5 | 96.3 | 98.7 | 99.6 | 100.0 |
| 17 | 0.0 | 0.0 | 0.0 | 0.7 | 2.8 | 6.1 | 10.7 | 12.9 | 16.1 | 21.9 | 32.8 | 45.9 | 55.5 | 60.3 | 64.0 | 71.2 | 77.2 | 80.3 | 83.1 | 87.7 | 92.6 | 97.2 | 99.1 | 99.8 | 100.0 |
| 18 | 0.0 | 0.0 | 0.0 | 0.6 | 2.5 | 6.2 | 12.4 | 16.4 | 20.2 | 23.9 | 29.3 | 37.7 | 45.6 | 49.8 | 53.3 | 58.4 | 64.3 | 69.0 | 75.0 | 86.6 | 93.9 | 96.6 | 98.0 | 100.0 | 100.0 |
| 19 | 0.0 | 1.0 | 2.6 | 7.4 | 16.4 | 23.5 | 28.0 | 31.0 | 33.5 | 37.0 | 41.7 | 48.1 | 51.1 | 52.0 | 52.5 | 53.6 | 55.7 | 57.6 | 61.1 | 65.8 | 74.7 | 88.0 | 95.8 | 98.7 | 100.0 |
| 20 | 0.0 | 9.8 | 18.5 | 25.4 | 30.2 | 35.6 | 38.9 | 41.5 | 42.9 | 44.0 | 45.2 | 48.2 | 50.8 | 51.7 | 52.5 | 54.6 | 57.4 | 58.5 | 60.1 | 63.2 | 69.6 | 76.7 | 85.4 | 92.4 | 100.0 |
| 21 | 0.0 | 7.5 | 13.6 | 18.1 | 21.1 | 24.4 | 27.0 | 29.4 | 31.7 | 34.6 | 37.3 | 39.6 | 41.6 | 43.4 | 45.4 | 48.1 | 51.3 | 53.3 | 56.6 | 62.4 | 72.4 | 81.3 | 88.9 | 94.7 | 100.0 |
| 22 | 0.0 | 1.2 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 2.2 | 3.9 | 4.6 | 6.4 | 14.2 | 32.8 | 47.2 | 58.8 | 69.1 | 76.0 | 82.0 | 87.1 | 96.7 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 |
| 23 | 0.0 | 7.9 | 15.0 | 20.9 | 25.7 | 31.1 | 35.7 | 40.2 | 43.2 | 46.2 | 47.7 | 48.8 | 49.4 | 49.9 | 50.7 | 51.8 | 54.1 | 57.7 | 62.8 | 65.9 | 70.1 | 77.3 | 86.8 | 93.5 | 100.0 |
| 24 | 0.0 | 12.2 | 23.6 | 33.0 | 39.7 | 47.1 | 51.7 | 55.9 | 57.7 | 58.6 | 58.9 | 59.1 | 59.1 | 59.2 | 59.2 | 59.3 | 59.5 | 60.0 | 61.4 | 63.0 | 66.5 | 71.8 | 81.3 | 89.6 | 100.0 |
| 25 | 0.0 | 9.8 | 20.8 | 30.2 | 37.6 | 45.8 | 50.6 | 54.4 | 56.0 | 56.8 | 57.1 | 57.1 | 57.2 | 57.6 | 58.5 | 59.8 | 62.2 | 65.3 | 67.5 | 68.2 | 69.4 | 74.8 | 86.6 | 93.0 | 100.0 |
| 26 | 0.0 | 2.0 | 5.4 | 9.8 | 15.6 | 21.5 | 24.7 | 26.6 | 27.4 | 28.0 | 28.7 | 29.8 | 32.5 | 36.6 | 44.9 | 55.4 | 65.7 | 72.6 | 77.8 | 84.4 | 89.5 | 93.9 | 96.5 | 98.4 | 100.0 |
| 27 | 0.0 | 0.0 | 0.0 | 1.0 | 4.0 | 5.9 | 8.0 | 11.1 | 13.0 | 14.0 | 14.6 | 15.3 | 17.0 | 23.2 | 39.1 | 60.0 | 76.3 | 86.1 | 89.7 | 90.4 | 90.9 | 93.1 | 96.6 | 99.1 | 100.0 |
| 28 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.5 | 1.5 | 3.3 | 7.2 | 11.9 | 17.7 | 21.4 | 27.0 | 37.1 | 51.4 | 62.3 | 70.6 | 78.8 | 84.6 | 90.6 | 94.4 | 97.9 | 99.3 | 100.0 | 100.0 |
| 29 | 0.0 | 0.6 | 0.7 | 0.7 | 0.7 | 1.5 | 3.9 | 6.0 | 10.5 | 17.9 | 28.8 | 36.6 | 43.8 | 51.5 | 59.3 | 68.0 | 74.8 | 80.3 | 84.3 | 88.8 | 92.7 | 98.0 | 99.8 | 99.9 | 100.0 |

# Appendix D: SWPPP Amendment Certifications

*Include certification statements for each SWPPP amendment.*

PRELIMINARY

**SWPPP Amendment No.**

_____

Project Name: West Antelope Solar Project

WDID #: _____

**Qualified SWPPP Developer's Certification of the**
**Stormwater Pollution Prevention Plan Amendment**

"This Stormwater Pollution Prevention Plan and attachments were prepared under my direction to meet the requirements of the California Construction General Permit (SWRCB Order No. 2009-009-DWQ as amended by 2010-0014-DWQ). I certify that I am a Qualified SWPPP Developer in good standing as of the date signed below."

| | |
|---|---|
| QSD's Signature | Date |
| QSD Name | QSD Certificate Number |
| Title and Affiliation | Telephone |
| Address | Email |

PRELIMINARY

# Amendment Log

Project Name: West Antelope Solar Project

WDID #:

| Amendment No. | Date | Brief Description of Amendment, include section and page number | Prepared and Approved By |
|---|---|---|---|
| | | | Name:<br>QSD# |
| | | | Name:<br>QSD# |
| | | | Name:<br>QSD# |
| | | | Name:<br>QSD# |
| | | | Name:<br>QSD# |
| | | | Name:<br>QSD# |
| | | | Name:<br>QSD# |
| | | | Name:<br>QSD# |
| | | | Name:<br>QSD# |

PRELIMINARY

# Appendix E: Submitted Changes to PRDs

PRELIMINARY

**Log of Updated PRDs**

The General Permit allows for the reduction or increase of the total acreage covered under the General Permit when a portion of the Project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the Project is purchased by a different entity; or when new acreage is added to the Project.

Modified PRDs shall be filed electronically within 30 days of a reduction or increase in total disturbed area if a change in permit covered acreage is to be sought. The SWPPP shall be modified appropriately, with revisions and amendments recorded in Appendix C. Updated PRDs submitted electronically via SMARTS can be found in this Appendix.

---

This appendix includes all of the following updated PRDs (check all that apply):

☐ Revised Notice of Intent (NOI);

☐ Revised Site Map;

☐ Revised Risk Assessment;

☐ New landowner's information (name, address, phone number, email address); and

☐ New signed certification statement.

| | |
|---|---|
| Legally Responsible Person | |
| Signature of Legally Responsible Person or Approved Signatory | Date |
| Name of Legally Responsible Person or Approved Signatory | Telephone Number |

PRELIMINARY

# *Appendix F: Construction Schedule*

*Refer to Section 2.4*

.

PRELIMINARY

# *Appendix G: Construction Activities, Materials Used, and Associated Pollutants*

PRELIMINARY

**Table G.1 Construction Activities and Associated Pollutants**

| Phase | Activity | Associated Materials or Pollutants | Visually Observable |
|---|---|---|---|
| Grading and Land Development | Grading Operations | Sediment, Turbidity | Cloudy/Discolored |
| | Vehicle and Equipment Use | Equipment Operation, Maintenance, Fueling, Hydrocarbons | Sheen/Stain |
| | Sanitary Waste | Portable Toilets, Bacteria, Nutrients, Oxygen Demanding Substances | Varies |
| | Solid Waste | Litter, Trash, Debris, Vegetation | Varies |
| | Vegetation | Organic matter | Varies |
| Site Stabilization Phase | Concrete | Cement Dust, Curing Compounds, Surface Cleaners, Turbidity, pH, Metals, Synthetic Organics | White solid |
| | Sanitary Waste | Portable Toilets, Bacteria, Nutrients, Oxygen Demanding Substances | Varies |
| | Solid Waste | Litter, Trash, Debris, Vegetation | Varies |
| Material and Equipment Storage | Pesticide | Water-insoluble chlorinated hydrocarbons, organophosphates, carbonates, and pyrethrums. | Varies |
| | Herbicide | Chlorinated hydrocarbons, organophosphates | Varies |
| | Diesel Fuel | Petroleum distillates, naphthalene, xylene | Sheen/Stain |
| | Gasoline | Benzene, toluene, xylene, MTBE | Sheen/Stain |
| | Hydraulic Oil | Mineral oil, trace additives | Sheen/Stain |
| | Engine Oil | Mineral oil, additives, combustion byproducts | Sheen/Stain |
| | Transmission Oil | Mineral oil, trace additives | Sheen/Stain |
| | Engine Coolant | Ethylene and propylene glycol, heavy metals | Green/red |
| | Grease | Petroleum hydrocarbons | Sheen/Stain |
| | Curing Compounds | Glass Oxide, urea-extended phenol | Creamy white |
| Foundations | Concrete (wet) | Fly ash, heavy metals, Portland cement | White solid |
| | Cement | Aluminum calcium iron oxide, calcium sulfate | Gray powder |

PRELIMINARY

# *Appendix H: CASQA Stormwater BMP Handbook Portal: Construction Fact Sheets*

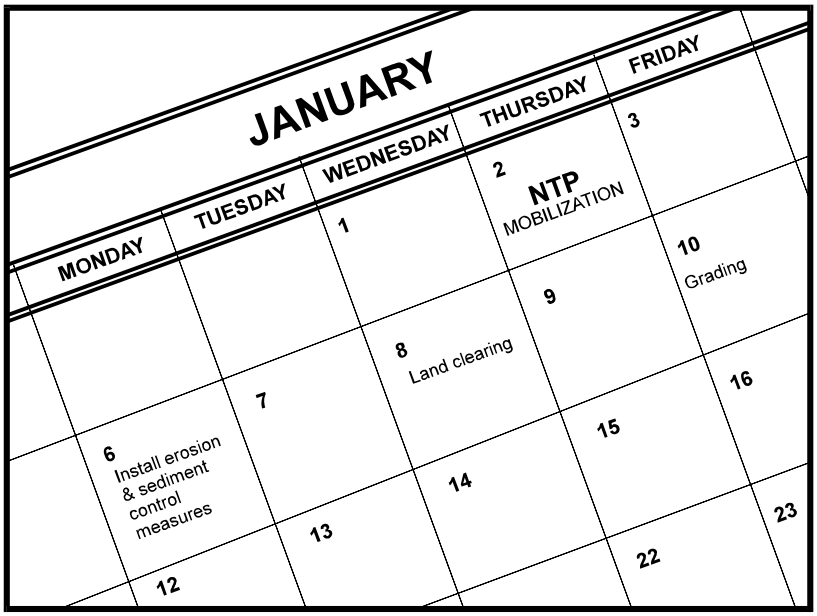
The BMPs as listed in Table 3.1 from the CASQA Construction Web Portal (2009) BMP factsheets are hereby made part of this SWPPP by reference. The factsheets are available for downloaded from the CASQA BMP Portal website:

http://www.casqa.org/LeftNavigation/BMPHandbooksPortal/tabid/200/Default.aspx

The SWPPP to be maintained at the construction site will include a hard copy of the BMP factsheets.

PRELIMINARY

# Scheduling EC-1




## Categories

| | | |
|---|---|---|
| EC | Erosion Control | ☑ |
| SE | Sediment Control | ☒ |
| TC | Tracking Control | ☒ |
| WE | Wind Erosion Control | ☒ |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | |

**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | |
| Organics | |

## Potential Alternatives

None

## Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

## Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

## Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

## Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase

of construction. Clearly show how the rainy season relates to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

### Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.

### Inspection and Maintenance

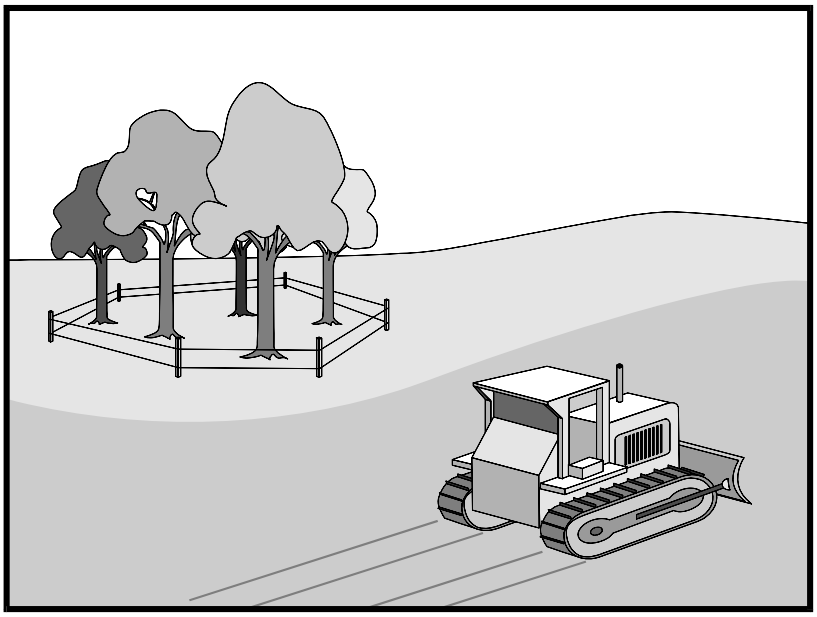
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

### References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

# Preservation Of Existing Vegetation EC-2



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**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | |
| Organics | |

## Potential Alternatives

None

## Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

## Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

## Limitations

- Requires forward planning by the owner/developer,

contractor, and design staff.

- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

## Implementation

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

### *Timing*

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

### *Design and Layout*

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

## Costs

There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of $10,000 per tree.

## Inspection and Maintenance

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization
  - Fertilize stressed or damaged broadleaf trees to aid recovery.
  - Fertilize trees in the late fall or early spring.

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.

- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

### References

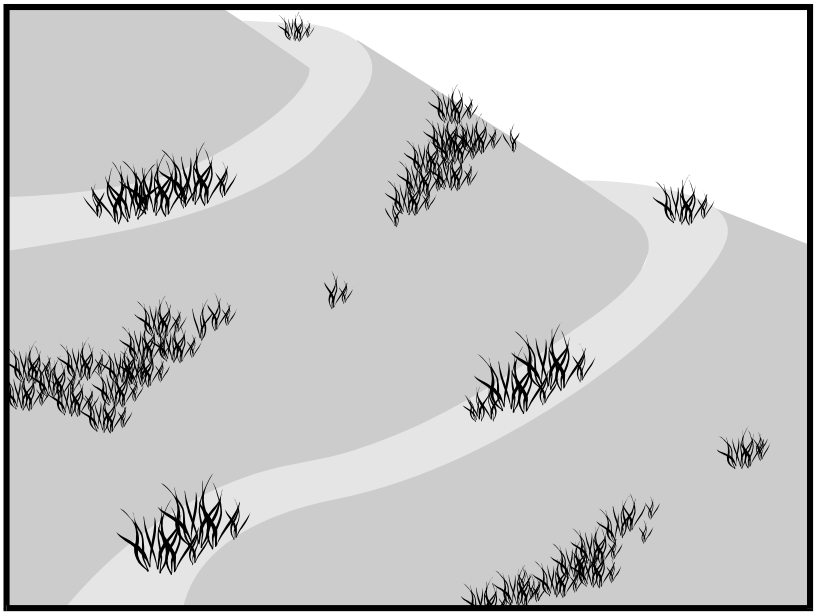
County of Sacramento Tree Preservation Ordinance, September 1981.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

# Hydroseeding EC-4



## Categories

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| SE | Sediment Control | |
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| WE | Wind Erosion Control | ☒ |
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| WM | Waste Management and Materials Pollution Control | |

**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | |
| Organics | |

## Potential Alternatives

EC-3 Hydraulic Mulch

EC-5 Soil Binders

EC-6 Straw Mulch

EC-7 Geotextiles and Mats

EC-8 Wood Mulching

EC-14 Compost Blanket

EC-16 Non-Vegetative Stabilization

## Description and Purpose

Hydroseeding typically consists of applying a mixture of a hydraulic mulch, seed, fertilizer, and stabilizing emulsion with a hydraulic mulcher, to temporarily protect exposed soils from erosion by water and wind. Hydraulic seeding, or hydroseeding, is simply the method by which temporary or permanent seed is applied to the soil surface.

## Suitable Applications

Hydroseeding is suitable for disturbed areas requiring temporary protection until permanent stabilization is established, for disturbed areas that will be re-disturbed following an extended period of inactivity, or to apply permanent stabilization measures. Hydroseeding without mulch or other cover (e.g. EC-7, Erosion Control Blanket) is not a stand-alone erosion control BMP and should be combined with additional measures until vegetation establishment.

Typical applications for hydroseeding include:

- Disturbed soil/graded areas where permanent stabilization or continued earthwork is not anticipated prior to seed germination.
- Cleared and graded areas exposed to seasonal rains or temporary irrigation.
- Areas not subject to heavy wear by construction equipment or high traffic.

## Limitations

- Availability of hydroseeding equipment may be limited just prior to the rainy season and prior to storms due to high demand.
- Hydraulic seed should be applied with hydraulic mulch or a stand-alone hydroseed application should be followed by one of the following:
    - Straw mulch (see Straw Mulch EC-6)
    - Rolled erosion control products (see Geotextiles and Mats EC-7)
    - Application of Compost Blanket (see Compost Blanket EC-14)

  Hydraulic seed may be used alone only on small flat surfaces when there is sufficient time in the season to ensure adequate vegetation establishment and coverage to provide adequate erosion control.
- Hydraulic seed without mulch does not provide immediate erosion control.
- Temporary seeding may not be appropriate for steep slopes (i.e., slopes readily prone to rill erosion or without sufficient topsoil).
- Temporary seeding may not be appropriate in dry periods without supplemental irrigation.
- Temporary vegetation may have to be removed before permanent vegetation is applied.
- Temporary vegetation may not be appropriate for short term inactivity (i.e. less than 3-6 months).

## Implementation

In order to select appropriate hydraulic seed mixtures, an evaluation of site conditions should be performed with respect to:

- Soil conditions
- Site topography and exposure (sun/wind)
- Season and climate
- Vegetation types
- Maintenance requirements
- Sensitive adjacent areas
- Water availability
- Plans for permanent vegetation

The local office of the U.S.D.A. Natural Resources Conservation Service (NRCS) is an excellent source of information on appropriate seed mixes.

The following steps should be followed for implementation:

- Where appropriate or feasible, soil should be prepared to receive the seed by disking or otherwise scarifying (See EC-15, Soil Preparation) the surface to eliminate crust, improve air and water infiltration and create a more favorable environment for germination and growth.

- Avoid use of hydraulic seed in areas where the BMP would be incompatible with future earthwork activities.
- Hydraulic seed can be applied using a multiple step or one step process.
  - In a multiple step process, hydraulic seed is applied first, followed by mulch or a Rolled Erosion Control Product (RECP).
  - In the one step process, hydraulic seed is applied with hydraulic mulch in a hydraulic matrix. When the one step process is used to apply the mixture of fiber, seed, etc., the seed rate should be increased to compensate for all seeds not having direct contact with the soil.
- All hydraulically seeded areas should have mulch, or alternate erosion control cover to keep seeds in place and to moderate soil moisture and temperature until the seeds germinate and grow.
- All seeds should be in conformance with the California State Seed Law of the Department of Agriculture. Each seed bag should be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test. The container should be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained. All legume seed should be pellet inoculated. Inoculant sources should be species specific and should be applied at a rate of 2 lb of inoculant per 100 lb seed.
- Commercial fertilizer should conform to the requirements of the California Food and Agricultural Code, which can be found at http://www.leginfo.ca.gov/.html/fac_table_of_contents.html. Fertilizer should be pelleted or granular form.
- Follow up applications should be made as needed to cover areas of poor coverage or germination/vegetation establishment and to maintain adequate soil protection.
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

## Costs

Average cost for installation and maintenance may vary from as low as $1,900 per acre for flat slopes and stable soils, to $4,000 per acre for moderate to steep slopes and/or erosive soils. Cost of seed mixtures vary based on types of required vegetation.

| BMP | Installed Cost per Acre |
|---|---|
| Hydraulic Seed | $1,900-$4,000 |

Source: Caltrans Soil Stabilization BMP Research for Erosion and Sediment Controls, July 2007

### Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Where seeds fail to germinate, or they germinate and die, the area must be re-seeded, fertilized, and mulched within the planting season, using not less than half the original application rates.
- Irrigation systems, if applicable, should be inspected daily while in use to identify system malfunctions and line breaks. When line breaks are detected, the system must be shut down immediately and breaks repaired before the system is put back into operation.
- Irrigation systems should be inspected for complete coverage and adjusted as needed to maintain complete coverage.

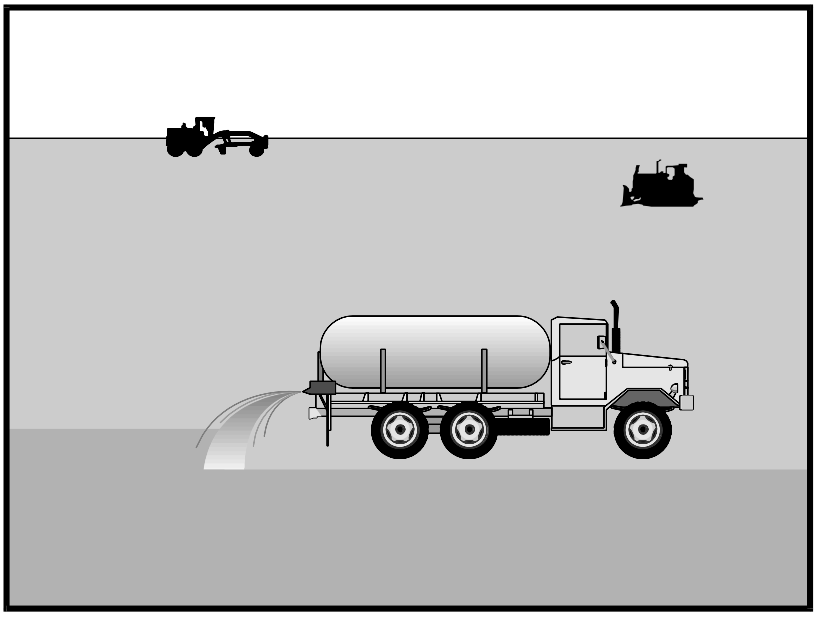
### References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.

# Soil Binders EC-5



| Categories | | |
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**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | |
| Organics | |

**Potential Alternatives**

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

EC-6 Straw Mulch

EC-7 Geotextiles and Mats

EC-8 Wood Mulching

## Description and Purpose

Soil binding consists of application and maintenance of a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water and wind induced erosion of exposed soils on construction sites.

## Suitable Applications

Soil binders are typically applied to disturbed areas requiring temporary protection. Because soil binders, when used as a stand-alone practice, can often be incorporated into the soil, they are a good alternative to mulches in areas where grading activities will soon resume. Soil binders are commonly used in the following areas:

- Rough graded soils that will be inactive for a short period of time
- Soil stockpiles
- Temporary haul roads prior to placement of crushed rock
- Compacted soil road base
- Construction staging, materials storage, and layout areas

## Limitations

- Soil binders are temporary in nature and may need reapplication.

- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer. Curing time may be 24 hours or longer. Soil binders may need reapplication after a storm event.
- Soil binders will generally experience spot failures during heavy rainfall events. If runoff penetrates the soil at the top of a slope treated with a soil binder, it is likely that the runoff will undercut the stabilized soil layer and discharge at a point further down slope.
- Plant-material-based soil binders do not generally hold up to pedestrian or vehicular traffic across treated areas as well as polymeric emulsion blends or cementitious-based binders.
- Soil binders may not sufficiently penetrate compacted soils.
- Some soil binders are soil texture specific in terms of their effectiveness. For example, polyacrylamides (PAMs) work very well on silt and clayey soils but their performance decreases dramatically in sandy soils.
- Some soil binders may not perform well with low relative humidity. Under rainy conditions, some agents may become slippery or leach out of the soil.
- Soil binders may not cure if low temperatures occur within 24 hours of application.
- The water quality impacts of some chemical soil binders are relatively unknown and some may have water quality impacts due to their chemical makeup.

## Implementation

### *General Considerations*

- Soil binders should conform to local municipality specifications and requirements.
- Site soil types will dictate appropriate soil binders to be used.
- A soil binder must be environmentally benign (non-toxic to plant and animal life), easy to apply, easy to maintain, economical, and should not stain paved or painted surfaces. Soil binders should not pollute stormwater when cured. Obtain a Material Safety Data Sheet (MSDS) from the manufacturer to ensure non-toxicity.
- Stormwater runoff from PAM treated soils should pass through one of the following sediment control BMP prior to discharging to surface waters.
  - When the total drainage area is greater than or equal to 5 acres, PAM treated areas should drain to a sediment basin.
  - Areas less than 5 acres should drain to sediment control BMPs, such as a sediment trap, or a series of check dams. The total number of check dams used should be maximized to achieve the greatest amount of settlement of sediment prior to discharging from the site. Each check dam should be spaced evenly in the drainage channel through which stormwater flows are discharged off site.
- Performance of soil binders depends on temperature, humidity, and traffic across treated areas.

- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

### *Selecting a Soil Binder*

Properties of common soil binders used for erosion control are provided on Table 1 at the end of this Fact Sheet. Use Table 1 to select an appropriate soil binder. Refer to WE-1, Wind Erosion Control, for dust control soil binders.

Factors to consider when selecting a soil binder include the following:

- Suitability to situation - Consider where the soil binder will be applied, if it needs a high resistance to leaching or abrasion, and whether it needs to be compatible with any existing vegetation. Determine the length of time soil stabilization will be needed, and if the soil binder will be placed in an area where it will degrade rapidly. In general, slope steepness is not a discriminating factor for the listed soil binders.
- Soil types and surface materials - Fines and moisture content are key properties of surface materials. Consider a soil binder's ability to penetrate, likelihood of leaching, and ability to form a surface crust on the surface materials.
- Frequency of application - The frequency of application is related to the functional longevity of the binder, which can be affected by subgrade conditions, surface type, climate, and maintenance schedule.
- Frequent applications could lead to high costs. Application frequency may be minimized if the soil binder has good penetration, low evaporation, and good longevity. Consider also that frequent application will require frequent equipment clean up.

### *Plant-Material-Based (Short Lived, <6 months) Binders*

Guar: Guar is a non-toxic, biodegradable, natural galactomannan-based hydrocolloid treated with dispersant agents for easy field mixing. It should be mixed with water at the rate of 11 to 15 lb per 1,000 gallons. Recommended minimum application rates are as follows:

**Application Rates for Guar Soil Stabilizer**

| Slope (H:V): | Flat | 4:1 | 3:1 | 2:1 | 1:1 |
|---|---|---|---|---|---|
| lb/acre: | 40 | 45 | 50 | 60 | 70 |

Psyllium: Psyllium is composed of the finely ground muciloid coating of plantago seeds that is applied as a dry powder or in a wet slurry to the surface of the soil. It dries to form a firm but rewettable membrane that binds soil particles together, but permits germination and growth of seed. Psyllium requires 12 to 18 hours drying time. Application rates should be from 80 to 200 lb/acre, with enough water in solution to allow for a uniform slurry flow.

Starch: Starch is non-ionic, cold water soluble (pre-gelatinized) granular cornstarch. The material is mixed with water and applied at the rate of 150 lb/acre. Approximate drying time is 9 to 12 hours.

### *Plant-Material-Based (Long Lived, 6-12 months) Binders*

Pitch and Rosin Emulsion: Generally, a non-ionic pitch and rosin emulsion has a minimum solids content of 48%. The rosin should be a minimum of 26% of the total solids content. The soil stabilizer should be non-corrosive, water dilutable emulsion that upon application cures to a water insoluble binding and cementing agent. For soil erosion control applications, the emulsion is diluted and should be applied as follows:

- For clayey soil: 5 parts water to 1 part emulsion
- For sandy soil: 10 parts water to 1 part emulsion

Application can be by water truck or hydraulic seeder with the emulsion and product mixture applied at the rate specified by the manufacturer.

### *Polymeric Emulsion Blend Binders*

Acrylic Copolymers and Polymers: Polymeric soil stabilizers should consist of a liquid or solid polymer or copolymer with an acrylic base that contains a minimum of 55% solids. The polymeric compound should be handled and mixed in a manner that will not cause foaming or should contain an anti-foaming agent. The polymeric emulsion should not exceed its shelf life or expiration date; manufacturers should provide the expiration date. Polymeric soil stabilizer should be readily miscible in water, non-injurious to seed or animal life, non-flammable, should provide surface soil stabilization for various soil types without totally inhibiting water infiltration, and should not re-emulsify when cured. The applied compound typically requires 12 to 24 hours drying time. Liquid copolymer should be diluted at a rate of 10 parts water to 1 part polymer and the mixture applied to soil at a rate of 1,175 gallons/acre.

Liquid Polymers of Methacrylates and Acrylates: This material consists of a tackifier/sealer that is a liquid polymer of methacrylates and acrylates. It is an aqueous 100% acrylic emulsion blend of 40% solids by volume that is free from styrene, acetate, vinyl, ethoxylated surfactants or silicates. For soil stabilization applications, it is diluted with water in accordance with the manufacturer's recommendations, and applied with a hydraulic seeder at the rate of 20 gallons/acre. Drying time is 12 to 18 hours after application.

Copolymers of Sodium Acrylates and Acrylamides: These materials are non-toxic, dry powders that are copolymers of sodium acrylate and acrylamide. They are mixed with water and applied to the soil surface for erosion control at rates that are determined by slope gradient:

| Slope Gradient (H:V) | lb/acre |
|---|---|
| Flat to 5:1 | 3.0 – 5.0 |
| 5:1 to 3:1 | 5.0 – 10.0 |
| 2:1 to 1:1 | 10.0 – 20.0 |

Poly-Acrylamide (PAM) and Copolymer of Acrylamide**:** Linear copolymer polyacrylamide for use as a soil binder is packaged as a dry flowable solid, as a liquid. Refer to the manufacturer's recommendation for dilution and application rates as they vary based on liquid or dry form, site conditions and climate.

- Limitations specific to PAM are as follows:

- Do not use PAM on a slope that flows into a water body without passing through a sediment trap or sediment basin.

- The specific PAM copolymer formulation must be anionic. Cationic PAM should not be used in any application because of known aquatic toxicity problems. Only the highest drinking water grade PAM, certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, should be used for soil applications.

- PAM designated for erosion and sediment control should be "water soluble" or "linear" or "non-cross linked".

- PAM should not be used as a stand-alone BMP to protect against water-based erosion. When combined with mulch, its effectiveness increases dramatically.

Hydro-Colloid Polymers: Hydro-Colloid Polymers are various combinations of dry flowable poly-acrylamides, copolymers and hydro-colloid polymers that are mixed with water and applied to the soil surface at rates of 55 to 60 lb/acre. Drying times are 0 to 4 hours.

### *Cementitious-Based Binders*

Gypsum: This is a formulated gypsum based product that readily mixes with water and mulch to form a thin protective crust on the soil surface. It is composed of high purity gypsum that is ground, calcined and processed into calcium sulfate hemihydrate with a minimum purity of 86%. It is mixed in a hydraulic seeder and applied at rates 4,000 to 12,000 lb/acre. Drying time is 4 to 8 hours.

### *Applying Soil Binders*

After selecting an appropriate soil binder, the untreated soil surface must be prepared before applying the soil binder. The untreated soil surface must contain sufficient moisture to assist the agent in achieving uniform distribution. In general, the following steps should be followed:

- Follow manufacturer's written recommendations for application rates, pre-wetting of application area, and cleaning of equipment after use.

- Prior to application, roughen embankment and fill areas.

- Consider the drying time for the selected soil binder and apply with sufficient time before anticipated rainfall. Soil binders should not be applied during or immediately before rainfall.

- Avoid over spray onto roads, sidewalks, drainage channels, sound walls, existing vegetation, etc.

- Soil binders should not be applied to frozen soil, areas with standing water, under freezing or rainy conditions, or when the temperature is below 40°F during the curing period.

- More than one treatment is often necessary, although the second treatment may be diluted or have a lower application rate.

- Generally, soil binders require a minimum curing time of 24 hours before they are fully effective. Refer to manufacturer's instructions for specific cure time.

- For liquid agents:
  - Crown or slope ground to avoid ponding.
  - Uniformly pre-wet ground at 0.03 to 0.3 gal/yd$^2$ or according to manufacturer's recommendations.
  - Apply solution under pressure. Overlap solution 6 to 12 in.
  - Allow treated area to cure for the time recommended by the manufacturer; typically at least 24 hours.
  - Apply second treatment before first treatment becomes ineffective, using 50% application rate.
  - In low humidities, reactivate chemicals by re-wetting with water at 0.1 to 0.2 gal/yd$^2$.

## Costs

Costs vary according to the soil stabilizer selected for implementation. The following are approximate installed costs:

| Soil Binder | Cost per Acre (2000)[1] | Estimated Cost per Acre (2009)[2] |
|---|---|---|
| Plant-Material-Based (Short Lived) Binders | $700-$900 | $770-$990 |
| Plant-Material-Based (Long Lived) Binders | $1,200-$1,500 | $1,320-$1,650 |
| Polymeric Emulsion Blend Binders | $700 -$1,500 | $770-$1,650 |
| Cementitious-Based Binders | $800-$1,200 | $880-$1,350 |

1. Source: Erosion Control Pilot Study Report, Caltrans, June 2000.

2. 2009 costs reflect a 10% escalation over year 2000 costs. Escalation based on informal survey of industry trends. Note: Expected cost increase is offset by competitive economic conditions.

## Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Reapply the selected soil binder as needed to maintain effectiveness.

**Table 1 Properties of Soil Binders for Erosion Control**

| Evaluation Criteria | Binder Type | | | |
|---|---|---|---|---|
| | **Plant Material Based (Short Lived)** | **Plant Material Based (Long Lived)** | **Polymeric Emulsion Blends** | **Cementitious-Based Binders** |
| Relative Cost | Low | Moderate to High | Low to High | Low to Moderate |
| Resistance to Leaching | High | High | Low to Moderate | Moderate |
| Resistance to Abrasion | Moderate | Low | Moderate to High | Moderate to High |
| Longevity | Short to Medium | Medium | Medium to Long | Medium |
| Minimum Curing Time before Rain | 9 to 18 hours | 19 to 24 hours | 0 to 24 hours | 4 to 8 hours |
| Compatibility with Existing Vegetation | Good | Poor | Poor | Poor |
| Mode of Degradation | Biodegradable | Biodegradable | Photodegradable/ Chemically Degradable | Photodegradable/ Chemically Degradable |
| Labor Intensive | No | No | No | No |
| Specialized Application Equipment | Water Truck or Hydraulic Mulcher | Water Truck or Hydraulic Mulcher | Water Truck or Hydraulic Mulcher | Water Truck or Hydraulic Mulcher |
| Liquid/Powder | Powder | Liquid | Liquid/Powder | Powder |
| Surface Crusting | Yes, but dissolves on rewetting | Yes | Yes, but dissolves on rewetting | Yes |
| Clean Up | Water | Water | Water | Water |
| Erosion Control Application Rate | Varies (1) | Varies (1) | Varies (1) | 4,000 to 12,000 lbs/acre |

(1) See Implementation for specific rates.

## References

Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

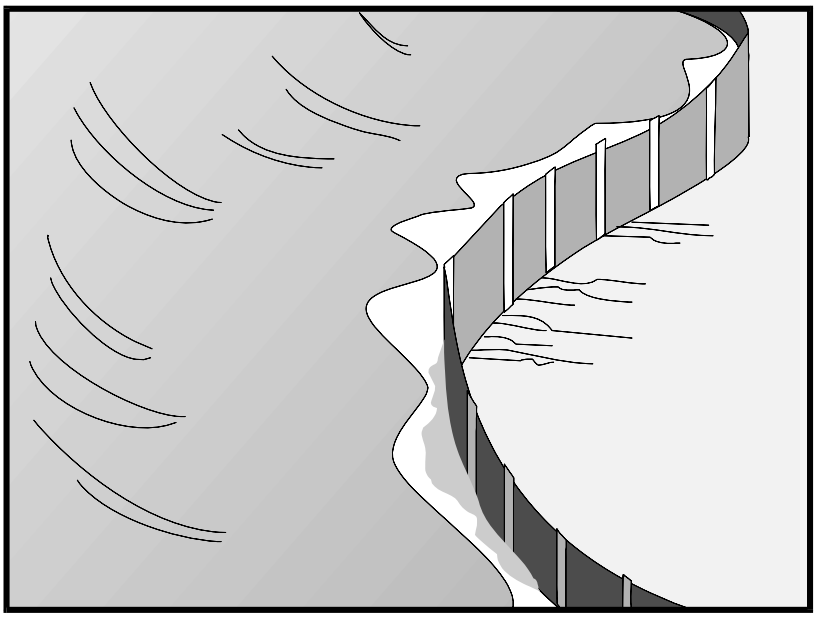
Sedimentation and Erosion Control, An Inventory of Current Practices Draft, US EPA, April 1990.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

# Silt Fence SE-1



| Categories | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | ☑ |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | |

**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | |
| Organics | |

**Potential Alternatives**

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-10 Storm Drain Inlet Protection

SE-14 Biofilter Bags

## Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

## Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows. Silt fences are most effective when used in combination with erosion controls. Suitable applications include:

- Along the perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

## Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard. Runoff typically ponds temporarily on the upstream side of silt fence.
- Do not use silt fence to divert water flows or place across any contour line. Fences not constructed on a level contour, or fences used to divert flow will concentrate flows resulting in additional erosion and possibly overtopping or failure of the silt fence.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Not effective unless trenched and keyed in.
- Not intended for use as mid-slope protection on slopes greater than 4:1 (H:V).
- Do not use on slopes subject to creeping, slumping, or landslides.

## Implementation

### *General*

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap sediment by intercepting and detaining small amounts of sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- The maximum length of slope draining to any point along the silt fence should be 200 ft or less.
- The maximum slope perpendicular to the fence line should be 1:1.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 $ft^2$ of ponding area should be provided for every acre draining to the fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.

- Silt fences should remain in place until the disturbed area is permanently stabilized, after which, the silt fence should be removed and properly disposed.
- Silt fence should be used in combination with erosion source controls up slope in order to provide the most effective sediment control.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

### *Design and Layout*

The fence should be supported by a plastic or wire mesh if the fabric selected does not have sufficient strength and bursting strength characteristics for the planned application (as recommended by the fabric manufacturer). Woven geotextile material should contain ultraviolet inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 °F to 120 °F.

- Layout in accordance with attached figures.
- For slopes steeper than 2:1 (H:V) and that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to install additional protection immediately adjacent to the bottom of the slope, prior to installing silt fence. Additional protection may be a chain link fence or a cable fence.
- For slopes adjacent to sensitive receiving waters or Environmentally Sensitive Areas (ESAs), silt fence should be used in conjunction with erosion control BMPs.

### *Standard vs. Heavy Duty Silt Fence*

*Standard Silt Fence*

- Generally applicable in cases where the slope of area draining to the silt fence is 4:1 (H:V) or less.
- Used for shorter durations, typically 5 months or less
- Area draining to fence produces moderate sediment loads.

*Heavy Duty Silt Fence*

- Use is generally limited to 8 months or less.
- Area draining to fence produces moderate sediment loads.
- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fence fabric has higher tensile strength.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
  - Posts are metal (steel or aluminum)

### *Materials*

<u>Standard Silt Fence</u>

- Silt fence material should be woven geotextile with a minimum width of 36 in. and a minimum tensile strength of 100 lb force. The fabric should conform to the requirements in ASTM designation D4632 and should have an integral reinforcement layer. The

reinforcement layer should be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric should be between 0.1 $sec^{-1}$ and 0.15 $sec^{-1}$ in conformance with the requirements in ASTM designation D4491.

- Wood stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts or bar reinforcement instead of wood stakes. If bar reinforcement is used in lieu of wood stakes, use number four or greater bar. Provide end protection for any exposed bar reinforcement for health and safety purposes.

### *Installation Guidelines – Traditional Method*

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).

- Bottom of the silt fence should be keyed-in a minimum of 12 in.

- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.

- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy–duty wire staples at least 1 in. long. The mesh should extend into the trench.

- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.

- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.

- The trench should be backfilled with native material and compacted.

- Construct silt fences with a setback of at least 3 ft from the toe of a slope. Where, due to specific site conditions, a 3 ft setback is not available, the silt fence may be constructed at the

toe of the slope, but should be constructed as far from the toe of the slope as practicable. Silt fences close to the toe of the slope will be less effective and more difficult to maintain.

- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case should the reach exceed 500 ft.
- Cross barriers should be a minimum of $^1/_3$ and a maximum of ½ the height of the linear barrier.
- See typical installation details at the end of this fact sheet.

***Installation Guidelines - Static Slicing Method***

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 inches into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the gerotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
    - Ease of installation (most often done with a 2 person crew). In addition, installation using static slicing has been found to be more efficient on slopes, in rocky soils, and in saturated soils.
    - Minimal soil disturbance.
    - Greater level of compaction along fence, leading to higher performance (i.e. greater sediment retention).
    - Uniform installation.
    - Less susceptible to undercutting/undermining.

## Costs

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.
- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is $7 per linear foot based on vendor research. Range of cost is $3.50 - $9.10 per linear foot.
- In tests, the slicing method required 0.33 man hours per 100 linear feet, while the trenched based systems required as much as 1.01 man hours per linear foot.

## Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair undercut silt fences.

- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Silt fences should be left in place until the upstream area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.
- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

### References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

Sedimentation and Erosion Control Practices, and Inventory of Current Practices (Draft), UESPA, 1990.

Southeastern Wisconsin Regional Planning Commission (SWRPC). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI. 1991

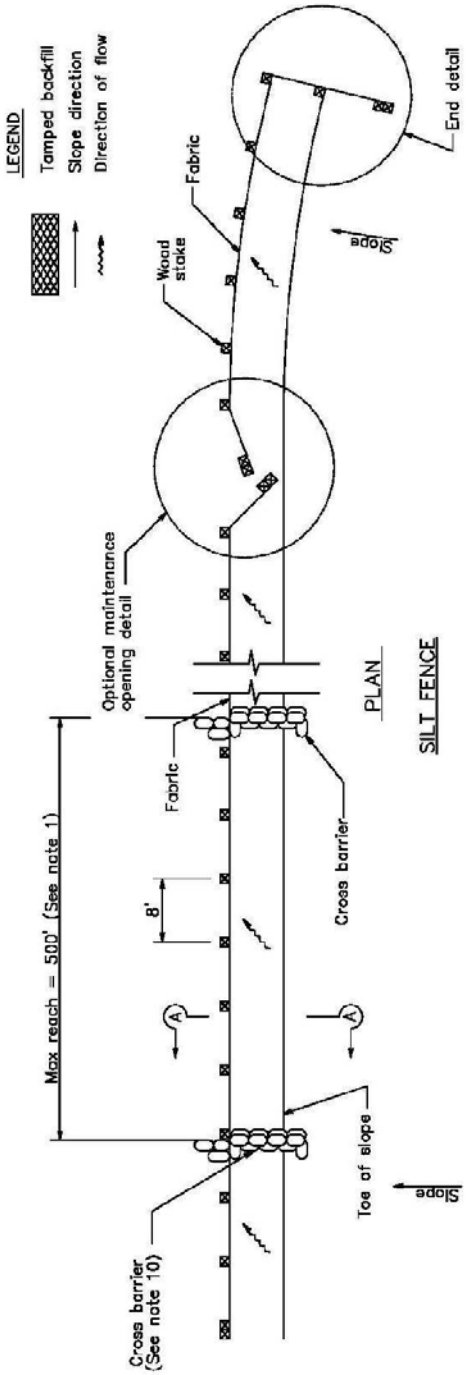
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

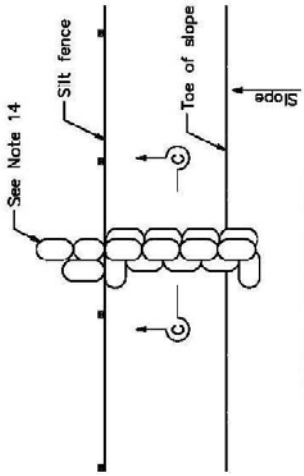
Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

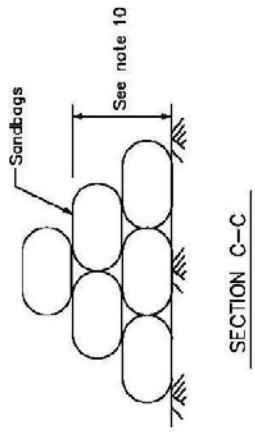
U.S. Environmental Protection Agency (USEPA). Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

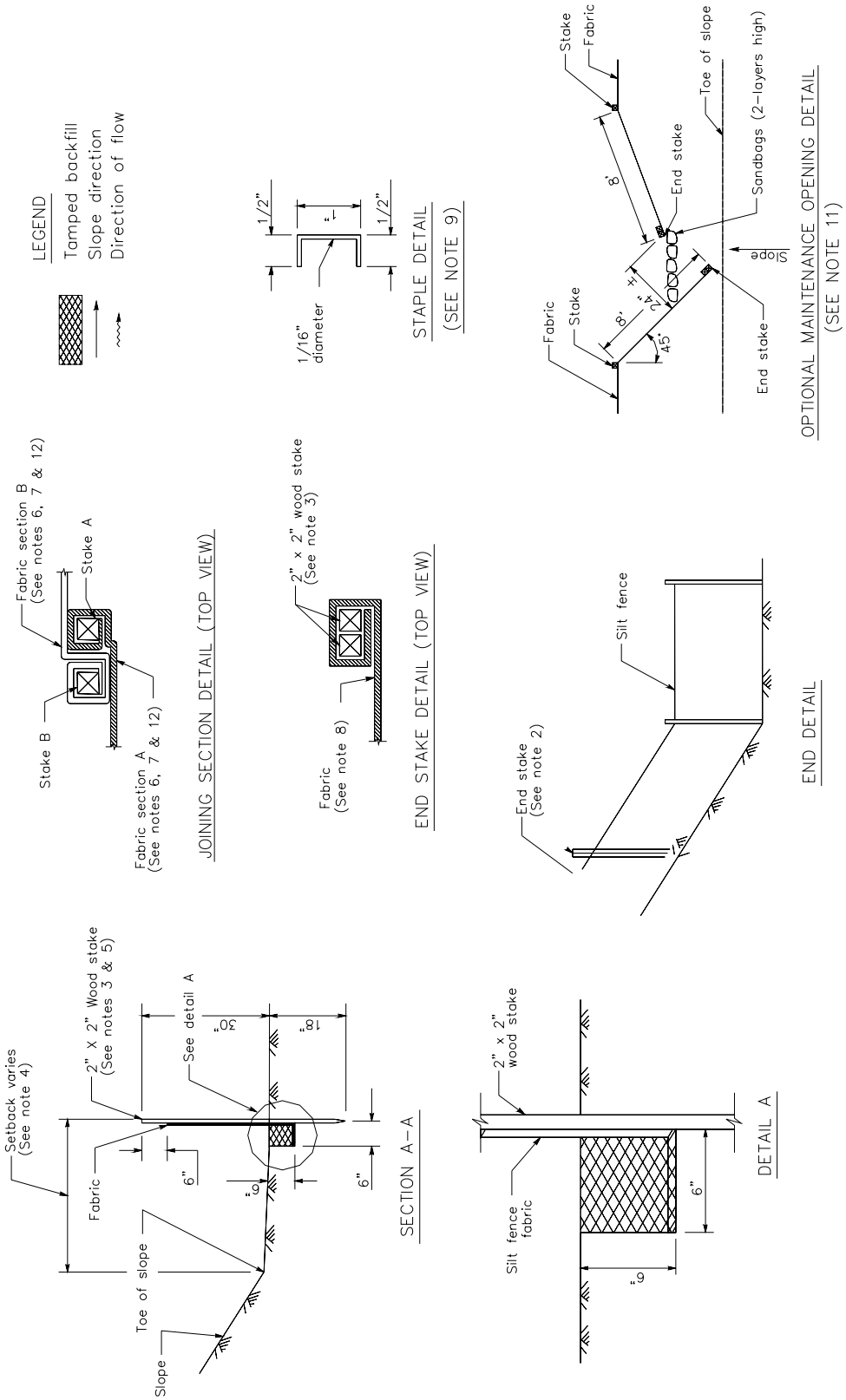


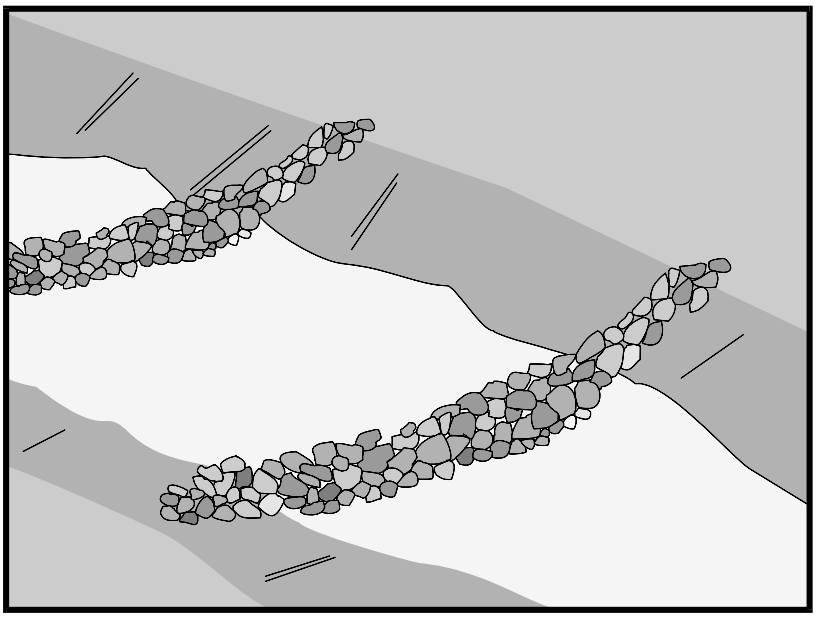




NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. The last 8'–0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'–0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow–through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes are full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Dimensions shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset: to eliminate gaps.
14. Add 3–4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.


LEGEND
Tamped backfill
Slope direction
Direction of flow
1/2"
1"
1/2"
1/16" diameter
STAPLE DETAIL
(SEE NOTE 9)
Stake
Fabric
Toe of slope
Sandbags (2-layers high)
End stake
8'
Slope
4"
8'
45°
Fabric
Stake
End stake
OPTIONAL MAINTENANCE OPENING DETAIL
(SEE NOTE 11)
Fabric section B
(See notes 6, 7 & 12)
Stake A
Stake B
Fabric section A
(See notes 6, 7 & 12)
JOINING SECTION DETAIL (TOP VIEW)
2" x 2" wood stake
(See note 3)
Fabric
(See note 8)
END STAKE DETAIL (TOP VIEW)
Silt fence
End stake
(See note 2)
END DETAIL
Setback varies
(See note 4)
2" X 2" Wood stake
(See notes 3 & 5)
See detail A
30"
18"
Fabric
6"
6"
6"
Toe of slope
Slope
SECTION A-A
2" x 2"
wood stake
Silt fence
fabric
6"
6"
DETAIL A

# Check Dams SE-4



## Categories

| | | |
|---|---|---|
| EC | Erosion Control | ☒ |
| SE | Sediment Control | ☑ |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | |

**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | |
| Organics | |

## Potential Alternatives

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

## Description and Purpose

A check dam is a small barrier constructed of rock, gravel bags, sandbags, fiber rolls, or other proprietary products, placed across a constructed swale or drainage ditch. Check dams reduce the effective slope of the channel, thereby reducing scour and channel erosion by reducing flow velocity and increasing residence time within the channel, allowing sediment to settle.

## Suitable Applications

Check dams may be appropriate in the following situations:

- To promote sedimentation behind the dam.
- To prevent erosion by reducing the velocity of channel flow in small intermittent channels and temporary swales.
- In small open channels that drain 10 acres or less.
- In steep channels where stormwater runoff velocities exceed 5 ft/s.
- During the establishment of grass linings in drainage ditches or channels.
- In temporary ditches where the short length of service does not warrant establishment of erosion-resistant linings.
- To act as a grade control structure.

## Limitations

- Not to be used in live streams or in channels with extended base flows.
- Not appropriate in channels that drain areas greater than 10 acres.
- Not appropriate in channels that are already grass-lined unless erosion potential or sediment-laden flow is expected, as installation may damage vegetation.
- Require extensive maintenance following high velocity flows.
- Promotes sediment trapping which can be re-suspended during subsequent storms or removal of the check dam.
- Do not construct check dams with straw bales or silt fence.
- Water suitable for mosquito production may stand behind check dams, particularly if subjected to daily non-stormwater discharges.

## Implementation

### *General*

Check dams reduce the effective slope and create small pools in swales and ditches that drain 10 acres or less. Using check dams to reduce channel slope reduces the velocity of stormwater flows, thus reducing erosion of the swale or ditch and promoting sedimentation. Thus, check dams are dual-purpose and serve an important role as erosion controls as well as as sediment controls. Note that use of 1-2 isolated check dams for sedimentation will likely result in little net removal of sediment because of the small detention time and probable scour during longer storms. Using a series of check dams will generally increase their effectiveness. A sediment trap (SE-3) may be placed immediately upstream of the check dam to increase sediment removal efficiency.

### *Design and Layout*

Check dams work by decreasing the effective slope in ditches and swales. An important consequence of the reduced slope is a reduction in capacity of the ditch or swale. This reduction in capacity should be considered when using this BMP, as reduced capacity can result in overtopping of the ditch or swale and resultant consequences. In some cases, such as a "permanent" ditch or swale being constructed early and used as a "temporary" conveyance for construction flows, the ditch or swale may have sufficient capacity such that the temporary reduction in capacity due to check dams is acceptable. When check dams reduce capacities beyond acceptable limits, either:

- Don't use check dams. Consider alternative BMPs, or.
- Increase the size of the ditch or swale to restore capacity.

Maximum slope and velocity reduction is achieved when the toe of the upstream dam is at the same elevation as the top of the downstream dam (see "Spacing Between Check Dams" detail at the end of this fact sheet). The center section of the dam should be lower than the edge sections (at least 6 inches), acting as a spillway, so that the check dam will direct flows to the center of

the ditch or swale (see "Typical Rock Check Dam" detail at the end of this fact sheet). Bypass or side-cutting can occur if a sufficient spillway is not provided in the center of the dam.

Check dams are usually constructed of rock, gravel bags, sandbags, and fiber rolls. A number of products can also be used as check dams (e.g. HDPE check dams, temporary silt dikes (SE-12)), and some of these products can be removed and reused. Check dams can also be constructed of logs or lumber, and have the advantage of a longer lifespan when compared to gravel bags, sandbags, and fiber rolls. Check dams should not be constructed from straw bales or silt fences, since concentrated flows quickly wash out these materials.

Rock check dams are usually constructed of 8 to 12 in. rock. The rock is placed either by hand or mechanically, but never just dumped into the channel. The dam should completely span the ditch or swale to prevent washout. The rock used should be large enough to stay in place given the expected design flow through the channel. It is recommended that abutments be extended 18 in. into the channel bank. Rock can be graded such that smaller diameter rock (e.g. 2-4 in) is located on the upstream side of larger rock (holding the smaller rock in place); increasing residence time.

Log check dams are usually constructed of 4 to 6 in. diameter logs, installed vertically. The logs should be embedded into the soil at least 18 in. Logs can be bolted or wired to vertical support logs that have been driven or buried into the soil.

See fiber rolls, SE-5, for installation of fiber roll check dams.

Gravel bag and sand bag check dams are constructed by stacking bags across the ditch or swale, shaped as shown in the drawings at the end of this fact sheet (see "Gravel Bag Check Dam" detail at the end of this fact sheet).

Manufactured products, such as temporary silt dikes (SE-12), should be installed in accordance with the manufacturer's instructions. Installation typically requires anchoring or trenching of products, as well as regular maintenance to remove accumulated sediment and debris.

If grass is planted to stabilize the ditch or swale, the check dam should be removed when the grass has matured (unless the slope of the swales is greater than 4%).

The following guidance should be followed for the design and layout of check dams:

- Install the first check dam approximately 16 ft from the outfall device and at regular intervals based on slope gradient and soil type.
- Check dams should be placed at a distance and height to allow small pools to form between each check dam.
- For multiple check dam installation, backwater from a downstream check dam should reach the toes of the upstream check dam.
- A sediment trap provided immediately upstream of the check dam will help capture sediment. Due to the potential for this sediment to be resuspended in subsequent storms, the sediment trap should be cleaned following each storm event.

- High flows (typically a 2-year storm or larger) should safely flow over the check dam without an increase in upstream flooding or damage to the check dam.
- Where grass is used to line ditches, check dams should be removed when grass has matured sufficiently to protect the ditch or swale.

***Materials***

- Rock used for check dams should typically be 8-12 in rock and be sufficiently sized to stay in place given expected design flows in the channel. Smaller diameter rock (e.g. 2 to 4 in) can be placed on the upstream side of larger rock to increase residence time.
- Gravel bags used for check dams should conform to the requirements of SE-6, Gravel Bag Berms.
- Sandbags used for check dams should conform to SE-8, Sandbag Barrier.
- Fiber rolls used for check dams should conform to SE-5, Fiber Rolls.
- Temporary silt dikes used for check dams should conform to SE-12, Temporary Silt Dikes.

***Installation***

- Rock should be placed individually by hand or by mechanical methods (no dumping of rock) to achieve complete ditch or swale coverage.
- Tightly abut bags and stack according to detail shown in the figure at the end of this section (pyramid approach). Gravel bags and sandbags should not be stacked any higher than 3 ft.
- Upper rows or gravel and sand bags shall overlap joints in lower rows.
- Fiber rolls should be trenched in, backfilled, and firmly staked in place.
- Install along a level contour.
- HDPE check dams, temporary silt dikes, and other manufactured products should be used and installed per manufacturer specifications.

## Costs

Cost consists of labor costs if materials are readily available (such as gravel on-site). If material must be imported, costs will increase. For other material and installation costs, see SE-5, SE-6, SE-8, SE-12, and SE-14.

## Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Replace missing rock, bags, rolls, etc. Replace bags or rolls that have degraded or have become damaged.

- If the check dam is used as a sediment capture device, sediment that accumulates behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- If the check dam is used as a grade control structure, sediment removal is not required as long as the system continues to control the grade.
- Inspect areas behind check dams for pools of standing water, especially if subjected to daily non-stormwater discharges.
- Remove accumulated sediment prior to permanent seeding or soil stabilization.
- Remove check dam and accumulated sediment when check dams are no longer needed.

### References

Draft – Sedimentation and Erosion Control, and Inventory of Current Practices, USEPA, April 1990.

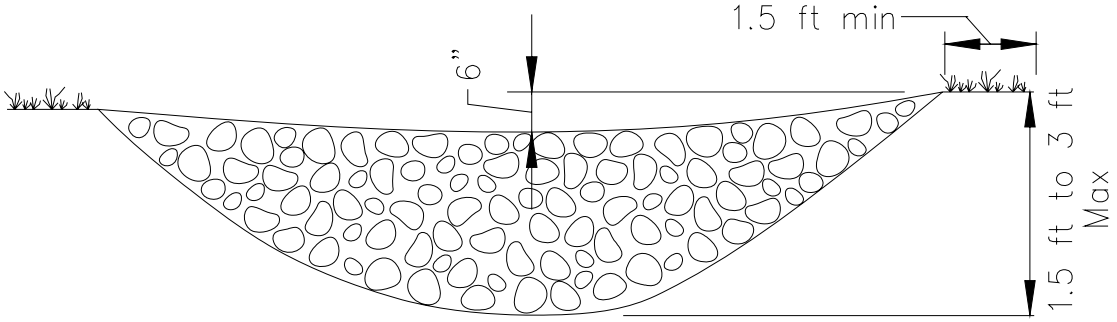
Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

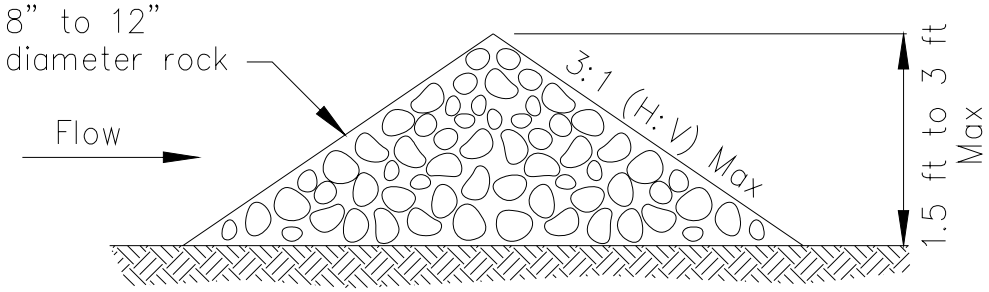
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Metzger, M.E. 2004. Managing mosquitoes in stormwater treatment devices. University of California Division of Agriculture and Natural Resources, Publication 8125. On-line: http://anrcatalog.ucdavis.edu/pdf/8125.pdf

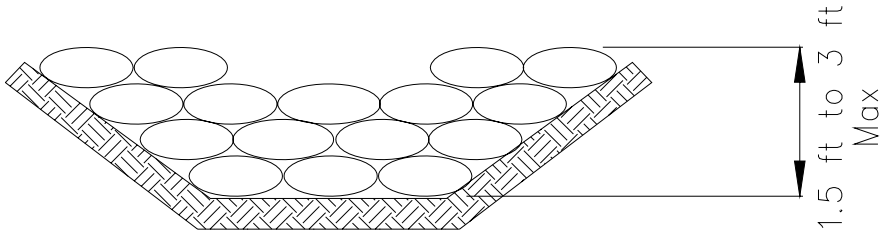



ELEVATION

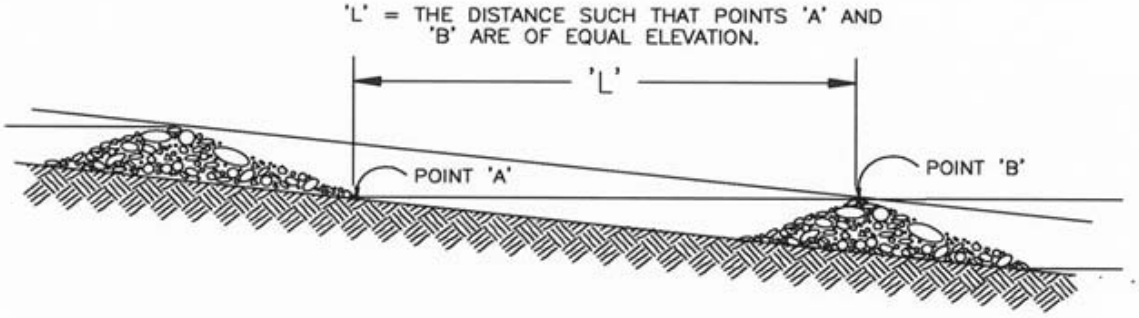



TYPICAL ROCK CHECK DAM SECTION

ROCK CHECK DAM
NOT TO SCALE

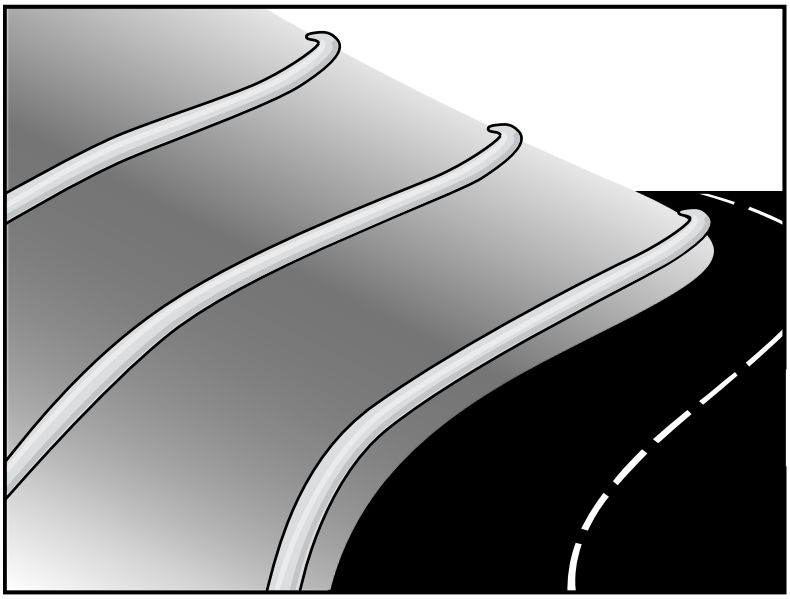



GRAVEL BAG CHECK DAM ELEVATION
NOT TO SCALE




SPACING BETWEEN CHECK DAMS

# Fiber Rolls SE-5



## Categories

| | | |
|---|---|---|
| EC | Erosion Control | ☒ |
| SE | Sediment Control | ☑ |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | |

**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

## Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

## Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | |
| Organics | |

## Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

- Around temporary stockpiles.

### Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

### Implementation

#### *Fiber Roll Materials*

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

#### *Installation*

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

***Removal***

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradeable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

## Costs

Material costs for regular fiber rolls range from $20 - $30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-$9.00 per linear foot, based upon vendor research.

## Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed

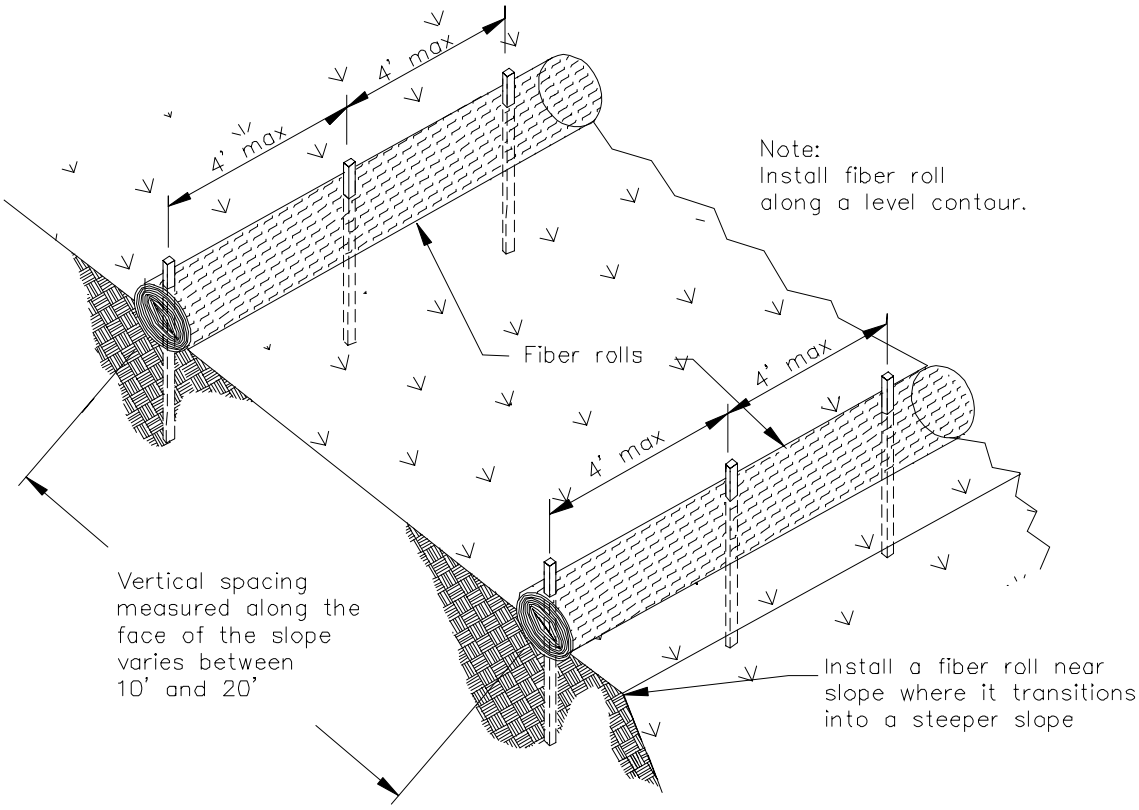
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

### References

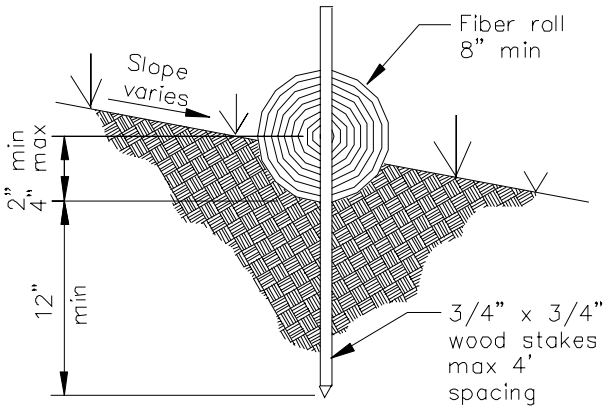
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.




TYPICAL FIBER ROLL INSTALLATION

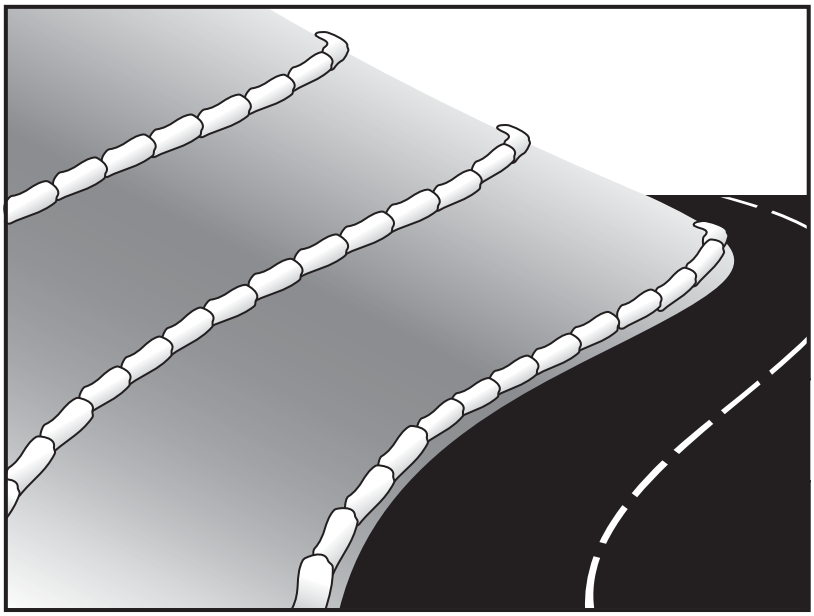
N.T.S.




ENTRENCHMENT DETAIL

N.T.S.

# Gravel Bag Berm SE-6



## Categories

| | | |
|---|---|---|
| EC | Erosion Control | ☒ |
| SE | Sediment Control | ☑ |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | |

**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | |
| Organics | |

## Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Roll

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

## Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

## Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As a linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

- At the top of slopes to divert runoff away from disturbed slopes.
- As chevrons (small check dams) across mildly sloped construction roads. For use check dam use in channels, see SE-4, Check Dams.

## Limitations

- Gravel berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the berm, possibly causing flooding if sufficient space does not exist.
- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Durability of gravel bags is somewhat limited and bags may need to be replaced when installation is required for longer than 6 months.
- Easily damaged by construction equipment.
- When used to detain concentrated flows, maintenance requirements increase.

## Implementation

### *General*

A gravel bag berm consists of a row of open graded gravel-filled bags placed on a level contour. When appropriately placed, a gravel bag berm intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. The open graded gravel in the bags is porous, which allows the ponded runoff to flow slowly through the bags, releasing the runoff as sheet flows. Gravel bag berms also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils. Gravel bag berms are similar to sand bag barriers, but are more porous. Generally, gravel bag berms should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

### *Design and Layout*

- Locate gravel bag berms on level contours.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Gravel bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Gravel bags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

Slope inclination 2:1 (H:V) or greater: Gravel bags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the gravel bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the gravel bag berm to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, gravel bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the gravel bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- In Non-Traffic Areas:
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more layer construction
  - Top width = 12 in. minimum for one or two layer construction
  - Side slopes = 2:1 (H:V) or flatter
- In Construction Traffic Areas:
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more layer construction.
  - Top width = 12 in. minimum for one or two layer construction.
  - Side slopes = 2:1 (H:V) or flatter.
- Butt ends of bags tightly.
- On multiple row, or multiple layer construction, overlap butt joints of adjacent row and row beneath.
- Use a pyramid approach when stacking bags.

***Materials***

- ***Bag Material:*** Bags should be woven polypropylene, polyethylene or polyamide fabric or burlap, minimum unit weight of 4 ounces/yd$^2$, Mullen burst strength exceeding 300 lb/in$^2$ in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.

- ***Bag Size:*** Each gravel-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal, and may vary based on locally available materials.

- ***Fill Material:*** Fill material should be 0.5 to 1 in. crushed rock, clean and free from clay, organic matter, and other deleterious material, or other suitable open graded, non-cohesive, porous gravel.

## Costs

Material costs for gravel bags are average and are dependent upon material availability. $2.50-3.00 per filled gravel bag is standard based upon vendor research.

## Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.

- Reshape or replace gravel bags as needed.

- Repair washouts or other damage as needed.

- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.

- Remove gravel bag berms when no longer needed and recycle gravel fill whenever possible and properly dispose of bag material. Remove sediment accumulation and clean, re-grade, and stabilize the area.

## References

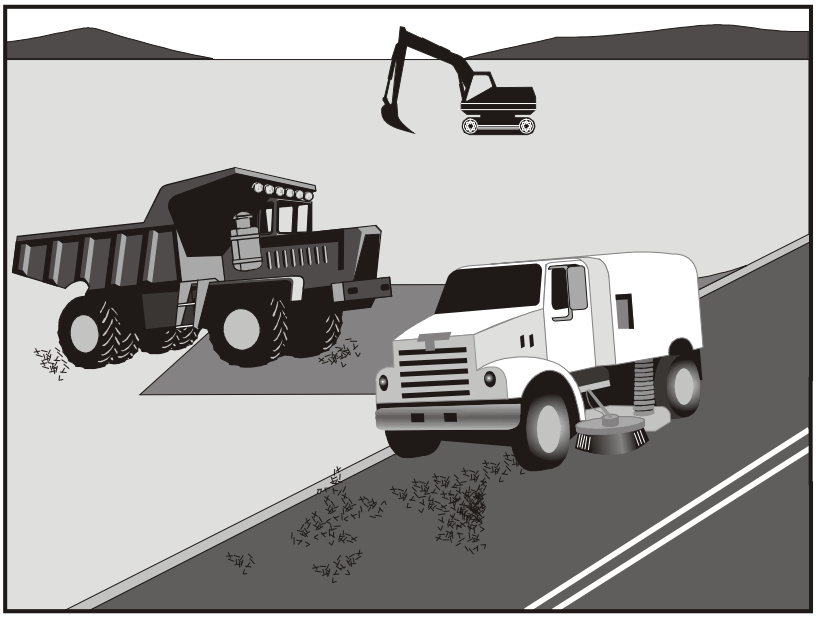
Handbook of Steel Drainage and Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

# Street Sweeping and Vacuuming SE-7



| Categories | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | ☒ |
| TC | Tracking Control | ☑ |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | |

**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | ☑ |
| Metals | |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | |

**Potential Alternatives**

None

## Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

## Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

## Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

## Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.

- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

### Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $58/hour (3 $yd^3$ hopper) to $88/hour (9 $yd^3$ hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

### Inspection and Maintenance

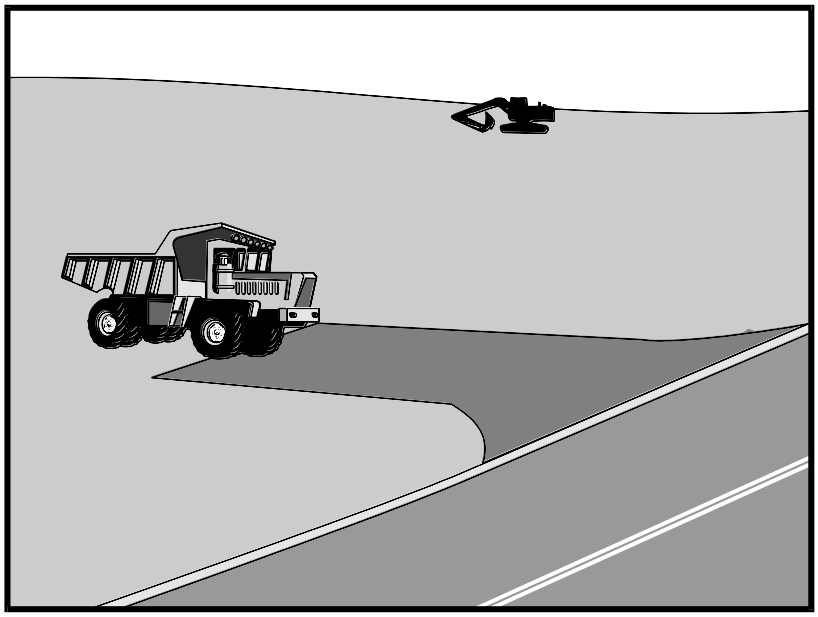
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

### References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.

# Stabilized Construction Entrance/Exit TC-1



## Categories

| | | |
|---|---|---|
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**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | |
| Organics | |

## Potential Alternatives

None

## Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

## Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

## Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

## Implementation

### *General*

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

### *Design and Layout*

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft or maximum site will allow, and 10 ft minimum width or to accommodate traffic.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

## Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

## Costs

Average annual cost for installation and maintenance may vary from $1,200 to $4,800 each, averaging $2,400 per entrance. Costs will increase with addition of washing rack, and sediment trap. With wash rack, costs range from $1,200 - $6,000 each, averaging $3,600 per entrance.

## References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

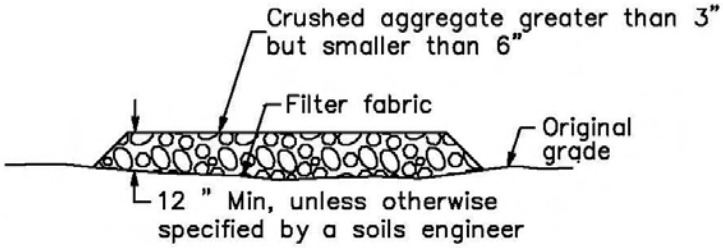
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

# Stabilized Construction Entrance/Exit TC-1




SECTION B–B
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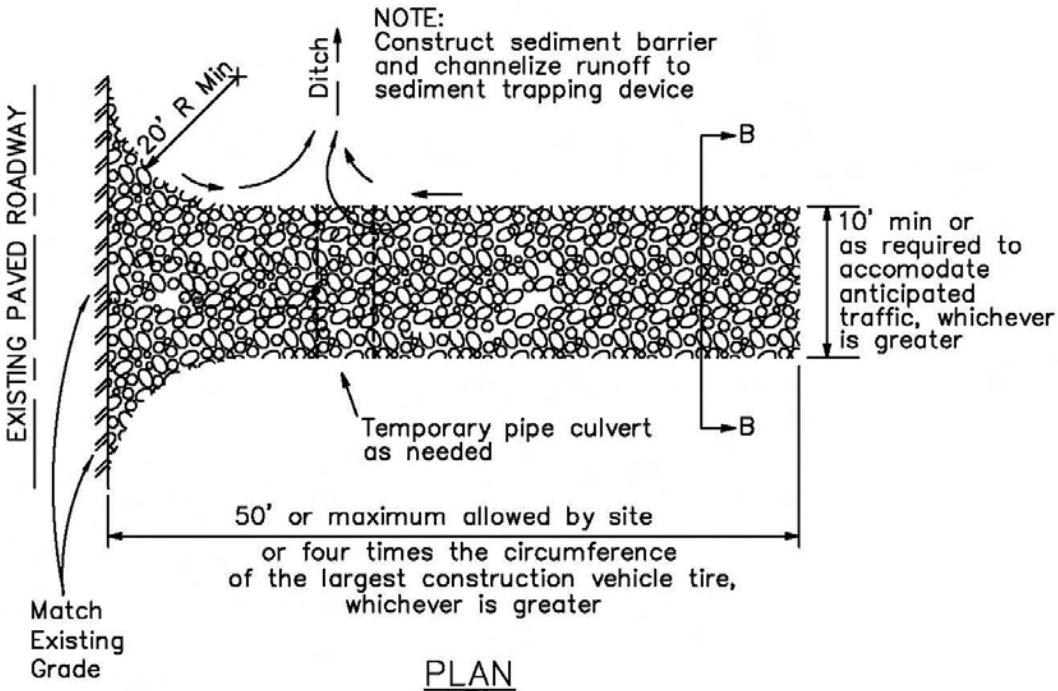


PLAN
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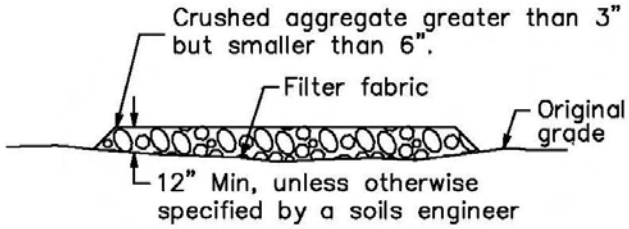


SECTION B–B
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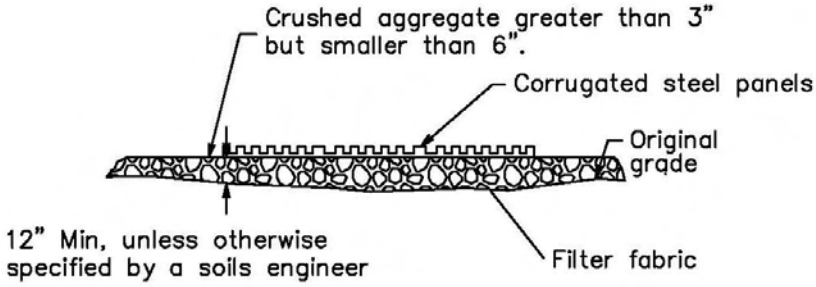
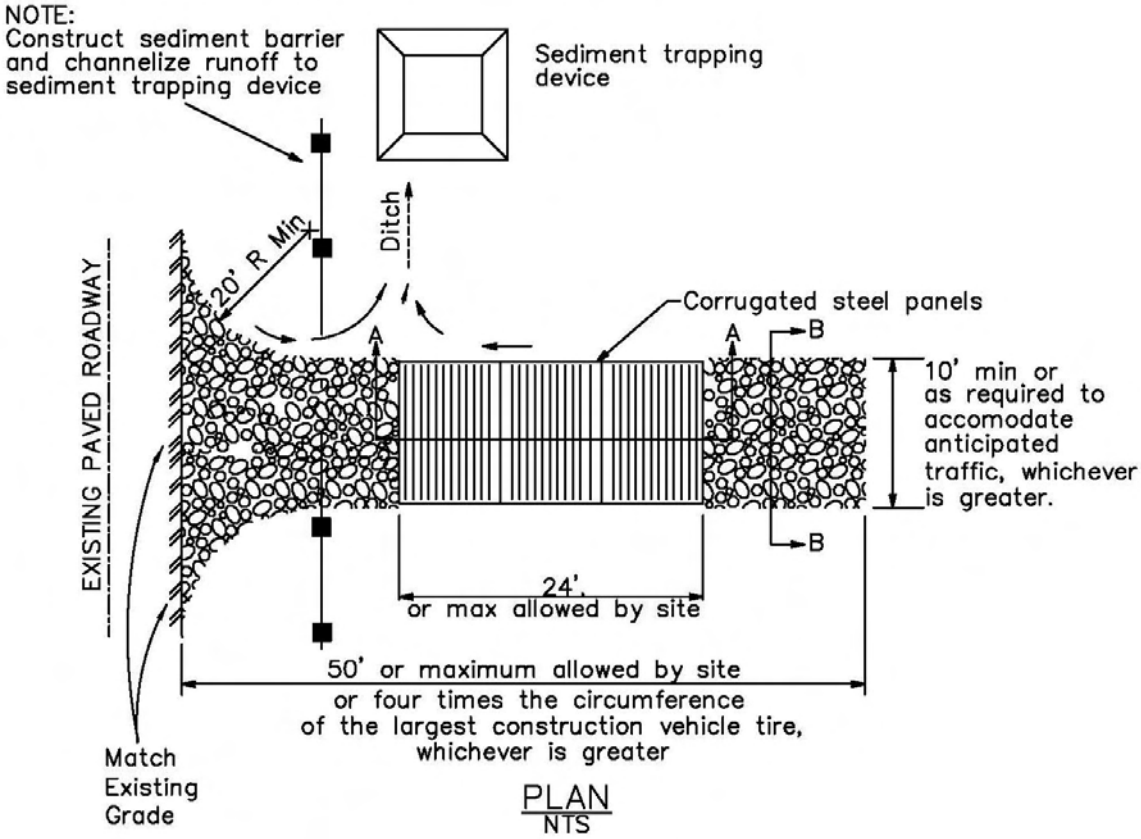



SECTION A–A
NOT TO SCALE

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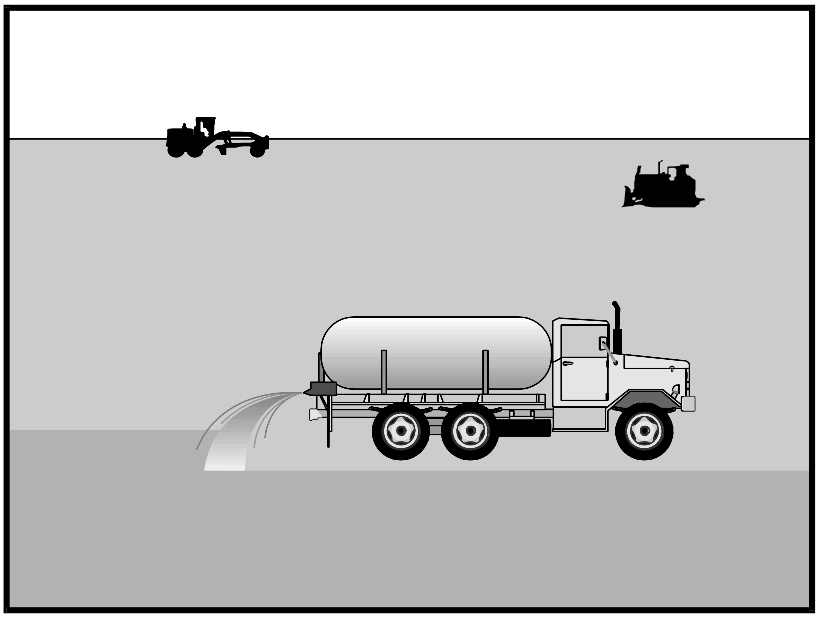
# Wind Erosion Control WE-1



## Categories

| | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | ☒ |
| TC | Tracking Control | |
| WE | Wind Erosion Control | ☑ |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | |

**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | |
| Organics | |

## Potential Alternatives

EC-5 Soil Binders

## Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

## Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

## Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

## Implementation

### *Dust Control Practices*

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montimorillonite) and electrochemical products (e.g. enzymes, ionic products).

| Site Condition | Dust Control Practices | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Permanent Vegetation | Mulching | Wet Suppression (Watering) | Chemical Dust Suppression | Gravel or Asphalt | Temporary Gravel Construction Entrances/Equipment Wash Down | Synthetic Covers | Minimize Extent of Disturbed Area |
| Disturbed Areas not Subject to Traffic | X | X | X | X | X | | | X |
| Disturbed Areas Subject to Traffic | | | X | X | X | X | | X |
| Material Stockpiles | | X | X | X | | | X | X |
| Demolition | | | X | | | X | X | |
| Clearing/ Excavation | | | X | X | | | | X |
| Truck Traffic on Unpaved Roads | | | X | X | X | X | X | |
| Tracking | | | | | X | X | | |

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

### Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

### Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

### References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

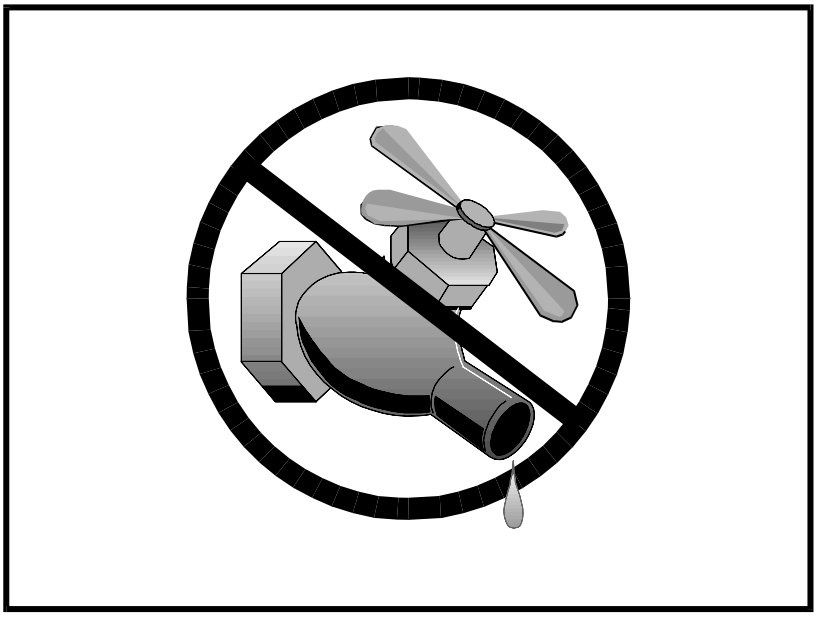
California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

# Water Conservation Practices NS-1



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| WM | Waste Management and Materials Pollution Control | |

**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | |
| Organics | |

**Potential Alternatives**

None

## Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

## Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

## Limitations

- None identified.

## Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.
- Direct construction water runoff to areas where it can soak

into the ground or be collected and reused.

- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

### Costs

The cost is small to none compared to the benefits of conserving water.

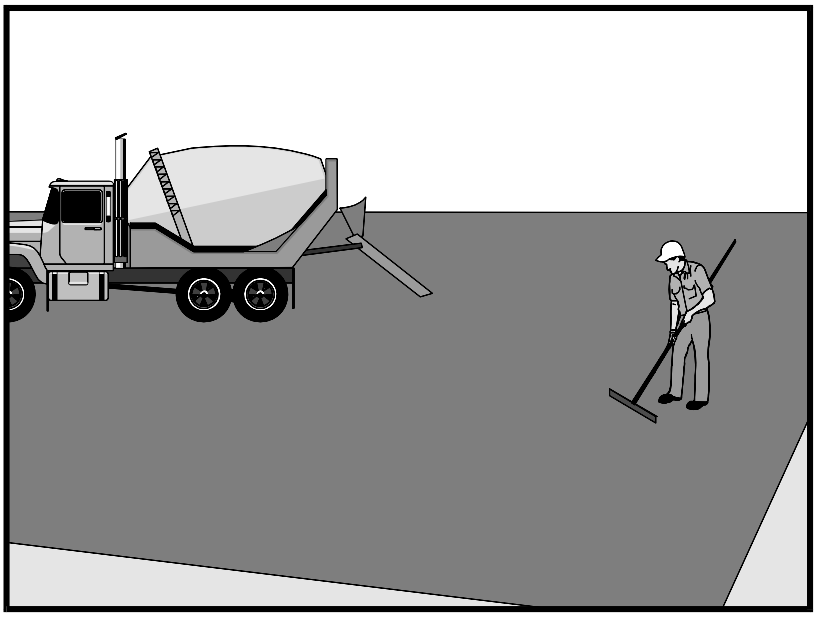
### Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

### References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

# Paving and Grinding Operations NS-3



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**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | |

**Potential Alternatives**

None

## Description and Purpose

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runon and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH and turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials associated with paving and grinding operations, including mortar, concrete, and cement and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

## Suitable Applications

These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

## Limitations

- Paving opportunities may be limited during wet weather.
- Discharges of freshly paved surfaces may raise pH to environmentally harmful levels and trigger permit violations.

## Implementation

### *General*

- Avoid paving during the wet season when feasible.
- Reschedule paving and grinding activities if rain is forecasted.
- Train employees and sub-contractors in pollution prevention and reduction.
- Store materials away from drainage courses to prevent stormwater runon (see WM-1, Material Delivery and Storage).
- Protect drainage courses, particularly in areas with a grade, by employing BMPs to divert runoff or to trap and filter sediment.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses. These materials should be stored consistent with WM-3, Stockpile Management.
- Disposal of PCC (Portland cement concrete) and AC (asphalt concrete) waste should be in conformance with WM-8, Concrete Waste Management.

### *Saw Cutting, Grinding, and Pavement Removal*

- Shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry.
- When paving involves AC, the following steps should be implemented to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
  - AC grindings, pieces, or chunks used in embankments or shoulder backing should not be allowed to enter any storm drains or watercourses. Install inlet protection and perimeter controls until area is stabilized (i.e. cutting, grinding or other removal activities are complete and loose material has been properly removed and disposed of)or permanent controls are in place. Examples of temporary perimeter controls can be found in EC-9, Earth Dikes and Drainage Swales; SE-1, Silt Fence; SE-5, Fiber Rolls, or SE-13 Compost Socks and Berms
  - Collect and remove all broken asphalt and recycle when practical. Old or spilled asphalt should be recycled or disposed of properly.
- Do not allow saw-cut slurry to enter storm drains or watercourses. Residue from grinding operations should be picked up by a vacuum attachment to the grinding machine, or by sweeping, should not be allowed to flow across the pavement, and should not be left on the surface of the pavement. See also WM-8, Concrete Waste Management, and WM-10, Liquid Waste Management.
- Pavement removal activities should not be conducted in the rain.
- Collect removed pavement material by mechanical or manual methods. This material may be recycled for use as shoulder backing or base material.

- If removed pavement material cannot be recycled, transport the material back to an approved storage site.

***Asphaltic Concrete Paving***

- If paving involves asphaltic cement concrete, follow these steps:
  - Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks. Vacuum or sweep loose sand and gravel and properly dispose of this waste by referring to WM-5, Solid Waste Management.
  - Old asphalt should be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.

***Portland Cement Concrete Paving***

- Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect waste materials by dry methods, such as sweeping or shoveling, and return to aggregate base stockpile or dispose of properly. Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in WM-8, Concrete Waste Management, or pump the water to the sanitary sewer if authorized by the local wastewater authority.

***Sealing Operations***

- During chip seal application and sweeping operations, petroleum or petroleum covered aggregate should not be allowed to enter any storm drain or water courses. Apply temporary perimeter controls until structure is stabilized (i.e. all sealing operations are complete and cured and loose materials have been properly removed and disposed).
- Inlet protection (SE-10, Storm Drain Inlet Protection) should be used during application of seal coat, tack coat, slurry seal, and fog seal.
- Seal coat, tack coat, slurry seal, or fog seal should not be applied if rainfall is predicted to occur during the application or curing period.

***Paving Equipment***

- Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials and dispose of in accordance with the applicable regulations. See NS-10, Vehicle and Equipment Maintenance, WM-4, Spill Prevention and Control, and WM-10, Liquid Waste Management.
- Substances used to coat asphalt transport trucks and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.
- Paving equipment parked onsite should be parked over plastic to prevent soil contamination.
- Clean asphalt coated equipment offsite whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in WM-5, Solid Waste Management. Any cleaning onsite should follow NS-8, Vehicle and Equipment Cleaning.

***Thermoplastic Striping***

- Thermoplastic striper and pre-heater equipment shutoff valves should be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the stormwater drainage system, or watercourses.
- Pre-heaters should be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave six inches of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move.
- Do not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible, recycle thermoplastic material.

***Raised/Recessed Pavement Marker Application and Removal***

- Do not transfer or load bituminous material near drain inlets, the stormwater drainage system, or watercourses.
- Melting tanks should be loaded with care and not filled to beyond six inches from the top to leave room for splashing.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.

## Costs

- All of the above are low cost measures.

## Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of paving and grinding operations.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Sample stormwater runoff required by the General Permit.
- Keep ample supplies of drip pans or absorbent materials onsite.
- Inspect and maintain machinery regularly to minimize leaks and drips.

## References

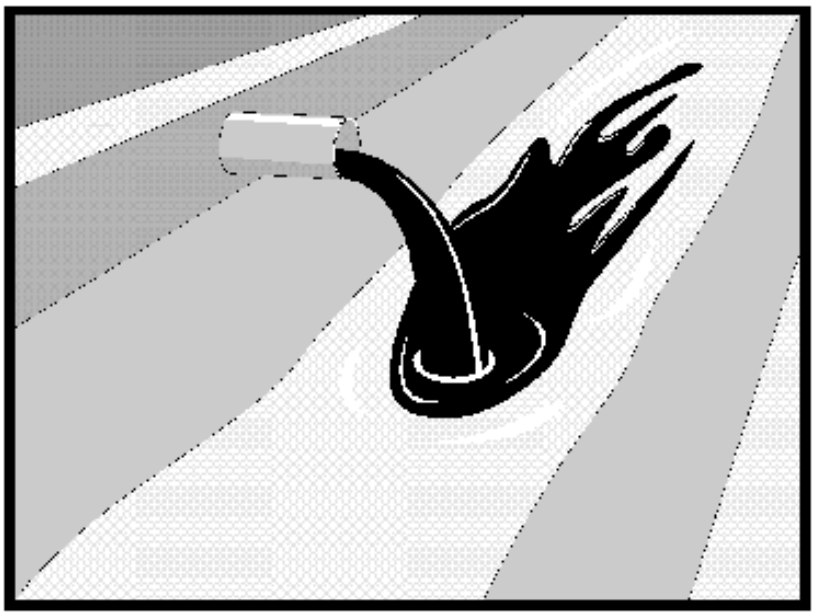
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Hot Mix Asphalt-Paving Handbook AC 150/5370-14, Appendix I, U.S. Army Corps of Engineers, July 1991.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

# Illicit Connection / Discharge NS-6



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**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

| Targeted Constituents | |
|---|---|
| Sediment | |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | ☑ |
| Oil and Grease | ☑ |
| Organics | ☑ |

**Potential Alternatives**

None

## Description and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

## Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

## Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

## Implementation

### *Planning*

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.
- Inspect site regularly during project execution for evidence

of illicit connections, illegal dumping or discharges.

- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

### *Identification of Illicit Connections and Illegal Dumping or Discharges*

- **General –** unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

### *Reporting*

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

### *Cleanup and Removal*

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

## Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

## Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

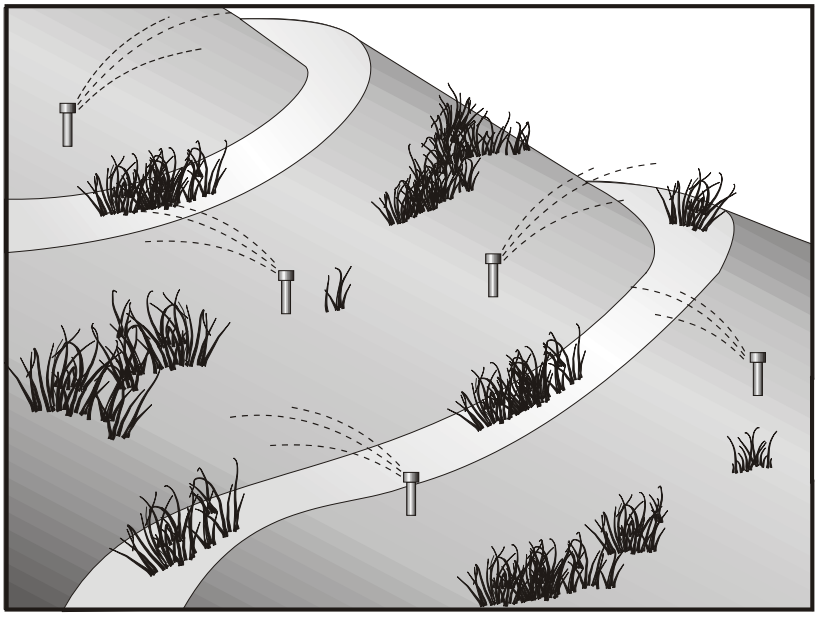
## References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

# Potable Water/Irrigation NS-7



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**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | |
| Organics | ☑ |

**Potential Alternatives**

None

## Description and Purpose

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

## Suitable Applications

Implement this BMP whenever potable water or irrigation water discharges occur at or enter a construction site.

## Limitations

None identified.

## Implementation

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.
- Inspect irrigated areas within the construction limits for

excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

## Costs

Cost to manage potable water and irrigation are low and generally considered to be a normal part of related activities.

## Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Repair broken water lines as soon as possible.
- Inspect irrigated areas regularly for signs of erosion and/or discharge.

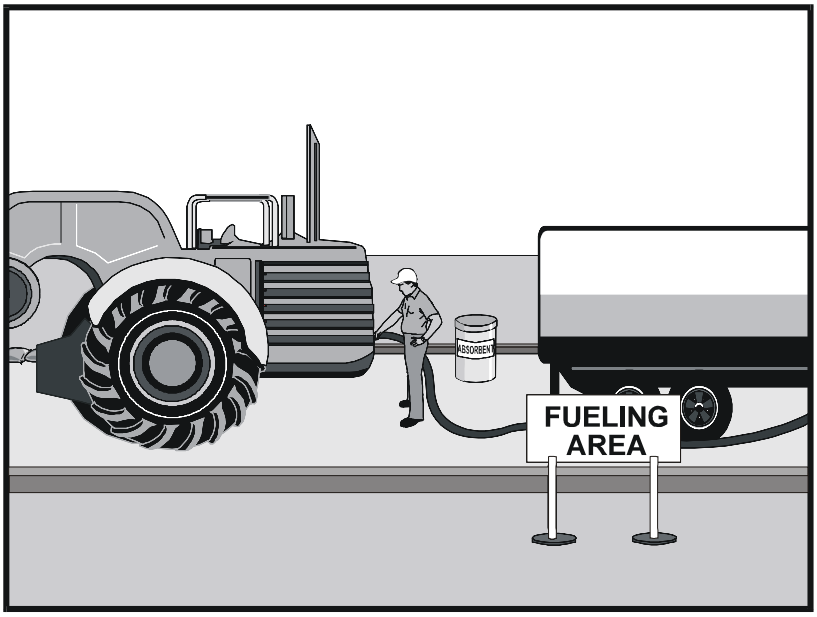
## References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

# Vehicle and Equipment Fueling NS-9




## Categories

| | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | ☑ |
| WM | Waste Management and Materials Pollution Control | |

**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

## Targeted Constituents

| | |
|---|---|
| Sediment | |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | |

## Potential Alternatives

None

## Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

## Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

## Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/ Exit.

## Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage “topping-off” of fuel tanks.
- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should

be disposed of properly after use.

- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runon and runoff, and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runon, runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

### Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

### Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

## References

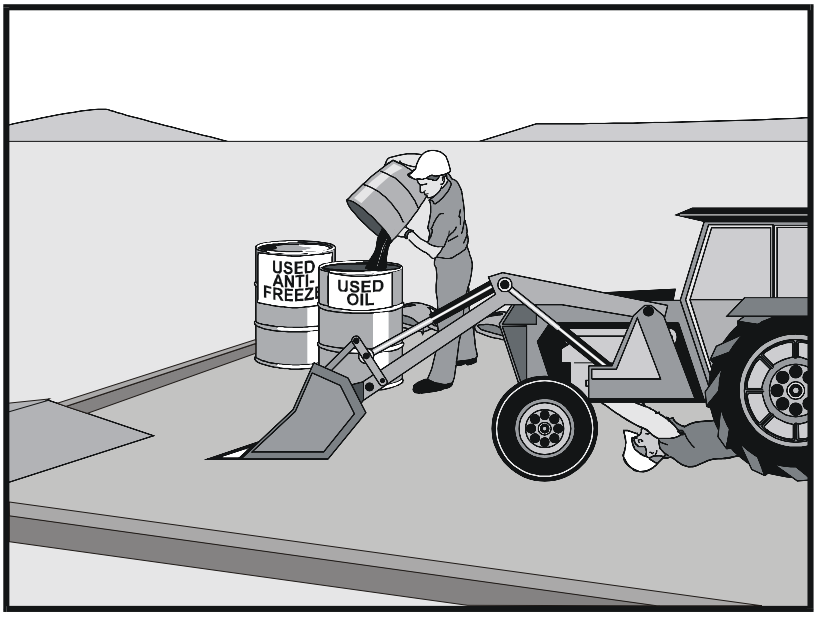
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

# Vehicle & Equipment Maintenance NS-10




| Categories | | |
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| SE | Sediment Control | |
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| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | ☑ |
| WM | Waste Management and Materials Pollution Control | |

**Legend:**
☑ **Primary Objective**
☒ **Secondary Objective**

| Targeted Constituents | |
|---|---|
| Sediment | |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | ☑ |

**Potential Alternatives**

None

## Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

## Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

## Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8, Vehicle and Equipment Cleaning, and NS-9, Vehicle and

Equipment Fueling.

### Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runon and runoff, and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.

- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

### *Safer Alternative Products*

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an "environmentally friendly" label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

### *Waste Reduction*

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

### *Recycling and Disposal*

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like,-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

## Costs

All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.

## Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

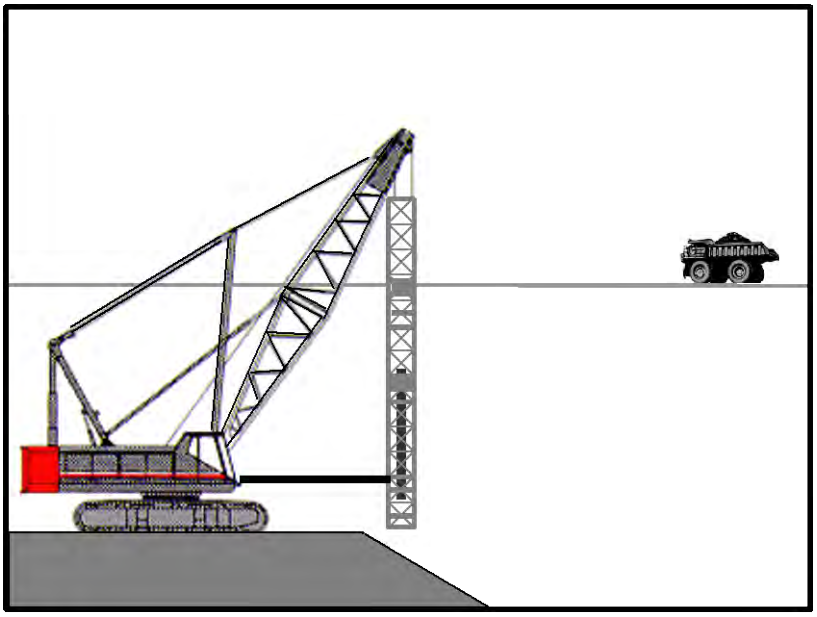
## References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

# Pile Driving Operations NS-11



## Categories

| | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | ☑ |
| WM | Waste Management and Materials Pollution Control | |

**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | |

## Potential Alternatives

None

## Description and Purpose

The construction and retrofit of bridges and retaining walls often include driving piles for foundation support and shoring operations. Driven piles are typically constructed of precast concrete, steel, or timber. Driven sheet piles are also used for shoring and cofferdam construction. Proper control and use of equipment, materials, and waste products from pile driving operations will reduce or eliminate the discharge of potential pollutants to the storm drain system, watercourses, and waters of the United States.

## Suitable Applications

These procedures apply to all construction sites near or adjacent to a watercourse or groundwater where permanent and temporary pile driving (impact and vibratory) takes place, including operations using pile shells as well as construction of cast-in-steel-shell and cast-in-drilled-hole piles.

## Limitations

None identified.

## Implementation

- Use drip pans or absorbent pads during vehicle and equipment operation, maintenance, cleaning, fueling, and storage. Refer to NS-8, Vehicle and Equipment Cleaning, NS-9, Vehicle and Equipment Fueling, and NS-10, Vehicle and Equipment Maintenance.
- Have spill kits and cleanup materials available at all locations of pile driving. Refer to WM-4, Spill Prevention

and Control.

- Equipment that is stored or in use in streambeds, or on docks, barges, or other structures over water bodies should be kept leak free.
- Park equipment over plastic sheeting or equivalent where possible. Plastic is not a substitute for drip pans or absorbent pads. The storage or use of equipment in streambeds or other bodies of water must comply with all applicable permits.
- Implement other BMPs as applicable, such as NS-2, Dewatering Operations, WM-5, Solid Waste Management, WM-6, Hazardous Waste Management, and WM-10, Liquid Waste Management.
- When not in use, store pile-driving equipment away from concentrated flows of stormwater, drainage courses, and inlets. Protect hammers and other hydraulic attachments from runon and runoff by placing them on plywood and covering them with plastic or a comparable material prior to the onset of rain.
- Use less hazardous products, e.g., vegetable oil, when practicable.

## Costs

All of the above measures can be low cost.

## Inspection and Maintenance

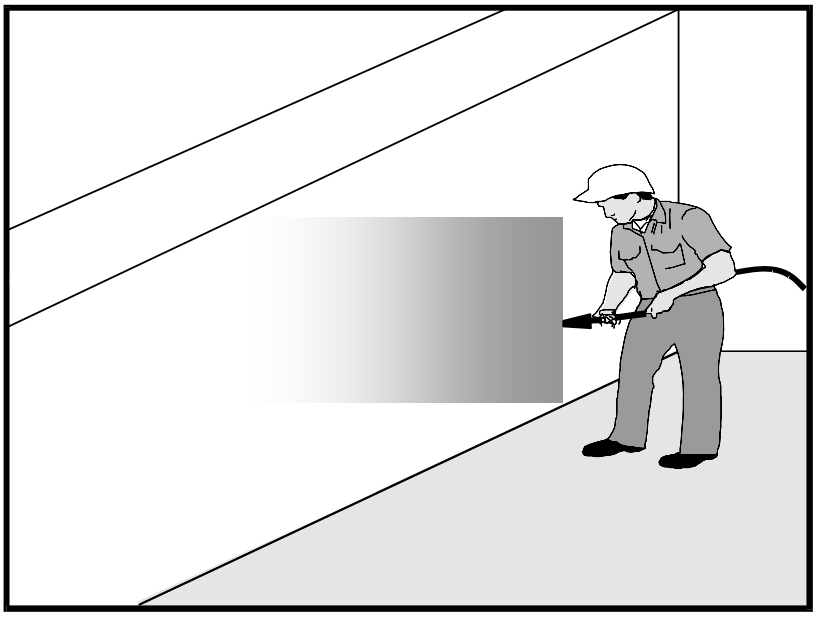
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspect equipment every day at startup and repair equipment as needed (i.e., worn or damaged hoses, fittings, and gaskets). Recheck equipment at shift changes or at the end of the day and scheduled repairs as needed.

## References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

# Concrete Curing NS-12



| Categories | | |
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| EC | Erosion Control | |
| SE | Sediment Control | |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | ☑ |
| WM | Waste Management and Materials Pollution Control | ☑ |

**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | |

**Potential Alternatives**

None

## Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

## Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

## Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

## Implementation

### *Chemical Curing*

- Avoid over spray of curing compounds.
- Minimize the drift by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

### *Water Curing for Bridge Decks, Retaining Walls, and other Structures*

- Direct cure water away from inlets and watercourses to collection areas for evaporation or other means of removal in accordance with all applicable permits. See WM-8 Concrete Waste Management.
- Collect cure water at the top of slopes and transport to a concrete waste management area in a non-erosive manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

### *Education*

- Educate employees, subcontractors, and suppliers on proper concrete curing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete curing procedures.

## Costs

All of the above measures are generally low cost.

## Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts uncured and partially cured concrete as required by the General Permit.
- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

### References

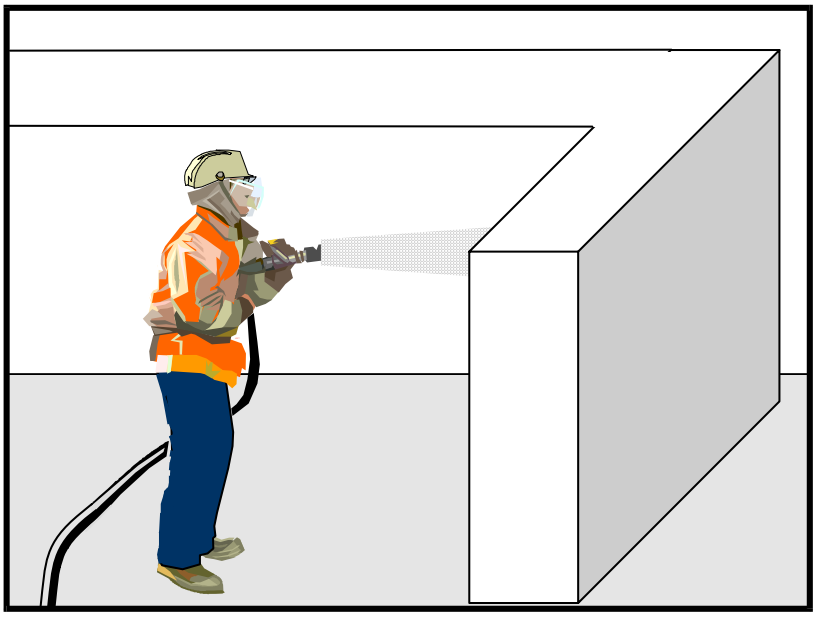
Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non Point Source Pollution Control Program, 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

# Concrete Finishing NS-13



## Categories

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| NS | Non-Stormwater Management Control | ☑ |
| WM | Waste Management and Materials Pollution Control | ☑ |

**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | |
| Organics | ☑ |

## Potential Alternatives

None

## Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

## Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

## Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

## Implementation

- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control. Refer to EC-9, Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering). Refer to NS-2 Dewatering Operations.
- Protect inlets during sandblasting operations. Refer to SE-10, Storm Drain Inlet Protection.
- Refer to WM-8, Concrete Waste Management for disposal of concrete debris.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

### *Education*

- Educate employees, subcontractors, and suppliers on proper concrete finishing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete finishing procedures.

## Costs

These measures are generally of low cost.

## Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts concrete dust and debris as required by the General Permit.

- Sweep or vacuum up debris from sandblasting at the end of each shift.
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

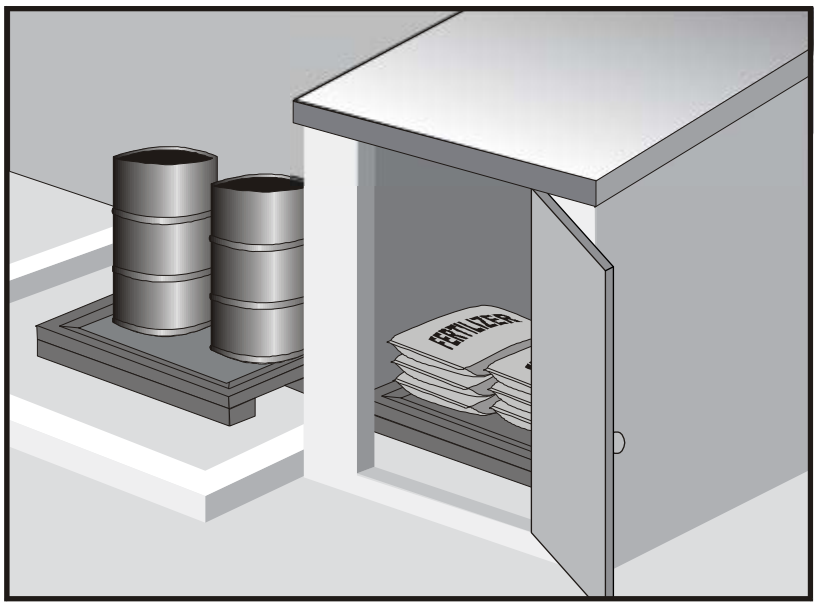
### References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

# Material Delivery and Storage WM-1

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**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | ☑ |

**Potential Alternatives**

None

## Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

## Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

### Limitations

- Space limitation may preclude indoor storage.
- Storage sheds often must meet building and fire code requirements.

### Implementation

The following steps should be taken to minimize risk:

- Chemicals must be stored in water tight containers with appropriate secondary containment or in a storage shed.
- When a material storage area is located on bare soil, the area should be lined and bermed.
- Use containment pallets or other practical and available solutions, such as storing materials within newly constructed buildings or garages, to meet material storage requirements.
- Stack erodible landscape material on pallets and cover when not in use.
- Contain all fertilizers and other landscape materials when not in use.
- Temporary storage areas should be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) should be available on-site for all materials stored that have the potential to effect water quality.
- Construction site areas should be designated for material delivery and storage.
- Material delivery and storage areas should be located away from waterways, if possible.
    - Avoid transport near drainage paths or waterways.
    - Surround with earth berms or other appropriate containment BMP. See EC-9, Earth Dikes and Drainage Swales.
    - Place in an area that will be paved.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- An up to date inventory of materials delivered and stored onsite should be kept.

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Keep ample spill cleanup supplies appropriate for the materials being stored. Ensure that cleanup supplies are in a conspicuous, labeled area.
- Employees and subcontractors should be trained on the proper material delivery and storage practices.
- Employees trained in emergency spill cleanup procedures must be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose of materials and any contaminated soil. See WM-7, Contaminated Soil Management. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

***Material Storage Areas and Practices***

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 should be stored in approved containers and drums and should not be overfilled. Containers and drums should be placed in temporary containment facilities for storage.
- A temporary containment facility should provide for a spill containment volume able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility should be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be collected and placed into drums. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids should be sent to an approved disposal site.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Materials should be covered prior to, and during rain events.
- Materials should be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels should be replaced immediately.

- Bagged and boxed materials should be stored on pallets and should not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials should be covered during non-working days and prior to and during rain events.
- Stockpiles should be protected in accordance with WM-3, Stockpile Management.
- Materials should be stored indoors within existing structures or completely enclosed storage sheds when available.
- Proper storage instructions should be posted at all times in an open and conspicuous location.
- An ample supply of appropriate spill clean up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous wastes.

***Material Delivery Practices***

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Arrange for employees trained in emergency spill cleanup procedures to be present when dangerous materials or liquid chemicals are unloaded.

***Spill Cleanup***

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7, Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.
- If spills or leaks of materials occur that are not contained and could discharge to surface waters, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

## Cost

- The largest cost of implementation may be in the construction of a materials storage area that is covered and provides secondary containment.

## Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep storage areas clean and well organized, including a current list of all materials onsite.
- Inspect labels on containers for legibility and accuracy.

- Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function.

### References

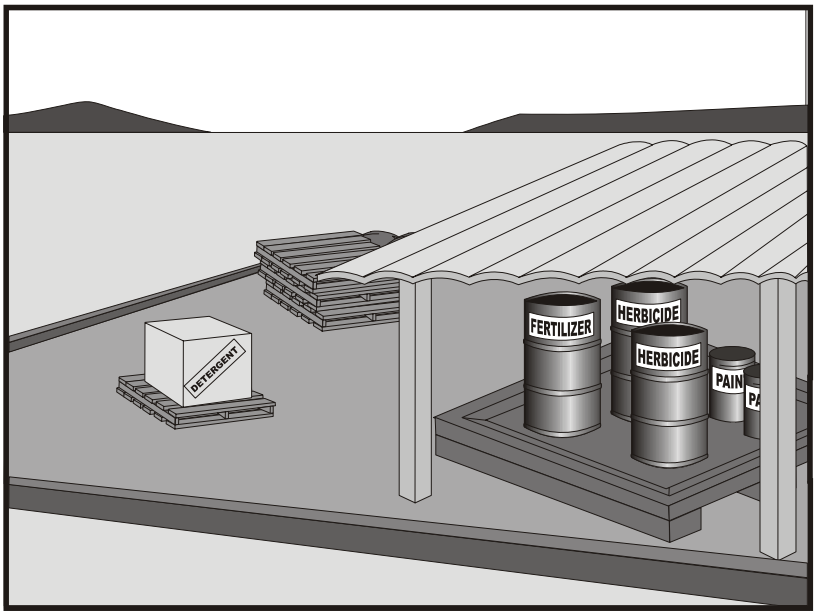
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

# Material Use WM-2




| Categories | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | ☑ |

**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | ☑ |

**Potential Alternatives**

None

## Description and Purpose

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

## Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

### Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

### Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
    - Do not treat soil that is water-saturated or frozen.
    - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
    - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
    - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
    - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
    - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
    - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
    - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the

application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted, or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.

- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

### Costs

All of the above are low cost measures.

### Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

### References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

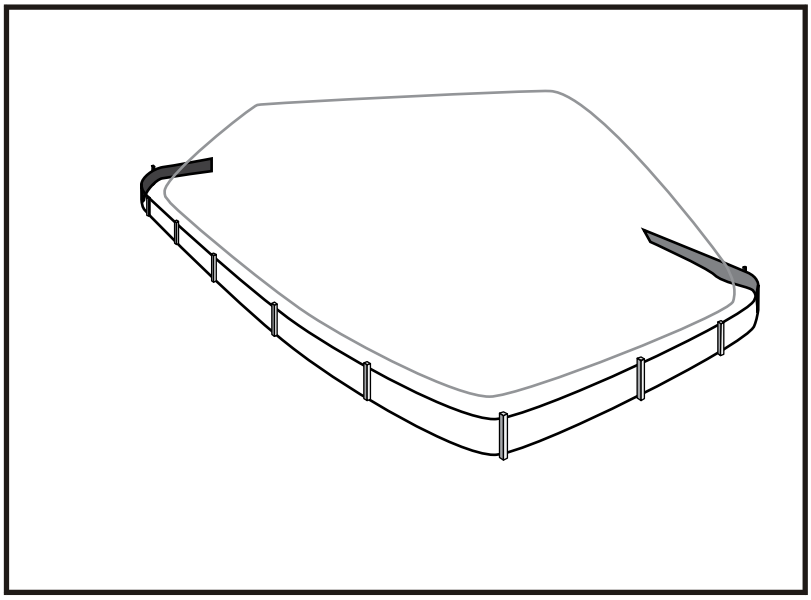
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Comments on Risk Assessments Risk Reduction Options for Cypermethrin: Docket No. OPP–2005–0293; California Stormwater Quality Association (CASQA) letter to USEPA, 2006.Environmental Hazard and General Labeling for Pyrethroid Non-Agricultural Outdoor Products, EPA-HQ-OPP-2008-0331-0021; USEPA, 2008.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

# Stockpile Management WM-3



| Categories | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | ☒ |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | ☒ |
| WM | Waste Management and Materials Pollution Control | ☑ |

**Legend:**
☑ **Primary Category**
☒ **Secondary Category**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | ☑ |

**Potential Alternatives**

None

## Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

## Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

## Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of plastic materials should be avoided when feasible and photodegradable plastics should not be used.

## Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- All stockpiles are required to be protected immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater run-on using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

### *Protection of Non-Active Stockpiles*

Non-active stockpiles of the identified materials should be protected further as follows:

*Soil stockpiles*

- Cover and project soil stockpiles with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Consider temporary vegetation for topsoil piles that will be stockpiled for extended periods.

*Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base*

- Provide covers and protect these stockpiles with a temporary perimeter sediment barrier at all times.

*Stockpiles of "cold mix"*

- Cover cold mix stockpiles and place them on plastic sheeting (or comparable material) and surround the stockpiles with a berm all times.

*Stockpiles of fly ash, stucco, hydrated lime*

- Cover stockpiles of materials that may raise the pH of runoff (i.e., basic materials) with plastic and surround the stockpiles with a berm at all times.

*Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate)*

- Cover treated wood with plastic sheeting (or comparable material) and surround with a berm at all times.

***Protection of Active Stockpiles***

Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

## Costs

For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

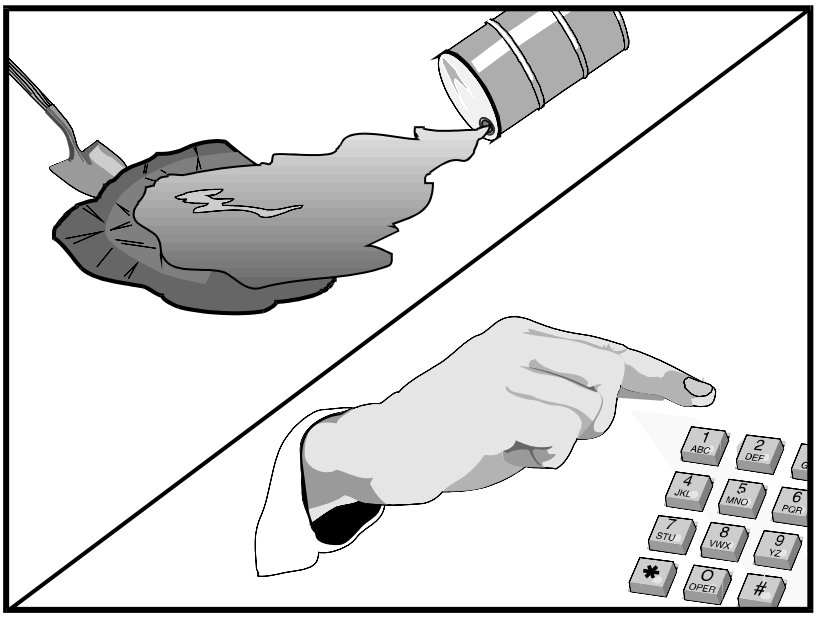
## Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

## References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

# Spill Prevention and Control WM-4



| Categories | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | ☑ |

**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | ☑ |

**Potential Alternatives**

None

## Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

## Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

- Fuels
- Lubricants
- Other petroleum distillates

## Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

## Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

### *Education*

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

### *General Measures*

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

### *Cleanup*

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

### *Minor Spills*

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

### *Semi-Significant Spills*

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

### *Significant/Hazardous Spills*

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

### *Reporting*

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

### *Vehicle and Equipment Maintenance*

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

### *Vehicle and Equipment Fueling*

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

## Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

## Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

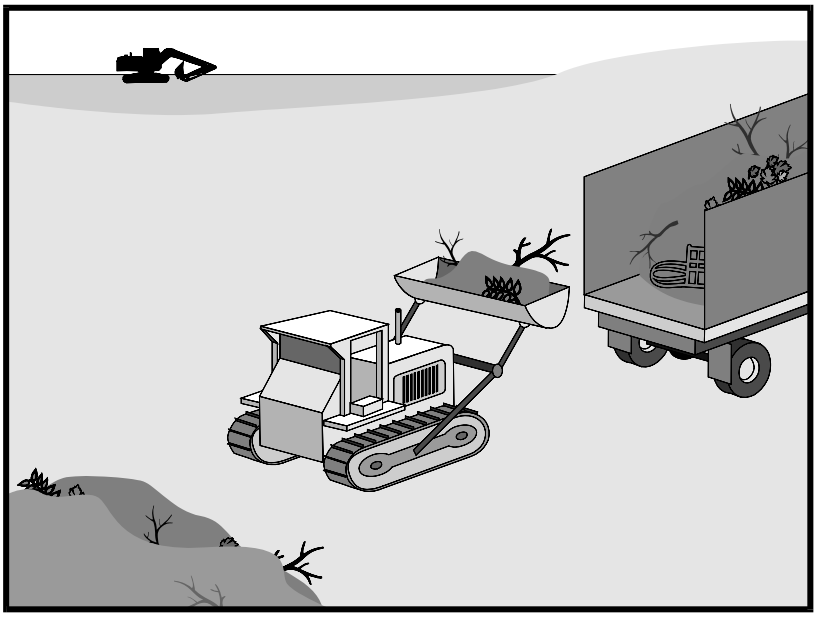
### References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

# Solid Waste Management WM-5



| Categories | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | ☑ |

**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | ☑ |

**Potential Alternatives**

None

## Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

## Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials
- Highway planting wastes, including vegetative material,

plant containers, and packaging materials

### Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

### Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Cover waste containers at the end of each work day and when it is raining.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

### *Education*

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

***Collection, Storage, and Disposal***

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

## Costs

All of the above are low cost measures.

## Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

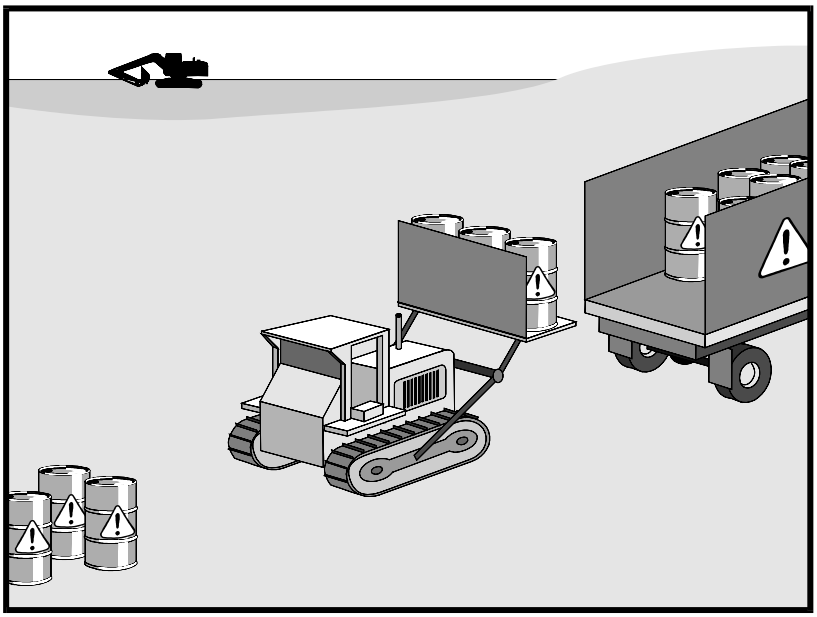
## References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

# Hazardous Waste Management WM-6



| Categories | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | ☑ |

**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

| Targeted Constituents | |
|---|---|
| Sediment | |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | ☑ |
| Oil and Grease | ☑ |
| Organics | ☑ |

**Potential Alternatives**

None

## Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

## Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Concrete Curing Compounds
- Palliatives
- Septic Wastes
- Stains
- Wood Preservatives
- Asphalt Products
- Pesticides
- Acids
- Paints
- Solvents
- Roofing Tar
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302

In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

## Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

## Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

### *Material Use*

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
  - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
  - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
  - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
  - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.

- Drums should not be overfilled and wastes should not be mixed.
- Unless watertight, containers of dry waste should be stored on pallets.
- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.
- Paint brushes and equipment for water and oil based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.
- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. “Paint out” brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.
- The following actions should be taken with respect to temporary contaminant:
  - Ensure that adequate hazardous waste storage volume is available.
  - Ensure that hazardous waste collection containers are conveniently located.
  - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.
  - Minimize production or generation of hazardous materials and hazardous waste on the job site.
  - Use containment berms in fueling and maintenance areas and where the potential for spills is high.
  - Segregate potentially hazardous waste from non-hazardous construction site debris.
  - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

### *Waste Recycling Disposal*

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

### *Disposal Procedures*

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

### *Education*

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

### Costs

All of the above are low cost measures.

### *Inspection and Maintenance*

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.
- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.
- A copy of the hazardous waste manifests should be provided.

### References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

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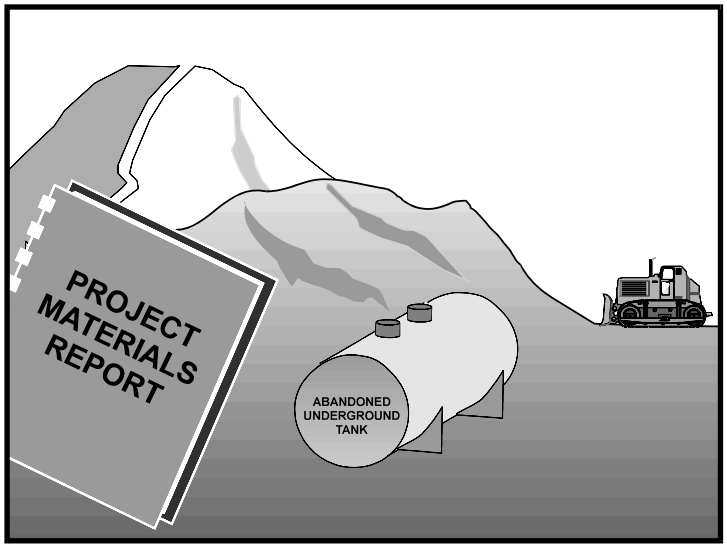
# Contaminated Soil Management WM-7

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**Legend:**

☑ **Primary Objective**

☒ **Secondary Objective**

| Targeted Constituents | |
|---|---|
| Sediment | |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | ☑ |
| Oil and Grease | ☑ |
| Organics | ☑ |

**Potential Alternatives**

None

## Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

## Suitable Applications

Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, aerial deposition, past use and leaks from underground storage tanks.

## Limitations

Contaminated soils that cannot be treated onsite must be disposed of offsite by a licensed hazardous waste hauler. The presence of contaminated soil may indicate contaminated water as well. See NS-2, Dewatering Operations, for more information.

The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

## Implementation

Most owners and developers conduct pre-construction environmental assessments as a matter of routine. Contaminated soils are often identified during project planning and development with known locations identified in the plans, specifications and in the SWPPP. The contractor should review applicable reports and investigate appropriate call-outs in the

plans, specifications, and SWPPP. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil highlight the need for contractors to confirm a site assessment is completed before earth moving begins.

The following steps will help reduce stormwater pollution from contaminated soil:

- Conduct thorough, pre-construction inspections of the site and review documents related to the site. If inspection or reviews indicated presence of contaminated soils, develop a plan before starting work.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills. Contaminated soil can be expensive to treat and dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- The contractor may further identify contaminated soils by investigating:
  - Past site uses and activities
  - Detected or undetected spills and leaks
  - Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements
  - Contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
  - Suspected soils should be tested at a certified laboratory.

### *Education*

- Have employees and subcontractors complete a safety training program which meets 29 CFR 1910.120 and 8 CCR 5192 covering the potential hazards as identified, prior to performing any excavation work at the locations containing material classified as hazardous.
- Educate employees and subcontractors in identification of contaminated soil and on contaminated soil handling and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

### *Handling Procedures for Material with Aerially Deposited Lead (ADL)*

- Materials from areas designated as containing (ADL) may, if allowed by the contract special provisions, be excavated, transported, and used in the construction of embankments and/or backfill.
- Excavation, transportation, and placement operations should result in no visible dust.
- Caution should be exercised to prevent spillage of lead containing material during transport.

- Quality should be monitored during excavation of soils contaminated with lead.

***Handling Procedures for Contaminated Soils***

- Minimize onsite storage. Contaminated soil should be disposed of properly in accordance with all applicable regulations. All hazardous waste storage will comply with the requirements in Title 22, CCR, Sections 66265.250 to 66265.260.
- Test suspected soils at an approved certified laboratory.
- Work with the local regulatory agencies to develop options for treatment or disposal if the soil is contaminated.
- Avoid temporary stockpiling of contaminated soils or hazardous material.
- Take the following precautions if temporary stockpiling is necessary:
  - Cover the stockpile with plastic sheeting or tarps.
  - Install a berm around the stockpile to prevent runoff from leaving the area.
  - Do not stockpile in or near storm drains or watercourses.
- Remove contaminated material and hazardous material on exteriors of transport vehicles and place either into the current transport vehicle or into the excavation prior to the vehicle leaving the exclusion zone.
- Monitor the air quality continuously during excavation operations at all locations containing hazardous material.
- Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including registration for transporting vehicles carrying the contaminated material and the hazardous material.
- Collect water from decontamination procedures and treat or dispose of it at an appropriate disposal site.
- Collect non-reusable protective equipment, once used by any personnel, and dispose of at an appropriate disposal site.
- Install temporary security fence to surround and secure the exclusion zone. Remove fencing when no longer needed.
- Excavate, transport, and dispose of contaminated material and hazardous material in accordance with the rules and regulations of the following agencies (the specifications of these agencies supersede the procedures outlined in this BMP):
  - United States Department of Transportation (USDOT)
  - United States Environmental Protection Agency (USEPA)
  - California Environmental Protection Agency (CAL-EPA)

- California Division of Occupation Safety and Health Administration (CAL-OSHA)
- Local regulatory agencies

***Procedures for Underground Storage Tank Removals***

- Prior to commencing tank removal operations, obtain the required underground storage tank removal permits and approval from the federal, state, and local agencies that have jurisdiction over such work.
- To determine if it contains hazardous substances, arrange to have tested, any liquid or sludge found in the underground tank prior to its removal.
- Following the tank removal, take soil samples beneath the excavated tank and perform analysis as required by the local agency representative(s).
- The underground storage tank, any liquid or sludge found within the tank, and all contaminated substances and hazardous substances removed during the tank removal and transported to disposal facilities permitted to accept such waste.

***Water Control***

- All necessary precautions and preventive measures should be taken to prevent the flow of water, including ground water, from mixing with hazardous substances or underground storage tank excavations. Such preventative measures may consist of, but are not limited to, berms, cofferdams, grout curtains, freeze walls, and seal course concrete or any combination thereof.
- If water does enter an excavation and becomes contaminated, such water, when necessary to proceed with the work, should be discharged to clean, closed top, watertight transportable holding tanks, treated, and disposed of in accordance with federal, state, and local laws.

## Costs

Prevention of leaks and spills is inexpensive. Treatment or disposal of contaminated soil can be quite expensive.

## Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for contractor's Water Pollution Control Manager, foreman, and/or construction supervisor to monitor onsite contaminated soil storage and disposal procedures.
- Monitor air quality continuously during excavation operations at all locations containing hazardous material.
- Coordinate contaminated soils and hazardous substances/waste management with the appropriate federal, state, and local agencies.

- Implement WM-4, Spill Prevention and Control, to prevent leaks and spills as much as possible.

## References

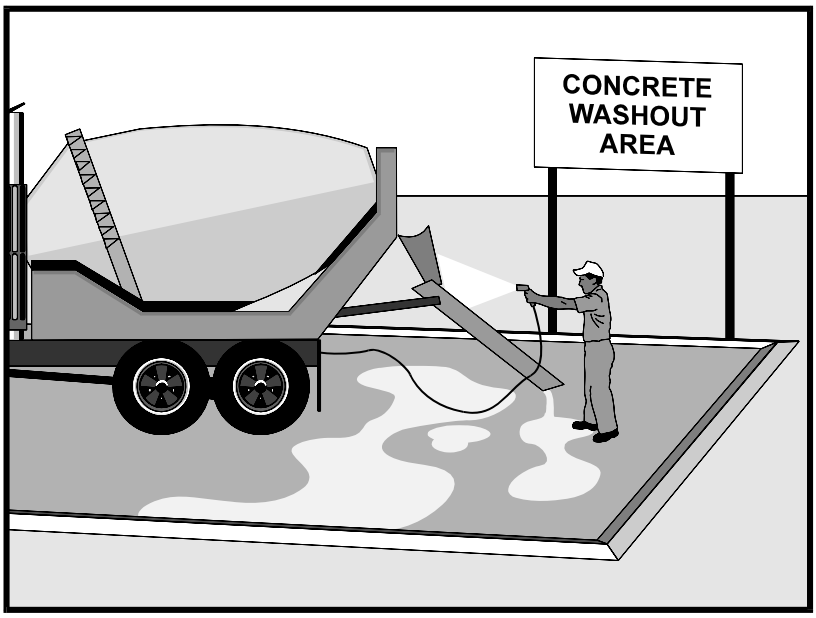
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

# Concrete Waste Management WM-8




## Categories

| | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | |
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| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | ☒ |
| WM | Waste Management and Materials Pollution Control | ☑ |

**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | |
| Trash | |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | |
| Organics | |

## Potential Alternatives

None

## Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

## Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.

- Concrete trucks and other concrete-coated equipment are washed onsite.
- Mortar-mixing stations exist.
- Stucco mixing and spraying .
- See also NS-8, Vehicle and Equipment Cleaning.

### Limitations

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

### Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
- Avoid mixing excess amounts of concrete.
- Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
- Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- For onsite washout:
  - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
  - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
  - Washout should be lined so there is no discharge into the underlying soil.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
- See typical concrete washout installation details at the end of this fact sheet.

### *Education*

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.

- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.
- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

***Concrete Demolition Wastes***

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.
- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

***Concrete Slurry Wastes***

- PCC and AC waste should not be allowed to enter storm drains or watercourses.
- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).
- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.
- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

***Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures***

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
  - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
  - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
  - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
  - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a “roll-off”; this concrete washout facility should be properly sealed to prevent leakage, and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
  - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
  - Lath and flagging should be commercial type.
  - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

***Removal of Temporary Concrete Washout Facilities***

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations..

- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

## Costs

All of the above are low cost measures. Roll-off concrete washout facilities can be more costly than other measures due to removal and replacement; however, provide a cleaner alternative to traditional washouts. The type of washout facility, size, and availability of materials will determine the cost of the washout.

## Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.

- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.

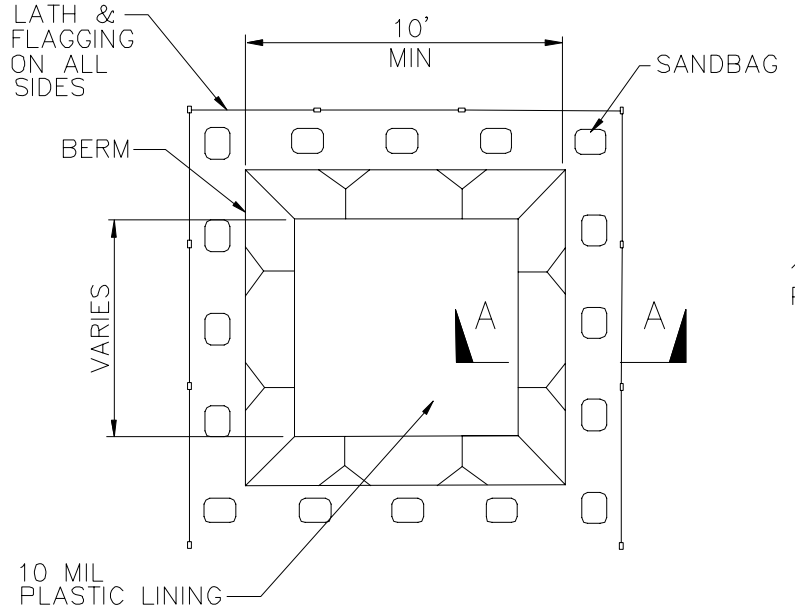
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

## References

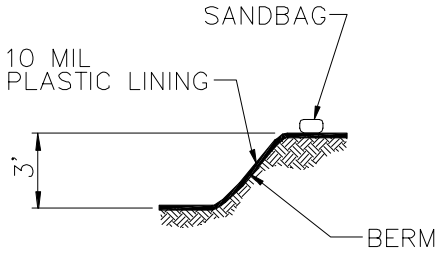
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000, Updated March 2003.

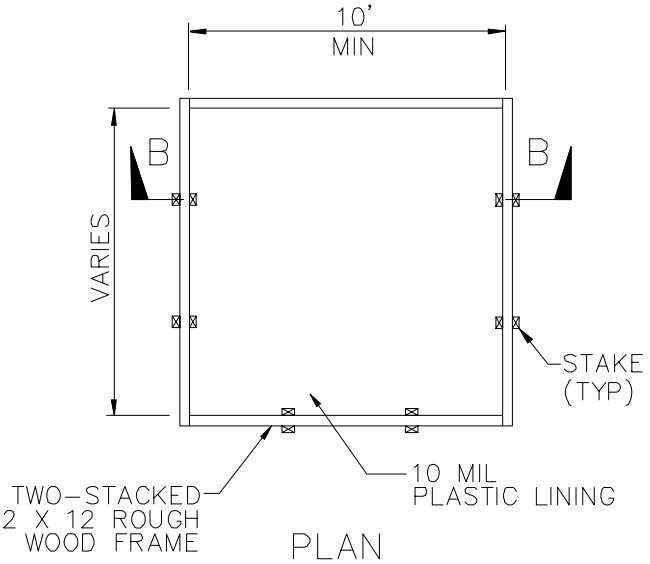
Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



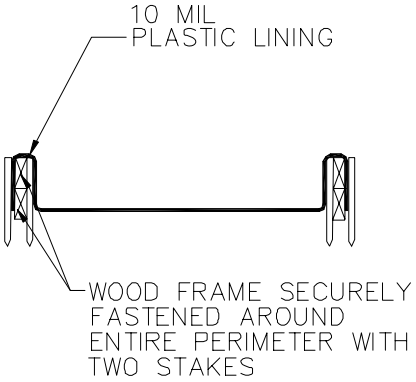

PLAN
NOT TO SCALE
TYPE "BELOW GRADE"




SECTION A–A
NOT TO SCALE



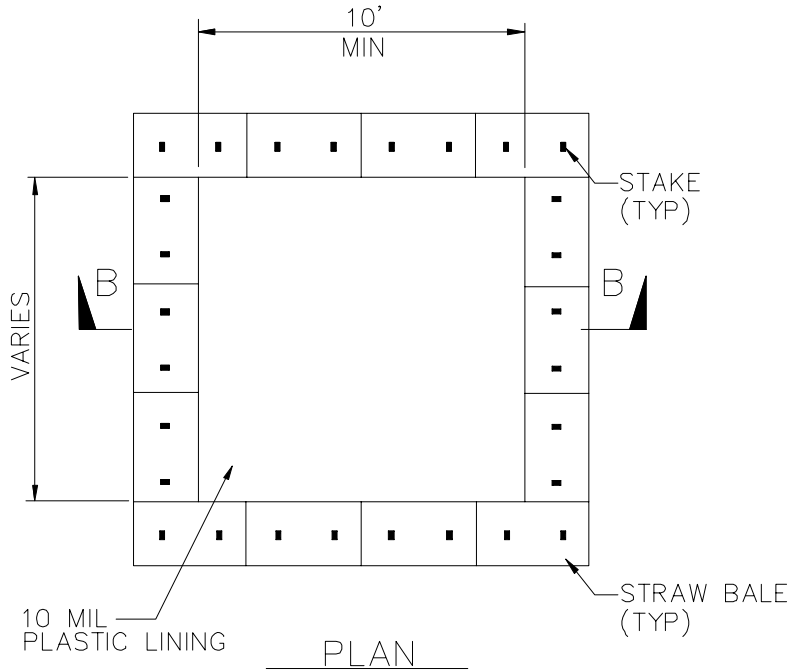

PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"



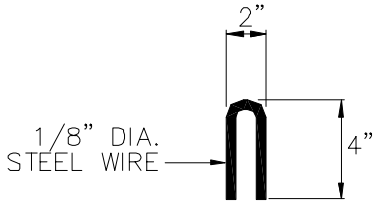

SECTION B–B
NOT TO SCALE

NOTES

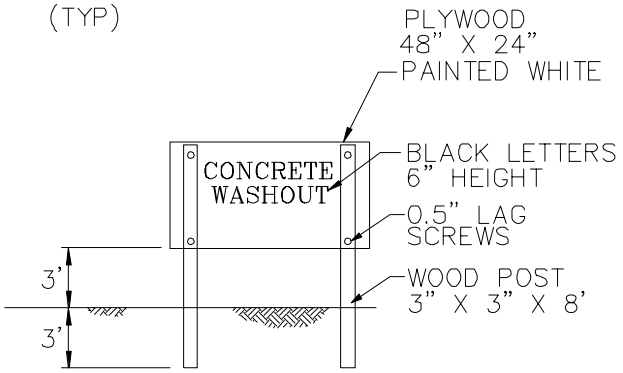
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



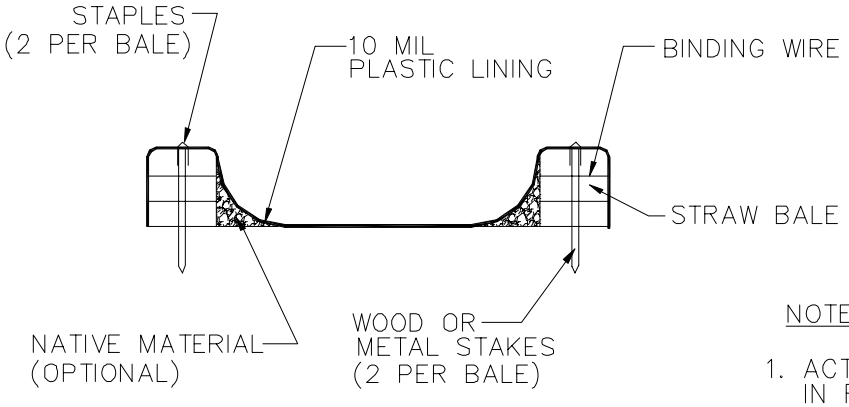

PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"
WITH STRAW BALES




STAPLE DETAIL




CONCRETE WASHOUT
SIGN DETAIL
(OR EQUIVALENT)

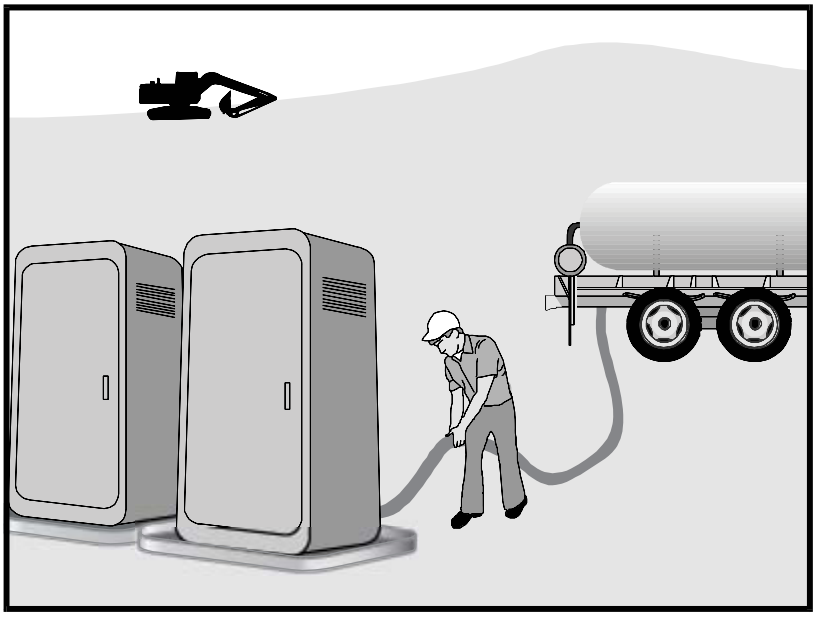



SECTION B–B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

# Sanitary/Septic Waste Management WM-9



## Categories

| | | |
|---|---|---|
| EC | Erosion Control | |
| SE | Sediment Control | |
| TC | Tracking Control | |
| WE | Wind Erosion Control | |
| NS | Non-Stormwater Management Control | |
| WM | Waste Management and Materials Pollution Control | ☑ |

**Legend:**

☑ **Primary Category**

☒ **Secondary Category**

## Targeted Constituents

| | |
|---|---|
| Sediment | |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | |
| Bacteria | ☑ |
| Oil and Grease | |
| Organics | ☑ |

## Potential Alternatives

None

## Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

## Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

## Limitations

None identified.

## Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

### *Storage and Disposal Procedures*

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

***Education***

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

## Costs

All of the above are low cost measures.

## Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

## References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

# *Appendix I: BMP Inspection Form*

PRELIMINARY

# BMP INSPECTION REPORT

| | | | | | |
|---|---|---|---|---|---|
| Date and Time of Inspection: | | | Date Report Written: | | |
| Inspection Type: (Circle one) | Weekly *Complete Parts I,II,III and VII* | Pre-Storm *Complete Parts I,II,III,IV and VII* | During Rain Event *Complete Parts I, II, III, V, and VII* | Post-Storm *Complete Parts I,II,III,VI and VII* | Quarterly *Complete Parts I,II,III,VI and VII* |

## Part I. General Information

### Site Information

| | | | |
|---|---|---|---|
| Construction Site Name: | | | |
| Construction stage and completed activities: | | | Approximate area of site that is exposed: |
| Photos Taken: (Circle one) | Yes | No | Photo Reference IDs: |

### Weather

| | |
|---|---|
| Estimate storm beginning: (date and time) | Estimate storm duration: (hours) |
| Estimate time since last storm: (days or hours) | Rain gauge reading and location: (in) |

Is a "Qualifying Event" predicted or did one occur (i.e., 0.5" rain with 48-hrs or greater between events)? (Y/N)
If yes, summarize forecast:

### Exemption Documentation (explanation required if inspection could not be conducted).

Visual inspections are not required outside of business hours or during dangerous weather conditions such as flooding or electrical storms.

### Inspector Information

| | |
|---|---|
| Inspector Name: | Inspector Title: |
| Signature: | Date: |

PRELIMINARY

| **Part II. BMP Observations.** **Describe deficiencies in Part III.** | | | |
|---|---|---|---|
| **Minimum BMPs for Risk Level _____ Sites** | Failures or other short comings (yes, no, N/A) | Action Required (yes/no) | Action Implemented (Date) |
| **Good Housekeeping for Construction Materials** | | | |
| Inventory of products (excluding materials designed to be outdoors) | | | |
| Stockpiled construction materials not actively in use are covered and bermed | | | |
| All chemicals are stored in watertight containers with appropriate secondary containment, or in a completely enclosed storage shed | | | |
| Construction materials are minimally exposed to precipitation | | | |
| BMPs preventing the off-site tracking of materials are implemented and properly effective | | | |
| **Good Housekeeping for Waste Management** | | | |
| Wash/rinse water and materials are prevented from being disposed into the storm drain system | | | |
| Portable toilets are contained to prevent discharges of waste | | | |
| Sanitation facilities are clean and with no apparent for leaks and spills | | | |
| Equipment is in place to cover waste disposal containers at the end of business day and during rain events | | | |
| Discharges from waste disposal containers are prevented from discharging to the storm drain system / receiving water | | | |
| Stockpiled waste material is securely protected from wind and rain if not actively in use | | | |
| Procedures are in place for addressing hazardous and non-hazardous spills | | | |
| Appropriate spill response personnel are assigned and trained | | | |
| Equipment and materials for cleanup of spills is available onsite | | | |
| Washout areas (e.g., concrete) are contained appropriately to prevent discharge or infiltration into the underlying soil | | | |
| **Good Housekeeping for Vehicle Storage and Maintenance** | | | |
| Measures are in place to prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters | | | |
| All equipment or vehicles are fueled, maintained, and stored in a designated area with appropriate BMPs | | | |
| Vehicle and equipment leaks are cleaned immediately and disposed of properly | | | |

PRELIMINARY

| **Part II. BMP Observations Continued.** **Describe deficiencies in Part III.** | | | |
|---|---|---|---|
| **Minimum BMPs for Risk Level _____ Sites** | Adequately designed, implemented and effective (yes, no, N/A) | Action Required (yes/no) | Action Implemented (Date) |
| **Good Housekeeping for Landscape Materials** | | | |
| Stockpiled landscape materials such as mulches and topsoil are contained and covered when not actively in use | | | |
| Erodible landscape material has not been applied 2 days before a forecasted rain event or during an event | | | |
| Erodible landscape materials are applied at quantities and rates in accordance with manufacturer recommendations | | | |
| Bagged erodible landscape materials are stored on pallets and covered | | | |
| **Good Housekeeping for Air Deposition of Site Materials** | | | |
| Good housekeeping measures are implemented onsite to control the air deposition of site materials and from site operations | | | |
| **Non-Stormwater Management** | | | |
| Non-Stormwater discharges are properly controlled | | | |
| Vehicles are washed in a manner to prevent non-stormwater discharges to surface waters or drainage systems | | | |
| Streets are cleaned in a manner to prevent unauthorized non-stormwater discharges to surface waters or drainage systems. | | | |
| **Erosion Controls** | | | |
| Wind erosion controls are effectively implemented | | | |
| Effective soil cover is provided for disturbed areas inactive (i.e., not scheduled to be disturbed for 14 days) as well as finished slopes, open space, utility backfill, and completed lots | | | |
| The use of plastic materials is limited in cases when a more sustainable, environmentally friendly alternative exists. | | | |
| **Sediment Controls** | | | |
| Perimeter controls are established and effective at controlling erosion and sediment discharges from the site | | | |
| Entrances and exits are stabilized to control erosion and sediment discharges from the site | | | |
| Sediment basins are properly maintained | | | |
| **Run-On and Runoff Controls** | | | |
| Run-on to the site is effectively managed and directed away from all disturbed areas. | | | |
| **Other** | | | |
| Are the Project SWPPP and BMP plan up to date, available on-site and being properly implemented? | | | |

PRELIMINARY

| Part III. Descriptions of BMP Deficiencies | | |
|---|---|---|
| **Deficiency** | **Repairs Implemented:**<br>**Note - Repairs must begin within 72 hours of identification and, complete repairs as soon as possible.** | |
| | **Start Date** | **Action** |
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |

| **Part IV. Additional Pre-Storm Observations**. **Note the presence or absence of floating and suspended materials, sheen, discoloration, turbidity, odors, and source(s) of pollutants(s).** | |
|---|---|
| | Yes, No, N/A |
| Do stormwater storage and containment areas have adequate freeboard? If no, complete Part III. | |
| Are drainage areas free of spills, leaks, or uncontrolled pollutant sources? If no, complete Part VII and describe below. | |
| Notes: | |
| Are stormwater storage and containment areas free of leaks? If no, complete Parts III and/or VII and describe below. | |
| Notes: | |
| | |

PRELIMINARY

| **Part V. Additional During Storm Observations.** **If BMPs cannot be inspected during inclement weather, list the results of visual inspections at all relevant outfalls, discharge points, and downstream locations. Note odors or visible sheen on the surface of discharges. Complete Part VII (Corrective Actions) as needed.** | |
|---|---|
| Outfall, Discharge Point, or Other Downstream Location | |
| Location | Description |
| Location | Description |
| Location | Description |
| Location | Description |
| Location | Description |
| Location | Description |
| Location | Description |
| Location | Description |

PRELIMINARY

| **Part VI. Additional Post-Storm Observations**. **Visually observe (inspect) stormwater discharges at all discharge locations within two business days (48 hours) after each qualifying rain event, and observe (inspect) the discharge of stored or contained stormwater that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Complete Part VII (Corrective Actions) as needed.** | |
|---|---|
| **Discharge Location, Storage or Containment Area** | **Visual Observation** |
| | |
| | |
| | |
| | |
| | |

| **Part VII. Additional Corrective Actions Required.** **Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Note if SWPPP change is required.** | |
|---|---|
| **Required Actions** | **Implementation Date** |
| | |
| | |
| | |

PRELIMINARY

# *Appendix J: Training Documentation*

PRELIMINARY

# CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

## QUALIFIED SWPPP DEVELOPER (QSD)
AND
## QUALIFIED SWPPP PRACTITIONER (QSP)

Mark Swanson

March 31, 2011 – March 31, 2013

***Certificate # 00457***

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

# Trained Contractor Personnel Log

## Stormwater Management Training Log and Documentation

Project Name: West Antelope Solar Project

WDID #: _____

Stormwater Management Topic: (check as appropriate)

☐ Erosion Control ☐ Sediment Control

☐ Wind Erosion Control ☐ Tracking Control

☐ Non-Stormwater Management ☐ Waste Management and Materials Pollution Control

☐ Stormwater Sampling

Specific Training Objective: _____

Location: _____ Date: _____

Instructor: _____ Telephone: _____

Course Length (hours): _____

**Attendee Roster (Attach additional forms if necessary)**

| Name | Company | Phone |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

As needed, add proof of external training (e.g., course completion certificates, credentials for QSP, QSD).

PRELIMINARY

# *Appendix K: Responsible Parties*

PRELIMINARY

**Authorization of Approved Signatories**

Project Name: West Antelope Solar Project

WDID #: _____

| Name of Personnel | Project Role | Company | Signature | Date |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

_____ _____

LRP's Signature Date

Antonio Rodriguez, Senior Project Engineer (925) 913-4817

LRP Name and Title Telephone Number

PRELIMINARY

# Identification of QSP

Project Name: West Antelope Solar Project

WDID #: _____

The following are QSPs associated with this Project (TBD):

| Name of Personnel[1] | Company | Date |
|---|---|---|
| | | |

(1) If additional QSPs are required on the job site add additional lines and include information here

PRELIMINARY

# *Appendix L: Contractors and Subcontractors*

PRELIMINARY

# CONTRACTORS AND SUBCONTRACTORS

| Contractor/Subcontractor Name and Address | Contact Person/ Phone Number | Activity | Start Date | End Date |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

PRELIMINARY