Appendices

This section contains the following Appendices to the Record of Decision:

- Appendix 1: Responses to Comments on the Final Environmental Impact Statement
- Appendix 2: Biological Opinion and Conference Opinion
- Appendix 3: Programmatic Agreement
- Appendix 4: Environmental and Construction Compliance Monitoring Program
- Appendix 5: Location Maps
- Appendix 6: Additional Agency Approvals and Review
- Appendix 7: Tables
- Appendix 8: Letter from Tessera Solar
- Appendix 9: Documentation of NEPA Adequacy

Appendix 1:
Responses to Comments on the Final Environmental Impact Statement

1.1 Introduction

The United States Bureau of Land Management (BLM) published the Notice of Availability of the Final Environmental Impact Statement (EIS) for the Imperial Valley Solar (IVS) project July 28, 2010. The comment period ended August 26, 2010.

Section 508, Accessibility of Electronic and Information Technology for People with Disabilities, of the Federal Rehabilitation Act (29 United States Code [USC] 796(d)) requires federal agencies to make their electronic and technology information accessible to people with disabilities. This appendix includes material that was not available to either BLM in a format that offered accessibility features compatible with Section 508 requirements. Specifically, the written comments provided on the Final EIS were received as either a printed paper product or a scanned version of a printed paper product, neither of which could be converted to an accessible format that would be consistent with the requirements of Section 508. As a result, Sections 1.4, Common Responses, and 1.5, Individual Responses, include a graphical interface that inserts pictures of individual written comments within the text pages. Because this graphical interface cannot be made accessible under Section 508, parts of Sections 1.4 and 1.5 may be unreadable under the requirements of Section 508. For the convenience of readers who wish to read the responses without the graphical interface comments in the text, the responses without those graphical interface comments are provided in Section 1.6, Responses Without Graphical Interface Comments.

1.2 Format of the Responses to Comments

The comments received on the Final EIS are organized by agency, organization, or member of the general public. Each comment letter/email was assigned a unique number. Individual comments/issues within each comment letter/email are numbered individually along the right-hand margins.

This appendix is organized as follows:

- **1.1 Introduction**
- **1.2 Format of the Responses to Comments:** This section describes the format and organization of the comments received on the Final EIS and the responses to those comments.
- **1.3 Index of Comments Received:** This section provides a list of the comments received on the Final EIS, by agency, organization, or member of the general public, and lists the unique letter/number code for each comment.

- **1.4 Common Responses:** This section provides consolidated responses for topics on which a number of similar and related comments were received. Section 1.4 provides the language of the individual comments, grouped by topic, followed by the common responses to the grouped comments. As noted earlier, Section 1.4 includes those comments as graphical interface inserts that are not accessible to people with certain disabilities and thus is not in compliance with Section 508 of the Federal Rehabilitation Act (29 USC 796(d)). Refer to Section 1.6, Responses without Graphical Interface Comments, for a text-only version of this section.

- **1.5 Individual Responses to the Comment Letters/Emails:** The section provides the language of individual comments followed by responses to individual comments not responded to in the common responses provided in Section 1.4. As noted earlier, Section 1.5 includes material which is not readable under the requirements of Section 508. Refer to Section 1.6, Responses Without Graphical Interface Comments, for readable text of this section.

- **1.6 Responses Without Graphical Interface Comments:** This section contains all the responses to comments received on the Final EIS without the graphical interface comments.

1.3 Index of Comments Received

Table 1-1 is an index list of the agencies, groups, and persons who commented on the Final EIS during the review and comment period. As described above, each comment was assigned a unique letter/number with each comment individually numbered. For example, F1-2 is the first substantive comment in letter F1. “F” represents a Federal agency, the “1” refers to the first Federal agency letter, and the “2” refers to the second comment in that letter.

Copies of the individual comments are provided in Sections 1.4, Common Responses, and 1.5, Individual Responses to the Comment Letters/Emails, with the responses following the comments. The full comment letters are on file at the United States Bureau of Land Management El Centro Field Office.

Table 1-1 Summary of Comments Received on the Imperial Valley Solar Project Final Environmental Impact Statement

Letter	Agency/Person
Comments from Federal Agencies	
F1	United States Environmental Protection Agency (August 30, 2010)
F2	Department of the Interior National Park Service (August 4, 2010)
F3	Department of the Interior National Park Service Pacific West Region (no date)
Comments from Native American Tribal Governments	
NA1	Quechan Indian Tribe (August 4, 2010)
NA2	Kristie Orosco, San Pasqual Culture Committee (August 26, 2010)
NA3	Carmen Lucas, Kwaaymii Laguna Band of Indians (August 26, 2010)
Comments from State Agencies	
S1	Native American Heritage Commission (July 30, 2010, revised August 19, 2010)
S2	Natural Resources Agency, CAL FIRE (August 20, 2010)
S3	Public Utilities Commission (August 23, 2010)
S4	State Clearinghouse (August 24, 2010)
Comments from Organizations	
O1	California Unions for Reliable Energy (August 25, 2010)
Comments from Members of the General Public	
P1	Richard R. Montanucci (July 26, 2010 and August 3, 2010)
P2	Joel Rathje (email July 29, 2010)
P3	Ed, resident of Ocotillo, CA (two post cards August 2, 2010)
P4	Brendan Hughes (email August 21, 2010)
P5	Greg Smestad (August 23, 2010)

1.4 Common Responses

1.4.1 Non-NEPA/BLM Issues

The following comments do not raise issues under the National Environmental Policy Act (NEPA) or that are outside the authority of the United States Bureau of Land Management (BLM).

Comments: S4-1, O1-1, P1-1, P2-1 and P3-1.

The State Clearinghouse submitted the above named Final Document to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on August 23, 2010, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

S4-1

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

We submit these Joint Comments on the Final Environmental Impact Statement ("FEIS"), prepared for the Imperial Valley Solar, LLC Project and the Proposed California Desert Conservation Area Plan Amendment (collectively "Project"), on behalf of California Unions for Reliable Energy ("CURE"), Neil Zinn, and Sterling E. Mayes. As explained more fully below, the FEIS does not comply with the requirements of the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4321 *et seq.*, and approval of the Project would violate the Federal Land Policy Management Act ("FLPMA"), 43 U.S.C. § 1701 *et seq.*, and the National Historic Preservation Act ("NHPA"), 16 U.S.C. § 470 *et seq.* BLM may not approve the Project until it has complied with all relevant law, and evaluated the Project impacts in a supplemental EIS, as required by NEPA.

O1-1

CURE is a coalition of labor unions whose members construct, operate, and maintain power plants throughout California. CURE encourages sustainable development of California's energy and natural resources. Environmental degradation jeopardizes future growth and jobs by causing construction moratoriums, destroying cultural or wildlife areas, consuming limited fresh water

2218-158a

resources, causing water pollution, and imposing other stresses on the environmental carrying capacity of the state. This in turn reduces future employment opportunities for CURE's members. Additionally, union members live, recreate and work in the communities and regions that suffer the impacts of projects that are detrimental to human health and the environment. CURE therefore has a direct interest in enforcing environmental laws to minimize the adverse impacts of projects that would otherwise degrade the environment. Finally, CURE members are concerned about projects that risk serious environmental harm without providing countervailing economic benefits. The NEPA process allows for a balanced consideration of a project's socioeconomic and environmental impacts, and it is in this spirit that CURE offers these comments.

Neil Zinn is a member of International Brotherhood of Electrical Workers Local 569. Mr. Zinn lives in El Centro, California and owns land near the proposed Project site. Mr. Zinn has a personal interest in protecting the Project site from unnecessary adverse impacts in order to protect the area for future study and recreation. Mr. Zinn is on the Board of the Imperial Valley College Desert Museum Society, dedicated to collecting and preserving Native American artifacts and prehistoric cultural sites that still exist in the surrounding area. His goal is to help students and the public learn about the early inhabitants around the lake that filled Imperial Valley. These ancient and sacred treasures include remains of Native American fishtraps, sleeping circles, and geoglyphs, among other cultural resources. Mr. Zinn has used the Project area and its vicinity for motorcycling and recreation since the 1960s. He now enjoys hiking the Project area and using the area for observation of desert wildlife and wildflowers. **O1-1**

Sterling E. Mayes is the Secretary and Treasurer of the Imperial County Building Trades Council. Mr. Mayes lives in El Centro, California. Mr. Mayes frequents the Project area for wildlife observation and to enjoy the scenic beauty of the Yuha Desert. Mr. Mayes also frequently visits the Salton Sea, where he takes drives and walks to observe native and migrating birds. Mr. Mayes has a personal interest in protecting the Project area of impact from unnecessary adverse environmental effects to preserve the area for future recreation.

The Bureau of Land Management ("BLM") and the California Energy Commission ("CEC") prepared a joint Staff Assessment/Draft Environmental Impact Statement ("SA/DEIS") for the Project to satisfy the requirements of NEPA and California Environmental Quality Act ("CEQA"), California Public Resources Code § 21000 *et seq.* Following publication of the SA/DEIS, BLM and the CEC

informed the public that environmental review of the Project would be bifurcated, and that BLM would publish a final EIS that would evaluate the Project in accordance with NEPA. These comments are directed toward BLM's FEIS and the technical appendices attached to the FEIS.

We have reviewed the FEIS and its technical appendices in conjunction with other studies and materials developed as part of the concurrent review of the Project by BLM and CEC. These comments were prepared with the technical assistance of Chris Bowles, Ph.D., P.E., Chris Campbell, M.S., and Claudia Nissley. The comments and qualifications of Dr. Bowels and Mr. Campbell are attached here to as Attachment A. The comments and qualifications of Ms. Nissley, a cultural resource specialist and former State Historic Preservation Officer of Wyoming, are attached hereto as Attachment B. We request that you consider and respond to these consultants' comments separately and individually. O1-1

I am a retired biology professor who has studied reptile species diversity in the deserts of the southwestern U.S. and northern Mexico for 40 years. I am writing to express my opposition to the proposed Solar 2 Imperial Valley solar energy project. My concern rests with the threat this project presents to the survival of the Flat-Tailed Horned Lizard (FTHL), *Phrynosoma mcallii*. P1-1

Thank you for your hard work on renewable energy projects. The EIS for the Tessera Solar project is a masterpiece of environmental review and will hopefully pave the way for a new energy revolution in America.

What happens when a solar collector or wind turbine fails or falls to the ground? Nothing What happens when an oil well, natural gas well, or coal mine fails?
People and wildlife die

Thank you so very much for your continued hard work. P2-1

P3

MA-400

A U.S. aircraft carrier in San Diego harbor.

Yes, get this Solar Power going quickly! in Imperial County.

Ed
PO Box 343
OCOTILLO CA 92259

© Road Runner Card Co., San Diego, CA 92102 619-232-1060

BLM
PROJECT MANAGER Jim Stobaugh
PO BOX 12000
Reno NV 89520-0006

P3-1

PLEASE DO NOT WRITE BELOW THIS LINE. SPACE RESERVED FOR U.S. POSTAL SERVICE.

MADE IN USA

Photo by: Abigail

MA-400

SAN BERNARDINO CA

A U.S. aircraft carrier in San Diego harbor.

Yes, get this Solar power going quickly, in Imperial County.

Ed
PO BOX 343
OCOTILLO CA 92259

© Road Runner Card Co., San Diego, CA 92102 619-232-1060

BLM
PROJECT MANAGER Jim Stobaugh
1340 FINANCIAL BLVD
RENO NV 89502

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MADE IN USA

Photo by: Abigail

Response: These comments do not raise environmental issues under the National Environmental Policy Act (NEPA). These comments are a letter stating the project complied with the State Clearinghouse submittal of the Final Environmental Impact Statement (Final EIS), the introduction of the California Unions for Reliable Energy's (CURE) comment letter describing the persons who reviewed the Final EIS, one comment that expressed general opposition of the project, and two comments that expressed general support of the project. No further response is necessary.

1.4.2 Project Modifications and Project Alternatives

Project Modifications in the 404(b)(1) Analysis

The following comments discuss the expectation that project modifications discussed in the 404(b)(1) analysis would be incorporated in the Record of Decision and the clarification of the feasibility of the 300 MW alternative as a stand-alone project.

Comments: F1-1 and F1-3.

The U.S. Environmental Protection Agency (EPA) has reviewed the Final Environmental Impact Statement (FEIS) for the Imperial Valley Solar Project (Project). Our review and comments are provided pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) Regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act (CAA).

EPA reviewed the Joint Draft Environmental Impact Statement (DEIS) and Staff Assessment and provided comments to the California Energy Commission (CEC) and the Bureau of Land Management (BLM) on May 27, 2010. We rated the DEIS as *Environmental Objections – Insufficient Information* (EO-2), primarily due to concerns over potential impacts to waters of the United States and the alternative water supply, as well as impacts to biological resources, threatened and endangered species, air quality, and cultural resources. We asked for additional information on cumulative impacts from future actions, justification for the Project purpose and need, and evaluation of alternatives.

F1-1

Previously, on November 18, 2008, EPA provided extensive formal scoping comments for the proposed Project. Also, on May 12th and June 7th, 2010, we submitted comments to the Army Corps of Engineers (Corps) on the March 15, 2010 Public Notice (Application for Permit) which highlighted our recommendations for compliance with section 404(b)(1) of the Clean Water Act Guidelines. EPA has continued to work with the Corps, fellow resource and regulatory agencies, and the applicant toward the goal of arriving at a permittable Project that protects natural resources.

We appreciate the efforts of BLM, the applicant, and its consultants to discuss and respond to our DEIS comments. We note that the preferred agency alternative identified in the FEIS addresses many of our comments and includes project design modifications that have reduced the proposed Project's total generating capacity from 750 megawatts (MW) to 709 MW by removing 1,163 SunCatchers, and increasing the use of non-standard configurations to avoid ephemeral main-stem streams. We support the reduction in the roadways on the Project site, decreased roadway widths, use of Arizona crossings, removal of culverts across main access roads, elimination of sediment basins and retention ponds, and the relocation of the Main

Services Complex. While some of these modifications are only discussed as part of the 709 MW alternative in the Draft Section 404(b)(1) Alternatives Analysis (Appendix H) and not in the FEIS, we expect all of them to be incorporated into the Record of Decision. Combined, these modifications would reduce the direct impacts to waters of the United States from 177.4 to 38.2 acres. We note that construction of a single 300 MW plant, which BLM has indicated would meet the Purpose and Need for the Project, would reduce the direct impacts to waters of the United States even further, and may be a practicable alternative that is less environmentally damaging. We request that the Record of Decision and the response to comments on the FEIS clarify the feasibility of the 300 MW alternative as a stand-alone project.

We were pleased to note additional information in the FEIS on compensatory mitigation for impacts to flat-tailed horned lizard habitat, and note that most of our suggested air quality comments were incorporated. **F1-1**

EPA continues to have concerns about impacts to aquatic resources, including waters of the United States, and the alternative water supply for the Project. We request additional information, clarification, and analysis of impacts to biological and cultural resources and air quality. Our primary concerns and recommendations are attached. We recommend that BLM address these issues prior to making a final decision on the proposed Project.

We understand that the applicant has a Power Purchase Agreement with San Diego Gas and Electric (SDG&E) to provide 300 megawatts (MW) of power once on-line. In light of the contingency of Phase II of the Project upon the Sunrise Powerlink Transmission Line (SPTL), it appears that the 300 MW alternative may have been considered by the applicant or SDG&E to have independent utility. We again request clarification of the implications to the proposed Project if the SPTL is not built, and whether Phase I could be funded as a stand-alone project. This information should be provided in the response to comments on the FEIS and addressed in the ROD. We note that the 300 MW alternative would reduce temporary and permanent impacts to WUS due to a 60% reduction in Project acreage. In that case, a single 300 MW plant, which BLM has indicated would meet the Purpose and Need for the Project (at pg. 2-7), may be a practicable alternative that is less environmentally damaging and could be the LEDPA. **F1-3**

Response: The project modifications discussed in Appendix H, Draft 404(b)(1) in the Final EIS, were developed as a result of the continued coordination among the Applicant, BLM and the United States Army Corps of Engineers (Corps). The 709 MW Alternative, which is the Selected Alternative, incorporated these modifications to avoid impacts to waters of the United States and cultural and biological resources. The 300 MW Alternative was evaluated as a freestanding independent alternative in the Staff Assessment/ Draft Environmental Impact Statement (SA/DEIS) and the Final EIS. In addition, it constitutes Phase I of the 709 MW Selected Alternative. The Final EIS for the Sunrise Powerlink Project has been released and is awaiting the final BLM decision. Therefore, it was appropriate to incorporate that the Sunrise Powerlink Project would be available by the time Phase II of the IVS project comes on line.

In addition, refer to the following section of the Final EIS for additional discussion regarding project alternatives: Final EIS Section 2.0 Alternatives Including the Proposed Action, and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.2, Project Alternatives.

1.4.3 Air Quality Effects

The following comments discuss air quality effects and the IVS project.

Cumulative Air Quality Impacts and Response to Comments in Final EIS

This comment discusses that the Responses to Comments in the Final EIS did not respond to the comment on Cumulative Air Quality impacts. The following response responds to cumulative air quality impacts for the IVS project.

Comment: F1-9.

Air Quality

The Responses to Comments did not respond to our cumulative impact comments on air quality. The scope of the cumulative impact analysis in the FEIS remains geographically limited to focus on 'localized' cumulative impacts. Determination of the affected environment should not be based on a predetermined geographic area, but rather on perception of meaningful impacts for each resource at issue. EPA disagrees that there is never overlap for sources separated by six miles. This would depend on the emissions, size of the source, and release height, among other criteria. For example, in our air permitting process, we require modeling of the significant impact area plus 50 kilometers out. In an area classified as nonattainment for ozone, the cumulative effects study area could be the entire air basin because ozone precursors are reactive over hundreds of miles.

F1-9

Additionally, we understand, based on information provided at the July 22, 2010 Renewable Energy Policy Group meeting, that the Project may now require diesel powered equipment for at least some period of the Project construction, which was not previously analyzed in the DEIS. EPA strongly recommends that this new information and the direct, indirect, and cumulative impacts associated with the use of diesel be fully analyzed and disclosed in responses to comments on the FEIS and in the ROD.

Recommendations:

- The response to comments on the FEIS should provide the rationale for limiting the scope of the cumulative impacts analysis to the specified local area. If the Project would affect the ability of other foreseeable projects to be permitted, the ROD and responses to comments on the FEIS should discuss this.
- The ROD and responses to FEIS comments should thoroughly evaluate the additional use of diesel powered equipment for Project construction and incorporate appropriate mitigation measures to reduce impacts. (Please see our May 27, 2010 DEIS comment letter for additional construction mitigation recommendations for mobile and stationary sources.) The evaluation in the ROD and responses to comments should include consideration of the feasibility and impacts of avoiding the need for diesel power by altering the construction schedule.
- At a minimum, any additional nonroad, diesel-powered engines should comply with federal requirements, as applicable, for 40 CFR Part 89.
- For those engines that will be sited and operated for 12-months or more, federal applicable requirements should be identified for, at a minimum, air quality permitting, hazardous air pollutants (40 CFR Part 63, Subpart ZZZZ), and new source performance standards (40 CFR Part 60, Subpart IIII).
- The ROD and responses to FEIS comments should discuss and address whether the diesel equipment would require a permit from the Imperial County Air Pollution Control District.

Response: As described in Section 2.10.4 Cumulative Impacts Study Areas and Projects and Section 4.2 Air Quality in the Final EIS, the air quality analysis is a cumulative assessment of potential air pollutant emissions on both the regional and local levels. For the regional analysis,

the projections for criteria pollutants have been established by the Imperial County Air Pollution Control District (ICAPCD) based on planned population and job growth in that air district. The ICAPCD issued a Preliminary Determination of Compliance (PDOC) for the IVS project on August 20, 2009 and after a 30-day comment period that ended on September 24, 2009, issued a Final Determination of Compliance on October 14, 2009. Compliance with all ICAPCD rules and regulations was demonstrated to the ICAPCD's satisfaction in the Final Determination of Compliance (FDOC). The ICAPCD's FDOC conditions are provided in the project mitigation measures.

The ICAPCD is responsible for issuing Federal New Source Review (NSR) permits and has been delegated enforcement of the applicable New Source Performance Standard (Subpart IIII). However, the IVS project will not require a Federal NSR or Title V permit and would not require a Prevention of Significant Deterioration (PSD) permit from the Environmental Protection Agency prior to the initiation of construction.

For the local analysis, a review of new development projects and stationary sources that have potential for emissions of criteria air contaminants within 6 mile (mi) of the IVS project site were identified. Of the projects identified in Tables 2-1 to 2-4 in the Final EIS, 24 projects are outside a 6 mi radius of the IVS project site and were, therefore, not included in the list of cumulative emission sources. Six projects were eliminated due to their annual permitted emission increases being negative, negligible, or less than 5 tons per year. The last project was eliminated because it is indefinitely on hold. Therefore, it has been determined that there are no planned stationary sources requiring a cumulative modeling analysis within a 6-mi radius of the IVS project site.

Construction emissions from diesel-fueled engines are addressed in measures AQ-SC1, AQ-SC2, AQ-SC5 and the ICAPCD regulations that must be complied with. As described in the Final EIS Section 4.2 Air Quality, the AQCMM will provide a monthly construction mitigation report that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction-related emissions. Additionally, off-road diesel construction equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by Measure AQ-SC2, and described on pages 4.2-49 - 4.2- 50.

New Potentially Significant Effects to Air Quality

The following comment discusses that the project would contribute to new potentially significant effects to Air Quality.

Comment: O1-5.

3. New Potentially Significant Impacts to Air Quality and Water Resources

The Preferred Project may potentially result in significant, unanalyzed impacts to air quality. Increases in the amount of "over land" unmaintained access throughout the site will generate additional dust resulting in significant public health impacts. Activities that result in soil disturbance and which generate dust present a unique health hazard in Imperial Valley because of the extremely high incidence of Valley Fever infection in this area.[21] Valley Fever is caused by the microscopic fungus *coccidiodides immitis*.[22] Infection can occur through spores that become airborne when contaminated soil is disturbed by human activities, such as agricultural activities or construction, and are inhaled.[23] Infection is often accompanies by flu like symptoms. In less than 1% of cases, however, the illness can spread to the lungs, brain, bone and skin. If left untreated, Valley Fever can lead to severe pneumonia, meningitis, and death.[24]

O1-5

Greater dust generation also translates into greater water use as more frequent watering events would be needed to adequately mitigate adverse air quality impacts.[25] These impacts have not been studied or addressed. Indeed, the Applicant acknowledged at an evidentiary hearing held at the CEC regarding the proposed Project, that an analysis of air quality impacts from the Preferred Project has not been prepared.[26]

O1-5

Substantial questions exist regarding the potentially significant effects of the Preferred Project. A supplemental environmental impact statement must be prepared to adequately analyze these effects and to afford the public a meaningful opportunity to comment on the Preferred Project.

In the FEIS, BLM asserts that the Preferred Project includes changes which are "not the types of changes in circumstance that would require analysis through supplementation of the DEIS because the minimizing effect of the drainage avoidance features . . . are within the scope of the original DEIS."[27] Notably, in making its determination of NEPA adequacy, BLM fails to identify the fact that the Preferred Project proposes to remove *all* spur roads from the Project design.[28] BLM's determination is not supported by substantial evidence. The Preferred Project will result in unanalyzed, potentially significant effects, and is exactly the type of Project change that warrants supplementation.[29] BLM must prepare a supplemental EIS and circulate the supplemental EIS for public review and comment in accordance with NEPA.

O1-5

Response: As described in Section 4.2 Air Quality in the Final EIS, Measures AQ-SC2, AQ-SC3 and AQ-SC7 provide for compliance with the Air Quality Construction Mitigation Plan (AQCMP) mitigation measures for the purposes of preventing all fugitive dust plumes from leaving the project site. A site Operations Dust Control Plan, including all applicable fugitive dust control measures identified in the Final EIS would be applicable to reducing fugitive dust during construction activities and ongoing operations at the project site.

The measures provided in Section 4.2 would reduce the project's stationary source NO_x, VOC, SO_2, PM_{10}, and $PM_{2.5}$ emissions through the use of Best Available Control Technology (BACT), minimizing delivery and employee trips, and reducing mobile source emissions. With the inclusion of these measures and compliance with the ICAPCD measures, the IVS project would not result in adverse air quality impacts.

In addition, refer to the following sections of the Final EIS for additional discussion regarding air quality: Sections 3.2 and 4.2 Air Quality, and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.6, Air Quality.

1.4.4 Biological Resources

Design Modifications and discussion in the ROD and the Final 404(b)(1) Analysis

The following comments discuss that the ROD and the Final 404(b)(1) analysis incorporate the final project design features and mitigation measures to avoid and minimize impacts to waters of the United States.

Comments: F1-4, F1-5 and O1-18

The Draft Section 404(b)(1) Alternatives Analysis (AA), included as Appendix H of the FEIS, describes design modifications to maximize avoidance and minimization of impacts to WUS (Appendix H at pg. 23). These modifications and updated calculations of impacts to WUS appear to have been incorporated into the 709 MW alternative (Alternative 3 in the 404(b)(1) AA), but not the other alternatives analyzed as part of the Draft Section 404(b)(1) AA. The Final 404(b)(1) AA and ROD should incorporate these modifications into all alternatives for which they are practicable, to ensure an accurate comparison of potential impacts.

F1-4

Although the 404(b)(1) AA presented in the FEIS is still in draft form and certain environmental studies have not been completed nor fully incorporated into the FEIS (for example, the vegetation removal plan), we note a number of discrepancies and unconfirmed design features in the FEIS and appendices. We strongly recommend that the ROD and Final 404(b)(1) AA consistently incorporate all final project design features and mitigation measures to demonstrate avoidance and minimization of impacts to WUS. For example, we note a discrepancy in the FEIS with respect to sediment transport and sediment basins. The Draft 404 (b)(1) AA indicates sediment basins were removed, which reduced the impact to sediment transfer through the Project area and decreased permanent impacts to WUS by 3.3 acres (Appendix H at pg. 25). This information conflicts with the FEIS (at pg. 4.17-19) as well as the Responses to Comments (Appendix D at pg. 335) which indicate that sediment basins will be used and could be overwhelmed by much larger sediment transport volume of larger flows. This could result in increased sediment deposition downstream if sediment transport from the SunCatcher fields has been increased through vegetation clearing and grading of surface irregularities (at pg. 4.17-19). The Draft 404 (b)(1) AA also indicates the waterline which extends to the Seeley Waste Water Treatment Facility (SWWTF) has been co-located beneath a site arterial and maintenance road and will either be horizontally drilled or constructed to span WUS, resulting in a reduction of impacts from over 2 acres to zero. While we note that a Frac-Out Contingency Plan for horizontal drilling is mentioned in BIO-7, neither the FEIS nor the Draft 404 (b)(1) AA confirms the final design nor the technical method that will be used to eliminate these impacts.

F1-4

Lastly, Appendix D (Responses to Comments) indicates that "when conditions are not conducive to the use of the metal fin-pipe foundation (for hydraulic SunCatcher pedestal installation), the foundation would consist of rebar-reinforced concrete constructed below grade" (Appendix D at pg. D-335). The 5,150 SunCatchers to be placed in flood hazard areas are subject to scour, and could also become unstable if the scour undermines their structural foundation, resulting in collapse and potentially damaging and polluting the ground surface with mirror fragments and other debris. EPA remains concerned about the increased erosion, migration of channels, local scour, and potential destabilization and damage that could result. As stated in our DEIS comments, the final project design should fully use the inherent flexibility of the SunCatcher technology to maximize avoidance of WUS and high risk flood hazard areas.

Recommendations:

- In the response to comments on the FEIS and in the ROD, clarify the implications to the proposed Project if the SPTL is not built, and discuss the practicability of the 300 MW Phase I as a stand-alone project.
- Integrate design modifications consistently across all alternatives evaluated in the FEIS and the Draft Section 404(b)(1) Alternatives Analysis to assist in alternative selection and identification of the LEDPA.

F1-5

iii. BLM Failed to Include in the FEIS Reasonable Measures to Reduce Adverse Impacts to Jurisdictional Waters

O1-18

The Preferred Project fails to address significant impacts to jurisdictional waters.[163] Specifically, the SunCatchers remain a significant impact to those washes that have not been avoided.[164] In comments submitted on the DEIS, EPA specifically requested that the Applicant redesign the Project to removal all SunCatchers from drainages.[165] This suggestion has been echoed in other comments submitted on the Project.[166] The FEIS, however, fails to fully mitigate for this adverse effect on jurisdictional waters. BLM also fails to provide any discernable rationale for failing to employ feasible mitigation to eliminate the Project's adverse impacts to jurisdictional waters by removing ALL SunCatchers from desert drainages.[167]

O1-18

Response: The 404(b)(1) Alternatives Analysis is provided in Appendix 6 in this ROD. Please refer to the analysis in the ROD and Final 404(b)(1) for the discussion of mitigation that would minimize impacts to waters of the United States under the 709 MW Alternative.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Sections 3.3 and 4.3 Biological Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement, Section D.4.7, Biological Resources.

Project Impacts to the Flat-tailed Horned Lizard Habitat

The following comments discuss concerns about the project's impacts to flat-tailed horned lizard.

Comments: P1-2, P1-3 and P1-4

The FTHL is currently under consideration for listing as a Threatened species, *75 Fed. Reg. 9377* (March 2, 2010). In November 1993, the U.S. Fish and Wildlife Service published a proposed rule to list the FTHL as a Threatened species. The Secretary of the Interior never approved it and moved to withdraw the listing proposal in 1997. Defenders of Wildlife and other conservation groups then sued the Secretary to compel a listing determination, but the government compromised by promising to address the threats to FTHL habitat on public lands. Also in 1997, Wendy Hodges prepared a report assessing the habitat loss of the FTHL in Arizona and California. At that time, Dr. Hodges had determined that the species had suffered a nearly 50 percent loss of habitat due to agricultural development and urban sprawl. Other threats included off-road vehicle use, energy developments, and military activities. Fifteen years have elapsed since a listing was first proposed, and according to the Center for Biological Diversity (Public Comment Letter, April 30, 2010) FTHL populations are still in decline

P1-2

Two important "management areas" or Areas of Critical Environmental Concern (ACECs) are the West Mesa and the Yuha Basin, so designated by the Working Group of FTHL Interagency Coordinating Committee (May 1997). The two ACECs are connected by a habitat corridor that varies in quality, but is sufficient to support the species and provide genetic connectivity. If project construction goes forward, it will destroy 6,500 acres, 75 percent of which (ca. 4,875 acres) is marginal to good FTHL habitat. Furthermore, the habitat corridor between the West Mesa and Yuha Basin FTHL populations will be disrupted, genetically

isolating the two habitat areas. Conservation biologists view habitat fragmentation as one of the most pernicious factors in the decline and eventual extinction of biological populations. Lack of gene exchange between fragmented populations causes inbreeding depression and field studies have demonstrated that inbreeding depression can increase the probability of extinction (Jimenez et al. 1994 *Science 366:271-3*; Newman and Pilson, 1997 *Evolution 51:354-62*; Saccheri et al. 1998 *Nature 392:491-4*).

Dr. Patrick Mock, the expert witness for the applicant (Tessera Solar), stated that Interstate Highway 8 is a "substantial barrier to movement", and concluded that the two management areas are already effectively isolated. I disagree with this assessment because, whereas road mortality will be high, highways are not complete barriers to dispersing individuals; some individuals will successfully cross highways. Population genetic theory suggests that between one and ten migrants (dispersers that breed) per generation is sufficient to negate the negative effects of inbreeding (Wright, 1931 *Genetics 16:97-259*; Allendorf and Phelps, 1981 *Canadian J. Fisheries & Aquat. Sci. 58:1507-14*; Mills and Allendorf, 1996 *Conserv. Biol. 10:1509-18*; Vucetich and Waite, 2000 *Animal Conserv. 3:261-6*). Furthermore, experimental data from both captive and wild populations demonstrate that this level of migration has beneficial effects on fitness and survival (Soule and Mills, 1998 *Science 282:1658-59*; Westemeier et al. 1998 *Science 282:1695-8*; Vila et al. 2002 *Proc. Royal Soc. London Ser. B, 270:91-7*). P1-2

As a mitigation procedure, it has been proposed to collect all FTHLs at the project site and relocate them to safe habitat areas. Unfortunately, there is now compelling evidence that translocation inevitably fails. For example, over the past 15 years, some 10,000 desert tortoises have been moved to the Large Scale Translocation Site in Clark County, Nevada, yet there has been no measurable increase in tortoise numbers at the site, and overall there has been a steady extirpation of tortoise populations due to habitat loss. The desert is a severe environment and if the number of individuals exceeds the carrying capacity of the habitat, the excess will die. FTHLs relocated to suitable habitat will lack familiarity with their new surroundings and will succumb relatively easily to predators because their escape behavior is less efficient than that of resident lizards. Horned lizards are limited by food availability (Whitford and Bryant, 1979 *Ecology 60:686-94*). Resident horned lizards are familiar with the locations of ant mounds and ant worker columns in their territories and forage efficiently on this patchy resource (Baharav, 1975 *Copeia:649-57*; Whitford and Bryant, 1979 *Ecology 60:686-94*; Shaffer and Whitford, 1981 *Am. Midl. Nat. 105:209-16*; Munger, 1984a *Ecology 65:1077-86*; 1984b *Am. Nat. 123:654-80*). However, by increasing the number of FTHLs in an area through relocation, competition for food will intensify, increasing the probability of malnutrition for both resident and non-resident lizards. Malnutrition will have negative effects on subsequent P1-3

reproductive effort and over-wintering survival. In sum, translocation has potential negative consequences and should be abandoned as a mitigation procedure. P1-3

In conclusion, the Solar 2 Imperial Valley solar energy project should not be approved because it will destroy approximately 4,875 acres of marginal to good FTHL habitat, disrupting the habitat corridor between the West Mesa and the Yuha Basin FTHL populations which is critically important for gene exchange between the two. There are no effective mitigation options for the loss of the habitat and lizards at the project site or the loss of genetic connectivity. The FTHL has already lost more than 50 percent of its habitat from various anthropogenic activities. In 1997 the Federal Government promised to address the threats to FTHL habitat on public lands in response to a lawsuit by Defenders of Wildlife and other groups. Although I am not familiar with the exact language of the compromise, implicit in the agreement would be the protection of habitat corridors that are vitally important for gene exchange between fragmented populations. Clearly, by authorizing the Solar 2 Imperial Valley solar energy project, the Federal Government would violate the spirit, if not the letter, of its 1997 agreement with the Defenders of Wildlife and other plaintiffs. P1-4

This communication should be considered an addendum to my letter to you of 26 July 2010, concerning the potential impact of the SES Solar Two energy project on the Flat-Tailed Horned Lizard, *Phrynosoma mcallii.*

Dr. Patrick Mock estimated a population of 20 to 30 individuals based on 40% coverage of the area and assuming a 25% detection rate, and a finding of three individuals on the project site. I believe that this estimate is probably too low as it would constitute a non-viable population. CEC biologists made a much higher estimate of some 2,000 to 5,000 FTHLs (DEIS at C.2-22) on the proposed project site. My concern is that there may be an even higher population of lizards. If sand-raking were used to detect lizards that were subsequently captured marked, and then re-captured, it might be possible to obtain more accurate numbers. Turner and Medica (*Copeia 1982:815-823*), using mark-recapture methods, found 6 to 8 lizards per hectare in the Yuha Basin. Assuming 75% of the project area is poor to good habitat that yields 4,638 acres or 1,877 hectares of occupied habitat. If we select 6 per hectare as the "high" estimate, that would yield 11,262 FTHLs at the project site. If we take 50% of 6, or 3 per hectare, that would be 5,631 FTHLs at the project site. I believe these limits (5,631 to 11,262) are realistic. If nothing else, they tend to support the estimates from CEC biologists. P1-4

A second point concerns the applicant's decision not to place SunCatchers in some of the larger washes, claiming that the washes would serve as dispersal corridors between the Yuha Basin and West Mesa management areas. I have reviewed the extensive literature on habitat preferences, and cannot find any statements that suggest the FTHL utilize washes to any extent. My own limited field experience with this species is in agreement with the literature information on habitat. Furthermore, the washes at the project site are high energy washes that receive both winter and summer monsoon floods. Visual inspection of the washes reveals scour marks around creosote and galleta grass, indicating strong, high volume water flow. Most likely, any lizards occupying the washes would be periodically eliminated, and the area would have to be re-colonized. This suggests that wash areas, while they might be occupied periodically, would not serve well as dispersal corridors.

Response: This comment expresses concern regarding the FTHL, specifically movement corridors currently provided by the project site and previously disregarded measures to translocate FTHL encountered during construction. The Selected Project will leave the vast majority of primary washes untouched for multiple reasons, including providing FTHL movement corridors between existing Management Areas. Additionally, the avoidance and mitigation measures were modified to eliminate the proposal to translocate FTHL encountered during construction to different areas; instead, the FTHL will be removed from immediate harm's way. The applicant will be providing approximately 12 million dollars in funding to be used to purchase and preserve FTHL habitat in accordance with the existing multi-agency, multi-jurisdictional Rangewide Management Strategy for FTHL.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Sections 3.3 and 4.3 Biological Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement, Section D.4.7, Biological Resources.

Potential Impacts to Peninsular Bighorn Sheep

The following comments discuss potential impacts to Peninsular bighorn sheep (PBS) and the IVS project.

Comments: O1-7 and O1-8.

2. New Potentially Significant Impacts to Groundwater Quality

The Dan Boyer Well is in a sole source aquifer that is relied upon by a number of surrounding communities as their only source of water.[45] Substantial question exists regarding potential impacts to water quality as a result of Project pumping. The CEC technical Staff found a negligible impact due to "upflux of relatively poor groundwater from underlying water-bearing zone into overlying water-bearing zones that are pumped by most wells."[46] However, CEC technical staff failed to analyze cumulative effects on water quality in the Ocotillo/Coyote Wells aquifer as a result of the Project.[47] There has also been no analysis of Project effects of groundwater pumping over an extended period of time. Potentially significant effects on groundwater quality could result from continued extractions because, "at some point there could be a threshold reached whereby additional groundwater upflux could be enhanced" due to pumping.[48] **O1-7**

In the FEIS, BLM claims that supplementation is not necessary because "the alternative water supply modification is essentially similar to that analyzed in the DEIS . . .the geographic and resource conditions are sufficiently similar to those analyzed in the DEIS, and the differences between the alternative water supply analysis in the DEIS are not substantial."[49] This rationale has no basis in fact.

Instead of relying on *recycled water* as originally proposed, the Project now proposes to use *groundwater* in a desert environment where water resources are scarce. Moreover, the Applicant proposes to rely on groundwater pumping from a basin that is currently in overdraft and which represents the sole source of drinking water for neighboring communities. As briefly summarized in these Joint Comments, substantial evidence suggests that the newly proposed reliance on groundwater pumping from the Ocotillo/Coyote Wells groundwater basin will have new, unanalyzed significant effects on groundwater resources. BLM must prepare a supplemental EIS that analyzes these effects, and provide the public with an opportunity to review and comment on its analyses, as required by NEPA. **O1-7**

ii. Impacts to Peninsular Bighorn Sheep and Newly Identified Need for an Incidental Take Permit Under the Federal Endangered Species Act

"The draft [environmental impact] statement must fulfill and satisfy to the fullest extent possible the requirements established for final statements in section 102(2)(C) of the Act."[50] "If a draft statement is so inadequate as to preclude meaningful analysis, the agency shall prepare and circulate a revised draft of the appropriate portion."[51] A supplemental EIS must be prepared to a final EIS if the agency makes "substantial changes" in the proposed action that are relevant to environmental concerns or if there are "significant new circumstances or information" relevant to environmental concerns and bearing on the proposed action or its impacts.[52] "If a change to an agency's planned action affects environmental concerns in a different manner than previous analyses, the change is surely "relevant" to those same concerns."[53]

O1-8

The Project is located within a recovery area for federally endangered peninsular bighorn sheep ("PBS"). PBS are known to occupy a number of areas surrounding the Planning Area, including the Coyote Mountains which lie immediately west of the Planning Area, the Fish Creek Mountains immediately north of the Planning Area, and the Jacumba Mountain range.[54] These mountain areas comprise the designated Carrizo Mountains/Tierra Blanca Mountains/Coyote Mountains Recovery Area ("CTRCA") for PBS.[55]

As pointed out by CURE in its comments on the DEIS, industrial development within the Project site would adversely affect the PBS through the interference and obstruction of movement corridors crucial for species recovery and the elimination of seasonal foraging and dispersal habitat.[56] BLM did not to disclose or evaluate these potentially significant impacts in the DEIS, finding that the proposed action would not cause adverse impacts to this protected species.[57]

O1-8

BLM first disclosed that "USFWS is in the process of preparing a Biological Opinion for the potential adverse project effects on the PBS" when it issued the FEIS.[58] Contrary to the information provided in the DEIS, the FEIS indicates that "USFWS has determined that the project area provides some forage function for Peninsular bighorn sheep." ***In a complete reversal of its prior position, BLM now indicates that mitigation measures will be required to reduce the newly identified adverse impacts of industrial development on the future recovery of the PBS.***[59] This new information qualifies as significant new information and circumstances under NEPA, triggering BLM's duty to supplement the FEIS.[60]

By failing to adequately analyze impacts to PBS at the outset of environmental review, BLM failed to take the requisite "hard look" at the environmental consequences of the proposed Plan Amendment and to adequately inform the public of those consequences. "NEPA does not permit an agency to

remain oblivious to differing environmental impacts, or hide these from the public . . . . Such a state of affairs would be anathema to NEPA's 'twin aims' of informed agency decisionmaking and public access to information."[61] BLM is required to supplement the DEIS or FEIS, and recirculate the supplemental environmental review document for public review and comment in accordance with NEPA to adequately evaluate the proposed Project impacts on the recovery of PBS. O1-8

Response: Comment states that the BLM has not adequately addressed potential impacts to Peninsular bighorn sheep (*Ovis canadensis nelsoni*). The BLM has been in consultation with the USFWS and as a result there is a requirement for the applicant to enhance substantial portions of the Carrizo Marsh as compensatory mitigation for effects on Peninsular bighorn sheep forage habitat. Refer to the Biological Opinion/Conference Opinion provided in Appendix 2 of this ROD. All project mitigation commitments, including those for biological resources, are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Sections 3.3 and 4.3 Biological Resources, Final EIS Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.7, Biological Resources.

BLM Did Not Adequately Address Mitigation for Impacts to Peninsular bighorn sheep

The following comment discusses that BLM did not adequately address mitigation for impacts to Peninsular bighorn sheep, and that the measures cited in the Final EIS do not even mention Peninsular bighorn sheep.

Comment: O1-16.

E. BLM Failed to Include a Complete Discussion of Measures Aimed to Mitigate the Project's Effects

In addition to a scientifically defensible analysis of project impacts, an EIS must include a discussion of "appropriate mitigation measures not already included in the proposed action or alternatives."[149] All relevant, reasonable mitigation measures that could alleviate the environmental effects of a proposed action must be identified, even if they are outside the lead or cooperating agencies' jurisdiction.[150] An EIS is inadequate unless it contains "a reasonably complete discussion of possible mitigation measures."[151] Mitigation includes "avoiding the impact altogether by not taking a certain action or parts of an action."[152] It also includes "minimizing impacts by limiting the degree or magnitude of the action and O1-16

its implementation."[153] The mandate to thoroughly evaluate all feasible mitigation measures is critical to NEPA's purposes.[154] Hence, a "perfunctory description" or a "mere listing" of possible mitigation measures is not adequate to satisfy NEPA's requirements.[155] That individual harms are somewhat uncertain due to limited understanding of the Project characteristics and baseline conditions does not relieve BLM of the responsibility under NEPA to discuss mitigation of reasonably likely impacts at the outset.[156]

i. BLM Failed to Include in the FEIS Reasonable Measures to Reduce Adverse Impacts to the Federally Endangered Peninsular Bighorn Sheep

O1-16

Although BLM now admits that mitigation is necessary to minimize adverse effects on PBS, BLM fails to propose mitigation that will reduce the significance of those adverse effects. The FEIS states that BIO-8 and BIO-17 will mitigate for impacts to PBS.[157] However, BLM presents no rational basis for this conclusion. Indeed, BIO-8 nor BIO-17 do not even *mention* PBS.

BIO-8 was originally included in the DEIS to minimize the construction and operation impacts of the proposed Imperial Valley Solar Project; this measure was devised prior to BLM's identification of potentially significant impacts to the PBS.[158] BLM also fails to provide any justification for its conclusion that BIO-8 may mitigate impacts to PBS. Similarly, BIO-17 was originally included in the DEIS to mitigate for impacts to state and federal jurisdictional waters.[159] BLM fails to identify any evidence to support its conclusion that BIO-17 may also mitigate impacts to PBS. For these reasons, BLM's conclusion that significant adverse impacts to PBS will be substantially reduced is arbitrary and capricious and in violation of NEPA.[160]

Response: The mitigation measures described in the Final EIS were originally developed to offset impacts to Federal jurisdictional waters and once Peninsular bighorn sheep Section 7 consultation was identified as a project requirement (During preparation of the DEIS, there was no indication that the USFWS considered the one-time sighting of Peninsular bighorn sheep as evidence that the site comprises Peninsular bighorn sheep forage habitat), then measures were analyzed to be proposed to offset potential project impacts to Peninsular bighorn sheep. The specific measures, BIO-8 and BIO-17 will require reduction in impacts to primary drainages, and restoration of approximately 250 acres within the Carrizo Marsh on California Department of State Parks lands. The reduction in impacts to primary drainages and more so, the restoration of Carrizo Marsh lands that historically provided summering grounds for the Peninsular bighorn sheep prior to their current infestation by invasive species that precludes the use of Carrizo Marsh by Peninsular bighorn sheep are adequate measures to protect the Peninsular bighorn sheep populations and future species recovery. Refer to the Biological Opinion/Conference Opinion provided in Appendix 2 of this ROD. All project mitigation commitments, including those

for biological resources, are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

1.4.5 Cultural Resourses

The following comments discuss issues related to the Juan Bautista de Anza Historic Trail (Anza Trail).

Comments: F2-1 and O1-22

Both the CEC and BLM have identified significant direct and impacts to the
Anza NHT in their respective environmental documents evaluating the
Imperial Valley Solar Project. The attached memorandum proposes two
possible approaches to determining the value of the impact to the Anza NHT
and for providing proportionate mitigation. Also included is a rough cost
estimate for the examples of interpretive facilities referenced by NPS in
our Draft EIS comment letter. As stated in FEIS Mitigation Measure REC-1,
number and type of interpretive media would be determined through
preparation of a Long Range Interpretive Plan. For your reference, pages
from the NPS Wayside Guide are also included as attachments to the
memorandum.

NPS is open to discussions with BLM and the applicant regarding the
management, design, and cost of these facilities, and this cost estimate is
only intended to provide a point of reference in determining the value of
some of the mitigation we have proposed. Please don't hesitate to contact
me to discuss this.

F2-1

C. **<u>BLM Failed to Preserve the Historic Resources Within the Project Site</u>**

O1-22

BLM failed to ensure that impacts to historic resources within the Project site will not be significantly diminished. In comments submitted by the National Park Service, sister agency to the BLM, the Service states "[b]ecause the project would have significant direct and indirect impacts to the Anza NHT [National

Historic Trail], *the NPS* [National Parks Service] *would prefer that the project not proceed*, or that alternatives be considered which would avoid impacts to the Anza NHT."[195] In its comments, NPS requested that impacts to the historic Anza Trail be mitigated to the greatest degree feasible "through the preparation of a comprehensive Interpretive Plan and a re-evaluation of the alignment of the Anza Recreational Trail in the area."[196] However, NPS also clarified that it "does not believe that the impacts to the Anza NHT can be reduced to a less than significant level through mitigation. Implementation of the project will forever change the landscape of this area and irreparably degrade the integrity of the Anza NHT and it will diminish the public's experience and understanding of the historic expedition and the cultural landscape of that period."[197]

Even if BLM were to disagree with NPS's finding of unavoidable significant impacts on the Anza Trail, BLM has failed to mitigate for the significant impacts identified in the DEIS. The FEIS is devoid of measures to reduce impacts to the historic Anza Trail. **The FEIS provides that "measures to address project impacts to the Anza Trail are provided in Section 4.5 Cultural Resources, in the FEIS, and the draft Programmatic Agreement."[198] However, Section 4.5 contains no analysis of impacts to the Anza Trail, and the "Draft PA is currently in development."[199]** O1-22

Clearly, a mitigation scheme for the potentially significant impacts to the Anza Trail has not been developed. In fact, it appears that little progress has been made since NPS submitted the following comments on the DEIS:

> The EIS concludes that Condition of Certification CUL-1 would reduce all cultural resource impacts to less than significant. CUL-1 requires compliance with the terms of the Programmatic Agreement (PA) being prepared by BLM pursuant to Section 106 of the National Historic Preservation Act. *NPS is an invited Signatory to the PA, which is still under development and does not yet specify mitigation for the Anza NHT.*[200]

The Draft Programmatic Agreement in the FEIS *still* does not specify mitigation measures for the Anza Trail; it sets forth only the intention of the consulting parties to devise such measures prior to ground disturbance.[201] In short, BLM failed to ensure that historic resources will not be significantly diminished as a result of the Project. BLM may not approve the Project until it has ensured that the Anza Trail will not be significantly diminished by the proposed industrial use, as required by FLPMA and the CDCA. O1-22

Response: As of September 2010, no physical evidence for the presence of the Anza Trail or campsite within the IVS project site has been observed. Additional identification efforts are on-going. The BLM has determined the IVS project and the other Build Alternatives will have an adverse effect on historic properties. Impacts to the Anza Trail corridor would be substantial. Measures to address project impacts to the Anza Trail, per consultation with the National Park Service and consulting parties, are provided in Section 4.5, Cultural Resources, in the Final EIS,

and the Final Programmatic Agreement (PA) in Appendix 3 in this Record of Decision (ROD). The BLM took comments provided on the draft into account in the revision and preparation of the Final PA.

In addition, refer to the following sections of the Final EIS for additional discussion regarding cultural resources: Sections 3.5 and 4.5 Cultural Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement, Section D.4.9, Cultural Resources.

The following comments discuss issues related to Native American Consultation, impacts to resources, mitigation, and the PA.

Comments: F1-10, NA1-1, NA2-1, NA3-1, NA3-2, NA3-3, NA3-4, NA3-5, NA3-8, S1-1, O1-12, O1-17, O1-21, O1-24, O1-25, O1-26, and O1-27

Cultural Resources

Responses to FEIS comments should provide the latest update on how any outstanding concerns raised by Tribes were addressed and resolved, provide an update on the status of the Programmatic Agreement and Tribal consultation, and indicate whether the Tribes are in agreement that the Programmatic Agreement will reduce impacts to prehistoric and sacred sites to less than significant. **F1-10**

On February 4, 2010, I wrote to you regarding the Quechan Tribe's concern with BLM's evaluation of cultural resource impacts associated with the Imperial Valley Solar Project (formerly known as SES Two) and BLM's failure to consult with the Quechan Tribe as required by law. Since that date, the Tribe's concerns with this Project and BLM's review process have only increased. The Tribe requests that BLM stop rushing this process and allow adequate time to meaningfully comply with the consultation process required by law and to properly evaluate the impacts this project would have on cultural resources if approved.

The Tribe's Historic Preservation Officer (HPO) first requested a copy of the cultural report for this project over two years ago, on February 19, 2008. In subsequent meetings, BLM informed the Tribe's HPO that the cultural report would be ready for distribution in June 2008. However, the Tribe only recently received a CD containing a copy of the cultural report in early July 2010. Required consultation under Section 106 regarding the evaluation of resources and the mitigation of impacts can not even begin until the Tribe has adequate time to review the lengthy cultural resources report. Yet, BLM contends that it will be ready to consider approval of this Project within weeks. BLM is not complying with the Section 106 process or its fiduciary obligations to the Tribe. **NA1-1**

To date, BLM has not met with the Quechan Tribal Council to discuss this project. The Tribe requests that BLM arrange a time to meet with the Tribal Council at the Fort Yuma Indian Reservation to engage in meaningful government-to-government consultation. Such consultation should occur only after the Tribe has been provided adequate time to review the relevant reports and maps describing the cultural resources present on the project site.

To be clear, notification letters and brief project updates to the general public are not adequate to comply with BLM's Section 106 consultation obligation to the Quechan Tribe. Meaningful consultation includes a timely exchange of information and requires BLM to seek

out, discuss, and carefully consider the views of the Quechan Tribe regarding identification, evaluation, and mitigation of affected cultural resources prior to reaching any final decision on the project. In this case, BLM's sole focus has been on rushing towards the finish line and getting this project approved on a "fast track," regardless of tribal views or impacts on cultural resources. This is not acceptable and not consistent with BLM's obligations.

Like BLM, the State of California is also rushing the process at the expense of cultural resource protection. The California Energy Commission (CEC) recently published its final Staff Assessment which included the evaluation and selection of its preferred alternative. Noticeably absent from the Staff Assessment was any analysis of cultural resource impacts. This is because the CEC has not completed its analysis of cultural resource impacts. *See* Supplemental Staff Assessment, Section C.3 (stating that "the Cultural Resources and Native American Values section of the Supplemental Staff Assessment will be filed subsequently and is not included in this document"). It is not clear to the Tribe how CEC can make an informed recommendation and select a preferred alternative for the project with literally no information or analysis about cultural resource impacts. **NA1-1**

Information that has been made available to the Tribe confirms that there are numerous cultural resources located on this project site, which is located within territory traditionally used by the Quechan Tribe. The most significant impact associated with this project is the permanent loss of cultural resources within the existing cultural landscape. Based on these impacts, the most appropriate alternative may be denial of the proposed project and relocation to other federal lands that have been previously disturbed and that lack the significant cultural values of this site. Until BLM finishes its cultural analysis, consults with the Quechan Tribe in accordance with its legal and fiduciary obligations, and completes the Section 106 process, BLM may not make any final decision on this project.

BLM has a duty under federal law to consult with the Quechan Tribe and to thoroughly understand, evaluate, and mitigate impacts to cultural resources before approving a project. The Quechan Tribe expects full compliance by BLM in this case. The Tribe looks forward to engaging in future consultation with BLM regarding this project.

This comment is in regard to Imperial Solar Projects. Comments are due on or before today, Aug. 26, 2010.

I am opposed to the destruction of all cultural resources and other locations of significance to all indigenous peoples. I believe that the proposed project severely impacts the ecosystem of the desert and our ability to continue practicing our customs and traditions as Native peoples. I believe that alternatives to the projects have not been explored enough. The consultation and evaluation process has been insufficient. **NA2-1**

This comment letter and protest is sent on behalf of my client, Carmen Lucas, Kwaaymii Laguna Band of Indians. Ms. Lucas has been involved in project planning through attending meetings, site visits and hearings. She is specifically referred to within the FEIS including at pages 7-1, 7-2, D-5 and throughout Appendix F. This letter supplements correspondence and comments that have already been provided by Ms. Lucas.

NA3-1

Improper Deferral of Cultural Inventories, Evaluations and Tribal Consultation

The FEIS states that further field visits and tours are expected in the upcoming months as the cultural resources inventory report is finalized and Section 106 consultation continues. (FEIS, 7-2). While we appreciate the value of field visits and tours, we strongly believe that to comply with Section 106, NEPA and CEQA, that tours and visits, cultural resource inventory reports, National Register evaluations, TCP identifications and landscape and visual effects analysis must be concluded prior to project approval. Otherwise, it cannot be said that the agencies have truly taken into account all the adverse effects of the project and considered all feasible mitigation measures. Improperly delaying the completion of 106 until after project approval is something we are seeing with more frequency on projects in our area, especially those related to industrial utility projects - like the Sunrise Powerlink - and is a practice that we believe is not supported in the law.

Improper Deferral of Mitigation Measures for Impacts to Tribal Cultural Resources

The FEIS states that "preliminary mitigation measures" are described in the FEIS and in the draft Programmatic Agreement ("PA"). (FEIS D-259, D-286). We strongly believe that mitigation measures must be known and implementable at the time of project approval - not deferred until sometime after public review closes or after project approval. A failure to timely present mitigation will result in the inability of the tribes and others to have an opportunity to publicly review the measures. Moreover, there is an obligation for the applicant and approving agency not to rush to override significant adverse impacts without adopting feasible mitigation measures to help lessen those impacts.

NA-3-2

Further, we have reviewed the draft PA and FEIS and find it to contain few tangible mitigation measures that would offset the project's impacts to tribes. Mitigation measures that should be investigated, in consultation with tribes, only if the project must move forward (which we hope it will not), include, but are not limited to funding/resources to: establish/enhance cultural centers, museums, language programs, or establish THPO offices. Such measures should be agreed upon prior to project approval.

The Draft Programmatic Agreement is Insufficient, Harmful to Tribal Interests and Consultation on it Should be Terminated
The draft PA for this project is insufficient in several regards and should not be used here or elsewhere in our desert as a template or model. Most of the actions described in this document, are actions that should take place prior to project approval to ensure the full and adequate consideration of cultural resources and values. There is little actual mitigation of the admitted adverse effects in the PA or the FEIS. This is very alarming.
The PA also is internally inconsistent by stating on the one hand that the applicant has "completed" all the necessary cultural investigations - and on the other hand admitting that the report is still in "draft" form. (Compare PA lines 150-151 to lines 157-158 and 463-469). Also, it is unclear that the project APE, while larger than the area surveyed for archaeological impacts, addresses the full geographic extent of adverse indirect effects (including effects to cultural landscapes, trail systems, visual impacts, and sacred mountains) which are beyond that boundary, contrary to PA line 152. A graphic map of the APE and sub-APEs would be helpful in understanding the differing areas.
National Register evaluation and nominations must include a focus on nomination under Criterion A - tribal values and not just Criterion D - scientific values (PA line 539). Tribes should also be consulted by BLM when it is determining whether to assume a discovered property to be eligible for inclusion in the NRHP (PA line 641).
The PA references many appendices, but does not provide a table of appendices nor are any appendices included for review. (See, for example, Appendix A to the PA is alluded to at PA line 566, but not provided for public review; Attachment B, mentioned at PA line 579, is also omitted, etc.). This renders the review period invalid. An additional 30 days of public review for the FEIS and PA must occur.

NA3-3

Government-to-Government Consultation Inadequately Described in FEIS
The so-called Government-to-Government Consultation section, FEIS Appendix F, is merely a recitation in chart of form listing the contacts made between BLM and tribes. There is no substantive summary of what the concerns of affected Tribal Governments are or how they were considered in the FEIS. This is inadequate, and does not provide sufficient information for decision makers to understand, even partially, the nature and depth of the cultural and other tribal concerns about the proposed action.

NA3-4

Avoidance of Tribal Burials not Guaranteed
The FEIS and PA do not state that burial or cremation grounds will be avoided by the project. (FEIS D-501). Avoidance should include all related cultural features, such as gathering or food preparation areas as well as include a buffer and protective measures. Specific mitigation measures to avoid adverse effects must be spelled out clearly in the mitigation and conditions of project approval. Moreover, what guarantee is there that additional burials will not be located within the project area? If they are subsequently found, how will the project avoid those resources? What specific steps will BLM and the applicant take? The FEIS and PA also must demonstrate compliance with California Public Resources Code section 5097.9.

NA3-5

Moreover, no amendment to the CDCA Plan should occur to accommodate a project that causes so many environmental harms to our special places and local peoples, as enumerated above, especially on Class L (Limited Use) lands which were designated to protect sensitive, natural, scenic, ecological and cultural resource values. Renewable energy may be an appropriate use for areas of the California desert, but not in this area. Please do not begin to turn our open desert into a sacrifice area for industrial renewable energy and forever change the hallowed landscape that the tribal ancestors entrusted to us.
In sum, based on the effects and impacts described above, my client is in favor of the No Action Alternative and to amend the CDCA Plan for No Solar in this, and similarly situated locations, within her ancestors' territory. NA3-8

The Native American Heritage Commission (NAHC) is the California State 'Trustee Agency pursuant to Public Resources Code §21070 for the protection of California's Native American Cultural Resources. The NAHC is also a 'reviewing agency' for environmental documents prepared under the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq*) and that are subject to the Tribal and interested Native American consultation requirements of the National Historic Preservation Act, as amended (Section 106) (16 U.S.C. 470). The provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. 3001-3013) and its implementation (43 CFR Part 10.2) apply to this project if Native American human remains are inadvertently discovered.

The NAHC is of the opinion that the federal standards, pursuant to the above-referenced Acts and the Council on Environmental Quality (CSQ; 42 U.S.C. 4371 *et seq*) are similar to and in many cases more stringent with regard to the 'significance' of historic, including Native American items, and archaeological, including Native American items than the California Environmental Quality Act (CEQA.). In most cases, federal environmental policy require 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 Statement (EIS). Both of the above-referenced projects contain known Native American cultural resources whose presence should be considered in the project planning of both. S1-1

A Sacred Lands File search was conducted for the project area ('area of potential effect' or APE and **Native American cultural sites were identified, including more than one set of remains, making it, in effect, a Native American burial ground.** The fact that the remains and associated grave goods may have been removed does not diminish the sanctity of this site to Native Americans. The remains were identified as 'of Native American in origin and reported to the California Native American Heritage Commission pursuant to California Health & Safety Code §7050.5. Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Since the discovery of human remains, determined Native American, and the presence of other cultural resources at this site, the Native American Heritage Commission **is opposed to this project until such time that the concerns of local culturally-affiliated Native American elders and tribes are satisfied.**

Enclosed are the names of the nearest tribes that may have knowledge of cultural resources in the project area. A list of Native American contacts is attached to assist you. It is advisable to contact the persons listed and seek to establish a 'trust' relationship with them; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area.

Lack of surface evidence of archeologica resources does not preclude the existence of archeological resources. Lead agencies should consider avoidance, in the case of cultural resources that are discovered. A tribe or Native American individual may be the only source of information about a cultural resource.

NEPA regulations 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. Even though a discovery may be in federal property, California Government Code §27460 should be followed in the event of an accidental discovery of human remains during any ground-breaking activity; in such cases California Health & Safety Code §7050.5 may apply.

S1-1

C. Failure to Take a "Hard Look" At Environmental Consequences

Section 101 of NEPA declares it is a matter of national policy to preserve important historic, cultural, and natural aspects of our national heritage. To achieve this goal, NEPA requires that agencies take a "hard look" at the environmental consequences of a proposed action.[100] A hard look is defined as a "reasoned analysis containing quantitative or detailed qualitative information."[101] The level of detail must be sufficient to support reasoned conclusions by comparing the amount and the degree of the impact caused by the proposed action and the alternatives.[102] An EIS must provide a "full and fair discussion of significant environmental impacts and shall inform the decision-makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment."[103] "General statements about 'possible' effects and 'some risk' do not constitute a 'hard look' absent a justification regarding why more definitive information could not be provided."[104] *"[L]ack of knowledge does not excuse the preparation of an EIS; rather it requires [the agency] to do the necessary work to obtain it."*[105]

O1-12

An EIS must provide a full and fair discussion of every significant impact, as well as inform decision-makers and the public of reasonable alternatives which would avoid or minimize adverse impacts.[106] The impacts analysis must include a discussion of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal

should it be implemented.[107] The discussion of impacts must include both "direct and indirect effects (secondary impacts) of a proposed project."[108]

As stated in CURE's comments on the DEIS, BLM failed to take a hard look at the Project's effects on cultural and soil and water resources. The FEIS similarly fails to analyze the Project's impacts on these resources.

i. BLM Failed to Take a "Hard Look" at the Cultural Resources Consequences of the Project

The cultural resources sections of the DEIS and FEIS fail to take a hard look at the Project's effects on cultural resources.[109] We incorporate by reference CURE's comments on the DEIS. The following comments address information that has been generated following the issuance of the DEIS. **O1-12**

A simple visual inspection of the ground surface on the proposed Project site revealed at least 453 cultural resource sites on the site.[110] These resources include two prehistoric districts, multiple stone scatters with human worked bones, stone tools, ceramics, geoglyphs, 11 segments of a prehistoric trail system, and a considerable number of cremations on and adjacent to the Project site.[111] The Project site is located in an area that is ancestral and sacred to a number of Tribes, including the Quechan Indian Tribe, the Cocopah Indian Tribe, and the Kumeyaay Nation.

In written comments submitted by the Quechan Indian Tribe ("the Quechan"), the Quechan indicate that the Planning Area, "is located in an area confirmed to have high cultural sensitivity."[112] The Quechan further note that 432 cultural resource sites have been previously recorded within the Project site, and industrialization within the Project site would also "impact sites outside the project area due to visual and glare impacts."[113] Specifically, "several cultural sites and

geoglyphs located in the Yuha area are ceremonial in nature" and the proximity of renewable generation facilities will interfere with the use of these sites and the Tribe members' ability to see from these sites to other nearby landscapes of cultural significance.[114] The severity of these impacts has not yet been analyzed by BLM.[115]

At an evidentiary hearing held on the Project at the CEC in May, 2010, a Kumeyaay and Quechan tribal elder expressed concerns about the value of the subsurface resources that may never be known:

> MR. ARROW-WEED: I also heard that potential for discovery for construction, what if you do find -- you haven't looked, you don't even know what's under there. You're only on the surface. It could be more under there. But you want to destroy it before we ever know anyway.[116]

O1-12

The concerns of tribal members were echoed by the U.S. Environmental Protection Agency in its comments on the DEIS:

> [D]ue to the extremely high frequency of identified cultural resources on or adjacent to the proposed Project site, the Project could have adverse effects on a presently unknown subset of approximately 328 known prehistoric and historical surface archaeological resources . . . [i]mpacts to on an unknown number of buried archaeological deposits may result.[117]

These impacts are expected to be significant.[118]

In responses to comments, BLM confirmed in the FEIS that it had not yet fully *identified* all of the cultural resources within the Project site or evaluated the potential effect on cultural resources as a result of the proposed Project. The Draft Programmatic Agreement, included with the FEIS, sets out a purported plan for cultural resource identification and evaluation that has not yet been fully devised

by the consulting parties.[119] For example, in recent comments on the draft Programmatic Agreement submitted by the Advisory Council for Historic Preservation ("ACHP"), ACHP notes that "BLM needs to better describe the process it plans to follow for Section III. Identification and Evaluation and Section IV. Treatment of Historic Properties . . . BLM also needs to develop a clearer consultation process for these sections."[120] Clearly, BLM has not even begun to consider the cultural resources within the Project site or how these may be impacted by the proposed Project.

The FEIS indicates that a draft cultural resources report was prepared just in advance of the FEIS – in June 2010 – and months after the issuance of the DEIS.[121] However, to date, BLM has not evaluated the ethnographic resources at the Project site. Claudia Nissley testified on August 16, 2010 that BLM had not conducted oral interviews with tribal members who can speak to the significance of the cultural sites within and in the vicinity of the Project site.[122] Additionally, Quechan Tribal Historic Preservation Officer Bridget Nash explained that an ethnographic study was necessary to ensure that the cultural significance of the resources impacted by the Project are adequately evaluated: O1-12

> MS. Nash: This is one way in which the tribes can really have some input into that associative value of the site, to allow the tribes to sit down and give their history and their knowledge of these areas. It's imperative that the tribe have an opportunity to share their cultural knowledge so that the archeologists have a better understanding of both the cultural and the ceremonial values of these resources.[123]

To date, there is no evidence in the record that BLM has conducted any oral interviews with tribal members who can speak to the significance of the sites, and no ethnographic study has been prepared for the Project. The FEIS also fails to evaluate impacts to archaeological and built environment sites.[124]

It is not surprising, given BLM's failure to establish a baseline for cultural resources at the Project site, that the impacts analysis provided in the FEIS is also vastly inadequate. BLM was able to provide only a summary table of the totality of the impact, by alternative.[125] The FEIS *assumes* that the Plan Amendment will significantly impact cultural resources within the Planning Area.[126] This sort of "analysis" is insufficient under NEPA because it is devoid of evidence that would ensure that BLM has been informed of the environmental consequences of the proposed action, and because it precludes meaningful public comment. Certainly, the discussion provided in the FEIS falls far short of the "full and fair discussion of every significant impact" that is required under NEPA. O1-12

This scant record clearly demonstrates that BLM failed to take a "hard look" at cultural resources within the Project site and its area of impact, as required by NEPA. In the absence of evidence, the only reasonable conclusion that could be drawn from the impact analysis provided is that BLM should not act at all in order to avoid significant adverse impacts to cultural resources.[127]

ii. BLM Failed to Mitigate for Project Effects to Cultural Resources

BLM failed to include in the FEIS a reasonably complete discussion of possible mitigation measures for adverse effects on cultural resources. A final Programmatic Agreement has not yet been prepared, and the Draft Programmatic Agreement attached to FEIS is merely a shell document that lacks any substantive discussion of mitigation.[161] A plan to make a plan does not satisfy the BLM's obligation under NEPA and the NHPA.

Moreover, consultation under section 106 of the National Historic Preservation Act has just begun. As the FEIS clearly states, O1-17

> A Draft PA is currently in development and has been sent out to the Consulting Parties . . . .[i]mplementation of measures CUP-1 through CUP-11, *subject to the consultation process for the development of the Programmatic Agreement*, would reduce or resolve adverse effects . . .[b]ecause specific treatments are being developed and consultation with all interested parties is ongoing, there is no absolute commitment to specific treatment measures until they are finalized.[162]

The above perfunctory description of a plan for mitigation development, and the mere listing of mitigation measures of unknown efficacy in the FEIS do not substitute for an adequate mitigation analysis under NEPA. BLM has clearly failed to "thoroughly evaluated all feasible mitigation measures," as required by NEPA.

B. BLM Failed to Evaluate and Preserve the Cultural Resources Within the Project Site

BLM failed to acknowledge and evaluate the traditional cultural properties in and around the Project site. A "traditional cultural property" is a property or a place, that is eligible for inclusion on the National Register of Historic Places because of its association with cultural practices and beliefs that are (1) rooted in the history of a community, and (2) are important to maintaining the continuity of that community's traditional beliefs and practices.[183] The Project site is within the ancestral use area of the Quechan Tribe and other Native Americans.[184] Tribal members and other Native Americans have described significant non-archeological cultural resources within and in the vicinity of the Project site. These cultural resources include biological resources within the Project site that are sacred to local tribes and the sacred areas on or near the Coyote Mountains. O1-21

These resources were not analyzed in the DEIS or the FEIS; in fact, the FEIS includes no information about the direct, indirect or cumulative effects on potential traditional cultural properties. In written comments submitted by the Quechan, the Quechan indicate that the Planning Area, "is located in an area confirmed to have high cultural sensitivity."[185] The Quechan further note that 432 cultural resource sites have been previously recorded within the Planning Area, and industrialization within the Planning Area would also "impact sites outside the project area due to visual and glare impacts."[186] Specifically, "several cultural sites and geoglyphs located in the Yuha area are ceremonial in nature" and the proximity of renewable generation facilities will interfere with the use of these sites and the Tribe member's current ability to see from these sites to other nearby landscapes of cultural significance.[187] The severity of these impacts has not yet been analyzed by BLM.[188]

The concern of the Quechan and CURE are echoed by the U.S. Environmental Protection Agency: "due to the extremely high frequency of identified cultural resources on or adjacent to the proposed Project site, the Project could have adverse effects on a presently unknown subset of approximately 328 known prehistoric and historical surface archaeological resources . . . [i]mpacts on

an unknown number of buried archaeological deposits may result."[189] These impacts are expected to significantly diminish the cultural resources within and around the proposed Project. Industrial development within the Project site may result in significant adverse effects on "an *unknown number* of buried archaeological deposits."[190] The Project "may wholly or partially *destroy all archaeological sites on the surface of the project area.*"[191]

The FEIS assumes that the Project will significantly impact cultural resources within the Project site.[192] However, the FEIS does not include a means to reduce those impacts to a level of insignificance. Instead, the FEIS states that "[a] draft PA is currently in development . . . implementation of Measures CUP-1 through CUP-11, *subject to the consultation process for the development of the Programmatic Agreement*, would reduce or resolve adverse affects."[193] In improperly deferring preparation of a final Programmatic Agreement until after the issuance of Project approval, BLM has ignored the urgings of the Quechan, and others, to devise enforceable measures to prevent the significant diminishment of these resources as a result of the proposed Project.[194] As such, BLM has unequivocally failed to evaluate and ensure no significant diminishment to cultural resources, as required by FLPMA and the CDCA Plan. BLM may not approve the Plan Amendment until it has ensured that cultural resource values are not significantly diminished.

O1-21

III. NHPA VIOLATIONS

The NHPA has been characterized as a "stop, look and listen" provision.[208] The NHPA requires, prior to any federal undertaking, that the relevant federal agency "take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register" and "afford the Advisory Council on Historic Preservation ... a reasonable opportunity to comment with regard to such undertaking."[209] Section 106 of the NHPA, and its implementing regulations, require the agency to undertake a three-step process.[210] Under the NHPA, the federal agency must make a reasonable and good faith effort to (1) identify historic properties; (2) determine whether identified properties are eligible for listing on the National Register; assess the effects of an "undertaking" on any eligible historic properties found and determine whether the effect will be adverse; and (3) avoid or mitigate any adverse effects.[211] In carrying out its responsibilities under Section 106, the federal agency must also consult with "any Indian Tribe ... that attaches religious and cultural significance" to such properties.[212] The federal agency may not postpone the ***entire*** Section 106 process until after the approval of a proposed undertaking.[213] Such deferral violates the NHPA.[214]

O1-24

Record of Decision - Imperial Valley Solar Project Appendices

In this case, BLM has opted to use a Programmatic Agreement to comply with its Section 106 obligation.[215] A Programmatic Agreement may not be used to improperly defer an agency's Section 106 obligations.[216] As detailed in the comments of the Quechan and others, here, BLM has improperly deferred Section 106 consultation until after the issuance of the Record of Decision for the proposed action. To date, BLM has failed to, (1) identify historic properties within the Planning Area; (2) determine which of these properties would be eligible for listing in the National Register; or (3) identify measures to avoid and minimize any adverse effects on eligible resources.[217] BLM may not approve the Project until it has made a good faith effort to comply with Section 106 of the NHPA.[218]

O1-24

A. BLM Failed to Identify Historic Properties within the Planning Area

To identify historic properties within the meaning of the NHPA, BLM must undertake the following actions all the while conducting government to government consultation with Native American representatives:

1. Determine the area of potential effects ("APE") in consultation with the State Historic Preservation Officer;
2. Review existing information on historic properties, including properties within the APE, including any data concerning possible unidentified historic properties;
3. Obtain relevant information from consulting parties;
4. Gather information from Indian tribes; and
5. Undertake a reasonable good faith effort to identify historic properties based on the resources gathered through steps 1-4, taking into account "past planning, research and studies, the magnitude and nature of the undertaking . . . the nature and extent of potential effects . . . and the likely nature and location of historic properties within the" APE.[219]

O1-25

BLM may defer the *final* identification and evaluation of historic properties "if it is specifically provided for in . . . a programmatic agreement executed pursuant to § 800.14(b)."[220] Such process "should establish the likely presence of historic properties within the area of potential effects for each alternative . . ."[221] BLM has failed to do that here.

BLM noticed its intention to prepare an environmental impact statement for the Project on October 17, 2008.[222] It is now August 2010 and BLM still has not identified the historic properties within the Planning Area. In other words, as of the time of writing, BLM has not yet completed step 2, above. The information gathering that has occurred to date is largely limited to the efforts of the Applicant. As recently as February 2010, BLM was provided with only a "usable sample" of 25% archaeological sites within the APE.[223] The majority of the archaeological information provided by the Applicant was found by BLM to be "insufficient to support defensible assessments of the potential effects" of the Project.[224] **O1-25**

The DEIS also references a literature search that was performed to identify previously recorded cultural sites in and within the vicinity of the Planning Area. This literature search was performed by the Applicant's consultant for portions of the Planning Area in 2007 and 2008.[225] Based on this literature search, efforts were made to record previously recorded sites but for reasons described in the DEIS, "the location information for these sites is suspect" and could not confidently be relied upon.[226]

In the FEIS, published in July 2010, BLM provides that the Applicant has submitted a draft Class III Cultural Resources Technical Report, which the BLM is *currently* reviewing for adequacy.[227] It should be noted, that the APE has been determined by BLM to encompass a 15 mile radius around the Project, [228] whereas the Applicant's Class III survey covers only a one mile radius around the Project.[229] As such, the Class III survey cannot reasonably be expected to adequately identify the cultural resources within the APE.

Consequently, BLM deferred resource identification until after Project approval. The DEIS provides that "the proposed PA will stipulate the completion of the documentation for the 75% of the surface archaeological sites in the project area of analysis . . . the execution of a program to evaluate the historical significant of archaeological landscapes and districts, archaeological site types, and individual archaeological sites . . . and refinements to and the execution of multiple treatment plans to resolve those potential effects that are found to be significant."[230] This complete deferral of Section 106 consultation does not amount to a good faith effort at compliance with the NHPA. **O1-25**

B. <u>BLM Failed to Determine Whether Historic Properties Within the Planning Area Are Eligible for Listing in the National Register and Which Eligible Properties Would be Adversely Affected</u>

BLM has to date failed to determine site eligibility and whether Project effects on eligible resources would be adverse.[231] In February 2010, the DEIS disclosed that, **O1-26**

> [S]taff is presently unable to identify precisely which of the different cultural [archeological] resources are historically significant and is therefore presently unable to articulate the exact character of the effects" of the Project;[232]
>
> No . . . eligible ethnographic resources are presently known to be in the project area of analysis. Further refinements to determinations of the historical significance and to the extant assessments of the potential for visual effects to occur to other ethnographic resources known to be in the vicinity . . . would help evaluate" [the presence of effects on historically significant ethnographic resources];[233] and

> [W]hereas determinations regarding . . . eligibility of built-environment resources within the project area of analysis have not been completed, identification and assessment of impacts cannot be assessed at this time.[234]

The DEIS explains that "determinations on the historical significance of the resources would be made under provisions in the proposed PA."[235] The DEIS further explains that these determinations could not be completed prior to Project approval because "the time required for formal evaluations of historical significance for the complete cultural resources inventory exceeds the one-year licensing process."[236] Such deferral does not amount to a reasonable good faith effort at Section 106 compliance. O1-26

Neither NEPA, nor any federal (or state) statue applicable to BLM's review of the proposed Project exempts BLM from complying with the requirements of the NHPA or NEPA.

C. BLM Failed to Identify Measures to Avoid and Minimize Adverse Effects on Eligible Resources

To date, BLM has failed to identify measures to avoid and minimize adverse effects on eligible resources. The Draft Programmatic Agreement indicates that all of the mitigation and avoidance options are, as of yet, to be developed by the Applicant and approved by BLM.[237] O1-27

The proposed Historic Properties Treatment Plans ("HPTP") contains "neither an outline to develop treatment plans nor [does it contain] a treatment plan for historic properties."[238] By way of illustration, in comments on the Draft Programmatic Agreement, the ACHP provides as follows: "Under Appendix B . . . clarify what is meant by "individually specify how the Applicant will avoid, minimize or resolve[sic] the adverse the adverse effects." As stated in the comments provided by Ms. Nissley, the HPTP simply requires *the Applicant* to supply a list of historic properties that will be avoided. There is no stated requirement as to what type of properties must be avoided or how much geographic or linear (buffer) space

must be available to avoid them. These discretionary decisions are deferred to the Applicant, and will be undertaken, presumably, sometime after BLM approves the Project.[239] The HPTP also requires *the Applicant* to describe the measures to avoid, minimize or mitigate the adverse effects on historic properties.[240]

The Draft Programmatic Agreement also fails to resolve adverse effects, as required by Section 106 and its implementing regulations. Under the 43 C.F.R. § 800.6, BLM is required to develop options for resolution of the adverse effects on historic resources in consultation with other consulting parties, including Native American tribes. However, the Draft Programmatic Agreement improperly defers this requirement, and also impermissibly delegates its duties under the NHPA to the Applicant.[241] O1-27

BLM has failed to make a reasonable good faith effort to comply with Section 106 prior to Project approval. In sum, BLM has deferred the ***entire*** Section 106 consultation, in violation of the NHPA.

Response: As described in the Final EIS, government-to-government consultation has been taking place since 2008. Appendix F for the Final EIS indicates that, the last contact by the BLM with the Tribes occurred on June 25, 2010. Since then, the BLM has contacted the Tribes by email on July 9, 2010, conducted a field visit with the Tribes on July 29-31, 2010, and sent a letter to the Quechen tribe on August 18, 2010. Section 7.2 in the Final EIS discloses that in a December 4, 2009 meeting, the Tribes had expressed concerns over impacts to cremated human remains in the project area. Section 3.5.3.2, in the Final EIS, states that 1,200 acres were excluded from the originally proposed project area to avoid direct effects to the cremation sites and other historic properties. The concerns of the Tribes regarding protection of human remains location were addressed by amending the project proposal, and by creating a protective buffer around these locations. Refer to the Final Programmatic Agreement in Appendix 3 in this ROD which addresses continued consultation, and mitigation committed to by BLM. Refer also to Section 4.3 Cultural Resources, in the Final EIS for additional mitigation measures addressing cultural resources.

Government-to government consultation is on-going, and is summarized in the Final EIS. Consultation includes meeting with Tribal governments, Elders, interested individuals. Tribes participating in consultation have been informed that the IVS project will have an adverse effect on historic properties. Known habitation sites and human remains locations are being avoided by project construction. A construction free buffer area in association with the known habitation sites and human remains locations will be established and avoidance will be enforced by the presence of archaeological and Native American monitors and protective fencing during construction. Government-to-government consultation has yet to identify specific traditional cultural properties that are eligible for the National Register of Historic Places (National Register) within the project's area of potential effects (APE). In an effort to identify Traditional

Cultural Properties (TCPs) in the APE that are eligible for the National Register (if any), meetings, requests to interview tribal elders, and field visits continue.

As part of good faith and reasonable identification efforts, government-to-government consultation is on-going, including providing for additional site visits seeking comments regarding National Register evaluations. Mitigation measures are included in the Final EIS, and the PA and will be adopted in the ROD. A draft PA was included in the Final EIS, execution completed in mid-September 2010 and the executed PA is provided in Appendix 3. The PA stipulates ongoing consultation with tribes, including participation in construction monitoring. The PA further requires that development and implementation of a Historic Properties Treatment Plan(s), in consultation with consulting parties, must take place prior to ground-disturbing activities that have the potential to adversely affect historic properties. The BLM took comments provided on the draft PA into account in the revision and preparation of the Final PA. Execution of the PA is evidence that the BLM has taken into account the effect of this undertaking on historic properties and that the BLM has satisfied its responsibilities under Section 106 of the National Historic Preservation Act.

As part of a good faith and reasonable effort to identify historic properties in the project's APE, the BLM has required the preparation of an adequate Class III Inventory. Inventory of the APE includes archival (literature) searches, assessments of the historic built environment (buildings and structures), and intensive pedestrian surveys of the proposed direct impact area (construction foot-print). Archaeological survey was originally of a larger area resulting in modification of the construction foot-print in an effort to avoid sensitive cultural resources. This report was provided to interested Tribes and consulting parties for comment. Based on the consultation process and comments received from Tribes and other interested parties, the BLM will make determinations of eligibility and effect for individual resources. On an undertaking-wide context, the BLM has determined that the project will have an adverse effect on historic properties and mitigation is required prior to construction. Mitigation measures are described in the Final EIS, and presented in the Final Programmatic Agreement in Appendix 3.

In addition, refer to the following sections of the Final EIS for additional discussion regarding cultural resources: Sections 3.5 and 4.5 Cultural Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement, Section D.4.9, Cultural Resources.

The following comments discuss cumulative impacts to cultural resources.

Comments: NA3-7, and O1-15

Cumulative Impacts Inadequately Considered
The FEIS does not adequately analyze cumulative impacts to cultural resources, instead laying out standard treatment measures at FEIS 4.5-23 through 4.5-31 and providing bare charts listing projects by BLM field office area at FEIS Table 2-7. There is no analysis of the cumulative loss of specific cultural values across the traditional homeland of the Yuman Tribes (Hoover Dam area to the Mexican Border and 20 miles east of the Colorado River to the Pacific Ocean) of the resources, traditional practices, belief systems that could be destroyed piecemeal and the affect that would have on the sustainability for these indigenous cultural life ways and beliefs. Such analysis must include, but not be limited to, specific discussion of the impacts associated with proposed utility projects at: Ivanapah, Topock, Blythe, West Imperial County, East Imperial County and approved projects such as the Sunrise Powerlink and past projects including the North Baja Pipeline and lining the All American Canal. Without this level of analysis in narrative form looking at the impacts across the desert, it cannot be said that BLM has truly taken these impacts and effects into account. **NA3-7**

ii. Cultural Resources

The FEIS fails to consider the Project's contribution to adverse cumulative effects on cultural resources in the Project vicinity. At an evidentiary hearing held on the Project at the CEC, Bridget Nash explained the Project's significant cumulative impacts to the cultural landscape in her testimony:

> There is no substantive quantification or detailed analysis of how these [other proposed projects in proximity] in conjunction with the Imperial Valley Solar Project are expected to impact the cultural resources of the surrounding area or the broader California desert conservation area;
>
> In fact, there are trails that are located within the project area that trend south... Some of them start trending towards the southwest over to another project area, which also contains a large number of cremations where the Schneider Dance Circle is, and some of the geoglyphs, some of the intaglios;

O1-15

> ... whatever happens within this project area is going to affect the Yuha Desert towards the south . . .[147]

Ms. Nash concluded, that the projects must be considered together to assess the cumulative impacts on the cultural landscape.

Carmen Lucas, a Kwaaymii Indian also shared concerns about the cumulative impacts on the landscape in the Project region: O1-15

> I work as a Native American monitor, I see what goes on in the southern area here, and I've very, very concerned with the overall picture, both here, as well as these power lines, and windmills, and geothermals travel up the mountains and through the grades, I wonder what we're offering to the future generations.[148]

BLM must supplement its analysis to include consideration of the cumulative effects of the proposed Project on cultural resources in the vicinity of the Project site.

Response: The cumulative impacts analysis in the Final EIS discusses the effects of reasonably foreseeable future projects. Refer to Section 2.10, Overview of the Cumulative Impacts Analysis, for a list of reasonably foreseeable future projects considered in the analysis of the potential for the IVS project to contribute to cumulative adverse impacts on cultural resources. The cumulative impacts analysis for cultural resources is provided in Section 4.5.5, Cumulative Impacts, in the Final EIS. That analysis indicates that the construction of the IVS project and other foreseeable cumulative projects will contribute to permanent long term adverse effects on cultural resources.

In addition, refer to the following section of the Final EIS for additional discussion regarding cultural resources: Appendix D, Public Comments on the Draft Environmental Impact Statement, Section D.4.9, Cultural Resources.

1.4.6 Water Resources

Groundwater Use

The following comments discuss the use of groundwater for the IVS project.

Comments: F1-7, O1-6 and O1-11.

Alternative Water Supply

The FEIS indicates in numerous places that the Project will rely on up to 40 acre-feet per year (afy) of withdrawals from State Well No. 16S.9E-36G4 (Boyer Well) within the Ocotillo-Coyote Wells Groundwater Basin (OCWGB) until water is made available from the upgraded Seeley Waste Water Treatment Facility (SWWTF). However, sections in the FEIS still indicate (see Appendix D, at pg. 334 and 509) that 50 afy will be needed for the Project. Thus, there is a discrepancy in the FEIS between the amount of water needed and the amount of water available. In addition, a question remains concerning how long the Boyer Well will be needed. The "Will Serve Letter" references a six-to-eleven month period, but the FEIS indicates up to 3 years. Unanticipated delays in the upgrade of the SWWTF could occur. The FEIS indicates that the proposed Project will not affect nearby residential/private wells, but it is still unclear whether the FEIS analysis factored in up to 67 afy of withdrawals for the Coyote Wells (CW) project in the same area. Thus, there is still some uncertainty whether nearby wells would be affected. F1-7

Recommendations:

- Resolve the 40 versus 50 afy discrepancy in the ROD and provide documentation (e.g., a letter from Imperial County or a copy of the permit for State Well No. 16S.9E-36G4) that Imperial County supports 40 afy (or whatever amount is determined to be correct) in withdrawals from the Boyer Well.
- Indicate whether other renewable energy projects and the CW project will, cumulatively, affect nearby residential/private wells, and, if so, describe the impact.
- Incorporate into the ROD an enforceable monitoring program to determine whether neighboring wells are affected by the use of Boyer Well. The ROD should describe the effectiveness of, and commitments to, proposed mitigation and monitoring plans.
- Integrate into the ROD a monitoring program to be initiated upon commencement of the use of water from the SWWTF to monitor for any indirect effects to wetlands in the New River.

i. BLM Must Supplement the EIS Because the Project Now Proposes to Rely on Groundwater Which Results in Different, Potentially Significant Adverse Environmental Effects

The DEIS assumed that the Seeley Waste Water Treatment Facility ("SWWTF") would serve the Project's water needs with recycled water. After publication of the DEIS, however, the Applicant proposed to rely on groundwater to meet Project construction and, potentially, operation needs. Specifically, the Applicant proposes to rely on groundwater from the Dan Boyer Well for the Project's primary water supply for up to the first three years of construction and operation.[30] This is a *significant* Project change. The Applicant's proposed reliance on groundwater will cause potentially significant adverse effects, none of which were analyzed in the DEIS. O1-6

1. New Potentially Significant Impacts to Groundwater Supply

The Dan Boyer Well was "registered" by the County some time after May 2010.[31] However, there is no license or permit that authorizes pumping from Dan Boyer Well for the Preferred Project.[32] The registration certificate, recently issued by the County, also does not take into consideration the affects of pumping on overall basin balance.[33] As understood by the Applicant, the total "registered" capacity of the Dan Boyer well is 40 AFY.[34]

No records of prior groundwater extraction from the Dan Boyer Well have been provided by the Applicant.[35] Currently, residential water use supplied by the well is estimated to amount to 6 AFY.[36] The Applicant, however, assumes that pumping from the Dan Boyer Well may *increase* as a result of the Project.[37] The Applicant proposes to extract 39.5 AF of water from the well on an annual basis.[38] Based on this record evidence, total water demand will *increase* by an unknown quantity to approximately 45.5 AFY. BLM has not attempted to ascertain the proposed level of increase of Project pumping.

Because total demand will exceed the "registered" capacity of the Dan Boyer well, existing users will have to obtain their water from elsewhere, effectively shifting the demand to other wells in the basin. There is substantial question regarding the potentially significant effects of this change because the basin is characterized by *overdraft* conditions. According to the Applicant, the overall historic trends regarding groundwater levels in the Coyote-Ocotillo basin suggests that groundwater levels have been on the decline.[39] *Any* additional groundwater would exacerbate basin overdraft conditions in the Coyote-Ocotillo Wells basin, and such effect would be significant. Specifically, **O1-6**

> [CEC] staff concluded that unmitigable impacts would occur to groundwater storage in the Ocotillo/Coyote Wells basin. This basin is in a state of ongoing overdraft and the approximate use of this groundwater would exacerbate this condition.[40]

CEC technical Staff further concluded that effects on groundwater from Project pumping would be significant because,

> of the fact that this is a drinking water supply and it's been designated as a sole source aquifer, so basically people rely on this groundwater system for their water supply.[41]

The effect would also be significant because of the non renewable nature of groundwater resources in the Ocotillo/Coyote Wells groundwater basin,

> [the Project would be located] in a desert basin, and the consumption of water, it's not a temporary thing, it's consumed and it's gone.[42]

Record evidence also strongly suggests that the Applicant's proposed reliance on groundwater from the Dan Boyer well violates Imperial County's prohibition on out of basin transfers.[43] Ordinarily, such prohibitions are in place where out of basin transfers will have significant effects on groundwater resources in the basin at issue.[44]

BLM has not analyzed the Project's significant effects on groundwater resources, and any adverse effects on groundwater supply as a result of Project pumping.

O1-6

iii. BLM Failed to Respond to Comments Submitted by the EPA Regarding Project Impacts to Groundwater Resources

It bears repeating that with regard to responses to comments submitted by expert federal agencies, the agency must "make available to the public *high quality* information, including accurate scientific analysis, expert agency comments and public scrutiny, before decisions are made and actions are taken."[90] The EPA submitted extensive comments on the DEIS, indicating that the DEIS failed to meet the informational purposes of NEPA.[91] EPA also noted that the Applicant had changed the Project to rely on groundwater resources after the publication of the DEIS.[92] Specifically, the EPA commented that,

> The [Applicant's Application] Supplement indicates the Project will rely on up to 50 acre –feet per year (afy) of withdrawals from an Alternative Water Supply (AWS) within the Ocotillo-Coyote Wells Groundwater Basin (OCWGB), a federally designated sole source aquifer . . . it is our understanding from the Applicant that the AWS will result in no net increase in pumping. If this is so, this should be disclosed and adequately supported in the FEIS.[93]

O1-11

EPA's comments on the DEIS specifically requested BLM to discuss the level of impact of proposed pumping on the overdraft conditions in the Ocotillo-Coyote Wells Groundwater Basin, among other issues raised by Applicant's proposed reliance on groundwater use.[94] As stated previously, BLM cannot respond to EPA's concern because it has not investigated this aspect of the Project.

BLM responds, however, that "the alternative water source is not expected to adversely affect the Ocotillo-Coyote Wells sole source aquifer because it is a currently permitted well."[95] BLM's response does not satisfy its obligation under NEPA because it is utterly unsubstantiated. BLM's assertions are also factually incorrect. O1-11

First, no analysis has been undertaken with regard to the effects of proposed Project pumping on the Ocotillo-Coyote Wells basin balance.[96] Second, the Dan Boyer well is not permitted.[97] To date, the only impact analysis that has been undertaken with regard to the Dan Boyer well was at the CEC. CEC technical Staff found that the effect of Project pumping would be significant, adverse, and unmitigable.[98]

BLM is required to include *high quality* information in the FEIS, such as *accurate scientific* analysis and expert agency comments, to meet the public disclosure requirements of NEPA.[99] Here, BLM has impermissibly strayed from its duty under NEPA by failing to undertake a good faith effort to examine the proposed Project's effects on the environment. In effect, BLM has misled the public by obscuring one of the most controversial aspects of the proposed Project, as well as a host of adverse effects resulting from the Project's proposed reliance on non-renewable groundwater resources. BLM's failure to adequately analyze the Project violates NEPA.

Response: As described in the Final EIS, the IVS project, the Selected Alternative, and the other Build Alternatives were modified after the publication of the SA/DEIS to use an off site well as a temporary water source during construction and initial operations. The use of water from the existing permitted Dan Boyer Water Company well to provide water to the site is proposed until the Seeley Wastewater Treatment Plant (SWWTP) can provide the water to the site. Also described in Appendix B, Determination of NEPA Adequacy, historically, the water has been extracted from this well at amounts up to nearly 200 afy, with amounts typically between 120 and 132 afy. That water was sold for a variety of uses including construction, dust control, quarry operations, and personal use. The well owner has provided a written will serve letter (March 26, 2010) to the applicant, indicating its ability to provide the needed water to the IVS project.

In addition, refer to the following sections of the Final EIS for additional discussion regarding water resources: Section 3.17 and 4.17 Hydrology, Water Use and Water Quality and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.13, Water Resources.

The Project's Impacts on Soil and Water Resources

The following comment discusses the project effects on soil and water resources.

Comment: O1-3 and O1-10.

1. New Potentially Significant Impacts to Soil and Water

The Preferred Project is new and different, and in some respects *worse*, than the originally proposed Project. The Preferred Project "has new and persistent significant impacts" due to the reduction in number of access roads and the proposed removal of spur roads from the Project design.[16] Based on the information provided in the FEIS, it is not clear how maintenance activities will be conducted as a result of a reduction in the number of access roads and the removal of spur roads. Presumably, where these roads do not exist, maintenance vehicles will simply travel "off road" to access the Project facilities. At least three potentially significant impacts can be identified based on BLM's newly announced Project change: **O1-3**

i. Excessive damage to the desert pavement and cryptobiotic crusts as a result of unrestricted access to areas not demarcated by a formal road;

ii. Unmitigated erosion due to the travel of maintenance vehicles along ad hoc access routes; and

iii. Increased, and unmitigated, transport of soils and sediment to the washes and streams in and around the Project site as a result of off-road travel.[17] **O1-3**

These impacts must be analyzed in a supplemental EIS, and the public must be given an opportunity to comment on the Preferred Project, as required by NEPA.

ii. BLM Failed to Provide a Good Faith Reasoned Response to CURE's Comments Regarding Project Impacts to Soil Resources

NEPA requires agencies to take a "hard look" at the environmental consequences of a proposed action.[77] A hard look is defined as a "reasoned analysis containing quantitative or detailed qualitative information."[78] The level of detail must be sufficient to support reasoned conclusions by comparing the amount and the degree of the impact caused by the proposed action and the alternatives.[79] An EIS must provide a "full and fair discussion of significant environmental impacts and shall inform the decision-makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment."[80] **O1-10**

In comments submitted on the DEIS, CURE raised the following concerns regarding the Project's impacts on soil and water resources:

> The DEIS fails to include any analysis of surface soils, including identification of the presence of cryptobiotic crusts on the Project site . . . [d]isruption of the crust will result in decreased organism diversity, soil nutrients, stability, and organic matter.[81]
>
> The DEIS failed to analyze or account for the physical properties of the desert pavement on the Project site . . . the BLM must evaluate the

> extent and type of desert pavement on the Project site in order to analyze the effects of [its] destruction.[82]
>
> The DEIS provides no consideration of the content of the soil on the project [*sic*] site and the extent of soluble salts that could be released into the environment from development activities.[83]
>
> The DEIS indicates that the Project will employ widespread use of soil binders . . . the DEIS fails to adequately address the potentially significant impacts posed by widespread use of soil binders.[84]

The CEC technical Staff and BLM agree that desert pavement and cryptobiotic crusts occur on the Project site.[85] Throughout the region, large expanses of nearly vegetation-free desert pavement are a characteristic element.

In response to CURE's comments, however, the FEIS provides as follows:

> *There are very limited areas on the project site that currently support biotic crusts.* Much of the site was used for gravel mining in the past and the site is currently used for some recreation uses which may have disturbed or continue to disturb biotic crusts on the site. *There are also limited areas on the site that support physical crusts.*[86]

BLM provides no citations to support these claims because it cannot. Gravel mining occurred on the site approximately 100 years ago.[87] With regard to current recreational uses, BLM provided in the FEIS that the Project site has minimal evidence of surface disturbance.[88] Indeed, BLM provides *no evidence* to support its claim that past and current uses on the Project site have substantially diminished cryptobiotic crusts and desert pavement from the Project site. On the contrary, the facts in the record point to the exact opposite conclusion.[89]

O1-10

BLM's response to CURE's comments is based on assumptions that are contrary to information provided in the DEIS and the FEIS. BLM's response also entirely fails to address CURE's comments regarding the effects of the proposed use of soil binders on the Project site. As such, BLM failed to provide a good faith reasoned response to CURE's comments in violation of NEPA.

O1-10

Response: As described in the SA/DEIS, Section C.3 Cultural Resources, and Section 3.5 Cultural Resources in the Final EIS, much of the site was used for gravel mining in the past and the site is currently used for some recreation uses which may have disturbed or continue to disturb biotic crusts on the site. There are very limited areas on the project site that currently

support biotic crusts. There are also limited areas on the site that support physical crusts. Therefore, as a result of the limited amounts of these types of soils on the site, the Build Alternatives are not expected to result in substantial adverse impacts to biotic or physical crusts. Refer to the Biological Opinion/Conference Opinion provided in Appendix 2 of this ROD. All project mitigation commitments, including those for biological resources, are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Section 3.3 and 4.3 Biological Resources and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.7 Biological Resources.

Indirect Project Effects on the New River and the Salton Sea

The following comment discusses the potential impacts to the New River and the Salton Sea

Comment: O1-13.

ii. BLM Failed to Take a "Hard Look" at Indirect Impacts to the Salton Sea and the New River

NEPA requires an analysis of the indirect effects of the proposed agency action.[128] An indirect effect is a reasonably foreseeable environmental effect that is caused by the action."[129] The FEIS fails to adequately analyze potentially significant indirect Project effects on the New River and the Salton Sea. Given the Project's proximity to these waterbodies and their importance to the United States and the State of California, BLM's disregard for these resources is inexcusable. **O1-13**

The Salton Sea ecosystem is an extremely valuable resource for resident and migratory birds, including a large number of threatened, endangered, and other

special-status species.[130] Increasing salinity and declining water quality have eliminated the marine fish species, and, with inflows that will be diminishing in the future, threaten the continued ability of the Salton Sea ecosystem to support birds and other wildlife.[131] Reduced inflows will also reduce the physical size of the Salton Sea and expose lakebed sediments (playa) that, with the prevailing winds in the area, could exacerbate dust problems for an already degraded air basin.[132]

River mouths, particularly in the southern part of the Salton Sea, provide areas of reduced salinity and higher dissolved oxygen.[133] These estuarine areas are relatively small, yet very productive, and they routinely support higher concentrations of birds than surrounding areas.[134] The size of the estuarine areas is influenced primarily by the amount of inflow. The New and Alamo rivers, which constitute nearly 80 percent of the inflow to the Salton Sea, support the largest estuarine areas.[135] **O1-13**

The ephemeral washes on the western edge of the Project site drain towards Coyote Wash north of the Project site. The ephemeral washes on the eastern half of the Project site drain east across the project site to the Westside Main Canal. The Westside Main Canal and Coyote Wash are tributaries to the New River and eventually to the Salton Sea.

In comments on the DEIS, the EPA determined that the Project *may* result in,

> substantial and unacceptable impacts to aquatic resources of national importance . . . due to the hydrologic, biogeochemical, and habitat functions that directly affect the integrity and functional condition of waters downstream at the New River and the Salton Sea.[136]

The Project may impact the Salton Sea through from runoff laden with sediment and soluble salts from the Project site.[137] According to comments submitted by EPA, the Project's indirect effects also include,

> . . .2) Increases in volume and velocity of polluted stormwater from impervious surfaces on the Project site; 3) decrease in water quality from the impairment of ecosystem services such as water filtration, groundwater recharge, and attenuation of floods; 4) disruption of hydrological and ecological connectivity upstream of the Project to the Salton Sea; [and] 5) decreases in biodiversity and ecosystem stability . . .[138]

O1-13

The FEIS now contains a cursory discussion of some of these impacts. However, the analysis in the FEIS is not sufficient to fully ascertain the impacts of the SunCatchers that would remain in the washes and stream channels.[139] BLM does not contest this defect.[140] Additional surveys, data collection and analysis, relating to hydraulics, sediment transport, and scour, must be conducted in order to fully evaluate and minimize such impacts.[141]

The core analysis supporting the FEIS continues to be insufficient because (1) the hydrologic analysis used for the project design is incorrect; (2) the soil erosion and sediment yield estimates are insufficient and have not been improved based on comments on the DEIS; and (3) the hydraulics and sediment transport analysis upon which the FEIS is based is still insufficient to correctly characterize the physical process occurring at the site.[142] Absent adequate underlying analyses, the conclusion that Project impacts have been reduced is not justifiable.[143]

Response: As described in Appendix H, Draft Section 404(b)(1) in the Final EIS, impacts to water quality are not anticipated because of the low amount of rainfall received in the region and the irregularity of subsequent flow events, the lack of impervious surfaces in the watersheds, and the type of proposed project (e.g. limited imperious surfaces). Mitigation Measures within the Final EIS were developed to limit the potential effects on hydrology and water quality and ensure that the proposed project complies with applicable regulatory requirements for both construction and post-development surface runoff water quality. These regulatory requirements not only apply to the proposed project, but all future projects. Therefore, cumulative impacts on surface water quality of receiving waters from the proposed project and future alternative energy projects in the watershed would be addressed through compliance with the applicable regulatory requirements that are intended to be protective of beneficial uses of the receiving waters.

In addition, Mitigation Measures in the Final EIS include Soil&Water-1, Development of a Drainage, Erosion and Sediment Control Plan (DESCP), which would include monitoring and rectifying any observed problems during operation; Soil&Water-5, National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Activity, would ensure adequate

control of construction storm water pollutants; and Soil&Water-3. Industrial Facility Storm Water Pollution Prevention Plan (SWPPP), which would specify best management practices that would minimize mobilization of sediments and soils on-site and eliminate or reduce non-storm water discharges to the waters of the United States.

Refer to the following sections of the Final EIS for additional discussion regarding water resources: Sections 3.17 and 4.17 Hydrology, Water Use and Water Quality and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.13, Water Resources.

1.5 Individual Responses to the Comment Letters/Emails

This section provides individual responses to individual comments not addressed by the common responses provided in Section 1.4.1, Common Responses. Each comment is uniquely coded to the commenting party and the individual comment within that comment letter.

The following comment letters included comments that required individual responses which are provided in this section:

- F1 – United States Environmental Protection Agency (August 30, 2010)
- F3 – Department of the Interior National Park Service Pacific West Region (No date)
- NA3-Carmen Lucus, Kwaaymii Laguna Band of Indians (August 26, 2010)
- S2-Natural Resources Agency, CAL FIRE (August 20, 2010)
- S3- Public Utilities Commission (August 23, 2010)
- O1- California Unions for Reliable Energy (August 25, 2010)
- P4 – Brendan Hughes (email August 21, 2010)
- P5 – Greg Smestad (August 23, 2010)

Comment F1-2: Permittable Discharge and the Least Environmentally Damaging Practicable Alternative (LEDPA)

This comment states that the only permittable discharge is the LEDPA.

Aquatic Resources and Clean Water Act Section 404

Clean Water Act Section 404 prohibits avoidable discharges of dredged or fill material to waters of the United States (WUS). Among other requirements, proposals for discharges must meet EPA's regulatory standards at 40 CFR 230.10, including a comprehensive evaluation of project alternatives that avoid and minimize impacts to the aquatic environment. The only permittable discharge is the "Least Environmentally Damaging Practicable Alternative" (LEDPA). What is "practicable" is evaluated by the U.S. Army Corps of Engineers based on cost, logistical, and technological factors that impact the applicant's ability to achieve the project purpose. F1-2

Response: Through the coordination among the Applicant, BLM and the United States Army Corps of Engineers, the Final 404B-1 analysis lead to the identification of the Least Environmentally Damaging Practicable Alternative (LEDPA). Specifically, the Agency Preferred Alternative is also the Corps' LEDPA as discussed in the Final 404(b)(1) which is provided in Appendix 6, in this ROD.

In addition, refer to the following section of the Final EIS for additional discussion regarding the LEDPA: Appendix H, Draft Section 404(b)(1) Alternatives Analysis.

Comment F1-6: Biological Resources Mitigation and LEDPA

This comment discusses issues related to the LEPDA and biological resources mitigation.

- The ROD and responses to comments on the FEIS should discuss why the selected alternative could be the LEDPA.
- The ROD and responses to comments should include a robust discussion of all avoidance and minimization measures proposed for the Project and include the final details and requirements of a compensatory mitigation plan. BIO-17 should be updated to reflect these final determinations.
- In responses to FEIS comments and in the ROD, confirm removal of sediment basins and demonstrate that downstream flows will not be disrupted due to proposed changes to natural washes, excavation of sediment or increased sedimentation due to increased vegetation clearing and grading of surface irregularities.
- Confirm and incorporate final design criteria and installation methods into the ROD for locating the waterline to the SWWTF that eliminate impacts to WUS.
- Integrate fencing design into the ROD to ensure unimpeded hydrologic flow and sediment transport through the site.

F1-6

- Incorporate vegetation removal and re-establishment conditions for construction into the ROD that minimize vegetation removal in drainages, avoid impacts to drainage bank contours and require restoration using low lying native species, as appropriate, that would not require trimming or impede SunCatcher operation.
- Incorporate into the ROD the applicant's commitment to not mow, trim, or otherwise disturb vegetation, nor place SunCatchers, within streams I, K, C, H, and the areas of streams E and G south of the transmission line corridor (Appendix H at pg. 80).
- Reponses to FEIS comments should fully discuss how many SunCatchers will be installed using rebar-reinforced concrete constructed below grade. Impacts from such construction to WUS should be quantified. All analyses should be updated to include a full evaluation of impacts to waters, sedimentation, scouring, etc. from locating SunCatchers in flood hazard areas.

F1-6

Response: This ROD includes the Responses to Comments on the Final EIS, and the Final 404(b)(1) with the LEDPA for the IVS project. The Final Section 404(b)(1) is provided in Appendix 6, Additional Agency Approvals and Review. All project mitigation commitments including those for biological resources are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological and water resources: Sections 3.3 and 4.3 Biological Resources, 3.17 and 4.17 Hydrology, Water Use and Water Quality, and Appendix D, Public Comments on the Draft

Environmental Impact Statement Sections D.4.7 Biological Resources, and D.4.13, Water Resources.

Comment F1-8: Biological Resources Mitigation

This comment discusses that the Record of Decision should describe the final biological resource mitigation commitments.

Biological Resources

Detailed compensatory mitigation measures are determined on a project-specific basis, and must be contained in each project's environmental analyses and decision documents. The ROD should describe the final biological resources mitigation commitments and how they would be funded and implemented. The FEIS specifies the applicant shall contribute to the National Fish and Wildlife Foundation (NFWF) Account to compensate for loss of flat-tailed horned lizard (FTHL) habitat. For each species requiring compensatory mitigation, the ROD should state whether and how the Project applicant would use the NFWF Account, an in-lieu fee strategy, or an applicant-directed implementation strategy.

F1-8

We also understand the Biological Opinion and Conferencing Opinion for peninsular bighorn sheep and the FTHL, respectively, have not been finalized (at pg. 4.3-22). As the FEIS indicates, the Conferencing Opinion for the FTHL would be converted to a Biological Opinion upon Federal listing of the FTHL. These final Biological Opinions will play an important role in informing the decision on which alternative to approve and what commitments, terms, and conditions must accompany that approval. Lastly, while additional botanical surveys were completed in Spring of 2010, it is unclear from the Responses to Comments (Appendix D at pg. D-493) whether any additional avoidance or mitigation measures were incorporated as a result of the new findings.

Recommendations:

- Incorporate final information on the compensatory mitigation proposals (including quantification of acreages, estimates of species protected, costs to acquire compensatory lands, etc.) for unavoidable impacts to Waters of the State and biological resources such as peninsular bighorn sheep and FTHL.
- If the applicant is to acquire compensation lands, the location(s) and management plans for these lands should be fully disclosed in the ROD.
- Fully incorporate mitigation measures from the Conference Opinion on FTHL into BIO-9 through BIO-11 in the ROD as contingency measures in anticipation of a Federal listing of the species.
- Provide additional supporting documentation in the responses to FEIS comments for the final acreage identified as foraging habitat for the peninsular bighorn sheep on the Project site. Update BIO-17 as appropriate.
- Include the provisions or mechanism(s) in the ROD that will ensure that habitat selected for compensatory mitigation will be protected in perpetuity.
- Fully incorporate into the ROD any mitigation measures for avoidance of rare plants during Project construction and operation that result from recent or pending botanical surveys.
- All mitigation commitments should be included in the ROD.

Response: The Biological Opinion/Conference Opinion are included in Appendix 2 of this ROD. All project mitigation commitments, including those for biological resources, are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

For example: the applicant will provide funding to the National Fish and Wildlife Foundation pursuant to the Flat-Tailed Horned Lizard Rangewide Management Strategy. The applicant will also implement habitat restoration of approximately 250 acres within the Carrizo Marsh to mitigate for IVS Project related impacts to forage habitat for the Peninsular bighorn sheep.

Further, the comment states that the results of the Biological and Conferencing Opinions for the Peninsular bighorn sheep and flat-tailed horned lizard, respectively, will play an important role in the selection of alternatives. This comment is duly noted.

The comment also states that it is unclear if the results of spring 2010 botanical surveys resulted in the need for additional avoidance or mitigation measures. The results of the 2010 botanical surveys did not warrant additional avoidance or mitigation measures.

The comment included a bullet point list of recommendations. Each bullet point will be addressed below:

- Details on the compensatory mitigation for flat-tailed horned lizard and Peninsular bighorn sheep are included in the POD as described in Chapter 2, Mitigation and Monitoring.
- The area identified as foraging habitat for the Peninsular bighorn sheep (PBS) was determined during the Section 7 Consultation between the BLM and the USFWS and was based on the area of waters of the United States within the IVS Project site.
- The habitat to be restored/enhanced as mitigation for impacts to waters of the United States and potential impacts to PBS forage habitat is within lands owned and managed by the California Department of Parks and Recreation and therefore will be protected in perpetuity.
- No new avoidance or mitigation measures were warranted from the results of the 2010 spring botanical surveys.

Comment F1-11: Project Alternatives

This comment discusses that other possible off-site alternatives be given consideration under NEPA.

Response: As described in the Final EIS, and evaluated under NEPA, (Section 2.9, pages 2-41 through 2-46), three off-site alternatives (the Mesquite Lake, the Agricultural Lands, and the South of Highway 98 alternative sites) were analyzed using criteria from the *BLM NEPA Handbook H-1790-1* (BLM 2008). It was determined that the Mesquite Lake and Agricultural Lands sites, which are not owned or managed by BLM, are not practicable or reasonable because of the acquisition of 52 parcels and greater impacts to waters of the United States, particularly to wetlands; and may not meet the cost, logistical, and environmental screening criteria, respectively. The South of Highway 98 alternative site has been withdrawn for Federal Bureau of Reclamation purposes which have not been revoked, thereby making this site infeasible at the present time. Refer also to Tables 7-1, 7-2 and 7-3 in Appendix 7, Tables, in the Rod for summary tables discussing alternatives.

In addition, refer to the following section of the Final EIS for additional discussion regarding project alternatives: Chapter 2, Alternatives Including the Proposed Action and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.2, Project Alternatives.

Comment F1-12:The Responses to Comments on the Final EIS

This comment discusses that the Responses to Comments should more thoroughly address substantive comments received.

Adequacy of Responses to Comments in the FEIS

The format and, in some cases, cursory responses to comments in the FEIS may have resulted in unsatisfactory responses to some stakeholder comments. The FEIS grouped lengthy, substantive comments from stakeholders into 16 common response categories. Unfortunately, many of the responses in these sections seem unduly brief given the volume, substantiveness, and diversity of comments, concerns, and recommendations. The FEIS did not include responses to portions of our comments on cumulative impacts (F2-34), effects of fencing (F2-23), the alternative water supply (F2-26) and sensitive plant species and vegetation (F2-30). If the lead agency decides not to respond to a comment, it must cite the sources, authorities, or reasons that support its position (40 CFR 1503.4(a),(b)). **F1-12**

Recommendation:

- Responses to comments on the FEIS should more thoroughly address substantive comments received.

Response: The responses to comments on the Draft EIS address each comment and clarify any project features that have been included in the comments. All comments on the Final EIS are included and are addressed in this appendix of the ROD.

In addition, refer to the following section of the Final EIS for additional discussion regarding responses to comments on the Draft EIS: Appendix D, Public Comments on the Draft Environmental Impact Statement.

Comment F3-1: The Anza Trail and California Energy Commission's Supplemental Staff Assessment

This comment discusses impacts to the Anza Trail and that the California Energy Commission (CEC) should include measure REC-1 from the Final EIS and include it in the Supplemental Staff Assessment report.

The National Park Service (NPS) respectfully submits the following comments regarding the California Energy Commission's Supplemental Staff Assessment (SSA) and BLM's Final Environmental Impact Statement (FEIS) prepared for the Imperial Valley Solar Project in Imperial County, California. Our comments focus on the potential impacts to, and mitigation for, the Juan Bautista de Anza National Historic Trail (Anza NHT), due to NPS's responsibility to administer, preserve and enhance this component of the National Trails System. The SSA contains several significant omissions with regard to the Anza NHT, and this letter is intended to highlight and correct those errors.

This project will forever change the landscape of this area and irreparably degrade the integrity of the Anza NHT and it will diminish the public's experience and understanding of the historic expedition and the cultural landscape of that period. Both the FEIS and SSA document this fact and conclude that the Imperial Valley Solar project would result in significant adverse impacts to the Anza NHT that cannot be fully mitigated. F3-1

The National Trails System Act (NTSA, 16 USC 1241 et. seq.) states that "National historic trails . . . will be extended trails which follow as closely as possible and practicable the original trails or routes of travel of national historic significance. . . [and] shall have as their purpose the identification and protection of the historic route and its historic remnants and artifacts for public use and enjoyment. . . components of a historic trail which are on federally owned lands and which meet the national historic trail criteria established in this Act are included as *Federal protection components. . .*" Section 7 of the

Act also states that "Other uses along the trail, *which will not substantially interfere with the nature of and purposes of the trail*, may be permitted by the Secretary charged with the administration of the trail. Reasonable efforts shall be made to provide sufficient access opportunities to such trails and, to the extent practicable, *efforts be made to avoid activities incompatible with the purposes for which such trails were established*" (emphasis added).

Below are our comments regarding specific sections of the SSA and FEIS:

SSA Chapter C.3, Cultural Resources and Native American Values / FEIS Chapters 3.5 & 4.5, Cultural and Paleontological Resources

F3-1

The CEC's summary of the Spanish Period is a misleading and inaccurate historical synthesis that emphasizes Anza's 1774 exploratory expedition and other Spanish period events (such as the Yuma Revolt), but essentially omits the more important 1775-76 colonizing expedition for which the Juan Bautista de Anza National Historic Trail was established by Congress. To clarify the record, we recommend that the Spanish Period section of Chapter C.3 be revised to accurately reflect the significance of the Anza colonizing expedition of 1775-76. Alternatively, CEC could incorporate pages 3.5-10 to 3.5-12 from BLM's FEIS into its administrative record because it provides an accurate summary of the Anza Expeditions and their cultural significance.

For example, page C.3-45 of CEC's document still includes the original text from the Draft EIS, which incorrectly states that the purpose of the expeditions was "to find an appropriate overland *route to the mission at San Diego along coastal California.*" BLM's FEIS page 3.5-10 correctly states that the purpose of the expeditions was "to find an appropriate overland route *to the missions in Alta California*" (emphasis added). This is an important distinction, because neither the Anza colonizing expedition nor the exploratory expedition sought to go to San Diego. The purpose was to establish the overland route to the missions and presidios in Alta California, and to establish a new presidio and mission at San Francisco, where the strategic San Francisco Bay had recently been discovered by the Portola Expedition in 1769. Some of the same settlers later established San Jose, CA in 1777. The overland route established by Anza was also followed by another Spanish party in 1781 to establish Los Angeles and Santa Barbara. These omitted facts certainly relate to the historical significance of the Anza expedition, the significance of the Anza NHT historic corridor and recreational trail, and the potential to affect historical resources on the project site.

NPS is a consulting party of the Programmatic Agreement (PA) being prepared pursuant to Section 106 of the National Historic Preservation Act. Implementation of the PA is required by the CEC's Condition of Certification CUL-1 and BLM's Mitigation Measure CUP-11 to mitigate cultural resource impacts to the Anza Trail. The PA specifies that additional efforts to identify material remains of the Anza Trail be implemented, such as 1) a close-quarter pedestrian survey, 2) review of artifacts or faunal remains that may have been left behind by the Anza party, 3) use of infrared satellite imagery or LIDAR technology, and 4) coordination of mitigation measures for effects to the recreation trail and viewshed. NPS concurs with these conditions and the PA's proposed requirements related to the Anza NHT. However, pages

C.3-134 and p. C.3-156 refer to conditions of certification that do not exist, and must be included in the CEC's approval to mitigate impacts to the Anza NHT. Page C.3-156 states:

> If material remains related to the trail are ultimately found, a trail-specific HPTP would be developed and implemented under appendix B that co-opts and augments the conditions of certification related to the trail in the Visual Resources, and Land Use, Recreation, and Wilderness sections of this SSA. If material remains related to the trail are found to be absent, those latter conditions of certification would attempt to reduce the significant impacts of the proposed action on what would then be non-cultural resources considerations. (SSA, p. C.3-156).

Refer to our comments below regarding the mitigation that must be provided to offset the project's impacts to the Anza Recreational Trail.

SSA, Chapter C.8 Land Use, Recreation, and Wilderness / FEIS, Chapters 3.12 & 4.12, Recreation

The CEC and BLM documents reach similar but different conclusions regarding the project's impacts on Recreation on the Anza Trail. Both documents conclude that the project would impact the recreational experience for visitors following the Anza Trail. The FEIS states that the project would "represent a cumulative change to the visual and historic context of the Anza Trail and impact the overall recreational experience of the Anza Trail by adding modern development in the viewscape" (FEIS, p. 4.12-9). The FEIS proposes Mitigation Measure REC-1 to address those impacts. One of the measures includes re-evaluation and completion of the Anza Recreational Trail.

CEC's SSA concludes that the project would result in "permanent preclusion of the use of the existing and planned segments of the Anza Recreational Trail alignment within and near the site" (p. C.8-1). The text seems to confuse the historic corridor that crosses through the project site, and the recreation trail, which does not necessarily lie within the historic corridor and is located along the perimeter of the site. In the project vicinity, the recreation trail follows existing dirt and paved roads and would not be precluded by implementation of the project, though it would be impacted by the construction, access roads, visual and noise impacts, as discussed on page C.8-16. The SSA states that the only potential mitigation for these impacts is realignment of the recreation trail, but the BLM has determined that realigning the Anza Trail is not feasible. The SSA includes no mitigation for recreational impacts to the Anza NHT. F3-1

To mitigate impacts to recreational visitors to the Anza NHT, we strongly recommend that the CEC include a condition of certification consistent with the BLM's Mitigation Measure REC-1, which is copied below for reference.

> **REC-1** **Juan Bautista de Anza National Historic Trail (Anza Trail) Corridor.** As recommended by the United States National Park Service (NPS), a Comprehensive Interpretive Plan for the Anza Trail will be prepared through applicant cooperation and coordination with the United States Bureau of Land Management (BLM) and the NPS. Potential components of this Plan as identified by the NPS could include, but not be limited to the following:

- New Interpretive Facilities
- Installation of Yuha Well Wayside Exhibit
- Additional Interpretation at the Anza Trail Overlook
- Interpretive Exhibit at Plaster City Off-Highway Vehicle (OHV) Open Area
- Supplement Exhibit at Sunbeam Rest Area on Interstate 8 (I-8)
- Anza Trail-Themed Exhibit at a Local Museum
- Anza Trail Interpretive Brochure
- Increase Accessibility of the BLM Yuha Desert Cultural History Anza Tour
- Re-evaluate and Complete the Anza Recreational Trail
- Historic Campsite Surveys (Archaeological Studies)
- Trail-Wide Mitigation Fund

It is assumed that the resources provided by the applicant that are required to prepare and implement the final Comprehensive Interpretive Plan and its components would be roughly proportionate to the degree of impact of the IVS project on the Anza Trail. (FEIS, p.4.12-8) F3-1

SSA, C.13 Visual Resources / FEIS, 3.16, 4.16, Visual Resources

The BLM's FEIS Visual Resources Chapter includes Mitigation Measure VIS-5 to off-set the project's unavoidable adverse impacts to visitors on the Anza Trail and the Yuha Desert ACEC. It requires the project owner to contribute funds to provide the improvements outlined in Mitigation Measure REC-1 (incorrectly referenced as REC-2 in the FEIS p. 4.16-25).

The CEC also concludes that visual impacts along the Anza Recreation Trail would be significant: "Staff does not, however, dispute that visual impacts to the recreational Anza Trail and trail corridor in general would be significant from most locations. . ." (SSA, p. C.13-20). However, CEC does not provide any mitigation to address this impact. In fact, CEC eliminated Mitigation Measure VIS-5, proposed in the Draft EIS, because the types of measures proposed in the condition would not mitigate the project's visual effects. NPS believes that reevaluation of the alignment of the recreation trail through terrain that would shield it from visual, noise, and other project impacts is a feasible mitigation measure for the Anza Trail, and we request that this condition be reinstated. Alternatively, contribution to a fund for acquisition of property or conservation easements elsewhere along the Anza Trail would also serve to mitigate the project's visual impact.

Response: As described in the Final EIS, Mitigation Measure REC-1 was developed and included in Section 4.12, Recreation (page 4.12-8) to address the potential effects of the IVS project on the Anza Trail corridor. The CEC's Supplemental Staff Assessment document is not under BLM's control to add measures.

In addition, refer to the following sections of the Final EIS for additional discussion regarding recreational resources: Sections 3.12 and 4.12 Recreation.

Comment NA3-6: Visual Impacts are not shown in the Final EIS

This comment discusses visual impacts of the IVS project.

Visual Impacts Unacceptable
Visual impacts are not adequately or consistently shown in the FEIS, NA3-6

likely in an effort to downplay their effects. Compare the binder spine images (vegetation up to the units) with FEIS Figures 2-3 and 4-5 which show the more accurate denuded base of the dish units and the vast number of units. These visual impacts to the tribal cultural landscape are unmitigable and unacceptable. NA3-6

Response: The figures and key views of the project site were provided in Sections 3.16 and 4.16 in the Final EIS. Mitigation measures for visual effects of the project were provided in Section 4.16 in the Final EIS and are also provided in the POD, as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, visual impacts to the Yuha Geoglyphs south of the IVS project site would be adverse. However, that impact would not be substantial due to the greater distance between that resource and the IVS project site. Project mitigation will require that all exterior lighting be designed so that lamps and reflectors are not visible from beyond the IVS project site boundary, lighting does not cause excessive reflected glare, direct lighting does not illuminate the nighttime sky except for required Federal Aviation Administration (FAA) aircraft safety lighting, and illumination of the IVS project site and the immediate vicinity is minimized.

Comment S2-1: Fuel Break Around the Project Area

This comment recommends that a fuel break be created around the project area.

Response: As described in Section 4.6 Fire and Fuels Management, in the Final EIS Measures WORKER SAFETY-1 and WORKER SAFETY-2 include a Construction Fire Prevention Plan and a Fire Prevention Program (8 CCR Section 3221). These measures, and compliance with all laws, ordinances, regulations, and standards (LORS) would be adequate to ensure protection from fire hazards associated with the Selected Alternative.

In addition, refer to the following sections of the Final EIS for additional discussion regarding fire management: Sections 3.6 and 4.6 Fire and Fuels Management.

Comment S2-2: Construct an All Weather Access Road

This comment recommends that an all weather access road be constructed into and around the project area.

Two; construct an all weather access road into and around project area. This will allow emergency vehicle access when a fire occurs. The road should be maintained through out the project life. S2-2

Response: As described in Section 4.11 Public Health and Safety, and Hazardous Materials in the Final EIS, site access procedures and security would be addressed by Measures HAZ-4 and HAZ-5 that include the construction and operational security plans and procedures for law enforcement contact in the event of a emergency at the project site.

Additionally, described in Section 4.15 Traffic and Transportation, regional access to the IVS project site is adequate given that an emergency vehicle can access the site directly from Evan Hewes Highway or Dunaway Road, with direct access to/from I-8. Emergency vehicles can approach the site from adjacent cities using different routes and would not be barred from access due to a singular problem on a surrounding road. On-site circulation of emergency vehicles is subject to site plan review by local agencies (Imperial County) and the standards of the Uniform Fire Code and Uniform Building Code.

Refer to the following sections of the Final EIS for additional discussion regarding access to the project site: Chapter 2, Alternatives Including the Proposed Action, and Sections 3.15 and 4.15 Traffic and Transportation.

Comment S2-3: Wires and Other Service Lines Placed Underground

This comment recommends that all wires and other service lines be placed underground.

Three; that all wires and other service lines be placed under ground. This action would greatly enhance public and firefighter safety in the event of a wild land fire and also allow access which typically is compromised because of burnt poles and down lines, which are indicative of overhead applications. This will also greatly increase aerial firefighting operational safety. I would recommend and strongly encourage that these considerations be utilized as part of the project plan. S2-3

Response: It is not within BLM's jurisdiction to place other agencies and companies wires and service lines underground. As described in the Final EIS, Section 2.0 Alternatives including the Proposed Action, the planned 230-kV transmission line required for Phase I would parallel the existing San Diego Gas and Electric (SDG&E) Southwest Powerlink transmission line and would be within the existing ROW for that SDG&E transmission line.

The electric service for the Main Services Complex would be obtained from Imperial Irrigation District (IID). Electric power would be provided via an overhead service line from an existing IID overhead distribution line on the north side of Evan Hewes Highway. The applicant would be responsible for applying to the IID for the extension of electric lines from the existing overhead line onto the IVS project site. The IID would need to apply for and receive an easement from the BLM for the part of that line on BLM managed land on the IVS project site.

In addition, refer to the following section of the Final EIS for additional discussion regarding project alternatives and features: Chapter 2, Alternatives Including the Proposed Action and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.2, Project Alternatives.

Comment S3-1: At-Grade Crossing for the San Diego and Arizona Eastern Railway

This comment discusses the Public Utilities Commission's policy not to authorize any new at-grade railroad crossings.

The California Public Utilities Commission (Commission) has regulatory and safety oversight over railroad crossings in California. The California Public Utilities Code requires Commission approval for the construction or alteration of crossings and grants the Commission with exclusive power on the design, alteration, and closure of crossings. Rail Crossing Engineering Section (RCES) staff is in receipt of the Bureau of Land Management Imperial Valley Solar (IVS) Project Final Environmental Impact Statement and has reviewed the document for impacts to rail crossing safety.

The IVS project is a privately proposed solar power farm that would be located on approximately 6, 500 acres of vacant land in southwestern Imperial County, south of Evan Hewes Highway and north of Interstate 8 (I-8). The IVS project site includes about 6, 140 acres of Federal land managed by the BLM and approximately 360 acres of privately owned land. The site is about 100 miles east of San Diego and 14 miles west of El Centro. Evan Hewes Highway and Dunaway Road provide direct access to the site. S3-1

The San Diego and Arizona Eastern Railway line parallels the northern boundary of the IVS project site between Evan Hewes Highway and the site boundary. Dunaway Road crosses the line at-grade, in addition; there is also a private dirt road crossing over the tracks at the location of the proposed main access to the IVS project site. In the Summary of Traffic Impacts for the IVS project alternative, it states that the construction of a crossing of existing railroad tracks as an impact. However, it is unclear if the existing at-grade crossing is being upgraded as part of the project or if a new crossing is being proposed.

It is Commission's policy to not authorize any new at-grade crossings, and as such, the applicant should provide clarification of the proposed crossing access into the IVS site. In particular, the applicant should state whether the project will utilize the existing private crossing to serve as the primary access point into the project site or if a new crossing location is being proposed.

If the crossing is public, a diagnostic will be required to evaluate the impact the project will have on the crossing and to identify mitigation measures to reduce any impacts. If you have any questions, you may contact me at (213) 576-7076 or ldi@cpuc.ca.gov. S3-1

Response: The proposed crossing access into the IVS site has been described as a private crossing and not a public crossing (Final EIS, Section 4.15 Traffic and Transportation). The

applicant has negotiated a lease agreement[1] with the San Diego Metropolitan Transit System (MTS) to provide a private crossing "...located west of Plaster City, south of Evan Hewes Highway at Road 2003 along the Desert Line at approximately Milepost 128.5." That agreement requires the applicant to pay an annual license fee, maintain appropriate insurance, and provide the necessary crossing improvements (not specified). Measure TRANS-2 requires the applicant to provide an executed agreement of the above prior to project construction and to obtain approval from the MTS for the permanent form of the railroad crossing.

Comment O1-2: Supplemental Environmental Impact Statement

This comment proposes the need for a supplemental EIS to be prepared for the IVS project.

I. NEPA VIOLATIONS

NEPA supplements and augments the authority of each federal agency, vesting each federal agency with the "responsibility and power to protect the environment and integrate environmental, social, and economic objectives when carrying out other federal agency functions."[1] Each federal agency is directed to "interpret the provisions of the Act as a supplement to its existing authority and as a mandate to view traditional policies and missions in the light of the Act's national environmental objectives."[2] Consistent with NEPA's mandate, the CDCA Plan requires BLM to analyze the environmental effects and the economic and social impacts of granting and/or implementing an applicant's request to amend the CDCA to accommodate a specific proposed use.[3] BLM's rationale shall be based on "the principles of multiple use, sustained yield, and maintenance of environmental quality."[4]

O1-2

[1] Metropolitan Transit System, San Diego. License to place permanent improvements in MTS/SD&AE Right-of-Way. January 7, 2010. MTS Doc #S200-10-424, ADM 160.1. CEC Doc 08-AFC-5.

A. BLM Must Prepare a Supplemental Environmental Impact Statement

"An agency's NEPA responsibilities do not end with the initial assessment; supplemental documentation "is at times necessary to satisfy the Act's action-forcing purposes."[5] As stated by the Supreme Court in *Marsh v. Oregon Natural Resources Defense Council*,

> It would be incongruous . . . with the Act's manifest concern with preventing uninformed action, for the blinders to adverse environmental effects, once unequivocally removed, to be restored prior to the completion of agency action simply because the relevant proposal has received initial approval.[6]

O1-2

A supplemental EIS must be prepared if the agency makes "substantial changes" in the proposed action that are relevant to environmental concerns or if there are "significant new circumstances or information" relevant to environmental concerns and bearing on the proposed action or its impacts.[7] "This is a low standard."[8] A plaintiff need only raise "substantial question regarding whether a project may have a significant effect."[9] If a change to an agency's planned action affects environmental concerns in a different manner than previous analyses, the change is surely "relevant" to those same concerns."[10]

i. BLM Must Supplement the EIS Because It Has Proposed a New Project Alternative Which Will Result in Different Potentially Significant Adverse Environmental Effects

A reduction in impact acreage due to the development of a new project alternative does not necessarily remove the agency's duty to a supplement an EIS.[11] For example, a supplement is required where the adopted alternative entails a different configuration of activities and locations, not merely a reduced version of a previously considered alternative, and where a change in the location of development gives rise to different, potentially significant impacts on the environment.[12] "If . . . the Proposed Action ultimately differs so dramatically from the alternatives canvassed in the draft EIS as to preclude "meaningful consideration" by the public, [CEQ regulations] still require[] the submission of the Proposed Action for public comment prior to the issuance of the final EIS."[13] In this case, "the circulation of a supplemental draft EIS describing the Proposed Action is the only means of satisfying" NEPA's requirement for meaningful public participation.[14] O1-2

Here, BLM failed to disclose the proposed Project until the publication of the FEIS. After the DEIS was released, the developer of the proposed Project, Imperial Valley Solar, LLC ("Applicant") and the Army Corps of Engineers ("Corps") proposed to modify the originally proposed Project to:

(1) relocate the main service complex out of several primary washes;

(2) remove some SunCatchers from drainages that transverse the Project site; and

(3) remove 30,000 stabilized spur access roads to allow all travel to Project SunCatcher units, whether for maintenance or mirror washing, to occur off road.

Thus, fundamental assumptions about the Project have changed since the publication of the DEIS; most notably, unlimited off road travel will now be permitted throughout the Project site.

The new Project proposal – referenced herein as the "Preferred Project" because BLM adopts it as the agency preferred project in the FEIS – changes the location of impacts by dispersing impacts throughout the Project site through unrestricted off-road travel. The Preferred Project also changes the configuration of the main Project elements. None of the alternatives considered in the DEIS evaluated a Project that proposes unrestricted off-road travel on ten square miles of fragile desert lands. Ironically, BLM currently also *forbids* this sort of activity in the Project area in order to protect the Yuha Desert as required by the CDCA Plan.[15] The Preferred Project will result in new, potentially significant effects to desert hydrology, biological resources, and air quality that were not analyzed in the DEIS and have never before been considered for this area of the Yuha Desert under the CDCA. Because core elements of the Preferred Project could not be ascertained in the DEIS, the public has also been deprived of a meaningful opportunity to review and comment on this ill-advised Project proposal. **O1-2**

Response: As described in Section 2.0 (page 2-5) in the Final EIS, the BLM chose to use a Determination of NEPA Adequacy (DNA), (Appendix B in the Final EIS), as an internal administrative tool to determine whether a supplement to the Draft EIS was required as a result of the four applicant proposed modifications (i.e. transmission line alignment, waterline alignment, hydrogen storage, and alternative water supply). The BLM determined that no supplement was required because the applicant-proposed modifications were similar to features of previously analyzed alternatives, resulted in an alternative within the range of the alternatives analyzed previously in the SA/DEIS and Final EIS, did not substantially change the previous analysis, and had effects that were similar to or less than those analyzed for the IVS project and the other Build Alternatives. The potential effects of these four modifications were presented in the analyses provided in the Final EIS and the DNA. The public review period for the Final EIS began on July 28 and was completed on August 23, 2010, thus allowing the public to review and comment on the Final EIS (in compliance with 40 CFR 1506.6).

Comment O1-4: Increased Temporary impacts to Wildlife Movement within the Project Area.

This comment discusses that the Preferred Project would result in increased temporary impacts to wildlife movement in the project area.

2. New Potentially Significant Impacts to B

The Preferred Project redesign would *increase* the temporary disturbance on the Project site with the construction of 50-foot wide roads for the installation of the underground utility line and hydrogen pipelines.[18] These Project changes result in new and different impacts to biological resources by, for example, obstructing wildlife movement throughout the ten square mile Project site.[19] BLM has not studied these impacts because they result from a newly proposed configuration of the Project. A supplemental EIS must be prepared to evaluate the impacts of the changed location of development within the Project site, and the public must be given an opportunity to comment on the Preferred Project in accordance with NEPA.[20] **O1-4**

Response: As described in the Final EIS, (Chapters 3 and 4), the entire project site will be subject to disturbances during construction, which are temporary. The ongoing disturbances during construction will likely result in decreased wildlife movement; however, the project site is currently subject to existing constraints to wildlife movement (proximity to Interstate 8 to the south, the railroad line and Evan Hughes Highway to the north and east, and Dunaway Road to the east) and therefore, temporary impacts to wildlife movement from access roads will not result in substantial adverse effects on wildlife movement.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Sections 3.3 and 4.3 Biological Resources, Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.7, Biological Resources.

Comment O1-9: Climate Change

This comment discusses the Final EIS Responses to Comments did not provide a reasoned response to CURE's comment on Climate Change.

B. Failure to Respond to Comments

NEPA's procedural requirements "are to be strictly interpreted to the "fullest extent possible" in accordance with the policies embodied in the Act . . . grudging, pro forma compliance will not do."[62] "NEPA's public comment procedures are at the heart of the NEPA review process.[63] Responsible opposing viewpoints must be included in the final EIS; "this reflects the paramount Congressional desire to internalize opposing viewpoints into the decision-making process to ensure that an agency is cognizant of all the environmental trade-offs that are implicit in a decision."[64] In responding to public comments on a DEIS, agencies are "obliged to provide "meaningful reference" to all responsible opposing viewpoints concerning the agency's proposed decision . . . . Moreover there must be a good faith, reasoned analysis in response."[65]

O1-9

Agencies are held to a more stringent standard with regard to responses to comments submitted by expert federal agencies. Specifically, courts have *required* the agency to respond to such comments and "to discuss at appropriate points in the final statement any responsible opposing view which was not adequately discussed in the draft statement and shall indicate the agency's response to the issues raised."[66] "This disclosure requirement obligates the agency to make available to the public ***high quality*** information, including accurate scientific analysis, expert

agency comments and public scrutiny, before decisions are made and actions are taken."[67]

Here, BLM failed to provide a good faith, reasoned analysis in response to public comments, and also failed to respond to comments submitted by the U.S. Environmental Protection Agency ("EPA"). These omissions violate NEPA.

i. BLM Failed to Provide a Good Faith Reasoned Response to CURE's Comments Regarding Climate Change

The evaluation of global climate change under NEPA must include an analysis of the Project in the *context of* global climate change; the agency's analysis should not be limited to the greenhouse gas (GHG) emissions associated with the proposed project.[68] O1-9

> The environmental analysis and documents produced in the NEPA process should provide the decision maker with relevant and timely information about the environmental effects of his or her decision . . . . [i]n this context, climate change issues arise in relation to the consideration of (1) the GHG emissions effects of a proposed action . . . *and* (2) *the relationship of climate change effects to a proposed action or alternatives, including the relationship to proposal design, environmental impacts, mitigation and adaptation measures.*[69]

"With regards to the effects of climate change on the design of a proposed action and alternatives, Federal agencies must ensure the scientific and professional integrity of their assessment of the ways in which climate change . . . could effect" the proposed action.[70] As recognized by the Council on Environmental Quality, "climate change can affect the environment of a proposed action in a variety of ways . . . [for example] climate change can affect the integrity of a development or structure by exposing it to a greater risk of floods, storm surges, or high temperatures."[71]

In comments submitted on the DEIS, CURE stated that, "the DEIS failed to consider the role that climate change may have in shaping the significance of the Project impacts on the hydrologic conditions on the Project site."[72] Specifically, CURE noted that,

> provided that intense summer storms are responsible for a majority of the runoff that occurs on the project site, the Nature Conservancy would suggest that summer rainfall in southeastern California may increase by as much as 50% by 2080 in the summer, which could be accompanied by significant increases in rainfall intensity and erosivity . . .
>
> These significant increases in rainfall quantity, intensity, and erosivity would have a profound impact on the landscape . . . [which would] in turn, significantly impact the structural stability and flood preparedness of the solar dishes placed in the washes . . .[73]

O1-9

CURE's concerns are echoed by comments submitted on the DEIS by the EPA, which recommended that BLM include a discussion in the FEIS regarding,

> [H]ow climate change could affect the proposed Project, specifically within sensitive areas, and assess how the impacts of the proposed Project could be exacerbated by climate change.[74]

In response to CURE's comments, the FEIS provides, "there is no requirement for an environmental document to attempt to speculate on weather patterns 70 years in the future or to speculate or attempt to analyze the secondary effects of weather changes."[75] This statement does not rise to the level of a "reasoned" response. On the contrary, BLM's rationale contradicts federal agency guidance regarding the elements of an adequate analysis of climate change under NEPA.

The response in the FEIS further provides that "Sections 3.4. and 4.4 in the FEIS discuss climate change."[76] However, the discussion included at Sections 3.4. and 4.4. addresses the Project's contribution of GHG emissions. As such, the information provided in those sections of the FEIS does not respond to CURE's or the EPA's comments regarding *the effect of climate change on the proposed Project.* BLM's response violates NEPA, because BLM's response hardly equates to a good faith effort to respond to public comment.

O1-9

Response: As described in Section 4.4 Climate Change in the Final EIS, the climate change analysis is for compliance with the United States Environmental Protection Agency (EPA) Prevention of Significant Deterioration (PSD) requirements to facilities whose carbon dioxide (CO_2)-equivalent emissions exceed 25,000 tons per year and the Council on Environmental Quality's (CEQ) draft guidance (February 18, 2010) for Federal agencies to improve their consideration of the effects of GHG emissions and climate change in their evaluation of proposals for Federal actions under the National Environmental Policy Act (NEPA). These requirements are to determine the proposed project's contribution to greenhouse gases. The Council on Environmental Quality's draft guidance (Memorandum dated February 18, 2010) for Federal agencies states:

> "if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and public."

The IVS project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368. As described in the Final EIS Section 4.4, the IVS project has an estimated GHG emission rate of 0.00123 $MTCO_2e/MWh$, well below the Greenhouse Gas Emission Performance Standard of 0.500 $MTCO_2/MWh$.

As also stated in the CEQ's guidance:

> "However, it is not currently useful for the NEPA analysis to attempt to link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions, as such direct linkage is difficult to isolate and to understand. The estimated level of GHG emissions can serve as a reasonable proxy for assessing potential climate change impacts, and provide decision makers and the public with useful information for a reasoned choice among alternatives."

In addition, refer to the following sections of the Final EIS for additional discussion regarding climate change: Sections 3.4 and 4.4 Climate Change, and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.8, Climate Change.

Comment O1-14: Cumulative Effects of the Proposed Project

This comment discusses the cumulative effects analysis of the IVS project.

D. BLM Failed to Take a "Hard Look" at the Cumulative Effects of the Proposed Project O1-14

A proper consideration of a Project's cumulative impacts requires "'some quantified or detailed information; ... [g]eneral statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided.'"[144] The analysis "must be more than perfunctory; it must provide a useful analysis of the cumulative impacts of past, present, and future projects."[145]

O1-14

i. Biological Resources

The FEIS fails to consider the Project's contribution to adverse cumulative effects on wildlife connectivity and other cumulative effects that will be caused by the influx of immense solar facilities in the CDCA Plan area. Specifically, the FEIS fails entirely to evaluate the cumulative effect of the proposed industrialization of the Project site on PBS movement within the CTCRA.[146] BLM must supplement its analysis to include consideration of the cumulative effects of the proposed Project on PBS recovery.

Response: As described in Section 4.3 Biological Resources in the Final EIS, the United States Fish and Wildlife Service (USFWS) and BLM biologists agree that the observation of Peninsular bighorn sheep on the project site in March 2009 was an unusual occurrence because no known lambing sites or water sites are known near the project site and no other bighorn sheep occurrences have been documented in the vicinity of the project site. USFWS prepared a Biological Opinion for the potential adverse project effects to the PBS which has been included with this ROD.

The Biological Opinion/Conference Opinion are included in Appendix 2 of this ROD. All project mitigation commitments, including those for biological resources, are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

Comment O1-19: Consultation for Section 106 and the United States Fish and Wildlife Service Consultation

This comment discusses the Consultation for Section 106 under the National Historic Preservation Act and the United States Fish and Wildlife Service (USFWS) Consultation.

Comment: O1-19.

> **F. BLM Failed to Integrate its NEPA Review With Studies and Analyses Required Under the National Historic Preservation Act and the Federal Endangered Species Act**
>
> BLM must "to the fullest extent possible . . . prepare draft environmental impact statements concurrently with and integrated with environmental impact analyses and related surveys and studies required by the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), the National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.), the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), and other environmental review laws and executive orders."[168] BLM is also required to include in the "draft environmental impact statement . . . all Federal permits, licenses, and other entitlements which must be obtained in implementing the proposal."[169] O1-19
>
> As detailed in these comments, BLM has made little effort to coordinate its environmental review with the development of the Programmatic Agreement under Section 106 of the NHPA and its [recently initiated] consultation with the U.S. Fish and Wildlife Service regarding impacts to PBS under Section 7 of the Endangered Species Act. In violation of NEPA, BLM also failed to include any mention of the Project's need for an incidental take permit under the Federal Endangered Species Act for the potential take of PBS. This haphazard and segmented environmental review record has greatly comprised BLM's ability to fully evaluate the environmental consequences of the Project and the public's ability to meaningfully participate in the environmental review process. BLM is required to prepare a supplemental EIS that adequately evaluates the Project's potentially significant effects to cultural, historic and biological resources.

Response: As described in Chapter 7, Government to Government Consultation and Appendix F, Tribal Consultation in the Final EIS, the Section 106 and Tribal Consultation has been ongoing since January 2008, with the purpose of completing a Programmatic Agreement for the IVS project. The Final Programmatic Agreement is provided in Appendix 3, Programmatic Agreement of this ROD.

As described in Section C.2 Biological Resources in the SA/DEIS, and Section 4.3 Biological Resources in the Final EIS, consultation with the USFWS has been ongoing for the IVS project.

The purpose of the consultation is to develop the Biological Opinion/Conferencing Opinion and comply with and obtain the Federal Clean Water Act (CWA) Section 404 permit, if necessary. All project mitigation commitments including those for biological resources are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Sections 3.3 and 4.3 Biological Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement Sections D.4.7 Biological Resources.

Comment O1-20: Multiple Use Class L Land Use and Visual Resources

This comment discusses that Multiple Use Class L land use not be used to diminish the values of the land and that the project would significantly diminish visual resources.

(3) limit recreational use to activities that involve low to moderate user densities; and

(4) preserve and protect Native American, archaeological and paleontological values, and to protect Native American values where applicable.[174]

Although renewable energy generation is a *conditionally* allowed use within Class L lands, BLM ***may not dedicate such lands for renewable energy generation if the proposed use will significantly diminish the natural, scenic, ecological and cultural values of those lands.***[175] O1-20

The Project would be located in a designated Class L area under the CDCA Plan. BLM failed to assess the proposed Project's impact on sensitive values and to ensure that such values are not significantly diminished, as required by FLPMA and the CDCA Plan.[176] For those resources that BLM did assess, BLM determined that the proposed Plan Amendment would significantly diminish sensitive resources. Therefore, the Project is inconsistent with the CDCA and violates FLPMA.

A. BLM May Not Approve the Project Because it Would Significantly Diminish Visual Resources Within the Project Site

FLPMA requires BLM to manage public lands "in a manner that will protect the quality of the . . . values . . ." of those lands, and to integrate visual resource management into the multiple use, sustained yield method of management mandated by the Act.[177] The DEIS finds that, "under the proposed project an area

of roughly 10 square miles, including 5.6 miles of frontage of Highway I-8, would experience a dramatic visual transformation from a predominantly natural desert landscape to one of a highly industrial character."[178] The visual impact of industrial development within the Planning Area is deemed in the DEIS to be significant and unavoidable:

> The proposed project would substantially degrade the existing visual character and quality of the site and its surroundings, including motorists on Interstate 8, recreational destinations within the Yuha Desert Area of Critical Environmental Concern and portions of the Juan Bautista Anza National Historic Trail, resulting in significant impacts. Because effective, feasible mitigation measures could not be identified by staff, these impacts are considered to be unavoidable.[179, 180]

O1-20

The FEIS does not alter this initial finding of unavoidable significant impacts.[181]

In light of this finding, BLM may not approve the Plan Amendment to allow the significant diminishment of visual resources within the Planning Area.[182] Such approval would be inconsistent with the CDCA Plan.

Response: The California Desert Conservation Area Plan (CDCA) is a dynamic land-use plan that was developed to protect resources while allowing for enjoyment of the desert and use by man. The CDCA describes (page 72) that many management activities (such as energy production and utility corridors) involve alteration of the natural character of the landscape to some degree. Any proposed activities will be evaluated and appropriate mitigation measures would be specified to determine the extent of visual impact that the proposed resource management activities would create in a landscape. All project mitigation commitments including those for visual resources are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding visual resources: Sections 3.16 and 4.16 Visual Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.12 Visual Resources.

Comment P4-1: The Project will have impacts on Cultural Resources, flat-tailed horned lizard and Peninsular bighhorn sheep

The following comment discusses impacts of the IVS project, and for BLM and California Energy Commission (CEC) to deny the project.

> I implore BLM and CEC to deny the Imperial Valley Solar project. This project will have unmitigable impacts on the rich cultural resources of the Colorado Desert and the flat-tail horned lizard and the peninsular bighorn sheep. It will cause the flat-tail horn lizard to be listed under the Endangered Species Act. Overriding these considerations will put BLM at odds with its multiple-use mandate to sustainably manage its resources for the benefit of the American people, and will cause the CEC to disregard the protections of CEQA. Alternatives to this project are clearly available, just not in the model that brings the highest profit to the energy companies. I urge you to bring some sanity to this energy debate and deny this destructive and unnecessary project. **P4-1**

Response: As described in Sections 4.5 Cultural Resources, and 4.3 Biological Resources in the Final EIS, mitigation measures were developed to address project impacts to cultural and biological resources. All project mitigation commitments including those for cultural and biological resources are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding cultural and biological resources: Sections 3.5 and 4.5 Cultural Resources, Sections 3.3 and 4.3, Biological Resources and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.9 Cultural Resources, and Section D.4.7, Biological Resources.

Comment P5-1: Comments on the Programmatic Agreement from Greg Smestad

Mr. Smestad is a signatory on the Programmatic Agreement (PA) for the IVS project. He provided his edits and comments which are embedded in the pdf file. The majority of his comments were edits to the formatting of the document, requesting that spaces be added where they had been omitted. He also requested clarification of some of the points in the PA.

Response: The coordination for the PA has been ongoing, and a Final Programmatic Agreement for the IVS project is provided in Appendix 3, Programmatic Agreement in this ROD. No further response is necessary.

Comment P5-1 is 28 pages in length and is provided below.

gregsmestad 8/23/2010 8:52:28 PM
Note

comments by Greg P. Smestad, Ph.D.
8/23/2010

P-5

DRAFT

PROGRAMMATIC AGREEMENT
AMONG THE
BUREAU OF LAND MANAGEMENT-CALIFORNIA,
THE UNITED STATES ARMY CORPS OF ENGINEERS,
THE CALIFORNIA ENERGY COMMISSION,
THE TESSERA SOLAR COMPANY,
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER,
AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION P5-1
REGARDING THE TESSERA SOLAR - IMPERIAL VALLEY SOLAR
PROJECT, IMPERIAL COUNTY, CALIFORNIA

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2

INVITED SIGNATORY PARTIES 26 P5-1

gregsmestad	8/23/2010 9:02:16 PM
Note	
fix thse - separate these - BLM in There are a few others like this indicated below.	

INTRODUCTION

The purpose of this Programmatic Agreement (Agreement) is to provide processes whereby the Bureau of Land Management (BLM), U.S. Army Corps of Engineers (COE), and the California Energy Commission (Energy Commission), in consultation with the California State Historic Preservation Officer (SHPO), Advisory Council on Historic Preservation (ACHP), Indian Tribes and other consulting parties, shall determine the steps the agencies shall follow to take into account effects on historic properties as required by Section 106 of the National Historic Preservation Act and satisfy the requirements of the California Environmental Quality Act.

The BLMin consultation with the consulting parties to this Agreement, will consider and incorporate within the Section 106 consultation process the performance standards (desired future condition), the range of mitigation measures and commitment to mitigate, and monitoring requirements of the Energy Commission's Staff Assessment for the Tessera Solar Imperial Valley Solar Project (Application for Certification 08-AFC-5). The BLM and the Energy Commission will endeavor to make the historic properties treatment and management provisions of this Agreement as consistent as possible with the objectives and terms of the Staff Assessment within the context of the consultation process required by Section 106 of the NHPA.

Government agencies, consulting parties, and the public identified in the scoping and public notification process for the Staff Assessment and Environmental Impact Statement will be advised in the Supplemental Staff Assessment and Final Environmental Impact Statement (FEIS) that historic properties associated with the undertaking would be treated consistent with the mitigation measures or performance standards identified in the Staff Assessment and adopted by the Energy Commission, and consistent with the stipulations of this Agreement. A proposed final draft of this Agreement will be circulated for public comment as an attachment to the FEIS. The Signatories have consulted with the Invited Signatories, Concurring Parties and Tribes on this Agreement, and have taken into consideration the views and comments received regarding the draft Agreement in preparing this final Agreement.

P5-1

PROGRAMMATIC AGREEMENT
AMONG THE
BUREAU OF LAND MANAGEMENT-CALIFORNIA,
THE UNITED STATES ARMY CORPS OF ENGINEERS,
THE CALIFORNIA ENERGY COMMISSION,
THE TESSERA SOLAR COMPANY,
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER,
AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING THE TESSERA SOLAR - IMPERIAL VALLEY SOLAR PROJECT,
IMPERIAL COUNTY, CALIFORNIA

WHEREAS, the Tessera Solar Company (Applicant) has applied for a right of way (ROW) grant on approximately 6,144 acres of public lands managed by the Bureau of Land Management (BLM) and has submitted a Plan of Development (POD) to construct, operate and maintain a solar energy electrical generating plant (hereinafter referred to as the Imperial Valley Solar Project or Project), including construction of approximately 30,000 solar dish power control units (SunCatchers), a 230 kilovolt (kV) transmission lines, a water pipeline, paved arterial roads, unpaved perimeter access and maintenance roads, laydown and staging areas, and support facilities and infrastructure which are more fully described in Appendix D: Project Description and illustrated in Appendix E: Project Maps and Illustrations attached hereto and incorporated by this reference; and

WHEREAS, the BLM has determined that issuing a right-of-way grant (ROW) to the Tessera Solar Company in accordance with the Federal Land Policy and Management Act (FLPMA) (Public Law 940-579; 43 USC 1701) is an undertaking as defined at 36 CFR 800.16(y)(Protection of Historic Properties, August 5, 2004) of the regulations implementing Section 106 of the National Historic Preservation Act (16 USC 470(f))(NHPA); and **P5-1**

WHEREAS, the United States Army Corps of Engineers (COE) may issue a Department of the Army permit pursuant to section 404 of the Clean Water Act for discharges of dredged or fill material into jurisdictional waters of the United States associated with the Imperial Valley Solar Project , which constitutes an undertaking as defined at 36 CFR 800.16(y), and has participated in this consultation and is a Signatory to this Programmatic Agreement (Agreement); and

WHEREAS, the BLM is the lead federal agency for these undertakings for the purpose of complying with Section 106 of the NHPA and its implementing regulations found at 36 CFR Part 800, and the BLM shall be responsible for managing historic properties within the Area of Potential Effects (APE) for the undertaking pursuant to the NHPA; and

WHEREAS, in August 2005, the United States Congress enacted the Energy Policy Act of 2005 (Public Law 109-58). In section 211 of this Act, Congress directed that the Secretary of the Interior (the "Secretary") should, before the end of the 10-year period beginning on the date of

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Note

Suggest framing context also with -WHEREAS...American Recovery and Reinvestment Act of 2009, abbreviated ARRA (Pub.L.111-5)... We all know this is being fast-tracked to meet ARRA deadlines. We might as well admit to future historians that this PL was a factor.

[illegible] power renewable energy projects located [illegible]00 megawatts of electricity; and

[illegible] 2009, the Secretary stated as [illegible] ery of renewable energy is one of the Department of Interior's (DOI) highest priorities and that agencies and bureaus within the DOI will work collaboratively with each other, and with other federal agencies, departments, states, local communities, and private landowners to encourage the timely and responsible development of renewable energy and associated transmission while protecting and enhancing the Nation's water, wildlife, and other natural resources; and

WHEREAS, BLM and the COE have consulted with the California State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP), pursuant to 36 CFR 800.14(b)(3) and following the procedures outlined at 36 CFR 800.6, and is in the process of considering alternatives for the Project that have the potential to adversely affect historic properties and may reach a decision regarding approval of the undertakings before the effects of the undertaking's implementation on historic properties have been fully determined, the BLM chooses to continue its assessment of the undertaking's potential adverse effect and resolve any such effect through the implementation of this Agreement; and

WHEREAS, the BLM and COE, in consultation with the SHPO and the ACHP and pursuant to 36 CFR 800.4(b)(2) where alternatives under consideration consist of large land areas, has determined that a phased (tiered) process for compliance with Section 106 of the NHPAmay be appropriate for the undertakings; and

WHEREAS, the Juan Bautista de Anza National Historic Trail corridor is located within the APE for the undertakings and the National Park Service (NPS) has agreed to participate in the Section 106 consultation regarding the undertakings under the terms of this Agreement and is a Concurring Party to this Agreement; and

WHEREAS, the California Energy Commission (Energy Commission) may certify the Imperial Valley Solar Project located on both public and private lands pursuant to Section 25519, subsection (c) of the Warren-Alquist Act of 1974 and for the purposes of consistency proposes to manage all historical resources in accordance with the stipulations of this Agreement, and has participated in this consultation and is an Invited Signatory to this Agreement; and

WHEREAS, the BLM, in coordination with the Energy Commission, has authorized the Applicant to conduct specific identification efforts for this undertaking including a review of the existing literature and records, cultural resources surveys, ethnographic studies, and geo-morphological studies to identify historic properties that might be located within the Area of Potential Effect (APE); and

WHEREAS, the Applicant has retained an archaeological consultant to complete all of the investigations necessary to identify and evaluate cultural resources located within the Area of

P5-1

Potential Effect (APE) for both direct and indirect effects. A review of the existing historic, archaeological and ethnographic literature and records has been completed to ascertain the presence of known and recorded cultural resources in the APE and buffered study area, has conducted an intensive field survey for 7,700 acres of land, including all of the lands identified in APE for direct effects for all project alternatives, and has completed intensive field surveys for alternatives on lands that are no longer part of the project. A cultural resources inventory report (*Draft Final Class III Cultural Resources Technical Report for the Imperial Valley Solar Project, Application for Certification (08-AFC-5), Imperial Valley Solar, LLC*, prepared by URS Corporation, June 2010) has been submitted that presents the results of identification efforts to the BLM, the COE, and the Energy Commission. The BLM has provided the report to the consulting parties and Indian Tribes for review and comment; and

WHEREAS, the BLM and the Energy Commission have prepared the *Staff Assessment and Draft Environmental Impact Statement and Draft California Desert Conservation Area Plan Amendment, SES Solar Two Project, Application for Certification (08-AFC-5) Imperial County (2010)* to identify the project alternatives for purposes of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), and have comparatively examined the relative effects of the alternatives on known historic properties; and

P5-1

WHEREAS, the Applicant has participated in this consultation per 36 CFR 800.2(c)(4), will be the entity to whom the BLM grants a ROW and the COE issues a permit related to Project activities, with the responsibility for carrying out the specific terms of this Agreement under the oversight of the BLM, and therefore is an Invited Signatory to this Agreement; and

WHEREAS, pursuant to section 101(d)(6)(B) of the NHPA, 36 CFR 800.2(c)(2)(ii), the American Indian Religious Freedom Act (AIRFA), Executive Order 13175, and section 3(c) of the Native American Graves Protection and Repatriation Act (NAGPRA), the BLM is responsible for government-to-government consultation with federally recognized Indian Tribes and is the lead federal agency for all Native American consultation and coordination; and

WHEREAS, the BLM has formally notified and invited the Campo Kumeyaay Nation, the Cocopah Indian Tribe, the Quechan Indian Tribe, the Ewiiaapaayp Band of Kumeyaay Indians, the Jamul Indian Village, the Kwaaymii Laguna Band of Indians, the La Posta Band of Kumeyaay Indians, the Manzanita Band of Kumeyaay Indians, the San Pasqual Band of Diegueno Indians, and the Santa Ysabel Band of Diegueno Indians (Tribes), and the Ah-Mut Pipa Foundation to consult on this undertaking and participate in this Agreement as a Concurring Party. BLM has documented its efforts to consult with the Tribes and Tribal Organizations and a summary is provided in Appendix I to this Agreement; and

WHEREAS, the BLM shall continue to consult with the Tribes and Tribal Organizations throughout the implementation of this Agreement regarding the adverse effects to historic properties to which they attach religious and cultural significance. BLM will carry out its responsibilities to consult with Tribes that request such consultation with the further

understanding that, notwithstanding any decision by these Tribes to decline concurrence, BLM shall continue to consult with these Tribes throughout the implementation of this Agreement; and .

WHEREAS, through consultation, Tribes and Tribal Organizations have expressed their views and concerns about the importance and sensitivity of specific cultural resources that hold religious and cultural significance. Tribes have expressed theconnection of these resources to the broader cultural landscape within and near the project area; and

WHEREAS, the National Trust for Historic Preservation, the Anza Society, the California Unions for Reliable Energy, and the Sacred Sites International Foundation, as organizations, and Edie Harmon and Greg P. Smestad, Ph.D., as individuals, have been invited to consult on this undertaking and this Agreement, have been afforded consulting party status pursuant to 36 CFR 800.4, and have been invited to be Concurring Parties to this Agreement;

NOW, THEREFORE, the BLM, the COE, the SHPO, and the ACHP (hereinafter "Signatories) and the Energy Commission and the Applicant (hereinafter "Invited Signatories"), agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties. **P5-1**

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Note
Is I. a) mentioning of signature consistent with g) and l) definitions? Will concurring parties sign and will that not make them signatories in a legal sense? Perhaps "through their signature" should be dropped.

A question about concurring parties. If the Applicant, BLM or CEC is sued regarding this IVS project, can the concurring parties also be named in the suit? Separate from this document, please describe any precedent cases, prior cases or indemnifications.

STIPULATIONS

The Signatories and Invited Signatories shall ensure that the following measures are implemented:

I. DEFINITIONS

The definitions found at 36 CFR 800.16 and in this section apply throughout this Agreement except where another definition is offered in this Agreement.

a) ***Concurring Parties.*** Collectively refers to consulting parties with a demonstrated interest in the Undertaking, who concur, through their signature, in this Agreement. Concurring Parties may propose amendments to this Agreement. Amendments proposed by Concurring Parties may be considered at the discretion of the Signatories.
b) ***Cultural Resource.*** A cultural resource is an object or definite location of human activity, occupation, or use identifiable through field inventory, historical documentation, or oral evidence. Cultural resources are prehistoric, historic, archaeological, or architectural sites, structures, buildings, places, or objects and definite locations of traditional cultural or religious importance to specified social and/or culture groups. Cultural resources include the entire spectrum of resources, from artifacts to cultural landscapes, without regard to eligibility for inclusion on the National Register of Historic Places (NRHP) or California Register of Historical Resources (CRHR).
c) ***Consulting Parties.*** Collectively refers to the Signatory, Invited Signatory and Concurring Parties to this Agreement.

d) ***Day.*** Singular or plural, refers to a calendar, rather than a business, day.

e) ***Historic Properties.*** Historic Properties are included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior and per the NRHP eligibility criteria at 36 CFR § 60.4 and my include any prehistoric or historic district, site, building, structure, traditional cultural property or objectCFR. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria. The term eligible for inclusion in the NRHP includes both properties formally determined as such in accordance with regulations of the Secretary of the Interior and all other properties that meet the NRHP criteria.

f) ***Historic Resources.*** Historic resources meet the criteria for listing on the CRHR as provided at California Code of Regulations Title 14, Chapter 11.5, Section 4850 and may include, but is not limited to, any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.

g) ***Invited Signatories.*** Invited Signatories to this Agreement are the Energy Commission and Applicant. Invited Signatories have specific responsibilities as defined in this Agreement and have the same rights as the Signatory Parties to propose amendments and termination of this Agreement, but their signatures are not required for execution of the Agreement. P5-1

h) ***Lands Administered by the U.S. Department of Interior, Bureau of Land Management*** (BLM) means any federal lands under the administrative authority of the BLM.

i) ***Lands Regulated by the U.S. Army Corps of Engineers*** (COE) means any lands subject to regulation by the COE pursuant to section 404 of the Clean Water Act (33 U.S.C. section 1344) or other law, and for which the COE has issued a Department of the Army permit.

j) ***Literature Review.*** A literature review is one component of a BLM class 1 inventory, as defined in BLM Manual Guidance 8100. 21(A)(1), and is a professionally prepared study that includes a compilation and analysis of all reasonably available cultural resource data and literature, and a management-focused, interpretive, narrative overview, and synthesis of the data. The overview may also define regional research questions and treatment options.

k) ***Records Search.*** A records search is one component of a BLM class I inventory and an important element of a literature review. A records search involves obtaining existing cultural resource data from published and unpublished documents, BLM cultural resource inventory records, institutional site files, State and national registers, interviews, and other information sources.

l) ***Signatories.*** Signatories to this Agreement are the BLM, COE, SHPO, and ACHP. Signatories have the sole authority to execute, amend or terminate this Agreement.

m) ***Traditional Cultural Property.*** A traditional cultural property is defined generally as property that is important to a living group or community because of its association with cultural practices or beliefs that (a) are rooted in that community's history, and (b) are

important in maintaining the continuing cultural identity of the community. It is a place that may figure in important community traditions or in culturally important activities, such as traditional gathering areas, prayer sites, or sacred/ceremonial locations. These sites may or may not contain features, artifacts, or physical evidence, and are usually identified through consultation. A traditional cultural property may be eligible for inclusion in the NRHP and the CRHR.

n) ***Tribes.*** The federally recognized and non-federally recognized Indian Tribes that BLM is consulting with on this undertaking

o) ***Undertaking.*** Issuing any ROW/permit(s) individually or collectively by the BLM or COE allowing or facilitating construction, operation or maintenance activities related to the Project on BLM administered or COE regulated lands constitutes an undertaking as defined at 36 CFR 800.16(y) and are the undertakings addressed by this Agreement.

p) ***Windshield Survey.*** A windshield survey is a common method utilized in reconnaissance surveys to identify built-environment cultural resources, such as buildings, objects, and structures. Windshield surveys involve surveyors driving or walking streets and roads of a community and observing and recording the buildings, structures, and landscape characteristics they see.

II. AREA OF POTENTIAL EFFECTS

a) The APE is defined as the total geographic area or areas within which the undertaking may directly or indirectly cause alterations in the character or use of historic properties per 36 CFR 800.16(d). The APE is influenced by the scale and nature of an undertaking and includes those areas which could be affected by a project prior to, during and after construction. For the Imperial Valley Solar Project the overall APE has been defined to include a 15 mile radius around the project location. Specific APE's for the project are discussed below and include the methodology used to identify historic properties. See Appendix E for APE map and project illustrations. **P5-1**

i) Where Historic Properties could sustain direct physical effects as a result of the undertaking the APE is defined to include:

(1) All areas subject to the BLM's ROW decision for the Phase I 300 megawatt (MW) and the Phase II 450 MW portions of the Project area, which includes approximately 6,140 acres of public lands and 360 acres of private lands. The area is generally bounded by Interstate 8 on the south, Dunaway Road to the east, and the Evan Hewes Highway to the north and west. A 200 foot buffer around the APE was included in the survey for cultural resources within the APE per Energy Commission requirements.

(2) The APE for linear elements of the undertaking includes:

(a) A ROW for an approximate 10 foot wide and 11.8 mile long water supply pipeline that would extend from the Seeley Waste Water Treatment Plant. The

pipeline will be buried 30 inches below grade in the shoulder of the existing ROW of the Evan Hewes Highway. A survey corridor for cultural resources for this linear element was established as a 75-foot buffer on either side of the center line (150 foot corridor) to allow for changes in the ROW to avoid cultural resources.

(b) A ROW for temporary or permanent access roads required outside the plant footprint is approximately 30 feet. A survey corridor for cultural resources for this linear element was established as a 50-foot buffer on either side of the center line (100 foot corridor) to allow for changes in the ROW to avoid cultural resources.

(c) The ROW for the 230 kV transmission line is defined as an approximately 100 foot wide and 10.3 mile long corridor that extends to the San Diego Gas and Electric Company Imperial Valley Substation. A survey corridor for cultural resources for this linear element was established as a 150-foot buffer on either side of the center line (300 foot corridor) to allow for changes in the ROW to avoid cultural resources. P5-1

ii) Historic properties not located within the areas described in Stipulation II(a)(i) within 15 miles of the Project that could sustain direct or indirect effects, including visual, auditory, and atmospheric, as a result of the undertaking and is defined to include:

(1) Cultural resources identified through a review of existing literature and records search, information or records on file with the BLM or at the SIC, interviews or discussions with local professional or historical societies and local experts in history or archaeology. Specific areas of concern or cultural resources that were identified include:

(a) Cultural resources in the Yuha Area of Critical Environmental Concern (ACEC).

(2) Any cultural resource or location which has been included in the Native American Heritage Commission Sacred Lands Files, identified through a literature review or records search, or identified by a Tribe or Tribal organization, through consultation as having religious or cultural significance. Specific areas of concern or cultural resources that have been identified through tribal consultation include:

(a) Certain geological features including Signal Mountain and Coyote Mountain.
(b) Human remains located within or in proximity to the undertaking including those in any state of decomposition or skeletal completeness.
(c) Geoglyphs within the 15 mile radius of the project location such as those in the Yuha ACEC.

(3) Any cultural resource or location which has been identified by a consulting party, organization, governmental entity, or individual through consultation or the public

commenting processes as having significance or being a resource of concern. Areas identified through consultation to date include:

(a) Juan Bautista de Anza National Historic Trail (Anza NHT).

(i) The Anza NHT corridor is designated pursuant to the National Trails Act. The corridor has historic values, as well as recreation and visitor experience values.

(ii) No identifiable and recognizable physical evidence or historic properties associated with the historic trail have yet been identified within the APE for direct effects. Specific areas of concern or cultural resources associated with the NHT have been identified both south and north of the Project location and include:

1. Anza Camp 47 (Yuha Well)
2. Anza Camp 48
3. Anza Camp 49 (San Sebastian Marsh)

Sites associated with the 1781 Rivera Expedition which utilized the Anza trail corridor

P5-1

(iii)No identifiable and recognizable physical evidence or historic properties associated with the Rivera y Moncada Expedition of 1781 have yet been identified to occur within the APE for direct effects.

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Note
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(4) Built-environment resources

(a) The APE for the built-environment is defined to include a half-mile buffer from the project site and above-ground linear facilities to encompass historic properties whose historic setting could be adversely affected. Specific areas of concern or cultural resources have been identified both south and north of the Project location and include:

(i) Imperial Irrigation District hydraulic irrigation system components
(ii) Highway 80 (Evan Hewes Highway) and remnants
(iii)San Diego and Arizona Railroad
(iv)U.S. Gypsum Rail-Line
(v) Plaster City Gypsum Plant

(5) Cultural resources on private property identified through surveys, where access was granted, and windshield surveys, where access was not allowed, within a half mile of the APE for direct effects.

(6) Cultural resources identified through a literature review and records search at the BLM El Centro Field Office and at the SIC, for cultural resources that are located

12

within a one mile buffer of the project area and ¼-mile from each linearProject feature.

(a) Historic Districts and Landscapes

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(i) Yuha Basin Archaeological District

(7) Cultural resources identified through archaeological or other field investigations for this undertaking that, as a result of project redesign to avoid direct effects to cultural resources, are no longer within the Project area but could still sustain indirect effects.

(a) Project redesign eliminated approximately 1200 acres of public lands on the eastern perimeter of the proposed project to avoid effects to potentially significant prehistoric archaeological sites and burial sites, reducing the generating capacity of the proposed solar project from 900 MW to 750 MW.

b) Amending the APE: The APE encompasses an area sufficient to accommodate all of the proposed and alternative project components under consideration as of the date of the execution of this Agreement. If BLM determines in the future that unforeseen changes to the undertaking may cause alterations in the character or use of historic properties, if any such properties exist, in a geographic area or areas beyond the extent of the APE above, then the BLM, in consultation with the Signatories and Invited Signatories, shall modify the APE using the following process: **P5-1**

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i) Any consulting party to this Agreement may propose that the APE established herein be modified. The BLM shall notify the other Signatories and Invited Signatories of the proposal and consult for no more than 15 days to reach agreement on the proposal.

ii) If the Signatories agree to the proposal, then the BLM will prepare a description and a map of the modification to which the Signatories agree. The BLM will keep copies of the description and the map on file for its administrative record and distribute copies of each to the other Signatories, Invited Signatories and Concurring Parties within 30 days of the day upon which agreement was reached.

iii) Upon agreement to a modification to the APE that adds a new geographic area, the BLM shall follow the processes set forth in Stipulation III to identify and evaluate historic properties in the new APE, assess the effects of the undertaking on any historic properties in the APE, and provide for the resolution of any adverse effects to such properties, known or subsequently discovered.

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iv) If the Signatories cannot agree to a proposal for the modification of the APE, then they will resolve the dispute in accordance with Stipulation XI.

III. IDENTIFICATION AND EVALUATION

a) The BLM, in coordination with the Energy Commission, has authorized the Applicant to conduct specific identification efforts for this undertaking including, but not limited to, a literature review, records search, cultural resources surveys, ethnographic studies, and geo-morphological studies to identify historic properties that might be located within the APE.

i) A cultural resources report (URS June 2010) has been submitted by the Applicant that presents the results of identification efforts to the BLM, the COE, and the Energy Commission and is currently under review. The BLM, the COE, and the Energy Commission will assess whether the report conforms with the field methodology and site description template required under BLM Fieldwork Authorization CA-670-06-07FA09 and Fieldwork Authorization CA-670-06-07FA10 and Energy Commission transaction number Data Requests Set 2, Part 2 #142, Docket number 08-AFC-5. **P5-1**

i) The BLM, in consultation with the Energy Commission and COE, may require additional field investigations to be conducted by the Applicant to ensure the accuracy of site recordation and to provide additional information to support site evaluations and the assessment of effects. The BLM, the COE, and the Energy Commission, separately or together, have the right and the discretion, under this Agreement, to request additional field studies.

ii) The BLM has consulted and shall respond to any request to consult with Tribes, Tribal organizations or tribal individuals regarding the identification of historic properties within the APE to which they attach religious or cultural significance.

b) The BLM shall make determinations of eligibility consistent with 800.4(b)(2) and findings of effect consistent with 800.5(a)(1) prior to the Record of Decision to the extent practicable on those cultural resources within the APE, and make the agency's determinations and findings available to the consulting parties, Tribes and the public for a 45 day review and comment period.

i) The BLM will respond to any request for consultation on its determinations from a consulting party to this Agreement or a Tribe.

ii) A consulting party may provide its comments directly to the SHPO with a copy to the BLM within the 45 day comment period.

iii) Absent comment within 45 days, the BLM may submit its determinations to SHPO for final review and comment.

iv) Where a consulting party or Tribe objects to the BLM's determination for a specific cultural resource within the 45 day review period, the BLM shall consult with the objecting party and the SHPO regarding the nature of the objection and reconsider its determinations.

(1) If the objection is not resolved, the BLM shall further consult with the SHPO and follow the processes provided at 36 CFR 800.4(c)(2) for involvement of the ACHP.
(2) The BLM may proceed with determinations for all cultural resources not subject to objection.

v) The BLM and the Energy Commission shall coordinate to the extent feasible and practicable on determinations of eligibility for the NRHP and the CRHR.

(1) Historic properties formally determined eligible for inclusion in the NRHP are listed on the CRHR per California Code of Regulations 4851(a)(1).
(2) If BLM and the Energy Commission do not agree on the eligibility of historic properties for the NRHP and CRHR respectively, the BLM and the Energy Commission shall consult with the SHPO for 15 days to resolve disagreements with regard to eligibility. **P5-1**

(a) The SHPO shall have the final authority to resolve disagreements regarding eligibility for the CRHR.
(i) If the SHPO determines that the cultural resource is eligible for the CRHR, the SHPO shall notify the Energy Commission and BLM and may request that BLM reconsider its determination.

vi) BLM will submit its determinations of eligibility to the SHPO for final review and comment.

(1) SHPO will have 30 days in which to review and comment.
(2) Absent comments within this time frame, BLM may assume, and formally document for the record, that the SHPO has elected not to comment and concurs with BLM's determinations.
(3) If the BLM and SHPO disagree on the determination, BLM shall follow the processes provided at 36 CFR 800.4(c)(2) and seek a determination from the Keeper of the National Register.

c) The BLM may defer the formal and final evaluation of cultural resources whose values are limited to the potential to yield information about history or prehistory and where testing or limited excavation is recommended to determine whether the site would be

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eligible under Criterion [illegible] ultural resources as historic pro[illegible] effects to those specific resourc[illegible]

i) If adverse effects to a cultural resource which is being treated as a historic property cannot be avoided, the BLM must either evaluate the resource and make a determination of eligibility or resolve the adverse effect by implementing the prescriptions of the Historic Properties Treatment Plan (HPTP).

ii) The Applicant shall submit to the BLM an analysis of the cultural resources that the Undertaking appears likely to affect. The analysis shall also detail which cultural resources that the undertaking appears to have no potential to affect, which cultural resources the Applicant commits to avoiding through the implementation of formal avoidance measures, and which cultural resources cannot be avoided and will need to be evaluated and/or be treated by implementing the prescriptions of the HPTP required in Section IV of the Agreement. This analysis will be included in table format in Appendix H.

iii) The Applicant, at the direction of the BLM, the COE, and the Energy Commission, may prepare the analysis required above in phases that correspond to the proposed sequence of development for the Phase 1 330 MW and Phase 2 450 MW energy plant, or in phases for each block of 60 SunCatchers, provided that analyses are ultimately prepared for the entirety of the APE. **P5-1**

iv) Where additional evaluation efforts are required to assess the informational values of cultural resources, the BLM and the Energy Commission shall ensure that cultural resources located within the APE are evaluated for the NRHP and the CRHR pursuant to the guidelines provided in Appendix A of this Agreement.

d) Where additional identification and evaluation efforts are required due to changes in the project and the APE, the BLM and the Energy Commission shall ensure that cultural resources located within the APE are identified and evaluated for the NRHP and the CRHR pursuant to Appendix A of this Agreement.

e) Amendment of the identification and evaluation process as set forth herein will not require amendment of this Agreement if all Signatories do so agree.

IV. TREATMENT AND MANAGEMENT OF HISTORIC PROPERTIES

a) The resolution or mitigation of effects to historic properties shall be described in one or more HPTP(s) that shall be an attachment to Appendix B of this Agreement.

i) The BLM and the Applicant, in consultation with the consulting parties and Tribes, shall seek to develop a draft HPTP prior to the ROD if feasible, or to otherwise

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develop a framework and consensus on the general treatment measures for affected historic properties that would be finalized in the HPTP.

(1) Prior to the issuance of any Notice to Proceed by BLM to initiate the undertaking or any component of the undertaking,which may affect historic propertiesthe Applicant shall develop and submit to BLM one or more HPTPs.
(2) The HPTP will be initiated after the ROW is granted by the BLM and issuance of any CWA section 404 permit by the COE but prior to the issuance of a Notice to Proceed for construction in those portions of the undertaking addressed by the HPTP.
(3) The BLM may authorize the phased implementation of the HPTP (per Stipulation IX), or if appropriate, the development of HPTPs for individual cultural resources, or HPTPs that are issue oriented or geographically.

ii) The BLM and the Energy Commission, to extent possible and consistent with the guidelines provided in Appendix B(2), shall coordinate on the development of the treatment or mitigation measures proposed in the Energy Commission's Conditions of Certifications and the treatment measures developed through the Section 106 consultation process.

b) The BLM shall submit the HPTP to the consulting parties and Tribes for a 30 day review period. Absent comments within this time frame, BLM may finalize the HPTP. BLM will provide the parties with written documentation indicating whether and how the draft HPTP will be modified in response to any timely comments received. If the HPTP is revised in response to comments, BLM shall submit the revised HPTP to all parties for a 15 day review period. Absent comments within this time frame, BLM will finalize the HPTP. BLM will provide the consulting parties and Tribes with a copy of the final HPTP. **P5-1**

c) Where an HPTP specifically addresses treatment for adverse effects to historic properties to which Tribes attach religious or cultural significance, the BLM shall submit the HPTP to the Tribes and seek their views and comments through consultation, regardless of the status of a Tribe as a consulting party to this Agreement.

i) BLM shall submit an HPTP which addresses treatment for adverse effects to historic properties to which a Tribe(s) attaches religious and cultural significance to the SHPO. BLM shall consult with involved Tribe(s) on distribution of the HPTP to other consulting parties.

d) BLM shall ensure that any HPTP, developed in accordance with Appendix B of this Agreement, is completed and implemented.

e) BLM shall ensure that a Historic Property Management Plan (HPMP), which provides for the protection and management of historic properties during the operational life and

decommissioning of the solar energy power plant, is developed and implemented in accordance with Appendix C of this Agreement.

f) Amendment of an HPTP or HPMP as set forth herein will not require amendment of this Agreement if all Signatories do so agree. If the Signatories do not agree to the amendment of the HPTP or HPMP, the disagreement will be resolved pursuant to the procedures in Section XI of this Agreement.

V. DISCOVERIES AND UNANTICIPATED EFFECTS

a) If the BLM determines during implementation of the HPTP that either the HPTP or the undertaking will affect a previously unidentified property that may be eligible for the NRHP, or affect a known historic property in an unanticipated manner, the BLM will address the discovery or unanticipated effect in accordance with those provisions of the HPTP that relate to the treatment of discoveries and unanticipated effects. BLM at its discretion may herein assume any discovered property to be eligible for inclusion in the NRHP. BLM compliance with this stipulation shall satisfy the requirements of 36 CFR 800.13(a)(1). P5-1

VI. TREATMENT OF HUMAN REMAINS OF NATIVE AMERICAN ORIGIN

a) The Signatories and Invited Signatories to this Agreement agree that Native American burials and related items discovered on BLM administered lands during implementation of the terms of the Agreement will be treated in accordance with the requirements of the NAGPRA. The BLM will consult with concerned Indian Tribes, Tribal Organizations, or individuals in accordance with the requirements of §§ 3(c) and 3(d) of the NAGPRA and implementing regulations found at 43 CFR Part 10 to address the treatment of Native American burials and related cultural items that may be discovered during implementation of this Agreement.

b) In consultation with the Tribes, the BLM shall seek to develop a written plan of action pursuant to 43 CFR 10.5(e) to manage the inadvertent discovery or intentional excavation of human remains, funerary objects, sacred objects, or objects of cultural patrimony. The plan of action shall be included in Appendix L of this Agreement.

c) The BLM shall ensure that Native American burials and related cultural items on private lands are treated in accordance with the requirements of §§ 5097.98 and 5097.991 of the California Public Resources Code, and § 7050.5(c) of the California Health and Human Safety Code.

VII. STANDARDS AND QUALIFICATIONS

a) PROFESSIONAL QUALIFICATIONS. All actions prescribed by this Agreement that involve the identification, evaluation, analysis, recordation, treatment, monitoring, and disposition of historic properties and that involve the reporting and documentation of

such actions in the form of reports, forms or other records, shall be carried out by or under the direct supervision of a person or persons meeting, at a minimum, the Secretary of the Interior's Professional Qualifications Standards (PQS), as appropriate (48 FR. 44739 dated September 29, 1983). However, nothing in this stipulation may be interpreted to preclude any party qualified under the terms of this paragraph from using the services of properly supervised persons who do not meet the PQS. Qualified Tribal Monitors shall be appointed by the Tribes. Qualified Tribal Monitors shall be an authorized representative of a Tribe with the training the Tribe deems necessary and physically capable of doing the required work.

b) DOCUMENTATION STANDARDS. Reporting on and documenting the actions cited in this Agreement shall conform to every reasonable extent with the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR. 44716-44740 dated September 29, 1983), as well as, the BLM 8100 Manual, the California Office of Historic Preservation's Preservation Planning Bulletin Number 4(a) December 1989, Archaeological Resource Management Reports (ARMR): Recommended Contents and Format (ARMR Guidelines) for the Preparation and Review of Archaeological Reports, and any specific county or local requirements or report formats as necessary.

c) CURATION STANDARDS. On BLM-administered land, all records and materials resulting from the actions cited in Stipulation III, IV, V and VI of this Agreement shall be curated in accordance with 36 CFR Part 79, and the provisions of the NAGPRA, 43 CFR Part 10, as applicable. To the extent permitted under §§ 5097.98 and 5097.991 of the California Public Resources Code, the materials and records resulting from the actions cited in Stipulation III and IV of this Agreement for private lands shall be curated in accordance with 36 CFR Part 79. The BLM will seek to have the materials donated through a written donation agreement to be curated with other cultural materials. The BLM will attempt to have all collections curated at one local facility where possible unless otherwise agreed to by the consulting parties. P5-1

VIII. REPORTING REQUIREMENTS

a) Within twelve (12) months after the BLM, in consultation with the Energy Commission, has determined that all fieldwork required by Stipulations III and IV have been completed, the BLM will ensure preparation and concurrent distribution to the consulting parties and Tribes a written draft report that documents the results of implementing the requirements of each Stipulation. The consulting parties and Tribes will be afforded 45 days following receipt of each draft report to submit any written comments to the BLM. Failure of these parties to respond within this time frame shall not preclude the BLM from authorizing revisions to the draft report as the BLM may deem appropriate. The BLM will provide the consulting parties with written documentation indicating whether and how each draft report will be modified in accordance with any reviewing party comments. Unless the reviewing parties object to this documentation in

writing to the BLM within 14 days following receipt, the BLM may modify each draft report as the BLM may deem appropriate. All objections shall be resolved pursuant to Stipulation XI. Thereafter, the BLM may issue the reports in final form and distribute these documents in accordance with Stipulation VIII(b).

b) Unless otherwise requested, one paper copy of final reports documenting the results of implementing the requirements of Stipulation III or IV, will be distributed by the BLM to each consulting party, Tribes and to the California Historical Resources Information Survey (CHRIS) Regional Information Center.

c) The BLM shall ensure that any draft document that communicates, in lay terms, the results of implementing the requirements of Stipulation III or IV, to members of the interested public, is distributed for review and comment concurrently with and in the same manner as that prescribed for the draft technical report prescribed by Stipulation VIII(a). If the draft document prescribed herein is a publication such as a report or brochure, publication shall upon completion be distributed by the BLM to the consulting parties, and to any other entity that the consulting parties may deem appropriate. P5-1

IX. IMPLEMENTATION OF THE UNDERTAKING

a) The BLM may authorize construction activities and manage the implementation of HPTP(s) in phases corresponding to the construction phases of the undertaking.

i) Upon approval of the HPTP and implementation of the components of the HPTP subject to determinations of compliance by the BLM for the Phase I 300 MW component, BLM may authorize a Notice to Proceed for construction activities.

(1) An HPTP(s) for the Phase II 450 MW component may be developed and implemented after approval of the HPTP and issuance of the Notice to Proceed above for the Phase 1 component.

b) The BLM may authorize construction activities, including but not limited to those listed below, to proceed in specific geographic areas of the undertaking's APE where there are no historic properties, where there will be no effect to historic properties, where a monitoring and discovery plan has been approved, an HPTP has been approved and initiated, and the activity would not preclude preservation or protection of historic properties in an area for which an HPTP has not been approved. Such construction activities may include:

(1) demarcation, set up, and use of staging areas for the project's construction,
(2) conduct of geotechnical boring investigations or other geophysical and engineering activities, and
(3) construction activities such as grading, constructing buildings, and installating SunCatchers.

c) Initiation of any construction activities on federal lands shall not occur until after the ROD and Notices to Proceed have been issued by the BLM Construction shall not occur in waters of the US without the issuance of a COE 404 permit..

X. AMENDMENTS TO THE AGREEMENT

a) This Agreement may be amended only upon written agreement of the Signatories.

b) Any consulting party to this Agreement may at any time propose amendments.

i) Upon receipt of a request to amend this Agreement, the BLM will immediately notify the other consulting parties and initiate a 30 day period to consult on the proposed amendment, whereupon all parties shall consult to consider such amendments.

ii) If agreement to the amendment cannot be reached within the 30 day period, resolution of the issue may proceed by following the dispute resolution process in Stipulation XI.

iii) This Agreement may be amended when such an amendment is agreed to in writing by all Signatories.

c) Any consulting party to this Agreement may at any time propose modifications to the Appendices.

i) Each Appendix to the Agreement may be individually modified without requiring amendment of the Agreement, unless the Signatories through such consultation decide otherwise.

ii) Upon receipt of a request to modify an Appendix, BLM will immediately notify the Signatories, Invited Signatories and Concurring Parties to consult on the proposed modifications and initiate a 30 day consultation period, whereupon all parties shall consult to consider such modification.

iii) If agreement on the modification cannot be reached within the 30 day period, resolution of the issue may proceed by following the dispute resolution process in Stipulation XI(c).

iv) Modifications to an Appendix shall take effect on the date that they are agreed to by the Signatories.

d) Amendments to this Agreement shall take effect on the dates that they are fully executed by the Signatories.

P5-1

e) If the Agreement is not amended through the above process, any consulting party to this Agreement may terminate its participation in the Agreement in accordance with Stipulation XII.

XI. DISPUTE RESOLUTION

a) Should the Signatories or Invited Signatories object at any time to the manner in which the terms of this Agreement are implemented, the BLM will immediately notify the other Signatories and Invited Signatories and initiate a 30 day period in which to resolve the objection.

b) If the objection can be resolved within the consultation period, the BLM may authorize the disputed action to proceed in accordance with the terms of such resolution.

c) If at the end of the 30 day consultation period, the objection cannot be resolved through such consultation, the BLM will forward all documentation relevant to the objection to the ACHP per 36 CFR 800.2(b)(2). Any comments provided by the ACHP within 30 days after its receipt of all relevant documentation will be taken into account by the BLM in reaching a final decision regarding the objection. The BLM will notify the other Signatories, Invited Signatories, and Concurring Parties in writing of its final decision within 14 days after it is rendered. **P5-1**

d) The BLM's responsibility to carry out all other actions under this Agreement that are not the subject of the objection will remain unchanged.

e) At any time during implementation of the terms of this Agreement, should an objection pertaining to the Agreement be raised by a Concurring party or a member of the interested public, the BLM shall immediately notify the Signatories, Invited Signatories, and other Concurring Parties, consult with SHPO about the objection, and take the objection into account. The other consulting parties may comment on the objection to the BLM. The BLM shall consult with the objecting party(ies) for no more than 30 days. Within 14 days following closure of consultation, the BLM will render a decision regarding the objection and notify all parties of its decision in writing. In reaching its final decision, the BLM will take into account all comments from the parties regarding the objection. The BLM shall have the authority to make the final decision resolving the objection. Any dispute pertaining to the NRHP eligibility of historic properties or cultural resources covered by this Agreement will be addressed by the BLM per 36 CFR 800.4(c)(2).

XII. TERMINATION

a) The Signatories and Invited Signatory have the authority to terminate this Agreement. If this Agreement is not amended as provided for in Stipulation X, or if a Signatory or Invited Signatory proposes termination of this Agreement for other reasons, the party

proposing termination shall notify the other Signatories and Invited Signatories in writing, explain the reasons for proposing termination, and consult for no more than 60 days to resolve the objection.

b) If a Concurring Party seeks termination of this Agreement, they may terminate their participation and shall notify the Signatories and Invited Signatories in writing, explain the reasons for proposing termination or terminating their participation, and consult for no more than 60 days to resolve the objection.

c) Should consultation result in an agreement to resolve the objection, the Signatories shall proceed in accordance with that agreement.

d) Should such consultations fail, the Signatory or Invited Signatory proposing termination may terminate this Agreement by notifying the other parties in writing.

e) Should the entire Agreement be terminated, then the BLM and the COE, separately if necessary, shall either consult in accordance with 36 CFR 800.14(b) to develop a new agreement or request the comments of the ACHP pursuant to 36 CFR 800.7(a).

XIII. WITHDRAWAL OR ADDITION OF PARTIES FROM/TO THE AGREEMENT

a) The BLM will respond to any written request for consulting party status pursuant to 36 CFR 800.2 and 800.3(f).

i) Should a Concurring Party determine that its participation in the undertaking and this Agreement is no longer warranted, the party may withdraw from participation by informing the BLM of its intention to withdraw as soon as is practicable. The BLM shall inform the other consulting parties to this Agreement of the withdrawal. P5-1

ii) Should conditions of the undertaking change such that other state, federal, or tribal entities not already party to this Agreement request to participate, the BLM will notify the other consulting parties and invite the requesting party to participate in the Agreement. The Agreement shall be amended following the procedures in Stipulation X.

XIV. DURATION OF THIS AGREEMENT

a) This Agreement will expire if the undertaking has not been initiated and the BLM right-of-way grant expires or is withdrawn, or the stipulations of this Agreement have not been initiated within five (5) years from the date of its execution. At such time, and prior to work continuing under the auspices of the undertaking, the BLM and the COE shall either (a) execute a memorandum of agreement pursuant to 36 CFR 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 C.F.R. 800.7.

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Prior toAt such time, the BLM and the C[illegible] may consult with the other consulting parties to reconsider the terms of the Agreemen[illegible] and amend it in accordance with Stipulation X. The BLM and the COE shall notify the S[illegible] in the event of actions they will pursue within 30 days.

b) This Agreement expires 25 years from its effective date unless extended by written agreement of the Signatories. The Signatories and Invited Signatories shall consult at year 10 to review this Agreement. Additionally, the Signatories and Invited Signatories shall consult not less than one year prior to the expiration date to reconsider the terms of this Agreement and, if acceptable, have the Signatories extend the term of this Agreement. Reconsideration may include continuation of the Agreement as originally executed or amended, or te[illegible] extensions are treated as amendi[illegible] Agreement under Stipulatio[illegible]

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c) Unless the Agreement is te[illegible] pursuant to Stipulation XII, another agreement executed for the undertakin[illegible] supersedes it, or the undertaking itself has been terminated, this Agreement will remain in full force and effect until BLM, in consultation with the other Signatories, determines that implementation of all aspects of the undertaking has been completed and that all terms of this Agreement and any subsequent tiering requirements have been fulfilled in a satisfactory manner. Upon a determination by BLM that implementation of all aspects of the undertaking have been completed and that all terms of this Agreement and any subsequent tiered agreements have been fulfilled in a satisfactory manner, BLM will notify the consulting parties of this PA in writing of the agency's determination. This Agreement will terminate and have no further force or effect on the day that BLM so notifies the Signatories to this Agreement. **P5-1**

XV. EFFECTIVE DATE

a) This Agreement and any amendments shall take effect on the date that it has been fully executed by the Signatories. The Agreement and any amendments thereto shall be executed in the following order: (1) Applicant, (2) Energy Commission, (3) NPS, (4) COE, (5) BLM, (6) SHPO, and (7) ACHP.

Execution and implementation of this Agreement is evidence that the BLM and the COE have taken into account the effect of this undertaking on historic properties, afforded the ACHP a reasonable opportunity to comment, and that the BLM and the COE have satisfied their responsibilities under Section 106 of the NHPA. The Signatories and Invited Signatories to this PA represent that they have the authority to sign for and bind the entities on behalf of whom they sign.

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930 **SIGNATORY PARTIES**
931
932
U.S. BUREAU OF LAND MANAGEMENT

BY: _____ DATE: _____
James Wesley Abbot
State Director
933
934
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

BY: _____ DATE: _____
David J. Castanon
Chief, Regulatory Division
935
936 **P5-1**
CALIFORNIA STATE HISTORIC PRESERVATION OFFICER

BY: _____ DATE: _____
Milford Wayne Donaldson, FAIA
State Historic Preservation Officer
937
938
ADVISORY COUNCIL ON HISTORIC PRESERVATION

BY: _____ DATE: _____
John M. Fowler
Executive Director
939
940

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INVITED SIGNATORY PARTIES

CALIFORNIA ENERGY COMMISSION

BY: _____ DATE: _____

TESSERA SOLAR L.L.C.

BY: _____ DATE: _____

P5-1

CONCURRING PARTIES:

(This is a potential list only)
CAMPO KUMEYAAY NATION
COCOPAH INDIAN TRIBE
FORT YUMA QUECHAN INDIAN TRIBE
EWIIAAPAAYP BAND OF KUMEYAAY INDIANS
JAMUL INDIAN VILLAGE
KWAAYMII LAGUNA BAND OF INDIANS
LA POSTA BAND OF KUMEYAAY INDIANS
MANZANITA BAND OF KUMEYAAY INDIANS
SAN PASQUAL BAND OF DIEGUENO INDIANS
SANTA YSABEL BAND OF DIEGUENO INDIANS
AH-MUT PIPA FOUNDATION
KUMEYAAY CULTURAL REPATRIATION COMMITTEE
CALIFORNIA UNIONS FOR RELIABLE ENERGY
NATIONAL TRUST FOR HISTORIC PRESERVATION
NATIONAL PARK SERVICE
ANZA SOCIETY
EDIE HARMON
SACRED SITES INTERNATIONAL FOUNDATION
GREG P. SMESTAD, PH.D.

P5-1

1.6 Responses Without Graphical Interface Comments

This section contains the text from Sections 1.4 Common Responses, and 1.5 Individual Responses, without the graphical interface inserts of individual comments.

1.6.1 Common Responses

A number of the comments received on the IVS project and the Final EIS discussed the same issues or environmental concerns. Rather than repeat responses over and over again, Common Responses were prepared that address those comments, and the responses to those comments refer the reader to the applicable Common Response.

In addition, some comments raised issues that are not environmental issues within the context of the National Environmental Policy Act (NEPA) or are outside the authority and jurisdiction of the BLM. Consistent with requirements of NEPA, the BLM has only addressed comments that raise substantive environmental issues under NEPA. However, all the comments received on the Final EIS are included in this appendix.

1.6.2 Non-NEPA/BLM Issues

The following comments do not raise issues under the National Environmental Policy Act (NEPA) or that are outside the authority of the United States Bureau of Land Management (BLM).

Comments: S4-1, O1-1, P1-1, P2-1 and P3-1.

Response: These comments do not raise environmental issues under the National Environmental Policy Act (NEPA). These comments are a letter stating the project complied with the State Clearinghouse submittal of the Final Environmental Impact Statement (Final EIS), the introduction of the California Unions for Reliable Energy's (CURE) comment letter describing the persons who reviewed the Final EIS, one comment that expressed general opposition of the project, and two comments that expressed general support of the project. No further response is necessary.

1.6.3 Project Modifications and Project Alternatives

Project Modifications in the 404(b)(1) Analysis

The following comments discuss the expectation that project modifications discussed in the 404(b)(1) analysis would be incorporated in the Record of Decision and the clarification of the feasibility of the 300 MW alternative as a stand-alone project.

Comments: F1-1 and F1-3.

Response: The project modifications discussed in Appendix H, Draft 404(b)(1) in the Final EIS, were developed as a result of the continued coordination among the Applicant, BLM and the United States Army Corps of Engineers (Corps). The 709 MW Alternative, which is the Selected Alternative, incorporated these modifications to avoid impacts to waters of the United States and cultural and biological resources. The 300 MW Alternative was evaluated as a freestanding independent alternative in the Staff Assessment/ Draft Environmental Impact Statement (SA/DEIS) and the Final EIS. In addition, it constitutes Phase I of the 709 MW Selected Alternative. The Final EIS for the Sunrise Powerlink Project has been released and is awaiting the final BLM decision. Therefore, it was appropriate to incorporate that the Sunrise Powerlink Project would be available by the time Phase II of the IVS project comes on line.

In addition, refer to the following section of the Final EIS for additional discussion regarding project alternatives: Final EIS Section 2.0 Alternatives Including the Proposed Action, and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.2, Project Alternatives.

1.6.4 Air Quality Effects

The following comments discuss air quality effects and the IVS project.

Cumulative Air Quality Impacts and Response to Comments in Final EIS

This comment discusses that the Responses to Comments in the Final EIS did not respond to the comment on Cumulative Air Quality impacts. The following response responds to cumulative air quality impacts for the IVS project.

Comment: F1-9.

Response: As described in Section 2.10.4 Cumulative Impacts Study Areas and Projects and Section 4.2 Air Quality in the Final EIS, the air quality analysis is a cumulative assessment of potential air pollutant emissions on both the regional and local levels. For the regional analysis, the projections for criteria pollutants have been established by the Imperial County Air Pollution Control District (ICAPCD) based on planned population and job growth in that air district. The ICAPCD issued a Preliminary Determination of Compliance (PDOC) for the IVS project on August 20, 2009 and after a 30-day comment period that ended on September 24, 2009, issued a Final Determination of Compliance on October 14, 2009. Compliance with all ICAPCD rules and regulations was demonstrated to the ICAPCD's satisfaction in the Final Determination of Compliance (FDOC). The ICAPCD's FDOC conditions are provided in the project mitigation measures.

The ICAPCD is responsible for issuing Federal New Source Review (NSR) permits and has been delegated enforcement of the applicable New Source Performance Standard (Subpart IIII). However, the IVS project will not require a Federal NSR or Title V permit and would not require a Prevention of Significant Deterioration (PSD) permit from the Environmental Protection Agency prior to the initiation of construction.

For the local analysis, a review of new development projects and stationary sources that have potential for emissions of criteria air contaminants within 6 mile (mi) of the IVS project site were identified. Of the projects identified in Tables 2-1 to 2-4 in the Final EIS, 24 projects are outside a 6 mi radius of the IVS project site and were, therefore, not included in the list of cumulative emission sources. Six projects were eliminated due to their annual permitted emission increases being negative, negligible, or less than 5 tons per year. The last project was eliminated because it is indefinitely on hold. Therefore, it has been determined that there are no planned stationary sources requiring a cumulative modeling analysis within a 6-mi radius of the IVS project site.

Construction emissions from diesel-fueled engines are addressed in measures AQ-SC1, AQ-SC2, AQ-SC5 and the ICAPCD regulations that must be complied with. As described in the Final EIS Section 4.2 Air Quality, the AQCMM will provide a monthly construction mitigation report that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction-related emissions. Additionally, off-road diesel construction equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by Measure AQ-SC2, and described on pages 4.2-49 - 4.2- 50.

New Potentially Significant Effects to Air Quality

The following comment discusses that the project would contribute to new potentially significant effects to Air Quality.

Comment: O1-5.

Response: As described in Section 4.2 Air Quality in the Final EIS, Measures AQ-SC2, AQ-SC3 and AQ-SC7 provide for compliance with the Air Quality Construction Mitigation Plan (AQCMP) mitigation measures for the purposes of preventing all fugitive dust plumes from leaving the project site. A site Operations Dust Control Plan, including all applicable fugitive dust control measures identified in the Final EIS would be applicable to reducing fugitive dust during construction activities and ongoing operations at the project site.

The measures provided in Section 4.2 would reduce the project's stationary source NO_x, VOC, SO_2, PM_{10}, and $PM_{2.5}$ emissions through the use of Best Available Control Technology (BACT), minimizing delivery and employee trips, and reducing mobile source emissions. With the inclusion of these measures and compliance with the ICAPCD measures, the IVS project would not result in adverse air quality impacts.

In addition, refer to the following sections of the Final EIS for additional discussion regarding air quality: Sections 3.2 and 4.2 Air Quality, and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.6, Air Quality.

1.6.5 Biological Resources

Design Modifications and discussion in the ROD and the Final 404(b)(1) Analysis

The following comments discuss that the ROD and the Final 404(b)(1) analysis incorporate the final project design features and mitigation measures to avoid and minimize impacts to waters of the United States.

Comments: F1-4, F1-5 and O-1-18

Response: The 404(b)(1) Alternatives Analysis is provided in Appendix 6 in this ROD. Please refer to the analysis in the ROD and Final 404(b)(1) for the discussion of mitigation that would minimize impacts to waters of the United States under the 709 MW Alternative.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Sections 3.3 and 4.3 Biological Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement, Section D.4.7, Biological Resources.

Project Impacts to the Flat-tailed Horned Lizard Habitat

The following comments discuss concerns about the project's impacts to flat-tailed horned lizard.

Comments: P1-2, P1-3 and P1-4

Response: This comment expresses concern regarding the FTHL, specifically movement corridors currently provided by the project site and previously disregarded measures to translocate FTHL encountered during construction. The Selected Project will leave the vast majority of primary washes untouched for multiple reasons, including providing FTHL movement corridors between existing Management Areas. Additionally, the avoidance and mitigation measures were modified to eliminate the proposal to translocate FTHL encountered during construction to different areas; instead, the FTHL will be removed from immediate harm's way. The applicant will be providing approximately 12 million dollars in funding to be used to purchase and preserve FTHL habitat in accordance with the existing multi-agency, multi-jurisdictional Rangewide Management Strategy for FTHL.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Sections 3.3 and 4.3 Biological Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement, Section D.4.7, Biological Resources.

Potential Impacts to Peninsular Bighorn Sheep

The following comments discuss potential impacts to Peninsular bighorn sheep (PBS) and the IVS project.

Comments: O1-7 and O1-8.

Response: Comment states that the BLM has not adequately addressed potential impacts to Peninsular bighorn sheep (*Ovis canadensis nelsoni*). The BLM has been in consultation with the USFWS and as a result there is a requirement for the applicant to enhance substantial portions of the Carrizo Marsh as compensatory mitigation for effects on Peninsular bighorn sheep forage habitat. Refer to the Biological Opinion/Conference Opinion provided in Appendix 2 of this ROD.

All project mitigation commitments, including those for biological resources, are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Sections 3.3 and 4.3 Biological Resources, Final EIS Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.7, Biological Resources.

BLM Did Not Adequately Address Mitigation for Impacts to Peninsular bighorn sheep

The following comment discusses that BLM did not adequately address mitigation for impacts to Peninsular bighorn sheep, and that the measures cited in the Final EIS do not even mention Peninsular bighorn sheep.

Comment: O1-16.

Response: The mitigation measures described in the Final EIS were originally developed to offset impacts to Federal jurisdictional waters and once Peninsular bighorn sheep Section 7 consultation was identified as a project requirement (During preparation of the DEIS, there was no indication that the USFWS considered the one-time sighting of Peninsular bighorn sheep as evidence that the site comprises Peninsular bighorn sheep forage habitat), then measures were analyzed to be proposed to offset potential project impacts to Peninsular bighorn sheep. The specific measures, BIO-8 and BIO-17 will require reduction in impacts to primary drainages, and restoration of approximately 250 acres within the Carrizo Marsh on California Department of State Parks lands. The reduction in impacts to primary drainages and more so, the restoration of Carrizo Marsh lands that historically provided summering grounds for the Peninsular bighorn sheep prior to their current infestation by invasive species that precludes the use of Carrizo Marsh by Peninsular bighorn sheep are adequate measures to protect the Peninsular bighorn sheep populations and future species recovery. Refer to the Biological Opinion/Conference Opinion provided in Appendix 2 of this ROD. All project mitigation commitments, including those for biological resources, are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

1.6.6 Cultural Resourses

The following comments discuss issues related to the Juan Bautista de Anza Historic Trail (Anza Trail).

Comments: F2-1 and O1-22

Response: As of September 2010, no physical evidence for the presence of the Anza Trail or campsite within the IVS project site has been observed. Additional identification efforts are on-going. The BLM has determined the IVS project and the other Build Alternatives will have an adverse effect on historic properties. Impacts to the Anza Trail corridor would be substantial. Measures to address project impacts to the Anza Trail, per consultation with the National Park Service and consulting parties, are provided in Section 4.5, Cultural Resources, in the Final EIS, and the Final Programmatic Agreement (PA) in Appendix 3 in this Record of Decision (ROD). The BLM took comments provided on the draft into account in the revision and preparation of the Final PA.

In addition, refer to the following sections of the Final EIS for additional discussion regarding cultural resources: Sections 3.5 and 4.5 Cultural Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement, Section D.4.9, Cultural Resources.

The following comments discuss issues related to Native American Consultation, impacts to resources, mitigation, and the PA.

Comments: F1-10, NA1-1, NA2-1, NA3-1, NA3-2, NA3-3, NA3-4, NA3-5, NA3-8, S1-1, O1-12, O1-17, O1-21, O1-24, O1-25, O1-26, and O1-27

Response: As described in the Final EIS, government-to-government consultation has been taking place since 2008. Appendix F for the Final EIS indicates that, the last contact by the BLM with the Tribes occurred on June 25, 2010. Since then, the BLM has contacted the Tribes by email on July 9, 2010, conducted a field visit with the Tribes on July 29-31, 2010, and sent a letter to the Quechen tribe on August 18, 2010. Section 7.2 in the Final EIS discloses that in a December 4, 2009 meeting, the Tribes had expressed concerns over impacts to cremated human remains in the project area. Section 3.5.3.2, in the Final EIS, states that 1,200 acres were excluded from the originally proposed project area to avoid direct effects to the cremation sites and other historic properties. The concerns of the Tribes regarding protection of human remains location were addressed by amending the project proposal, and by creating a protective buffer around these locations. Refer to the Final Programmatic Agreement in Appendix 3 in this ROD which addresses continued consultation, and mitigation committed to by

BLM. Refer also to Section 4.3 Cultural Resources, in the Final EIS for additional mitigation measures addressing cultural resources.

Government-to government consultation is on-going, and is summarized in the Final EIS. Consultation includes meeting with Tribal governments, Elders, interested individuals. Tribes participating in consultation have been informed that the IVS project will have an adverse effect on historic properties. Known habitation sites and human remains locations are being avoided by project construction. A construction free buffer area in association with the known habitation sites and human remains locations will be established and avoidance will be enforced by the presence of archaeological and Native American monitors and protective fencing during construction. Government-to-government consultation has yet to identify specific traditional cultural properties that are eligible for the National Register of Historic Places (National Register) within the project's area of potential effects (APE). In an effort to identify Traditional Cultural Properties (TCPs) in the APE that are eligible for the National Register (if any), meetings, requests to interview tribal elders, and field visits continue.

As part of good faith and reasonable identification efforts, government-to-government consultation is on-going, including providing for additional site visits seeking comments regarding National Register evaluations. Mitigation measures are included in the Final EIS, and the PA and will be adopted in the ROD. A draft PA was included in the Final EIS, execution completed in mid-September 2010 and the executed PA is provided in Appendix 3. The PA stipulates ongoing consultation with tribes, including participation in construction monitoring. The PA further requires that development and implementation of a Historic Properties Treatment Plan(s), in consultation with consulting parties, must take place prior to ground-disturbing activities that have the potential to adversely affect historic properties. The BLM took comments provided on the draft PA into account in the revision and preparation of the Final PA. Execution of the PA is evidence that the BLM has taken into account the effect of this undertaking on historic properties and that the BLM has satisfied its responsibilities under Section 106 of the National Historic Preservation Act.

As part of a good faith and reasonable effort to identify historic properties in the project's APE, the BLM has required the preparation of an adequate Class III Inventory. Inventory of the APE includes archival (literature) searches, assessments of the historic built environment (buildings and structures), and intensive pedestrian surveys of the proposed direct impact area (construction foot-print). Archaeological survey was originally of a larger area resulting in modification of the construction foot-print in an effort to avoid sensitive cultural resources. This report was provided to interested Tribes and consulting parties for comment. Based on the consultation process and comments received from Tribes and other interested parties, the BLM will make determinations of eligibility and effect for individual resources. On an undertaking-wide context, the BLM has determined that the project will have an adverse effect on historic

properties and mitigation is required prior to construction. Mitigation measures are described in the Final EIS, and presented in the Final Programmatic Agreement in Appendix 3.

In addition, refer to the following sections of the Final EIS for additional discussion regarding cultural resources: Sections 3.5 and 4.5 Cultural Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement, Section D.4.9, Cultural Resources.

The following comments discuss cumulative impacts to cultural resources.

Comments: NA3-7, and O1-15

Response: The cumulative impacts analysis in the Final EIS discusses the effects of reasonably foreseeable future projects. Refer to Section 2.10, Overview of the Cumulative Impacts Analysis, for a list of reasonably foreseeable future projects considered in the analysis of the potential for the IVS project to contribute to cumulative adverse impacts on cultural resources. The cumulative impacts analysis for cultural resources is provided in Section 4.5.5, Cumulative Impacts, in the Final EIS. That analysis indicates that the construction of the IVS project and other foreseeable cumulative projects will contribute to permanent long term adverse effects on cultural resources.

In addition, refer to the following section of the Final EIS for additional discussion regarding cultural resources: Appendix D, Public Comments on the Draft Environmental Impact Statement, Section D.4.9, Cultural Resources.

1.6.7 Water Resources

Groundwater Use

The following comments discuss the use of groundwater for the IVS project.

Comments: F1-7, O1-6 and O1-11.

Response: As described in the Final EIS, the IVS project, the Selected Alternative, and the other Build Alternatives were modified after the publication of the SA/DEIS to use an off site well as a temporary water source during construction and initial operations. The use of water from the existing permitted Dan Boyer Water Company well to provide water to the site is proposed until the Seeley Wastewater Treatment Plant (SWWTP) can provide the water to the site. Also described in Appendix B, Determination of NEPA Adequacy, historically, the water has been extracted from this well at amounts up to nearly 200 afy, with amounts typically between 120 and 132 afy. That water was sold for a variety of uses including construction, dust control,

quarry operations, and personal use. The well owner has provided a written will serve letter (March 26, 2010) to the applicant, indicating its ability to provide the needed water to the IVS project.

In addition, refer to the following sections of the Final EIS for additional discussion regarding water resources: Section 3.17 and 4.17 Hydrology, Water Use and Water Quality and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.13, Water Resources.

The Project's Impacts on Soil and Water Resources

The following comment discusses the project effects on soil and water resources.

Comment: O1-3 and O1-10.

Response: As described in the SA/DEIS, Section C.3 Cultural Resources, and Section 3.5 Cultural Resources in the Final EIS, much of the site was used for gravel mining in the past and the site is currently used for some recreation uses which may have disturbed or continue to disturb biotic crusts on the site. There are very limited areas on the project site that currently support biotic crusts. There are also limited areas on the site that support physical crusts. Therefore, as a result of the limited amounts of these types of soils on the site, the Build Alternatives are not expected to result in substantial adverse impacts to biotic or physical crusts. Refer to the Biological Opinion/Conference Opinion provided in Appendix 2 of this ROD. All project mitigation commitments, including those for biological resources, are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Section 3.3 and 4.3 Biological Resources and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.7 Biological Resources.

Indirect Project Effects on the New River and the Salton Sea

The following comment discusses the potential impacts to the New River and the Salton Sea

Comment: O1-13.

Response: As described in Appendix H, Draft Section 404(b)(1) in the Final EIS, impacts to water quality are not anticipated because of the low amount of rainfall received in the region and the irregularity of subsequent flow events, the lack of impervious surfaces in the watersheds, and the type of proposed project (e.g. limited imperious surfaces). Mitigation Measures within the Final EIS were developed to limit the potential effects on hydrology and water quality and ensure that the proposed project complies with applicable regulatory requirements for both construction and post-development surface runoff water quality. These regulatory requirements not only apply to the proposed project, but all future projects. Therefore, cumulative impacts on surface water quality of receiving waters from the proposed project and future alternative energy projects in the watershed would be addressed through compliance with the applicable regulatory requirements that are intended to be protective of beneficial uses of the receiving waters.

In addition, Mitigation Measures in the Final EIS include Soil&Water-1, Development of a Drainage, Erosion and Sediment Control Plan (DESCP), which would include monitoring and rectifying any observed problems during operation; Soil&Water-5, National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Activity, would ensure adequate control of construction storm water pollutants; and Soil&Water-3. Industrial Facility Storm Water Pollution Prevention Plan (SWPPP), which would specify best management practices that would minimize mobilization of sediments and soils on-site and eliminate or reduce non-storm water discharges to the waters of the United States.

Refer to the following sections of the Final EIS for additional discussion regarding water resources: Sections 3.17 and 4.17 Hydrology, Water Use and Water Quality and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.13, Water Resources.

1.6.8 Individual Responses to the Comment Letters/Emails

This section provides individual responses to individual comments not addressed by the common responses provided in Section 1.5.1, Common Responses. Each comment is uniquely coded to the commenting party and the individual comment within that comment letter.

The following comment letters included comments that required individual responses which are provided in this section:

- F1 – United States Environmental Protection Agency (August 30, 2010)
- F3 – Department of the Interior National Park Service Pacific West Region (No date)
- NA3-Carmen Lucus, Kwaaymii Laguna Band of Indians (August 26, 2010)
- S2-Natural Resources Agency, CAL FIRE (August 20, 2010)
- S3- Public Utilities Commission (August 23, 2010)
- O1- California Unions for Reliable Energy (August 25, 2010)
- P4 – Brendan Hughes (email August 21, 2010)
- P5 – Greg Smestad (August 23, 2010)

Comment F1-2: Permittable Discharge and the Least Environmentally Damaging Practicable Alternative (LEDPA)

This comment states that the only permittable discharge is the LEDPA.

Response: Through the coordination among the Applicant, BLM and the United States Army Corps of Engineers, the Final 404B-1 analysis lead to the identification of the Least Environmentally Damaging Practicable Alternative (LEDPA). Specifically, the Agency Preferred Alternative is also the Corps' LEDPA as discussed in the Final 404(b)(1) which is provided in Appendix 6, in this ROD.

In addition, refer to the following section of the Final EIS for additional discussion regarding the LEDPA: Appendix H, Draft Section 404(b)(1) Alternatives Analysis.

Comment F1-6: Biological Resources Mitigation and LEDPA

This comment discusses issues related to the LEPDA and biological resources mitigation.

Response: This ROD includes the Responses to Comments on the Final EIS, and the Final 404(b)(1) with the LEDPA for the IVS project. The Final Section 404(b)(1) is provided in Appendix 6, Additional Agency Approvals and Review. All project mitigation commitments including those for biological resources are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological and water resources: Sections 3.3 and 4.3 Biological Resources, 3.17 and 4.17 Hydrology, Water Use and Water Quality, and Appendix D, Public Comments on the Draft Environmental Impact Statement Sections D.4.7 Biological Resources, and D.4.13, Water Resources.

Comment F1-8: Biological Resources Mitigation

This comment discusses that the Record of Decision should describe the final biological resource mitigation commitments.

Response: The Biological Opinion/Conference Opinion are included in Appendix 2 of this ROD. All project mitigation commitments, including those for biological resources, are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

For example: the applicant will provide funding to the National Fish and Wildlife Foundation pursuant to the Flat-Tailed Horned Lizard Rangewide Management Strategy. The applicant will also implement habitat restoration of approximately 250 acres within the Carrizo Marsh to mitigate for IVS Project related impacts to forage habitat for the Peninsular bighorn sheep.

Further, the comment states that the results of the Biological and Conferencing Opinions for the Peninsular bighorn sheep and flat-tailed horned lizard, respectively, will play an important role in the selection of alternatives. This comment is duly noted.

The comment also states that it is unclear if the results of spring 2010 botanical surveys resulted in the need for additional avoidance or mitigation measures. The results of the 2010 botanical surveys did not warrant additional avoidance or mitigation measures.

The comment included a bullet point list of recommendations. Each bullet point will be addressed below:

- Details on the compensatory mitigation for flat-tailed horned lizard and Peninsular bighorn sheep are included in the POD as described in Chapter 2, Mitigation and Monitoring.
- The area identified as foraging habitat for the Peninsular bighorn sheep (PBS) was determined during the Section 7 Consultation between the BLM and the USFWS and was based on the area of waters of the United States within the IVS Project site.
- The habitat to be restored/enhanced as mitigation for impacts to waters of the United States and potential impacts to PBS forage habitat is within lands owned and managed by the California Department of Parks and Recreation and therefore will be protected in perpetuity.
- No new avoidance or mitigation measures were warranted from the results of the 2010 spring botanical surveys.

Comment F1-11: Project Alternatives

This comment discusses that other possible off-site alternatives be given consideration under NEPA.

Response: As described in the Final EIS, and evaluated under NEPA, (Section 2.9, pages 2-41 through 2-46), three off-site alternatives (the Mesquite Lake, the Agricultural Lands, and the South of Highway 98 alternative sites) were analyzed using criteria from the *BLM NEPA Handbook H-1790-1* (BLM 2008). It was determined that the Mesquite Lake and Agricultural Lands sites, which are not owned or managed by BLM, are not practicable or reasonable because of the acquisition of 52 parcels and greater impacts to waters of the United States, particularly to wetlands; and may not meet the cost, logistical, and environmental screening criteria, respectively. The South of Highway 98 alternative site has been withdrawn for Federal Bureau of Reclamation purposes which have not been revoked, thereby making this site infeasible at the present time. Refer also to Tables 7-1, 7-2 and 7-3 in Appendix 7, Tables, in the Rod for summary tables discussing alternatives.

In addition, refer to the following section of the Final EIS for additional discussion regarding project alternatives: Chapter 2, Alternatives Including the Proposed Action and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.2, Project Alternatives.

Comment F1-12:The Responses to Comments on the Final EIS

This comment discusses that the Responses to Comments should more thoroughly address substantive comments received.

Response: The responses to comments on the Draft EIS address each comment and clarify any project features that have been included in the comments. All comments on the Final EIS are included and are addressed in this appendix of the ROD.

In addition, refer to the following section of the Final EIS for additional discussion regarding responses to comments on the Draft EIS: Appendix D, Public Comments on the Draft Environmental Impact Statement.

Comment F3-1: The Anza Trail and California Energy Commission's Supplemental Staff Assessment

This comment discusses impacts to the Anza Trail and that the California Energy Commission (CEC) should include measure REC-1 from the Final EIS and include it in the Supplemental Staff Assessment report.

Response: As described in the Final EIS, Mitigation Measure REC-1 was developed and included in Section 4.12, Recreation (page 4.12-8) to address the potential effects of the IVS project on the Anza Trail corridor. The CEC's Supplemental Staff Assessment document is not under BLM's control to add measures.

In addition, refer to the following sections of the Final EIS for additional discussion regarding recreational resources: Sections 3.12 and 4.12 Recreation.

Comment NA3-6: Visual Impacts are not shown in the Final EIS

This comment discusses visual impacts of the IVS project.

Response: The figures and key views of the project site were provided in Sections 3.16 and 4.16 in the Final EIS. Mitigation measures for visual effects of the project were provided in Section 4.16 in the Final EIS and are also provided in the POD, as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, visual impacts to the Yuha Geoglyphs south of the IVS project site would be adverse. However, that impact would not be substantial due to the greater distance between that resource and the IVS project site. Project mitigation will require that all exterior lighting be designed so that lamps and reflectors are not visible from beyond the IVS project site boundary, lighting does not cause excessive reflected glare, direct lighting does not illuminate the nighttime sky except for required Federal Aviation Administration (FAA) aircraft safety lighting, and illumination of the IVS project site and the immediate vicinity is minimized.

Comment S2-1: Fuel Break Around the Project Area

This comment recommends that a fuel break be created around the project area.

Response: As described in Section 4.6 Fire and Fuels Management, in the Final EIS Measures WORKER SAFETY-1 and WORKER SAFETY-2 include a Construction Fire Prevention Plan and a Fire Prevention Program (8 CCR Section 3221). These measures, and compliance with all laws, ordinances, regulations, and standards (LORS) would be adequate to ensure protection from fire hazards associated with the Selected Alternative.

In addition, refer to the following sections of the Final EIS for additional discussion regarding fire management: Sections 3.6 and 4.6 Fire and Fuels Management.

Comment S2-2: Construct an All Weather Access Road

This comment recommends that an all weather access road be constructed into and around the project area.

Response: As described in Section 4.11 Public Health and Safety, and Hazardous Materials in the Final EIS, site access procedures and security would be addressed by Measures HAZ-4 and HAZ-5 that include the construction and operational security plans and procedures for law enforcement contact in the event of a emergency at the project site.

Additionally, described in Section 4.15 Traffic and Transportation, regional access to the IVS project site is adequate given that an emergency vehicle can access the site directly from Evan Hewes Highway or Dunaway Road, with direct access to/from I-8. Emergency vehicles can approach the site from adjacent cities using different routes and would not be barred from access due to a singular problem on a surrounding road. On-site circulation of emergency

vehicles is subject to site plan review by local agencies (Imperial County) and the standards of the Uniform Fire Code and Uniform Building Code.

Refer to the following sections of the Final EIS for additional discussion regarding access to the project site: Chapter 2, Alternatives Including the Proposed Action, and Sections 3.15 and 4.15 Traffic and Transportation.

Comment S2-3: Wires and Other Service Lines Placed Underground

This comment recommends that all wires and other service lines be placed underground.

Response: It is not within BLM's jurisdiction to place other agencies and companies wires and service lines underground. As described in the Final EIS, Section 2.0 Alternatives including the Proposed Action, the planned 230-kV transmission line required for Phase I would parallel the existing San Diego Gas and Electric (SDG&E) Southwest Powerlink transmission line and would be within the existing ROW for that SDG&E transmission line.

The electric service for the Main Services Complex would be obtained from Imperial Irrigation District (IID). Electric power would be provided via an overhead service line from an existing IID overhead distribution line on the north side of Evan Hewes Highway. The applicant would be responsible for applying to the IID for the extension of electric lines from the existing overhead line onto the IVS project site. The IID would need to apply for and receive an easement from the BLM for the part of that line on BLM managed land on the IVS project site.

In addition, refer to the following section of the Final EIS for additional discussion regarding project alternatives and features: Chapter 2, Alternatives Including the Proposed Action and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.2, Project Alternatives.

Comment S3-1: At-Grade Crossing for the San Diego and Arizona Eastern Railway

This comment discusses the Public Utilities Commission's policy not to authorize any new at-grade railroad crossings.

Response: The proposed crossing access into the IVS site has been described as a private crossing and not a public crossing (Final EIS, Section 4.15 Traffic and Transportation). The

applicant has negotiated a lease agreement[1] with the San Diego Metropolitan Transit System (MTS) to provide a private crossing "…located west of Plaster City, south of Evan Hewes Highway at Road 2003 along the Desert Line at approximately Milepost 128.5." That agreement requires the applicant to pay an annual license fee, maintain appropriate insurance, and provide the necessary crossing improvements (not specified). Measure TRANS-2 requires the applicant to provide an executed agreement of the above prior to project construction and to obtain approval from the MTS for the permanent form of the railroad crossing.

Comment O1-2: Supplemental Environmental Impact Statement

This comment proposes the need for a supplemental EIS to be prepared for the IVS project.

Response: As described in Section 2.0 (page 2-5) in the Final EIS, the BLM chose to use a Determination of NEPA Adequacy (DNA), (Appendix B in the Final EIS), as an internal administrative tool to determine whether a supplement to the Draft EIS was required as a result of the four applicant proposed modifications (i.e. transmission line alignment, waterline alignment, hydrogen storage, and alternative water supply). The BLM determined that no supplement was required because the applicant-proposed modifications were similar to features of previously analyzed alternatives, resulted in an alternative within the range of the alternatives analyzed previously in the SA/DEIS and Final EIS, did not substantially change the previous analysis, and had effects that were similar to or less than those analyzed for the IVS project and the other Build Alternatives. The potential effects of these four modifications were presented in the analyses provided in the Final EIS and the DNA. The public review period for the Final EIS began on July 28 and was completed on August 23, 2010, thus allowing the public to review and comment on the Final EIS (in compliance with 40 CFR 1506.6).

Comment O1-4: Increased Temporary impacts to Wildlife Movement within the Project Area.

This comment discusses that the Preferred Project would result in increased temporary impacts to wildlife movement in the project area.

Response: As described in the Final EIS, (Chapters 3 and 4), the entire project site will be subject to disturbances during construction, which are temporary. The ongoing disturbances during construction will likely result in decreased wildlife movement; however, the project site is

[1] Metropolitan Transit System, San Diego. License to place permanent improvements in MTS/SD&AE Right-of-Way. January 7, 2010. MTS Doc #S200-10-424, ADM 160.1. CEC Doc 08-AFC-5.

currently subject to existing constraints to wildlife movement (proximity to Interstate 8 to the south, the railroad line and Evan Hughes Highway to the north and east, and Dunaway Road to the east) and therefore, temporary impacts to wildlife movement from access roads will not result in substantial adverse effects on wildlife movement.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Sections 3.3 and 4.3 Biological Resources, Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.7, Biological Resources.

Comment O1-9: Climate Change

This comment discusses the Final EIS Responses to Comments did not provide a reasoned response to CURE's comment on Climate Change.

Response: As described in Section 4.4 Climate Change in the Final EIS, the climate change analysis is for compliance with the United States Environmental Protection Agency (EPA) Prevention of Significant Deterioration (PSD) requirements to facilities whose carbon dioxide (CO_2)-equivalent emissions exceed 25,000 tons per year and the Council on Environmental Quality's (CEQ) draft guidance (February 18, 2010) for Federal agencies to improve their consideration of the effects of GHG emissions and climate change in their evaluation of proposals for Federal actions under the National Environmental Policy Act (NEPA). These requirements are to determine the proposed project's contribution to greenhouse gases. The Council on Environmental Quality's draft guidance (Memorandum dated February 18, 2010) for Federal agencies states:

> "if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and public."

The IVS project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368. As described in the Final EIS Section 4.4, the IVS project has an estimated GHG emission rate of 0.00123 $MTCO_2e/MWh$, well below the Greenhouse Gas Emission Performance Standard of 0.500 $MTCO_2/MWh$.

As also stated in the CEQ's guidance:

> "However, it is not currently useful for the NEPA analysis to attempt to link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions, as such direct linkage is difficult to isolate and to understand. The estimated level of GHG emissions can serve as a reasonable proxy for assessing potential climate change impacts, and provide decision makers and the public with useful information for a reasoned choice among alternatives."

In addition, refer to the following sections of the Final EIS for additional discussion regarding climate change: Sections 3.4 and 4.4 Climate Change, and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.8, Climate Change.

Comment O1-14: Cumulative Effects of the Proposed Project

This comment discusses the cumulative effects analysis of the IVS project.

Response: As described in Section 4.3 Biological Resources in the Final EIS, the United States Fish and Wildlife Service (USFWS) and BLM biologists agree that the observation of Peninsular bighorn sheep on the project site in March 2009 was an unusual occurrence because no known lambing sites or water sites are known near the project site and no other bighorn sheep occurrences have been documented in the vicinity of the project site. USFWS prepared a Biological Opinion for the potential adverse project effects to the PBS which has been included with this ROD.

The Biological Opinion/Conference Opinion are included in Appendix 2 of this ROD. All project mitigation commitments, including those for biological resources, are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

Comment O1-19: Consultation for Section 106 and the United States Fish and Wildlife Service Consultation

This comment discusses the Consultation for Section 106 under the National Historic Preservation Act and the United States Fish and Wildlife Service (USFWS) Consultation.

Response: As described in Chapter 7, Government to Government Consultation and Appendix F, Tribal Consultation in the Final EIS, the Section 106 and Tribal Consultation has been ongoing since January 2008, with the purpose of completing a Programmatic Agreement for the IVS project. The Final Programmatic Agreement is provided in Appendix 3, Programmatic Agreement of this ROD.

As described in Section C.2 Biological Resources in the SA/DEIS, and Section 4.3 Biological Resources in the Final EIS, consultation with the USFWS has been ongoing for the IVS project. The purpose of the consultation is to develop the Biological Opinion/Conferencing Opinion and comply with and obtain the Federal Clean Water Act (CWA) Section 404 permit, if necessary. All project mitigation commitments including those for biological resources are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding biological resources: Sections 3.3 and 4.3 Biological Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement Sections D.4.7 Biological Resources.

Comment O1-20: Multiple Use Class L Land Use and Visual Resources

This comment discusses that Multiple Use Class L land use not be used to diminish the values of the land and that the project would significantly diminish visual resources.

Response: The California Desert Conservation Area Plan (CDCA) is a dynamic land-use plan that was developed to protect resources while allowing for enjoyment of the desert and use by man. The CDCA describes (page 72) that many management activities (such as energy production and utility corridors) involve alteration of the natural character of the landscape to some degree. Any proposed activities will be evaluated and appropriate mitigation measures would be specified to determine the extent of visual impact that the proposed resource management activities would create in a landscape. All project mitigation commitments including those for visual resources are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding visual resources: Sections 3.16 and 4.16 Visual Resources, and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.12 Visual Resources.

Comment P4-1: The Project will have impacts on Cultural Resources, flat-tailed horned lizard and Peninsular bighhorn sheep

The following comment discusses impacts of the IVS project, and for BLM and California Energy Commission (CEC) to deny the project.

Response: As described in Sections 4.5 Cultural Resources, and 4.3 Biological Resources in the Final EIS, mitigation measures were developed to address project impacts to cultural and biological resources. All project mitigation commitments including those for cultural and biological resources are included in the Plan of Development (POD) as described in Chapter 2, Mitigation and Monitoring in this ROD.

In addition, refer to the following sections of the Final EIS for additional discussion regarding cultural and biological resources: Sections 3.5 and 4.5 Cultural Resources, Sections 3.3 and 4.3, Biological Resources and Appendix D, Public Comments on the Draft Environmental Impact Statement Section D.4.9 Cultural Resources, and Section D.4.7, Biological Resources.

Comment P5-1: Comments on the Programmatic Agreement from Greg Smestad

Mr. Smestad is a signatory on the Programmatic Agreement (PA) for the IVS project. He provided his edits and comments which are embedded in the pdf file. The majority of his comments were edits to the formatting of the document, requesting that spaces be added where they had been omitted. He also requested clarification of some of the points in the PA.

Response: The coordination for the PA has been ongoing, and a Final Programmatic Agreement for the IVS project is provided in Appendix 3, Programmatic Agreement in this ROD. No further response is necessary.

Comment P5-1 is 28 pages in length and is provided below.

Appendix 2:
Biological Opinion and Conference Opinion

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

In Reply Refer To:
FWS-IMP-09B0351-10F0271

SEP 23 2010

Memorandum

To: Field Manager, El Centro Office, Bureau of Land Management
El Centro, California
(Attn: Andrew Trouette)

From: Field Supervisor, Carlsbad Fish and Wildlife Office
Carlsbad, California

Subject: Section 7 Biological/Conference Opinion on the Imperial Valley Solar (Solar Two) Power Plant (3031 (P) CAD000.06)

This memorandum transmits the U.S. Fish and Wildlife Service's (Service) biological and conference opinion on the proposed Imperial Valley Solar Power Plant (Project), located in Imperial County, California and its effects on the endangered Peninsular bighorn sheep (*Ovis canadensis nelsoni*; PBS) and flat-tailed horned lizard (*Phrynosoma mcallii*; FTHL), proposed for Federal listing, in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your request for formal consultation, dated December 24, 2009, was received December 28, 2009.

This biological/conference opinion is based on information provided in the following documents and communications: (1) *Staff Assessment and Draft Environmental Impact Statement and Draft California Desert Conservation Area Plan Amendment SES Solar Two Commission Application For Certification (08-AFC-5) Imperial County*, dated February 2010; (2) *Imperial Valley Solar Project (Formerly SES Solar Two) Supplemental Staff Assessment*, dated July 2010; (3) the Biological Assessment (BA) for the Project prepared by URS, dated December 23, 2009; (4) the *404B-1 Alternatives Analysis For the Imperial Valley Solar Project* prepared by Ecosphere, dated June 3, 2010; and (5) supplemental materials provided during the consultation process. The project file for this consultation is located at the Carlsbad Fish and Wildlife Office (CFWO).

YUMA CLAPPER RAIL, LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER

The primary water source for the operations and maintenance of the proposed Project would be supplied by the Seeley Wastewater Reclamation Facility (WWRF) and the Project applicant would finance upgrades to the existing WWRF so the effluent can be treated to a tertiary level.

TAKE PRIDE IN AMERICA

Once the upgrade is complete, it is anticipated the proposed Project would take all of the treated effluent produced by the Seeley WWRF, which is between 567,812 (150,000) and 757,082 liters-per-day (lpd) (200,000 gallons-per-day (gpd)).

The Seeley WWRF currently discharges the effluent into the New River via an unlined earthen channel approximately 244-meter (m) [800-feet (ft)] long and 15-m (50-ft) wide. Once the discharge is rerouted to the proposed Project, a decline in vegetation along the channel may occur. The approximately 0.37-hectare (ha) (0.92-acres (ac)) unlined channel now supports fresh-brackish water marsh dominated by narrow-leaved cattail (*Typha latifolia*), and tamarisk scrub dominated by salt cedar (*Tamarix sp*.) with less than 15 percent cover of arrow weed (*Pluchea sericea*) and Emory's baccharis (*Baccharis emoryi*). General reconnaissance surveys were conducted on the Seeley WWRF site in May 2002 and July 2009, and no special-status species were detected (Dudek 2009).

Although the tamarisk scrub is unlikely to support habitat for the Yuma clapper rail (*Rallus longirostris yumamensis*; YCR), freshwater brackish marsh may support the species and the entire area is generally considered suitable for this species given the number of nearby occurrences in the New River (Dudek 2010a). However, focused protocol surveys for Yuma clapper rail were conducted by John Konecny, a Service-permitted biologist, and were found to be negative (J. Konecny, pers. comm. 2010). Therefore, we conclude the proposed Project is not likely to adversely affect YCR and is not addressed in this biological opinion.

The tamarisk scrub also has the potential to support least Bell's vireo (*Vireo bellii pusillus*; LBV) and southwestern willow flycatcher (*Empidonax traillii extimus*; SWWF). Mr. Konecny determined the habitat within the channel was unsuitable for LBV because of the lack of understory and narrow configuration of the tamarisk habitat (Dudek 2010a). Based on input from biologists conducting the 2010 habitat assessment (A. Hayworth, pers. comm. 2010), the habitat within the channel likely does not support the SWWF for similar reasons. However, focused protocol surveys were conducted for LBV and SWWF in the areas described above in May 2010 with negative results (Dudek 2010b). Therefore, we conclude the proposed Project is not likely to adversely affect LBV and SWWF, and these species are not addressed in this biological opinion.

CONSULTATION HISTORY

On December 28, 2009, the Bureau of Land Management (BLM) initiated consultation for construction, operation, maintenance, and decommissioning of the Imperial Valley Solar facility (formerly known as Solar Two). Following several discussions with Tessera Solar (applicant) that involved the BLM, U.S. Army Corps of Engineers (Corps), California Department of Fish and Game (CDFG), the California Energy Commission (CEC), and the Service, Tessera Solar modified its project to reduce adverse effects to waters of the U.S., biological resources, and cultural resources. The Corps' *404B-1 Alternatives Analysis for the Imperial Valley Solar*

Project incorporates these project modifications. This biological opinion analyzes the effects associated with the reduced project footprint as described in alternative #3 in the 404B-1 analysis.

On December 14, 2009, we received a letter from the BLM requesting our concurrence that the proposed Project may affect, but is not likely to adversely affect PBS. After further review of project impacts and information received on April 2, 2010, from Dr. Vern Bleich, we concluded the project is likely to adversely affect PBS.

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the issuance of a right-of-way (ROW) grant by the BLM to the applicant that would authorize construction, operation, and decommissioning of the 2,659 ha (6,571 ac) Imperial Valley Solar plant (formerly known as Solar Two), a solar dish stirling engine project, and its ancillary facilities. Two related federal actions are necessary for ultimate approval of this Project. The first is an individual permit from the Corps in compliance with Section 404 of the Clean Water Act. The second is a loan guarantee from the Department of Energy for construction of alternative energy projects. The BLM is acting as the Federal lead agency for the Project and has prepared the aforementioned BA on behalf of those two federal agencies.

The Project is located in Imperial County, California, approximately 161 kilometers (km) (100 miles (mi)) east of San Diego, 22.5 km (14 mi) west of El Centro, and 6.4 km (4 mi) east of Ocotillo (Figure 1). The proposed Project site is bordered by Interstate 8 (I-8) to the south; County Highway S80 (also known as Evan Hewes Highway) and a railroad to the west, north and northeast; and agricultural lands to the east. Plaster City, a gypsum plant run by United States Gypsum (USG), is also on the northern boundary of the site. The proposed Project would occupy approximately 2,523 ha (6,235 ac) of land managed by the BLM and approximately 136 ha (336 ac) of privately owned land, use approximately 4 hectare-meter (33 acre-feet) of water per year, produce 709 megawatts (MW) of electricity, and operate for a term of 40 years.

The Project would occupy an area that is regulated by the BLM's California Desert Conservation Area (CDCA) Plan of 1980, as amended. In the CDCA Plan, the location of the proposed Project includes land that is classified as Multiple-Use Class L (Limited Use), which allows for development of solar power facilities after National Environmental Protection Act (NEPA) requirements are met. The proposed Project is not identified within the CDCA Plan; therefore BLM is also processing a Plan Amendment to include the proposed Project as a recognized element within the Plan.

Project Components

Construction

The primary equipment for the power plant would include the approximately 28,360 SunCatchers and their support infrastructure, which includes: a 600-volt underground power

collection system; overhead collection circuits; a 19-km (11.8-mi) water supply pipeline[1]; a 16.6-km (10.3-mi), 230 kilovolt (kV) electrical transmission line (approximately 12.2 km (7.56 mi) of the new line would be constructed offsite); 75 km (46.7 mi) of arterial and perimeter roads; 275.6 km (171.24 mi) of unpaved (but acrylic polymer treated) maintenance roads; a 15-ha (37-ac) main services complex, which includes a water treatment facility and evaporation ponds; and a 3.6-ha (9-ac) substation. The SunCatcher is a 12-m (38-ft) high by 12-m (40-ft) wide solar concentrator in a dish structure that supports an array of curved glass mirror facets. The SunCatcher dish is mounted on a 0.6-m (2-ft) diameter, round steel pipe that is hydraulically vibrated into the ground to a depth of approximately 5 m (17 ft). No mass site grading is required to install the solar field, though grading is required for the buildings and substation, transmission line, portions of the water supply line, evaporation ponds, and access and maintenance roads. Site access roads would generally follow existing BLM roads. Vegetation under SunCatcher fields would be trimmed or mowed for the life of the Project. Refer to Table 1 for a summary of habitat impacts, both temporary and permanent, for each project component.

Table 1: Imperial Valley Solar – Project Impacts

Project Feature	**Phase I**	**Phase II**	**Total**
Permanent Impacts			
Water Pipeline (onsite portion)	2.4 ha 6 ac	0	2.4 ha 6 ac
230 kV Transmission Line	44.5 ha 110 ac	0	44.5 ha 110 ac
Substation	1.6 ha 4 ac	2 ha 5 ac	3.6 ha 9 ac
Main Services Complex, Including the SunCatcher Assembly Area	15 ha 37 ac	0	15 ha 37 ac
Perimeter and Arterial Roads	25 ha 64 ac	32.4 ha 80 ac	58.3 ha 144 ac
Maintenance Roads	35.6 ha 88ac	48.2 ha 119 ac	83.8 ha 207 ac
SunCatcher Field (excluding Maintenance Roads and Utility Trenching)	291 ha 719 ac	384.5 ha 950 ac	675.4 ha 1,669 ac
Subtotal	416 ha 1,028 ac	467 ha 1,154 ac	833 ha 2,182 ac
Temporary Impacts			
Laydown Areas	53 ha 131 ac	0	53 ha 131 ac
Utility Trenching	214 ha 529 ac	289.4 ha 715 ac	503.4 ha 1,244 ac
Subtotal	267 ha 660 ac	289.4 ha 715 ac	556.4 ha 1,375 ac
GRAND TOTAL	683 ha 1,688 ac	756.4 ha 1,869 ac	1,439.5 ha 3,557 ac

*38 ha (93 ac) are located in the Yuha Desert MA

[1] The water supply pipeline would be routed primarily within the Evan Hewes Highway Right-of-Way

The Project would be constructed in two phases for a total output of 709 MW. Phase I of the Project would consist of up to 12,000 SunCatchers built on approximately 40 percent of the Project site. Acreage impacts for Phase I construction would include 683 ha (1,688 ac) as listed in Table 1. The renewable energy from Phase I would be transmitted via the existing 500 kV, SDG&E Southwest Powerlink transmission line. Phase I construction is scheduled to begin fall 2010, and last for approximately 24 months.

Phase II would expand the Project by adding 16,360 SunCatchers, for a total of 28,360. Acreage cleared for Phase II construction would impact 756 ha (1,869 ac) as listed in Table 1. Phase II would require a new transmission capacity within the grid. The construction and operation of Phase II is contingent on the development of either the Sunrise Powerlink transmission line or additional transmission capacity in the SDG&E transmission system. Phase II of the project would be connected to the grid at the SDG&E Imperial Valley Substation via the new double circuit 230 kV transmission line. Phase II construction is scheduled to begin in the summer of 2012, and last for approximately 24 months.

Water would be needed for dust control and soil preparation during construction. Approximately 170,344 lpd (45,000 gpd) would be needed for the construction of Phase I. Phase II would require approximately 234,696 lpd (62,000 gpd). Construction water would be provided by the Dan Boyer Water Company. Water would be transported to the site via 26,498 liter (7,000 gallon) water trucks.

The site layout generally would consist of 46-m (150-ft) wide linear strips (rows) containing SunCatchers, their support infrastructure, and 3-m (10-ft) wide maintenance roads (the length of the 46 m (150 ft) wide rows would vary depending on location within the site). The primary building block for these rows consists of 1.5 MW solar generator groups, which contain 60 SunCatchers. Between each of these 46-m (150-ft) wide strips would be 23 m (75 ft) of avoided ground cover. Approximately 57 ha (141 ac) of primary drainages would also be avoided. The entire project would be fenced for security purposes, however the design of the fencing would be determined in coordination with the regulatory and resource agencies to protect sensitive ecological areas and address storm flows in washes (Figure 2).

Brush trimming would be conducted within the 46-m (150-ft) linear strips, which would consist of cutting the top of the existing brush while leaving the native plant root system in place to minimize soil erosion. To minimize shading on SunCatchers and prevent potential brush fire hazards, natural vegetation trimmings would be cleared in the area of each SunCatcher, as well as on either side of paved roadways. After brush has been trimmed, blading for roadways and foundations would be conducted between SunCatcher rows to provide access to individual SunCatchers. Blading would consist of limited removal of terrain undulations. Although ground disturbance would be minimized wherever possible, the Project applicant proposes that localized rises or depressions within the individual 1.5 MW solar groups would be removed to provide for proper alignment and operation of the individual SunCatchers. Paved roadways would be constructed as close to the existing topography as possible, with limited cut-and-fill operations to maintain roadway design slope to within a maximum of 10 percent.

Operations and Maintenance

Operations and maintenance (O&M) activities would occur 7 days a week, 24 hours a day to ensure SunCatcher availability when solar energy is available. O&M activities would include: brush trimming, SunCatcher maintenance, and SunCatcher mirror washing; each SunCatcher would require washing approximately once every month. Individual washings per SunCatcher would use approximately 53 liters (14 gallons) of water, with another "seasonal scrubbing" wash of approximately 159 liters (42 gallons) once every 3 months. Seasonal scrubbing would occur prior to peak electricity demand season, which is June through September. Mirror washing and dust control watering would comprise the primary water use for O&M activities, which is estimated at127,001 lpd (33,550 gpd), with total annual use of approximately 5 hectare-meter (38 acre-feet). Additionally, it is anticipated that heavy equipment would be used for scour repair and removal of sediment from the impacted washes for the life of the project.

The water for O&M needs would be supplied by the Seeley WWTF. The water would be treated to a tertiary level and pumped to the site via a 19 km (11.8 mi) force main pipeline constructed in Evans Hewes Highway. The water would be treated by reverse osmosis and stored on site.

Decommission

The planned life of the proposed Project is 40 years; however, if the Project is still economically viable, it could be operated longer. The Project may become economically noncompetitive before 40 years have passed, forcing early decommissioning. Whenever the Project is permanently closed, the closure procedure would follow a plan that would be developed as described below.

The removal of the proposed Project from service, or decommissioning, may range from "mothballing" to the removal of equipment and appurtenant facilities, depending on conditions at the time. Because the conditions and effects of the decommissioning are largely unknown at this time, these conditions would be presented to the CEC, BLM, and other applicable agencies. Once the impacts from the conditions are assessed, if effects exceed those analyzed herein, or if take of FTHL or PBS exceeds what is authorized, reinitiation of this biological opinion would be required.

Action area

Under the implementing regulations for section 7(a)(2) of the Act, the action area is defined as the reach of direct and indirect effects, as well as the analysis area for this opinion. The action area is also the area in which baseline conditions and cumulative effects are analyzed.

To define the action area for this project, we note that bighorn sheep are wide-ranging, large mammals living in a harsh desert environment that must cover relatively large areas to meet their resource needs. Because bighorn sheep conservation and management must be considered on a large, landscape scale, the proposed project may negatively affect the ability of PBS to utilize the

greater landscape that is now available to them. As a result, the action area needs to include the 2,630 ha (6,500 ac) solar plant site; the surrounding Coyote, In-Ko-Pah, and Jacumba Mountains; and the valley floor area stretching from the eastern boundary of the project west to the base of the mountains and south to the international boundary (Figure 3). For FTHL, the action area not only needs to include the Project site, but the offsite access roads, proposed 19-km (11.8-mi) water line, proposed 16.6-km (10.3-mi) transmission line, 45-ha (110-ac) construction laydown area east of Dunaway road, and 450-m (1,476-ft) buffer around the project site and all new project components to account for indirect effects of the development on FTHL (Young and Young 2005). Finally, the action area also includes the West Mesa Management Area where acquisition and management of land for the benefit of FTHL will be focused.

Conservation Measures

The proposed Project includes the following conservation measures (CM) and/or design features that will be implemented to avoid, minimize, and offset potential adverse effects to the FTHL and PBS. These measures were developed and coordinated with the BLM, CEC, and Project applicant and based on information in the Project BA, Draft SA/EIS, and supplemental material provided during the consultation process. The CM will be implemented during the project construction phase and during long-term O&M of the project. The Final SA/EIS includes additional measures to offset proposed Project impacts on rare and sensitive species, which will be implemented to further reduce impacts to biological resources on the proposed Project site.

1. Prior to ground disturbing activities, an individual will be identified as the Designated Biologist[2] (i.e., field contact representative); the Project applicant will ensure that the Designated Biologist position is always filled with a qualified Designated Biologist for the life of the project. Over the course of the Project, each successive Designated Biologist will be approved by the BLM's Authorized Officer (i.e., BLM field manager, El Centro) and the Energy Commission Compliance Project Manager (CPM). The Designated Biologist will have the authority to ensure compliance with the CM for the FTHL and will be the primary agency contact for the implementation of these measures. The Designated Biologist will have the authority and responsibility to halt activities that are in violation of the CM. A detailed list of responsibilities for the Designated Biologist is listed in measures BIO-2 and BIO-11 of the draft SA/EIS and is summarized below. To avoid and minimize impacts to biological resources, the Designated Biologist and/or biological monitor(s) (see number 2 below) will:

    - Notify BLM's Authorized Officer, CPM, and the CFWO at least 14 calendar days before initiating ground-disturbing activities.

[2] A qualified Designated Biologist must have (1) a bachelor's degree with an emphasis in ecology, natural resource management, or related science; (2) three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society (3) previous experience with applying the terms and conditions of a biological opinion; and, (4) the appropriate permit and/or training if conducting focused or protocol surveys for listed or proposed species.

- Immediately notify BLM's Authorized Officer, CPM, and the CFWO in writing if the Project applicant is not in compliance with any CM, including but not limited to any actual or anticipated failure to implement CM within the time periods specified.
- Be present during construction (e.g., grubbing, grading, SunCatcher installation) and O&M activities that take place in FTHL habitat to avoid or minimize take of FTHL. Activities include, but are not limited to, ensuring compliance with all impact avoidance and minimization measures, monitoring for FTHLs and removing lizards from harm's way, and checking avoidance areas (e.g., washes) to ensure that signs, stakes, and fencing are intact and that human activities are restricted in these avoidance zones.
- At the end of each work day, inspect all potential wildlife pitfalls (trenches, bores and other excavations) for wildlife and then backfill. If backfilling is not feasible, all trenches, bores, and other excavations will be contoured at a 3:1 slope at the ends to provide wildlife escape ramps, or completely and securely covered to prevent wildlife access.
- Conduct compliance inspections at a minimum of once per month after clearing, grubbing, and grading are completed and submit a monthly compliance report to BLM's Authorized Officer and CPM.
- During construction, examine areas of active surface disturbance periodically, at least hourly, when surface temperatures exceed 29°C (85°F) for the presence of FTHL.
- No later than January 31 of every year the Project remains in operation, provide the CPM, BLM's Authorized Officer, CFWO, CDFG, and the FTHL Interagency Coordinating Committee (ICC) an annual FTHL Status Report, which will include, at a minimum: 1) a general description of the status of the project site and construction activities, including actual or projected completion dates, if known; 2) a copy of the table in the Project biological monitoring report (see SA/EIS measure BIO-7) with notes showing the current implementation status of each conservation measure; 3) an assessment of the effectiveness of each completed or partially completed measure in avoiding and minimizing project impacts; 4) completed Horned Lizard Observation Data Sheets and a Project Reporting Form from the Flat-tailed Horned Lizard Rangewide Management Strategy (RMS) (FTHL ICC 2003); 5) a summary of information regarding the numbers of captured, relocated, and dead FTHLs; and 6) recommendations on how CM might be changed to more effectively avoid, minimize, and offset future project impacts on the FTHL.

2. Biological monitor(s) will assist the Designated Biologist in conducting surveys and in monitoring of mobilization, ground disturbance, grading, construction, operation, closure, and restoration activities. The biological monitor(s) will have experience conducting FTHL field monitoring, have sufficient education and field experience to understand FTHL biology, be able to identify FTHL scat, and be able to identify and follow FTHL tracks. The Designated Biologist will submit the resume, at least three references, and

contact information of the proposed biological monitors to the BLM, CEC, CDFG, and CFWO for approval.

3. Prior to Project initiation, a worker environmental awareness program (WEAP) will be developed and implemented, and will be available in both English and Spanish. Wallet-sized cards summarizing this information will be provided to all construction, operation, and maintenance personnel. The education program will include the following aspects:

   - Biology and status of the FTHL;
   - Protection measures designed to reduce potential impacts to the species;
   - Reporting procedures to be used if a FTHL is encountered in the field;
   - Driving procedures and techniques, for commuting to, and driving on, the Project site, to reduce mortality of FTHL on roads.

4. Temporary FTHL barrier fencing will be installed along the main construction access road, east of the Project site. FTHL barrier fencing will be built per specifications listed in Appendix 7 of the RMS to prevent FTHLs from entering these areas during construction. Barrier fencing will be inspected daily by the Designated Biologist or biological monitor(s) to ensure the fence sustains its effectiveness as a lizard-proof barrier. If FTHLs are encountered within the fence, the Designated Biologist or biological monitor(s) will remove the lizards per CM #7 below. Fencing will be removed upon completion of project construction and/or the access road is no longer used as a primary road.

5. FTHLs will be removed from harm's way during all construction, operations, and maintenance activities per CM #7. FTHL removal will be conducted by two or more biological monitors when construction activities are being conducted in suitable FTHL habitat. To the extent feasible, methods to find FTHLs will be designed to achieve a maximal capture rate and will include, but not be limited to using strip transects, tracking, and raking around shrubs. During construction, the minimum survey effort will be 30 minutes per 0.40 ha (30 minutes per 1 ac). Persons that handle FTHLs will first obtain all necessary permits and authorization from the CDFG. If the species is federally listed, only persons authorized by both CDFG and the Service under the auspices of this biological opinion will handle FTHLs. FTHL removal surveys will also include:

   - Accurate records maintained by biological monitors for each relocated FTHL, including sex, snout-vent length, weight, air temperature, location, date, and time of capture and release, a close-up photo of the lizard, and a photo of the habitat where the lizard was first encountered. To the extent feasible, a sample of the lizard scat will be collected. A Horned Lizard Observation Data Sheet and a Project Reporting Form, per Appendix 8 of the RMS, will be completed. During construction, quarterly reports describing FTHL removal activity, per the reporting requirements described in

CM #1, will be submitted to the Service, BLM, CEC, and CDFG. During O&M, FTHL removal reports will be included in the annual FTHL Status Report, per CM #1.

6. During O&M, the Designated Biologist or biological monitor(s) will evaluate and implement the best measures to reduce FTHL mortality along access and maintenance roads, particularly during the FTHL active season (March 1 through September 30). These measures may include reduced driving speeds, biological monitor escorts, or temporary fencing at designated locations. Implementation of these measures would be based on FTHL activity levels, the best professional judgment of the Designated Biologist, and site specific road utilization. FTHL found on access/maintenance roads will be relocated per CM #7.

7. The removal of FTHLs out of harm's way will include relocation to nearby suitable habitat in low-impact (e.g., away from roads and SunCatchers) areas of the Project site. Relocated FTHLs will be placed in the shade of a large shrub in undisturbed habitat. If surface temperatures in the sun are less than 24° Celsius (C) 75° Fahrenheit (F) or exceed 38°C (100° F), the Designated Biologist or biological monitor, if authorized, will hold the FTHL for later release. Initially, captured FTHLs will be held in a cloth bag, cooler, or other appropriate clean, dry container from which the lizard cannot escape. Lizards will be held at temperatures between 75° F and 90° F and will not be exposed to direct sunlight. Release will occur as soon as possible after capture and during daylight hours. The Designated Biologist or biological monitor will be allowed some judgment and discretion when relocating lizards to maximize survival of FTHLs found in the Project area.

8. To the maximum extent practicable, grading in FTHL habitat will be conducted during the active season, which is defined as March 1 through September 30, or if ground temperatures are between 24°C (75° F) and 38 °C (100° F). If grading cannot be conducted during this time, any FTHLs found will be removed to low-impact areas (see above) where suitable burrowing habitat exists, (e.g., sandy substrates and shrub cover).

9. The Project applicant will fund and implement, a Before-and-After Impact Study, to determine if FTHLs remain on the project site after construction. The study design will be reviewed and approved by the BLM, CDFG, ICC and the Service prior to ground-disturbing activities. At a minimum, the Study will include: parameters to be measured; sample size; level of effort per plot; assessment approach; data management; verification of scat source and extirpation of habitat; and reporting requirements.

10. To compensate for loss of FTHL habitat, the Project applicant will purchase and provide long-term management funding for 2,679 ha (6,619.9 ac) of suitable FTHL habitat within a FTHL MA. Long-term management funding will be determined through a Property Assessment Report (PAR) tailored to the specific acquisition. The land will be deeded and transferred to the BLM and managed consistent with the management activities

outlined in the FTHL RMS. Alternatively, the Project applicant may satisfy the requirements of this measure by depositing a sufficient amount of funds to cover acquisition and management of 2,679 ha (6,619.9 ac) of FTHL habitat in a MA into the Renewable Energy Action Team (REAT) Account established with the National Fish and Wildlife Foundation (NFWF), as described in the CEC's supplemental Staff Assessment, Condition of Certification BIO-10.

11. Transmission lines and all electrical components will be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Mitigating Bird Collisions with Power Lines (APLIC 2004) to reduce the likelihood of large bird electrocutions and collisions.

12. The boundaries of all areas to be disturbed (including staging areas, access roads, and sites for temporary placement of spoils) will be delineated with stakes and flagging prior to construction activities. Spoils will be stockpiled in disturbed areas lacking native vegetation or where habitat quality is poor. To the extent possible, disturbance of shrubs and surface soils due to stockpiling will be minimized. All disturbances, vehicles, and equipment will be confined to the flagged areas. To the extent possible, surface disturbance will be timed to minimize mortality to FTHL (see CM #8).

13. Temporarily disturbed areas associated with water pipeline and transmission line construction and staging areas, will be revegetated according to a Habitat Restoration Plan (HRP) approved by the BLM, CEC, CDFG, and Service. The HRP must be approved in writing by the aforementioned agencies prior to the initiation of any vegetation disturbing activities. Restoration involves recontouring the land, replacing the topsoil (if it was collected), planting seed and/or container stock, and maintaining (i.e., weeding, replacement planting, supplemental watering, etc.), and monitoring the restored area for a period of 5 years (or less if the restoration meets all success criteria). Components of the HRP will include:

    - The incorporation of Desert Bioregion Revegetation/Restoration Guidance measures. These measures generally include alleviating soil compaction, returning the surface to its original contour, pitting or imprinting the surface to allow small areas where seeds and rain water can be captured, planting seedlings that have acquired the necessary root mass to survive without watering, planting seedlings in the spring with herbivory cages, broadcasting locally collected seed immediately prior to the rainy season, and covering the seeds with mulch.

14. The Project applicant will install exclusionary fencing around the evaporation ponds and cover the evaporation ponds with 3.8-centimeter (cm) (1.5-in) mesh netting designed to exclude birds and other wildlife from drinking or landing on the water of the ponds. The netted ponds will be monitored regularly to verify that the netting remains intact, is fulfilling its function in excluding birds and other wildlife from the ponds, and does not

pose an entanglement threat to birds and other wildlife. The ponds will include a visual deterrent in addition to the netting, and the ponds will be designed such that the netting will never contact the water.

15. The Project applicant will use water for construction, operation, and maintenance (e.g., truck washing, dust suppression, SunCatcher washing, landscaping, etc.) in a manner that does not result in water ponding. During construction, the biological monitor(s) will patrol these areas to ensure water does not puddle and attract common ravens, and other wildlife to the site, and will make recommendations for reduced water application rates where necessary.

16. The Project applicant will prepare and implement a Raven Control Plan, approved by the BLM, CEC, CDFG, and Service, for the entire project site. The raven control plan will identify the purpose of conducting raven control and include, at a minimum, training on how to identify raven nests and how to determine whether a nest belongs to a raven or a raptor species; describe the seasonal limitations on disturbing nesting raptors; describe raven control methods to be employed (e.g. perching and nesting deterrents); and describe procedures for documenting the activities on an annual basis.

17. Debris (e.g., glass, metal) associated with SunCatcher fields will not be allowed to accumulate under SunCatchers. Any debris found will be immediately removed and appropriately recycled.

18. The Project applicant will implement a Weed Management Plan that will be subject to review and approval by the BLM, Service, CDFG, and the Energy Commission staff. In addition to describing weed eradication and control methods, and a reporting plan for weed management during and after construction, the final Noxious Weed Management Plan will include at a minimum:

    - A pre-construction weed inventory that includes a survey of the entire project site, for weed populations that: (1) are considered by the Imperial County Agriculture Commissioner as being a priority for control and (2) aid and promote the spread of wildfires (such as cheatgrass [*Bromus tectorum*], Saharan mustard [*Brassica tournefortii*] and medusa head [*Taeniatherum caput-medusae*]). These populations will be mapped and described according to density and area covered. These plant species will be treated prior to construction or at a time when treatments will be most effective based on phenology according to control methods and practices for invasive weed populations designed in consultation with the Imperial County Agriculture Commissioner's Office and California Invasive Plants Council (Cal-IPC), as appropriate.

    - For areas directly impacted by the Project, a pre-construction weed inventory will be conducted for those weed populations rated "High" or "Moderate" for negative ecological impact in the California Invasive Plant Inventory Database (Cal-IPC 2006). These weed species will be treated prior to construction or at a time when

treatments will be most effective based on phenology according to control methods and practices for invasive weed populations designed in consultation with Cal-IPC.

- Weed control treatments will include all legally permitted chemical, manual, and mechanical methods applied with the authorization of the Imperial County Agriculture Commissioner. The application of herbicides will be in compliance with all State and Federal laws and regulations under the prescription of a Pest Control Advisor (PCA) and implemented by a Licensed Qualified Applicator. Where manual and/or mechanical methods are used, disposal of the plant debris will follow the regulations set by the Imperial County Agriculture Commissioner. The timing of the weed control treatment will be determined for each plant species in consultation with the PCA, Imperial County Agriculture Commissioner, and Cal-IPC with the goal of controlling populations before they start producing seeds.
- For the lifespan of the project (i.e., as long as the project is physically present), long-term measures to control the introduction and spread of noxious weeds in the project area will be taken as follows:
    - The survey areas described above would be surveyed annually to monitor previously-identified and treated populations and to identify new invasive weed populations. The treatment of weeds will occur on a minimum annual basis, unless otherwise approved by the PCA, Imperial County Agriculture Commissioner, and Cal-IPC.
    - During project construction, all seeds and straw materials will be certified weed free, and all gravel and fill material will be certified weed free by the Imperial County Agriculture Commissioner's Office.
    - During project construction, vehicles and all equipment will be washed (including wheels, undercarriages, and bumpers) at an offsite washing facility (e.g., a car wash or truck wash) immediately before project construction begins and prior to returning to project construction should equipment be used in a different construction area. In addition, tools such as chainsaws, hand clippers, pruners, etc., will be washed at an offsite washing facility immediately before project construction begins and prior to returning to project construction should tools be used in a different construction area. Vehicles, tools, and equipment will be washed at an offsite washing facility should these vehicles, tools, and equipment have been used in an area where invasive plants have been mapped during the pre-construction weed control inventory and as directed by the Designated Biologist, prior to entering a project area free of populations of invasive plants (as determined by the pre-construction weed control inventory). All washing will take place where rinse water is collected and disposed of in either a sanitary sewer or landfill; an effort will be made to use wash facilities that use recycled water. A written daily log will be kept for all vehicle/equipment/tool washing that states the date, time, location, type of equipment washed, methods used, and staff

present. The log will include the signature of a responsible staff member. Logs will be available to the CEC, BLM, CDFG, the Service, and Designated Biologist for inspection at any time.

19. The applicant will purchase or restore wash foraging habitat at a 1:1 ratio, which will be permanently available for bighorn sheep. "Available" will be defined as wash habitat located in or immediately adjacent to the essential habitat line, as delineated in the Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California (Service 2000). The number of acres of wash habitat lost to bighorn sheep will be defined as the average percent cover of vegetation supported by the primary and secondary drainages mapped and considered jurisdictional by the Corps located within the perimeter fence of the project, which equals 100 ha (247 ac). It is anticipated the acreage requirement to offset impacts to bighorn sheep will be met through enhancement along Carrizo Creek and marsh on lands managed by California State Parks. The acreage needed for bighorn sheep will overlap with the acreage proposed to replace the functional losses to waters of the U.S., as required through the Corps section 404 permit.

SPECIES ACCOUNTS

Peninsular bighorn sheep (*Ovis canadensis nelsoni*)

Legal/Listing Status

Desert bighorn sheep within the Peninsular Mountain Ranges of the U.S. were federally listed as an endangered distinct population segment on March 18, 1998, (63 Federal Register [FR] 13134). A recovery plan was approved in October 2000, and 152,542 ha (376,938 ac) of revised critical habitat were designated on April 14, 2009, (74 FR 17288). The decision to list the PBS at the time was made because of declining population numbers and the continuing loss, degradation, and fragmentation of habitat throughout a significant portion of the range of the population. Due to human developments, the population segment had become isolated from other populations of desert bighorn sheep. In addition, periods of depressed recruitment, likely associated with disease and high predation, coincided with low population numbers endangering the continued existence of these animals in southern California. The California Fish and Game Commission listed bighorn sheep inhabiting the Peninsular Ranges as "rare" in 1971. In 1984, the designation was changed to "threatened" by the CDFG to conform to the terminology in the amended California Endangered Species Act. In addition, bighorn sheep in the Peninsular Ranges are "fully protected" under State law, per California Department of Fish and Game Code 4700, which does not allow "incidental take" of fully protected species.

Species Description

Bighorn sheep inhabiting the Peninsular Ranges were once considered a separate subspecies (*Ovis canadensis cremnobates*) and were one of the 4 desert subspecies (*O. c. nelsoni, O. c. mexicana, O. c. cremnobates,* and *O. c. weemsi*) recognized by Cowan (1940). The distinctiveness of these subspecies was questioned and reassessed when modern techniques

became available. Based on morphometric and genetic results, Wehausen and Ramey (1993) and Ramey (1995) placed the bighorn sheep in the Peninsular Ranges within the subspecies *O. c. nelsoni*, which is the currently accepted taxonomy. While the range of *O. c. nelsoni* or Nelson's bighorn sheep covers much of Nevada, Utah, southern California, and northwest Arizona (Monson and Sumner 1980), only the bighorn sheep from the Peninsular Ranges of the U.S. are listed under the ESA. Moreover, the Peninsular Mountain Ranges bighorn sheep, which are commonly referred to as PBS, were listed as a distinct population segment and not as a subspecies under the Act.

Habitat Affinities

Bighorn sheep in the Peninsular Ranges and throughout the desert southwest have important habitat requirements that relate to topography, visibility, water availability, and forage quality and quantity. Bighorn sheep evolved predator evasion behaviors that use escape terrain, which is generally defined as steep, rugged slopes (Hansen 1980a, Cunningham 1989). Escape terrain is critical because bighorn sheep typically do not depend upon speed alone to outrun their predators, but use their exceptional climbing abilities to out maneuver predators on steep, rocky outcrops and talus slopes (Geist 1971, McQuivey 1978). When ewes are ready to give birth they will typically seek out the most precipitous terrain, where they and their lambs will be safest (Geist 1971). The presence of such steep terrain for predator evasion and lambing is, therefore, a crucial component of bighorn sheep habitat.

The predator evasion behavior of bighorn sheep also depends on the ability to visually detect danger at a distance. Bighorn sheep will avoid habitat in which dense vegetation reduces visibility (Risenhoover and Bailey 1985, Etchberger *et al.* 1989). This appears to be the case in the Peninsular Ranges, where bighorn sheep usually remain below the elevation of chaparral and other dense vegetation associations. In the Peninsular Ranges, bighorn sheep habitat occurs along the east-facing desert slopes, typically below approximately 1,402 m (4,600 ft) elevations (Jorgensen and Turner 1975, DeForge *et al.* 1997). The patterns of vegetation associations in the Peninsular Ranges, in combination with bighorn sheep predator avoidance behavior, result in habitat use patterns that are more restricted to lower elevations than in most other bighorn populations. The available habitat of PBS can, therefore, be visualized as a long, narrow band that runs north-south along the lower elevations of the Peninsular Ranges.

Variations in slope and aspect also help bighorn sheep to survive in a harsh environment. During hot weather, desert bighorn seek shade under boulders, over hanging rocks, and cliffs, or they may move to north facing slopes (Merritt 1974, Andrew 1994) where temperatures are moderated. During inclement weather bighorns may again seek protected caves, overhangs, or slopes that are protected from strong winds, and on cold winter days bighorns may move to sunny, south facing slopes (Andrew 1994).

In addition to mountainous terrain, other types of habitat are crucial to bighorn sheep populations. Areas of gentle terrain, such as valley floors, serve as important linkages between neighboring mountainous regions, thereby providing bighorn sheep temporary access to

resources (e.g., forage, water, or lambing habitat) in neighboring areas, and allowing gene flow to occur between subpopulations (Krausman and Leopold 1986, Schwartz *et al.* 1986, Bleich *et al.* 1990, Bleich *et al.* 1996). Alluvial fans and washes contain a greater diversity of browse species than steeper terrain, and this diverse vegetation furnishes important sources of high quality forage (Leslie and Douglas 1979). In summer and times of drought, wash vegetation remains green longer than forages found on mountainsides under these conditions, thus providing forage higher in nutrients and digestibility (Andrew 1994, Crawley 1983, Laycock and Price 1970). Leslie and Douglas (1979) noted that these areas became increasingly important to bighorn sheep not only in summer, but during any period of limited forage availability. Bighorn sheep in the Peninsular Ranges have been observed foraging on alluvial fans for extended periods of time in Coyote Canyon and other undeveloped washes and alluvial fans within Anza-Borrego Desert State Park (Service 2000). In the northern Santa Rosa and San Jacinto Mountains, much of the alluvial fan and wash habitat has been lost to residential and golf course development (Service 2000).

In hot, arid deserts, water is an important resource for bighorn sheep (Jones *et al.* 1957, Blong and Pollard 1968, Leslie and Douglas 1979, Turner and Weaver 1980, Elenowitz 1984, Cunningham and Ohmart 1986). A number of studies have shown that desert bighorn sheep will concentrate around water sources in the summer, with most animals found within a 3-to-5-km (2-to-3-mi) radius of water (Jones *et al.* 1957, Leslie and Douglas 1979, Cunningham and Ohmart 1986). During periods of more abundant rainfall and cooler temperatures, sheep distribution is less coincident with permanent water sources (Leslie and Douglas 1979). Apparently, bighorn sheep obtain enough water from forage to meet their requirements during cooler, wetter portions of the year. Lactating ewes and lambs may be more dependent on free-standing water and are often found closer to water sources (Blong and Pollard 1968, Leslie and Douglas 1979, Bleich *et al.* 1997). Water sources are most valuable to bighorn sheep if they occur in proximity to adequate escape terrain with good visibility. Therefore, the juxtaposition of open escape terrain to water sources is an important factor in their utilization (Cunningham 1989, Andrew 1994). The critical importance of free-standing water to bighorn sheep has been questioned (Krausman and Leopold 1986, Broyles 1995), and some small populations apparently exist without free-standing water (Krausman *et al.* 1985, Krausman and Leopold 1986, Broyles 1995). However, in most populations, bighorn sheep will drink regularly when water is available, and they concentrate near water sources during the warmer months. In the Peninsular Ranges, bighorns migrate seasonally during the hot season, leaving mountain ranges where no standing water is known to exist, such as the Coyote Mountains, and moving to adjacent mountain ranges where standing water is available year-round. They then center their activity on standing water for the hot season, and this behavior may indicate that vegetation alone does not provide sufficient water during the hot season, and at least in some mountain ranges, standing water is a requirement.

In the Peninsular Ranges, bighorn sheep use a wide variety of plant species as their food source (Weaver *et al.* 1968, Jorgensen and Turner 1973). Turner (1973) recorded the use of at least 43 species, with browse being the food category most frequently consumed. Cunningham and Ohmart (1986) determined that the bighorn sheep diet in Carrizo Canyon (at the south end of the U.S. Peninsular Ranges) consisted of 57 percent shrubs, 32 percent forbs, 8 percent cacti, and 2

percent grasses. Scott (1986) and Turner (1976) reported similar diet compositions at the north end of the range. Diet composition varied among seasons (Cunningham and Ohmart 1986, Scott 1986), presumably because of variations in forage availability, selection of specific plant species during different times of the year (Scott 1986), and seasonal movements of bighorn sheep.

The time period surrounding late gestation, lambing, and nursing is very demanding in terms of the energy and protein required by bighorn ewes. Failure to acquire sufficient nutrients during late gestation and during nursing adversely affects the survival of newborn ungulates (Thorne *et al.* 1976, Julander *et al.* 1961, Holl *et al.* 1979). Crude protein and digestible energy values of early green-up species are usually much higher than those of dormant forages during the critical late gestation, lambing, and rearing seasons (Crawley 1983, White 1983). With their high nutrient content, even minor volumes of these forages within the overall diet composition may contribute important nutritional value at critical life stages (Wagner 2000). However, during the reproductive season, due to the varied topography of bighorn sheep habitat, these forages typically are concentrated on specific sites, such as alluvial fans and washes, where more productive soils support greater herbaceous growth than steeper, rockier soils. Furthermore, forage green-up follows an elevational gradient with lower elevations beginning spring growth earlier than higher elevations (Wehausen 1980, Berger 1991). Access to a range of elevations provides bighorn sheep enhanced opportunities to acquire nutrients during critical seasons (Hebert 1973, Wehausen 1980, Berger 1991).

Life History

The movement patterns and habits of ewes are learned by their offspring (Geist 1971). By following older animals, young bighorn sheep gather knowledge about escape terrain, water sources, foraging areas, and lambing habitat (Geist 1971). As young rams reach 2 to 4 years of age, they begin to follow older rams away from their natal group (Geist 1971, Festa-Bianchet 1991). Because bighorn sheep rely on vigilance to detect predators, they benefit from gregariousness and group alertness (Geist 1971, Berger 1978).

The adult sexes tend to loosely segregate during much of the year, coming together primarily during the rut (Geist 1971, Bleich *et al.* 1997), which typically peaks from August through October in the Peninsular Ranges (Rubin *et al.* 2000). During the rut, rams join the ewe groups and compete to breed with receptive ewes. The largest rams presumably are the most successful breeders, but smaller rams have been reported to breed as well (Hogg 1984). During the period of sexual segregation, ewes and their lambs are typically found in steeper, more secure habitat, while rams may be found in less steep or rugged terrain (Geist 1971, Bleich *et al.* 1997).

Desert bighorn sheep are primarily diurnal (Krausman *et al.* 1985), but they may be active at any time of day or night (Miller *et al.* 1984). Their daily activity pattern includes alternating feeding and resting/ruminating periods. Forage quality influences activity patterns because when forages are low in digestibility, bighorn sheep must spend more time ruminating and digesting forage. Consequently, bighorn sheep may establish a cycle of feeding and ruminating that reflects forage quality and optimizes nutrient intake (Wagner and Peek 1999, Wagner 2000).

In general, bighorn sheep are a wide-ranging species that requires large swaths of relatively pristine land. For example, in the San Jacinto Mountains, fixed-kernel home range sizes averaged 25 km^2 (9.65 mi^2) for rams and 20 km^2 (7.72 mi^2) for ewes (DeForge *et al.* 1997). Large home ranges allow for animals to move in response to variation in predation pressure and changes in resource availability. The size of individual or group home ranges depends on the juxtaposition of required resources (water, forage, escape, or lambing habitat) and, therefore, varies geographically. Home range size also is affected by forage quantity and quality, season, sex, and age of the animal (Leslie 1977, McQuivey 1978). Although most desert bighorn sheep do not seasonally migrate along elevational gradients like many populations in higher latitude mountain ranges, they do exhibit seasonal differences in habitat use patterns. In many populations, animals will have a smaller home range in summer (McQuivey 1978, Leslie and Douglas 1979, Elenowitz 1983), presumably due to their limited movement away from permanent water sources. During the cooler or wetter months of the year, bighorn sheep often exhibit an expanded range as animals move farther from water sources (Simmons 1980). Ewes generally display a higher degree of philopatry to their seasonal home ranges than do rams. Rams tend to range more widely, often moving among ewe groups (Boyce *et al.* 1997, DeForge *et al.* 1997, Rubin *et al.* 1998). In most populations of desert bighorn sheep, ram home ranges have been found to be larger than those of ewes (Simmons 1980, DeForge *et al.* 1997).

The gregarious and philopatric behavior of ewes limits their dispersal and exploratory ability relative to those of rams (Geist 1967, 1971). Geist (1971) theorized, however, that a young ewe might switch to a new ewe group if she encountered neighboring sheep and followed them away from her natal ewe group. In the Peninsular Ranges, movement of radio-collared ewes between ewe groups is rare; however, inter-group movement does occasionally occur. During a 3-year study, one ewe moved over 30 km (18.6 mi) and temporarily joined another ewe group (Rubin *et al.* 1998). No emigration of ewes has been observed even though radio-collared animals have been regularly monitored in the northern Santa Rosa Mountains since 1981 (Ostermann *et al.* 2001) and throughout the range since 1993 (E. Rubin *et al*. 1998; DeForge *et al.* 1997). Bighorn sheep evolved movement patterns that were adapted to exploiting stable patches of habitat, consequently compared to other North American ungulates they are regarded as poor dispersers (Geist 1971). Nevertheless, dispersal and exploratory movements do occur, and genetic analyses reflect a low rate of ewe dispersal across the Peninsular Ranges in the evolutionary past (Boyce *et al.* 1999). In 2005, two yearling ewes crossed Chino Canyon, and temporarily occupied the area north of the canyon in an exploratory movement documented by the Bighorn Institute.

The breeding period, or rut, occurs in the late summer and fall months. In the Peninsular Ranges, ewes estimated to be between 2 and 16 years of age have been documented to produce lambs (Rubin *et al*. 2000, Ostermann *et al.* 2001). As parturition approaches, ewes seek secluded sites with shelter, escape terrain, and unobstructed views (Turner and Hansen 1980). They isolate themselves from other females while bearing their lambs (Etchberger and Krausman 1999). Lambs are born after a gestation of approximately 6 months-171 to 185 days (Turner and Hansen 1980, Shackleton *et al.* 1984, Hass 1995). During a 4-year (1993 to 1996) study conducted in the Peninsular Ranges, south of the San Jacinto Mountains, the lambing season extended from February through August; however, 87 percent of the lambs were born from

February to April, and 55 percent of the lambs were born in March (Rubin *et al.* 2000). DeForge *et al.* (1997) and Cunningham (1982) reported a similar onset of the lambing season in the San Jacinto Mountains and in Carrizo Canyon, respectively. However, in the San Jacinto and Northern Santa Rosa Mountains ewe groups, the lambing season has started in January during some years (Bighorn Institute 1997). Lambs usually are weaned by 6 months of age (Hansen and Deming 1980, Wehausen 1980).

From 1993 to 1996, the reproductive patterns of five ewe groups [Carrizo Canyon, south San Ysidro Mountains, north San Ysidro Mountains, Santa Rosa Mountains (Deep Canyon), and northern Santa Rosa Mountains] were monitored and annual lamb production averaged 77 percent (0.77 lambs born per "ewe-year") for the 4-year period (Rubin *et al*. 1998). Using a fecal-based enzyme immunoassay, Borjesson *et al.* (1996) determined that in the fall of 1992, at least 85 percent of sampled adult ewes were pregnant. Both of these observations suggest that conception rates are not limiting population growth in the Peninsular Ranges.

Lamb survival (to 6 months of age) was variable among groups and across years. A year of high lamb survival in one group was not necessarily a high survival year in another group (Rubin *et al.* 2000). Of the four groups studied, the northern Santa Rosa Mountains group typically had the lowest lamb survival, while the neighboring Deep Canyon group, located less than 8 km (5 mi) away, had the highest lamb survival. Lamb recruitment in the northern Santa Rosa Mountains was found to be very low between the years of 1977 and 1997 (DeForge *et al.* 1982, DeForge and Scott 1982, Turner and Payson 1982; Ostermann *et al.* 2001). Shorter periods of low lamb to ewe ratios, as well as clinical signs of pneumonia among lambs, have occasionally been observed in Anza-Borrego Desert State Park (Jorgensen and Turner 1973, Jorgensen and Turner 1975, Hicks 1978), but years of high lamb to ewe ratios (Cunningham 1982; M. Jorgensen, *in litt* 2000) have been observed in these areas as well (Rubin *et al.* 2000).

Wehausen (1992) suggested that periods of low recruitment may not warrant alarm because long-lived animals such as bighorn sheep can exist in viable populations if periods of low offspring recruitment are interrupted by periodic pulses of high offspring recruitment. Most ewe groups in the Peninsular Ranges appear to have exhibited such recruitment pulses, but declining population trends suggest that at times they have not been sufficient to balance adult mortality.

In ruminants, reproductive success is related to the mother's body weight, access to resources, quality of home range, and age (Etchberger and Krausman 1999). Survival of offspring also depends on birth weight and parturition date. Festa-Bianchet and Jorgenson (1996) found that female sheep reduce the care of lambs when resources are scarce to favor their own nutritional requirements over their lamb's development. Ewes that fail to acquire a minimum level of energy reserves (i.e., body weight) may not conceive (Wehausen 1984) or will produce smaller offspring with a poorer chance of survival (Price and White 1985). Several studies have documented a positive relationship between winter precipitation and lamb recruitment in the following year (Douglas and Leslie 1986, Wehausen *et al.* 1987). However, the relationships between climate, lamb recruitment, and population trends likely differ among different bighorn sheep populations, and are not fully understood (Rubin *et al.* 2000).

Lamb and yearling age classes experience high mortality rates relative to adult bighorns. After reaching adulthood at 2 years of age, bighorn sheep survival is high until 10 years of age (Hansen 1980b), or until shortly before the age of ecological longevity (Cowan and Geist 1971). However, observed values of annual adult survivorship in the PBS appear low relative to other reported desert populations. During November 1992 to May 1998, survivorship of 113 adult radio-collared bighorn sheep (97 ewes and 16 rams) was monitored between State Route (SR) 74 in the Santa Rosa Mountains and the U.S.-Mexico border. During this period, overall annual adult survival was 0.79, with no significant difference among three age classes of adults (Hayes *et al.* 2000). Annual survivorship of individual ewe groups ranged from 0.70 to 0.87, and a year of high survivorship in one group was not necessarily a year of high survivorship in other groups (Rubin *et al.* 1998). In the northern Santa Rosa Mountains ewe group, adult survivorship was monitored during a 14-year period (1985 to 1998), and was found to range between 0.50 and 1.00 annually (Ostermann *et al*. 2001). In the San Jacinto Mountains, DeForge *et al.* (1997) monitored the survival of adult (2 or more years of age) radio-collared bighorn sheep during 1993 to 1996 and estimated annual adult survival to be 0.75.

Survival of desert bighorn sheep in greater southeastern California averaged 0.91 (Andrew 1994), 0.86 or greater in northwest Arizona (when highway mortalities were excluded (Cunningham and deVos 1992), 0.82 in New Mexico (Logan *et al.* 1996), and 0.85 or greater for four populations studied in the Mojave Desert (Wehausen 1992).

Distribution

Within the U.S., the range of PBS extends along the Peninsular Ranges from the San Jacinto Mountains in Riverside County south to the U.S.-Mexico border. Bighorn sheep habitat in the Peninsular Ranges of California is restricted to the east facing, lower elevation slopes that are typically below 1,402 m (4,600 ft) and located along the northwestern edge of the Colorado Division of the Sonoran Desert.

An examination of past records and current data suggests that the distribution of PBS in California has been altered during the past 25 years. Ewe groups along the Mexican border and in the northern San Jacinto Mountains (north of Chino Canyon) were apparently extirpated in the late1980s (DeForge *et al.* 1997; Rubin *et al.* 1998). DeForge *et al.* (1997) suggested disturbance and habitat fragmentation were the primary factors driving the changes in bighorn distribution in the northern San Jacinto Mountains. Blong (1967) reported that construction of the Tramway Road through Chino Canyon severely reduced bighorn movement in this area. Ewes ceased regularly occupying the northern San Jacinto Mountains about 20 years after construction of the Palm Springs Aerial Tramway in Chino Canyon, though rams continued to cross Chino Canyon and use the area formerly occupied by the ewe group (DeForge *et al.* 1997). However, ewes were recently documented crossing Chino Canyon in route to Blaisdell Canyon in 2005, where they remained for several days before re-crossing and returning to Tachevah Canyon (Bighorn Institute 2005). The group, consisting of adult ewes, female lambs and yearlings, and male yearlings; has been regularly located within Chino Canyon since 2005 (Bighorn Institute 2005, 2007).

The possible extirpation of the bighorn subpopulation between I-8 and the U.S.-Mexico border was poorly documented, but the construction of the Interstate in the mid-1960s, railroad activity, livestock grazing, poaching, and fire suppression appear the most likely factors contributing to the isolation and decline of bighorn sheep in the area (Rubin *et al.* 1998). Recently, bighorn sheep sightings and their sign have become common around the Mountain Spring area of I-8 (Service and CDFG, unpublished aerial census data, 2006, 2008). Bighorn sheep have been observed crossing this wide highway (J. Collins, Naval Air Facility El Centro, *in litt*. 2007, 2008), and bighorn sheep have been observed further south in the Jacumba Mountains by the U.S. Border Patrol (D. Kim, pers. *in litt*., 2007).

Rubin *et al.* (1998) suggested that in portions of the range, roads or increased traffic have contributed to habitat fragmentation by restricting ewe movement, as evidenced by four ewe groups whose home ranges were delineated by roadways. In the 1970s, ewes were observed crossing SR 74 in the Santa Rosa Mountains (D. Jessup, *in litt.* 1999). However, no radio-collared ewes were observed crossing this road from 1993 to 2001 (Service 2000). California Department of Transportation records indicated SR 74 traffic approximately tripled from 1970 onward. However, in recent years ewes have begun crossing SR 74 in at least two locations documented by the Bighorn Institute. Additionally, the number of crossings by rams near Vista Point has also increased, and several have been struck by automobiles. As a result, Caltrans has installed wildlife crossing signs in the area.

Population Trends

Bighorn sheep have been documented in the Peninsular Ranges since early explorers, such as Anza, observed them in the 1700s (Bolton 1930). Grinnell and Swarth (1913) described the area of Deep Canyon in the southern Santa Rosa Mountains, "...well worn trails, footprints, and feces were plentiful. In places it looked as though a herd of domestic sheep had been over the region." Rangewide population estimates were not made until the 1970s. Published estimates were as high as 971 in 1972, (Weaver 1972), and 1,171 in 1974 (Weaver 1975).

Range-wide population estimates in the U.S were 570 in 1988 (Weaver 1989), 400 in 1992 (Service 2000), and between 327 and 524 in 1993 (Torres *et al.* 1994). Starting in 1994, a biennial helicopter census has been conducted throughout the Peninsular Ranges using radio-collared animals to estimate sighting probabilities. The range-wide population estimates were 347, 276, 334, 400, 667, 708, 793, and 876 for the years 1994-2008, respectively. From the historic highs of the 1970s, population estimates declined to a low of 276 adults in 1996 (Service 2000); since 1996, the population has steadily increased. Currently, at least eight ewe groups (or subpopulations) exist in the overall U.S. range, however, the population trajectory of each ewe group appears to be determined independently (Rubin *et al.* 1998). Climatic patterns are correlated across the Peninsular Ranges, suggesting that other local factors specific to each ewe group play important roles in determining long-term abundance trends (Rubin *et al.* 1998). Independent population trends also were observed among ewe groups in the Mojave Desert (Wehausen 1992). Bighorn sheep are relatively long-lived animals that have the potential to reproduce over an extended period of time (2-16 years). Therefore, periods of above average

recruitment may compensate for periods of low recruitment (Wehausen 1992). Forage quality and quantity vary with environmental conditions; therefore, female condition, and conception, parturition and lamb survival rates reflect this natural variation. However, if mortality agents begin impacting adult survival, then subpopulation levels may drop dramatically, endangering the existence of a ewe group. Consequently, persistence of a ewe group is always vulnerable to disease outbreaks, high levels of predation, mortality caused by urbanization, and habitat loss from development and human disturbance.

An important influence on bighorn sheep population trends are their behavioral responses to human activity. Bighorn sheep were classified as a wilderness species by Aldo Leopold (1933) because they usually declined when confronted with expanding human developments and activities. Over the past 75 years, numerous other scientists and land managers have expressed concerns regarding the impact of human activities on bighorn sheep populations (Horesji 1976, Hicks and Elder 1979, Graham 1980, Leslie and Douglas 1980, Hamilton *et al.* 1982, Stemp 1983, Miller and Smith 1985, Gionfriddo and Krausman 1986, Krausman and Leopold 1986, Smith and Krausman 1988, Etchberger *et al.* 1989, Krausman *et al.* 2001, Papouchis *et al*. 2001). These concerns have been echoed in the Peninsular Ranges where bighorn sheep have altered their movement and habitat use patterns in response to human activity (Jorgensen and Turner 1973, Hicks 1978, Olech 1979, Cunningham 1982, DeForge and Scott 1982, Gross 1987, Sanchez *et al.* 1988). The impacts of human development extend beyond the urban edge into bighorn sheep habitat. Growing human populations and their increased activities adjacent to and within bighorn sheep habitat have the potential to adversely affect bighorn sheep by directly converting habitat to human uses and fragmenting remaining use areas. Additionally, the behavioral responses of bighorn sheep to human activities may alter how they utilize resources occurring in their environment. These altered behavior patterns may be less than optimal and could eventually negatively affect population trajectories.

Threat

Threats to bighorn sheep in the Peninsular Ranges include habitat loss and fragmentation, urban sources of mortality, human disturbance, disease, and mountain lion predation (Service 2000). As discussed above, the population dynamics of ewe groups operate independently, and threats to the various ewe groups vary spatially and temporally.

<u>Habitat Loss and Fragmentation:</u> Habitat loss is a leading cause of current species extinctions and endangerment worldwide (Burgman *et al.* 1993). It represents a particularly serious threat to PBS, because they live in a narrow band of lower elevation habitat that represents some of the most desirable real estate in the California desert, and it is being developed at a rapid pace. At least 7,490 ha (18,500 ac) or about 77.7 km^2 (30 mi^2) of suitable habitat has been lost to urbanization and agriculture within the range of the three ewe groups that occur along the urban interface between Palm Springs and La Quinta (Service 2000), and development is spreading southward towards Anza-Borrego Desert State Park. Within the narrow band of habitat, bighorn sheep make use of sparse and sometimes sporadically available resources found within their home ranges. As humans encroach into this habitat, these resources are eliminated or reduced in

value, and the survival of ewe groups is threatened. Bighorn sheep are also sensitive to habitat loss or modification because they are relatively poor dispersers (Geist 1967, 1971), largely learning their ranging patterns from older animals. When habitat is lost or modified, the affected group may remain within their familiar surroundings where they will experience a reduced likelihood of population persistence, due to the reduced quantity and/or quality of resources.

Encroaching urban development and anthropogenic disturbances have the dual effect of restricting animals to a smaller area and severing connections between ewe groups. Fragmentation poses a particularly severe threat to species with a metapopulation structure, such as PBS, because overall survival depends on interaction among subpopulations. Isolated, small groups of animals are subject to greater risks of extinction, while inter-connected, small groups acquire much of the resilience of larger populations. The movement of rams and occasional ewes between ewe groups maintains genetic diversity and augments populations of individual ewe groups (Brown and Kodric-Brown 1977, Soulé 1980, Krausman and Leopold 1986, Schwartz *et al.* 1986, Burgman *et al.* 1993). Temporary moves by females between neighboring ewe groups could also provide new habitat knowledge facilitating future range expansion (Geist 1971). Increased fragmentation reduces such possibilities and increases the risk of ewe group extinction.

Beyond physical barriers to movement, fragmentation also can result from less obvious forms of habitat modification. Increased traffic on roads apparently make bighorn sheep, especially ewes, hesitant to cross roads (Rubin *et al.* 1998; Epps *et al.* 2004). Animals that do cross suffer an additional risk of mortality from automobile collisions (Turner 1976, McQuivey 1978, Cunningham and deVos 1992, DeForge and Ostermann 1998, Bighorn Institute 1999), with the result that a group whose range is bisected by a road can have reduced viability in the long-term (Cunningham and deVos 1992).

Bighorn sheep evolved in the presence of predators, and developed effective physical and behavioral mechanisms for dealing with them. Similar to other desert bighorn populations, sheep in the Peninsular Ranges have likely experienced varying levels of lion predation for thousands of years. However, when other factors, such as drought, habitat loss and fragmentation due to urbanization, diseases, and other mortality factors reduce populations to low levels and/or alter the abundance and distribution of alternate prey species, such as mule deer, then the influence of predation on population dynamics may increase (Logan and Sweanor 2001). For example, prey populations frequently respond to the presence of mountain lions by changing their distribution at a landscape scale (Hornocker 1970). Where habitats have become fragmented by human developments, bighorns may not be able to move away from areas of high predation risk. In the Peninsular Ranges, coyotes (*Canis latrans*), golden eagles (*Aquila chrysaetos*) and bobcats (*Lynx rufus*) are also potential predators of bighorn sheep (Weaver and Mensch 1970, Jorgensen and Turner 1975, DeForge and Scott 1982).

<u>Disease:</u> The westward spread of Europeans and their domestic livestock across North America was thought to play a significant role in reducing the distribution and abundance of bighorn sheep due to the introduction of new infectious diseases (Spraker 1977, Onderka and Wishart

1984). In particular, domestic sheep have been repeatedly implicated in *Pasteurella* pneumonia die-offs of bighorn sheep. It has been hypothesized that disease has played an important role in the population dynamics of bighorn sheep in the Peninsular Ranges (DeForge *et al.* 1982, DeForge and Scott 1982, Turner and Payson 1982, Wehausen *et al.* 1987). Numerous pathogens have been isolated or detected by serologic assay from bighorn sheep in these ranges. These pathogens include bluetongue virus, contagious ecthyma virus, parainfluenza-3 virus, bovine respiratory syncytial virus (BRSV), *Anaplasma*, *Chlamydia*, *Leptospira*, *Pasteurella*, *Psoroptes,* and *Dermacentor* (DeForge *et al.*, 1982; Clark *et al.* 1985, 1993; Mazet *et al*. 1992; Elliott *et al.* 1994; Boyce 1995; Crosbie *et al.*, 1997, DeForge *et al.* 1997).

Response to Human Disturbance: Numerous bighorn sheep biologists and land managers have written about their experiences and observations concerning the impacts of human activity on bighorn sheep. These scientists and mangers developed their opinions by and large independently over a lengthy period of time (approximately 75 years). The overwhelming majority expressed concern, recounted increases in human activity with accompanying changes in bighorn sheep behavior, and at times decreased population levels. They almost universally recommended management of human activity in bighorn sheep habitat.

The strength of inference varies within the literature, ranging from simple opinion to reporting expensive and difficult to conduct field studies in peer-reviewed scientific publications. The most compelling evidence available is the local extinctions of bighorn sheep populations living next to expanding urban areas where bighorns experienced high levels of human activity within their home ranges (Krausman *et al.* 2001). Occasional encounters with humans that result in flight or other behavioral and physiological reactions are probably well within the abilities of bighorn sheep to tolerate. Bighorn sheep have evolved to deal with occasional disruptions of their usual behavioral patterns, such as the presence of a predator. However, it appears beyond a certain threshold of human activity, bighorns can simply be overwhelmed, and a number of factors interact to determine the effects of human activity on bighorn sheep.

Bighorn response to human activity is variable and depends on many factors, including but not limited to: the type and predictability of the activity, presence of domestic dogs, previous experience with humans, size or composition of the bighorn sheep group, location of bighorn sheep relative to the elevation of the activity, distance to escape terrain, and distance to the activity (Weaver 1973; McQuivey 1978; Hicks 1977, 1978; Hicks and Elder 1979; MacArthur *et al.* 1979, 1982; Wehausen 1980; Hamilton *et al*. 1982; Whittaker and Knight 1998; Papouchis *et al.* 1999).

The history of sheep and human interactions has shown that not all bighorn sheep react in the same way to human disturbance. As in humans, there are individual differences in behavior and different groups of sheep have had different experiences with humans (King and Workman 1986). A portion of individuals in some populations may not react as strongly to disturbance as others (Hicks and Elder 1979, Leslie and Douglas 1980, Papouchis *et al.* 2001). Different groups of bighorns may possess different “cultures” in terms of their reactions to human activities. Ewes with lambs typically are more sensitive to disturbance (Light and Weaver 1973,

Wehausen 1980) than groups without young. Attraction, habituation, and avoidance are behavioral events that should be placed in careful context with descriptions of the conditions under which the animal displayed a particular response. Individual animals or populations should not be labeled based on the limited responses of a few animals (Whittaker and Knight 1998).

Although the reactions of bighorn sheep to human activity are complex, for communication purposes it is useful to divide them into habitat effects and physiological effects. Habitat effects refer to the relocation of bighorn sheep away from human activity, and this can also be considered spatial displacement. The end result of moving away from humans reduces the options bighorns have for meeting their resource needs. Physiological effects refer to changes that occur within bighorn sheep when they perceive and react to danger or disturbance, such as elevated heart rate or the additional energy expended in moving away from sources of concern. In reality, habitat and physiological effects are not mutually exclusive, and both usually occur when sheep act to avoid danger or disturbance.

A variety of recreational activities such as hiking, mountain biking, hang gliding, horseback riding, camping, hunting, dog-walking, and use of aircraft and off-road vehicles have the potential to disrupt normal bighorn sheep social behaviors and use of essential resources, and cause bighorn sheep to abandon traditional habitat (Graham 1971, Jorgensen 1973 and 1974, McQuivey 1978, MacArthur *et al*. 1979, Olech 1979, Wehausen 1979, Graham 1980, Leslie and Douglas 1980, Monson and Sumner 1980, Wilson *et al.* 1980, MacArthur *et al*. 1982, Bates and Workman 1983, Wehausen 1983, Miller and Smith 1985, Cunningham and Ohmart 1986, Krausman and Leopold 1986, Armentrout and Brigham 1988, Krausman *et al.* 1989, Goodson *et al*. 1999, Papouchis *et al*. 1999, 2001). For example, Graham (1971) found that areas with more than 500 visitor-days of use per year resulted in a decline of use by bighorn sheep. Jorgensen (1974) reported that PBS use of an area of Anza-Borrego Desert State Park was reduced by about 50 percent on days when more recreational vehicle traffic occurred, versus periods of low or no vehicle use. Etchberger *et al.* (1989) found that habitat abandoned by bighorn sheep in the Pusch Ridge Wilderness had greater human disturbance and differences in vegetation and visibility as a result of fire suppression when compared to currently occupied habitat. In addition to recreation, construction, industrial, and agricultural activities may also disturb bighorn sheep (Krausman *et al*. 1989, Leslie and Douglas 1980).

Cases have been cited in which bighorn sheep populations did not appear to be greatly affected by human activity. However, even when bighorn sheep appear to be tolerant, continued and frequent human use of an area can cause them to eventually avoid the area, interfering with use of resources, such as water, mineral licks, lambing or feeding areas, or traditional movement routes (Jorgensen and Turner 1973, McQuivey 1978, Graham 1980, Leslie and Douglas 1980, DeForge and Scott 1982, Hamilton *et al.* 1982, Krausman and Leopold 1986, Rubin *et al.* 1998).

In addition to spatial displacement, human activity can result in physiological responses, such as elevated heart rate, even when no behavioral response is discernable, and the cumulative energetic cost of such responses may potentially affect the nutritional status of individuals and

potentially populations (Stemp 1983, MacArthur *et al.* 1979, 1982). Responses can range from cautious curiosity to immediate flight. Cardiac and behavioral responses of bighorn sheep to an approaching human were determined to be greatest when a person was accompanied by a dog or approached from over a ridge (MacArthur *et al.* 1979, 1982). When individuals perceive danger, changes can occur within the endocrine system along with increased heart rates. These changes are actually adaptive and evolved to deal with imminent danger, such as a mountain lion attack. However, long-term chronic activation of this "flight or fight" mechanism may cause physiological reactions that impair immune function, endocrine regulation, and growth and development (Desert Bighorn Council 1992). Additionally, bighorn sheep prevented from using preferred foraging areas or following normal activity patterns by frequent human disturbance may experience less than adequate nutrition, which can also adversely affect the immune system (Festa-Bianchet 1988, Wagner and Peek 1999).

Drought: Similar to predation, prolonged drought is a natural factor that can have negative impacts on desert bighorn sheep populations, either by limiting water sources or by affecting forage quality and quantity (Rosenzweig 1968, Hansen 1980a, Douglas and Leslie 1986, Wehausen *et al.* 1987). During drought years, the concentration of bighorn sheep near remaining water sources may increase competition for forage as well as water, thereby limiting population growth through density dependent regulation (Caughley 1977). In addition, increased density potentially renders animals more susceptible to diseases or parasites (Anderson and May 1979, May and Anderson 1979). Climate-change research indicates that warmer temperatures during the past 30 years have affected the function, composition and distribution of many ecological communities (Walther et al. 2002), and that future changes in climate are expected to affect the population dynamics of many species (McCarty 2001). Recent regional trends in warming and drying (Lane et al. 1994, Weiss and Overpeck 2005) have caused concern among scientists and managers for the persistence of desert bighorn sheep, especially in the drier mountain ranges of the southwest (Epps et al. 2004). A warmer and dryer climate may result in fewer sources of water and nutritious forage for PBS.

Exotic Vegetation and Fire Suppression: In the Peninsular Ranges, the presence of tamarisk (*Tamarix* sp.), also known as saltcedar, represents a serious threat to bighorn sheep. This exotic plant has rapid reproductive and dispersal rates (Sanchez 1975, Lovich *et al.* 1994), enabling it to out compete native plant species in canyon bottoms and washes. It has the following negative effects on bighorn sheep: 1) it reduces or eliminates the standing water on which bighorn sheep depend, 2) it out competes plant species on which bighorn sheep feed, and 3) it occurs in thick, often impenetrable stands that block access to water sources and it provides cover for predators.

Fire suppression can influence the distribution and habitat use patterns of bighorn sheep by causing avoidance of areas with low visibility (Risenhoover and Bailey 1985, Etchberger *et al.* 1989, Etchberger *et al*. 1990, Krausman *et al*. 1996). Long-term fire suppression results in taller, denser stands of vegetation, thereby reducing openness and visibility and making bighorn sheep more susceptible to predation (Sierra Nevada Bighorn Sheep Interagency Advisory Group 1997). In addition, Graf (1980) suggested that fire suppression reduces forage conditions on some bighorn sheep ranges. In the Peninsular Mountains, changes in vegetation succession are evident

in some portions of bighorn sheep habitat, primarily in higher elevation chaparral and pinyon-juniper, and this change has apparently decreased bighorn sheep use of certain canyons and springs (M. Jorgensen, Anza-Borrego Desert State Park, *in litt* 2000).

Border Crossing from Mexico: The number of individuals entering the U.S. from Mexico on foot continues to increase. Some of these individuals travel through the Peninsular Ranges and camp at water sources where they may occasionally kill and consume bighorn sheep, or displace them. Because in response the U.S. Border Patrol is increasing its enforcement activity along the border and in the southern Peninsular Ranges, the overall level of human activity in the area is increasing. This scenario may cause bighorn sheep to avoid areas they once used and may compromise bighorn sheep population connectivity between the U.S. and Mexico. In addition, the Federal government has constructed an intermittent fence along the border, which may prevent the movement of large mammals, as well as targeted humans, along some sections of the border. The locations of the constructed portions will likely funnel border crossing individuals into the Jacumba Mountains, where no fence has been constructed. The number of individuals traversing this portion of the Peninsular Ranges may increase as a result of the border fence design, causing the Border Patrol to also increase their activities in this portion of PBS habitat.

Flat-tailed horned lizard (*Phrynosoma mcallii*)

Legal/Listing Status

The FTHL is designated as a State Species of Special Concern by the CDFG and is listed as a threatened species in Mexico. The FTHL was initially proposed as a threatened species under the Act in 1993 (58 FR 62624). Since that time, the Service withdrew the species from listing three times (62 FR 37853, 68 FR 331, 71 FR 36745), while the courts subsequently reinstated proposed threatened status three times (66 FR 66384, 70 FR 72776, 75 FR 9377). While currently proposed for threatened status, a more detailed account of our previous Federal actions for FTHL can be found in our **Federal Register** notice published on March 2, 2010, (75 FR 9377).

In June 1997, seven Federal and State agencies signed a Flat-Tailed Horned Lizard Conservation Agreement to implement a Flat-tailed Horned Lizard RMS. The purpose of the RMS is to provide a framework for conserving and managing sufficient habitat to maintain several viable populations of the FTHL throughout the U.S. range of the species. The RMS was developed by FTHL ICC working group over a 2-year period. As part of the Conservation Agreement, agencies delineated specific areas under their jurisdiction as Management Areas (MAs). The MAs comprise 196,273 ha (485,000 ac), including 15,216 ha (37,600 ac) of private inholdings, of FTHL habitat managed by signatories of the Conservation Agreement within five MAs. The five MAs are the Borrego Badlands, West Mesa, Yuha Desert, East Mesa, and the Yuma Desert. These managed areas represent a habitat-based conservation strategy and are believed to represent approximately 40 percent of FTHL habitat remaining in the U.S.

The five MAs include large areas of public land where FTHLs have been found and include most

FTHL habitat identified as key areas in previous studies (Turner *et al.* 1980, Turner and Medica 1982, Rorabaugh *et al.* 1987, Foreman 1997). MAs were proposed based on accepted principles of preserve design, utilizing the best information available at the time (FTHL ICC 2003). Furthermore, the MAs were delineated to include areas as large as possible, while avoiding extensive, existing and predicted management conflicts (e.g., off-highway vehicle (OHV) open areas). The MAs are meant to function as core areas for maintaining self-sustaining populations of FTHLs in the U.S. (FTHL ICC 2003). Lands within the MAs have a development cap of 1 percent relative disturbance. Ocotillo Wells State Vehicle Recreation Area (SVRA) was designated as a Research Area under the Conservation Agreement. Research on FTHLs is funded and encouraged in this area.

Species Description

The FTHL was first described by Hallowell in 1852 as *Anota mcallii* after U.S. Army Colonel George A. M'Call (Funk 1981). The FTHL is a small phrynosomatid lizard that reaches a maximum adult body length of 8.4 cm [3.3 inches (in)] (Muth and Fisher 1992). The FTHL has a dorso-ventrally flattened body; long, broad flattened tail; and dagger-like head spines common to horned lizards of the genus *Phrynosoma.* The species is cryptic in color, ranging from pale gray to light rust brown dorsally, and white or cream ventrally. Males have enlarged postanal scales; females do not. The FTHL can be distinguished from the only other horned lizard known to occur within its range, the desert horned lizard (*Phrynosoma platyrhinos*), by its dark vertebral stripe, two rows of fringed scales on each side of the body, lack of external ear openings, and white or cream (unspotted) ventral surface with a prominent umbilical scar in most individuals (Foreman 1997). Apparent hybrids between the two species, exhibiting a mix of morphological characteristics, have been observed in the vicinity of Ocotillo, California (Stebbins 1985), and southeast of Yuma, Arizona (K. Young, Utah State University, pers. comm. 2002). Genetic analysis has confirmed hybridization in Arizona (Mendelson *et al.* 2004, Mulcahy *et al.* 2006).

Genetics

Because current FTHL populations are separated by significant barriers to movement (Colorado River, Salton Sea), genetic differences between populations may exist. To measure the genetic diversity of FTHL populations in relationship to current patterns of fragmentation, a genetic analysis of the FTHL and the desert horned lizard was conducted (Mendelson *et al.* 2004, Mulcahy *et al.* 2006). Populations were sampled in Coachella Valley, East Mesa, West Mesa, Ocotillo Wells SVRA, the Yuha Desert, the Yuma Desert, and Gran Desierto in Mexico. Sequences were also obtained from individual lizards from the southwest side of Laguna Salada valley in Mexico, north of Borrego Springs, and the southeast part of the range in Mexico. Mitochondrial DNA sequences were obtained of the ND4 gene from a total of 84 FTHLs.

Thirty unique haplotypes of FTHLs were recovered. Unique haplotypes were identified in Coachella Valley (3 unique haplotypes), Yuha Desert (4 unique haplotypes), Ocotillo Wells SVRA (6 unique haplotypes), East Mesa (1 unique haplotype), Gran Desierto Mexico (3 unique haplotypes), and Yuma (7 unique haplotypes). One shared haplotype was recovered from every

location where more than one sample was taken. Uncorrected pair-wise sequence divergence within FTHL ranged from 0-2.2 percent. Most individual sequences could be divided into two clades corresponding to each side of the Colorado River. The analysis indicates that the species expanded into its current range in past millennia and then developed unique haplotypes in each area it populated. The data are indicative of a relatively deep but incomplete divergence within an otherwise moderate-level range of variation among populations of FTHL. Low levels of population-endemic haplotypes exist.

The FTHL was found to be hybridizing with a subspecies of the desert horned lizard (*Phrynosoma platyrhinos goodei)* in the Yuma Desert. Mendelson *et al.* (2004) suggest that *P. p. goodei* is a full species and treat the matter further in Mulcahy *et al.* (2006).

Habitat Affinities

The FTHL is most commonly found in sandy flats and valleys dominated by creosote bush (*Larrea tridentata*) and white burr sage (*Ambrosia dumosa*) (Turner *et al*. 1980, Muth and Fisher 1992, Foreman 1997), which Sawyer *et al.* (2009) refer to as the *Larrea tridentata-Ambrosia dumosa* shrubland alliance or creosote bush-white burr sage scrub. Turner *et al.* (1980) stated the best habitats are generally low-relief areas with surface soils of fine packed sand or pavement, overlain with loose, fine sand. Flat-tailed horned lizards are also known to occur at the edges of vegetated sand dunes, on barren clay soils, and sparse saltbush communities, but Turner *et al.* (1980) suspected that these recorded occurrences were actually individuals that had dispersed from more suitable habitats. Within a creosote plant community in West Mesa, California, Muth and Fisher (1992) found that FTHLs preferred sandy substrates with white burr sage and Emory dalea (*Psorothamnus emoryi*), and avoided creosote and *Tiquilia plicata*. In Arizona, Rorabaugh *et al.* (1987) found FTHL abundance correlated with big galleta grass (*Hilaria rigida*) and sandy substrates, but suggested that the presence of sandy substrates were more important than that of big galleta grass. Beauchamp *et al.* (1998) described FTHLs occupying mud hills and gravelly flats. Altman *et al.* (1980) also reported finding FTHLs in desert pavement areas. Grant (2005) found the percent cover of sand and the number of black harvester ant (*Messor pergandei*) nests to be positively correlated with FTHL abundance.

Life History

Greater than 95 percent of the diet by prey item of FTHLs consists of ants of the genera *Messor*, *Pogonomyrmex*, *Conomyrma*, and *Myrmecocystus* (Turner and Medica 1982, Pianka and Parker 1975). *Messor pergandei* and *Pogonomyrmex* spp. are harvester ants that collect seeds of plants for food. Harvester ants are much larger than *Conomyrma* and *Myrmecocystus* and hence are probably more important prey sources. FTHLs are oviparous (egg-laying), early maturing, and may produce multiple clutches within a breeding season (Howard 1974). FTHLs produce relatively small egg clutches (Howard 1974), compared to most other horned lizards (Pianka and Parker 1975). The first cohort hatches in July to August (Muth and Fisher 1992; Young and Young 2000) in years of adequate rainfall. Approximately 50 millimeters (mm) (2 in) of rainfall in the previous September to May is enough to cause the first cohort to appear in July or August

(Grant 2005). Generally a second cohort then appears in the fall (Muth and Fisher 1992). In drier years, only one cohort is produced that emerges in the fall (e.g. Setser 2004, Muth and Fisher 1992). Hatchlings from the first cohort may reach sexual maturity after their first winter season, whereas hatchlings born later may require an additional growing season to mature (Howard 1974, Young and Young 2000). FTHLs can live up to at least 6 years in the wild (FTHL ICC 2003), and up to 9 years in captivity (Baur 1986). In the Yuma Desert, few lizards were found to live longer than 4 years (FTHL ICC 2003).

Based on studies of their daily movements, FTHLs are very active and have large home ranges compared to other sympatric lizard species of similar size (Miller 1999; Wone and Beauchamp 2003). Large variation in home range size was noted among individuals and between years (Miller 1999; Young and Young 2000); this variation may depend on gender and precipitation. However, FTHLs may not maintain distinct home ranges, but instead shift their area of use through time, thereby increasing the home range estimate with each additional location (Miller 1999). Mean home range size for FTHLs has been estimated between 0.56 ha (1.4 ac) and 10.3 ha (25.5 ac) (Muth and Fisher 1992; Miller 1999; Young and Young 2000; Setser 2004).

Adult FTHLs are reported to be obligatory hibernators (Mayhew 1965), although individuals have been noted on the surface during January and February (Wone and Beauchamp 2003). While most adults apparently hibernate during winter months, some juveniles may remain active (Muth and Fisher 1992, Grant 2005). Hibernation may begin as early as October and end as late as March (Muth and Fisher 1992). Individual lizards may hibernate for many months, or as short as one week (Muth and Fisher 1992, Grant 2005), or not at all (Wone and Beauchamp 2003). The date at which FTHLs enter hibernation in the fall depends on the size and weight of the lizard. Larger, heavier lizards begin hibernation sooner (Grant 2005, Grant and Doherty 2006). Hibernation burrows are constructed by the lizards themselves rather than using burrows constructed by other animals and are within 10 cm (3.9 in) of the surface (Muth and Fisher 1992). Mayhew (1965) found that the majority of lizards hibernated within 5 cm (2.0 in) of the surface. The greatest depth recorded was 20 cm (7.9 in) below the surface. Grant (2005) found the median depth of hibernating lizards (N = 31) to be 5 cm to the center of the dorsum.

FTHLs generally lie close to the ground and remain motionless when approached (Wone 1995). Individuals may also bury themselves in loose sand if it is available (Norris 1949). More rarely they may flee. Their propensity to remain motionless and bury themselves in the sand, along with their cryptic coloration and flattened body, make individual lizards difficult to find in the field (Foreman 1997) and increase their susceptibility to vehicle strikes. During the summer, FTHLs escape extreme surface temperatures by retreating to burrows (Rorabaugh 1994; Young and Young 2000; Wone and Beauchamp 2003).

Distribution

The FTHL, the most restricted range of any species of horned lizard in the U.S. (Stebbins 2003), is endemic to the Sonoran Desert in southern California, southwestern Arizona, and adjacent portions of Baja California and Sonora, Mexico (Turner and Medica 1982). Within California, the FTHL ranges from the Coachella Valley, the northernmost extent of its range, south along both sides of the Salton Sea and Imperial Valley. On the west side of the Salton Sea and Imperial Valley, the species ranges into the Borrego Valley, Ocotillo Wells area, West Mesa, and the Yuha Desert. On the east side of Imperial Valley, the species occurs in the vicinity of the Dos Palmas Area of Critical Environmental Concern, but predominantly occurs in East Mesa and in areas adjoining the Algodones Dunes (aka, Imperial Sand Dunes, Glamis Sand Dunes). In Arizona, the FTHL is found in the Yuma Desert south of the Gila River and west of the Gila and Butler Mountains (Rorabaugh *et al*. 1987). The FTHL is patchily distributed throughout its range, and was once recorded at 520 m (1,706 ft) above sea level, but is more commonly found below 250 m (820 ft) in areas with flat-to-modest slopes (Turner *et al*. 1980).

The range of the FTHL extends into Mexico from the international border in the Yuha Desert in California, south to Laguna Salada in Baja California, and from the international border in the Yuma Desert in Arizona, south and east through the Pinacate Region to the sandy plains around Puerto Penasco and Bahia de San Jorge, Sonora (Johnson and Spicer 1985, Gonzales-Romero and Alvarez-Cardenas 1989).

Historically, a portion of the range of the FTHL was periodically flooded by water from the meandering Colorado River that filled the Salton Trough (Basin) to varying depths (and areal extents), depositing sediments in the process. The lake that periodically formed is known as Lake Cahuilla. At its fullest extent to 12 m (39 ft) in elevation, Lake Cahuilla covered half of the Coachella Valley, the agricultural areas of the Imperial Valley, and a relatively smaller area in adjacent Mexico. The lake filled and evaporated 4 times from 700 to 1580 AD (Waters 1983). Before agriculture, the vegetation of the lakebed when it was dry was predominantly saltbush (Parish 1914).

The current distribution of the FTHL is not contiguous across its range. Large-scale agricultural and urban development, primarily in the Imperial and Coachella Valleys in the United States, and Mexicali and San Luis Valleys in Mexico, has increased fragmentation beyond current natural barriers. In addition, the Salton Sea, Colorado River, East Highline Canal, New Coachella Canal, and All American Canal are barriers to movement of FTHLs. Due to this habitat fragmentation and existing natural geographic barriers, the distribution of FTHLs is now divided on a broad scale into at least four geographically discrete U.S. populations, three in California and one in Arizona. The three in California include; Coachella Valley population, including those individuals northwest of the Salton Sea; Western Population, including those individuals in the areas west of the Salton Sea and Imperial Valley; and the Eastern Population, including those individuals in the areas east of the Salton Sea and Imperial Valley but west of the Colorado River. Additionally, populations occur in southwestern Arizona and Baja California and Sonora, Mexico.

A portion of the historical range of the FTHL has been modified by agricultural, urban, and industrial development and no longer supports the species but an indeterminable amount of this area was likely not suitable for FTHL prior to the aforementioned human related modifications upon the landscape. FTHL populations remain on public lands in several desert areas that receive limited protection under the RMS, as well as protected reserve land in Coachella Valley and unprotected private desert land.

The historical range of the FTHL has been estimated by Hodges (1997), and by the ICC in the RMS (FTHL ICC 2003). Within the Coachella Valley, the Scientific Advisory Group has provided estimates of the current range of the species. However, these estimates of historical range are based on assumptions of occupied FTHL habitat. Because most of the area was developed in the early twentieth century, we do not know how much of this now-developed area was suitable FTHL habitat.

Hodges (1997) estimated that the FTHL historically occupied up to 979,037 ha (2,419,200 ac) of habitat in Arizona and California prior to agricultural or urban development of either the Coachella or Imperial Valleys. Approximately 51 percent (503,173 ha [1,243,339 ac]) of this historical habitat remains in the U.S., with about 56,770 ha (140,300 ac) in Arizona and 446,390 ha (1,103,040 ac) in California (Hodges 1997). The Salton Sea trough could arguably be considered ephemeral historical habitat, present at some points and absent at others, as the area changed through time and was periodically inundated with water (historic Lake Cahuilla). Hodges (1997) included the Salton Sea as historical habitat. Additionally, Lake Cahuilla was periodically filled by flooding of the Colorado River through a network of temporary and semi-permanent drainages, all of which did not provide habitat for the FTHL when filled with water.

Table 2: Estimates of Flat-tailed Horned Lizard Range

	U.S.		**Coachella (subset of U.S figure)**		**Rangewide Total**	
	Historic	Current	Historic	Current	Historic	Current
Hodges (1997)	979,016 ha 2,419,200 ac	503,162 ha 1,243,341 ac	N/A	N/A	N/A	N/A
ICC (2003)	1,054,800 ha 2,606,468 ac	485,358 ha 1,199,345 ac	167,499 ha 413,900 ac	16,200 ha 40,030 ac	2,502,433 ha 6,183,647 ac	1,603,584 ha 3,962,543 ac
CVAG (2005)	N/A	N/A	179,745 ha 444,160 ac	162,200 ha 40,030 ac	N/A	N/A

The current range for the FTHL was estimated by using GIS information to eliminate areas from the historical range now converted to agriculture, urban areas and other anthropogenic disturbances (FTHL ICC 2003). For the Coachella Valley specifically, the habitat model for the FTHL was obtained from CVAG in 2002 and used to delineate the current range in the Coachella Valley. The habitat model for the Coachella Valley contains many small parcels of land in which FTHLs may already be extirpated or in which they cannot be expected to maintain viable

populations. These pieces were, however, included in the current range of the FTHL, which was estimated to be 1,603,584 ha (3,962,543 ac) in the U.S. and Mexico.

Johnson and Spicer (1985) estimated that in 1981 approximately 59 percent of the species range occurred in Mexico, with the majority of the range in Mexico occurring in the state of Sonora. However, the distribution of the species in Mexico is poorly understood because few surveys have been conducted to determine areas where the species occurs (CEDO 2002). In Sonora, about 14 percent of the habitat was estimated to be threatened by urban, agricultural or recreational use, and habitat degradation in 1981 (Johnson and Spicer 1985). In Baja California, considerable habitat loss has occurred in the Mexicali Valley, where urban and agricultural development extends from the Mexicali San Luis Valleys to the Colorado River (Johnson and Spicer 1985, Foreman 1997).

Approximately 60 percent of the species' range in Mexico is located within two areas provided with protection by the Mexican government: (1) the Upper Gulf of California and Colorado Delta Biosphere Reserve, and (2) the Pinacate and Gran Desierto de Altar Biosphere Reserve (CEDO 2002). The National Park of Pinacate is an area administered by the Mexican government with use restrictions similar to those in a national park in the U.S.. The Pinacate area is primarily a volcanic zone within which FTHL habitat is probably limited to the sandy perimeters of Volcan Pinacate. The Upper Gulf of California Biosphere Reserve includes FTHL habitat in the vicinity of the Colorado River Delta in Sonora, Mexico.

Population Trends

Information concerning size and dynamics of FTHL populations has increased greatly in recent years. From 1979 to 2001, population trends were monitored using scat counts and lizards observed along transects (Wright 2002). Different methods of transect selection, numbers and experience of observers, numbers of repetitions, and lengths and shapes of transects have been used from year to year (Wright 2002).

Methodologies that rely on scat counts to assess the relative abundance of FTHLs are confounded by several potential limitations (Wright 2002). Wright (2002) states that while differences in scat abundance could indicate differences in lizard abundance, the observed decline in the rate at which scat is found could also be a result of an increase in OHV activity resulting in crushed or buried scat, lower deposition rates, greater wind eradication, different observers, or additional factors. Furthermore, the use of scat counts does not account for variations in lizard activity, misidentification of scat from other species, variability in scat production due to fluctuating food resources, weather conditions that affect scat production or longevity in the field, observer differences, and small sample sizes (Muth and Fisher 1992, Rorabaugh 1994). Consequently, scat abundance may not be closely correlated with lizard abundance under varying conditions (Rorabaugh 1994, Beauchamp *et al*. 1998). In addition, the use of a relative index, such as scat counts, to indicate population trends are not reliable due to uncorrected bias that exists (discussed further below). Relative index techniques assume that any changes or differences in survey results are proportional to true changes or differences in the

populations of interest (Thompson *et al*. 1998). Thus, due to the significant limitations of scat count data, we consider the use of scat count information useful primarily in determining the presence and distribution of FTHLs in areas where desert horned lizards do not occur.

Two measures of abundance trends (i.e., lizards detected per 10 hours, and lizards per transect) used between 1979 and 2001 for the East Mesa, West Mesa, and Yuha Desert, did not include scat data (Wright 2002). No statistically significant trends were found in the rate at which lizards were detected or the number of lizards per transect on any of the areas from 1979 to 2001 (Wright 2002). The measure of lizards per transect has inherent error due to differences in transect lengths surveyed among years. More importantly, the methodologies used between 1979 and 2001 have varied and the data have not incorporated detection probabilities (Thompson *et al*. 1998). Because FTHLs are difficult to find in the field due to their cryptic coloration and behavioral characteristics, incorporating the probability of detecting them should be included in survey results.

Detectability is a common source of bias that is ignored for relative index techniques, such as the techniques used to collect the data between 1979 and 2001. Numerous factors may affect the detectability of animals within selected sampling plots. These include physical structure and cover, weather, individual behavior, and survey methodology. However, it is possible that differences in relative abundance found using uncorrected data may result from only a difference in detectability of animals between areas or within the same area across time (Thompson *et al*. 1998). Uncorrected bias could seriously affect the validity and usefulness of data in indicating abundance trends (Thompson *et al*. 1998).

The BLM recently estimated the population size on three MAs by using capture-mark-recapture (CMR) techniques incorporating detection probabilities (see Thompson *et al.* 1998, Williams *et al.* 2002). Grant (2005) analyzed the BLM FTHL mark-recapture data from four summer monitoring surveys of three Management Areas: the Yuha Desert MA in 2002, the East Mesa MA in 2003, the West Mesa MA in 2003, and the Yuha Desert MA again in 2004. The East Mesa MA was estimated to have 42,619 (95 percent CI = 19,704 to 67,639) adult lizards (over 65 mm snout-to-vent length) in 2003 and the Yuha Desert MA in 2002 was estimated to have 25,514 adult lizards (95 percent confidence interval = 12,761 to 38,970). The West Mesa MA was estimated to have 10,849 adult lizards (95 percent confidence interval = 3,213 to 23,486). The Yuha Desert in 2004 was estimated to have 73,017 adult lizards (95 percent confidence interval = 4,837 to 163,635). The West Mesa MA survey and the Yuha Desert MA survey of 2004 were based on sparse data, hence the large confidence intervals. No trend can be inferred from the 2 years of data in the Yuha Desert MA because the confidence intervals overlap. Young *et al.* (2004) surveyed the Yuma Desert MA using CMR and estimated a population of 25,855 (95 percent confidence interval = 16,390 to 43,951). A concurrent survey using distance sampling with a trapping web estimated a population of 16,328 adult lizards (95 percent CI 8,378 to 31,794); however, the data were ill-conditioned. The trapping web methodology is probably unsuitable because daily movements of FTHLs are too large relative to practical trapping web sizes.

Hollenbeck (2004) surveyed the Ocotillo Wells Research Area in 2003. The Ocotillo Wells Research Area is the Ocotillo Wells SVRA, an area open to OHV recreation. He estimated 19,222 lizards (95 percent confidence interval 18,870 to 26,752) in 2003. A similar survey completed in 2005 (Eric Hollenbeck, pers. comm.) estimated 24,345 adult lizards (95 percent confidence interval 14,328 – 69,922) and 37,085 young-of-the-year (95 percent confidence interval 22,165 to 74,811).

The Flat-tailed Horned Lizard RMS was revised in 2003 and CMR methodology was adopted as the standard for abundance and trend monitoring (FTHL ICC 2003). Presence/absence surveys in the framework of occupancy estimation (Mackenzie *et al.* 2003) were adopted for distribution monitoring (FTHL ICC 2003). A new monitoring plan using CMR and occupancy has been circulated for comments and is meant to form the basis of future FTHL monitoring.

Based on track monitoring in the Coachella Valley from 2002 to 2005 (CCB 2005), which may not be reliable due to an uncorrected bias that exists (Service 2008), it appears that Coachella Valley FTHL numbers declined for several years but mostly recovered in 2006. The abundance index for FTHLs is the mean number of trackways (a set of tracks laid down by one lizard) per transect. This index has dropped each year from nearly 1 in 2002 to approximately 0.1 in 2005 (CCB 2005). Anecdotally, while Dr. Cameron Barrows could find 10 FTHLs on the Coachella Valley Preserve in an hour in 2002, he was fortunate to find one in an hour in 2005 (Cam Barrows, pers. comm. 2006). In 2006, the index had returned to nearly 0.7. Such wide fluctuations make it difficult to determine the status of the species. The critical time period is at the low ebb of population size, when the population could fluctuate too low to recover. It is unknown how close the Coachella Valley population came to reaching this point in 2005.

The proposed Project site occurs within the geographically discrete FTHL Western Population, which includes areas west of the Salton Sea and the Imperial Valley. The Western Population includes approximately 252,999 ha[3] (625,175 ac) within the current mapped range of the FTHL, not including Mexico. There is no direct estimate of the FTHL population size for this population segment. Several FTHL MAs and one research area (RA) occur within this population segment, including the Yuha Desert MA, West Mesa MA, Borrego Badlands MA, and Ocotillo Wells SVRA RA (Figure 5). Recent data indicate that relatively large FTHL populations remain in the Yuha Desert and Ocotillo Wells SVRA RA (see above). The West Mesa MA also supports a lesser population of approximately 10,000 lizards (see above). Current population estimations for the Borrego Badlands MA do not exist. To date, impacts to FTHL habitat within the MAs that overlap the action area are below the 1 percent cap (Table 3) (Daniel Steward, BLM pers. comm. 2010).

[3] Acreage for the Western Population was calculated using GIS and the "current distribution" FTHL layer as defined in the Rangewide Management Strategy (FTHL ICC 2003).

Table 3 Acres Impacted To Date In the West Mesa and Yuha Desert Management Areas			
Management Area	**FTHL Suitable Habitat**	**Acres Impacted**	**Percent Impacted**
West Mesa	55,078 ha 136,100 ac	50 ha 123.11 ac	0.09
Yuha Desert	24,362 ha 60,200ac	*73 ha *180.01ac	0.30ac

*Includes acreage impacts from the proposed Sunrise Powerlink project.

Threats

Rangewide potential threats to the FTHL include: urban development (including renewable energy), OHV activity, military activities, introduction of exotic plants, pesticide use, and habitat degradation due to Border Patrol activities along the U.S.–Mexico border.

Numerous renewable energy developments have recently been proposed for construction within the California desert, primarily on BLM lands. Energy developments can result in surface disturbance that would modify FTHL habitat, likely making the area no longer suitable for FTHL. Several aspects of FTHL ecology and behavior contribute to the species' sensitivity to habitat loss and degradation. Among these are the following: 1) the FTHL is distributed over a relatively small area; 2) relatively low clutch size may limit the ability of FTHL populations to recover from declines; 3) FTHLs often freeze in response to danger, which makes them susceptible to mortality on roads and in other areas of activity; 4) FTHLs are found in valleys and flats where the majority of residential, agricultural, and energy development typically occurs; 5) FTHLs are susceptible to a variety of predators, many of which occur at elevated levels near agriculture or urban areas; and 6) FTHLs inhabit the most arid portions of the Sonoran Desert, in which drought is likely an important factor in population dynamics, which may be exacerbated by accelerated climate change.

Changes in weather patterns associated with global climate change, particularly the timing and amount of rainfall in the Sonoran Desert, are a potential threat to the FTHL. Assessments for the Sonoran Desert are few, but since the 1970s, the region appears to have experienced widespread warming trends in winter and spring, increased minimum winter temperatures, and more variable precipitation (Weiss and Overpeck 2005). Additionally, models developed to assess extinction risk to lizards due to climate change suggest that Phrynosomatid lizards are susceptible to increased risk of extinction because of intolerance to an increase in environmental temperatures (Sinervo *et al*. 2010). Therefore, the effects associated with global climate change may adversely affect the FTHL, but at this time, the level of uncertainty in climate predictions is high. While we recognize that climate change is an important issue with potential effects to listed species and their habitats, we lack adequate local information to make accurate predictions regarding the magnitude of potential effects to the FTHL.

OHV activity occurs at varying intensities throughout most remaining areas supporting FTHL habitat. Use guidelines within all of the FTHL MAs recognized in the RMS allow OHV use on existing or designated routes; however legal use is restricted to such routes in these areas. Four areas open to unrestricted OHV use in California are within the range of the FTHL: Plaster City Open Area, Superstition Hills Open Area, Imperial Sand Dunes Recreation Area; and Ocotillo Wells SVRA. Together, the four Open Areas comprise approximately 99,998 ha (247,100 ac) which is 21 percent of the approximately 485,358 ha (1,199,345 ac) of habitat remaining in U.S. Illegal OHV recreation is difficult to quantify, but occurs to some degree in many areas inside the MAs. Recreational use of OHV vehicle open areas has increased substantially since the 1980s, and is expected to continue to increase in the future. Visitation at California SVRAs, of which Ocotillo Wells SVRA is the largest, increased by 52 percent between 1982 and 2000 (CDPR 2002). The number of registered OHVs in California has increased by 108 percent since 1980 (CDPR 2002). While some research has demonstrated FTHL fatalities associated with vehicle use (Muth and Fisher 1992), the degree of impact to FTHL populations is not known. Grant (2005) found that hibernating FTHLs suffer low levels of mortality due to OHVs, but quantification of direct effects of OHVs on active (non-hibernating) lizards has yet to be undertaken. OHVs likely degrade habitat by destroying native plants which produce seeds which are the main food for the harvester ants *Messor pergandei* and *Pogonomyrmex* spp. These ants are the primary food for the FTHL.

The Department of the Navy administers land in FTHL habitat in Arizona and California. In California, the Navy has several bombing practice targets for Navy jets. The bombs used are generally dummy bombs with only a small charge that releases smoke to verify the strike. The impact of low-flying, loud aircraft has not been studied. The operations and maintenance of these targets likely has some level of effect. However, the military lands are off-limits to the public; thus, other sources of ground disturbance are limited.

Sonoran Desert vegetation, like vegetation in other deserts, rarely experiences fire "due to low primary productivity and limited production of fuels" (Brooks and Matchett 2006). However, invasive exotic plants, especially annual species (e.g., Mediterranean grass (*Schismus barbatus*)) increase the fine fuel load thereby increasing the frequency of fire (Brooks 1999). Invasive plants generally quickly recolonize sites following fire, which in turn encourages more frequent fires (Brooks and Esque 2002). As a result, increased fire frequency may result in the local extirpation of desirable woody shrubs and their replacement by more fire-tolerant herbaceous species, such as aforementioned invasive annual grasses (Paysen *et al.* 2000).

Invasive exotic plants pose a threat to the FTHL because FTHLs are found in areas with a high percentage of bare ground. Thick herbage is difficult for them to move through because of their wide bodies (Newbold 2005), perhaps making them more susceptible to predators. Additionally, dense stands of exotic plants shrink their field of view, making it more difficult to find prey. Exotic plant seeds may not be the ideal food resource for the ants that FTHLs prey on. Saharan mustard was estimated to cover 39.5 percent of sampled sand fields in the Coachella Valley Preserve in 2005 (Barrows 2005). The extent of invasive plant coverage in FTHL habitat throughout their range has not been measured, but may be increasing.

Pesticides used in agriculture are known to kill individual surface-foraging harvester ants, though colonies seem to recover quickly from a single treatment (FTHL ICC 2003). The chronic effects of pesticide drift are unknown and difficult to quantify. Foreman (1997) stated that the effects of applying broad-spectrum insecticide to desert scrub communities over many years are potentially many and complex. Pesticide/herbicide drift from croplands also has the potential to affect plant communities adjacent to agricultural areas. Although some pesticide drift is likely leaving agricultural areas and entering adjacent desert lands, the magnitude and effects of this drift have not been measured. Moreover, such effects are limited to areas in the immediate vicinity of agriculture, which is a small proportion of the FTHL range.

In Imperial and Yuma County, Border Patrol is highly active in patrolling the international border to intercept individuals crossing the border from Mexico. The Border Patrol has no restrictions on desert access and can drive off-road. The border area is enduring impacts from Border Patrol traffic, as well as, the associated driving through the desert by individuals attempting to pick up border crossers from Mexico.

Some of these threats have been reduced since the development and implementation of the RMS and we anticipate a further reduction of threats with continued implementation of the RMS. A more detailed analysis of these threats can be found in the RMS (FTHL ICC 2003), which is hereby incorporated by reference.

Synopsis of Status

Recent data indicate that relatively large FTHL populations remain in the East Mesa, Yuha Desert, and Yuma Desert MAs and the Ocotillo Wells SVRA. The West Mesa MA also supports a lesser population of approximately 10,000 lizards. Based on recent CMR surveys in these MAs, the species consistently can be found in all of the MAs, which include 40 percent of the remaining range in the U.S. Additionally, based on a recent report (Service 2010) analyzing several years of occupancy and demographic data on four of the MAs (East Mesa, West Mesa, Yuha Basin, and Yuma Desert) and the Ocotillo Wells State Vehicular Recreation Area, it was concluded that FTHL populations in these four locations are not low and have not declined since 2007 and probably not declined since 1997. Currently the lizard is afforded protection under a Conservation Agreement that entails implementation of the RMS. This strategy established the five MAs (West Mesa, East Mesa, Yuha Desert, Yuma Desert, and Borrego Badlands) with the goal of maintaining viable populations of FTHLs. If this voluntary management strategy continues to be implemented over the long term, the FTHL likely will remain in designated FTHL MAs.

ENVIRONMENTAL BASELINE

Project Site

The proposed Project site is located within the Lower Colorado River Valley Subdivision of the Sonoran Desert (Shreve and Wiggins 1964), in gently rolling open terrain predominantly

consisting of creosote bush-white burr sage scrub. This region is characterized as a hot and dry climate with summer high temperatures up to 48.8^{o} C (120° F) and less than 7.6 cm (3 in) of annual rainfall (ASDM 2010). The majority of the precipitation falls in the winter and spring months with occasional monsoonal thunderstorms (CDWR 2009).

Habitats in this region vary with the topography and precipitation levels. The area to the east of the Project site supports irrigated agricultural lands. Areas to the south, west, and north are dominated by creosote bush, white burr sage, brittle bush (*Encelia farinosa*), and several species of cactus. Other plant species observed on the project site include tamarisk (*Tamarix* sp.), ocotillo (*Fouquieria splendens*), silver cholla (*Opuntia echinocarpa*), and mesquite (*Prosopis* sp.). Shrub density ranges from moderate to low. Substrates on the proposed Project site include desert pavement, coarse sand, and sandy wash. Compared to the washes, the upland areas of the project site furnish less forage in terms of quantity and quality for bighorn sheep. Sparse stands of tamarisk and mesquite mixed with creosote scrub are primarily concentrated within several dry washes that transect the property. Disturbed areas are mostly limited to dirt roads and OHV trails that traverse the Project site.

An existing SDG&E transmission line traverses the site from the northwest to the southeast. North of the site is the USG wallboard manufacturing facility (known as Plaster City), which is located on Evan Hewes Highway approximately 3 miles west of the intersection of Dunaway Road and Evan Hewes Highway. The southern border of the proposed Project is adjacent to I-8, where currently no fence exists. However, the interstate may still inhibit bighorn sheep inter-mountain movements due to the almost continual traffic.

The western portion of the proposed Project site (west of the SDG&E transmission line) is characterized by rolling terrain with well-defined washes. East of the SDG&E transmission line, the terrain has uniform and gentle slopes. The area adjoining the proposed Project is primarily undeveloped recreational desert land. Other land uses in the area surrounding the Project site include BLM-administered public land zoned for multiple use, including an OHV Open Area (Plaster City Open Area), and private land containing agricultural, residential, and industrial uses. The Yuha Desert Area of Critical Environmental Concern (ACEC), is just south of I-8, this ACEC overlaps the Yuha Desert FTHL MA.

Status of the Species in the Action Area

Peninsular Bighorn Sheep

<u>Past Peninsular Bighorn Sheep Consultations in the Area</u>

Formal Section 7 Conference Opinion on the effects of the Proposed Jimenez Pit Sand and Gravel Mine, Imperial County, California (Reference no. 1-6-98-F07) February 1998.

> The Jimenez Pit project is located on 41 ha (100 ac) within the boundaries of two, 65 ha (160 ac) unpatented claims, and it involves mining 5,896,701metric tons (6.5 million

tons) (an average of 226,796 metric tons (250,000 tons) per year) of aggregate over an estimated 30-year period. The action impacted waters of the U.S. and required a section 404 Clean Water Act permit from the Army Corps of Engineers. The project is located in Peninsular bighorn sheep habitat, and on an alluvial fan at the base of the Coyote Mountains.

Formal Biological Opinion on the effects of California Desert Conservation Area Plan, Bureau of Land Management, Riverside and Imperial Counties, California (Reference no. FWS-ERIV/IMP-2810.2), December 2002.

To provide for management of recreational use, and to resolve other resource and public land use conflicts, section 602(d) of FLPMA directed the Secretary of the Interior to "prepare and implement a comprehensive, long-range plan for management use, development, and protection of the public lands within the California Desert Conservation Area." As such the CDCA Plan is an over-arching or programmatic plan from which activity-level or more site-specific plans are tiered.

Formal Biological Opinion on the effects of Western Colorado Amendment to the CDCA Plan, Bureau of Land Management route designation, Imperial County, California (Reference no. (FWS-IMP-3327.1) December 2002.

To improve the conservation and management of biological resources, especially threatened and endangered species, five bioregional planning areas were designated within the CDCA Plan area, including the Western Colorado Amendment area. The WECO amendment consisted entirely of route designations on BLM lands within Imperial County, California.

Formal Consultation on the effects of Sand and Gravel Mining Along the Slopes of the Coyote and Jacumba Mountains, Imperial County, California, Bureau of Land Management permits for sand and gravel extraction from public lands (Reference no. FWS-ERIV-3371.1) July 2003.

Sand and gravel mines have operated along the southwestern edge of the Coyote Mountains and eastern edge of the Jacumba Mountains for decades, and the Bureau of Land Management (BLM) has routinely issued permits and contracts authorizing the extraction of sand and gravel (aggregate). Bighorn sheep in the Peninsular Ranges were listed as endangered by the Service on March 8, 1998, and critical habitat was designated on February 1, 2001. Consequently, the mines operating on BLM lands in the Coyote and Jacumba Mountains were included within the boundaries of designated critical habitat; and actions taken by the BLM regarding these mines required consultation with the Service under section 7 of the ESA.

Formal Consultation on the effects of Sunrise Powerlink Transmission Line, Imperial and San Diego Counties, California, Bureau of Land Management Right-of -Way permit (Reference no. FWS-2008BO423-2009F0097) January 2009 (currently reinitiated).

> The entire project spans 193 km (120 miles) between El Centro and southwestern San Diego County. The proposed ROW bisects bighorn sheep habitat and critical habitat within the I-8 Island, where approximately 30 to 50 bighorn sheep live year-round. The construction phase of the project is likely to cause temporary displacement of bighorn sheep due to the numerous low-elevation helicopter flights and the elevated levels of human activity necessary to construct the project. The applicant is currently reinitiating section 7 consultation on Peninsular bighorn sheep, and no ground disturbance or construction has occurred to date.

The incidental take resulting from the above past consultations has not been exceeded. All of the ewe groups in the action area, as defined in the Recovery Plan (Service 2000), appear to be stable or increasing in abundance.

Species Abundance within the Action Area

Carrizo Canyon (also referred to as Carrizo Gorge) is a large north-south drainage bordered on the west by the In-Ko-Pah Mountains and on the east by the Jacumba Mountains. The southernmost recovery region identified in the Recovery Plan was designated the Carrizo Canyon/Tierra Blanca Mountains/Coyote Mountains Recovery Region (Service 2000). Available evidence indicates that Carrizo Canyon serves as the core use area for bighorn sheep in the greater area; however, different subsets of the Carrizo Canyon population migrate seasonally to the Tierra Blanca and Coyote Mountain ranges, during the cooler, wetter months of the year. Approximately, 50 bighorn move across County Highway S2 in the fall to the Coyote Mountains, where they generally remain for 6 to 8 months. Although recent observations indicate that some animals are remaining in the Coyote Mountains for longer periods of time, including year-round (R. Botta, CDFG, pers. comm., 2010). There are no known water sources in the Coyote Mountains, and the group eventually returns to Carrizo Canyon where there are permanent water sources available during the hot season. Bighorn sheep moving from Carrizo Canyon to the Coyote Mountains temporarily reduces the density of animals living near the permanent water sources in Carrizo Canyon. This reduction in density provides an opportunity for forage resources to recover from the higher levels of browsing experienced during the summer months. Bighorns migrating to the Coyote Mountains may acquire lower levels of intra-specific competition for quality forage during the cooler, wetter months, and the Coyote Mountains may also provide parturition and lamb rearing areas where predation risk from mountain lions is lower than Carrizo Canyon.

On March 25, 2009, a group of four female and one yearling bighorn sheep were observed on the western portion of the project site by a biological consultant (J. Platt, *in litt* 2009). At least one of the adult ewes appeared to be pregnant, none of the animals observed appeared to be radio-collared, and the group was following a wash in a northwest to southeast direction (Figure 3). The proximity of the group to the Coyote Mountains supports the assumption that the group originated in the Coyote Mountains.

The Jacumba Mountains form the east side of Carrizo Canyon, and extend southward into Mexico. Bighorn sheep populations inhabiting this area were poorly known prior to 1968 (Weaver *et al.* 1968). Starting at that time, CDFG initiated a state-wide inventory of desert bighorn sheep. Methods included ground and aerial surveys, waterhole counts, and interviews with local residents. Due to funding and time constraints, information for the Jacumba Mountains was obtained mainly by interviewing local residents, with some having lived and worked in the area as far back as 1919. For example, Lloyd Lovell was raised in the area by the McCain family, early ranchers and namesakes for nearby McCain Valley. Lovell related that the area north and including Devil's Canyon had been good sheep habitat in his youth and he frequently observed them in the area. At the time of the Weaver *et al*. survey, the number of sheep in the area appeared reduced compared to earlier years. Based upon interviews and limited ground surveys, Weaver *et al.* (1968) estimated the number of bighorn sheep using Devil's Canyon at 12 animals, the number south of the I-8 corridor at 20 individuals, and the number inhabiting Carrizo Gorge to the north at 20. The Jacumba Mountains south of the I-8 corridor were mapped as containing a permanent population of bighorn sheep. The surveys were continued for 3 years and the final population estimate for the Jacumba Mountains was 83 total animals (Weaver 1972).

Hicks (1978) reported a study of the status and distribution of bighorn sheep in the In-Ko-Pah Mountains, which mentioned a sighting of bighorn sheep attempting to cross I-8 near Myer Creek during spring 1978. When questioned, highway maintenance crews said they had not observed sheep in the area since 1971. Additionally, the area around Mountain Springs and I-8 was mentioned as an area containing bighorn sheep by border crossing individuals from Mexico (Hicks 1978). The number of sheep inhabiting the In-Ko-Pah and Jacumba Mountains was estimated at 80 to 100 animals. Cunningham (1982) studied bighorn sheep in the area soon after Hicks (1978), and observed that I-8 acted as a barrier to sheep movement. He reported that > 30 bighorn sheep were believed to inhabit the area south of the Interstate. Cunningham (1982) speculated that the area around the I-8 Island was once important bighorn sheep habitat because six water sources existed relatively close to the highway from In-Ko-Pah to Ocotillo. Local residents also reported that three of these springs had been used by bighorn sheep, and highway department personnel stated that bighorn sheep were common when construction of I-8 began. The Interstate most likely bisected a once continuous distribution of bighorn sheep (Cunningham 1982). In summary, bighorn sheep populations in the Jacumba Mountains north of I-8 to Carrizo Gorge were well studied and documented by field biologists (see also Olech 1979 and Sanchez 1988). However, population estimates for the area from I-8 to the Mexican border were largely derived from interviewing local residents and highway department personnel.

Helicopter surveys became the favored method for surveying bighorn sheep populations inhabiting remote, roadless areas in the 1980s. A limited number of flights occurred south of I-8, because few animals were regularly observed (Rubin *et al.* 1998). However, a small population of < 25 animals was assumed to exist south of the Interstate as reported in 1994 (Torres *et al.* 1994), when regular biennial, range-wide helicopter surveys of the Peninsular Ranges were started by CDFG. A subsequent aerial survey of the area failed to find any bighorn sheep south of the Interstate or around the I-8 Island, and this subpopulation of bighorn was

assumed to be extirpated by 1996 (Torres *et al.* 1996, Rubin *et al.* 1998, Service 2000). Therefore, subsequent aerial surveys spent minimal time south of Carrizo Gorge (Rubin *et al.* 1998). The construction of I-8 in the mid-1960s, railroad activity in Carrizo Gorge, livestock grazing, poaching, and fire suppression were suggested as the likely causes of the decline and disappearance of bighorn sheep in the I-8 area south to the Mexican border (Rubin *et al.* 1998).

Helicopter surveys conducted in the mid-1990s, in Baja Norte, Mexico, documented bighorn sheep south of the border in the Sierra Cucapa Mountains, although the number of bighorn sheep recorded was low and numbers of domestic livestock were considered high compared to neighboring mountain ranges in northern Baja (DeForge *et al.* 1993). Bighorn sheep are also known to inhabit the Sierra Juarez, which is located immediately south of the Jacumba Mountains in Mexico. Portions of the Sierra Cucapa and Sierra Jurarez are visible from the Coyote and Jacumba Mountains, and the Imperial Solar project site (Figure 3). The distance from the Coyote Mountains to the northern extent of the Sierra Cucapa Mountains is approximately 26 km (16 mi), and the distance from the Coyote Mountains to the Sierra Juarez is 32 km (20 mi).

For approximately 10 years, bighorn sheep were regarded as absent from the I-8 corridor and southern Jacumba Mountains. Starting in January 2006, bighorn sheep sightings began occurring on a regular basis in the Jacumba Mountains. The first sightings were from the U.S. Border Patrol, and they were centered on the Mountain Springs area, including the I-8 Island. The November 2006 CDFG aerial survey detected two ewes in Devil's Canyon and six ewes, four lambs, and four rams overlooking the east-bound lanes of I-8. Follow-up hikes through the area by Dr. Esther Rubin and Service personnel revealed bighorn sheep tracks and fecal piles. Automatic cameras were set up at the permanent water source at Mountain Springs, and several groups of bighorn sheep were photographed and observed. The BLM also supplied photographs and point locations of bighorn sheep observed in the area. During 2007, several visits to the I-8 Island area were made by Service biologists and Caltrans personnel and each observed sheep tracks and fecal pellets. The November 17, 2008, CDFG aerial survey detected five groups of bighorn sheep totaling 30 individuals, which were located within the I-8 Island and just north of the west bound lane. Due to insufficient funds, the aerial survey did not cover the entire area south of I-8 to the international border. Bighorn sheep were subsequently reported south of I-8 by the U.S. Border Patrol and by Art Davenport, a biological consultant. A field-trip to the border area on April 24, 2008, detected fecal pellets in lower Pinto Wash, which based upon the elevation, topography, and micro-site, have a probability of being of bighorn sheep origin. Funding was obtained from the Department of Homeland Security for capture operations to occur south of I-8 during October 2009, and nine sheep were successfully captured in the I-8 Island area.

Based upon the plentiful tracks leading under the two bridges that span Devil's Canyon, it is apparent bighorn sheep are using these bridges as underpasses to access the approximately 1,214 ha (3,000 ac) island of habitat between the east and west bound lanes. On the east bound side there are no similar bridges, only large culverts and smaller, lower bridges. Questions remain as to whether the east bound lanes pose a significant obstacle to sheep movement. It is unknown if

bighorns use the culverts at times. However, there have been several sightings of bighorn sheep crossing I-8 on the highway surface (J. Collins, Naval Air Facility El Centro, *in litt.* 2007, 2008) and the California Highway Patrol confirmed that an adult ram was killed on the east bound lanes on August 12, 2008.

In summary, bighorn sheep appear to have re-colonized the I-8 Island area and at least occasionally use areas south of the interstate. The bighorn being observed may have either moved to the area as the population in Carrizo Gorge expanded in numbers and geographic distribution, represent an increasing remnant of an original population, or be animals that moved northward from areas further south, including Mexico. Occasional movements by the bighorn sheep regularly found in the I-8 Island area towards Carrizo Canyon indicate that a range expansion, originating from Carrizo Canyon, may be the most likely explanation for the recent increase in bighorn sheep in the I-8 corridor (R. Botta, CDFG, pers. comm. 2010).

The above description includes bighorn sheep in the Coyote Mountains because the sheep observed on the project site in March 2009, most likely originated from that location. Descriptions of bighorn sheep populations in the Jacumba Mountains and Mexico were included because the project may adversely affect the ability of bighorn sheep to move between mountain ranges using the valley floor. The bighorn sheep observed on site may have been observed while attempting an inter-mountain movement. However, there is no conclusive evidence to confirm or refute this possibility. Additionally, bighorn sheep in the Coyote and Jacumba Mountains are both considered part of the Carrizo Canyon/Tierra Blanca Mountains/Coyote Mountains Recovery Region (Service 2000). Likewise, while designated critical habitat for bighorn sheep occurs within the action area, the proposed Project will not affect bighorn sheep critical habitat, because the project site is not located in critical habitat. However, bighorn sheep occupying critical habitat within the greater action area may be indirectly affected by the potential effect of the Project to impede movement of bighorn sheep at a landscape scale (see Effects of the Action below).

Flat-tailed Horned Lizard

<u>Species Abundance within the Action Area</u>

Suitable habitat for the FTHL is present throughout the 2,659 ha (6,571 ac) proposed Project site, which includes the solar plant, the offsite transmission line, and the laydown area. The solar plant includes: the onsite portions of the transmission line and waterline, SunCatcher fields and associated infrastructure, the main service complex, and the substation. Based on focused surveys conducted between May 1 and July 11, 2007, and May 5 and May 7, 2008, two FTHLs were detected along the eastern boundary of the solar plant, one within the proposed Project site and one just outside. One additional FTHL was detected within the solar plant site during the 2008 focused surveys. Two deceased FTHLs were observed along the offsite transmission line corridor in 2007 (Figure 6).

These surveys used a modified occupancy protocol approach based on the FTHL 2008 monitoring plan developed by Grant (2008). Occupancy protocols were designed to develop an estimate for the percentage of a site that is occupied by FTHL, not how many lizards occur on the site or the density of lizards occurring on the site. For better accuracy, occupancy surveys should include a FTHL detection probability. The 2007/08 surveys did not incorporate a detection probability, which can result in estimates that are biased low and may provide misleading results (Grant 2005). Furthermore, research suggests that FTHL population densities can exhibit local boom and bust dynamics driven primarily by temporally varying factors such as rainfall (Grant 2005). Because these surveys were conducted in consecutive below average rainfall years, FTHL population densities on the proposed Project site may have been lower, resulting in even lower detection rates. An estimate of FTHL abundance on the proposed Project site is likely more accurately portrayed by using density estimates derived from mark-recapture surveys conducted in 2002 in the adjacent Yuha Desert MA (T. Grant pers. comm. 2010). Using density estimates from that study (Grant and Doherty 2007), the proposed Project site could support an average of 1.05 lizards per ha, for a total population estimate of 2,792 individuals occurring on the proposed Project site. If we assume the site supports lower FTHL population densities due to adverse edge effects from I-8 and Evans Hewes Highway (Barrows *et al.* 2006; and Young and Young 2005) and we use the lower confidence interval number derived by Grant and Doherty (2007), the site may support lizard densities of 0.52 lizards per ha, for a total population estimate of 1,383 individuals occurring on the proposed Project site. Therefore, depending on yearly precipitation values and other temporally varying factors that could affect FTHL densities, the proposed Project site could support between 1,383 and 2,792 individuals.

Habitat Connectivity

The RMS identified potential habitat corridors in the action area between the West Mesa and Yuha Desert MAs. However, existing obstacles to movement between the Yuha Desert and West Mesa MAs through the area include I-8, the Evans Hewes Highway, the railroad, and the Plaster City OHV Open Area. There are several culverts or openings under these obstacles that may allow some movement between the MAs through the proposed Project area but most of the culverts that are adjacent to the proposed Project boundary along I-8 were inaccessible to FTHL (URS 2010). FTHL movement over the highways could occur, but is not likely due to adverse road effects, e.g. increased mortality and predation (FTHL ICC 2003). Movement of lizards under I-8 west of the proposed Project boundary likely occurs via a large bridge that spans the South Fork Coyote Wash under I-8. To the east of the Project site, similar limitations to those that exist along the south side of the proposed Project, e.g. impassible culverts, likely occur.

Factors Affecting the Species' Environment within the Action Area

A number of factors such as fragmentation, OHV activity, edge effects associated with roads, and climate change may adversely affect the FTHL in the action area. Roads may be especially deadly as FTHLs are inclined to stop motionless rather than run when confronted with a threat and are difficult to see and avoid. Lizard densities are likely reduced along I-8 and Evans Hewes Highway.

The Plaster City OHV Open Area is directly north of the proposed Project site. OHV traffic may not kill hibernating FTHLs, but lizards on the surface can be killed. The indirect effects of OHVs are poorly understood (Grant 2005).

As mentioned above, changes in weather patterns associated with global climate change, particularly the timing and amount of rainfall in the Sonoran Desert, are a potential threat to the FTHL, affecting suitable habitat in the action area. Existing habitat may become unable to support FTHLs, and habitat that does not currently support FTHLs may become available in the future. Rainfall patterns could change, rendering habitat too dry or wet to continue to support FTHLs and/or temperatures may rise to levels that adversely affects FTHL survival. The sum effect is difficult to predict because the extent that climate will change is unknown.

EFFECTS OF THE ACTION

Peninsular Bighorn Sheep

Effects to the Species in the Action Area

The proposed project would be constructed on approximately 2,659 ha (6,571 ac) of the Colorado Division of the Sonoran Desert in Imperial County, California. Approximately 2,616 ha (6,465 ac) of the site would be permanently fenced to prevent unauthorized human access to the facility. The design elements of the fence, which are necessary to prevent humans from breaching the barrier, would preclude bighorn sheep from using the site for the foreseeable future. The project may adversely affect bighorn sheep by: 1) reducing the ability of bighorn sheep to travel between mountain ranges, 2) eliminating access to forage resources, 3) incrementally adding to the permanent conversion of natural desert plant communities to human industrial uses, and 4) creating hazards associated with fencing the proposed Project site.

<u>Habitat Connectivity</u>

Intermountain movements by desert bighorn sheep have been well documented in the past, and continue to occur in areas where human activities and developments do not physically block bighorns or elicit behavioral reactions from bighorn sheep resulting in their avoidance of intermountain movements. For example, on the Cabeza Prieta National Wildlife Refuge in Arizona, bighorns are occasionally observed crossing the wide flat valley between the Sierra Pinta and Sierra Cabeza Prieta, a distance of 13 km (8 mi). Bighorns crossing the flat, open terrain usually take the shortest possible route, and seldom pause to feed (Simmons 1969). Additional intermountain movements of bighorn sheep were reported by Davis and Taylor (1939), Russo (1956), Monson (1964), Hansen (1965), Whitam and Smith (1979), and Ough and deVos (1984). In Nevada, annual migrations between mountain ranges have ranged between 32 km (20 mi) for the Muddy and Black Mountains to over 64 km (40 mi) for the Meadow Valley Range and the Arrow Canyon Mountains (McQuivey 1978). In more recent years, colonizations of isolated mountain ranges by desert bighorn sheep, which required intermountain movements, have been reported in California (Epps *et al*. 2010).

The shortest distance between the Jacumba Mountains and the Coyote Mountains is approximately 5 km (3 mi). Under pristine conditions bighorn sheep may have crossed directly between the mountain ranges using the valley floor, compared to taking a more circuitous, mountain route through Carrizo Gorge. However, I-8 and the town of Ocotillo occur on the valley floor area that offers the most direct route for bighorn sheep movement between the two mountain ranges (Figure 3). The proposed Project site offers an alternative, less direct route to the Jacumba Mountains or Sierra Juarez, which avoids the town of Ocotillo, but still requires sheep to cross an OHV open area and I-8. The proposed Project site also offers a direct route to the Sierra Cucapa in Mexico, which is approximately 32 km (20 mi) from the Coyote Mountains. However, bighorn sheep would need to cross the OHV open area, I-8, navigate the recently constructed vehicle barriers along the international border, and cross several two-lane highways in Mexico and the U.S. to reach the Sierra Cucapa.

A number of the bighorn sheep, which migrate seasonally to the Coyote Mountains, have been radio-collared and monitored monthly by CDFG using fixed-wing aircraft. The point locations obtained thus far indicate that bighorn sheep move seasonally between Carrizo Gorge and the Coyote Mountains using Sweeney Pass (R. Botta, CDFG, pers. comm. 2010), which is located on County Highway S2 northwest of the main portion of the Coyote Mountains (Figure 7) and 23 km (14 mi) from the proposed Project site. No intermountain movements by bighorn sheep from the Coyote Mountains south to the Jacumba Mountains, Sierra Cucapa, or Sierra Juarez have been documented. The bighorn sheep observed on the proposed Project site in March 2009, may have been undertaking an intermountain movement, but no conclusive evidence exists to confirm such an event. The group was moving in a southeasterly direction, but they may have been responding to the presence of the vehicle and its occupants.

Although relatively rare for bighorn ewes when compared to rams, dispersal (one-way movements) across open, flat desert to colonize or re-colonize distant mountain ranges does occasionally occur (Simmons 1969, Boyce *et al*. 1999, and Epps *et al.* 2010). These movements are important for maintaining functional metapopulations of desert bighorn sheep in the California desert (Schwartz *et al.* 1986, Bleich *et al.* 1990, 1996), and may be evidence of an increasing and expanding population. When bighorn sheep population persistence is viewed from a large-scale, landscape perspective; human developments, such as towns, highways, and more recently, renewable energy projects, may eliminate the possibility of intermountain movements by desert bighorn sheep.

The proposed Project contributes to the overall, long-term loss of habitat connectivity occurring in the Peninsular Ranges. The proposed Project site represents a location where PBS would not be able to travel in the future. However, the current relative value of the area as a travel corridor is uncertain at best due to the location of an OHV open area located between the Coyote Mountains and the proposed Project site, the additional barriers presented by I-8 and other human structures, and the lack of telemetry data or other information indicating that bighorn sheep use the proposed Project site for intermountain movements. Human structures present in the vicinity of the town of Ocotillo may not completely, physically block bighorn sheep movements, but from a behavioral standpoint, such human-dominated areas may reduce the

likelihood bighorn sheep would use the area. The proposed Project site is less developed and possesses more natural characteristics of terrain and vegetation, and therefore is more likely to be used by bighorn sheep.

Forage Resources.

Desert bighorn sheep rely on steep, rugged terrain to evade predators. Consequently, their distribution is tied to mountainous topography. However, desert bighorn also utilize less precipitous portions of the landscape, such as washes, to access the quality forage resources characteristic of desert washes. The greater available soil moisture present in washes results in a greater variety and quantity of vegetation with higher nutritional content (Leslie and Douglas 1979). In arid regions, small changes in plant moisture content can result in marked changes in plant nutritional content and diet quality (Epps *et al.* 2004). The forage species found in washes generally have higher moisture content and greater nutritional value throughout much of the year compared to mountainside plants, which "cure out" quite rapidly once warmer weather arrives.

The time period surrounding late gestation, lambing, and nursing is very demanding in terms of the energy and protein required by bighorn ewes. Failure to acquire sufficient nutrients during late gestation and during nursing adversely affects the survival of newborn ungulates (Holl *et al.* 1979, Douglas 2001). Lower elevations may green-up earlier in spring (Wehausen 1980, Berger 1991), providing important nutrients for bighorn ewes. Crude protein and digestible energy values of early green-up species are usually much higher than those of dormant forages during the critical late gestation, lambing, and rearing seasons (Crawley 1983, White 1983). With their higher nutrient content, even minor volumes of these forages, within the overall diet composition, may contribute important nutritional value.

Bighorn sheep in the area have been observed to follow ravines and breaks in the topography down onto alluvial fans, and at times out onto the valley floor (M. Jorgensen, Anza-Borrego Desert State Park, pers. comm. 2010). Tracking and direct observations indicate that bighorns are focused upon accessing the quality forage found in these areas. Essentially, bighorn sheep weigh the predation risk of being caught away from escape terrain with the opportunity to acquire more plentiful and nutritious forage. The portion of the Coyote Mountains adjacent to the proposed Project site does not end abruptly at a flat valley floor. A series of benches, ravines, and areas of broken topography extend from the mountains to the proposed Project site. Therefore, the presence of bighorn sheep unexpectedly distant from designated essential or critical habitat is understandable given these terrain features. The bighorn sheep observed on the site in March 2009, most likely followed the irregular topography down from the Coyote Mountains while foraging, eventually arriving in the wash habitat where they were observed. The fencing of the proposed Project site would permanently exclude bighorn sheep from accessing these sources of forage, even though some vegetation associated with washes may persist on site after construction. The area of primary and secondary drainages mapped and considered jurisdictional by the Corps located on the proposed Project site is 357 ha (881 ac.) Based on a California Rapid Assessment method (CRAM) analysis, these drainages support approximately 28 percent overall plant cover. Therefore, the proposed Project site supports

approximately100 ha (247 ac) of wash vegetation habitat. This value approximates the amount of wash foraging habitat that would be lost to bighorn sheep.

The higher elevations of the proposed Project site are characterized by extensive areas of desert pavement interspersed with mainly creosote bush, burr sage, and exotic grasses, such as red brome (*Bromus madritensis* ssp. *rubens*) and Mediterranean grass. These exotic grasses can furnish nutritious forage during early green-up. However, they reach senescence quickly and rapidly lose much of their nutritive value. Similarly, creosote bush contains numerous secondary plant compounds, and although occasionally sampled by bighorn sheep, the species is not considered a valuable forage species. Therefore, the loss of foraging opportunities associated with the upland areas of the proposed Project site is considered less important than the loss of forage resources found in the washes.

Incremental Loss and Alteration of Desert Landscapes

Natural desert plant communities begin abruptly at the terminus of the irrigated agricultural area west of El Centro, California. If the proposed Project is constructed, a brief swath of natural desert would remain between intensive agriculture and the eastern boundary of the proposed Project located near Plaster City. Moving westward, the proposed Project in combination with the existing town of Ocotillo, would permanently change the character of the valley floor in this area.

Interpretations of present day bighorn sheep behavioral ecology should consider the vast changes that have occurred in the desert southwest following European settlement (McCutchen 1981). In many areas, bighorn sheep most likely use the landscape much differently than earlier generations of mountain sheep. McCutchen (1981) argues that large areas, which do not exist today, were suitable for bighorn sheep prior to the arrival of Europeans, and dispersal, colonization, and gene exchange were common place. The widespread distribution of desert bighorn sheep is a result of these processes. Therefore, the small, isolated groups of extant desert bighorn are remnants of former larger interconnected populations, which utilized a much greater spatial area. Likewise, many of the characteristic behaviors we currently attribute to desert bighorn sheep, such as slow dispersal, have been profoundly shaped by the human-caused changes to their environment. The proposed Project represents an additional such alteration to the desert, which would require PBS to at least partially alter where they obtain forage and how they move across the desert landscape.

Fencing

Wire fences or even a single strand of wire may kill or harm bighorn sheep. Bighorn rams may easily become entangled, when wire becomes trapped within the curl of their horns. If this happens, the animals frequently panic, fight the strange object, and eventually strangle themselves. Additionally, bighorn sheep have been killed while attempting to crawl under wire fences. Bighorns have crawled through amazingly small gaps along the bottom of wire fences constructed in the Rancho Mirage area of the Coachella Valley of California (Aimee Byard,

Bighorn Institute, pers. comm. 2010). Following correct fence specifications should minimize the chances that accidents or entrapments would occur.

Should an animal become trapped within the enclosure, attempts to return the animal to open sheep habitat may result in injury or death to the animal, if proper methods of removal are not followed. Given the numerous mirrors and other structures, pursuit and/or capture with helicopters and net-guns is most likely not a viable approach. Therefore, measures for removing bighorn sheep from the enclosure should be planned ahead of time to reduce the probability of accidents occurring, and personnel should be trained beforehand in case an animal becomes trapped.

Effects on Recovery of Peninsular Bighorn Sheep

Section 2(b) of the ESA states the primary purposes of the Act are to provide a means whereby the ecosystems upon which listed species depend may be conserved, and to provide a program for the recovery of listed species. In section 2(c), Congress establishes a policy requiring all Federal agencies to use their authorities to recover listed species and further the purposes of the Act. Consistent with these purposes and Congressional policy, sections 3(5), 4(f), 7(a)(1), implementing regulations (50 CFR 402.02) to section 7(a)(2), and related preamble at 51 *Federal Register* 19926-57 require Federal agencies to further the survival and recovery of listed species in the use of their authorities. Pursuant to these mandates, our analysis below assesses (1) whether the proposed project adequately offsets its adverse effects to the environmental baseline, and (2) the extent to which the proposed project would cause "significant impairment of recovery efforts" or adversely affect the "species' chances for survival to the point that recovery is not attainable" (51 *Federal Register* 19934).

The recovery strategy, as outlined in the Recovery Plan (Service 2000), is founded upon four biological principals that generally apply to desert bighorn sheep throughout their range, including the Peninsular Ranges of California.

1. Bighorn sheep are wide-ranging animals that are spatially dependent on large, intact tracts of habitat that provide a diversity of resources needed to offset seasonal, annual, and longer term cycles of environmental variability and scarcity.

2. Metapopulation structure requires habitat contiguity between/among constituent demes (ewe groups) to allow for long-term shifts in distribution and genetic interchange.

3. Bighorn sheep appear to lack natural or acquired resistance to some diseases and remain highly vulnerable to diseases introduced by domestic sheep.

4. Behavioral responses to human-related activities, which can adversely affect habitat use patterns and population persistence, can be variable among individuals and populations.

The proposed project would permanently remove from the overall resource base an area that currently provides forage to PBS. As mentioned previously, the forage associated with the washes on the project site is likely more valuable than the sparse forage present on the upland portions. Thus, the proposed project may negatively influence recovery by contributing to the overall loss of resources needed by PBS to adjust to the variability of their desert environment. However, the amount of loss is relatively small, and other foraging opportunities are available to bighorn sheep in the area. Furthermore, the applicant has proposed to restore an equal amount of wash habitat in the Carrizo Creek drainage that is currently infested with exotic vegetation and not providing bighorn sheep with water or forage resources. Therefore, completion of the project (including restoration of Carrizo Creek) should not significantly impede recovery of PBS in regard to principle number 1.

The recovery strategy for PBS focuses on maintaining a functioning metapopulation structure, which requires that bighorns retain the ability to move between subpopulations. These movements maintain genetic integrity and make it possible for sheep to re-colonize suitable habitat should a local extinction event occur. The proposed project will add to the number and spatial extent of human-made obstacles, which impede the ability of bighorn sheep to move across the landscape. Therefore, the proposed project will negatively affect the recovery of PBS by making it more difficult for the distinct population segment to maintain a functioning metapopulation structure.

The proposed project does not directly introduce or increase disease threats to PBS. Therefore, the proposed project has no effect on recovery in regard to principle 3 above.

The behavioral characteristics of individual and groups of bighorn sheep vary, with some being much less likely to use areas where humans and their structures are present compared to others. Therefore, this variation in behavior can have a profound influence on the magnitude of the effects associated with a project or other human use, such as recreation. For example, the proposed project will not extend westward entirely to the town of Ocotillo; a gap will exist where Carrizo Wash runs under I-8. It is unknown whether bighorn sheep in the area will exhibit the boldness to use this area for inter-mountain movement. Additionally, anthropogenic structures south of I-8 near this area, including the interstate, present a potential barrier. As a result, it is difficult to assess the effects on recovery in regards to principle 4 until more information is available concerning the behavioral characteristics of bighorn sheep in the area.

Effects to Critical Habitat in the Action Area

The proposed Project site is not located within designated critical habitat for bighorn sheep; consequently, impacts to critical habitat are not anticipated. However, bighorn sheep existing in and using critical habitat may be indirectly affected by the project effects on habitat connectivity.

Flat-tailed Horned Lizard

Direct Effects

Direct effects to the FTHL include impacts to suitable habitat, mortality, and degradation of habitat connectivity between management areas.

Loss of Habitat

Approximately 883 ha (2,182 ac) of suitable FTHL habitat would be permanently destroyed, 38 ha (93 ac) of which occur within the Yuha Desert MA. An additional 556 ha (1,375 ac) would be temporarily impacted (Table 1), for a total of 1,439 ha (3,557 ac). Temporary impacts are likely to result in FTHL habitat loss that would persist for various periods of time. Following extensive disturbance and compaction, desert soils can take between 92 and 124 years to recover in the absence of active restoration (Webb 2002). In addition, recovery of plant cover and biomass in the desert can require 50 to 300 years in the absence of restoration efforts (Lovich and Bainbridge 1999). Although active restoration can reduce the time required to restore desert ecosystems, success is varied and dependent on numerous variables (Bainbridge 2007). Based on this information, the amount of habitat currently characterized as a temporary disturbance is likely to be unsuitable as habitat for the life of the proposed Project (40 years).

Construction, maintenance, and operations of the solar plant can cause physical disturbances that may change soil structure; runoff and soil erosion patterns; moisture holding capabilities of the soil; and energy flux patterns due to surface reflectivity changes. Changes in plant and animal density, diversity, growth, reproduction, and behavior can be expected as a result of these activities (Patten 1978). Therefore, even though approximately 1,214 ha (3,000 ac) of the proposed solar plant site would not be directly impacted by grading or other mechanical surface disturbances, the entire solar plant site likely will experience the aforementioned habitat quality changes. For example, native plant populations, adapted to more xeric conditions, could be replaced with more mesic non-native varieties, which could lead to artificial increases in rodent populations (Patten 1978) and, consequently, a reduction in native ant populations (Brown *et al.* 1979). Additionally, significant shifts in dominance may occur within the creosote bush-white burr sage scrub, possibly increasing the patchiness and diversity of native plant communities in short periods of time (3 years), which could lead to changes in the faunal diversity and abundance (Smith *et al*. 1987) within the proposed Project area.

Based on the effects described above, we are assuming 2,659 ha (6,571 ac) of suitable FTHL habitat will be destroyed or adversely impacted. This represents approximately a 1 percent loss of mapped suitable habitat in the Western Population segment.

To offset this impact, the Project applicant proposes to fund the acquisition and management of suitable FTHL habitat within the West Mesa MA (CM #10). Although the purchase and protection of suitable FTHL habitat would not create new habitat within the range of the lizard, it would result in a net increase in the amount of FTHL habitat managed for the conservation of

this species. In addition, habitat enhancements the BLM performs with acquisition and management funds would restore habitat values to lands that have been degraded by human activities.

Mortality

A majority of the lizards occurring within construction areas on the proposed Project site at the time of construction would likely be killed during the course of construction. FTHLs typically freeze and bury themselves in the sand in response to predators and this behavior is likely to occur in response to construction activity (FTHL ICC 2003). Alternatively, FTHLs may be underground and inactive if construction occurs during cold weather conditions, which could lead to individual FTHLs being crushed or entombed in their burrows. Any remaining lizards not killed during construction activities may be killed or injured by O&M activities through increased vehicle traffic and maintenance activities (e.g., mirror washing). FTHL mortality in conjunction with plant construction, operations, and maintenance is likely. Moreover, because of a lack of FTHL exclusionary fencing and the ongoing O&M activities, the Project site may contribute to ongoing FTHL mortality for the life of the Project resulting in lower reproduction rates, probability of survival, and probability of emigration to a source site (Runge *et al*. 2006).

To minimize mortality of FTHLs, individuals found would be removed from harm's way when encountered during construction, operation, and maintenance. Also, a worker education program would be implemented to inform personnel working on the proposed Project site about FTHL ecology and measures to avoid and minimize impacts. Finally, a biological monitor position would be filled for the life of the Project to ensure compliance with avoidance and minimization measures (CMs 1 through 7).

Because of several uncertainties, for the purposes of this analysis, we assume all lizards (approximately 1,383 to 2,792 individuals as previously discussed in the FTHL status section) occurring on the proposed Project site at the time of construction will be killed. However, based on previous experiments and surveys involving handling and moving lizards (Grant 2005, Painter and Ingraldi 2007, Painter *et al.* 2008), we expect some survival of relocated lizards to occur and anticipate that a population of lizards, albeit at lower densities, will remain onsite.

Effect on Habitat Connectivity between Management Areas

According to the RMS, some FTHL movement between the Yuha Desert MA and the West Mesa MA likely occurs under existing conditions. Recent genetic analysis supports this assumption indicating there is current genetic interchange between the Yuha Desert MA and the Mesa MA populations (pers. comm. D. Mulcahy 2010).

No Project related alterations to the existing potential movement corridors (e.g. culverts, trestles) are proposed and approximately 57 ha (141 ac) of primary drainages leading up to the railroad trestles and culverts under I-8 on the proposed Project site would be avoided. However, if FTHL use the proposed Project site to move between the Yuha Desert MA and West Mesa MA, and

physical disturbances and O&M activities render the proposed Project site unsuitable for FTHLs and/or increase FTHL mortality, this would reduce the effectiveness of an already constrained habitat corridor (Simberloff and Cox 1987). The South Fork Coyote Wash and any FTHL movement currently occurring under I-8 at this location west of the proposed Project boundary, however, will not be directly affected by the proposed Project.

It is important for future FTHL management, and stability of the species, to better understand how well FTHLs persist on the proposed Project site. To gain this understanding, the Project applicant will fund and implement a FTHL occupation study (CM #9) to help provide this information. Biological monitoring activities designed to minimize FTHL mortality would be adaptively implemented through the Designated Biologist position proposed to be funded for the life of the Project, which may help sustain populations of FTHLs on the proposed Project site (CM #1).

Effect on FTHL Management Areas

Approximately 40 percent of the current range of FTHL, in areas considered especially important to the species (Rado 1981, Turner *et al.* 1980), is being managed and conserved in MAs, through implementation of the FTHL RMS. Based on the best scientific information currently available, we anticipate this level of conservation and management will maintain persistent populations of FTHLs in perpetuity. FTHL habitat impacts from the proposed Project within the Yuha Desert MA are 38 ha (93 ac). The Yuha Desert MA contains approximately 24,362 ha (60,200 ac) of suitable FTHL habitat, 23,148 ha (57,200 ac) of which is managed by the BLM; therefore, overall loss of habitat in this MA would be relatively small (0.15 percent). Additionally, the loss of 38 ha (93 ac) would increase the cumulative impact in the Yuha Desert MA to 110.5 ha (273.01 ac), or 0.45 percent of the available suitable FTHL habitat, which would not exceed the 1 percent development cap for that MA.

Indirect Effects

Possible indirect effects to FTHLs caused by proposed Project construction, operation, and maintenance include increases in FTHL predators and introduction of invasive weeds.

Construction and operation of the Project could provide new sources of food, water, and nesting and perching sites that might attract unnaturally high numbers of FTHL predators such as the common raven, loggerhead shrikes, and American kestrel. These predators habituate to human activities and are subsidized by food and water, as well as roosting, perching, and nesting resources that are introduced or augmented by human developments (FTHL ICC 2003). The Project applicant has proposed to fund and implement a Raven Control Plan and implement other project design features to reduce nesting. This includes installing physical deterrents to nesting, removing nests, and conducting monitoring to make sure these measures are working as intended (CM #11 and CM #17). Additionally, exclusionary fencing would be installed around the evaporation ponds and netting would be installed over the ponds to exclude wildlife.

Round-tailed ground squirrels (*Spermophilus tereticaudus*) may be the primary predator of FTHL in the proposed Project vicinity (FTHL ICC 2003). While the species was not directly observed on the proposed Project site, they are known to occur in the proposed Project area (Hoefler and Harris 1995). A potential effect of O&M of the solar plant is increased shade and water application from the periodic washing beneath the SunCatcher structures. The increase in water may lead to more dense vegetation on the proposed Project site (Smith *et al*. 1987). The higher density of vegetation, specifically perennials, could attract higher densities of round-tailed ground squirrels to the proposed Project vicinity that may not have previously been sustained under the current arid conditions (Grant 2005), elevating predation on FTHLs. Elevated predation levels may contribute population declines in some areas of the proposed Project vicinity (FTHL ICC 2003). Valid measures to minimize this potential threat to FTHL have not been proposed.

The permanent and temporary earth disturbance associated with construction activities could introduce new non-native invasive weeds to lands adjacent to the solar plant site and its linear facilities, which could further spread weeds already present in the project vicinity, including Sahara mustard, red brome, and Mediterranean grass. Invasive weeds can colonize areas of disturbance and out-compete and exclude native species, potentially altering the structure of the vegetation, degrading or eliminating upland habitat used by the FTHL, and providing food and cover for undesirable non-native animals (Randall and Hoshovsky 2000). We anticipate implementation of the Weed Control Plan (CM #18) would minimize adverse effects associated with increased introduction of non-native plant species.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local, private, or certain tribal actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Bighorns may react strongly to low-flying aircraft, especially helicopters (Bleich *et al.* 1990). Military and private aircraft frequently fly over the Peninsular Ranges and low elevation flights have the potential to disturb bighorn sheep. Such aerial sources of disturbance are not covered in BLM Land Management Plans. However, at this time, we do not have any specific project information to analyze potential direct and indirect impacts of this activity on PBS.

Routine maintenance of highways and other structures do not routinely require Federal permits or funding, though some of these activities will be covered under future section 7 consultations. These activities can temporarily disturb bighorn sheep and potentially cause them to avoid an area during maintenance activities. However, at this time, we do not have any specific project information to analyze potential direct and indirect impacts of this activity on PBS.

Imperial County has released a draft EIR for the Wind Zero project. The 382 ha (944 ac) project proposes to build a training facility for law enforcement and a road course and racetrack country

club near Ocotillo (south of I-8 and north of SR 98) and adjacent to the Yuha Desert ACEC in Imperial County. This project is located approximately 3.3 km (2 mi) southwest of the proposed Project. Approximately 295 ha (729 ac) of suitable FTHL habitat within the current range of the species, but outside of a MA, may be lost with implementation of this project. Some measures to avoid and minimize impacts to individual FTHL are proposed but replacement of habitat losses apparently will not occur. The proposed project site also would eliminate a large vacant parcel of land that otherwise could be used by sheep if they attempted to cross I-8 immediately west of the Project site. Thus, the Project may further reduce north-south movement opportunities for sheep in this portion of their range, though neither the Project nor Coyote Wells/Wind Zero projects would adversely affect the location where sheep are now known to cross I-8 in the vicinity of Mountain Springs.

Overall, known cumulative effects would reduce the extent of suitable FTHL habitat available on private lands in the action area but the amount of habitat loss at issue is relatively small compared to the large amount of BLM lands that are being conserved in the State-Federal management area reserve system for the species. Though cumulative effects would reduce potential opportunities for bighorn sheep movement across the I-8 corridor in the desert flats where bighorn sheep spend relatively little time, north-south movements by sheep in the action area are known to occur more frequently in mountainous terrain, which would not be affected by the proposed project or cumulative effects. Therefore, cumulative effects would not preclude sheep population connectivity between/among the Coyote, In-Ko-Pah, and Jacumba mountain ranges in the action area.

CONCLUSION

Peninsular Bighorn Sheep

After reviewing the current status and environmental baseline of bighorn sheep in the Peninsular Ranges, effects of the proposed action, and cumulative effects, it is our biological opinion that the implementation of the proposed action is not likely to jeopardize the continued existence of the distinct population segment of bighorn sheep in the Peninsular Ranges. We reached these conclusions based upon the following reasons:

1. Available telemetry data indicate that seasonal intermountain movements of bighorn sheep found in the Coyote Mountains occur across County Highway S2 in the Sweeney Pass area, which is located in the northwestern portion of the mountain range. No telemetry data indicate that intermountain movements to mountain ranges through the project site occur.

2. Dispersal (one-way movements) to mountain ranges through the project site may already be impeded by human structures and land uses. Opportunities to facilitate future habitat connectivity exist along I-8 much further west in the Jacumba Mountains.
3. Construction of the proposed project would eliminate approximately 100 ha (247 ac) of plant communities associated with desert washes from the available forage base. The

conservation and/or restoration of wash habitat available to bighorn sheep would offset the loss of foraging opportunities resulting from construction and fencing of the project.

4. Wash habitat is available to bighorn sheep at other locations in the Coyote Mountains.

5. The proposed project contributes to the transformation of the desert to industrial and other human uses, but the effects of the project do not appreciably decrease the probability of population persistence for bighorn sheep in the action area.

Flat-tailed Horned Lizard

After reviewing the current status of the FTHL, the environmental baseline for the action area, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the death of up to approximately 2,792 individuals from impacts and the destruction of approximately 2,659 ha (6,571 ac) of suitable habitat is not likely to appreciably reduce the likelihood of survival and recovery of the FTHL by reducing the reproduction, numbers, or distribution of the species. We reached these conclusions based upon the following reasons:

6. The proposed Project would impact only a small fraction (much less than 1 percent) of the overall range of the FTHL in the U.S. Similarly, the FTHL population estimates for the Western Population Segment and suitable habitat areas east of the Imperial Valley suggest that the loss of FTHL individuals on the proposed Project site would be relatively small.
7. The proposed Project would result in a relatively small loss of FTHL habitat, 38 ha (93 ac) out of 24,362 ha (60,200 ac), in the Yuha Desert MA.
8. Connectivity between the Yuha Desert MA and the West Mesa MA through the Project site, though likely less functional than under baseline conditions, would remain a possibility because of the avoidance of the major washes, the lack of FTHL exclusionary fencing around the Project site, and the maintenance of existing culverts under I-8 and the railroad tracks. Further, the Coyote Wash undercrossing and other possible connectivity areas outside of the Project boundary will not be directly affected by the proposed Project.
9. The acquisition and management funds contributed by the applicant through the FTHL RMS would result in an increase in the amount of existing habitat that is conserved and managed for the FTHL and would likely lead to restoration of degraded habitat within these areas.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulation pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to

engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below for PBS are non-discretionary, and must be undertaken by the BLM so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the activity covered by this incidental take statement. If the BLM fails to adopt and implement the terms and conditions or fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the BLM must report the progress of the action and its impact on the species to the Service as specified herein [50 CFR §402.14(i)(3)].

The prohibitions against taking FTHL found in section 9 of the Act do not apply until the species is listed. However, the Service advises the BLM to consider implementing the following reasonable and prudent measures. If the FTHL is listed and this conference opinion is adopted as a biological opinion, the measures described below for the FTHL, with their implementing terms and conditions, will be non-discretionary.

Amount or Extent of Take Anticipated

Peninsular Bighorn Sheep

Although the probability is low, the Service realizes that one (1) PBS may breach the exclusionary fence surrounding the project site over the life of the project. Such an event could result in the injury or death of the animal during the removal process. Alternatively, one (1) PBS may become entangled in fencing material over the life of the project leading to injury or death of the animal. The specified level of incidental take due to complications with fencing as just described over the life of the project is one (1) PBS.

Flat-tailed horned lizard

The FTHL is a rare, difficult to detect species, with a limited distribution. Detection of FTHLs in the field is difficult because of their propensity to remain motionless and/or bury themselves in the sand when threatened and their cryptic coloration and flattened body (Foreman 1997). More appropriate detection probabilities for FTHL were first investigated and incorporated into

abundance estimates by Grant (2005). We do not have survey data to derive a detection probability estimate for the proposed Project site, but data from 2006-2009 FTHL occupancy monitoring surveys within FTHL MAs estimated an average detection probability of 18 percent. Given that the level of survey effort (i.e., amount of area searched per period of time) to find FTHLs on the proposed Project site will incorporate a level of effort similar to occupancy monitoring, we assume detection probabilities will also be similar. Therefore, we will assume a detection probability of 18 percent on the proposed project site.

The Service anticipates up to 2,792 individual FTHLs may be incidentally taken as a result of the proposed Project, but predict that only 18 percent or 503 individuals (18 percent of 2,792) would be detected over the life of the project. Thus, the detection of 503 individuals either dead or alive will indicate that the anticipated incidental take level of 2,792 individuals has been met. Incidental take is expected to be in the form of accidental injury or death due to construction, operation, and maintenance of the proposed Project and in the form of capture or collect when the biological monitors move live FTHLs out of harm's way. If more than 503 FTHLs are found (alive or dead) on the project site during construction, operations, or maintenance over the life of the project, the amount of incidental take would be exceeded and reinitiation of this biological/conference opinion would be required.

Reasonable and Prudent Measures

The reasonable and prudent measures outlined below are nondiscretionary. Failure to comply may cause the protective coverage of section 7(o)(2) to lapse. The following reasonable and prudent measures are necessary and appropriate to minimize incidental take.

Flat-tailed Horned Lizard

> We have not identified any additional reasonable and prudent measures beyond those identified in the Conservation Measures above that would further minimize incidental take of FTHL.

Peninsular Bighorn Sheep

> The BLM, Corps, and applicant will minimize the probability of bighorn sheep being killed or injured by the construction and maintenance of the perimeter fence.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the BLM, Corps, applicant, and all agents/contractors must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

The following terms and conditions implement the reasonable and prudent measure for PBS:

1.1 In conjunction with the BLM, CDFG, and Service, the applicant shall devise a plan for safely removing bighorn sheep from the interior of the facility if bighorns breach the Project perimeter fence.

1.2 Onsite personnel shall be trained on proper techniques and protocols for dealing with entrapped or entangled animals. These proper techniques and protocols shall be articulated in a bighorn removal plan. Prior to fence construction, the bighorn removal plan shall be submitted to CDFG and the Service for approval.

1.3 The Project perimeter fence shall be designed, constructed, and maintained to minimize the risk of injury or death occurring to PBS. The fence design shall include the following:

- Fences shall be a minimum of 2.44-m (8-ft) high, chain link, with spaces no larger than 11-cm (4.3-in).
- Spaces along the bottom of the fence shall be less than 5 cm (2 in) to discourage bighorn sheep from attempting to crawl under the fence. In low spots, it may be necessary to manually pile rocks or other substrate along the bottom of the fence.
- No razor-wire shall be used in the construction of the fence.
- Three (3) gates at least 3-m (10-ft) wide shall be installed along the northern project boundary at the major washes (identified as wash I, K, and C on Figure 2) to provide for safe escape routes and enable bighorn sheep to be herded out of the interior of the facility.

Disposition of Sick, Injured, or Dead Specimens

The Service's Carlsbad Fish and Wildlife Office (760) 431-9440 must be notified should any bighorn sheep or FTHL (should it be listed) are found injured or dead in the action area. Any dead, injured, or sick PBS should be immediately reported to: our Division of Law Enforcement at (619) 557-2997, (310) 328-1516, the Carlsbad Fish and Wildlife Office at (760) 431-9440, CDFG entities: (909) 659-6464, (760) 771-0375, or (916) 358-1464, and the Bighorn Institute at (760) 346-7334. Written notification should be submitted within 5 calendar days to the Carlsbad Fish and Wildlife Office, 6010 Hidden Valley Road, Suite 101, Carlsbad, California 92011. To the extent known, written or verbal notification should include the date, time, and location of the incident; number of discovered specimens; cause of injury or death; and any other pertinent information. Injured animals, if deemed treatable, should be transported under humane conditions to a qualified veterinarian or certified wildlife care facility, with the Service apprised of the final disposition. Any dead specimens may be: (1) reposited with the closest Service field office or with an educational/research institution possessing the appropriate State and Federal

permits; or (2) marked, photographed, and left in the field. In either case, the finding and relevant details should be immediately reported to the Service.

Reporting Requirements

Please refer to CM #1 in the Conservation Measures section of this biological/conference opinion above for details on reporting procedures for FTHL.

Any sightings of bighorn sheep on or near the Project site by Project employees or contractors shall be reported immediately to the Designated Biologist and/or Biological Monitor, whoever is available first. The Designated Biologist and/or Biological Monitor shall forward the information to CFWO immediately via e-mail and phone.

REINITIATION NOTICE

This concludes formal consultation on the proposed Project for the PBS. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect the species or critical habitat in a manner or to an extent not considered in this conference opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the species or critical habitat that was not considered in this conference opinion; or (4) a new species is listed or critical habitat designated that may be affected by the proposed action.

This concludes the formal conference on the proposed project for the flat-tailed horned lizard (FTHL). You may ask the Service to confirm the conference opinion as a biological opinion issued through formal consultation if the FTHL is listed. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference opinion as the biological opinion on the project and no further section 7 consultation will be necessary.

If the FTHL is listed under the Act and this conference opinion is adopted as the biological opinion, the BLM shall request reinitiation of consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect the species or critical habitat in a manner or to an extent not considered in this conference opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the species or critical habitat that was not considered in this conference opinion; or (4) a new species is listed or critical habitat designated that may be affected by the proposed action.

The incidental take statement provided in this conference opinion does not become effective until the species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the proposed Project will be reviewed to determine whether any take of the FTHL has occurred. Modifications of the opinion and incidental take

statement may be appropriate to reflect that take. No take of the FTHL may occur between the listing of the FTHL and the adoption of the conference opinion through formal consultation, or the completion of a subsequent formal consultation.

If you have any questions regarding this document, please contact the Carlsbad Fish and Wildlife Office at (760) 431-9440.

Attachments (6)

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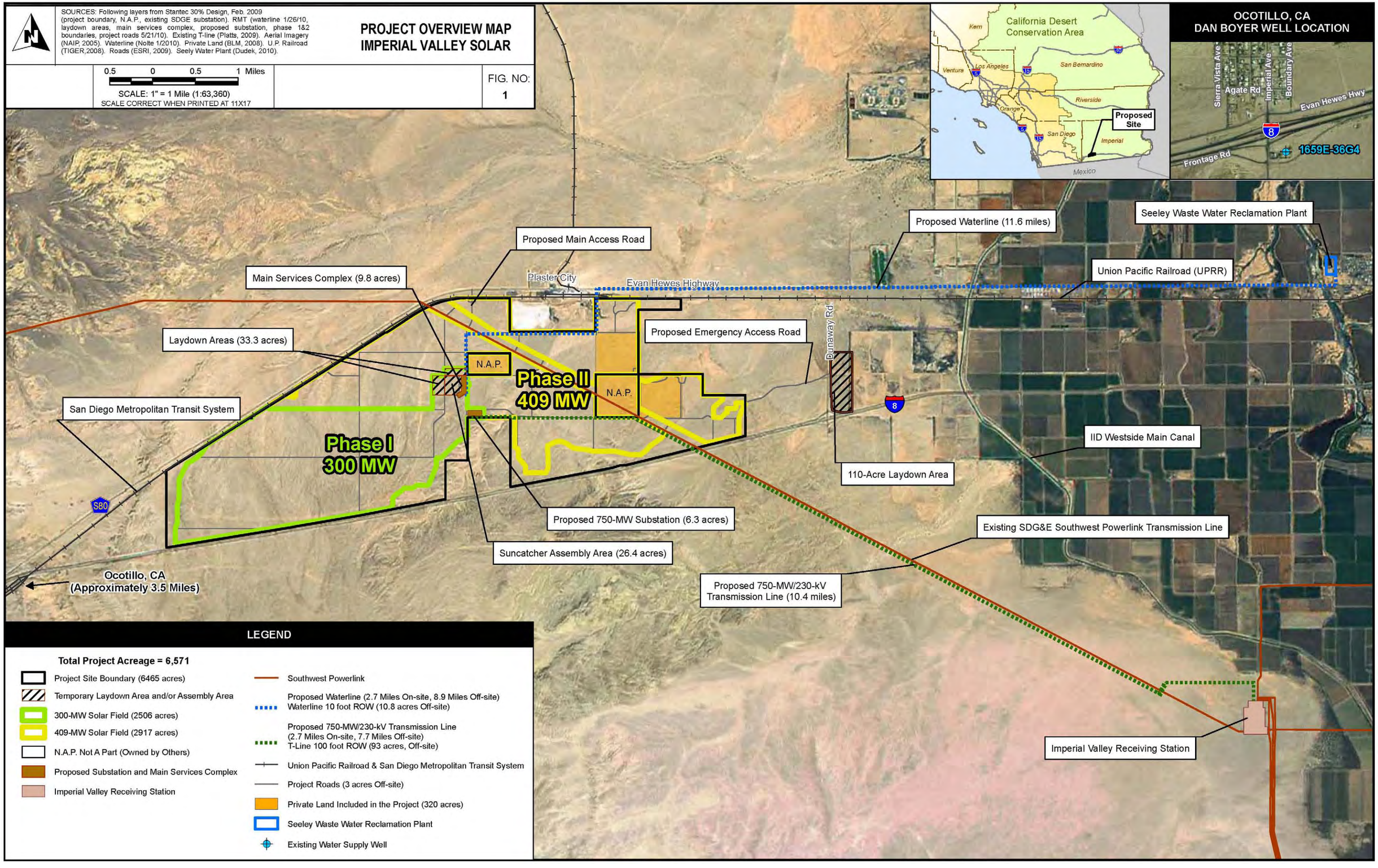
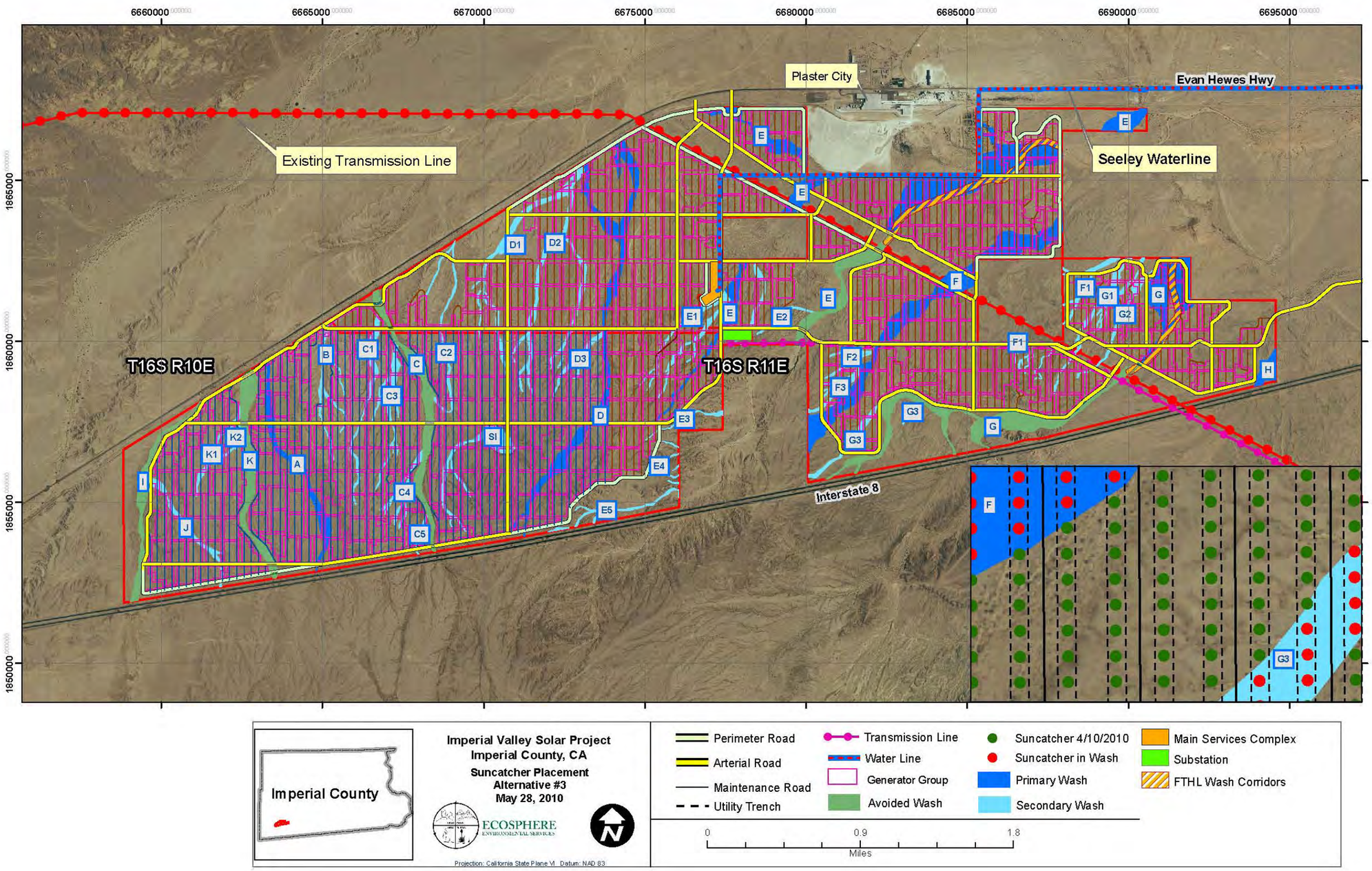
Figure 1: Project Overview Map



Map 4. Site plan for Alternative #3 – Avoidance of the Highest Value Aquatic Resources Alternative.

Figure 2: Project Design Layout



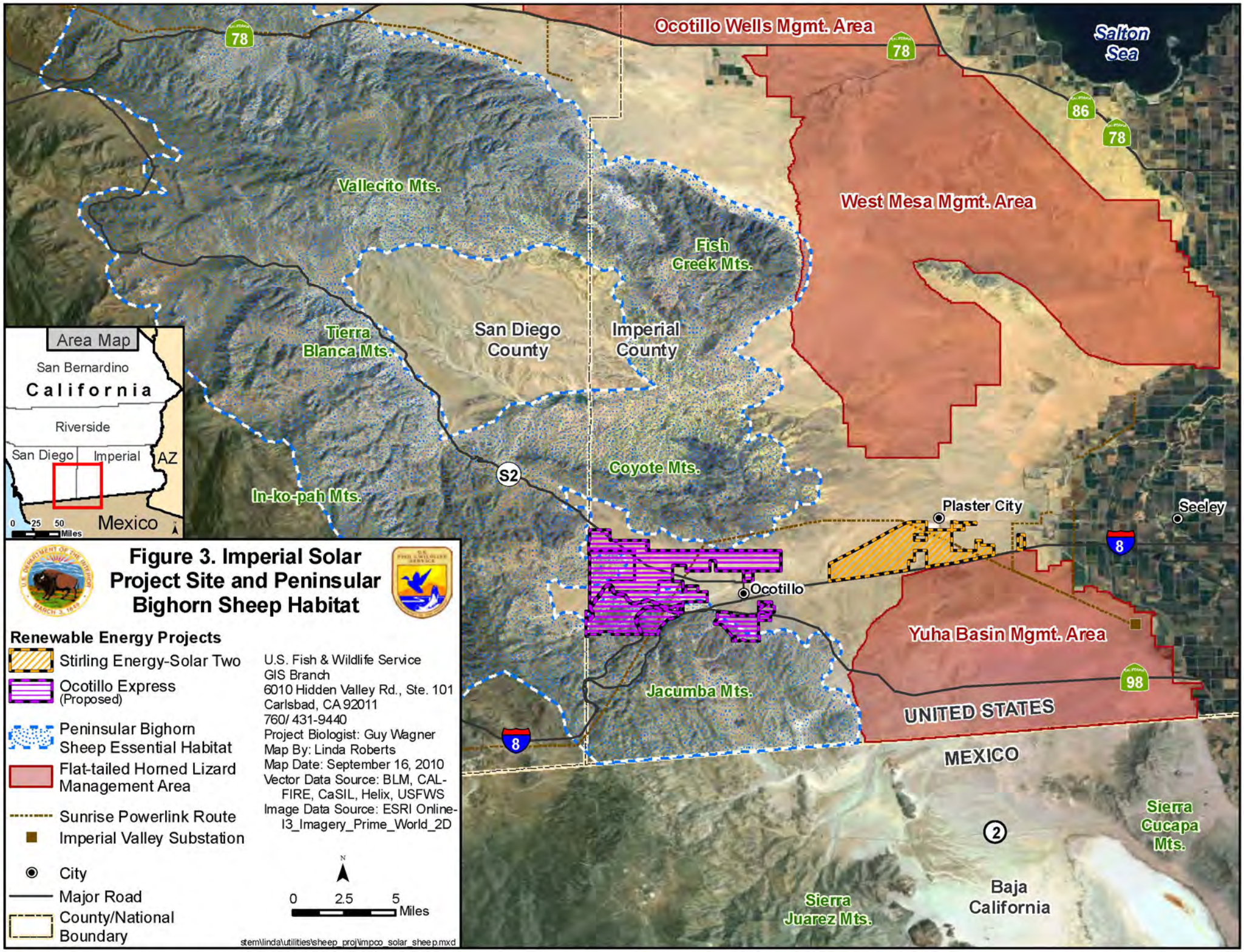

Ocotillo Wells Mgmt. Area
Salton Sea
78
86
Vallecito Mts.
West Mesa Mgmt. Area
Fish Creek Mts.
Tierra Blanca Mts.
San Diego County
Imperial County
Coyote Mts.
In-ko-pah Mts.
S2
Plaster City
Seeley
Ocotillo
8
Yuha Basin Mgmt. Area
98
Jacumba Mts.
UNITED STATES
MEXICO
Sierra Cucapa Mts.
2
Baja California
Sierra Juarez Mts.
Area Map
San Bernardino
California
Riverside
San Diego
Imperial
AZ
Mexico
0 25 50 Miles
Figure 3. Imperial Solar Project Site and Peninsular Bighorn Sheep Habitat
Renewable Energy Projects
Stirling Energy-Solar Two
Ocotillo Express (Proposed)
Peninsular Bighorn Sheep Essential Habitat
Flat-tailed Horned Lizard Management Area
Sunrise Powerlink Route
Imperial Valley Substation
City
Major Road
County/National Boundary
U.S. Fish & Wildlife Service
GIS Branch
6010 Hidden Valley Rd., Ste. 101
Carlsbad, CA 92011
760/ 431-9440
Project Biologist: Guy Wagner
Map By: Linda Roberts
Map Date: September 16, 2010
Vector Data Source: BLM, CAL-FIRE, CaSIL, Helix, USFWS
Image Data Source: ESRI Online-I3_Imagery_Prime_World_2D
N
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Figure 4. FTHL Western Population in California

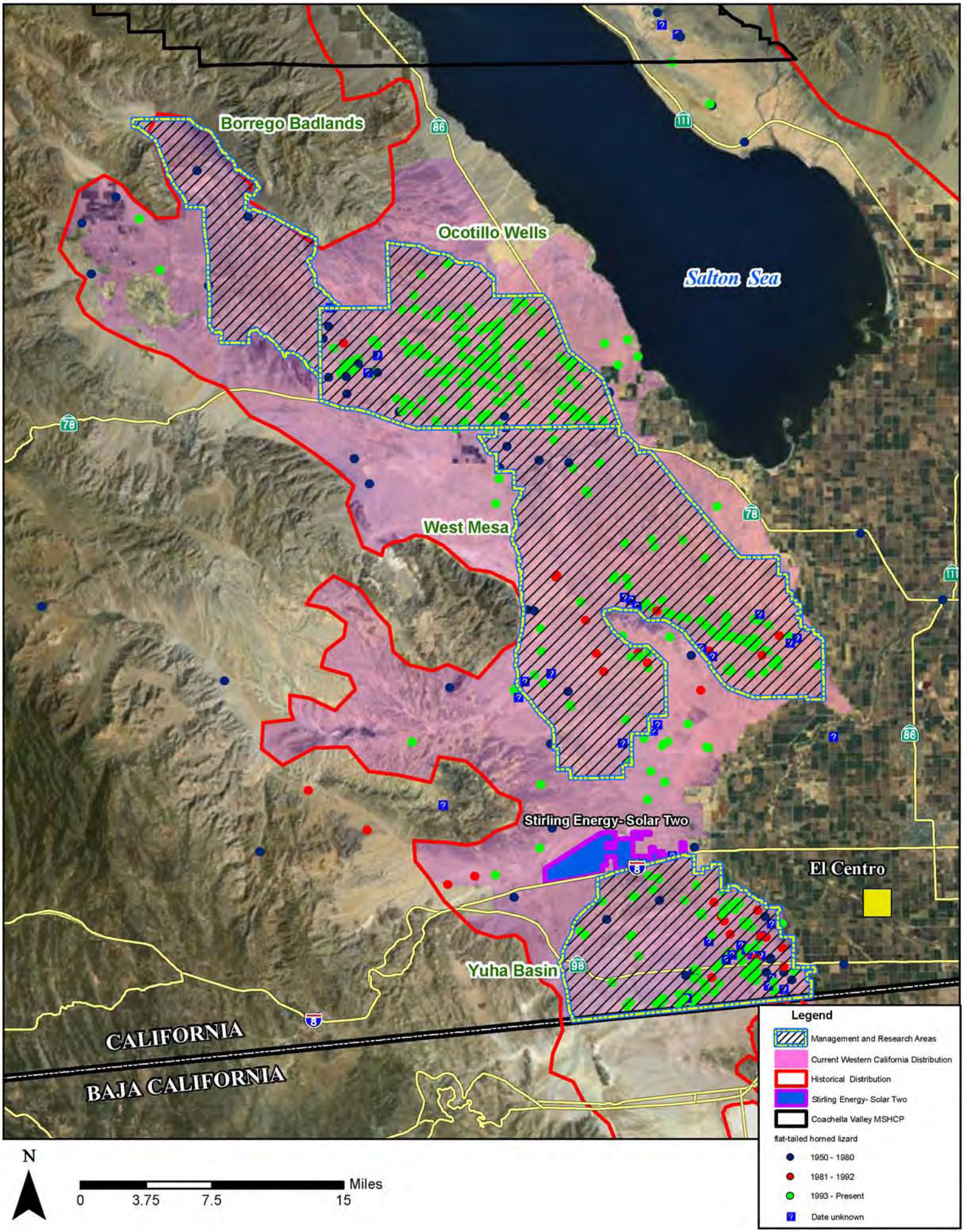


Figure 5: Peninsular Bighorn Sheep Locations

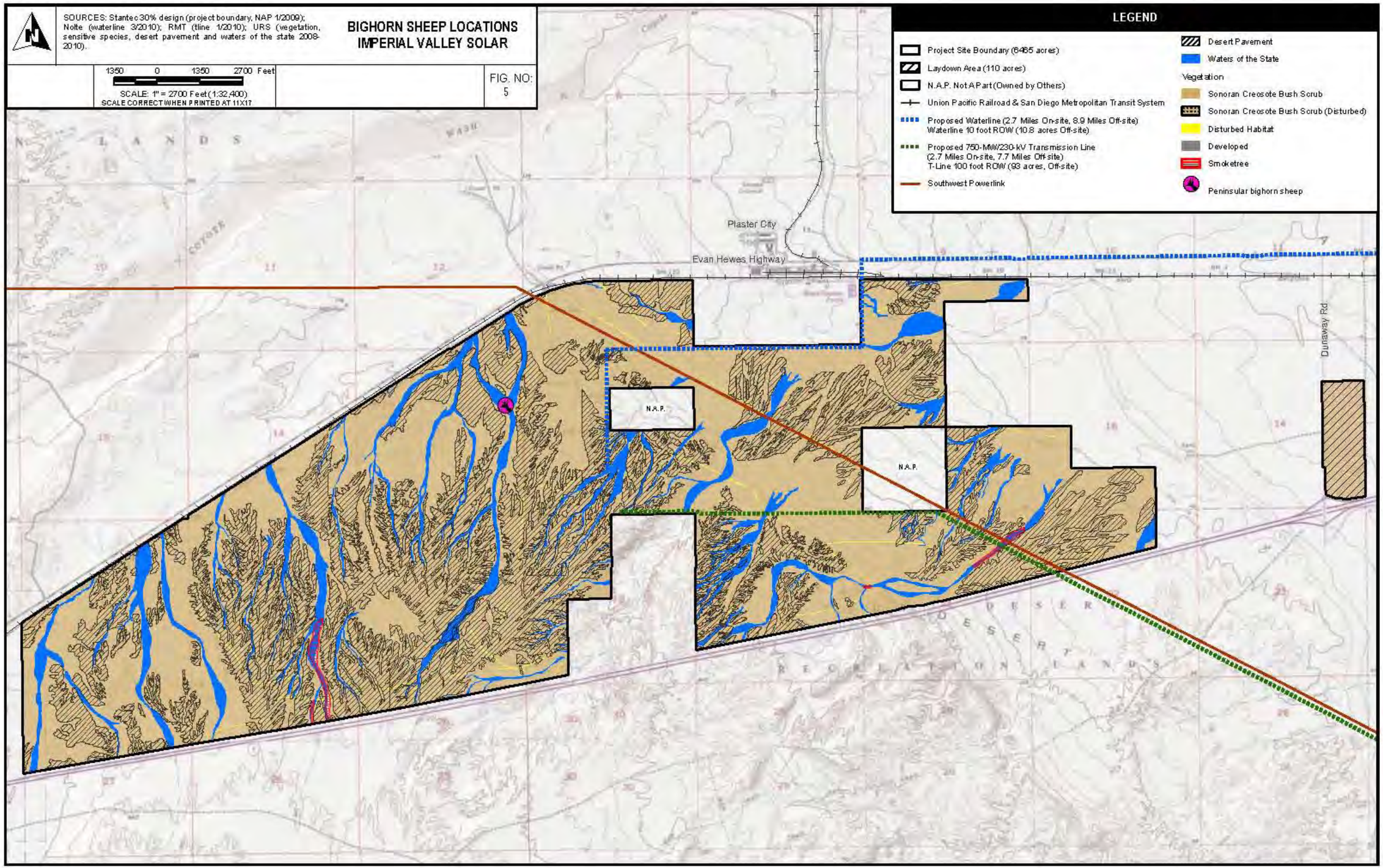
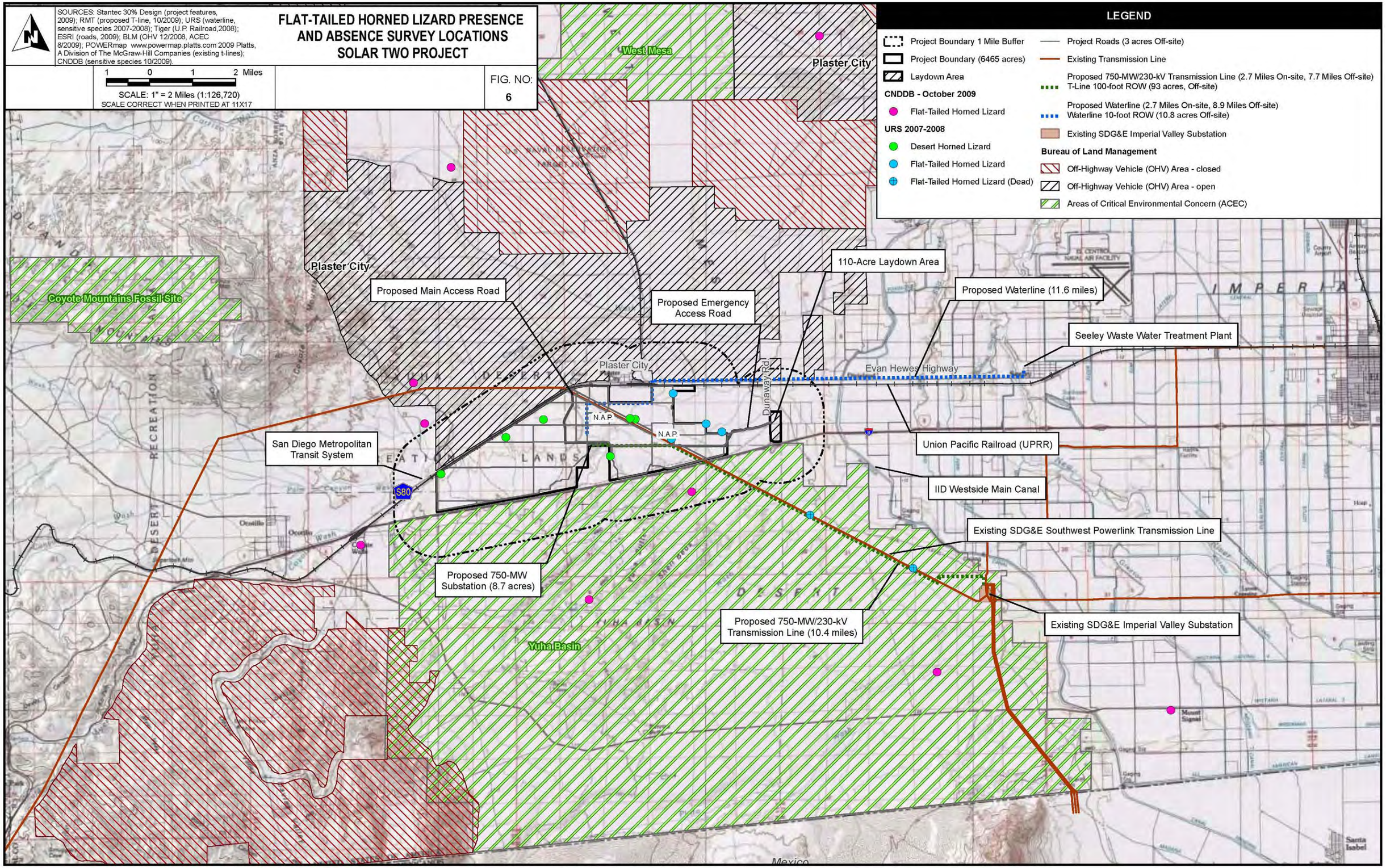


Figure 6: Flat-tailed Horned Lizard Presence/Absence Survey Locations



Appendix 3:
Programmatic Agreement

PROGRAMMATIC AGREEMENT
AMONG THE
BUREAU OF LAND MANAGEMENT-CALIFORNIA,
THE UNITED STATES ARMY CORPS OF ENGINEERS,
THE CALIFORNIA ENERGY COMMISSION,
THE TESSERA SOLAR COMPANY,
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER,
AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING THE TESSERA SOLAR - IMPERIAL VALLEY SOLAR PROJECT, IMPERIAL COUNTY, CALIFORNIA

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INTRODUCTION

The purpose of this Programmatic Agreement (Agreement) is to provide the processes whereby the Bureau of Land Management (BLM) and the U.S. Army Corps of Engineers (COE), in consultation with the California State Historic Preservation Officer (SHPO), Advisory Council on Historic Preservation (ACHP), Indian Tribes and other consulting parties, take into account the effects of the Tessera Solar – Imperial Valley Solar Project on historic properties and provide the ACHP a reasonable opportunity to comment as required by Section 106 of the National Historic Preservation Act (Section 106). The California Energy Commission (Energy Commission) intends to use this Agreement to satisfy the requirements of the California Environmental Quality Act.

The BLM, in consultation with the consulting parties to this Agreement, will consider and incorporate within the Section 106 consultation process the performance standards (desired future condition), range of mitigation measures and commitment to mitigate, and monitoring requirements of the Energy Commission's Staff Assessment for the Tessera Solar - Imperial Valley Solar Project (Application for Certification 08-AFC-5). The BLM and the Energy Commission will endeavor to make the historic properties treatment and management provisions of this Agreement as it applies to the project as consistent as possible with the objectives and terms of the Staff Assessment within the context of the consultation process required by Section 106.

Government agencies, consulting parties, and the public identified in the scoping and public notification process for the Staff Assessment and Environmental Impact Statement were advised in the Supplemental Staff Assessment and Final Environmental Impact Statement (FEIS) that historic properties associated with the Tessera Solar – Imperial Valley Solar Project would be treated consistent with the mitigation measures or performance standards identified in the Staff Assessment and adopted by the Energy Commission, and consistent with the stipulations of this Agreement. A proposed final draft of this Agreement was circulated for public comment as an attachment to the FEIS. The Signatories have consulted with the Invited Signatories, Concurring Parties, Tribes, and Tribal Organizations on this Agreement, and have taken into consideration the views and comments received regarding the draft Agreement in preparing this final Agreement.

Appendices to this Agreement provide additional information about the Project or guidance. The Appendices can also include examples or drafts of planning documents that may be required and tiered from this Agreement and for which Section 106 consultation will continue to develop a final version.

PROGRAMMATIC AGREEMENT
AMONG THE
BUREAU OF LAND MANAGEMENT-CALIFORNIA,
THE UNITED STATES ARMY CORPS OF ENGINEERS,
THE CALIFORNIA ENERGY COMMISSION,
THE TESSERA SOLAR COMPANY,
THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER,
AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING THE TESSERA SOLAR - IMPERIAL VALLEY SOLAR PROJECT,
IMPERIAL COUNTY, CALIFORNIA

WHEREAS, the Tessera Solar Company (Applicant) has applied for a right-of-way (ROW) grant on public lands managed by the Bureau of Land Management (BLM) and has submitted a Plan of Development (POD) to construct, operate and maintain a solar energy electrical generating plant (hereinafter referred to as the Imperial Valley Solar Project or Project), including construction of solar dish power control units (SunCatchers), a 230 kilovolt (kV) transmission line, a water pipeline, paved arterial roads, unpaved perimeter access and maintenance roads, laydown and staging areas, and support facilities and infrastructure which are more fully described in Appendix D: Project Description and illustrated in Appendix E: Project Maps and Illustrations attached hereto and incorporated by this reference; and

WHEREAS, the BLM has determined that since it requires the issuance of a ROW to the Tessera Solar Company in accordance with the Federal Land Policy and Management Act (FLPMA) (Public Law 940-579; 43 U.S.C 1701), the Project is an undertaking subject to Section 106 of the National Historic Preservation Act (NHPA), 16 USC 470(f), and its implementing regulations under 36 CFR Part 800 (2004) (Section 106); and

WHEREAS, the United States Army Corps of Engineers (COE) may also have Section 106 responsibilities since it may issue a Department of the Army (DA) permit pursuant to Section 404 of the Clean Water Act for discharges of dredged or fill material into jurisdictional waters of the United States associated with the Project, and therefore has participated in this consultation and is a Signatory to this Programmatic Agreement (Agreement); and

WHEREAS, the BLM is the lead Federal agency for this Project for the purpose of complying with Section 106 on behalf of itself and the COE, and the BLM shall be responsible for managing historic properties within the Area of Potential Effects (APE) for the Project pursuant to the NHPA; and

WHEREAS, in August 2005, the United States Congress enacted the Energy Policy Act of 2005 (Public Law 109-58). In Section 211 of that Act, Congress directed that the Secretary of the Interior ("Secretary") should, before the end of the 10-year period beginning on the date of enactment of the Act, seek to have approved non-hydropower renewable energy projects located on the public lands with a generation capacity of at least 10,000 megawatts of electricity; and

WHEREAS, by Secretarial Order No. 3285 issued March 11, 2009, the Secretary stated as policy that encouraging the production, development, and delivery of renewable energy is one of the Department of Interior's (DOI) highest priorities and that agencies and bureaus within the DOI will work collaboratively with each other, and with other federal agencies, departments, states, local communities, and private landowners to encourage the timely and responsible development of renewable energy and associated transmission while protecting and enhancing the Nation's water, wildlife, and other natural resources; and

WHEREAS, the BLM and COE, in consultation with the California State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP), pursuant to 36 C.F.R. 800.4(b)(2), seek to phase final identification and evaluation of historic properties for the project pursuant to 36 C.F.R. 800.4(b)(2) because the alternatives under consideration consist of large land areas. In accordance with the requirements of 36 C.F.R. 800.4(b)(2), the BLM is preparing this Agreement to set forth the process for completing phased compliance with Section 106 of the NHPA; and

WHEREAS, the BLM and COE have consulted with the SHPO and the ACHP, pursuant to 36 C.F.R. 800.14(b)(3) and following the procedures outlined at 36 C.F.R. 800.6, and are in the process of considering alternatives for the Project that have the potential to adversely affect historic properties and may reach a decision regarding approval of the ROW and DA permit associated with the Project before the effects of the Project's implementation on historic properties have been fully determined, the BLM chooses to continue its assessment of the undertaking's potential adverse effect and resolve any such effect through the implementation of this Agreement; and

WHEREAS, the Juan Bautista de Anza National Historic Trail corridor is located within the APE for the Project and the National Park Service (NPS) has agreed to participate in the Section 106 consultation regarding the Project under the terms of this Agreement and is a Concurring Party to this Agreement; and

WHEREAS, the California Energy Commission (Energy Commission) may certify the Project located on both public and private lands pursuant to Section 25519, subsection (c) of California's Warren-Alquist Act of 1974 and, for the purposes of consistency, proposes to manage all historical resources in accordance with the stipulations of this Agreement, and has participated in this consultation and is an Invited Signatory to this Agreement; and

WHEREAS, the BLM has prepared the *Final Environmental Impact Statement Imperial Valley Solar Project (July 2010)* and the Energy Commission has prepared the *Supplemental Staff Assessment SES Solar Two Project, Application for Certification (08-AFC-5) Imperial County (2010)* to identify the Project alternatives for purposes of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), and have comparatively examined the relative effects of the alternatives on known historic properties; and

WHEREAS, the Applicant has participated in this consultation per 36 C.F.R. 800.2(c)(4) and, will be the entity to whom the BLM may grant a ROW and the COE may issue a permit related to Project activities, and has the responsibility for carrying out the specific terms of this Agreement under the oversight of the BLM, and therefore is an Invited Signatory to this Agreement; and

WHEREAS, pursuant to the special relationship between the Federal government and Indian tribes, and Section 101(d)(6)(B) of the NHPA, 36 C.F.R. 800.2(c)(2)(ii), the American Indian Religious Freedom Act (AIRFA), Executive Order 13175, and Section 3(c) of the Native American Graves Protection and Repatriation Act (NAGPRA), the BLM is responsible for government-to-government consultation with federally recognized Indian Tribes and is the lead federal agency for all Native American consultation and coordination; and

WHEREAS, the BLM has formally notified and invited Federally recognized tribes including the Campo Kumeyaay Nation, Cocopah Indian Tribe, Quechan Indian Tribe, Ewiiaapaayp Band of Kumeyaay Indians, Jamul Indian Village, , La Posta Band of Kumeyaay Indians, Manzanita Band of Kumeyaay Indians, San Pasqual Band of Diegueno Indians, and Santa Ysabel Band of Diegueno Indians (Tribes), and the non Federally recognized tribe of the Kwaaymii Laguna Band of Indians and the Ah-Mut Pipa Foundation (Tribal Organizations) to consult on this Project and participate in this Agreement as a Concurring Party. BLM has documented its efforts to consult with the Tribes and Tribal Organizations and a summary is provided in Appendix I to this Agreement; and

WHEREAS, through consultation, Tribes and Tribal Organizations have expressed their views and concerns about the importance and sensitivity of specific cultural resources to which they attach religious and cultural significance. Tribes have expressed the connection of these resources to the broader cultural landscape within and near the Project area; and

WHEREAS, the BLM shall continue to consult with the Tribes throughout the implementation of this Agreement regarding the adverse effects to historic properties to which they attach religious and cultural significance. BLM will carry out its responsibilities to consult with Tribes that request such consultation with the further understanding that, notwithstanding any decision by these Tribes to decline concurrence, BLM shall continue to consult with these Tribes throughout the implementation of this Agreement; and

WHEREAS, the National Trust for Historic Preservation, the Anza Society, the California Unions for Reliable Energy, and the Sacred Sites International Foundation, as organizations, and Edie Harmon and Greg P. Smestad, Ph.D., as individuals, have been invited to consult on this undertaking and this Agreement, have been afforded consulting party status pursuant to 36 C.F.R. 800.3(f)(4), and have been invited to be Concurring Parties to this Agreement. The BLM will continue to consult with any consulting party that request such consultation regardless of their decision to concur by signature in this Agreement. BLM shall continue to consult throughout the implementation of this Agreement, however only consulting parties that have concurred in this Agreement by signature shall have rights with regard to implementation of the terms of this Agreement; and

WHEREAS, the BLM, in coordination with the Energy Commission, has authorized the Applicant to conduct specific identification efforts for this Project including a review of the existing literature and records, cultural resources surveys, ethnographic studies, and geo-morphological studies to identify historic properties that might be located within the APE; and

WHEREAS, the BLM has defined the APE in which the Project may directly or indirectly adversely affect historic properties pursuant to the definition of APE at 36 C.F.R. 800.16(d). The basis of the APE is described in greater detail in Stipulation II of this Agreement; and

WHEREAS, the Applicant has retained an archaeological consultant to complete all of the investigations necessary to identify and evaluate the National Register of Historic Places (NRHP) eligibility for cultural resources located within the APE for both direct and indirect effects. The consultant has completed a review of the existing historic, archaeological and ethnographic literature and records to ascertain the presence of known and recorded cultural resources in the APE and buffered study area; conducted an intensive field survey for 7,700 acres of land, including all of the lands identified in APE for direct effects for all Project alternatives; and completed intensive field surveys for alternatives on lands that are no longer part of the Project. The consultant has also submitted a cultural resources inventory report (*Draft Final Class III Cultural Resources Technical Report for the Imperial Valley Solar Project, Application for Certification (08-AFC-5), Imperial Valley Solar, LLC*, prepared by URS Corporation, June 2010) that presents the results of identification efforts and was submitted to the BLM, COE, and Energy Commission. The BLM has provided the report to the interested parties and Tribes for review and comment; and

NOW, THEREFORE, the BLM, COE, SHPO, and ACHP (hereinafter "Signatories) and the Energy Commission and Applicant (hereinafter "Invited Signatories"), agree that the Project shall be implemented in accordance with the following stipulations in order to take into account the adverse effect of the undertaking on historic properties, resolve such adverse effects through the process set forth in this Agreement, and provide the ACHP with a reasonable opportunity to comment in compliance with Section 106.

STIPULATIONS

The BLM and COE shall ensure that the following measures are implemented:

I. DEFINITIONS

The definitions found at 36 C.F.R. 800.16 and in this section apply throughout this Agreement except where another definition is offered in this Agreement.

a) ***Area of Potential Effect.*** The APE is defined as the total geographic area or areas within which the Project may directly or indirectly cause alterations in the character or use of historic properties per 36 C.F.R. 800.16(d). The APE is influenced by the scale and nature of an undertaking and includes those areas which could be affected by a project prior to, during and after construction.
b) ***Concurring Parties***. Collectively refers to consulting parties with a demonstrated interest in the Project, who agree, through their signature, with the terms of this Agreement. Concurring Parties may propose amendments to this Agreement.
c) ***Cultural Resource.*** A cultural resource is an object or definite location of human activity, occupation, use, or significance identifiable through field inventory, historical documentation, or oral evidence. Cultural resources are prehistoric, historic, archaeological, or architectural sites, structures, buildings, places, or objects and locations of traditional cultural or religious importance to specified social and/or culture groups. Cultural resources include the entire spectrum of objects and places, from artifacts to cultural landscapes, without regard to eligibility for inclusion on the National Register of Historic Places (NRHP) or California Register of Historical Resources (CRHR).
d) ***Consulting Parties.*** Collectively refers to the Signatories, Invited Signatories and Concurring Parties who have signed this Agreement.
e) ***Historic Properties.*** Properties (cultural resources) that are included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior and per the NRHP eligibility criteria at 36 CFR60.4 and may include any prehistoric or historic district, site, building, structure, traditional cultural property or object. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the NRHP criteria. The term "eligible for inclusion in the NRHP" refers both to properties formally determined as such in accordance with regulations of the Secretary of the Interior and all other properties that meet the NRHP criteria.
f) ***Historical Resources.*** Historical resources are cultural resources that meet the criteria for listing on the CRHR as provided at California Code of Regulations Title 14, Chapter 11.5, Section 4850 and may include, but are not limited to, any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.

g) ***Invited Signatories.*** Invited Signatories are parties that have specific responsibilities as defined in this Agreement. Those Invited Signatories who actually sign this Agreement have the same rights with regard to seeking amendment or termination of this Agreement as the Signatory Parties, but whose signatures are not required for execution of the Agreement. Invited Signatories to this Agreement are the Energy Commission and Applicant.

h) ***Lands Administered by the U.S. Department of Interior, Bureau of Land Management*** (BLM) means any federal lands under the administrative authority of the BLM.

i) ***Lands Regulated by the U.S. Army Corps of Engineers*** (COE) means any lands subject to regulation by the COE pursuant to Section 404 of the Clean Water Act (33 USC Part 1344) or other law, and for which the COE has issued a Department of the Army permit.

j) ***Literature Review.*** A literature review is one component of a BLM class I inventory, as defined in BLM Manual Guidance 8100.21(A)(1), and is a professionally prepared study that includes a compilation and analysis of all reasonably available cultural resource data and literature, and a management-focused, interpretive, narrative overview, and synthesis of the data. The overview may also define regional research questions and treatment options.

k) ***Records Search.*** A records search is one component of a BLM class I inventory and an important element of a literature review. A records search is the process of obtaining existing cultural resource data from published and unpublished documents, BLM cultural resource inventory records, institutional site files, State and national registers, interviews, and other information sources.

l) ***Signatories.*** Signatories are parties that have the sole authority to execute, amend or terminate this Agreement. Signatories to this Agreement are the BLM, COE, SHPO, and ACHP.

m) ***Traditional Cultural Property.*** A traditional cultural property is defined generally as a property that is important to a living group or community because of its association with cultural practices or beliefs that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. It is a place, such as a traditional gathering area, prayer site, or sacred/ceremonial location, that may figure in important community traditions. These places may or may not contain features, artifacts, or physical evidence, and are usually identified through consultation. A traditional cultural property may be eligible for inclusion in the NRHP and the CRHR.

n) ***Tribes.*** The federally recognized Indian Tribes that BLM is consulting with on this Project.

o) ***Tribal Organizations.*** The non Federally recognized Indian tribes and Native American organizations that BLM is consulting with on this Project.

p) ***Windshield Survey.*** A windshield survey is the driving or walking of surveyors along streets and roads of a community in order to observe and record the buildings, structures, and landscape characteristics seen from those vantage points. A windshield survey is a method commonly utilized in reconnaissance surveys to identify built-environment resources, such as buildings, objects, and structures.

II. AREA OF POTENTIAL EFFECTS

a) The BLM has defined the APE for the Imperial Valley Solar Project based on both the direct and indirect impacts, to be a 15 mile radius around the block area of the Project. Below is a discussion about the APE and the methodology used to so define, and the survey methodology utilized within each APE. See Appendix E for APE map and Project illustrations.

i) The area within which historic properties could sustain direct effects as a result of the Project is defined to include:

(1) The block area of installation of the proposed Phase I and Phase II components of the Project, which includes approximately 6,140 acres of public lands and 360 acres of private lands. The area is generally bounded by Interstate 8 on the south, Dunaway Road to the east, and the Evan Hewes Highway to the north and west. Per Energy Commission requirements, a 200-foot wide buffer around the APE was included in the survey for cultural resources within the block area. This buffer is deemed sufficient to include any Project-related activity conducted near the edge of the Project footprint..

(2) All linear elements of the Project including:

(a) A 10-foot wide ROW for an approximately 11.8 mile long water supply pipeline that would extend from the Seeley Waste Water Treatment Plant to the Project area. The pipeline will be buried 30 inches below grade in the shoulder of the existing ROW of the Evan Hewes Highway. A survey corridor for cultural resources for this linear element was established as a 75-foot wide buffer on either side of the center line (150-foot wide corridor) to allow for changes in the ROW to avoid cultural resources.

(b) A 30-foot wide ROW for temporary or permanent access roads required outside the plant footprint. The survey corridor for cultural resources for this linear element included a 50-foot wide buffer on either side of the center line (100-foot wide corridor) to allow for changes in the ROW to avoid cultural resources.

(c) A ROW for the 230 kV transmission line is approximately 100-feet wide and 10.3 miles long and extends from the Project area to the San Diego Gas and Electric Company Imperial Valley Substation. The survey corridor for cultural resources for this linear element was established as a 150-foot wide buffer on either side of the center line (300-foot wide corridor) to allow for changes in the ROW to avoid cultural resources.

ii) The area within which historic properties could sustain indirect effects, including visual, auditory, atmospheric, and contextual, as a result of the Project includes:

(1) Historic properties or cultural resources within a 15-mile radius of the direct effects APE that are identified through a review of existing literature and records search, information or records on file with the BLM or at the South Coastal Information Center, interviews or discussions with local professional or historical societies and local experts in history or archaeology. For example, specific areas of concern or cultural resources that were identified include:

(a) Cultural resources in the Yuha Area of Critical Environmental Concern (ACEC).
(b) Yuha Basin Discontiguous Archaeological District
(c) Historic properties or cultural resources identified through archaeological or other field investigations for this Project that, as a result of Project redesign to avoid direct effects to cultural resources, are no longer within the Project area.

(2) Historic properties or cultural resources within a 15-mile radius of the direct effects APE that are included in the Native American Heritage Commission Sacred Lands Files, identified through a literature review or records search, or identified by a Tribe or Tribal Organization, through consultation as having religious or cultural significance. Specific places or cultural resources that have been identified through tribal consultation include:

(a) Certain geological features including Signal Mountain and Coyote Mountain.
(b) Human remains located within or in proximity to the Project including those in any state of decomposition or skeletal completeness.
(c) Geoglyphs such as those in the Yuha ACEC.

(3) Historic properties or cultural resources within a 15 mile radius of the direct effects APE that have been identified by a consulting party, organization, governmental entity, or individual through consultation or the public commenting processes as having significance or being a resource of concern. Areas identified through consultation to date include:

(a) Juan Bautista de Anza National Historic Trail (Anza NHT).

(i) The Anza NHT corridor is designated pursuant to the National Trails Act.
(ii) No identifiable and recognizable physical evidence or historic properties associated with the historic trail have yet been identified within the APE for direct effects. However, specific areas of concern or cultural resources associated with the Anza NHT have been identified both south and north of the Project location and include:

1. Anza Camp 47 (Yuha Well)
2. Anza Camp 48
3. Anza Camp 49 (San Sebastian Marsh)

(b) Sites associated with the 1781 Rivera y Moncada Expedition which utilized the Anza trail corridor.

(i) No identifiable and recognizable physical evidence or historic properties associated with the Rivera y Moncada Expedition of 1781 have been identified yet within the APE for direct effects.

(4) Built-environment resources located within one-half mile of the Project footprint

(a) whose historic settings could be adversely affected. Specific areas of concern or cultural resources have been identified both south and north of the Project location and include:

(i) Imperial Irrigation District hydraulic irrigation system components
(ii) Highway 80 (Evan Hewes Highway) and remnants
(iii) San Diego and Arizona Railroad
(iv) U.S. Gypsum Rail-Line
(v) Plaster City Gypsum Plant

(b) On private property, historic properties or cultural resources within one-half mile of the direct effects APE that are identified through surveys, where access was granted, and windshield surveys, where access was not granted.

b) The APE, as currently defined, encompasses an area sufficient to accommodate all of the proposed and alternative Project components under consideration as of the date of the execution of this Agreement. If it is determined in the future that the Project may directly or indirectly affect historic properties located outside the currently defined APE, then the BLM, in consultation with the Signatories, Invited Signatories, and Concurring Parties, shall modify the APE using the following process:

i) Any consulting party to this Agreement may propose that the APE established herein be modified. The BLM shall notify the other Signatories, Invited Signatories, and Concurring Parties of the proposal and consult for no more than 15 days to reach agreement on the proposal.

ii) If the Signatories agree to the proposal, then the BLM will prepare a description and a map of the modification to which the Signatories agree. The BLM will keep copies of the description and the map on file for its administrative record and distribute copies of each to the other Signatories, Invited Signatories and Concurring Parties within 30 days of the day upon which agreement was reached.

iii) Upon agreeing to a modification to the APE that adds a new geographic area, the BLM shall follow the processes set forth in Stipulation III to identify and evaluate historic properties in the new APE, assess the effects of the undertaking on any

historic properties in the new APE, and provide for the resolution of any adverse effects to such properties, known or subsequently discovered, per Stipulations IV and V.

iv) If the Signatories cannot agree to a proposal for the modification of the APE, then they will resolve the dispute in accordance with Stipulation XII.

III. IDENTIFICATION AND EVALUATION

a) The BLM, in coordination with the Energy Commission, has authorized the Applicant to conduct specific identification efforts for this undertaking including, but not limited to, a literature review, records search, cultural resources surveys, ethnographic studies, and geo-morphological studies to identify historic properties that might be located within applicable specific APE.

i) The Applicant has prepared and submitted a cultural resources inventory report (URS June 2010) to the BLM, COE, and the Energy Commission that presents the results of the Applicant's identification efforts. The report is currently under review by the BLM, COE, and Energy Commission to assess whether the report conforms with the field methodology and site description template required under BLM Fieldwork Authorization CA-670-06-07FA09 and Fieldwork Authorization CA-670-06-07FA10 and Energy Commission transaction number Data Requests Set 2, Part 2 #142, Docket number 08-AFC-5.

ii) The BLM, in consultation with the Energy Commission and COE, may require additional field investigations to be conducted by the Applicant to ensure the accuracy of site recordation and to provide additional information to support site evaluations and the assessment of effects. However, the BLM, COE, and Energy Commission, separately or together, have the right and the discretion, under this Agreement, to request additional field studies.

iii) The BLM is consulting with interested Tribes, Tribal Organizations or tribal individuals regarding the identification of historic properties within the APE to which they attach religious or cultural significance and shall respond to any additional request to consult with Tribes, Tribal Organizations or tribal individuals.

b) The BLM shall make determinations of eligibility consistent with 36 C.F.R. 800.4 prior to the Record of Decision (ROD) to the extent practicable, and will make any remaining determinations as soon as possible afterwards, on those cultural resources within the APE, and make the agency's determinations available to the consulting parties, Tribes and the public for a 45 day review and comment period.

i) The BLM will respond to any request for consultation on its determinations from a consulting party to this Agreement or a Tribe.

ii) A consulting party may provide its comments directly to the SHPO with a copy to the BLM within the 45 day comment period.

iii) The BLM will forward to the SHPO all comments regarding its determinations received during the 45 day comment period.

iv) After the 45 day comment period, the BLM may request SHPO concurrence for those determinations and findings for which there is no disagreement.

(1) SHPO will have 15 days in which to comment.
(2) Should SHPO not comment, BLM shall document that SHPO has elected not to comment and may proceed in accordance with its proposed determinations.
(3) If the BLM and SHPO disagree on a determination, BLM shall seek a determination from the Keeper of the National Register.

v) Where a consulting party or Tribe objects to the BLM's determination for a specific cultural resource within the 45 day review period, the BLM shall consult with the objecting party and the SHPO regarding the nature of the objection and reconsider its determinations.

(1) If the objection is not resolved, the BLM shall further consult with the SHPO and follow the processes provided at 36 C.F.R. 800.4(c)(2).
(2) The BLM may proceed with determinations for all cultural resources not subject to objection.

vi) The BLM and the Energy Commission shall coordinate to the extent feasible and practicable on determinations of eligibility for the NRHP and CRHR.

vii) If adverse effects to a cultural resource can be avoided, the BLM may choose to prescribe avoidance without making an eligibility determination of that cultural resource.

c) In only the following circumstances, the BLM may defer the final evaluation of significance of cultural resources

i) where BLM through consultation has determined that the potential significance of an archaeological site is limited to scientific, prehistoric, historic or archaeological data and where testing or limited excavation is recommended to determine whether the site would be eligible under Criterion D for inclusion on the NRHP.

ii) where additional evaluation efforts are required to assess the scientific, prehistoric, historic or archaeological data values of a property, the BLM and Energy Commission shall ensure that such properties located within the APE are evaluated

for the NRHP and CRHR pursuant to Stipulation III and the guidelines provided in Appendix A of this Agreement.

IV. ASSESSMENT OF EFFECTS

a) The BLM shall make determinations of effect consistent with 36 C.F.R. 800.4(d) and identify the type of adverse effect for each affected property in accordance with the criteria established in 36 C.F.R. 800.5(a)(1) and (2)(i)-(vii) prior to the ROD to the extent practicable on those cultural resources within the APE that are listed on or determined eligible for the NRHP, and provide the SHPO, Tribes, and the consulting parties with the results of this finding.

   i) The Applicant shall submit to the BLM:

      (1) a list of the cultural resources that the Project appears likely to affect.
      (2) a list of the cultural resources that the Project has no potential to affect.
      (3) a list of the cultural resources that the Applicant commits to avoiding through the implementation of formal avoidance measures.
      (4) a list of the cultural resources that cannot be avoided and will need to be evaluated and/or treated by implementing the prescriptions of the Historic Properties Treatment Plan (HPTP) required in Stipulation V of the Agreement.

b) The BLM shall issue a finding of effect, based on the BLM's own evaluation of the Applicant's analysis, and provide Tribes and consulting parties to this Agreement an opportunity to review the BLM's finding and the analysis to support its finding.

   i) The BLM shall attempt to make its determinations and findings to the extent possible in a single consolidated decision and may submit findings of effect to the SHPO concurrently with its determinations of eligibility per Stipulation III(b), otherwise, the consulting parties shall have 30 days to comment on BLM findings of effect.

   ii) The BLM will forward to the SHPO all comments regarding its findings of effect received during the comment period.

   iii) After the comment period, the BLM may request SHPO concurrence for those findings for which there is no disagreement.

      (1) SHPO will have 15 days in which to comment.
      (2) Should SHPO not comment, BLM shall document that SHPO has elected not to comment and may proceed in accordance with its proposed determinations.
      (3) Should SHPO disagree with BLM's finding, they shall continue to consult to resolve the disagreement within a 30 day review period.

(4) If the SHPO and BLM are not able to resolve the disagreement within the review period, BLM will request ACHP review of the finding pursuant to 36 C.F.R. 800.5(c)(3)(i).

iv) Where a consulting party or Tribe objects to the BLM's findings, the BLM shall consult with the objecting party and the SHPO regarding the nature of the objection and reconsider its findings.

(1) If the objection is not resolved, the BLM shall further consult with the SHPO and follow the processes provided at Stipulation IV(b)(iii).

c) The Applicant, at the direction of the BLM, COE, and Energy Commission, may prepare the analysis required above in phases that correspond to the proposed sequence of development for the Project or in phases for each block of 60 SunCatchers, provided that analyses are ultimately prepared for the entirety of the APE.

d) If adverse effects to such cultural resources will not be avoided, the BLM must resolve the adverse effect by implementing the prescriptions of the HPTP. When developing these HPTPs, BLM does not need to consider those cultural resources that it has evaluated and determined are not eligible for inclusion in the NRHP consistent with the process under 36 C.F.R. 800.4.

e) Where additional identification and evaluation efforts are required due to changes in the project and the APE, the BLM and Energy Commission shall ensure that cultural resources located within the APE are identified and evaluated for the NRHP and CRHR pursuant to Stipulation III of this Agreement.

V. TREATMENT AND MANAGEMENT OF HISTORIC PROPERTIES

a) BLM will ensure the resolution of identified adverse effects to historic properties through avoidance, minimization, or mitigation and shall be described in one or more HPTP(s) that shall be written and finalized as described below and included in Appendix B.

i) The BLM and Applicant, in consultation with the consulting parties and Tribes, shall develop a draft HPTP(s), prior to the ROD if feasible, or as soon as possible thereafter.

(1) Prior to the issuance of any Notice to Proceed by the BLM to initiate the Project or any component of it that may affect historic properties, the Applicant shall develop and submit to the BLM one or more HPTPs for the BLM's approval.
(2) The HPTP(s) will be implemented after the ROW is granted by the BLM and issuance of any DA permit by the COE and prior to the issuance of a Notice to Proceed for construction in those portions of the Project addressed by the HPTP.

The process for developing the HPTPs is further described below in this stipulation.

(3) The BLM may authorize the phased implementation of the HPTP(s) (per Stipulation X), or if appropriate, the development of HPTPs for individual cultural resources, or HPTPs that are related to specific issues or geography.

ii) The BLM and Energy Commission, consistent with the guidelines provided in Appendix B(2), shall make every effort within the legal limits imposed on each party to incorporate into the Historic Properties Management Plan (HPMP) and any HPTP the intent of the treatment or mitigation measures in the Energy Commission's Conditions of Certification and BLM's ROD. The purpose of this effort is to evidence that due consideration of the intent inherent in the Energy Commission's Conditions of Certification were fully considered and incorporated when possible. If the BLM and Energy Commission cannot agree to proposed treatment measures, then they will resolve the dispute in accordance with Stipulation XII(c)(iii).

iii) The BLM shall submit the HPTP(s) to the consulting parties and Tribes for a 30-day review period. BLM will consider timely comments when finalizing the HPTP(s). A consulting party may provide its comments directly to the SHPO with a copy to the BLM within the 30-day comment period. The BLM will forward to the SHPO all comments regarding the HPTP(s) received during the comment period.

(1) Where an HPTP specifically addresses treatment for adverse effects to historic properties to which Tribes attach religious or cultural significance, the BLM shall submit the HPTP to the Tribes and seek their views and comments through consultation, regardless of the status of a Tribe as a Concurring party to this Agreement. BLM shall consult with involved Tribe(s) on the distribution to other consulting parties of any HPTP(s) that specifically addresses treatment for adverse effects to historic properties to which the Tribes attach religious or cultural significance. Such a specific HPTP(s) shall be governed by the consultation time frames as provided in Section V(a)(iii) and (iv).

iv) BLM will provide the consulting parties with written documentation indicating whether and how the draft HPTP will be modified in response to any timely comments received. If the HPTP is revised in response to comments received within that 30 day period, BLM shall submit the revised HPTP to all parties for a final, 15 day review period. BLM will consider any timely comments in finalizing the HPTP and provide the consulting parties and Tribes with a copy.

b) BLM shall ensure that any HPTP developed in accordance with this Stipulation and Appendix B of this Agreement is completed and implemented. A finalized HPTP will be included in Appendix B of this Agreement.

c) BLM shall ensure that a HPMP, which provides for the protection and management of historic properties during the operational life and decommissioning of the solar energy power plant, is developed and implemented in accordance with Appendix C of this Agreement. A finalized HPMP will be included in Appendix C of this Agreement.

d) An amendment to an HPTP or HPMP will go into effect when agreed to in writing by the Signatories. If the Signatories do not agree on an HPTP or HPMP amendment proposed by another Signatory, the disagreement will be resolved pursuant to the procedures in Stipulation XII of this Agreement.

VI. DISCOVERIES AND UNANTICIPATED EFFECTS

a) The BLM, in consultation with the consulting parties and Tribes, will seek to develop a monitoring and discovery plan for the Project pursuant to 36 C.F.R. 800.13(a)(1). A finalized monitoring and discovery plan will be included as Appendix J to this Agreement.

b) If the BLM determines that implementation of the Project or a HPTP will affect a previously unidentified property that may be eligible for the NRHP, or affect a known historic property in an unanticipated manner, and a monitoring and discovery plan has not been finalized, the BLM, in coordination with the Energy Commission, will address the discovery or unanticipated effect by following the procedures at 36 C.F.R. 800.13(b)(3) where a process has not been yet been agreed to pursuant to 36 C.F.R. 800.13(a)(1).

c) The BLM at its discretion may assume any discovered property to be eligible for inclusion in the NRHP. The BLM's compliance with this stipulation shall satisfy the requirements of 36 C.F.R. 800.13(a)(1).

VII. TREATMENT OF HUMAN REMAINS OF NATIVE AMERICAN ORIGIN

a) The BLM shall ensure that any that Native American burials and related items discovered on BLM administered lands during implementation of the terms of the Agreement will be treated in accordance with the requirements of the NAGPRA. The BLM will consult with concerned Tribes, Tribal Organizations, or individuals in accordance with the requirements of Sections 3(c) and 3(d) of the NAGPRA and implementing regulations found at 43 C.F.R. Part 10 to address the treatment of Native American burials and related cultural items that may be discovered during implementation of this Agreement.

b) In consultation with the Tribes and Tribal Organizations, the BLM shall seek to develop a written plan of action pursuant to 43 C.F.R. 10.5(e) to manage the inadvertent discovery or intentional excavation of human remains, funerary objects, sacred objects, or objects of cultural patrimony. The finalized plan of action shall be included as Appendix K to this Agreement.

c) The BLM shall ensure that Native American burials and related cultural items on private lands are treated in accordance with the applicable requirements of the California Public Resources Code at Sections 5097.98 and 5097.991 , and of the California Health and Human Safety Code at Section 7050.5(c).

VIII. STANDARDS AND QUALIFICATIONS

a) PROFESSIONAL QUALIFICATIONS. All actions prescribed by this Agreement that involve the identification, evaluation, analysis, recordation, treatment, monitoring, and disposition of historic properties and that involve the reporting and documentation of such actions in the form of reports, forms or other records, shall be carried out by or under the direct supervision of a person or persons meeting, at a minimum, the Secretary of the Interior's Professional Qualifications Standards (PQS), as appropriate (48 Fed. Reg. 44739 dated September 29, 1983). However, nothing in this Stipulation may be interpreted to preclude any party qualified under the terms of this paragraph from using the services of persons who do not meet the PQS, so long as the work of such persons is supervised by someone who meets the PQS. Tribal consultants who are available to perform monitoring duties are assigned and approved of by each Tribe.

b) DOCUMENTATION STANDARDS. Reporting on and documenting the actions cited in this Agreement shall conform to every reasonable extent with the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 Fed Reg. 44716-40 dated September 29, 1983), as well as, the BLM 8100 Manual, the California Office of Historic Preservation's Preservation Planning Bulletin Number 4(a) December 1989, Archaeological Resource Management Reports (ARMR): Recommended Contents and Format (ARMR Guidelines) for the Preparation and Review of Archaeological Reports, and any specific and applicable county or local requirements or report formats.

c) CURATION STANDARDS. On BLM-administered land, all records and materials resulting from the actions cited in Stipulation III, IV, V and VI of this Agreement shall be curated in accordance with 36 C.F.R. Part 79, and the provisions of the NAGPRA, 43 C.F.R. Part 10, as applicable. To the extent permitted under Sections 5097.98 and 5097.991 of the California Public Resources Code, the materials and records resulting from the actions cited in Stipulations III though VI of this Agreement for private lands shall be curated in accordance with 36 C.F.R. Part 79. The BLM will seek to have the materials retrieved from private lands donated through a written donation agreement. The BLM will attempt to have all collections curated at one local facility where possible unless otherwise agreed to by the consulting parties.

IX. REPORTING REQUIREMENTS

a) Within twelve (12) months after the BLM, in consultation with the Energy Commission, has determined that all fieldwork required by Stipulations III through V has been completed, the BLM will ensure preparation and concurrent distribution to the

consulting parties and Tribes a draft report that documents the results of implementing the requirements of each Stipulation. The consulting parties and Tribes will be afforded 45 days following receipt of each draft report to submit any written comments to the BLM. BLM will consider timely comments when making revisions to the draft report. A revised draft will be provided for a 14 day review. The BLM will consider timely comments in making final changes to the report. Thereafter, the BLM may issue the reports in final form and distribute these documents in accordance with Stipulation IX(b).

b) Unless otherwise requested, the BLM will distribute one copy of final reports documenting the results of implementing the requirements of Stipulations III through V to each consulting party, Tribes and to the California Historical Resources Information System (CHRIS) Regional Information Center.

c) The BLM shall ensure that any draft document that communicates, in lay terms, the results of implementing Stipulations III through V to members of the interested public is distributed for review and comment concurrently with and in the same manner as that prescribed for the draft technical report prescribed by Stipulation IX(a). If the draft document prescribed is a publication, such as a report or brochure, the BLM shall distribute the publication upon completion to the consulting parties and to other entities that the consulting parties may deem appropriate.

X. IMPLEMENTATION OF THE UNDERTAKING

a) The BLM may authorize construction activities and manage the implementation of HPTP(s) in phases corresponding to the construction phases of the Project.

   i) Upon approval of the HPTP(s) and implementation of the components of the HPTP(s) subject to determinations of compliance by the BLM for Phase I of the Project, BLM may authorize a Notice to Proceed for construction activities within the Phase I area only.

      (1) An HPTP(s) for Phase II of the Project may be developed and implemented after approval of the HPTP(s) and issuance of the Notice to Proceed described above for the Phase 1 component.

b) The BLM may authorize construction activities, including but not limited to those listed below, to proceed in specific geographic areas of the Project's APE where there are no historic properties; where there will be no adverse effect to historic properties; where a monitoring and discovery process or plan is in place per Stipulation VI(b); or where an HPTP(s) has been approved and initiated. Such construction activities may include:

   i) demarcation, set up, and use of staging areas for the Project's construction,
   ii) conduct of geotechnical boring investigations or other geophysical and engineering activities, and

iii) grading, constructing buildings, and installing SunCatchers.

c) Initiation of any construction activities on federal lands shall not occur until after the BLM issues the ROD, ROW grant, and Notice(s) to Proceed. Construction shall not occur in waters of the United States on or off federal lands until the COE issues the DA permit.

XI. AMENDMENTS TO THE AGREEMENT

a) This Agreement may be amended only upon written agreement of the Signatories.

   i) Upon receipt of a request to amend this Agreement, the BLM will immediately notify the other consulting parties and initiate a 30 day period to consult on the proposed amendment, whereupon all parties shall consult to consider such amendments.

   ii) If agreement to the amendment cannot be reached within the 30 day period, resolution of the issue may proceed by following the dispute resolution process in Stipulation XII.

b) This Agreement may be amended when such an amendment is agreed to in writing by all Signatories.

c) Amendments to this Agreement shall take effect on the dates that they are fully executed by the Signatories.

d) Modifications, additions, or deletions to the appendices made as a result of continuing consultation among the consulting parties do not require the Agreement to be amended.

XII. DISPUTE RESOLUTION

a) Should the Signatories or Invited Signatories object at any time to the manner in which the terms of this Agreement are implemented, the BLM will immediately notify the other Signatories and Invited Signatories and consult to resolve the objection.

b) If the objection can be resolved within the consultation period, the BLM may authorize the disputed action to proceed in accordance with the terms of such resolution.

c) If the objection cannot be resolved through such consultation, the BLM will forward all documentation relevant to the objection to the ACHP. Any comments provided by the ACHP within 30 days after its receipt of all relevant documentation will be taken into account by the BLM in reaching a final decision regarding the objection. The BLM will notify the other Signatories, Invited Signatories, and Concurring Parties in writing of its final decision within 14 days after it is rendered.

d) The BLM's responsibility to carry out all other actions under this Agreement that are not the subject of the objection will remain unchanged.

e) At any time during implementation of the terms of this Agreement, should an objection pertaining to the Agreement be raised by a Concurring Party or a member of the interested public, the BLM shall immediately notify the Signatories, Invited Signatories, and other Concurring Parties, consult with the SHPO about the objection, and take the objection into account. The other consulting parties may comment on the objection to the BLM. The BLM shall consult with the objecting party/parties for no more than 30 days. Within 14 days following closure of consultation, the BLM will render a final decision regarding the objection and proceed accordingly after notifying all parties of its decision in writing. In reaching its final decision, the BLM will take into account all comments from the parties regarding the objection.

XIII. TERMINATION

a) If any Signatory or Invited Signatory to this Agreement determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation XI above. If within sixty (60) days an amendment cannot be reached;

   i) a Signatory or Invited Signatory may terminate the Agreement upon written notification to the other Signatories and Invited Signatories.

b) If the Agreement is terminated, and prior to work continuing on the Project, the BLM and COE shall continue to follow the process provided at 36 C.F.R. 800.4 – 6 until (a) a new Agreement is executed pursuant to 36 C.F.R. 800.6 or (b) the agencies request, take into account, and respond to the comments of the ACHP under 36 C.F.R. 800.7. The BLM shall notify the Signatories and Invited Signatories as to the course of action it will pursue.

XIV. ADDITION/WITHDRAWAL OF PARTIES FROM/TO THE AGREEMENT

a) Should conditions of the Project change such that other state, Federal, or tribal entities not already party to this Agreement request to participate, the BLM will notify the other consulting parties and invite the requesting party to participate in the Agreement. The Agreement shall be amended following the procedures in Stipulation XI.

b) Should a Concurring Party determine that its participation in the Project and this Agreement is no longer warranted, the party may withdraw from participation by informing the BLM. The BLM shall inform the other consulting parties to this Agreement of the withdrawal.

XV. DURATION OF THIS AGREEMENT

a) This Agreement will expire if the Project has not been initiated and the BLM ROW grant expires or is withdrawn, or the stipulations of this Agreement have not been initiated, within five (5) years from the date of its execution. This Agreement will also expire 30 years after its execution. At such time, and prior to work continuing on the Project, the BLM and COE shall continue to follow the process provided at 36 C.F.R. 800.4 – 6 until either (a) a new memorandum of agreement or programmatic agreement is executed pursuant to 36 C.F.R. 800.6, or (b) the BLM and COE request, take into account, and respond to the comments of the ACHP under 36 C.F.R. 800.7. The BLM and COE shall notify the Signatories as to the course of action they will pursue within 30 days.

b) The Signatories and Invited Signatories shall consult at year 4 to review this Agreement and every 5 years subsequently. Additionally, the Signatories and Invited Signatories shall consult not less than one year prior to the expiration date to reconsider the terms of this Agreement and, if acceptable, have the Signatories extend the term of this Agreement. Reconsideration may include continuation of the Agreement as originally executed or amended, or termination. Extensions are treated as amendments to the Agreement under Stipulation XI.

c) Unless the Agreement is terminated pursuant to Stipulation XIII, another agreement executed for the Project supersedes it, or the Project itself has been terminated, this Agreement will remain in full force and effect until BLM, in consultation with the other Signatories, determines that implementation of all aspects of the Project has been completed and that all terms of this Agreement and any subsequent tiering requirements have been fulfilled in a satisfactory manner. Upon a determination by BLM that implementation of all aspects of the undertaking have been completed and that all terms of this Agreement and any subsequent tiered agreements have been fulfilled in a satisfactory manner, BLM will notify the consulting parties of this Agreement in writing of the agency's determination. This Agreement will terminate and have no further force or effect 30 days after BLM so notifies the Signatories to this Agreement, unless BLM retracts its determination before the end of that period.

XVI. EFFECTIVE DATE

This Agreement and any amendments shall take effect on the date that it has been fully executed by the Signatories. The Agreement and any amendments thereto shall be executed in the following order: (1) BLM, (2) COE, (3) SHPO, and (4) ACHP.

Execution and implementation of this Agreement is evidence that the BLM and COE have taken into account the effect of this Project on historic properties, afforded the ACHP a reasonable opportunity to comment, and that the BLM and COE have satisfied their responsibilities under Section 106. The Signatories and Invited Signatories to this Agreement represent that they have the authority to sign for and bind the entities on behalf of whom they sign.

The remainder of this page is blank.

SIGNATORY PARTIES

U.S. BUREAU OF LAND MANAGEMENT

BY: Margaret L. Goodro DATE: 9/14/10

Margaret L. Goodro
Manager, El Centro Field Office

U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

BY: David J. Castanon DATE: 9-14-10

David J. Castanon
Chief, Regulatory Division

CALIFORNIA STATE HISTORIC PRESERVATION OFFICER

BY: milford wayne donaldson DATE: 15 SEP 2010

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

ADVISORY COUNCIL ON HISTORIC PRESERVATION

BY: John M. Fowler DATE: 9/15/10

John M. Fowler
Executive Director

INVITED SIGNATORY PARTIES

California Energy Commission
Tessera Solar Company, L.L.C.

Invited Signatory

CALIFORNIA ENERGY COMMISSION

BY: _____ DATE: _____

TITLE: _____

Invited Signatory

TESSERA SOLAR COMPANY L.L.C.

BY: _____ DATE: _____

TITLE: _____

CONCURRING PARTIES

CAMPO KUMEYAAY NATION
COCOPAH INDIAN TRIBE
FORT YUMA QUECHAN INDIAN TRIBE
EWIIAAPAAYP BAND OF KUMEYAAY INDIANS
JAMUL INDIAN VILLAGE
KWAAYMII LAGUNA BAND OF INDIANS
LA POSTA BAND OF KUMEYAAY INDIANS
MANZANITA BAND OF KUMEYAAY INDIANS
SAN PASQUAL BAND OF DIEGUENO INDIANS
SANTA YSABEL BAND OF DIEGUENO INDIANS
AH-MUT PIPA FOUNDATION
KUMEYAAY CULTURAL REPATRIATION COMMITTEE
CALIFORNIA UNIONS FOR RELIABLE ENERGY
NATIONAL TRUST FOR HISTORIC PRESERVATION
NATIONAL PARK SERVICE
ANZA SOCIETY
EDIE HARMON
SACRED SITES INTERNATIONAL FOUNDATION
GREG P. SMESTAD, PH.D.

Concurring Party

CAMPO KUMEYAAY NATION

BY: _____ DATE: _____

TITLE: _____

Concurring Party

COCOPAH INDIAN TRIBE

BY: _____ DATE: _____

TITLE: _____

Concurring Party

FORT YUMA QUECHAN INDIAN TRIBE

BY: _____ DATE: _____

TITLE: _____

Concurring Party

EWIIAAPAAYP BAND OF KUMEYAAY INDIANS

BY: _____ DATE: _____

TITLE: _____

Concurring Party

JAMUL INDIAN VILLAGE

BY: _____ DATE: _____

TITLE: _____

Concurring Party

KWAAYMII LAGUNA BAND OF INDIANS

BY: _____ DATE: _____

TITLE: _____

Concurring Party

LA POSTA BAND OF KUMEYAAY INDIANS

BY: _____ DATE: _____

TITLE: _____

Concurring Party

MANZANITA BAND OF KUMEYAAY INDIANS

BY: _____ DATE: _____

TITLE: _____

Concurring Party

SAN PASQUAL BAND OF DIEGUENO INDIANS

BY: _____ DATE: _____

TITLE: _____

Concurring Party

SANTA YSABEL BAND OF DIEGUENO INDIANS

BY: _____ DATE: _____

TITLE: _____

Concurring Party

AH-MUT PIPA FOUNDATION

BY: _____ DATE: _____

TITLE: _____

Concurring Party

KUMEYAAY CULTURAL REPATRIATION COMMITTEE

BY: _____ DATE: _____

TITLE: _____

Concurring Party

CALIFORNIA UNIONS FOR RELIABLE ENERGY

BY: _____ DATE: _____

TITLE: _____

Concurring Party

NATIONAL TRUST FOR HISTORIC PRESERVATION

BY: _____ DATE: _____

TITLE: _____

Concurring Party

NATIONAL PARK SERVICE

BY: _____ DATE: _____

TITLE: _____

Concurring Party

ANZA SOCIETY

BY: _____ DATE: _____

TITLE: _____

Concurring Party

EDIE HARMON

BY: _____ DATE: _____

TITLE: _____

Concurring Party

SACRED SITES INTERNATIONAL FOUNDATION

BY: _____ DATE: _____

TITLE: _____

Concurring Party

GREG P. SMESTAD, PH.D.

BY: _____ DATE: _____

TITLE: _____

APPENDIX A: IDENTIFICATION AND EVALUATION

I. IDENTIFICATION

a) The BLM will ensure that all cultural resources identified during cultural resources survey are recorded on new or updated California Department of Parks and Recreation Form DPR 523 (Series 1/95), using the "Instructions for Recording Historical Resources" (Office of Historic Preservation, March 1995).

   i) Previously unrecorded cultural resources which have religious or cultural significance to Tribes identified during cultural resources investigations and/or through consultations with Tribes may be recorded on the California DPR Form 523, unless a Tribe, Tribal Organization, or an individual from a Tribe objects. If such objection arises, the properties may be recorded on a form and in a manner that is in accordance with the recommendations of the Tribe, Tribal Organization, or of the individual. If the traditional cultural property is also a historical or archaeological site, those components of site will be recorded on the appropriate DPR form and filed with the California Historical Resources Information System (CHRIS).

b) The cultural resources contractor will obtain permanent site numbers from CHRIS regional information center.

c) The BLM, in consultation with the COE, the Energy Commission, and the SHPO, shall review all site records for accuracy, adequacy of information, and completeness and determine whether they are sufficient to support agency determinations and findings. Final approved site records shall be submitted to the CHRIS. Permanent site numbers shall then be used in all final reports and other documents prepared pursuant to the requirements of this Agreement.

d) The BLM, in consultation with the COE and the Energy Commission will ensure that cultural resources survey reports are responsive to Energy Commission Data Requests.

II. EVALUATION

a) The BLM shall authorize field investigations by the Applicant for the purposes of evaluation of the potential site types identified in the APE listed below (but not limited to) and evaluation of the information potential and significance of the cultural resources in the APE.

   Prehistoric Archaeological Resources
   Potential Lake Cahuilla Shoreline District
   Chipped Stone Deposits
   Sparse Lithic Scatters
   Chipped and Ground Stone Deposits
   Ceramic Deposits

Archaeological Deposits that Include FAR Concentrations
Trail Segments

Historical Archaeological Resources
Potential Early Twentieth Century Sand and Gravel Mining Landscape
Surveying Monuments
Historic Refuse Deposits
Pebble and Cobble Concentrations
Transportation and Trail segments

Unique Archaeological Resources

b) BLM shall consult with the Tribes and seek the views and comments of Tribal Organizations and individual tribal members regarding any unevaluated cultural resource to which they may attach religious or cultural significance in order to ascertain the status of these places relative to NRHP and CRHR eligibility criteria.

APPENDIX B: HISTORIC PROPERTIES TREATMENT PLAN(S)

I. *HISTORIC PROPERTIES TREATMENT PLAN(S) provide for the resolution or mitigation of effects to historic properties as a result of the project.*

a) Any HPTP tiered from the Agreement shall include but is not limited to:

i) A list of the historic properties subject to the HPTP, determined or treated as eligible for project management purposes, in the APE that the construction of the Project will unconditionally avoid,

ii) The measures that the Applicant will take to avoid, minimize, or mitigate the adverse effects on historic properties,

iii) If a separate monitoring and/or discovery plan is not already in place, provide a plan for monitoring during construction, which would include the treatment of inadvertent discoveries and the participation of tribal cultural specialists. The following shall be considered during development of these plans:

(1) Qualifications of archaeological monitors
(2) participation of tribal cultural specialists in monitoring
(3) areas in the APE requiring monitoring
(4) authority of monitors to halt work
(5) protective measures for historic properties
(6) communication protocols
(7) safety and resource training
(8) procedures upon discovery
(9) evaluation of the inadvertent discoveries
(10) implementation of standard treatment measures
(11) field protocol upon discovery of human remains

iv) The proposed disposition of recovered materials and records shall be curated in accordance with Stipulation VIII(c).

v) The procedures for treatment and disposition of any human remains, funerary objects, sacred objects, and objects of cultural patrimony in accordance with NAGPRA and the California Health and Safety Code 7050.5 as appropriate.

vi) A research design which addresses significant themes and questions for the types of historic properties to receive treatment.

vii) A schedule for completing treatment measures, including analysis, reporting and disposition of materials and records, as well as a schedule for completing the draft and final data recovery report(s).

viii) A description of alternative treatments for adverse effects that are not data recovery and that may include (but is not limited to):

(1) Placement of construction within portions of historic properties that do not contribute to the qualities that make the resource eligible
(2) Deeding cemetery areas into open-space in perpetuity and providing the necessary long-term protection measures
(3) Public interpretation including the preparation of a public version of the cultural resources studies and/or education materials for local schools
(4) Access by Indian tribes to traditional areas in property after the project has been constructed
(5) Support by Applicant to cultural centers in the preparation of interpretive displays
(6) Consideration of other off-site mitigation

b) Any treatment plan tiered from this Agreement or the HPTP shall reflect the ACHP archaeological guidance at http://www.achp.gov/archguide/, the BLM 8100 Manual, and the Secretary of the Interior's Standards for the Treatment of Historic Properties.

II. COORDINATION WITH ENERGY COMMISSION MEASURES UNDER CEQA

a) Guidelines for implementation codified in the California Code of Regulations (CCR), Title 14, Chapter 3, Sections 15000 et seq., requires state and local public agencies to identify the environmental impacts of proposed discretionary activities or projects, determine if the impacts will be significant, and identify alternatives and mitigation measures that will substantially reduce or eliminate significant impacts to the environment. Pursuant to 13 CRR Section 15126.4(a)(1), feasible measures which could minimize adverse impacts must be described in the environmental assessment.

i) Section 15221(b) provides that because NEPA does not require separate discussion of mitigation measures, these points of analysis will need to be added, supplemented, or identified before the EIS can be used as an EIR.

ii) Section 15126.4(a)(1)(B) states that formulation of mitigation measures should not be deferred until some future time, but that measures may specify performance standards which would mitigate the significant effect of the project and which may be accomplished in more than one specified way.

III. PERFORMANCE STANDARDS FOR NHPA SECTION 106 AND CEQA MITIGATION

a) Cultural mitigation measures and performance standards considered within the Section 106 consultation and CEQA process include, but are not limited to:

i) Avoidance

ii) For cultural resources, the preferred method of mitigation is avoidance of all cultural resources to the maximum extent practicable. Mitigation measures which could

include avoidance are normally developed through consultation to reduce impacts to significant cultural resources. The BLM through the consultation process and development of the HPTP(s) will determine which mitigation measures are applied to specific cultural resources.

iii) Archaeological Data Recovery

(1) When data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provision for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken.

(2) Data recovery shall not be required for an historical resource if the lead federal agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource.

iv) Built-Environment Resources

(1) Documenting built-environment resources in accordance with the standards and guidelines provided by the Historic American Building Survey (HABS), Historic American Engineering Record (HAER), Historic American Landscapes Survey (HALS).

(2) Relocating or moving historic buildings, objects or structures out of the APE.

v) Properties of Sacred or Cultural Significance to Indian Tribes

(1) Cremation/Burial Sites

(a) Avoidance of cremation or burial sites is the preferred management alternative.

(b) Where avoidance of direct physical effects is not achievable, treatment shall follow the provisions of the NAGRPA Plan of Action as provided in Appendix L.

(2) Trails

(a) Avoidance of direct physical effects to trails is the preferred management alternative.

(b) Where avoidance of direct physical effects is not achievable, treatment shall follow the provisions of the HPTP. A study of trails may be carried out to determine the nature and extent of the trails beyond the APE and may be considered within the context of a HALS study.

(3) Geological landforms or other places of religious or cultural significance.

(a) BLM shall continue to seek information from the Tribe(s) or Tribal Organizations to determine the character and use of places of religious or cultural significance.

(i) Maintenance of existing access to places of religious or cultural significance is the preferred management alternative.

(b) Engineering solutions to eliminate or minimize direct or indirect non-physical effects will be identified, including but not limited to, orienting the SunCatchers to minimize glare, or erecting screens to eliminate glare.

vi) Discoveries

(1) Following the discovery of any resources determined by BLM to be eligible to the NRHP, the Applicant shall ensure that the designated cultural resources contractor prepares a research design and a scope of work for any necessary data recovery or additional mitigation. The Applicant shall submit the proposed research design and scope of work to the BLM and Energy Commission's Compliance Project Manager for review and approval.

(2) The proposed research design and scope of work shall include (but not be limited to): a discussion of the methods to be used to recover additional information and any needed analysis to be conducted on recovered materials; a discussion of the research questions that the materials may address or answer by the data recovered from the Project, and; discussion of possible results and findings.

vii) Monitoring

(1) Prior to the start of vegetation clearance or earth disturbing activities or Project site preparation, the Applicant shall provide the designated cultural resources monitors and the BLM and/or Energy Commission's CPM with maps and/or drawings showing the footprint of the power plant and all linear facilities. Maps provided will include USGS 7.5-minute topographic quadrangle maps. If the designated cultural resource specialist requests enlargements or strip maps for linear facility routes, the Applicant shall provide them. If the footprint of the power plant or linear facilities changes, the Applicant shall provide maps and drawings reflecting these changes, to the cultural resources specialist within five days. Maps shall show the location of all areas where surface disturbance may be associated with Project-related access roads, and any other Project components.

(2) The designated cultural resource specialist shall be available at all times to respond within 24 hours after pre-construction or construction activities have been halted due to the discovery of a cultural resource(s). The specialist, or representative of the Applicant shall have the authority to halt or redirect construction activities if previously undiscovered cultural resource materials are encountered during vegetation clearance or earth disturbing activities or project site preparation or construction. If such resources are discovered, the designated cultural resource specialist shall be notified and the Applicant or Applicant's representative shall halt construction in order to protect the discovery from further

damage and the BLM will be notified. Project construction may continue elsewhere on the Project if the BLM determines that it will not affect the cultural resource in question.

viii) Qualifications

(1) Prior to the start of construction-related vegetation clearance, or earth-disturbing activities or Project site preparation; or the movement or parking of heavy equipment onto or over the Project surface, the Applicant shall provide the BLM and/or the Energy Commission CPM with the name and statement of qualifications for its designated cultural resource specialist and alternate cultural resource specialist, if an alternate is proposed, who will be responsible for implementation of all BLM cultural resources conditions and Energy Commission cultural resources conditions of certification. The statement of qualifications for the designated cultural resource specialist and alternate shall include all information needed to demonstrate that the specialist meets at least the minimum qualifications specified by the National Park Service, Heritage Preservation Services.

(2) Training

(a) Prior to the start of vegetation clearance or earth disturbing activities or Project site preparation, the designated cultural resource specialist shall prepare an employee training program. The Applicant shall submit the cultural resources training program to the BLM, Energy Commission, and SHPO for review and written approval. If a video is used as part of the training program, the owner shall also submit the script for review and written approval.

(b) Prior to the start of vegetation clearance or earth disturbing activities or Project site preparation, and throughout the project construction period as needed for all new employees, the Applicant shall ensure that the designated cultural resource trainer(s) provide(s) approved cultural resources training to all Project managers, construction supervisors, or anyone coming on the construction site as an employee, contractor, subcontractor, or in any other capacity to complete work for the Applicant. The Applicant shall ensure that the designated trainer provides the workers with the approved a set of procedures for reporting any sensitive resources that may be discovered during Project-related ground disturbance. In addition, the Applicant shall communicate the work curtailment procedures that the workers are to follow if previously undiscovered cultural resources are encountered during construction.

IV. HISTORIC PROPERTY TREATMENT PLANS (HPTP)

a) Finalized HPTPs will be included as an attachment to this Appendix.

b) In developing the HPTPs, the HPTPs shall consider the following measures:

i) Prehistoric Period Historic Properties

(1) Avoidance

(2) Minimize

(a) Strategic placement of transmission towers in areas of a site that would not adversely affect the information values

(b) Data recovery for historic properties eligible under Criterion D only

(i) Research Design

ii) Historic Period Historic Properties

(1) Avoidance

(2) Minimize

(a) Data recovery for historic properties eligible under Criterion D only

(i) Research Design

1. Sand and gravel mining

2. Construction camps associated with the San Diego and Arizona Railroad

(b) Historic built-environment Historic Properties with associative values

(i) San Diego and Arizona Railroad

(ii) Historic Highway 80

(c) Juan Bautista de Anza National Historic Trail

(i) Archaeological Investigations

(ii) Indicators for Paths or Trails

1. Monitoring

2. Interpretation (on and off-site)

(d) Resources of Native American religious and cultural significance and Traditional Cultural Properties

(i) Avoidance

(ii) Minimize

(iii) Monitor

(iv) Access

APPENDIX C: HISTORIC PROPERTIES MANAGEMENT PLAN

I. HISTORIC PROPERTIES MANAGEMENT PLAN

a) A Historic Properties Management Plan (HPMP) will be developed to further manage or prescribe additional treatment to historic properties within the APE during the future operation, long-term maintenance and decommissioning of the Imperial Valley Solar Project and consider effects to historic properties in relation to those actions. The HPMP will include but is not limited to monitoring requirements for those cultural resources within the APE that were avoided through project redesign.

b) The BLM shall submit the HPMP to the consulting parties to the Agreement and Tribes for a 60 day review period. Absent comments within this time frame, the BLM may finalize the HPMP. If comments are received, the BLM will provide the parties with written documentation indicating whether and how the draft HPMP will be modified. If the HPMP is revised in response to comments, the BLM shall submit the revised HPMP to all parties for an additional 30 day review period. Absent comments within this time frame, the BLM will finalize the HPMP. The BLM will provide each of the consulting parties and Tribes a copy of the final HPMP.

APPENDIX D: PROJECT DESCRIPTION

The Imperial Valley Solar Project is a proposed 750-megawatt (MW) solar energy power plant. The project proposal also includes a 230-kilovolt (kV) on-site substation, 10.3 miles of 230 kV transmission line, an administrative building, maintenance complex, an 11.8 mile water line, and other related facilities. The proposed project would be built on approximately 6,140 acres of land administered by the BLM and 360 acres of private lands in Imperial County, California, approximately four miles east of the town of Ocotillo, and 14 miles west of the city of El Centro.

The proposed Imperial Valley Solar Project includes the following components:

a) A solar thermal power plant facility.

b) The proposed Project would be constructed in two phases utilizing SunCatcher (Sterling Engine) technology, and would include approximately 30,000 25 kilowatt (kW) solar power dishes with a generating capacity of approximately 750 megawatts (MW). Construction of the facility would proceed in blocks of 60 SunCatchers, which comprise a 1.5 MW group. Construction would take approximately 40 months to complete, but power would be available for transmission to the grid as each 60-unit group of SunCatchers is completed.

   i) The first phase would consist of up to 12,000 SunCatchers configured in arrays of 200 1.5 mW solar groups (60 SunCatchers/1.5 MW group) with a generating capacity of about 300 MW.

   ii) The second phase would consist of approximately 18,000 SunCatchers configured in 500 1.5 MW groups (60 SunCatchers/1.5 MW group) with a net generating capacity of 450 MW.

   iii) The SunCatcher is a 25-kilowatt-electrical (kW) solar dish system designed to automatically track the sun and collect and focus solar energy onto a power conversion unit (Stirling Engine, or PCU), which generates electricity. The system consists of a 40-foot-high by 38-foot-wide solar concentrator in a dish structure that supports an array of curved glass mirror facets. These mirrors collect and concentrate solar energy onto the solar receiver of the PCU

   1) Each SunCatcher dish would typically be mounted on a foundation consisting of a hollow single metal fin-pipe approximately 20 feet long and two feet in diameter that is hydraulically driven (vibrated) into the ground. This foundation is preferred because no concrete is required, no spoils are generated, and the foundations can be completely removed when the project is decommissioned.

   2) When conditions are not conducive to the use of the metal pipe foundation, the foundation would consist of rebar-reinforced concrete constructed below grade. The SunCatcher pedestal on which the SunCatcher dish assembly is secured is approximately 18 feet 6 inches in height and would be an integrated part of the metal

pipe foundation or would be a separate structure fastened to the rebar-reinforced concrete foundation at ground level.

3) Solar groups would be arranged as necessary to fit the contours of the site. SunCatchers would be aligned in rows approximately 112 feet apart, with access roads constructed between alternating rows of SunCatchers. Blading for roadways and foundations would be conducted between alternating rows to provide access to individual SunCatchers. Brush trimming would be conducted between the remaining rows and around the SunCatchers and consists of cutting the top of the existing brush while leaving the existing native plant root system in place to minimize soil erosion.

4) Electrical conduit and hydrogen delivery systems will be constructed in trenches connecting the SunCather units. Electrical conduit will be installed in trenches that are 24 inches wide and 30 inches deep. The hydrogen pipeline will be installed in trenches that are 4 inches wide and 24 inches deep.

c) Related structures include a main services complex, assembly buildings, a 230 kV electrical substation, access roads, an 11.8 mile water supply line, and a 10.3 mile 230 kV transmission line from the Project site to the existing San Diego Gas and Electric (SDG&E) Imperial Valley Substation.

d) The solar power generation plant would be located on approximately 6,500 acres of land, including approximately 6,180 acres of public land administered by the Bureau of Land Management and 320 acres of privately owned land. This area would be fenced around the perimeter of the generation plant for security.

e) A 110 acre laydown/staging area and main services complex would be located along the east side of Dunaway Road and north of the Interstate 8 highway.

f) An off-site 6-inch-diameter water supply pipeline would be constructed a distance of approximately 11.8 miles from the Seeley Water Treatment Plant to the project boundary. The pipeline would be buried in a trench, approximately 30 inches deep, in the shoulder of the Evan Hewes Highway.

g) An off-site double-circuit generation interconnection transmission line would be constructed a distance of approximately 10 miles to connect the Imperial Valley Solar Project to the SDG&E Imperial Valley Substation. Approximately 7.56 miles of the 10.3-mile double-circuit generation interconnection transmission line would be constructed off-site from the solar power generation plant.

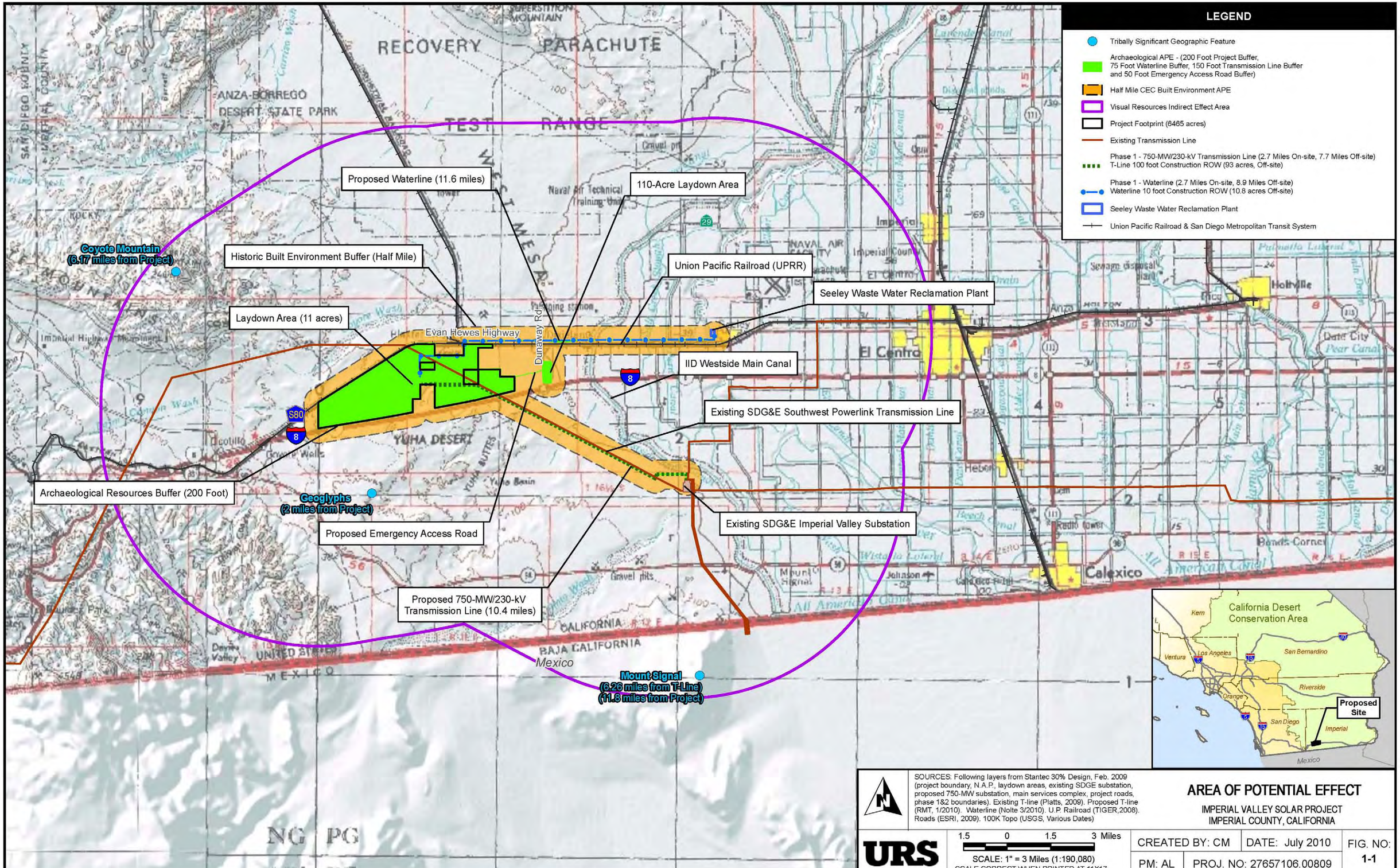
h) A arterial site access road, approximately 24 feet wide, would be constructed from Dunaway Road to the eastern boundary of the Project site and generally follow an existing road.

i) The Applicant's Plan of Development proposes the construction of approximately 27 miles of paved arterial roads (24 feet wide, 102 acres of disturbance) to provide access to

and throughout the site approximately 14 miles of unpaved perimeter roads (10 feet wide, 18 acres of disturbance) for access throughout the site, and approximately 234 miles (10 feet wide, 215 acres of disturbance) of unpaved routes for access to and maintenance of the SunCatchers.

APPENDIX E: PROJECT MAPS AND ILLUSTRATIONS

1. Map showing Area of Potential Effect
2. Project Overview Map
3. Phase I Construction Sequence
4. Phase 2 Construction Sequence
5.Photograph of SunCatcher Solar Dish Array
6. Illustrated Photograph of SunCatcher Solar Dish Array



SOURCES: Following layers from Stantec 30% Design, Feb. 2009 (project boundary, N.A.P., laydown areas, existing SDGE substation, proposed 750-MW substation, main services complex, project roads, phase 1&2 boundaries). Existing T-line (Platts, 2009). Proposed T-line (RMT, 1/2010). Waterline (Nolte 3/2010). U.P. Railroad (TIGER,2008). Roads (ESRI, 2009). 100K Topo (USGS, Various Dates)

AREA OF POTENTIAL EFFECT

IMPERIAL VALLEY SOLAR PROJECT
IMPERIAL COUNTY, CALIFORNIA

URS

1.5 0 1.5 3 Miles

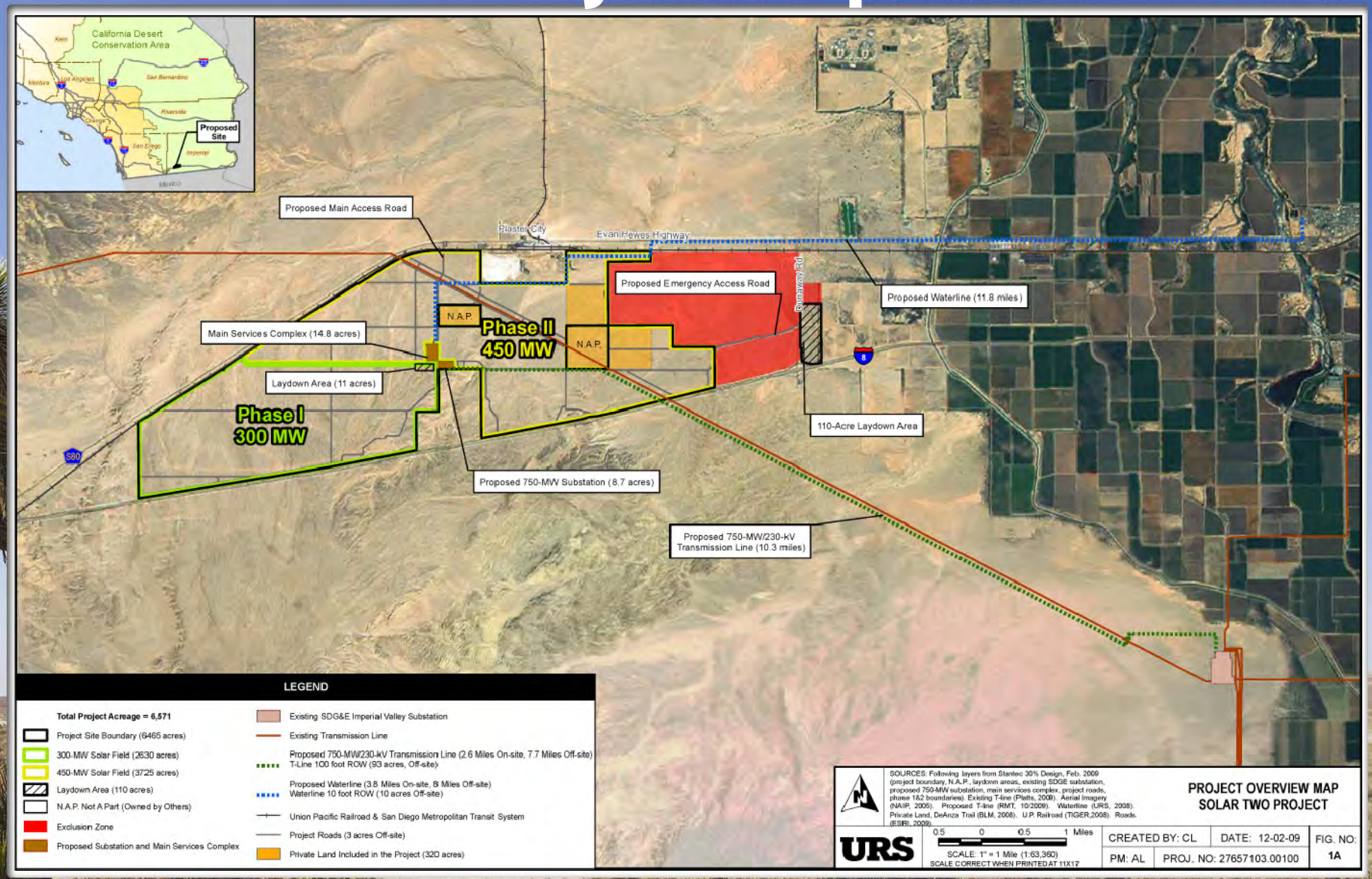
SCALE: 1" = 3 Miles (1:190,080)
SCALE CORRECT WHEN PRINTED AT 11X17

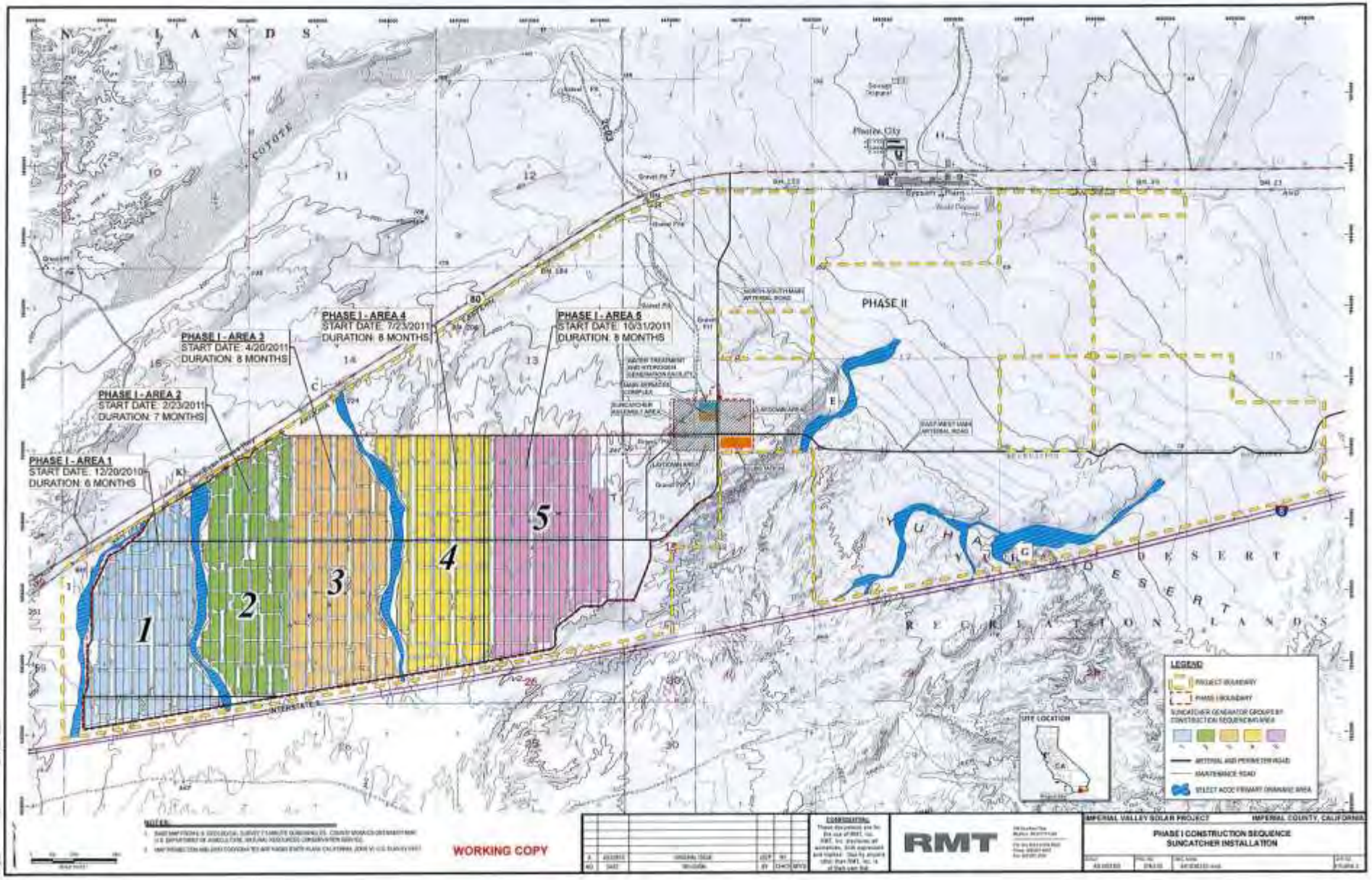
CREATED BY: CM	DATE: July 2010	FIG. NO: 1-1
PM: AL	PROJ. NO: 27657106.00809	

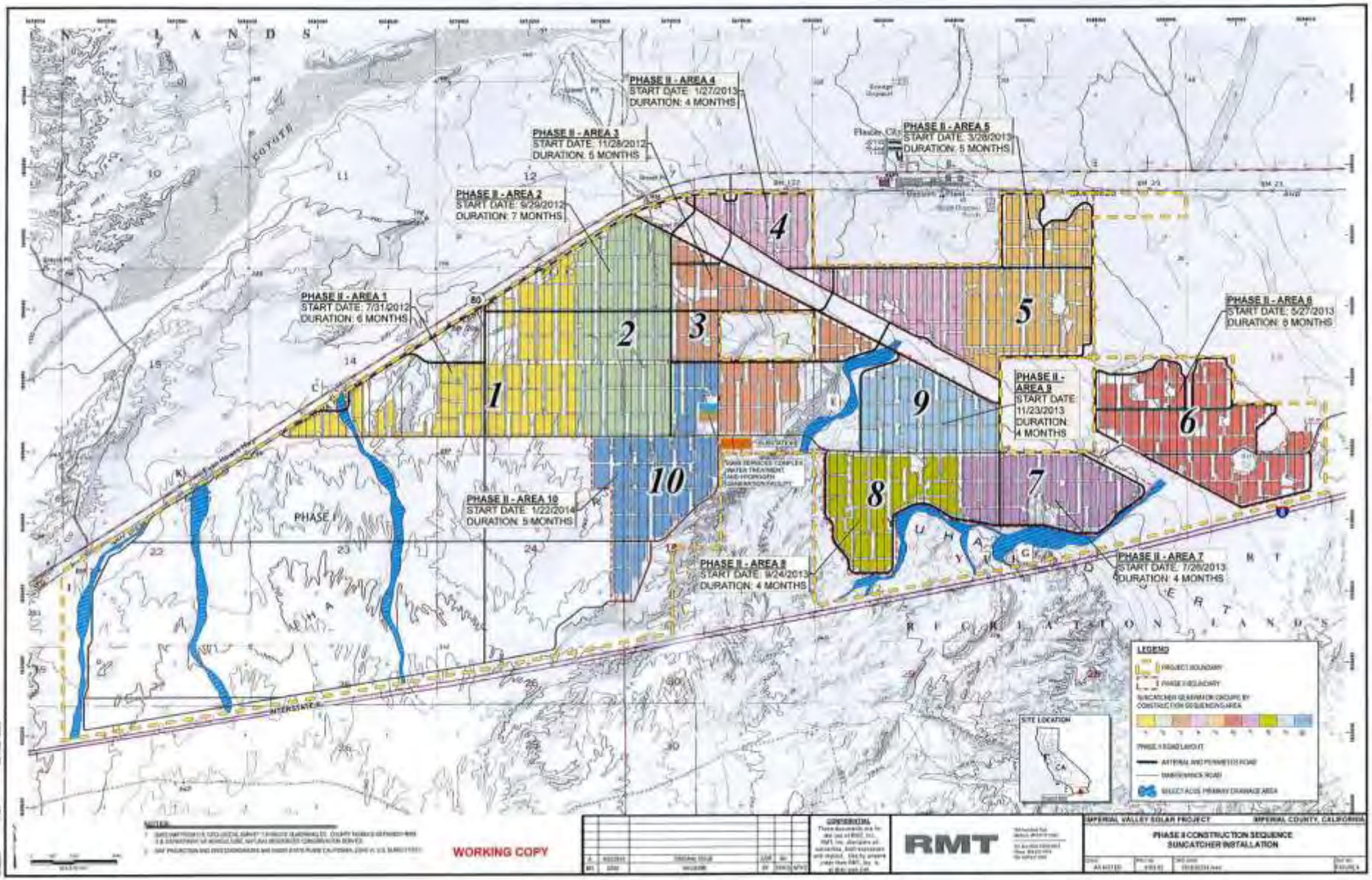
Path: G:\gis\projects\1577\22238980\support\Cultural\NewSurveys_082609\map_docs\mxd\Report\Final\2010_06\Area_Indirect_Effect_2010_07_11x17.mxd, 07/19/10, colin_mattison

BRIEF OVERVIEW OF PROJECT

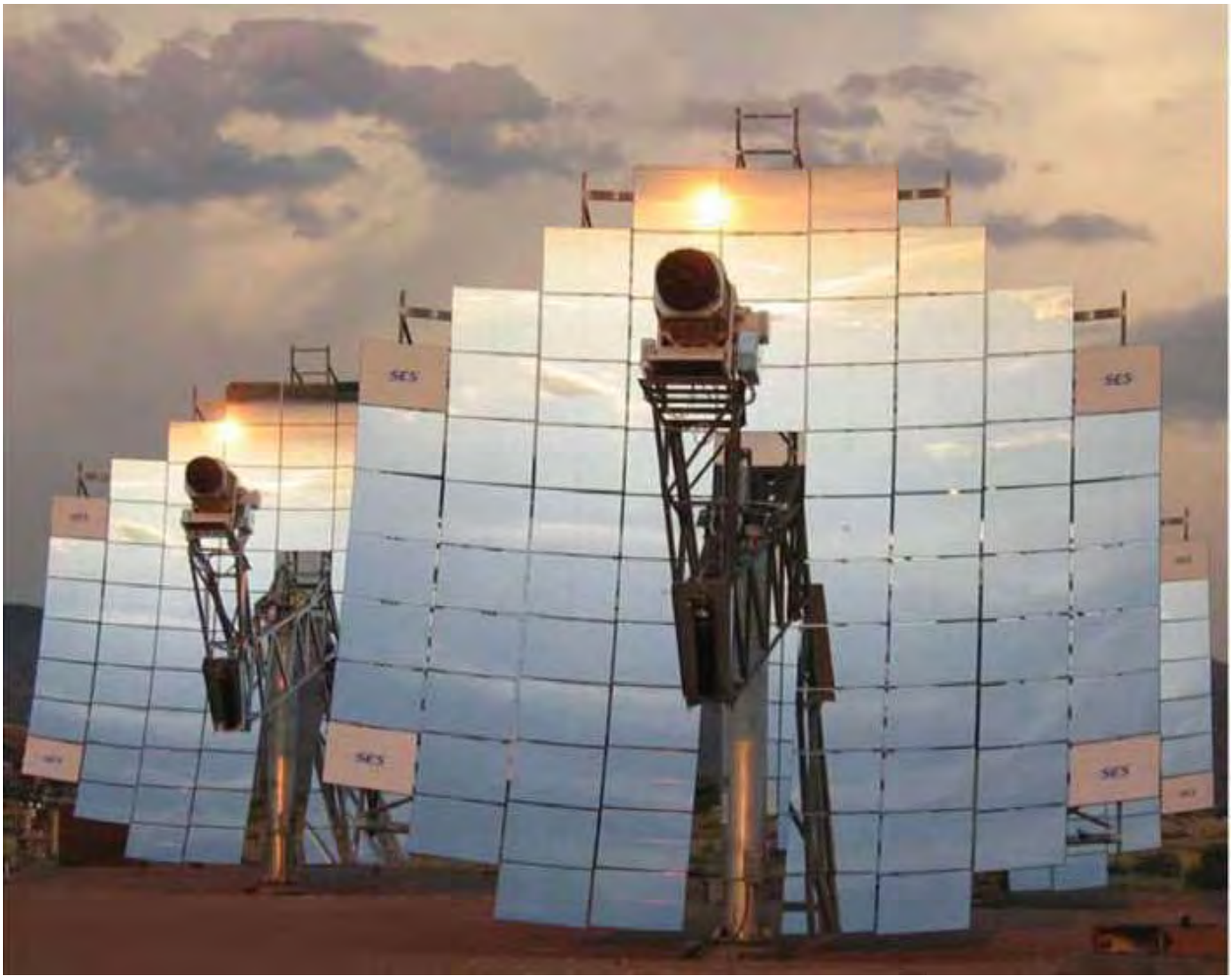
Project Map



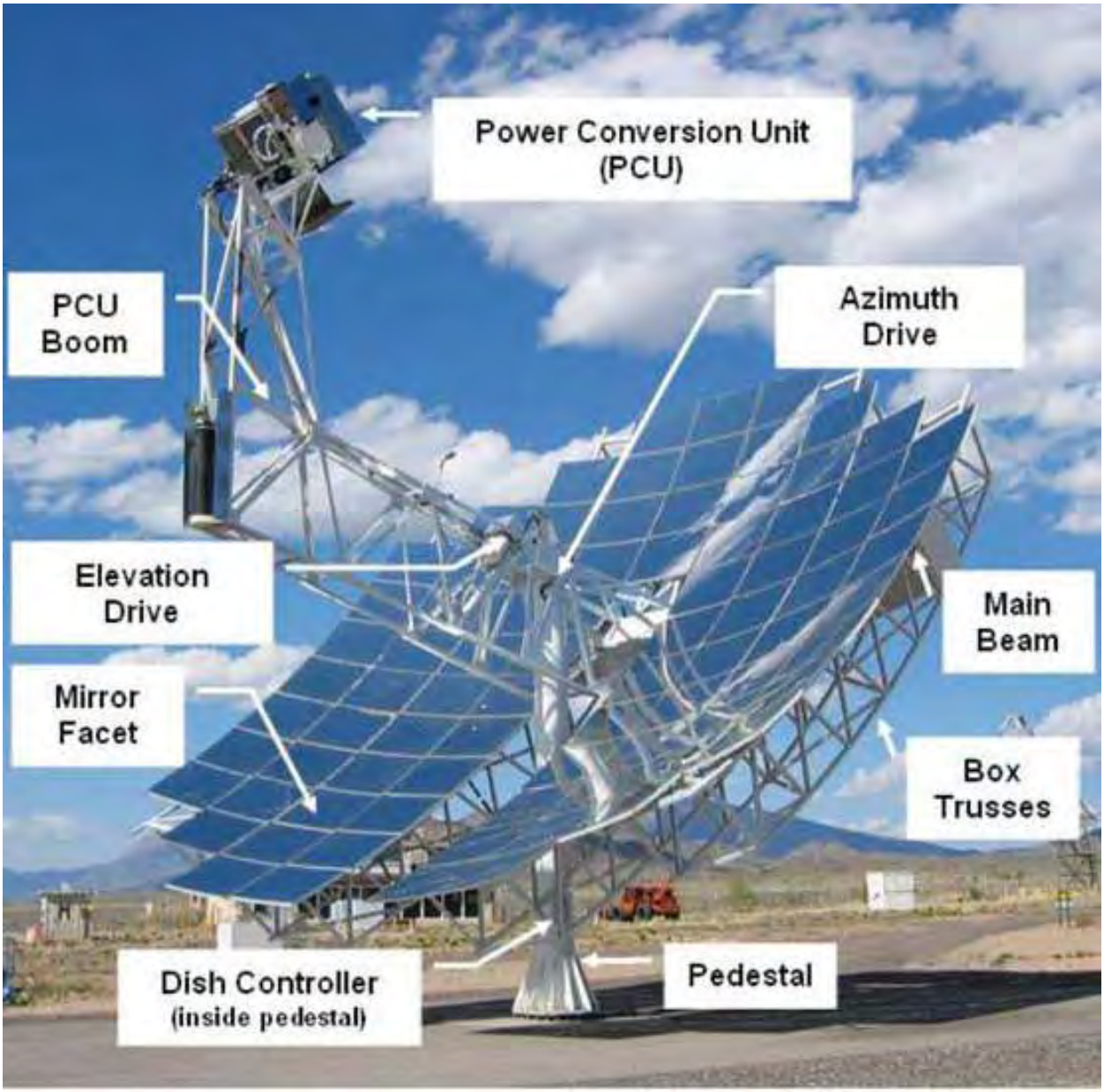

PHASE I - AREA 1
START DATE: 12/20/2010
DURATION: 6 MONTHS
PHASE I - AREA 2
START DATE: 2/23/2011
DURATION: 7 MONTHS
PHASE I - AREA 3
START DATE: 4/20/2011
DURATION: 8 MONTHS
PHASE I - AREA 4
START DATE: 7/23/2011
DURATION: 8 MONTHS
PHASE I - AREA 5
START DATE: 10/31/2011
DURATION: 8 MONTHS
PHASE II
1
2
3
4
5
INTERSTATE 8
COYOTE
Plaster City
LEGEND
PROJECT BOUNDARY
PHASE I BOUNDARY
SUNCATCHER GENERATOR GROUPS BY CONSTRUCTION SEQUENCING AREA
ARTERIAL AND PERIMETER ROAD
MAINTENANCE ROAD
SELECT ACOE PRIMARY DRAINAGE AREA
UTM LOCATION
WORKING COPY
RMT
IMPERIAL VALLEY SOLAR PROJECT
IMPERIAL COUNTY, CALIFORNIA
PHASE I CONSTRUCTION SEQUENCE
SUNCATCHER INSTALLATION


PHASE II - AREA 1
START DATE: 7/31/2012
DURATION: 6 MONTHS
PHASE II - AREA 2
START DATE: 9/29/2012
DURATION: 7 MONTHS
PHASE II - AREA 3
START DATE: 11/28/2012
DURATION: 5 MONTHS
PHASE II - AREA 4
START DATE: 1/27/2013
DURATION: 4 MONTHS
PHASE II - AREA 5
START DATE: 3/28/2013
DURATION: 5 MONTHS
PHASE II - AREA 6
START DATE: 5/27/2013
DURATION: 5 MONTHS
PHASE II - AREA 7
START DATE: 7/26/2013
DURATION: 4 MONTHS
PHASE II - AREA 8
START DATE: 9/24/2013
DURATION: 4 MONTHS
PHASE II - AREA 9
START DATE: 11/23/2013
DURATION: 4 MONTHS
PHASE II - AREA 10
START DATE: 1/22/2014
DURATION: 5 MONTHS
PHASE I
1
2
3
4
5
6
7
8
9
10
LEGEND
PROJECT BOUNDARY
PHASE II BOUNDARY
SUNCATCHER QUADRANT GROUPS BY CONSTRUCTION SEQUENCE AREA
PHASE II ROAD LAYOUT
ARTERIAL AND PERIMETER ROAD
MAINTENANCE ROAD
SELECT ACCESS PRIMARY DRAINAGE AREA
SITE LOCATION
CA
WORKING COPY
RMT
IMPERIAL VALLEY SOLAR PROJECT
IMPERIAL COUNTY, CALIFORNIA
PHASE II CONSTRUCTION SEQUENCE
SUNCATCHER INSTALLATION

Photograph of SunCatcher Solar Dish Array



Illustrated Photograph of a SunCatcher Solar Dish Array



APPENDIX F: SUMMARY OF CULTURAL RESOURCES INVESTIGATIONS

The BLM, in coordination with the Energy Commission, has authorized the Applicant to conduct specific identification efforts for this undertaking including a review of the existing literature and records, cultural resources surveys, ethnographic studies, and geomorphological studies to identify historic properties that might be located within the APE.

The Applicant has retained URS Corporation to complete all of the investigations necessary to identify and evaluate cultural resources located within the APE for both direct and indirect effects. URS Corporation is authorized to conduct cultural resources investigations on lands managed by the BLM under Cultural Resources Use Permits No. CA-06-01 and CA-06-11 issued by the BLM California State Office. URS is authorized to conduct specific field investigations for the Tessera Solar Imperial Valley Solar Project under BLM Fieldwork Authorization CA-670-06-07FA09 and Fieldwork Authorization CA-670-06-07FA10. URS Corporation has completed a review of the existing historic, archaeological and ethnographic literature and records to ascertain the presence of known and recorded cultural resources in the APE, has conducted an intensive field survey for all of the lands identified in APE for direct physical effects for all project alternatives, and has completed intensive field surveys for alternatives on lands that are no longer part of the project. Approximately 7,700 acres of pedestrian survey to identify cultural resources within the APE has been completed.

The ROW that BLM would issue encompasses approximately 6,251 acres of land, including the proposed 230-kV substation, the solar energy power plant, the Main Services Complex and associated electric and utility services, the sanitary system, access and entry roads, and corridors for the electric transmission line and the water supply pipeline. There are 360 acres of private land included within the Project. As proposed, the Project would encompass approximately 6,500 acres.

A draft cultural resources report (*Revised Class III Confidential Cultural Resources Technical Report, Application for Certification (08-AFC-5), SES Solar Two*, *LLC*, prepared by URS Corporation, June 2010) has been submitted by the Applicant that presents the results of identification efforts to the BLM, the COE, and the Energy Commission. The BLM, the COE, and the Energy Commission are currently reviewing all documentation to determine whether the report conforms with the field methodology and site description template required by BLM and the Energy Commission and is adequate to support to determinations and findings the BLM and COE will render pursuant to Section 106 of the NHPA.

URS Corporation conducted a records search at the Southeastern Information Center (SIC) in San Diego, California. The SIC searched all relevant previously recorded cultural resources site records and previous investigations completed within the Project area and a 1-mile search radius around it. Information reviewed included location maps for all previously recorded trinomial and primary prehistoric and historical archaeological sites and isolates; site record forms and updates for all cultural resources previously identified; previous investigation boundaries; and National

Archaeological Database citations for associated reports, historical maps, and historical addresses. The literature and records search identified 31 records related to cultural resources investigations conducted within 1-mile of the Project area. Several of these records were for prior projects which overlap the boundaries of the Imperial Valley Solar Project APE. The record search also identified approximately 400 previously recorded cultural resources within the APE and extended survey areas.

Between January 9, 2008 and April 5, 2008, URS conducted an intensive cultural resources survey (also referred to as a BLM Class III survey) of the APE. In 2009 additional fieldwork took place over the course of a number of separate field efforts as directed by the BLM and Energy Commission. The additional field work was conducted to develop additional documentation for sites within the APE for the Phase 1 and Phase 2 components of the 750 MW solar energy plant. This work involved re-visiting and updating approximately 302 sites recorded in 2008. Other project related components included in the APE were also examined during the cultural resources investigations. These included the Imperial Valley Substation, which is an existing facility. The water pipeline and transmission line corridors were also surveyed, both within the Project site and off-site locations that are associated with the Project.

The Class III intensive pedestrian survey of the Project APE identified 460 total cultural resources; 448 archaeological resources and 12 historic built environment resources. Of the archaeological resources, 365 are archaeological sites, (238 prehistoric, 73 historic, 44 multi-component and 12 indeterminate and 81 are isolated finds. The following describes the data collected within the 300-MW Phase I APE. The 300-MW Phase I is divided into Phase Ia and Phase Ib. Phase Ia consists of the initial disturbance areas including the first 9-MW portion of the 300-MW solar field; initial arterial roads maintenance, perimeter roads and fencing; the Main Services Complex, the waterline from the Seeley Waste Water Treatment Facility, the Phase I Transmission Line, and the 750-MW substation. Phase Ib includes the remainder of the Phase I 300-MW solar field, the East-West Main Arterial Access Road, and the Laydown Area.

The 300-MW Phase I Project area component contains 98 prehistoric sites, 46 historic sites, 21 multi-component sites, and two indeterminate sites and nine built environment resources. The 450-MW Phase II project component contains 135 prehistoric sites, 24 historic sites, 23 multi-component sites, and 9 indeterminate sites. An additional five prehistoric resources, three historic resources, one indeterminate resource and three built environment resources were recorded in proximity but are now outside the project footprint. The solar energy power plant as originally proposed had a production capacity of 950 MW and encompassed approximately 7,700 acres.

After considering the preliminary results of cultural resources investigations, the Applicant redesigned and reduced the size of the solar energy power plant to 750 MW and excluded 1,200 acres from the Project area to avoid direct effects to the high concentration of archaeological sites in that area. Sites located in this exclusion zone include potential cremation or burial sites, which Indian Tribes have indicated through consultation, hold sacred or religious values and cultural significance.

One archaeological district with previously recorded sites is located near or within the Project area and the one-mile file search buffer. The Yuha Basin Discontiguous Archaeological District is located outside of the Project boundary and to the south and east of the project area and reflects prehistoric use of the area. A second proposed district, referred to as the Lake Cahuilla High Water Mark Archaeological District, may result as a recommendation of the cultural resources investigations. The boundary of the proposed Lake Cahuilla High Water Mark Archaeological District will include sites located on and adjacent to the established shoreline of ancient Lake Cahuilla. Sites in the Project area considered may be recommended for inclusion in this district based upon their potential to contribute to the knowledge of the exploitation of the prehistoric lacustrine environment.

In addition, URS completed an intensive historic architecture survey to account for the properties that appeared to be older than 45 years within the historic architecture APE, which extends one half mile from the proposed Project site and one-half mile on either side of its aboveground linear facilities. URS also completed a supplemental reconnaissance-level historic architectural survey for five previously recorded historic period properties recorded in 2008 as being located within a one-half-mile radius of the Project area. The historic-period properties included canals and drains associated with the Imperial Irrigation District hydraulic irrigation system, portions of Highway 80, portions of the San Diego and Arizona Railroad, portions of U.S. Gypsum Rail-Line, and the Plaster City Gypsum Plant.

A complete list of cultural resources that are located within the APE for direct effects is provided in Appendix H. A tabular summary of the results of cultural resources investigations follows:

Table 1: Cultural Resources within the APE by Project Effect

Number of Sites by Effect	**Prehistoric**	**Historic**	**Multi-component**	**Indeterminate**	**Built**	**Total**
Outside Project Footprint	5	3		1	3	12
Phase Ia	21	14	2	0	9	46
Phase Ib Solar Field	70	24	14	**2**	0	110
Phase Ib Laydown and Emergency Access Road	7	8	5	0	0	20
Phase II	135	24	23	9	0	191
Total	**238**	**73**	**44**	**12**	**12**	**379**

The Project area is traversed by the Juan Bautista de Anza National Historic Trail corridor, which has been designated under the National Historic Trails Act. No physical evidence of the historic trail has yet been located within the APE for this Project although continued studies are underway utilizing remote sensing technology to determine if traces of the original trail could be detected. The nearest known and recorded sites associated with the Anza Trail are two campsites, one located about 2.5 miles south of the Project and one located about 3 miles north of the Project.

The BLM has formally invited 13 Tribes to consult at the government-to-government level throughout the review of this Project, and has on-going discussions about this Project with Tribal cultural staff (Appendix I: Documentation of Tribal Consultation). Consultation with Indian Tribes, and discussions with Tribal organizations and individuals, has revealed concern about the importance and sensitivity of cultural resources within and near the project area and that they attach significance to the broader cultural landscape. Specifically, the Cocopah Indian Tribe and Kwaaymii Band of Laguna Indians have indicated that certain geological features within the APE hold significant value to the Tribe. Several Tribes have indicated that they attach sacred, religious and cultural significance to the cremations/burials that have been identified within the APE.

APPENDIX G: AGENCY FINDINGS AND DETERMINATIONS

The BLM has not rendered formal determinations of eligibility or findings of effect for the cultural resources that may be affected by this Project. As provided for in Stipulation III of this Agreement, it is the BLM's intent to render its proposed determinations of eligibility on all resources prior to the ROD if feasible and provide opportunity for consulting parties and the public to comment on the agency's determinations, prior to submitting final determinations to the SHPO for concurrence. For a few cultural resources, primarily archaeological sites limited to their potential to yield significant scientific, prehistoric, historic or archaeological data, the BLM may treat those sites as eligible for the NRHP for project management purposes and either direct that additional testing be conducted for purposes of evaluation or that adverse effects to the property be resolved pursuant to the prescriptions of the HPTP.

Effects to historic properties and the treatment of effects within the APE are generally summarized as follows. Specific treatments to resolve effects that are developed by the consulting parties to this Agreement would be stipulated in the HPTP(s) that tier from this Agreement.

- Within the APE for direct physical effects for the Phase 1 and Phase 2 solar energy plant, there would be an adverse effect on all historic properties for which the significant values are informational and eligibility for the NRHP is limited to criterion D considerations. Though opportunities to avoid significant values may exist through fencing and Project modification, or because of the specific nature of the installation of the SunCatcher solar dish, the industrial nature of the Project and the intensity of the development may make long term management and protection of resources within the boundaries of the solar energy plant impractical and difficult to implement. The recommended treatment measures may likely involve recovery of the informational values through archaeological excavation and study. Additional mitigation measures, such as educational materials or public interpretation, would also be considered in the HPTP for these historic properties.
    - Based on the results of the intensive cultural resources survey for the original 950 MW solar energy plant, the Applicant, in consultation with BLM and the Energy Commission, redesigned and downscaled the proposed Project, eliminating approximately one third of the eastern portion of the Project (approximately 1,200 acres) for the express purpose of avoiding direct physical impacts to archaeological sites and potential cremation/burial sites. This area is referred to as the Exclusion Area.
    - Avoidance of direct physical effects is the preferred treatment measure for historic properties to which Indian Tribes attach religious or cultural significance, or for properties that have cultural significance as a traditional cultural property. The BLM would achieve this preferred treatment by conditioning the ROW grant to exclude those historic properties, or lands, from the Project.
- For historic properties located in the APE for direct physical effects in linear corridors, such as the water pipeline, the transmission line, and the main access road, the preferred treatment measure is avoidance through Project redesign. Transmission tower locations may be adjusted to avoid direct effects. The water pipeline would be constructed in the shoulder of the existing Evan Hewes Highway and should avoid direct physical effects to

historic properties. However, the water pipeline may be realigned and the ROW adjusted to avoid historic properties that may be located in the APE. If the property cannot be avoided, the BLM would minimize or mitigate the effects through implementation of the HPTP for significant values of the resource.

- Although the Juan Bautista de Anza National Historic Trail corridor traverses the Project area, no cultural resources or other manifestation associated with the trail has yet been identified within the APE.
    - Mitigation measures developed for the trail and outlined in an HPTP would provide for additional archaeological investigations and testing throughout the Project area to try to define the location of the trail or whether any archaeological evidence remains.
    - Use of aerial, LIDAR and satellite imaging technology to try to identify a primary path for the trail.
    - Where archaeological data recovery is used as a mitigation measure, the investigations should provide special attention to identifying artifacts or faunal remains that may have been left behind by the Anza party.
    - Coordination with mitigation measures developed in the FEIS and Energy Commission's Staff Assessment for effects to the recreation trail and viewshed, which may include installation of interpretive displays at the Project site or other known trail sites outside the Project area, the development of visitory overlooks, and the creation of audio/driving interpretive materials.

APPENDIX H: CULTURAL RESOURCES IDENTIFIED WITHIN THE APE

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
CA-IMP-7886 (Highway 80)	Built Environment	Historic	–	None
Plaster City	Built Environment	Historic	–	None
Portion of US Gypsum Rail Line	Built Environment	Historic	–	None
RAN-029	Lithic Scatter	Historic	Very Low	None
EBR-083	Rock Cluster	Historic	Very Low	None
CJA-S2-006	Refuse Deposit, Rock Cluster	Indeterminate	Very Low	None
EBR-017	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock/Hearth, Possible Cremation	Prehistoric	Moderate	None
EBR-218	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock/Hearth	Prehistoric	Low to Moderate	None
RAN-028	Lithic Scatter	Prehistoric	Very Low	None
RAN-S2-015	Lithic Scatter	Prehistoric	Very Low	None
LL-024	Lithic Scatter, Fire-Affected Rock (Hearth Features)	Prehistoric	Low to Moderate	None
Fern Check	Built Environment	Historic	_	None
DRK-030	Historic Refuse Deposit	Historic	Very Low	Phase 1a
DRK-033	GLO Benchmark	Historic	Very Low	Phase 1a
DRK-036	GLO Benchmark, Rock Cluster	Historic	Very Low	Phase 1a
1105 Leibert Road -Residence	Built Environment	Historic	-	Phase 1a
S2-SLY-25	Historic Refuse Deposit	Historic	Low to Moderate	Phase 1a
S2-SLY-26	Historic Refuse Deposit and "C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-27	Historic Refuse Deposit	Historic	Low to Moderate	Phase 1a
S2-SLY-28	Historic Refuse Deposit and "C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-30	Historic Refuse Deposit	Historic	Low to Moderate	Phase 1a
S2-SLY-32	Historic Refuse Deposit and "C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-33	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-34	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-35	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-36	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
S2-SLY-37	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-38	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-39	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-40	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-41	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-42	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-43	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-44	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
S2-SLY-45	"C" Block Right-of-Way Survey Marker	Historic	Low to Moderate	Phase 1a
Foxglove Canal	Built Environment	Historic	–	Phase 1a
Dixie Drain	Built Environment	Historic	–	Phase 1a
Fern Canal and Drain	Built Environment	Historic	–	Phase 1a
Fig Canal	Built Environment	Historic	–	Phase 1a
Forget-Me-Not Canal	Built Environment	Historic	–	Phase 1a
Portion of Westside Canal	Built Environment	Historic	–	Phase 1a
Salt Creek Drain 2	Built Environment	Historic	–	Phase 1a
JMR-016	Aerial Marker, Rock Cluster	Indeterminate	Very Low	Phase 1a
S2-SLY-29	Lithic Scatter, One Ceramic Sherd, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase 1a
S2-SLY-31	Historic Refuse Deposit and two Prehistoric Artifacts	Multi-Component	Low to Moderate	Phase 1a
CA-IMP-4391 (JF-021)	Lithic Scatter, Ceramic Scatter, and Historic Refuse Deposit	Multi-Component	Moderate	Phase 1a
S2-SLY-1	Lithic Scatter, Ceramic Scatter, Historic Refuse Scatter	Multi-Component	Low to Moderate	Phase 1a
S2-SLY-3	Lithic Scatter, Ceramic Scatter, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase 1a

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
RAN-420	Lithic Scatter, Ceramic Scatter, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase 1a
RAN-433	Lithic Scatter, Ceramic Scatter, Historic Refuse Scatter, Rock Cluster	Multi-Component	Very Low	Phase 1a
RAN-431	Lithic Scatter, Fire-Affected Rock	Prehistoric	Very Low	Phase 1a
RAN-416	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock Groundstone	Prehistoric	Low to Moderate	Phase 1a
CA-IMP-4578 / CA-IMP-1007 / CA-IMP-1006 / CA-IMP-1008 / CA-IMP-8744 / CA-IMP-4348 (RAN-424)	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock/Hearths, Flaked Stone tools	Prehistoric	Moderate	Phase 1a
DRK-034	Lithic Scatter	Prehistoric	Very Low	Phase 1a
CA-IMP-2156 (RAN-030)	Lithic Scatter	Prehistoric	Very Low	Phase 1a
RAN-066	Lithic Scatter	Prehistoric	Very Low	Phase 1a
JM-029	Lithic Scatter	Prehistoric	Very Low	Phase 1a
JM-033	Lithic Scatter	Prehistoric	Very Low	Phase 1a
JM-041	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1a
SM-S2-040	Lithic Scatter	Prehistoric	Very Low	Phase 1a
EBR-101	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1a
SM-S2-041	Lithic Scatter	Prehistoric	Very Low	Phase 1a
PRM-S2-001	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1a
EJK-S2-017	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1a
EBR-003	Lithic Scatter	Prehistoric	Very Low	Phase 1a
EBR-104	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1a

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
CA-IMP-4344 (RAN-428)	Lithic Scatter, Flaked Stone	Prehistoric	Low to Moderate	Phase 1a
CA-IMP-4343 (PRM-S2-018) - also see CA-IMP-4344 (RAN-428)	Lithic Scatter, Fire-Affected Rock (Hearth Features)	Prehistoric	Low to Moderate	Phase 1a
RAN-412C	Lithic Scatter, Ceramic Scatter	Prehistoric	Low to Moderate	Phase 1a
RAN-413	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1a
S2-SLY-5	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock	Prehistoric	Low to Moderate	Phase 1a
JMR-014	Lithic Scatter, Rock Clusters	Prehistoric	Very Low	Phase 1a
PRM-S2-019	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock (Hearth Feature)	Prehistoric	Low to Moderate	Phase 1a
RAN-419	Lithic Scatter, Fire-Affected Rock (Hearth Feature)	Prehistoric	Low to Moderate	Phase 1a
RAN-434	Lithic Scatter with rock features	Prehistoric	Very Low	Phase 1a
SM-S2-039	Lithic Scatter, Ceramic Scatter	Prehistoric	Low to Moderate	Phase 1a
RAN-418	Lithic Scatter, Ceramic Scatter, Groundstone	Prehistoric	Low to Moderate	Phase 1a
RAN-417	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1a
RAN-412F	Lithic Scatter, Ceramic Scatter	Prehistoric	Low to Moderate	Phase 1a
EBR-093	Lithic Scatter, Ceramic Scatter	Prehistoric	Low to Moderate	Phase 1a
EBR-103	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1a
JM-017	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1a
RAN-426	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1a
CA-IMP-4342 (RAN-430)	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1a
Portion of San Diego and Arizona Railroad	Built Environment	Historic	–	Phase 1b
RAN-014	Historic Refuse Deposit	Historic	Very Low	Phase 1b
EBR-015	Historic Refuse Deposit	Historic	Low to Moderate	Phase 1b

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
EBR-207	Historic Refuse Deposit	Historic	Low to Moderate	Phase 1b
RAN-020	Historic Refuse Deposit	Historic	Very Low	Phase 1b
JF-008	Historic Refuse Deposit	Historic	Very Low	Phase 1b
County Gravel Mine	Historic Gravel Mining	Historic	–	Phase 1b
EBR-016	Historic Refuse Deposit, Rock Cluster	Historic	Low to Moderate	Phase 1b
Wixon Gravel	Historic Gravel Mining	Historic	–	Phase 1b
JF-030	Historic Refuse Deposit	Historic	Low to Moderate	Phase 1b
JF-031	Historic Refuse Deposit	Historic	Low to Moderate	Phase 1b
RAN-S2-020	Historic Refuse Deposit	Historic	Low to Moderate	Phase 1b
DRK-021	GLO Benchmark	Historic	Very Low	Phase 1b
JF-003A	USGLO Benchmark	Historic	Very Low	Phase 1b
JFB-004	USGLO Benchmark	Historic	Very Low	Phase 1b
JFB-009A	USGLO Benchmark	Historic	Very Low	Phase 1b
RAN-001	USGLO Benchmark, Rock Clusters	Historic	Very Low	Phase 1b
RANA-003	Historic Bomb Crater	Historic	Very Low	Phase 1b
RAN-S2-011H	Historic Rock Cluster and Horseshoe Fragment	Historic	Very Low	Phase 1b
RAN-S2-012H	Historic Refuse Deposit, Rock Cluster	Historic	Very Low	Phase 1b
SM-S2-010	Rock Cluster	Historic	Very Low	Phase 1b
DRK-146	Historic Refuse Deposits	Historic	Low to Moderate	Phase 1b
DRK-149	Historic Refuse Deposit	Historic	Low to Moderate	Phase 1b
H-06	Historic Road	Historic	Very Low	Phase 1b
T-S2-002	Trails	Historic	Very Low	Phase 1b
RAN-S2-001	Rock Cluster	Indeterminate	Very Low	Phase 1b
DRK-148	Lithic Scatter, Ceramic Scatter, Fire Affected Rock, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase 1b
PRM-S2-009	One Core, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase 1b
DRK-147	Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase 1b
RAN-S2-018	Lithic Scatter, Fire-Affected Rock, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase 1b
RAN-S2-019	Historic Refuse Deposit and one Metavolcanic Core	Multi-Component	Low to Moderate	Phase 1b
CA-IMP-2003 (DRK-004)	Lithic Scatter, Historic Benchmark	Multi-Component	Very Low	Phase 1b
JFB-010	Lithic Scatter, Survey Benchmark	Multi-Component	Very Low	Phase 1b
PRM-S2-010	Lithic Scatter, Ceramic Scatter, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase 1b
T-06	Trails	Multi-Component	Very Low	Phase 1b
DRK-S2-031	Lithic Scatter, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase 1b
CA-IMP-4337 (JM-039)	Lithic Scatter, Historic/Modern Rock Cluster	Multi-Component	Very Low	Phase 1b

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
RAN-036	Lithic Scatter, Historic Rock Clusters, Historic Refuse Deposit	Multi-Component	Very Low	Phase 1b
CA-IMP-2004 (DRK-010)	Lithic Scatter, Rock Cluster Features, Historic GLO Benchmark, Historic Refuse	Multi-Component	Very Low	Phase 1b
RAN-004	Lithic Scatter, Historic/Modern Rock Clusters, Historic/Modern Metal Artifact	Multi-Component	Very Low	Phase 1b
CA-IMP-4677 / CA-IMP-1426 / CA-IMP-997 / CA-IMP-995 / CA-IMP-994 / CA-IMP-2443 / CA-IMP-269 (EBR-019)	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock, Flaked Stone, Animal Bone	Prehistoric	Moderate	Phase 1b
JM-035	Lithic Scatter	Prehistoric	Very Low	Phase 1b
JM-038	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-S2-033	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1b
JF-019	Lithic Scatter	Prehistoric	Very Low	Phase 1b
CA-IMP-2002 (DRK-005)	Lithic Scatter	Prehistoric	Very Low	Phase 1b
CA-IMP-2000 (DRK-016)	Lithic Scatter	Prehistoric	Very Low	Phase 1b
CA-IMP-2190 (DRK-002)	Lithic Scatter	Prehistoric	Very Low	Phase 1b
CJA-S2-001	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-011	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-012	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-013	Lithic Scatter	Prehistoric	Very Low	Phase 1b

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
DRK-015	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-017	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-022	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-024	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-042	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-043	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-044	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-046	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-047	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-048	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-049	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-050	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-051	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-052	Lithic Scatter	Prehistoric	Very Low	Phase 1b
DRK-S2-001	Lithic Scatter	Prehistoric	Very Low	Phase 1b
EBR-020	Lithic Scatter	Prehistoric	Very Low	Phase 1b
EBR-021	Lithic Scatter	Prehistoric	Very Low	Phase 1b
EBR-022	Lithic Scatter, Rock Cluster	Prehistoric	Very Low	Phase 1b
EBR-023	Lithic Scatter	Prehistoric	Very Low	Phase 1b
EBR-025	Lithic Scatter	Prehistoric	Very Low	Phase 1b
EBR-061	Lithic Scatter	Prehistoric	Very Low	Phase 1b
EBR-062	Lithic Scatter	Prehistoric	Very Low	Phase 1b
RAN-002	Lithic Scatter	Prehistoric	Very Low	Phase 1b
RAN-024	Lithic Scatter	Prehistoric	Very Low	Phase 1b
RAN-025	Lithic Scatter	Prehistoric	Very Low	Phase 1b
RAN-S2-005	Lithic Scatter	Prehistoric	Very Low	Phase 1b
RAN-S2-006	Lithic Scatter	Prehistoric	Very Low	Phase 1b
RAN-S2-010	Lithic Scatter	Prehistoric	Very Low	Phase 1b
SM-002	Lithic Scatter	Prehistoric	Very Low	Phase 1b
SM-004	Lithic Scatter	Prehistoric	Very Low	Phase 1b
SM-005	Lithic Scatter	Prehistoric	Very Low	Phase 1b

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
SM-006	Lithic Scatter	Prehistoric	Very Low	Phase 1b
SM-S2-002	Rock Cluster	Prehistoric	Very Low	Phase 1b
SM-S2-003	Rock Cluster	Prehistoric	Very Low	Phase 1b
SM-S2-007	Lithic Scatter	Prehistoric	Very Low	Phase 1b
SM-S2-008	Lithic Scatter	Prehistoric	Very Low	Phase 1b
SM-S2-012	Lithic Scatter	Prehistoric	Very Low	Phase 1b
SM-S2-011	Lithic Scatter, Rock Cluster	Prehistoric	Very Low	Phase 1b
EBR-215	Lithic Scatter, Ceramics, Fire-Affected Rock	Prehistoric	Moderate	Phase 1b
EBR-220	Lithic Scatter, Ceramics, Fire-Affected Rock	Prehistoric	Moderate	Phase 1b
DRK-141	Lithic Scatter, Fire-Affected Rock/Hearth	Prehistoric	Low to Moderate	Phase 1b
DRK-143	Lithic Scatter, Groundstone	Prehistoric	Low to Moderate	Phase 1b
DRK-188	Lithic Scatter, Ceramic Scatter	Prehistoric	Low to Moderate	Phase 1b
DRK-139	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1b
DRK-140	Lithic Scatter	Prehistoric	Low to Moderate	Phase 1b
EBR-010A	Ceramic Scatter	Prehistoric	Very Low	Phase 1b
DRK-019	Ceramic Scatter	Prehistoric	Very Low	Phase 1b
EBR-026	Lithic Scatter, Ceramic Scatter	Prehistoric	Very Low	Phase 1b
CA-IMP-2194 / CA-IMP-2193 (DRK-009)	Lithic Scatter	Prehistoric	Very Low	Phase 1b

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
SM-001	Lithic Scatter	Prehistoric	Very Low	Phase 1b
SM-003	Lithic Scatter	Prehistoric	Very Low	Phase 1b
T-17	Trails	Prehistoric	Very Low	Phase 1b
T-18	Trails	Prehistoric	Very Low	Phase 1b
T-21A	Trails	Prehistoric	Very Low	Phase 1b
T-21B	Trails	Prehistoric	Very Low	Phase 1b
T-42	Trails	Prehistoric	Very Low	Phase 1b
T-43A	Trails	Prehistoric	Very Low	Phase 1b
T-43B	Trails	Prehistoric	Very Low	Phase 1b
DRK-020	GLO Benchmark and bullet casing	Historic	Very Low	Phase II
JF-006	Historic Refuse, Rock Cluster	Historic	Very Low	Phase II
CJA-S2-015	Historic Refuse Deposit	Historic	Very Low	Phase II
DRK-026	Rock Cluster	Historic	Very Low	Phase II
DRK-S2-009	Historic Refuse Deposit	Historic	Very Low	Phase II
EBR-086	Historic Refuse Deposit	Historic	Low to Moderate	Phase II
JF-015	USGLO Benchmark	Historic	Low to Moderate	Phase II
JFB-011	Historic Refuse Deposit	Historic	Very Low	Phase II
RAN-005	USGLO Benchmark, Tobacco Can	Historic	Very Low	Phase II
RAN-006	Historic Refuse Deposit	Historic	Very Low	Phase II
RAN-013	Historic Refuse Deposit	Historic	Very Low	Phase II
RAN-015	Historic Refuse Deposit	Historic	Very Low	Phase II
RAN-016	USGLO Benchmark	Historic	Low to Moderate	Phase II
RAN-018	Aerial Marker	Historic	Low to Moderate	Phase II
RAN-019	Historic Refuse Deposit	Historic	Very Low	Phase II
SM-S2-020	USGLO Benchmark	Historic	Low to Moderate	Phase II
RAN-008	USGLO Benchmark	Historic	Very Low	Phase II
RAN-009	Historic Refuse Deposit	Historic	Very Low	Phase II
RAN-027	Historic Refuse Deposit, Rock Alignment	Historic	Very Low	Phase II
EBR-087	Historic Refuse Deposit	Historic	Very Low	Phase II
HR-02	Historic Road	Historic	Very Low	Phase II
HR-04	Historic Road	Historic	Very Low	Phase II

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
EBR-092	Historic Refuse Deposit, Rock Cluster	Historic	Very Low	Phase II
RAN-035	Historic Refuse Deposit	Historic	Very Low	Phase II
EJK-S2-001	Rock Cluster	Indeterminate	Low to Moderate	Phase II
EJK-S2-002	Rock Cluster	Indeterminate	Very Low	Phase II
EJK-S2-003	Rock Cluster	Indeterminate	Very Low	Phase II
RAN-064	Rock Cluster	Indeterminate	Very Low	Phase II
CJA-S2-010	Rock Alignment	Indeterminate	Very Low	Phase II
DRK-S2-002	Rock Cluster	Indeterminate	Very Low	Phase II
DRK-S2-011	Rock Feature	Indeterminate	Very Low	Phase II
DRK-S2-012	Rock Cluster	Indeterminate	Very Low	Phase II
DRK-S2-027	Rock Cluster	Indeterminate	Low to Moderate	Phase II
DRK-S2-028	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase II
EBR-213	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock, Possible Cremation, Animal Bone, Historic Refuse Deposit	Multi-Component	Moderate	Phase II
EBR-219	Lithic Scatter, Fire-Affected Rock/Hearth	Multi-Component	Very Low	Phase II
DRK-S2-014	Lithic Scatter, Historic Refuse Deposit	Multi-Component	Very Low	Phase II
RAN-022	Lithic Scatter, Fire-Affected Rock, Historic Refuse Deposit, Historic Structure	Multi-Component	Very Low	Phase II
DRK-S2-032	Lithic Scatter, Fire-Affected Rock/Hearth, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase II
JM-026	Lithic Scatter, Fire-Affected Rock/Hearth, Flaked Stone, Animal Bone, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase II
RAN-012	Lithic Scatter, Ceramic Scatter, Rock Clusters, Historic/Modern Refuse Deposit	Multi-Component	Very Low	Phase II
JM-020	Lithic Scatter, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase II
DRK-023	Lithic Scatter, Rock Cluster	Multi-Component	Very Low	Phase II
DRK-S2-010	Lithic Scatter, Historic Refuse Deposit, Rock Cluster	Multi-Component	Very Low	Phase II
EBR-069	Lithic Scatter, Groundstone, Historic Refuse	Multi-Component	Very Low	Phase II
EBR-098	Lithic Scatter, Rock Cluster	Multi-Component	Low to Moderate	Phase II
EBR-109	Lithic Scatter, Historic Refuse Deposit	Multi-Component	Very Low	Phase II

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
JF-043	Lithic Scatter, Historic Refuse Deposit	Multi-Component	Very Low	Phase II
JM-021	Lithic Scatter, Rock Clusters, Historic Refuse Deposit	Multi-Component	Low to Moderate	Phase II
JMR-005	Lithic Scatter, Rock Cluster, Historic Refuse Deposit	Multi-Component	Very Low	Phase II
RAN-011	Lithic Scatter, Historic Refuse Deposit	Multi-Component	Very Low	Phase II
RAN-017	Lithic Scatter,Historic Refuse Deposit, Historic Structure	Multi-Component	Low to Moderate	Phase II
RAN-034	Lithic Scatter, Historic Refuse Deposit	Multi-Component	Very Low	Phase II
T-03	Trails	Multi-Component	Very Low	Phase II
MN-S2-002	Trails	Multi-Component	Very Low	Phase II
JMR-006	Two Prehistoric Ceramics, One Historic Nail, Historic/Modern Rock Cluster	Multi-Component	Very Low	Phase II
CA-IMP-993 (DRK-001)	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock, Groundstone, Flaked Stone, Possible Cremation	Prehistoric	Moderate	Phase II
DRK-S2-018	Lithic Scatter, Ceramic Scatter, Fire Affected Rock/Hearths	Prehistoric	Moderate	Phase II
DRK-S2-021	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock	Prehistoric	Moderate	Phase II
DRK-S2-023	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock, Flaked Stone	Prehistoric	Moderate	Phase II
JM-037	Lithic Scatter	Prehistoric	Very Low	Phase II
EBR-064	Lithic Scatter	Prehistoric	Very Low	Phase II
EBR-065	Lithic Scatter	Prehistoric	Very Low	Phase II
RAN-026	Lithic Scatter	Prehistoric	Very Low	Phase II
SM-S2-004	Rock Cluster	Prehistoric	Very Low	Phase II
SM-S2-005	Rock Cluster	Prehistoric	Very Low	Phase II
CJA-S2-005	Lithic Scatter	Prehistoric	Very Low	Phase II
CJA-S2-007	Lithic Scatter, Ceramic Scatter	Prehistoric	Low to Moderate	Phase II
DRK-025	Lithic Scatter	Prehistoric	Very Low	Phase II
DRK-027	Lithic Scatter, Groundstone, Rock Cluster	Prehistoric	Very Low	Phase II
DRK-028	Lithic Scatter	Prehistoric	Very Low	Phase II
DRK-029	Lithic Scatter	Prehistoric	Very Low	Phase II
DRK-031	Lithic Scatter	Prehistoric	Very Low	Phase II
DRK-032	Lithic Scatter	Prehistoric	Very Low	Phase II
DRK-037	Lithic Scatter	Prehistoric	Very Low	Phase II
DRK-S2-006	Lithic Scatter	Prehistoric	Very Low	Phase II
DRK-S2-007	Lithic Scatter	Prehistoric	Very Low	Phase II
DRK-S2-008	Lithic Scatter	Prehistoric	Very Low	Phase II
DRK-S2-013	Lithic Scatter	Prehistoric	Very Low	Phase II

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
EBR-002	Lithic Scatter	Prehistoric	Very Low	Phase II
EBR-070	Lithic Scatter	Prehistoric	Very Low	Phase II
EBR-072	Lithic Scatter	Prehistoric	Very Low	Phase II
EBR-073	Lithic Scatter	Prehistoric	Very Low	Phase II
EBR-080	Lithic Scatter	Prehistoric	Very Low	Phase II
EBR-081	Lithic Scatter	Prehistoric	Very Low	Phase II
EBR-084	Lithic Scatter	Prehistoric	Very Low	Phase II
EBR-106	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-202	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EJK-S2-006	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EJK-S2-010	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EJK-S2-014	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EJK-S2-016	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
JF-001	Lithic Scatter	Prehistoric	Very Low	Phase II
JF-003	Lithic Scatter	Prehistoric	Very Low	Phase II
JF-004	Lithic Scatter	Prehistoric	Very Low	Phase II
JF-005	Lithic Scatter	Prehistoric	Very Low	Phase II
JF-018	Lithic Scatter	Prehistoric	Very Low	Phase II
JFB-012	Lithic Scatter	Prehistoric	Very Low	Phase II
JM-003	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
JM-005	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
JM-006	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
JM-007	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
JM-008	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
JM-012	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
JM-028	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
JM-030	Lithic Scatter	Prehistoric	Very Low	Phase II
JM-032	Lithic Scatter	Prehistoric	Very Low	Phase II
JM-036	Lithic Scatter	Prehistoric	Very Low	Phase II
JM-043	Lithic Scatter	Prehistoric	Very Low	Phase II
JMR-008	Lithic Scatter	Prehistoric	Very Low	Phase II
JMR-009	Lithic Scatter	Prehistoric	Very Low	Phase II
JMR-011	Lithic Scatter	Prehistoric	Very Low	Phase II
JMR-012	Lithic Scatter	Prehistoric	Very Low	Phase II
JMR-013	Lithic Scatter	Prehistoric	Very Low	Phase II
JMR-018	Lithic Scatter	Prehistoric	Very Low	Phase II
JMR-025	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
KRM-001	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
KRM-S2-002	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
PRM-S2-003	Lithic Scatter	Prehistoric	Very Low	Phase II
RAN-007	Lithic Scatter	Prehistoric	Very Low	Phase II
RAN-010	Lithic Scatter	Prehistoric	Very Low	Phase II
RAN-063	Lithic Scatter	Prehistoric	Very Low	Phase II
RAN-067	Lithic Scatter	Prehistoric	Very Low	Phase II
RAN-068	Lithic Scatter	Prehistoric	Very Low	Phase II

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
RAN-074	Lithic Scatter	Prehistoric	Very Low	Phase II
RAN-081	Lithic Scatter	Prehistoric	Very Low	Phase II
RAN-092	Lithic Scatter	Prehistoric	Very Low	Phase II
RANA-004	Lithic Scatter	Prehistoric	Very Low	Phase II
DRK-S2-026	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
CA-IMP-3752 / CA-IMP-3753 / CA-IMP-8731 (JM-001)	Lithic Scatter, Ceramic Scatter	Prehistoric	Low to Moderate	Phase II
CJA-S2-008	Lithic Scatter,Ceramic Scatter, Fire-Affected Rock (Hearth Feature)	Prehistoric	Low to Moderate	Phase II
CJA-S2-017	Lithic Scatter, Obsidian Artifacts	Prehistoric	Low to Moderate	Phase II
EBR-066	Lithic Scatter, Ceramic Scatter	Prehistoric	Very Low	Phase II
EBR-077	Ceramic Scatter	Prehistoric	Very Low	Phase II
EBR-085	Ceramic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-097	Lithic Scatter, Ceramic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-222	Lithic Scatter, Ceramic Scatter, Fire-Affected Rock	Prehistoric	Low to Moderate	Phase II
EJK-S2-004	Lithic Scatter, Fire-Affected Rock/Hearth	Prehistoric	Very Low	Phase II
JM-023	Lithic Scatter, Obsidian	Prehistoric	Low to Moderate	Phase II
JM-042	Lithic Scatter	Prehistoric	Very Low	Phase II
JMR-004	One Core, Fire-Affected Rock (Hearth Feature)	Prehistoric	Very Low	Phase II
JMR-021	Ceramic Scatter, one Secondary Flake	Prehistoric	Low to Moderate	Phase II
KRM-S2-003	Lithic Scatter, Fire-Affected Rock (Hearth Feature)	Prehistoric	Low to Moderate	Phase II
PRM-S2-014	Lithic Scatter, Ceramic Scatter	Prehistoric	Low to Moderate	Phase II
PRM-S2-016	Lithic Scatter, Obsidian Biface/Projectile Point, Cleared Circle Feature	Prehistoric	Low to Moderate	Phase II
RAN-055	Lithic Scatter, Fire-Affected Rock (Hearth Features)	Prehistoric	Very Low	Phase II
RAN-057	Lithic Scatter, Ceramic Scatter	Prehistoric	Low to Moderate	Phase II
RAN-069	Lithic Scatter, Fire-Affected Rock (Hearth Features)	Prehistoric	Very Low	Phase II
RAN-073	Lithic Scatter, Fire-Affected Rock (Hearth Feature)	Prehistoric	Very Low	Phase II
RAN-095	Lithic Scatter, Fire-Affected Rock (Hearth Feature)	Prehistoric	Very Low	Phase II
DRK-S2-029	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
DRK-S2-030	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-095	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
CA-IMP-2083 (JM-009)	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
CA-IMP-2093 (EJK-S2-011)	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-096	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-099	Lithic Scatter	Prehistoric	Low to Moderate	Phase II

Site No.	Site Type	Cultural Context	Potential for Buried Deposits Based on Geomorphologic Information	Project Area Location
EBR-100	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-102	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-107	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-108	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-204	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-205	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-223	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EJK-S2-005	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
JM-002	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
JM-011	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
LL-002A	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
LL-018	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
LL-020	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
LL-022A	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
LL-026	Lithic Scatter	Prehistoric	Very Low	Phase II
PRM-S2-017	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
SM-S2-021	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
SM-S2-031	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
SM-S2-032	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
DRK-S2-022	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
EBR-079	Lithic Scatter (and rock cluster)	Prehistoric	Very Low	Phase II
JF-042	Lithic Scatter, Ground Feature	Prehistoric	Very Low	Phase II
JM-027	Lithic Scatter	Prehistoric	Low to Moderate	Phase II
LL-019	Lithic Scatter, Rock Clusters	Prehistoric	Very Low	Phase II
RAN-061	Lithic Scatter	Prehistoric	Very Low	Phase II
T-02	Trails	Prehistoric	Very Low	Phase II
T-52	Trails	Prehistoric	Very Low	Phase II
DRK-S2-015	Lithic Scatter, Rock Cluster	Prehistoric	Very Low	Phase II

APPENDIX I: DOCUMENTATION OF TRIBAL CONSULTATION

Major Tribal Consultation Events and Contacts: January 2008 through April 2010

TRIBE	FIRST	LAST	Title/Position	BLM Letter-January 8, 2008	Tribe Letter Response- 2/19/08	Face to Face Meeting-August 19, 2008	Tribe Letter Response-8/28/08	Face to Face Meeting - October 9, 2008	BLM Letter-November 11, 2008	Field Visit- November 12, 2008	Follow-up calls- 11/17/08	Follow-up calls- 12/12/08	Tribe Letter Response-3/23/09	Face to face Meeting - July 10, 2009	BLM Letter-November 6, 2009	Follow-up calls, emails from BLM-11/21/09-12/01/09	Face to Face Meeting - December 4, 2009	BLM Letter-January 15, 2010	Tribe Letter Response-2/4/10	Tribe Letter Response-2/24/10	Follow up email from BLM- 3/1/10	BLM Letter-March 11, 2010	Follow up email from BLM- 3/12/10	Follow up email from BLM -3/26/10	BLM Letter-March 29, 2010	Follow up email from BLM -4/15/10
Campo Band of Kumeyaay Indians	H. Paul	Cuero, Jr.	Chairperson	X																						
Campo Band of Kumeyaay Indians	Fidel	Hyde	EPA Director	X																						
Campo Band of Kumeyaay Indians	Monique	LaChappa	Chairperson				X	X	X		X	X			X	X		X				X		X	X	X
Campo Band of Kumeyaay Indians	Frank	Salazar	Tribal Member																							
Campo Band of Kumeyaay Indians	Lisa	Gover	Tribal Administrator EPA Director					X	X		X	X			X	X		X				X			X	
Cocopah Indian Tribe	Sherry	Cordova	Chairperson	X					X		X	X			X	X		X				X			X	

TRIBE	FIRST	LAST	Title/Position	BLM Letter-January 8, 2008	Tribe Letter Response- 2/19/08	Face to Face Meeting-August 19, 2008	Tribe Letter Response-8/28/08	Face to Face Meeting - October 9, 2008	BLM Letter-November 11, 2008	Field Visit- November 12, 2008	Follow-up calls- 11/17/08	Follow-up calls- 12/12/08	Tribe Letter Response-3/23/09	Face to face Meeting - July 10, 2009	BLM Letter-November 6, 2009	Follow-up calls, emails from BLM-11/21/09-12/01/09	Face to Face Meeting - December 4, 2009	BLM Letter-January 15, 2010	Tribe Letter Response-2/4/10	Tribe Letter Response-2/24/10	Follow up email from BLM- 3/1/10	BLM Letter-March 11, 2010	Follow up email from BLM- 3/12/10	Follow up email from BLM -3/26/10	BLM Letter-March 29, 2010	Follow up email from BLM -4/15/10
Cocopah Indian Tribe	Jill	McCormick	Cultural Resources Manager	X					X	X	X	X			X	X	X	X			X	X	X	X	X	X
Ewiiaapaayp Band of Kumeyaay Indians	Robert	Pinto, Sr.	Chairperson	X					X		X	X			X	X		X				X			X	
Ewiiaapaayp Band of Kumeyaay Indians	Will	Micklin	Executive Director	X					X		X	X			X	X		X				X		X	X	X
Ewiiaapaayp Band of Kumeyaay Indians	Michael	Garcia	Vice-Chairman, EPA Director	X					X		X	X			X	X		X				X			X	
Ewiiaapaayp Band of Kumeyaay Indians	Jim	Robertson	Cultural Resources Coordinator														X					X				
Fort Yuma Quechan Tribe	Michael	Jackson, Sr.	President	X					X		X	X			X	X		X	X			X			X	

TRIBE	FIRST	LAST	Title/Position	BLM Letter-January 8, 2008	Tribe Letter Response- 2/19/08	Face to Face Meeting-August 19, 2008	Tribe Letter Response-8/28/08	Face to Face Meeting - October 9, 2008	BLM Letter-November 11, 2008	Field Visit- November 12, 2008	Follow-up calls- 11/17/08	Follow-up calls- 12/12/08	Tribe Letter Response-3/23/09	Face to face Meeting - July 10, 2009	BLM Letter-November 6, 2009	Follow-up calls, emails from BLM-11/21/09-12/01/09	Face to Face Meeting - December 4, 2009	BLM Letter-January 15, 2010	Tribe Letter Response-2/4/10	Tribe Letter Response-2/24/10	Follow up email from BLM- 3/1/10	BLM Letter-March 11, 2010	Follow up email from BLM- 3/12/10	Follow up email from BLM -3/26/10	BLM Letter-March 29, 2010	Follow up email from BLM -4/15/10
Fort Yuma Quechan Tribe	Bridget	Nash-Chrabascz	Historic Preservation Officer/ Cultural Committee Coordinator	X	X	X			X		X	X		X	X	X		X			X	X	X	X	X	X
Fort Yuma Quechan Tribe-Ah-Mut Pipa Foundation	Preston	Arroweed	Tribal Member													X	X	X			X	X	X	X	X	X
Fort Yuma Quechan Tribe	Lorey	Cachora	Tribal Member																							
Fort Yuma Quechan Tribe	Manfred	Scott	Tribal Member																							
Jamul Indian Village	Kenneth	Meza, Sr.	Chairperson															X				X			X	
Jamul Indian Village	Jesse	Pinto	Tribal Member														X	X				X			X	
Kwaaymii Laguna Band of Mission Indians	Carmen	Lucas	Tribal Member	X					X	X	X	X			X	X	X	X				X			X	

TRIBE	FIRST	LAST	Title/Position	BLM Letter-January 8, 2008	Tribe Letter Response- 2/19/08	Face to Face Meeting-August 19, 2008	Tribe Letter Response-8/28/08	Face to Face Meeting - October 9, 2008	BLM Letter-November 11, 2008	Field Visit- November 12, 2008	Follow-up calls- 11/17/08	Follow-up calls- 12/12/08	Tribe Letter Response-3/23/09	Face to face Meeting - July 10, 2009	BLM Letter-November 6, 2009	Follow-up calls, emails from BLM-11/21/09-12/01/09	Face to Face Meeting - December 4, 2009	BLM Letter-January 15, 2010	Tribe Letter Response-2/4/10	Tribe Letter Response-2/24/10	Follow up email from BLM- 3/1/10	BLM Letter-March 11, 2010	Follow up email from BLM- 3/12/10	Follow up email from BLM -3/26/10	BLM Letter-March 29, 2010	Follow up email from BLM -4/15/10
La Posta Band of Kumeyaay Indians	Gwendolyn	Parada	Chairperson	X					X		X	X			X			X				X		X	X	X
La Posta Band of Kumeyaay Indians	James	Hill	EPA Director	X																						
La Posta Band of Kumeyaay Indians	Bernice	Paipa	Environmental Coordinator/ Kumeyaay Cultural Repatriation Committee													X		X				X		X	X	X
Manzanita Band of Kumeyaay Indians	Leroy	Elliott	Chairperson	X					X		X	X			X	X		X				X			X	
Manzanita Band of Kumeyaay Indians	Keith	Adkins	Environmental Coordinator	X					X		X	X			X	X		X				X		X	X	X
Manzanita Band of Kumeyaay Indians	Nick	Elliott	Environmental Coordinator	X					X		X	X					X	X				X			X	

TRIBE	FIRST	LAST	Title/Position	BLM Letter-January 8, 2008	Tribe Letter Response- 2/19/08	Face to Face Meeting-August 19, 2008	Tribe Letter Response-8/28/08	Face to Face Meeting - October 9, 2008	BLM Letter-November 11, 2008	Field Visit- November 12, 2008	Follow-up calls- 11/17/08	Follow-up calls- 12/12/08	Tribe Letter Response-3/23/09	Face to face Meeting - July 10, 2009	BLM Letter-November 6, 2009	Follow-up calls, emails from BLM-11/21/09-12/01/09	Face to Face Meeting - December 4, 2009	BLM Letter-January 15, 2010	Tribe Letter Response-2/4/10	Tribe Letter Response-2/24/10	Follow up email from BLM- 3/1/10	BLM Letter-March 11, 2010	Follow up email from BLM- 3/12/10	Follow up email from BLM -3/26/10	BLM Letter-March 29, 2010	Follow up email from BLM -4/15/10
San Pasqual Band of Diegueno Indians	Allen	Lawson, Jr.	Chairperson												X	X		X				X			X	
San Pasqual Band of Diegueno Indians	Dave	Toler	Councilman												X	X		X		X		X		X	X	X
San Pasqual Band of Diegueno Indians	Kristie	Orosco	Environmental Coordinator																							
Santa Ysabel Band of Diegueno Indians	Johnny	Hernandez	Chairperson									X			X	X		X				X		X	X	X
Santa Ysabel Band of Diegueno Indians	Clint	Linton	Red Tail Monitoring and Research, Inc. Owner/Tribal Member							X		X			X	X		X				X		X	X	X
Santa Ysabel Band of Diegueno	Ron	Christman	Councilman												X			X				X			X	

TRIBE	FIRST	LAST	Title/Position	BLM Letter-January 8, 2008	Tribe Letter Response- 2/19/08	Face to Face Meeting-August 19, 2008	Tribe Letter Response-8/28/08	Face to Face Meeting - October 9, 2008	BLM Letter-November 11, 2008	Field Visit- November 12, 2008	Follow-up calls- 11/17/08	Follow-up calls- 12/12/08	Tribe Letter Response-3/23/09	Face to face Meeting - July 10, 2009	BLM Letter-November 6, 2009	Follow-up calls, emails from BLM-11/21/09-12/01/09	Face to Face Meeting - December 4, 2009	BLM Letter-January 15, 2010	Tribe Letter Response-2/4/10	Tribe Letter Response-2/24/10	Follow up email from BLM- 3/1/10	BLM Letter-March 11, 2010	Follow up email from BLM- 3/12/10	Follow up email from BLM -3/26/10	BLM Letter-March 29, 2010	Follow up email from BLM -4/15/10
Indians																										
Santa Ysabel Band of Diegueno Indians	Rodney	Kephart	Councilman													X										
Torres-Martinez Desert Cahuilla Indians	Raymond	Torres	Chairperson	X					X			X														
Torres-Martinez Desert Cahuilla Indians	Diana	Chihuahua	Cultural Resources Coordinator						X		X	X	X													
Torres-Martinez Desert Cahuilla Indians	Alberto	Ramirez	Environmental Coordinator						X		X	X														

Major Tribal Consultation Events and Contacts: May 2010 through August 2010

TRIBE	FIRST	LAST	Title/Position	Follow up email from BLM -5/3/10	Face to face Meeting- May 4, 2010	Tribe Letter Response- 5/4/10	Follow up email from BLM -5/13/10 and 5/17/10	Tribe Letter Response-5/16/10	Face to face Meeting- May 18, 2010	Follow up email from BLM - 5/28/10	Tribe Letter Response-5/31/10	Tribe Letter Response- 6/4/10	BLM Letter-June 2, 2010	Tribe Letter Response- 6/14/10	Follow up email from BLM -6/15/10	Face to face Meeting- June 16, 2010	BLM Letter- June 24, 2010	Follow up email from BLM -6/25/10	Email from BLM-Project Update and revised PA-7/9/10	Field Visit- July 29-31, 2010	Tribe Letter Response- 8/4/10	Tribe Letter Response- 8/7/10	Follow up email from BLM-8/9/10	BLM Letter to Quechan Tribe- August 18, 2010	Tribe Letter Response- 8/26/10
Campo Band of Kumeyaay Indians	H. Paul	Cuero, Jr.	Chairperson																						
Campo Band of Kumeyaay Indians	Fidel	Hyde	EPA Director																						
Campo Band of Kumeyaay Indians	Monique	LaChappa	Chairperson	X			X			X			X		X		X	X	X				X		
Campo Band of Kumeyaay Indians	Frank	Salazar	Tribal Member																X	X			X		

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Campo Band of Kumeyaay Indians	Lisa	Gover	Tribal Administrator/ EPA Director										X				X								
Cocopah Indian Tribe	Sherry	Cordova	Chairperson										X				X								
Cocopah Indian Tribe	Jill	McCormick	Cultural Resources Manager	X	X		X		X	X			X		X	X	X	X	X				X		
Ewiiaapaayp Band of Kumeyaay Indians	Robert	Pinto, Sr.	Chairperson										X				X								
Ewiiaapaayp Band of Kumeyaay Indians	Will	Micklin	Executive Director	X			X			X			X		X		X	X	X				X		
Ewiiaapaayp Band of Kumeyaay Indians	Michael	Garcia	Vice-Chairman, EPA Director										X				X								
Ewiiaapaayp Band of Kumeyaay	Jim	Robertson	Cultural Resources Coordinator										X				X								

TRIBE	FIRST	LAST	Title/Position	Follow up email from BLM -5/3/10	Face to face Meeting- May 4, 2010	Tribe Letter Response- 5/4/10	Follow up email from BLM -5/13/10 and 5/17/10	Tribe Letter Response-5/16/10	Face to face Meeting- May 18, 2010	Follow up email from BLM - 5/28/10	Tribe Letter Response-5/31/10	Tribe Letter Response- 6/4/10	BLM Letter-June 2, 2010	Tribe Letter Response- 6/14/10	Follow up email from BLM -6/15/10	Face to face Meeting- June 16, 2010	BLM Letter- June 24, 2010	Follow up email from BLM -6/25/10	Email from BLM-Project Update and revised PA-7/9/10	Field Visit- July 29-31, 2010	Tribe Letter Response- 8/4/10	Tribe Letter Response- 8/7/10	Follow up email from BLM-8/9/10	BLM Letter to Quechan Tribe- August 18, 2010	Tribe Letter Response- 8/26/10
Indians																									
Fort Yuma Quechan Tribe	Michael	Jackson, Sr.	President										X				X				X			X	
Fort Yuma Quechan Tribe	Bridget	Nash-Chrabascz	Historic Preservation Officer/ Cultural Committee Coordinator	X	X	X	X		(X - call in)	X		X	X	X	X	(X-call in)	X	X	X				X	X	
Fort Yuma Quechan Tribe-Ah-Mut Pipa Foundation	Preston	Arroweed	Tribal Member	X	X		X			X			X		X		X	X	X	X			X		
Fort Yuma Quechan Tribe	Lorey	Cachora	Tribal Member													X	X		X				X		
Fort Yuma Quechan Tribe	Manfred	Scott	Tribal Member													X		X	X	X			X		

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Jamul Indian Village	Kenneth	Meza, Sr.	Chairperson										X				X								
Jamul Indian Village	Jesse	Pinto	Tribal Member										X				X								
Kwaaymii Laguna Band of Mission Indians	Carmen	Lucas	Tribal Member					X			X		X			X	X			X		X			X
La Posta Band of Kumeyaay Indians	Gwendolyn	Parada	Chairperson	X			X			X			X		X		X	X	X				X		
La Posta Band of Kumeyaay Indians	James	Hill	EPA Director																						
La Posta Band of Kumeyaay Indians	Bernice	Paipa	Environmental Coordinator/Kumeyaay Cultural Repatriation Committee	X			X			X			X		X	(X-call in)	X	X	X				X		
Manzanita Band of Kumeyaay	Leroy	Elliott	Chairperson										X				X								

TRIBE	FIRST	LAST	Title/Position	Follow up email from BLM -5/3/10	Face to face Meeting- May 4, 2010	Tribe Letter Response- 5/4/10	Follow up email from BLM -5/13/10 and 5/17/10	Tribe Letter Response-5/16/10	Face to face Meeting- May 18, 2010	Follow up email from BLM - 5/28/10	Tribe Letter Response-5/31/10	Tribe Letter Response- 6/4/10	BLM Letter-June 2, 2010	Tribe Letter Response- 6/14/10	Follow up email from BLM -6/15/10	Face to face Meeting- June 16, 2010	BLM Letter- June 24, 2010	Follow up email from BLM -6/25/10	Email from BLM-Project Update and revised PA-7/9/10	Field Visit- July 29-31, 2010	Tribe Letter Response- 8/4/10	Tribe Letter Response- 8/7/10	Follow up email from BLM-8/9/10	BLM Letter to Quechan Tribe- August 18, 2010	Tribe Letter Response- 8/26/10
Indians																									
Manzanita Band of Kumeyaay Indians	Keith	Adkins	Environmental Coordinator	X			X			X			X		X		X	X	X				X		
Manzanita Band of Kumeyaay Indians	Nick	Elliott	Environmental Coordinator										X				X		X				X		
San Pasqual Band of Diegueno Indians	Allen	Lawson, Jr.	Chairperson										X				X								
San Pasqual Band of Diegueno Indians	Dave	Toler	Councilman	X			X			X			X		X		X	X	X				X		
San Pasqual Band of Diegueno Indians	Kristie	Orosco	Environmental Coordinator													X	X	X	X	X			X		

TRIBE	FIRST	LAST	Title/Position	Follow up email from BLM -5/3/10	Face to face Meeting- May 4, 2010	Tribe Letter Response- 5/4/10	Follow up email from BLM -5/13/10 and 5/17/10	Tribe Letter Response-5/16/10	Face to face Meeting- May 18, 2010	Follow up email from BLM - 5/28/10	Tribe Letter Response-5/31/10	Tribe Letter Response- 6/4/10	BLM Letter-June 2, 2010	Tribe Letter Response- 6/14/10	Follow up email from BLM -6/15/10	Face to face Meeting- June 16, 2010	BLM Letter- June 24, 2010	Follow up email from BLM -6/25/10	Email from BLM-Project Update and revised PA-7/9/10	Field Visit- July 29-31, 2010	Tribe Letter Response- 8/4/10	Tribe Letter Response- 8/7/10	Follow up email from BLM-8/9/10	BLM Letter to Quechan Tribe- August 18, 2010	Tribe Letter Response- 8/26/10
Santa Ysabel Band of Diegueno Indians	Johnny	Hernandez	Chairperson	X			X			X			X		X		X	X	X				X		
Santa Ysabel Band of Diegueno Indians	Clint	Linton	Red Tail Monitoring and Research, Inc. Owner/Tribal Member	X			X			X			X		X		X	X	X	X			X		
Santa Ysabel Band of Diegueno Indians	Ron	Christman	Councilman																						
Santa Ysabel Band of Diegueno Indians	Rodney	Kephart	Councilman							X			X		X		X	X	X				X		
Torres-Martinez Desert Cahuilla Indians	Raymon d	Torres	Chairperson																						

TRIBE	FIRST	LAST	Title/Position	Follow up email from BLM -5/3/10	Face to face Meeting- May 4, 2010	Tribe Letter Response- 5/4/10	Follow up email from BLM -5/13/10 and 5/17/10	Tribe Letter Response-5/16/10	Face to face Meeting- May 18, 2010	Follow up email from BLM - 5/28/10	Tribe Letter Response-5/31/10	Tribe Letter Response- 6/4/10	BLM Letter-June 2, 2010	Tribe Letter Response- 6/14/10	Follow up email from BLM -6/15/10	Face to face Meeting- June 16, 2010	BLM Letter- June 24, 2010	Follow up email from BLM -6/25/10	Email from BLM-Project Update and revised PA-7/9/10	Field Visit- July 29-31, 2010	Tribe Letter Response- 8/4/10	Tribe Letter Response- 8/7/10	Follow up email from BLM-8/9/10	BLM Letter to Quechan Tribe- August 18, 2010	Tribe Letter Response- 8/26/10
Torres-Martinez Desert Cahuilla Indians	Diana	Chihuahua	Cultural Resources Coordinator																						
Torres-Martinez Desert Cahuilla Indians	Alberto	Ramirez	Environmental Coordinator																						

APPENDIX J: DRAFT MONITORING AND DISCOVERY PLAN

DRAFT
MONITORING AND DISCOVERY PLAN

IMPERIAL VALLEY SOLAR PROJECT
IMPERIAL COUNTY, CALIFORNIA

Submitted to:

Bureau of Land Management

1661 South 4th Street

El Centro, CA 92243

Prepared by:

LSA Associates, Inc.

703 Palomar Airport Road Suite 260

Carlsbad, California 92011

(760) 931-5471

May 26, 2010

And

Supplemented by AECOM

1420 Kettner Boulevard, Suite 500

San Diego, CA 92101

(619) 233-1454

August 13, 2010

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INTRODUCTION

Tessera Solar is proposing to construct the Imperial Valley Solar Project (IVSP or Project) in Imperial County on lands under the jurisdiction of the Bureau of Land Management (BLM), and cultural resources have been documented in the Project's area of potential effects (APE). Efforts are being made to design the Project to avoid known cultural resources eligible for listing in the National Register of Historic Places (NRHP) and/or the California Register of Historic Resources (CRHR). The following will be discussed in this Monitoring and Discovery Plan:

- The measures necessary to avoid potential impacts to recorded cultural resources, including Environmentally Sensitive Areas (ESAs)
- Professional standards
- Monitoring plan
- Discovery plan
- Avoidance/protection procedures
- Cultural resources training
- Curation

The entire surface of the APE of the proposed Project has been surveyed. Multiple prehistoric and historic resources have been identified.

PROJECT DESCRIPTION

The IIVSP will construct a proposed 750-megawatt (MW) solar energy plant on approximately 6,500 acres of public lands in California administered by BLM California Desert District and the El Centro Field Office. Imperial Valley Solar will use existing roads and construct new roads in the Project area.

The Project is located in western Imperial County, California, immediately east of the town of Ocotillo, west of the town of Seeley, and north and south of Interstate 8 (I-8). The Project will utilize the SunCatcher technology of Stirling Energy Services. Each SunCatcher consists of a 25-kilowatt solar power electric-generating system. The system is designed to track the sun automatically and to focus solar energy onto a Power Conversion Unit, which generates electricity. The system consists of an approximate 38-foot-high by 40-foot-wide solar concentrator dish that supports an array of curved glass mirror facets. The 300-MW Phase I of the Project will consist of approximately 12,000 SunCatchers. The 450-MW Phase II portion of the Project will include approximatley18,000 SunCatchers.

The Project will include the construction of a new 230-kilovolt (kV) substation approximately in the center of the Project. A Main Services Complex, where key buildings and parking areas will be located, will be constructed at the northeastern end of

the Phase I Project. Main roads will be constructed with a combination of roadway dips and elevated sections across the dry washes on the Project.

The full Phase II expansion of the Project will require the construction of the 500-kV Sunrise Powerlink transmission line that San Diego Gas & Electric (SDG&E) has proposed. A 230-kV transmission line that will be built for Phase I will parallel the current transmission line corridor for the Southwest Powerlink transmission line within the existing right-of-way (ROW). The main entry for truck traffic to the Project during construction will be from I-8 to the Project entrance on Evan Hewes Highway. During Project operation, the secondary and emergency access will be from Dunaway Road.

REGULATORY CONTEXT

The proposed Project requires authorization and issuance of an ROW grant by BLM. The proposed Project is a federal undertaking. Therefore, compliance with 36 Code of Federal Regulations (CFR) Part 800, regulations implementing the National Historic Preservation Act (as amended), is required. In addition, BLM and the California Energy Commission (CEC), together, have prepared the *Staff Assessment and Draft Environmental Impact Statement and Draft California Desert Conservation Area Plan Amendment, SES Solar Two Project,* and *Application for Certification (08-AFC-5) Imperial County (2010)* to identify Project alternatives for purposes of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), and have comparatively examined the relative effects of the alternatives on known historic properties. Therefore, cultural resources on the Project are evaluated subject to criteria of both the federal NRHP and CEQA CRHR. As the Project may have an adverse effect on historic properties (resources eligible for or listed in the NRHP and/or CRHR), BLM prepared a Programmatic Agreement (PA) stipulating measures that will be implemented prior to construction. The preparation of a Monitoring and Discovery Plan is stipulated in the PA.

PROFESSIONAL QUALIFICATIONS

BLM shall ensure that all work is under the supervision of personnel meeting the *Secretary of the Interior's Standards and Guidelines* (as amended and annotated)*, Professional Qualifications Standards*. The requirements are those used by the National Park Service, and have been previously published in the Code of Federal Regulations (36 CFR Part 61). The qualifications define minimum education and experience required to perform identification, evaluation, registration, and treatment activities. BLM shall obtain résumés of prospective consultants and verify credentials of supervisory personnel and staff, as necessary.

ARCHAEOLOGY

The minimum professional qualifications for supervisory personnel in archaeology shall be a graduate degree in archaeology, anthropology, or closely related field plus the following:

- At least 1 year of full-time professional experience or equivalent specialized training in archaeological research, administration, or management;
- At least 4 months of supervised field and analytic experience in general North American archaeology; and
- Demonstrated ability to carry research to completion.

In addition to these minimum qualifications, a professional in prehistoric archaeology shall have at least 1 year of full-time professional experience at a supervisory level in the study of archaeological resources of the prehistoric period. A professional in historic archaeology shall have at least 1 year of full-time professional experience at a supervisory level in the study of archaeological resources of the historic period.

KEY PERSONNEL

Personnel involved in the archaeological monitoring, testing, and data recovery efforts will be responsible primarily for conducting the monitoring; archaeological fieldwork and laboratory analysis; report preparation; and (as necessary) coordination with BLM, construction contractors, and Native American consultants. The responsibilities of key personnel are outlined below.

PRINCIPAL INVESTIGATOR/CULTURAL RESOURCES SPECIALIST

The Principal Investigator (PI)/Cultural Resources Specialist (CRS) will have overall responsibility for the testing and data recovery investigations and will be the primary point of contact between the archaeological consultant and BLM for these programs. The PI will also be responsible for the analysis and the overall quality of the technical report of these investigations. The PI will meet the Secretary of the Interior's Qualification Standards for Archaeologists and be on the BLM Cultural Resources Use Permit.

MONITORING SUPERVISOR

The Monitoring Supervisor will have overall responsibility for the cultural resources monitoring program and will be the primary point of contact between the archaeological consultant and BLM for this program. The Monitoring Supervisor will also be responsible for the content and the overall quality of the monitoring report. The Monitoring Supervisor will meet the Secretary of the Interior's Qualification Standards for Archaeologists.

FIELD MONITORS

Field monitors will conduct the daily archaeological construction monitoring and will be responsible for making the initial discoveries, subsequent initial notifications, equipment diversions, preparing daily monitoring notes and logs, and recording and mapping for initial discovery documentation.

FIELD DIRECTOR

The Field Director will be responsible for the day-to-day activities of the testing and data recovery investigations, including management of field personnel and coordination of crews. The Field Director will also be responsible for compiling and ensuring the quality of the field data on a daily basis. Additionally, the Field Director will coordinate the work of subconsultants or other contractors participating in the archaeological field investigations, and will be responsible for implementing the requirements of the Health and Safety Plan, including daily safety briefings. The Field Director will also meet the Secretary of the Interior's Qualification Standards for Archaeologists and be on the Cultural Uses Permit.

CREW CHIEFS

The Crew Chiefs will, in consultation with the Field Director, be responsible for implementing the field strategies at individual sites. The Crew Chief will direct field crew, lay out excavations, and compile collections and field documentation on a daily basis. Additionally, the Crew Chief will be responsible for implementing on-site safety procedures.

FIELD CREW

Field crew members will conduct surface examinations and hand excavations, and monitor mechanical test investigation excavations. Each crew member will operate under the direct supervision of the Crew Chief and will conduct basic documentation of field operations, including completing excavation-level records, bag labeling, and trench monitoring forms.

LABORATORY DIRECTOR

The Laboratory Director will be responsible for directing all phases of laboratory processing of the data recovery collections, including check-in, cleaning, sorting, cataloguing, analyzing, distributing special samples, and preparing for curation. The Laboratory Director will coordinate closely with the PI and Monitoring Supervisor to ensure that the appropriate data are documented and compiled.

1.5 DEFINITION OF RESOURCE TYPES

Below are examples of archaeological site types that might be encountered in the Project APE during construction or additional surveys.

PREHISTORIC

HABITATION SITES. Sites have, at a minimum, flaked stone tools and evidence of food processing and fire affected rock/hearths. Sites contain a wide variety of artifacts and materials. Habitation sites within the IVSP area may include flakes, tools, groundstone, ceramics, fire-affected rocks, midden, rock features (domestic and storage), and human remains.

– Temporary camp: flaked stone tools, evidence of food processing, fire affected rock/hearths

– Long-term: multiple artifact categories, evidence of use of fire, midden

RESOURCE EXTRACTION/PROCESSING SITES. Sites contain artifacts associated with specific resource extraction or processing activities. Processing/extraction sites within the IVSP include the following:

– Plant processing: Associated artifacts include groundstone, manos, metates, pestles, bedrock storage facilities, and bedrock milling features. Groundstone was also used to process fish, small animals, and pigments, and for hide-tanning. Flaked lithics were also used for cutting/harvesting plants prior to grinding or for preparing vegetal construction materials.

– Animal processing: associated artifacts include lithics, fish traps, and faunal bone

– Lithic reduction: associated artifacts include lithic tools, flakes, debitage, cores, and blanks

– Lithic processing: evidence of heat treatment; associated artifacts include flakes, debitage, and/or cores

– Groundstone production: associated artifacts or features include sandstone and granite outcrops, basalt boulders, etc.

TRAVEL SITES. Trails/footpaths, including trail markers.

CERAMICS SITES. These sites can include both scatters of ceramics and single pot locales or "pot drops."

ROCK FEATURES SITES. These sites contain cairns, rock alignments, rock rings, and/or cleared circles.

OTHER. All other prehistoric sites that do not fit into the above categories.

HISTORIC

HABITATION SITES. In addition to food-related refuse, these are sites that contain evidence of domestic activity. Features may include tent pads, cleared areas, campfire rings, foundations, or other evidence of more than casual use.

HISTORIC REFUSE. These sites contain primary or secondary refuse deposit or concentrations of debris.

– Food containers: primarily cans

– Beverage containers: bottles and cans

– Mixed domestic: in addition to food and beverage containers, a variety of materials such as crockery, glassware, buttons, wire, toys, etc.

– Construction: cement, milled lumber, nails, paint, tile, etc.

– Target practice: shell casings, fragmentary bullets, etc.

GRAVEL EXTRACTION/MINING. These sites are characterized by pits, scraping scars, rock piles, and/or access roads.

SURVEYING. These sites consist of trash piles associated with surveying activities and historic survey markers.

TRANSPORTATION. These sites are linear features designed to facilitate the transportation of people.

– Roads: unpaved

– Trails: wagon trails and footpaths

MILITARY. Any site associated with military activities.

ROCK FEATURES. Cairns, rock alignments, and/or rock rings.

WATER CONVEYANCE. Any subsurface feature or device constructed to transport water over a distance (irrigation canals, ditches, flumes, pipes, etc.) not associated or addressed as part of the built environment.

OTHER. All other sites that do not fit into the above categories.

BUILT ENVIRONMENT

HABITATION. Standing residential buildings.

INDUSTRIAL. Standing processing or manufacturing plant.

TRANSPORTATION. Existing linear feature designed to facilitate the transportation of people.

– Roads: paved

– Railroads: with intact crossties and rails

WATER CONVEYANCE. Any existing feature or device constructed to transport water over a distance: irrigation canals, ditches, flumes, pipes, etc.

2.0 AVOIDANCE AND PRESERVATION

Avoidance of all cultural resources is preferred and is the goal of BLM. If cultural resources are discovered during construction and they are determined eligible for listing in the NRHP and/or the CRHR, implementation of a data recovery program may be necessary. If avoidance and minimization alternatives are not feasible, then data recovery through archaeological excavation may be warranted. Archaeological sites are most often determined eligible for the NRHP under Criterion D ("have yielded or may be likely to yield, information important in prehistory or history"), and/or the CRHR under Criterion 4 ("potential to yield information important to the prehistory or history of the local area, California or the nation"). The important information can often be characterized by the physical data, the artifacts, and features in the ground. Archaeological excavations may recover this information. This form of mitigation is called data recovery and includes scientific analyses and the preparation of a technical report. The purpose of conducting excavation as mitigation is to recover, analyze, and document in written form the important information contained within an archaeological site. The report must meet professional standards discussed later in this plan.

As stated above, avoidance of cultural resources during construction is preferred. Whenever practicable, an archaeological site that is determined eligible for listing in the NRHP and/or CRHR should be left in place and preserved from damage. Avoidance and minimization alternatives should be also considered as the first option for sites not evaluated. Avoidance measures may include limiting the size of the undertaking to reduce the effect, modifying the undertaking through redesign, and monitoring ground-disturbance activities to record significant archaeological remains if they are encountered.

2.1 ENVIRONMENTALLY SENSITIVE AREAS

Newly discovered and previously known prehistoric and historic archaeological sites located within the Project's APE shall be designated as ESAs. Construction personnel will be instructed on how to avoid ESAs.

All construction personnel will be trained regarding the recognition of possible buried cultural remains, including prehistoric and historic resources during construction, prior to the initiation of construction or ground-disturbing activities. BLM will complete training for all construction personnel. Training will inform all construction personnel of the procedures to be followed upon the discovery of archaeological materials, including Native American burials.

2.2 PLAN OF ESA ESTABLISHMENT AND DESIGNATION

1. The archaeological consultant shall flag and/or fence cultural resources.
2. The lead Construction Manager and all supervisory personnel shall be informed by the BLM archaeologist and/or its representative of the presence and location of all ESAs within the Project area and the need to maintain integrity of the ESAs.

3. The BLM archaeologist and/or its representative shall convey the archaeological sensitivity of the resource to the construction personnel.
4. Construction personnel shall be informed that ESAs are strictly off-limits to construction, and entrance is not allowed at any time. ESAs shall not be described as archaeological sites. The exact location of cultural resources will be confidential.
5. For prehistoric resources, the BLM archaeologist shall consult with interested Native American tribes regarding the sensitivity of the area and any new discoveries. BLM shall make a reasonable and good faith effort to address concerns. BLM shall consider the role of Native Americans regarding supporting the monitoring of significant Native American resources within and adjacent to Project impact areas.
6. Archaeological monitors shall maintain flagging/staking for ESAs to identify these as areas where no ground-disturbing activities are to take place. Results of this effort shall be presented in the monitoring report for the Project.
7. Archaeological monitors shall immediately report all violations to BLM.

If a resource cannot be avoided, then the resource will be evaluated for eligibility for listing in the NRHP and/or CRHR.

TRAINING

BLM will provide a background briefing for supervisory construction personnel describing the potential for exposing cultural resources, the location of any potential ESA, and procedures to treat unexpected discoveries. An IVSP training document has been prepared and will be provided to construction personnel in support of the on-site training described below. The training document provides prehistoric, historic, and regulatory contexts, the roles of BLM and the archaeological monitors, the responsibilities and authority of the monitors, an outline of discovery protocols, and examples of artifacts. The cultural resources training shall include the following:

1. A summary of the archaeological and cultural sensitivity of the area.
2. The regulatory context and BLM protocols.
3. Project roles and responsibilities for the BLM archaeologist and the archaeological monitors.
4. Authority of archaeological monitors to halt work.
5. Basic artifact recognition.
6. The understanding that if construction personnel observe cultural material or what appears to be a cultural resource, the BLM archaeologist and/or representative shall be contacted immediately. Construction personnel shall have the requisite contact information.
7. The explicit understanding that cultural resources and human remains are not to be disturbed.
8. The procedures to follow if cultural material or human burials are observed:

- Work halts immediately.
- The location is secured and made off-limits to ground-disturbing activities.
- The construction foreman and BLM archaeologist are called immediately.
- Work does not re-commence until authorized by the BLM archaeologist.

3.0 MONITORING PLAN

3.1 MONITORING

A consultant will be retained to provide archaeological monitors. An archaeological monitor or monitors will be present during construction. Additionally, monitoring of ground-disturbing activities within 50 feet of a known cultural resource is required. Monitors are to ensure that ESAs are properly (and adequately) marked and protected. A Native American monitor is required at all sensitive prehistoric resource locations. Safety is paramount, and all monitors will undergo safety briefings and abide by all Occupational Safety & Health Administration (OSHA) and Project safety requirements. Monitors have the authority to halt work. BLM will maintain a record of the safety briefings and require that all monitors participate. The following list outlines the qualifications and responsibilities of the archaeological monitors.

1. The qualifications of monitors shall be confirmed by BLM. The consultant shall provide résumés and references. The monitors must be familiar with the types of historic and prehistoric resources within the study area.
2. Monitors shall maintain a daily work log (see Appendix B) that includes the following:
    a. Date and time of work
    b. Area of work
    c. Type of work and equipment present
    d. Construction activities performed
    e. Monitoring activities performed (e.g., protection of ESA)
    f. Cultural resources present
    g. Name of Native American monitor (if present)
3. Color digital photographs shall be taken, as appropriate, to document monitoring activities. All ESAs, at a minimum, shall be photographically documented prior to, during, and after construction in their vicinity. If previously unknown or inadequately documented cultural resources are encountered during monitoring, BLM and the monitors shall follow the procedures presented in the section titled *Discovery Treatment Plan*.
4. Monitors shall provide daily updates to the Monitoring Supervisor, who shall provide a summary to the BLM archaeologist. Written memo updates shall be provided weekly. The weekly memos shall identify the monitors present, dates worked, and their locations for that week. The memo shall present the results of monitoring for that week. Once monitoring is complete, a monitoring report shall be drafted for review and approval by the BLM archaeologist. The monitoring report shall present the following:
    a. All monitoring activities
    b. Location of monitoring

c. Dates of monitoring

d. Personnel participating and their qualifications

e. Resources (ESAs) satisfactorily protected

f. Damaged resources, including the effects and the significance

g. Discovered resources and their significance (if any)

h. Management and treatment measures implemented

The report shall be reviewed and approved by the BLM archaeologist and shall be prepared per *Archaeological Resources Management Reports* (*ARMR*)*: Recommended Contents and Format* guidelines (OHP 1990).

5. Monitors shall maintain the flagging and staking to make sure that all ESAs are avoided and protected. This includes verification that the current conditions of known significant resources do not change as part of this Project. If protected sites exhibit physical changes, then protection measures need to be immediately changed and improved under direction from the BLM archaeologist. Earthmoving within 50 feet of a significant resource may be halted.

6. If individual artifacts are exposed during monitoring, they shall be mapped in situ with a submeter accuracy, global positioning system (GPS) unit, collected, analyzed in the consultant's laboratory, cataloged, and curated. A curation agreement shall be established with a curation facility that meets federal standards.

7. If a feature (cluster of in situ artifacts, intact hearth, historic foundation, etc.) is exposed during monitoring, construction activities shall be diverted briefly until the Monitoring Supervisor has had the opportunity to assess the find and make appropriate recommendations. Consultant recommendations shall be provided to BLM and in accordance with the *Discovery Treatment Plan* provided later in this document. Avoidance is preferred and, if a resource cannot be avoided, then it first must be evaluated. If the resource is significant, then avoidance must be considered. If a significant resource cannot be avoided, then treatment measures (including possibly data recovery) must be implemented prior to recommencing construction. The details of this process are also discussed in the *Discovery Treatment Plan* provided later in this document. During the field implementation of archaeological studies, earthmoving within 50 feet may be halted.

   After mitigation of site impacts are complete, and if additional cultural material is exposed by grading in the same site, additional hand-excavation will not be required unless the additional material represents a new kind of data not recovered during previous data recovery at that site. Such new data would consist of artifact classes and features not recovered during previous mitigation. Features may include hearths, refuse pits, and burials. Even if no additional hand-excavation is required, the newly exposed material shall be mapped and collected.

8. If human remains are encountered, a course of action following the requirements set forth in 43 CFR 10 and the BLM Native American Graves Protection and Repatriation Act (NAGPRA) as presented in the NAGPRA Plan of Action shall be followed. This includes stopping work in the exclusion area for a period of no more than 30 days while the consultation requirements of NAGPRA are completed. Work on the undertaking can proceed outside of the exclusion area. Should these BLM NAGPRA protocols not be followed, a violation of NAGPRA and the Archaeological Resources Protection Act (ARPA) may take place. The ARPA allows the government to assess civil fines and to proceed with criminal prosecution depending on the nature of the violation.
9. Notification Procedures

   When a potential discovery not involving human remains is made during construction monitoring, the cultural resources monitor shall temporarily halt or redirect the work at that location and create a temporary exclusion area (Table 1). The monitor shall then notify the on-site Native American monitor (if not present) if the find is prehistoric (or potentially prehistoric) and the Monitoring Supervisor, who shall inspect the find and perform an initial assessment. If the find appears to represent a potentially significant cultural resource, the Monitoring Supervisor shall notify BLM. BLM shall then notify the Construction Manager, who will issue a temporary stop work order for the location of the find. A list of contact information is provided in Appendix C.

   If human remains or fragmentary bones that are suspected to be human are encountered during construction activities, work at that location shall be suspended. The archaeological monitor shall notify BLM and the Native American monitor on-site (if not present at the discovery location) immediately. This notification will be the initial step in the consultation procedures under the NAGPRA. The remains shall be left in place and exclusionary fencing shall be placed in a 50-foot radius around the discovery. Decisions regarding additional identification procedures and the continuation or permanent suspension of work at the discovery location shall then be made by BLM.

Table 1 Discovery Notification Procedures

Resource Type	Definition (in a 25 m^2 area)	Procedure
Isolated find	Fewer than three artifacts	Monitor to record, photograph, map with GPS
Archaeological site	Three or more artifacts; feature	Monitor to redirect construction, contact Monitoring Supervisor, erect exclusionary flagging/fencing, and record; Monitoring Supervisor to assess

Potentially human remains		Monitor to redirect construction, and contact BLM, Native American monitor (if not present), and Monitoring Supervisor; erect exclusionary flagging/fencing

4.0 DISCOVERY PLAN

4.1 PLAN OF TREATMENT OF DISCOVERIES

This Discovery Plan addresses the actions to be taken should discoveries occur during Project implementation. Potential discoveries in the IVSP area are divided into two categories, each requiring distinct management procedures: treatment of previously unknown artifacts, features, site components, or sites; and treatment of human remains discoveries. The procedures to be followed should such discoveries be made during the treatment program or during Project implementation are reviewed below.

If human remains are encountered, the course of action will follow the requirements set forth in 43 CFR 10 and the BLM NAGPRA Protocols. This includes stopping work in the exclusion area while the consultation requirements of NAGPRA are completed. Work on the undertaking can proceed outside of the exclusion area. Should these BLM NAGPRA Protocols not be followed, a violation of the NAGPRA and ARPA may take place. The ARPA allows the government to assess civil fines and to proceed with criminal prosecution depending on the nature of the violation.

Whereas the protocols below apply to all discoveries, specific management and treatment measures may vary according to the resource type discovered, the discovery location within the Project area, and anticipated Project effects. Specific field and laboratory methods are presented in Appendix A.

MANAGEMENT OF PREVIOUSLY UNKNOWN SITES, SITE COMPONENTS, OR FEATURES

Previously unknown artifacts, features, site components, or even sites may be encountered during archaeological monitoring. The spatial distribution of features and their functional types are important aspects of the research design, both in terms of intrasite structure and spatial organization, and in the distribution of features associated with the desert cultural landscape. Some potential for buried remains occurs within depositional environments present within the APE.

Recovery and documentation of cultural materials will, at minimum, include mapping the discovery location and may also include one or more of the following: photographs; illustrations of artifacts, features, or soil profiles; surface artifact collection; and test or data recovery excavations. The procedures outlined below will be adhered to should there be archaeological discoveries during construction monitoring for the Project. A discussion of the disposition and

curation of recovered artifacts is presented later in the section titled *Data Management and Curation*.

Guidelines for the treatment of new discoveries within the Project area are as follows:

- The archaeological monitor shall have the authority to halt work in discovery vicinities and redirect heavy equipment away from the discovery site.
- All ground-disturbing activities that would adversely impact a newly discovered cultural resource shall be halted. The horizontal and vertical limits of the resource within the impact area shall be determined. The resource shall be protected by physical barriers and the presence of monitors to ensure that further disturbance to the resource is avoided and to minimize impacts.
- BLM shall apply the criteria for listing in the NRHP:
  - (A) It is associated with events that have made a significant contribution to the broad patterns of history and cultural heritage;
  - (B) It is associated with the lives of persons important in our past;
  - (C) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; and/or
  - (D) It has yielded, or may be likely to yield, information important in prehistory or history.

  Properties found eligible for the NRHP are assumed to be eligible for the CRHR.
- If the cultural resource is determined by BLM to be a historic property (eligible for the NRHP), consultation shall take place to determine the appropriate treatment measures.
- BLM shall consult with Native American groups or other interested parties regarding the treatment of the find.
- As needed, a data recovery plan shall be developed by the consultant under direction and in coordination with BLM and to recover the significant values contained by newly discovered resources. Recovered data shall be processed, analyzed, and reported concurrent with other sites addressed during the treatment program. Refer to the specific field and laboratory methods in Appendix A.
- If individual non-diagnostic artifacts are exposed during monitoring or construction, they shall be mapped in situ. If diagnostic artifacts are exposed, they shall be mapped using a sub-meter accuracy GPS unit, collected, analyzed in the consultant laboratory, catalogued, and curated.
- If a feature (e.g., cluster of in situ artifacts, intact hearth, or foundation) is exposed during monitoring, construction activities shall be diverted until the find can be assessed and appropriate recommendations made. If excavation is required, it shall be accomplished expediently. Features shall be exposed and recovered using standard excavation techniques,

with care taken to maintain the provenance of the feature as a distinct unit. The feature shall be photographed and mapped in place prior to recovery. Samples shall be recovered for special analyses (e.g., radiocarbon, macrobotanical, palynological, or faunal) as appropriate to the character of the feature. Artifacts collected shall be analyzed in the consultant's laboratory, cataloged, and temporarily curated.

- A determination shall be made as to whether a new discovery is part of an existing site or a previously unknown cultural resource. Based on that determination, either new Department of Parks and Recreation (DPR) forms will be created or the existing DPR forms shall be updated to include the discovery. The potential significance of newly discovered sites or site components shall be evaluated relative to the research design.
- If a new site or significant component of a previously recorded site is discovered, construction activities will be halted in the area until an assessment of the find can be made. If it is determined that the site has the potential to yield important data that can address research questions, a sample of the site area shall be hand-excavated using the standard archaeological procedures described in Appendix A. BLM shall be informed by the consultant as to the estimated time necessary for an NRHP/CRHR eligibility determination. The assessment shall include mapping the locations and elevations of new discoveries. To the extent possible, boundary definition, assessment of content and integrity, and assessment of eligibility shall be accomplished with shovel test pit (STP) excavations. At minimum, the evaluation shall include recording, excavating, and reporting major features or artifact concentrations uncovered, and recovery/curation of a sample of uncovered artifacts where practicable.
- Construction activities in the discovery area shall not resume until the site evaluation is completed. The consultant shall prepare a brief report of the findings and eligibility evaluation, and propose avoidance measures and provisions to minimize impacts specific to that discovery. This shall be submitted to BLM for review and concurrence. If further disturbance cannot be minimized, then the cultural resources contractor shall provide justification and recommendations for data recovery to BLM. If BLM determines that disturbance is justified, then recommendations for data recovery shall be reviewed by BLM for adequacy and to evaluate the cost of treatment versus the cost of Project redesign. Interested Native American community members shall be consulted if the resource contains a Native American context. Only after BLM review and approval of a site-specific data recovery plan shall such excavation be performed. Data recovery shall collect a representative sample of the deposits that would be destroyed.
- The discovery of human remains during Project implementation shall require special procedures, as discussed below.
- If additional cultural material is exposed by construction, after mitigation of site impacts has been performed per the Discovery Treatment Plan, additional hand-excavation will not be required unless the material represents a new type of data. Such new cultural material would consist of artifact classes and features not recovered in previous excavations. However, even if no additional excavation is required, the newly exposed material shall be mapped and collected.
- Discoveries and their treatment relative to the research shall be reported in the final monitoring report for the Project. A separate report of findings and interpretation relative to a research design shall be prepared if data recovery excavations are employed for mitigative site treatment.

MANAGEMENT AND TREATMENT OF HUMAN REMAINS

Human remains may be discovered in situ during the field excavation program, which includes the test unit excavations. Additionally, human remains may be discovered during the laboratory processing and analysis phases of the treatment program. Archaeological monitoring both within and outside site areas is also planned, during which isolated or disarticulated human remains may be uncovered. One of the objectives of archaeological monitoring is to identify such remains while they are still in place so they and their context can be managed in a manner that is sensitive to the Native American community or other ancestors and to address existing regulations.

If human remains are encountered, the course of action will follow the requirements set forth in 43 CFR 10 and the BLM NAGPRA Protocols as presented in the NAGRPA Plan of Action. This includes stopping work in the exclusion area for a period of no more than 30 days while the consultation requirements of the NAGPRA are completed. Work on the undertaking can proceed outside of an exclusion area defined by BLM. Should these BLM NAGPRA Protocols not be followed, a violation of the NAGPRA and ARPA may take place. The ARPA allows the government to assess civil fines and to proceed with criminal prosecution depending on the nature of the violation.

While it is hoped that human remains will not be encountered during the treatment program, the possibility exists that such a discovery can occur, and procedures are included herein to address such an event. When skeletal remains that may be human are encountered, the following steps will be taken:

- For Project construction activities (as described in the Monitoring Section), if definite or suspected human remains are encountered, the archaeological monitor shall halt work in the discovery vicinity and redirect heavy equipment away from the discovery site to avoid ground-disturbing activities that could adversely impact the remains. The monitor shall also immediately contact/notify the on-site Native American monitor, the consultant Monitoring Supervisor, and BLM. BLM shall then direct the procedures for identification and/or verification of the remains as human. The horizontal and vertical extent of occurrence of the remains within the impact area shall be determined. The remains shall be protected by physical barriers and the presence of monitors to ensure that further disturbance to the remains is avoided. Subsequent to verification of the remains, as previously indicated, the course of action shall follow the requirements set forth in 43 CFR 10 and the BLM NAGPRA Protocols.
- For archaeological investigations, activities in the discovery area shall cease and the field supervising archaeologist shall notify the on-site Native American monitor and the Principal Investigator, who shall notify BLM. As with a discovery during construction, BLM shall then

direct the procedures for the identification and/or verification of the remains as human. Subsequent to verification of the remains, as previously indicated, the course of action shall follow the requirements set forth in 43 CFR 10 and the BLM NAGPRA Protocols.

- Human remains shall be treated with respect and dignity, with care taken to limit disturbance and maintain the association of the remains with any accompanying funerary items and their physical setting. Archaeological investigations or Project development work shall not resume in the discovery area until the appropriate recovery and management actions have been completed.
- The specific location of the discovery shall be withheld from public disclosure, as will the location of any reburial site.
- No excavation of human remains shall be put on public display in any manner, nor photographed, except for the purpose of scientific documentation. No photographs of human remains shall be distributed to the public or published.

For laboratory situations, where small bone or fragments may be identified as sensitive, similar notification and management procedures to field discovery will be followed, and strict provenance controls will be maintained. As with the field, the initial step is expert identification which shall proceed as directed by the BLM. Subsequent to verification of the remains, the course of action will follow the requirements set forth in 43 CFR 10 and the BLM NAGPRA Protocols, including consultation with tribes and preparation of a written plan for management of the remains.

5.0 DATA MANAGEMENT AND CURATION

5.1 TECHNICAL REPORT PREPARATION AND DISSEMINATION

Reports regarding training, monitoring, consulting, evaluating, and data recovery (if necessary), will be responsive to contemporary professional standards. This will include the *Secretary of Interior's Standards for Archaeological Documentation* (NPS 1983).

A comprehensive technical report may be required that will present the results of monitoring, evaluation, and treatment programs completed in relation to the Imperial Valley Solar Project. The production and dissemination of the technical report is the final step in treatment. The consultant is responsible for technical report preparation, with BLM oversight and final document approval. The technical report and ancillary studies will also be responsive to contemporary professional standards and consistent with *ARMR* (OHP 1990). Precise locational data may be provided in a separate appendix if it appears that its release could jeopardize archaeological sites.

The draft report(s) will contain cultural background; the results of Native American consultation; a description of the physical environment; research design, methods, and results sections; and a discussion of meaning (interpretation). Results of laboratory and specialized analyses will be given along with a discussion of spatial and temporal distributions, as appropriate to the individual report. At a minimum, final technical report(s) resulting from actions pursuant to this treatment plan will be provided by BLM to the South Coastal Information Center.

5.2 CURATION IN PERPETUITY

Following completion of cataloging and analytical procedures, Project collections will be prepared for permanent curation according to Smithsonian Institution guidelines and the requirements of the permanent curatorial facility. Materials to be curated include archaeological specimens and samples, site catalogs, field notes, field and analysis forms, feature and burial records, maps, plans, profile drawings, photo logs, photographic negatives, consultants' reports or special studies, and two copies of the final technical report. These materials will be curated at a facility that meets federal standards as promulgated at 36 CFR Part 79, *Curation of Federally Owned and Administered Archaeological Collections*.

REFERENCES

National Park Service (NPS)

1983 *Secretary of Interior's Standards for Archeological Documentation*. Washington, DC.

Office of Historic Preservation (OHP)

1990 *Archaeological Resources Management Report (ARMR): Recommended Contents and Format*. California Office of historic Preservation, Sacramento, CA.

APPENDIX A

SPECIFIC FIELD AND ANALYTICAL METHODS

ATTACHMENT A

SPECIFIC FIELD AND ANALYTICAL METHODS

Standard archaeological field, laboratory, and analysis methods that are consistent with current scientific and regional procedures will be used for the Imperial Valley Solar Project (IVSP or Project). This appendix addresses newly discovered sites that cannot be avoided by Project construction. Upon unanticipated discovery of intact cultural deposits, including features, these resources will be evaluated for listing in the National Register of Historic Places (NRHP) and/or the California Register of Historic Resources (CRHR).

Strategies will include controlled excavations, which consist primarily of Shovel Test Pits (STPs) that measure 0.5 by 1 meter (m), Test Excavation Units (TEUs) that measure 1 by 1 m, and/or larger block exposures that are hand-excavated with strict provenance controls using shovels, trowels, picks, and other tools. Supervised mechanical excavations may also be used, where appropriate, as well as remote sensing surveys.

Archaeological resources are normally determined eligible under NRHP Criterion D or CRHR Criterion 4, potential for important information. The resource must clearly demonstrate the potential and must exhibit the requisite physical integrity. The presence of diagnostic (datable) material and/or artifacts allowing the opportunity to date the site is imperative. Resources in disturbed contexts with no opportunity to be dated are often ineligible for the NRHP. If a resource is eligible and cannot be avoided by construction, the Bureau of Land Management (BLM) may decide to conduct data recovery and excavate a representative sample of the site employing the excavation strategies below.

FIELD METHODS

SURFACE SCRAPES

Surface scrapes are employed in areas of dense vegetation and involve scraping the ground with a shovel in large units to expose the surface for examination.

SHOVEL TEST PITS

STPs are preliminary tests for the presence of subsurface cultural deposits. It is expected that they will be used to delineate the boundaries of previously unknown sites, site components, or large diffuse features, should they be discovered during archaeological fieldwork or monitoring. STPs normally measure approximately 35 centimeters (cm) in diameter and are excavated in incremental 10-cm levels. The number and distribution of STPs depend on the size and geomorphic setting of each site. Each STP is excavated to bedrock or to soil strata that are clearly not of a culturally relevant age, with the ground surface serving as reference for depth

measurements. Excavated soil is reduced by dry-screening through ⅛-inch mesh hardware cloth, and recovered artifacts are collected and bagged by level, with reference numbers assigned and typical labeling information provided. Stockpiled dirt is returned to the STP upon completion; shovel test forms are completed for each unit.

TEST EXCAVATION UNITS

Manually excavated TEUs afford larger subsurface exposures than STPs and are used to recover representative samples of subsurface artifacts with controlled depth information. In general, TEUs measure 0.5 square meter (0.5 by 1 m) to 4 square meters (2 by 2 m); however, dimensions may vary according to circumstances, and adjacent units may be excavated in various configurations to develop block exposures. For example, site depth is a determinant for defining unit size. Unit depths greater than 1.5 m (5 feet) require the opening of an adjacent unit for health and safety issues, as well as for facility of excavation and recording. Also, additional exploration and exposure of a feature that extends beyond the boundaries of a TEU may be necessary. Excavation proceeds by 10-cm arbitrary contour levels unless natural or cultural strata are present; then, levels are subdivided to maintain these distinctions. Contour levels are maintained by measuring depth from the existing surface. An excavation level record is completed for each level. As appropriate, other records are completed, including plan views, profiles of test units, and descriptions of features. In addition, test units are selectively photographed during excavation to show artifact and/or stratigraphic associations, profiles, features, or other data.

Test units will be numbered by a sequential designation. The highest corner of each test pit is designated the unit's datum for elevation control. This corner will be marked with a pin flag labeled with the test unit's number. Depths of units are determined by empirical site stratigraphy. In alluvial or aeolian deposits, units can range up to several meters below the surface of the site. Whenever possible, units will be excavated to bedrock or to sediments that are clearly not of a culturally relevant age.

Hand-excavation of test units will normally be accomplished using shovels, trowels, breaker bars, and picks, depending on the composition of the soil and the nature of the cultural deposits. In feature contexts, trowels, brushes, and other small implements may be most appropriate. Special methods are used in the excavation of features, including sample collections suitable for special study. Charcoal (for radiocarbon assay) is collected when present. Depending on excavation context and research design issues, other samples that may be collected include bulk sediment for humate analysis and/or chemical analysis, pollen and/or phytolith, and flotation. Excavated soils are typically dry-screened through ⅛-inch mesh to reduce sediment volume and bagged and tagged as previously described.

AUGER EXCAVATION

Auger excavations are used to define soil stratigraphy, to locate bedrock, or to test for the presence of cultural remains at greater depth, including potentially buried deposits. With extension handles, this procedure can accurately locate and trace soil strata at depths of several meters. Augers can be placed in the bottom of STPs or other excavation units to further test for depth of deposit when additional excavation is otherwise impossible. However, the small volume of most auger borings limits the usefulness of this procedure for mapping the absence of subsurface cultural deposits with certainty. Auger excavations may or may not proceed using arbitrary levels (e.g., 10 cm or 20 cm), depending on the circumstances. Augered soils are typically screened through ⅛-inch mesh to recover cultural remains. On each site, auger tests are sequentially numbered, and recovered materials are bagged, labeled, transported, and processed in the same manner as other excavated materials. Reference log numbers are assigned to each provenance unit, and an auger form is completed. Auger test locations are plotted on the site plan views, and auger holes are covered upon completion with the dirt available from the initial screening reduction.

TRENCHING

Where trenching is conducted, an archaeologist and/or geoarchaeologist will direct backhoe operation. The duties of this person include selecting trench locations and their dimensions, monitoring the backhoe while in operation, and examining profiles. Depths of trenches are determined by the site context. For safety, trenches deeper than 1.5 m (5 feet) should be double width or shored. This is an Occupational Safety & Health Administration (OSHA) requirement. Trench walls are photographed and profiled, and stratigraphic units are described. To facilitate accurate sketching, elevation-control stakes are placed at 20-m intervals along the excavated portions of the trench. Trench profiles will be cleaned and examined at least every 5 m. The depth of stratigraphic boundaries is measured from the surface, with strata boundaries extrapolated between mapping points. Standard sedimentary and soil variables are recorded for each stratum. Recorded variables may include (1) description of contacts; (2) soil color; (3) textures; (4) boulder and gravel content; (5) large clast angularity (gravel size and larger); (6) large clast lithology; (7) soil structure, consistency, and plasticity; (8) root content and form; (9) sedimentary structure; (10) disturbance; and (11) organic content. Standard data on soils and sediments are recorded on the Soil Worksheet. As warranted, diagnostic artifacts and special samples may be collected from trench profiles. These collections will be point provenanced and assigned individual numbers.

Back dirt from the trenches will be sample screened at no less than 5-m intervals through ⅛-inch mesh. All features encountered will be exposed by hand. Features will be recorded and mapped on feature forms and photographically documented.

Each trench is marked with a wooden stake labeled with the trench designation. A master list of trenches with their locations, dimensions, and general observations is maintained, and trench locations are included on the site map. Backfilling of trenches is done by backhoe after manual excavations on a site are complete. The wooden stakes marking trench locations will be left in place for mapping.

FEATURE EXCAVATION

Features will be exposed in plain view. If necessary, additional excavation units will be opened as a block. All feature components will be mapped and photographed. If appropriate, the feature will be bisected and profiled, and soil samples will be collected to allow the studies discussed below.

GEOMORPHOLOGY

The use of geomorphology in archaeological excavations has increased substantially over the last decade. A trained geomorphologist/geoarchaeologist will determine and discuss landform context and site formation processes, including the issue of disturbance, and will profile select trenches and excavation units. The geomorphologist will also help determine where trenches should be placed to obtain the best cross-section of the site stratigraphy.

REMOTE SENSING

There are several types of remote sensing techniques that are useful to locate buried features and other anomalies on archaeological sites. These techniques are noninvasive and, when used in combination with hand-excavation, can greatly increase the efficiency of the latter by indicating areas worthy of investigation. Such techniques may be employed in circumstances where they can provide information not otherwise obtainable.

Ground Penetrating Radar (GPR). GPR is a geophysical method that has been developed over the past 30 years for shallow, high-resolution, subsurface investigations of the ground. GPR uses high-frequency pulsed electromagnetic waves to acquire subsurface information. Energy is propagated downward into the ground and is reflected back to the surface from boundaries where there are electrical property contrasts. GPR is a method that is commonly used for environmental, engineering, archeological, and other shallow investigations.).

Resistivity Survey. Another method, soil-resistivity survey, uses an electrical current introduced into the soil to locate anomalies. The ease or difficulty with which this current flows within the soil is then measured, and resistant areas are mapped. Results are useful when the resistivity contrasts between the archaeological record and the surrounding soil matrix.

Magnetic-Field Gradient Survey. Magnetic-field gradient survey consists of mapping deviations from the uniformity of Earth's magnetic field.. This technique is based on the magnetic field gradient being consistently zero, with deviations from this uniformity indicating archaeological features. Magnetic-field gradient surveys are particularly useful in detecting remnant magnetization that originates from heating iron oxides found in most soils in features such as hearths, fire pits, and ceramic concentrations.

MAPPING METHODS

Point Provenance Method. The point provenance method is employed to map the locations of diagnostic artifacts, tools, and other items or significant features prior to collection or excavation, or to collect the surface of low-density sites. The Global Positioning System (GPS) units with sub-meter accuracy are used for point provenance mapping of monitoring finds, surface scatters of artifacts, and collecting isolated diagnostic cultural materials. Monitors and field mapping personnel will use hand-held GPS units to map finds and to collect surface materials. Materials collected will be assigned sequential reference numbers that are logged on GPS recording forms for the location of each item or feature documented. The reference number is used to prepare a site or item location map and in the presentation of tabled data and artifact illustrations provided in the technical report.

Electronic Distance Measurer Method. During testing and data-recovery program, where provenance accuracy is critical for meaningful interpretation of cultural resources, the electronic distance measurer (EDM) method is typically used. The EDM method provides precise locational data in three dimensions. Because each mapping shot records the vertical azimuth, distance, and bearing, site topography can also be easily documented. To make maximum use of the precision afforded by this mapping technique, data are linked to AutoCAD and geographic information system (GIS) software data and downloaded or entered into an electronic mapping program for output. When the mapping data are plotted, the result is a precise scaled map.

An electronic total station is used for the EDM method, and a single primary mapping station is located in a central area of each property. Sub-data are established, as needed, especially on large sites or those with diverse topography. Stations are established with a well-embedded 9-inch-long nail, and demarked with black-and-pink striped surveyor's flagging. Station labeling includes the station number, site number (permanent designation if available, field number if not), research organization, and date. At large properties, secondary mapping data can be established, keyed to the primary datum, and properly labeled to facilitate recordation of cultural, topographic, and other data.

PHOTOGRAPHS AND ILLUSTRATIONS

Photographic documentation will include color digital photographs taken throughout the monitoring program and during all phases of individual site treatment activities such as testing and/or data recovery. Photographs taken during monitoring will used to document the activities monitored and the initial recordation of any discoveries or finds made. During testing and/or data recovery activities, photographs will include site overviews to show a site's physiographic and environmental setting, hand and mechanical excavations in action, and features and unit wall profiles. Photographs will be recorded on standard photographic logs identifying the frame, day, month, year, time, subject, and direction of view. Illustrative photographs will be included in the draft technical report.

Sketches or illustrations of unique features and artifacts are also beneficial in depicting details that are sometimes not evident in photographs. These techniques will be used, as determined necessary, and also included in the draft technical report.

CATALOGING AND ANALYTICAL METHODS

Collected artifacts will be inventoried and organized during and following fieldwork and prior to sorting and detailed attribute recording. The Reference Number Log (bucket/bag log) that is completed in the field is submitted to the laboratory with the bagged and labeled residues. The Reference Number Log is the primary inventory document and serves as the list against which artifacts and forms are crosschecked when transferred to the laboratory. Checking assures that (1) collections and data forms are present; (2) the provenance designations (e.g., site, test unit, depth) on each collection bag match those on the data forms and in the Reference Number Log; and (3) other required data sheets (e.g., feature records or special sample forms) are present, accurate, and complete. Data sheets with incomplete or unclear information and those that contradict other data sheets for the same property are returned to the appropriate field personnel (e.g., crew chief, field monitor) for correction.

CLEANING

Prior to cataloging and analysis tasks, most artifacts and specimens will be cleaned and stabilized, either at the wet-screening station or in the laboratory. Specimens that will *not* be cleaned include (1) wood or fiber; (2) fragile/friable bone, antler, or shell; (3) selected groundstone (for possible pollen wash or immunological analysis); (4) selected lithic tools (for blood residue analysis); and (5) possible baked clay or ceramic items.

For other artifacts, adhering dirt will be removed by washing or dry brushing. Flaked stone, groundstone, and shell are typically cleaned using water. Depending on its condition, bone may be either dry brushed or quickly immersed in water, gently brushed, and then quickly rinsed. To

prevent accidental contamination between provenances, artifacts from a single provenance will be cleaned and/or stabilized at the same time, and washing should proceed one unit at a time. Once dry, individual artifacts from each provenance will be placed in clean polyethylene bags along with identification tags produced on archivally stable cardstock. Radiocarbon samples will be placed in either aluminum foil pouches or in glass vials, which will then be placed in clean polyethylene bags. Flotation, pollen, sediment, and other bulk samples will be left in double polyethylene bags until they are processed.

SORTING AND CATALOGING

Sorting and cataloging methods will follow the requirements of the curation standards for a facility that will meet minimum federal requirements as published in 36 Code of Federal Regulations (CFR) Part 79. Specific curation requirements at the facility selected to curate the Project materials will also be ascertained and followed.

Recovered data are separated hierarchically into material class, artifact type, material, quantity, and weight. Material class separates artifacts and other data into such major categories as stone, ceramic, bone, shell, glass, metal, and others. The second ordering variable (artifact type) places the artifact into a category such as debitage, biface, mano, or awl. Material is sorted by toolstone (e.g., chalcedony, obsidian, volcanic, quartzite, or granite), bone, shell, etc.

This information is recorded on the master catalog form with the following additional data: count, weight, locus, unit coordinates, depth/level, unit type, unit designation, and curation box number. Stone, bone, and shell artifacts are counted; unmodified shell, bone, and charcoal are not. Special samples and ecological data (ecofacts) are recorded on the same catalog form, with the same information required for artifacts. Where appropriate, feature number, sampling stratum designation, soil stratum (stratigraphic) designation, and screening mesh size are also included for each catalog entry. Attributes for cores, debitage, flaked stone tools, groundstone, bifaces or projectile points, and prehistoric ceramics are recorded on the corresponding sub- or detail catalogs.

After the information has been recorded, an artifact is given a three-part catalog number, with each part separated by a dash. The first part of the catalog number is the site number, the second part is the year excavated, and the third part is assigned consecutively in the order of entry. After assigning catalog numbers, the artifacts will be placed in clean polyethylene bags with the catalog number and provenance written with archival-quality black ink markers. Identification tags will be generated on adhesive archival-quality labels and applied to the interior of the bags. The tags will include, at a minimum, catalog number, artifact type, and provenance information. Each tag will show the catalog number along with other pertinent

information, such as site number and selected provenance information. Bagged artifacts are stored in 6-inch-square boxes, which are incorporated into the temporary boxing system. The catalog will be entered into the computerized data management system for ease in sorting and manipulating data within and between sites.

TEMPORARY CURATION METHODS

Processed artifacts will be physically organized by artifact type and grouped using archival bags and boxes. The boxes will be temporarily stored at the AECOM processing facility until transfer to the designated curation facility. The boxing system is set up by site, class, and project number. After cataloging, the artifacts are placed in appropriately sized boxes. These boxes will be labeled with the box number and the item type (e.g., debitage, groundstone, bone, soil samples). Smaller archival-quality boxes or plastic film canisters may be used for small or unusual artifacts that need further protection. The boxed artifacts are then placed in a 12- by 15- by 10-inch archival banker's box. The boxes are recorded on an Inventory Spread Sheet.

For a discussion of long-term curation and artifact disposition, refer to the chapter *Data Management and Curation*.

ARTIFACT AND ECOFACT ANALYSES METHODS

Following initial processing and interim curation, artifact and sample analyses will proceed. The recovered chipped and groundstone assemblages, bone and shell artifacts, shell and faunal assemblages, and other items will be subject to a variety of morphological, functional, technological, and typological analyses as appropriate to the data class and research goals. Brief overviews of standard analysis methods are provided in the following sections.

Chipped Stone. The analysis of chipped stone items is directed toward developing classes (and types) of artifacts that are based on morphological, functional, and technological attributes.

Bifaces. Finished bifacial tools include such formal items as points, knives, and drills. The trajectory of biface reduction yields progressively smaller flakes and an objective piece that becomes thinner and takes on a planned form. The objective piece can include the original cobble/core or any detached flake modified using the bifacial strategy. At any point in the production sequence, an incomplete or broken biface can be used as a tool. Bifaces are classified according to the stage of manufacture represented. Biface reduction/production is recognized as a continuum, and the stages reflect arbitrary divisions within this continuum. Biface reduction can be performed on flakes, cobbles, or split cobbles, and can result in cores, tools, and rejected items.

The following data will be recorded for analyzed bifaces: manufacturing stage; lithic material; color, condition, and portion present; overall shape; base shape; transverse cross-section; longitudinal cross-section; and maximum dimensions (length, width, and thickness). The stages of biface manufacture include the following:

- *Stage 1: Edging.* Deep and wide cortical removals originate from natural lateral surfaces. Twenty percent or more of the cortex is retained. The cross-section is irregular or blocky. The width-to-thickness ratio is greater than 3:1.
- *Stage 2: Primary Thinning.* Primary thinning includes second-row and some third-row flaking, loss of natural surface platform angles, prepared platforms, straightened edges, and the most prominent masses and ridges removed. Minimal cortex is retained by the end of Stage 2. The biface begins to form an ovate shape, but the cross-section is rectangular, trapezoidal, or very thick lenticular. The width-to-thickness ratio is less than 3:1.
- *Stage 3: Secondary Thinning.* Overlapping flake scars form opposing lateral margins, no cortex remains, and the biface assumes the desired shape. The cross-section is becoming more lenticular, and the width-to-thickness ratio is about 4:1. Often, change to soft hammer percussion techniques takes place during this stage.
- *Stage 4: Shaping to Preform Tool.* Shaping results in regular flake removals and uniform lateral edges. The cross-section is very lenticular, and optimal width-to-thickness ratios are reached (between 4:1 and 5:1). Optionally, a change to pressure flaking may be made for tool shaping.
- *Stage 5: Finishing.* The preform is finished by notching or fluting, basal grinding, or minor retouch and shaping, if necessary, accomplished through pressure flaking. Stage 5 bifaces can be further subdivided into morphological types.
- *Stage 6: Tool Maintenance and Resharpening.* Continued use of the tool results in dulled edges. Resharpening by pressure flaking reduces the size of the tool and produces a characteristic S-shaped edge cross-section.

Projectile Points. Projectile points are finished bifaces and are a morphologic variation of this chipped stone category. Points exhibit a wide range of styles that are chronologically and culturally diagnostic and are, therefore, treated in greater detail. Typological analysis of projectile points provides diagnostic artifact characteristics to the items and increases their importance for chronological, settlement, subsistence, and technological research.

Projectile points are well-shaped (although not always symmetrical) thin bifaces with uniform cross-sections, regular and non-sinuous edges, little to no cortex, and minute edge alteration and retouch. They often have a deliberately prepared haft element oriented near the center of one end. From the distal to proximal ends, attributes of points include the tip, blade, and stem, but reflect considerable morphological variability in tip form, blade edges,

shoulder/barb configurations, notch location and orientation, stem shape, tang morphology, and base configuration.

The attribute stage of analysis recognizes three subclasses: “dart” points/shafted knives, “arrow” points, and indeterminate points. Points are further classified into named types (where possible). The attributes recorded for projectile points include lithic material, condition and portion present, blade edge form, blade shape, base shape, shoulder form, stem form, presence of serration, presence of basal notching, presence of side notching, cross-section, actual maximum dimensions (length, width, and thickness), length at longitudinal axis, actual width, position of maximum width, maximum blade width, basal width, maximum stem width, position of maximum stem width, shoulder height, proximal shoulder angle, distal shoulder angle, notch opening, side notch width, basal notch width, side notch depth, and basal notch depth.

Cores. This class of artifacts refers to bulky objective pieces used in the preparation of chipped stone tools. Most of these items are pieces representing a wide range of lithic reduction strategies, with the main goal oriented toward testing the quality of material or producing large serviceable flakes suitable for use or for modification into formal tools. Cores can be minimally described by core type, maximum dimensions (length, width, and thickness), lithic material, total observable flake removals, and percentage of cortex.

Cores can be separated into the following categories:

- Test blocks largely reflect the morphology of the original cobble and have a high percentage of cortex. They are characterized by a minimum amount of flaking (usually fewer than five flake scars), which was used to assess the texture and knapping quality of the stone and to determine whether vugs or impurities are present. Test blocks tend to represent rejected materials (i.e., those excluded from tool production trajectories).
- Split cobble/pebbles are the result of splitting cobbles or pebbles into half sections for further reduction. A minimum number of flake scars may be present. The specimens are not shaped and have thick, irregular cross-sections approaching plano-convex. Cortex covers more than 50% of the dorsal surface. Some secondary flaking may occur around the perimeter of the split edge, but the modification has not substantially changed the morphology of the split sections. The edges may or may not be sinuous.
- Biface cores are virtually indistinguishable from Stage 1 and 2 bifaces, described previously.

- Unidirectional cores primarily have a single striking platform from which a series of flakes has been detached. The flake removal can reflect direct percussion or bipolar technique, but the vast majority of flakes should originate from the single platform.
- Bipolar cores resemble single platform cores, but differ in the existence of a second platform on the opposite end of the core. The orientation of flake removal is from both ends of the core along a single axis.
- Bidirectional cores are similar to bipolar cores, but differ in the location of the second striking platform. In bidirectional cores, the platforms are not in opposable locations.
- Multidirectional (also labeled amorphous or unpatterned cores) have multiple platforms and flake scar orientation that may either coincide with the ridges on the original cobble or lens geometry or utilize appropriate edge angles from previous flake scar removals. The flake scar removal patterning may appear haphazard and random.

Unifaces. Unifaces are shaped tools or incidentally shaped flakes or blades that have been retouched or display continuous modification along one or more edges of one face. Flakes with modification along different edges on alternate faces are also regarded as unifaces. Edge modification can occur on the dorsal or ventral surfaces. During analysis, unifaces will be typed according to existing morphological categories (e.g., keeled scraper, beaked scraper, or concave scraper). In addition, the following observations may be recorded for each specimen: material, shape, cross-section, longitudinal cross-section, condition, location of worked edge(s), maximum dimensions (length, width, and thickness), and edge angle. Unifaces can be subdivided into the following subclasses:

- Formally shaped unifaces are tools with extensive retouching that has substantially modified the morphology of the tool. The retouching consists of a continuous series of flake scars knapped from the edge and extend from at least one-quarter to the entire face of the tool. The tool morphology may or may not be symmetrical, but the modification is relatively extensive and clearly patterned.
- Informally shaped unifaces are tools with incidental edge modification or retouching not substantially modifying the outline morphology of the flake. These items are regarded as expedient tools selected for their natural morphology or edge characteristics and are believed to have been used for a limited number of tasks. The shape of the original flake is largely evident. Edge modification is restricted to a series of five or more continuous flake scars along the edge. Discontinuous nicks randomly occurring along the edge are not regarded as modified flake tools.

Debitage. This category of artifacts refers to unmodified, discarded knapping residues resulting from the production and maintenance of chipped stone tools. Represented are a wide range of remains, including complete and broken flakes, angular waste, and heat spalls and potlids from errors in heat treatment. The attributes recorded for debitage include lithic material, manufacturing stage, completeness, presence and percentage of cortex, evidence

of heat treatment, and size. Debitage generally can be defined within the following six categories:

- Core flakes have definable dorsal/ventral surfaces and predominantly unfaceted platforms with steep platform/dorsal edge angles. The dorsal surface flake scar patterns may have unidirectional or multidirectional orientations. Flake cross-sections may be thick, angular, and irregular. Cortex commonly occurs on platforms and/or dorsal faces of these specimens.
- Biface flakes have definable dorsal/ventral surfaces and predominantly faceted platforms, acute platform/dorsal edge angles, and dorsal surface flake scar patterns with mostly multidirectional orientations. Flake cross-sections tend to be thin and concave/convex. Cortex does not occur on platforms and is rarely present on dorsal faces of these specimens. Biface reduction may have resulted in cores or tools.
- Unidentified flakes are flakes or flake fragments that possess insufficient characteristics to be classified as either core or biface flakes. They have definable dorsal and ventral orientations, but platforms are generally absent. This subclass is a general "catch-all" category for non-diagnostic flakes.
- Blades are a special form of long, relatively thin flakes characterized by unidirectional flake scar patterns on the dorsal face and a length-to-width ratio in excess of 2:1.
- Angular waste consists of irregular pieces of knapping debris that do not possess sufficient morphological attributes to permit classification into a specific flake category. Most are angular and blocky without discernible platforms or dorsal/ventral surface orientations.
- Heat spalls and potlid flakes are derived from thermal damage and are morphologically distinct from knapping debitage. Heat spalls are often characterized by crazed exterior surfaces and sometimes thermally discolored lithic materials. Typically, the dorsal surface of heat spalled debris displays cortex or compression rings from previous flake removals. Potlids are plano-convex spalls, where the planar surface is the dorsal side and the convex surface is the ventral. Potlids and heat spalls are formed from different expansion/contraction of stone materials under extreme thermal conditions; they characteristically lack the compression rings of force. This type of debris is usually derived from failed attempts at heat treatment or accidental exposure to fire.

Because debitage is generally the most frequent artifact class on prehistoric sites, and because minimal additional key conclusions can be obtained using size data on numerous individual specimens, size sorting of debitage can be accomplished. Debitage analysis is also useful for determining whether heat treatment was a phase in tool production. Characteristic heat treatment attributes or damage such as differential luster and crazed surfaces will be recorded during debitage analysis.

Groundstone. Groundstone is defined as lithic material whose shape is modified by repeated friction of stone against stone, as opposed to chipping. Groundstone is recorded using simple

morphological and technological attributes based on size and shape. For groundstone specimens, type, lithic material, number of ground surfaces, and maximum measurements (length, width, thickness, and weight) are recorded. In addition, evidence of formal shaping, rejuvenation, secondary use, and the presence and distribution of peck marks, polish, and striations can be recorded.

Common groundstone artifacts include the following:

- Milling stones or metates are large, tabular pieces of stone that exhibit flat to concave ground surfaces on one or both faces. They served as the surface against which materials were ground. They are separated into slab, block, and amorphous forms based on thickness and cross-section. Those that have rectangular cross-sections and are 6 cm or less in thickness are termed slab milling stones. Those with rectangular cross-sections but are greater than 6 cm in thickness are termed block metates. Milling stones with irregular, long cross-sections, without consideration of their thickness measurements, are termed amorphous. Surfaces may be classified as Type A (planar) or Type B (concave).
- Handstones or manos are handheld grinding stones used to mill food grains or other items against a metate. Typically, they are slabs or cobbles of a size to fit in one or two hands and exhibit a flattened, ground surface on one or more of their faces. Type 1 manos include amorphous to subrectangular handstones with no indication of intentional shaping. Type 2 manos are those that have been shaped into a regularized form. This type is further subdivided on the basis of size into one-handed and two-handed varieties, with two-handed manos defined as those greater than 15 cm along their longest axis.
- Mortars are deeply concave stones in which material was ground and/or pounded. They may be either bowl or bedrock forms.
- Pestles are handheld grinding stones used to press against and into a mortar. They are typically long, cylindrical, and rounded at one or both ends.
- Discoidals/cogstones are thick circular items that served an unknown function, but are associated with the Milling Stone tradition in California archaeological contexts.
- Abrading stones show parallel striations oriented longitudinally (rather than transversely) on one or more faces. Battering may also be present.
- Pendants/gorgets are extensively ground on both surfaces and may have evidence of a biconically drilled hole.
- Unidentified groundstone are fragments that are too small to distinguish morphology or function. These have one or more ground/faceted surfaces, but the remaining portion is too small to infer artifact type.

Hammerstones. Typically, these artifacts are unmodified cobbles, initially reduced cores, or broken cores that exhibit battering on one or more edges. Three subclasses may be defined, two indicating the state of reduction of the artifact and the third indicating the degree of wear. The first subclass includes cobbles that lack signs of modification except for obvious battering at one

or more points on the cobble surface. The second subclass is cores that show battering on one or more previously flaked edges. The third subclass is pecking stones: pebbles or cobbles with lighter and more localized wear, often on a pointed projection of the cobble. For these specimens, lithic material, number of modified surfaces, and maximum measurements (length, width, thickness, and weight) can be recorded.

FAUNAL ANALYSES

A minimum number of individuals indexed will be developed for the vertebrate sample. The purpose of vertebrate faunal analysis is twofold: (1) to identify the variety of fauna present in the local environment over a long period of time, and (2) to identify the species of animals and birds that were included in the human diet, and their ratios diachronically. Both aspects—environmental change and subsistence base—are integral to understanding prehistoric adaptations and historic uses of the area. Special attention to the possibility of faunal remains related to the Anza expedition will be included in the analysis.

SPECIAL STUDIES

Special studies to be completed for the treatment program, as data facilitate, include the following:

- *Radiometric Analysis.* Selected charcoal and shell samples and other remains containing carbon (e.g., organics and bone) from key contexts will be submitted for radiocarbon assay. Approximately 10 samples will be submitted to establish the chronology of paleolandscapes for the paleoenvironmental reconstruction historic context, and another 10 will be submitted to date the chronology of sites and site components should sufficient data be recovered during the treatment program.
- *Obsidian Sourcing Analyses and Hydration.* Obsidian sourcing analysis is used for providing an idea of the regional exchange system within which prehistoric site occupants operated. Obsidian hydration analysis by source is useful for assigning relative chronological ages to the sites and associated materials.
- *Flotation, Pedological, and Chemical Analyses of Sediments.* Flotation analysis of cultural features, including subsequent macrobotanical identification, as necessary, is an important aspect of the evaluation program. Data can be used to address subsistence, site function, seasonality of occupation, internal site structure, and settlement type. Pedological and chemical analyses are useful for geomorphic studies, paleoenvironmental reconstructions, and postformation processes.
- *Ceramic Analyses.* Ceramic thin sectioning (sourcing).
- *Other Analyses and Assays.* Other types of artifact analyses and sample assays may be performed if sufficient data are recovered during the treatment program. These include (1) blood residue (immunological) analysis of selected lithic tools, (2) microscopic use/wear analysis of the edges of selected lithic tools, and (3) stable carbon isotope assay of bone samples from various taxa.

ATTACHMENT B

DAILY MONITORING LOG

IMPERIAL VALLEY SOLAR PROJECT
DAILY ARCHAEOLOGICAL MONITORING LOG

DATE:

ARCHAEOLOGICAL MONITOR: _____

FACILITY: _____

ARRIVAL: _____ **LUNCH:**_____ **DEPARTURE:** _____

PROJECT AREA(S): (Location**)**_____

_____

_____

TYPE OF WORK AND EQUIPMENT: _____

_____

SUMMARY OF CONSTRUCTION ACTIVITIES PERFORMED: _____

_____

_____

MONITORING ACTIVITIES PERFORMED (e.g., protection of ESA)**:** _____

_____

_____

_____

CULTURAL RESOURCES PRESENT: _____

_____

_____

NATIVE AMERICAN MONITOR (If present):_____

NON-COMPLIANCE: _____

Use additional sheet if needed

_____

COMMENTS: _____

_____

_____

LOG FILED WITH MONITORING SUPERVISOR: _____

ATTACHMENT C

CONTACT LIST

CONTACT LIST

AFFILIATION **NAME**
TELEPHONE **EMAIL**

Bureau of Land Management Cultural Resources

California Energy Commission

Tessera

Construction Manager

Monitoring Supervisor

Principal Investigator

Imperial County Coroner

DRAFT

APPENDIX K: DRAFT NAGPRA PLAN OF ACTION

DRAFT

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NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT PLAN OF ACTION:

**A WRITTEN PLAN OF ACTION
FOR THE TREATMENT OF
INTENTIONALLY EXCAVATED OR INADVERTENTLY DISCOVERED
HUMAN REMAINS, FUNERARY OBJECTS, SACRED OBJECTS,
OR OBJECTS OF CULTURAL PATRIMONY
FOR THE IMPERIAL VALLEY SOLAR PROJECT IN CALIFORNIA DESERT DISTRICT OF THE
BUREAU OF LAND MANAGEMENT CALIFORNIA**

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August 13, 2010

DRAFT

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A Upon The Discovery of Human Remains, Funerary Objects, Sacred Objects, or Objects of Cultural Patrimony

B List of Native American Tribal Contacts

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Introduction

This Plan of Action (POA) describes the procedures for the treatment and disposition of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony (hereinafter, cultural items) for inadvertent discoveries during construction of the Imperial Valley Solar Project (IVSP or Project) located in the California Desert District (CDD) of the Bureau of Land Management (BLM), California. This POA complies with the requirements of the Native American Graves Protection and Repatriation Act (NAGPRA), 25 U.S. Code (USC) 3001 et seq. and its implementing regulations as set forth in 43 Code of Federal Regulations (CFR) Part 10 (specifically §10.5[e]), and the Archaeological Resources Protection Act (ARPA), 16 USC 470aa-mm., with its implementing regulations (43 CFR Part 7).

Planned Action

The IVSP would construct a 750-megawatt (MW) solar energy plant on approximately 6,500 acres of public lands in California administered by BLM CDD and the El Centro Field Office. The Project would use existing roads and construct new roads in the Project area.

The Project is located in western Imperial County, California, immediately east of the town of Ocotillo, west of the town of Seeley, and north and south of Interstate 8 (I-8). The Project will use the SunCatcher technology of Stirling Energy Services. Each SunCatcher consists of a 25-kilowatt solar power electric-generating system. The system is designed to track the sun automatically and to focus solar energy onto a Power Conversion Unit, which generates electricity. The system consists of an approximate 38-foot-high by 40-foot-wide solar concentrator dish that supports an array of curved glass mirror facets. The 300-MW Phase I of the Project will consist of approximately 12,000 SunCatchers. The 450-MW Phase II portion of the Project will include approximately 18,000 SunCatchers.

The Project will include the construction of a new 230-kilovolt (kV) substation approximately in the center of the Project. A Main Services Complex, where key buildings and parking areas will be located, will be constructed at the northeastern end of the Phase I Project. Main roads will be constructed with a combination of roadway dips and elevated sections across the dry washes on the Project. The full Phase II expansion of the Project will require the construction of the 500-kV Sunrise Powerlink transmission line that San Diego Gas & Electric (SDG&E) has proposed. A 230-kV transmission line that will be built for Phase I will parallel the current transmission line corridor for the Southwest Powerlink transmission line within the existing right-of-way (ROW). The main entry for truck traffic to the Project during construction will be from I-8 to the Project entrance on Evan Hewes Highway. During Project operation, the secondary and emergency access will be from Dunaway Road.

Consultations

Based on previous consultation, the Campo Band of Kumeyaay Indians, the Cocopah Indian Tribe, the Fort Yuma Quechan Indian Tribe, the Ewiiaapaayp Band of Kumeyaay Indians, the Jamul Indian Village, the Kwaaymii Laguna Band of Indians, the La Posta Band of Kumeyaay

Indians, the Manzanita Band of Kumeyaay Indians, the San Pasqual Band of Diegueno Indians, and the Santa Ysabel Band of Diegueno Indians (tribes) have been contacted for the IVSP and have indicated that the project is within ancestral territory. Additionally, sensitive areas have been identified in association with relic shorelines of ancient Lake Cahuilla. Should remains subject to NAGPRA be discovered during the course of construction, BLM will continue to consult with the interested tribes. These groups have been consulted with and have received a copy of this plan.

BLM's duty to consult with tribes does not include any obligation, implied or expressed, to fund or pay tribes or tribal members for their participation to consult or confer with BLM.

1) Objects to be considered as cultural items:

For the purpose of this plan, the objects considered as cultural items are defined in 43 CFR 10.2 (d) and are as follows:

1. *Human remains* means the physical remains of a human body of a person of Native American ancestry. The term does not include remains or portions of remains that may reasonably be determined to have been freely given or naturally shed by the individual from whose body they were obtained, such as hair made into ropes or nets or individual teeth. For the purposes of determining cultural affiliation, human remains incorporated into a funerary object, sacred object, or object of cultural patrimony, as defined below, must be considered as part of that item (43 CFR 10.2[d][1]).

2. *Funerary objects* means items that, as part of the death rite or ceremony of a culture, are reasonably believed to have been placed intentionally at the time of death or later with or near individual human remains. Funerary objects must be identified by a preponderance of evidence as having been removed from a specific burial site of an individual affiliated with a particular Indian tribe or Native Hawaiian organization, or as being related to specific individuals or families or to known human remains. The term *burial site* means any natural or prepared physical location, whether originally below, on, or above the ground, into which, as part of the death rite or ceremony of a culture, individual human remains were deposited, and includes rock cairns or pyres that do not fall within the ordinary definition of a gravesite. For purposes of completing the summary requirements in §10.8 and the inventory requirements of §10.9 (43 CFR 10.2[d][2]), funerary objects can be further defined as follows:

   (i) Associated funerary objects means those funerary objects for which the human remains with which they were placed intentionally are also in the possession or control of a museum or Federal agency. Associated funerary objects also means those funerary objects that were made exclusively for burial purposes or to contain human remains.

   (ii) Unassociated funerary objects means those funerary objects for which the human remains with which they were placed intentionally are not in the possession or control of a museum or Federal agency. Objects that were displayed with

individual human remains as part of a death rite or ceremony of a culture and subsequently returned or distributed according to traditional custom to living descendants or other individuals are not considered unassociated funerary objects.

Funerary objects found in prehistoric burials in the Colorado Desert include, but are not limited to, arrowheads, shell beads, pendants, ceramic pots, and arrow shaft straighteners.

3. *Sacred objects* means items that are specific ceremonial objects needed by traditional Native American religious leaders for the practice of traditional Native American religions by their present-day adherents. While many items, from ancient pottery sherds to arrowheads, might be imbued with sacredness in the eyes of an individual, these regulations are specifically limited to objects that were devoted to a traditional Native American religious ceremony or ritual and that have religious significance or function in the continued observance or renewal of such ceremony. *Traditional religious leader* means a person who is recognized by members of an Indian tribe or Native Hawaiian organization (43 CFR 10.2[d][3]) as follows:

   (i) Being responsible for performing cultural duties relating to the ceremonial or religious traditions of that Indian tribe or Native Hawaiian organization, or

   (ii) Exercising a leadership role in an Indian tribe or Native Hawaiian organization based on the tribe or organization's cultural, ceremonial, or religious practices.

4. *Objects of cultural patrimony* means items having ongoing historical, traditional, or cultural importance central to the Indian tribe itself, rather than property owned by an individual tribal or organization member. These objects are of such central importance that they may not be alienated, appropriated, or conveyed by an individual tribal or organization member. Such objects must have been considered inalienable by the culturally affiliated Indian tribe or Native Hawaiian organization at the time the object was separated from the group (43 CFR 10.2[d][4]).

2) Specific information to determine custody:

In the event of the removal of NAGPRA material on Federal lands, the following specific information will be used to determine custody:

1. Information provided by a lineal descendant(s) that can trace his or her direct relationship, without interruption, between themselves and the deceased by means of the traditional kinship system of the appropriate Indian tribe (43 CFR 10.2[b] and 43 CFR 10.14[b]).

2. Information provided by a Native American tribe, people, or culture that is indigenous to the United States and that can establish cultural affiliation by means of a relationship of shared group identity that can reasonably be traced historically or prehistorically between members of a present day Indian tribe and an identifiable earlier group (25 USC 3001[9], 43 CFR 10.2[e] and 43 CFR 10.14[c]).

3. The Federal agency official will determine cultural affiliation between a present-day individual or Indian tribe by a preponderance of evidence based on geographical, kinship, biological, archaeological, anthropological, linguistic, folkloric, oral traditional, historical, or other relevant information or expert opinion (25 USC 3005 [a][4], 43 CFR 10.2[e], and 43 CFR 10.14[e]).

4. Priority order of custody of the cultural materials will be consistent with 43 CFR 10.6 (a) as follows:

    (1) In the case of human remains and associated funerary objects, in the lineal descendant of the deceased individual as determined pursuant to Sec. 10.14 (b);

    (2) In cases where a lineal descendant cannot be ascertained or no claim is made, and with respect to unassociated funerary objects, sacred objects, and objects of cultural patrimony:

        i. In the Indian tribe on whose tribal land the cultural items were excavated;

        ii. In the Indian tribe that has the closest cultural affiliation with the cultural items as determined pursuant to Sec. 10.14 (c); or

        iii. In circumstances in which the cultural affiliation of the cultural items cannot be ascertained, BLM is unable to prove a right of possession as defined at 43 CFR 10.10(a)(2), and the materials were excavated or removed from Federal land that is recognized by a final judgment of the Indian Claims Commission or the United States Court of Claims as the aboriginal land of an Indian tribe:

            (A) In the Indian tribe aboriginally occupying the Federal land on which the cultural items were excavated, or

            (B) If it can be shown by a preponderance of the evidence that a different Indian tribe has a stronger cultural relationship with the cultural items, in the Indian tribe that has the strongest demonstrated relationship with the objects.

BLM intends to repatriate human remains and associated funerary objects when cultural affiliation can be determined.

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3) Planned treatment, care, and handling of human remains:

All discovered remains will be treated with respect and dignity. BLM will provide the tribes an opportunity to examine remains prior to removal and to conduct traditional religious activities, if this is feasible without delay that would endanger the remains. While BLM will provide the opportunity to view the remains prior to removal, the tribes are responsible for their travel expenses to and from the location of the discovery.

The IVSP will avoid any unnecessary disturbance, physical modification, or breakage of remains and the transport, inventory, or storage of human skeletal remains in locations separate from their associated funerary objects. Treatment will proceed according to the following provisions:

1. Representatives of the tribes will have the opportunity to be present during the exposure and removal of remains whenever possible. If agreed upon by BLM and the tribes, and if feasible, specific tribes may be designated to take the lead in initially responding to discoveries.

2. Remains will be excavated in accordance with the stipulations of the Monitoring and Discovery Plan approved under the terms of the Project's Programmatic Agreement (PA) for compliance with Section 106 of the National Historic Preservation Act (NHPA).

3. No destructive analyses of remains will be permitted without the written permission from BLM, and only after BLM has consulted with tribes regarding the planned treatment, care, and handling of any recovered human remains, funerary objects, sacred objects, or objects of cultural patrimony.

4. Drawings of remains and the locations of associated funerary objects will be made and may be published with BLM approval unless the claimants determine funerary objects are of a sensitive nature.

5. No pollen or flotation samples will be removed from burial pit fill dirt without the written permission of BLM, and only after BLM has consulted with tribes regarding such removal.

6. Transportation of cultural items will be minimized under all circumstances and will be carefully packed to avoid disturbance or damage. Human remains may be packed separately from their associated funerary objects, but the containers will be kept together at all times.

7. Representatives of the tribes will be afforded the opportunity to view all artifact collections and records resulting from the archaeological investigation to identify funerary objects, objects of cultural patrimony, or sacred objects. If such objects are identified, BLM will be notified by the tribes and consultation will be initiated regarding their consistency with NAGPRA criteria for identification of these classes of objects and their treatment and disposition.

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8. IVSP is responsible for ensuring the security of cultural items from vandalism or other disturbance through employment of security personnel, fencing, and other appropriate measures, as needed. If human remains are endangered by exposure or other factors, IVSP's approved cultural resources/archaeological contractor may be authorized by BLM to proceed with removal of the cultural items to their facility to protect the cultural items. Written notice of this action must be provided to the claimants and agencies within 3 days of removal.

9. IVSP will not resume construction in the buffer area surrounding the discovery until it has received written authorization to proceed based on procedures established in the treatment plans as prescribed in the PA. In addition, no news releases, including photographs, videotapes, written articles, or other means of information, shall be released by any party unless approved by BLM and the tribe(s).

4) Planned archaeological recording of the human remains and cultural materials:

All cultural items, as defined in this POA, will be appropriately recorded and described using current standards and following current archaeological practices and methods. The archaeological documentation of human remains will be limited to visually evident characteristics that indicate such things as age, gender, obvious pathologies, and any obvious visual traits that may help to indicate cultural affiliation. Funerary objects will be recorded at a descriptive non-invasive level including measurements, type, and morphology. If human remains and/or cultural items are removed from the site, a catalogue of these items will be maintained.

5) Analysis planned for the human remains and cultural materials:

Initially, only non-destructive analyses will be carried out on the human remains. These can include anthropometric analyses (measurements/weight), mapping, drawing, measuring, weighing, and photo documentation. After consultation with the tribe(s), other tests may be determined appropriate by BLM.

Likewise, only non-destructive analyses will be carried out initially on the associated funerary objects, unassociated funerary objects, sacred items, and objects of cultural patrimony. These can include measuring and weighing, drawing, mapping, photographing, X-raying, and X-ray fluorescence analysis. After consultation with the tribe(s), other tests may be authorized by BLM.

6) Steps to be followed to contact Indian tribe officials at the time of intentional excavation:

In the event of a discovery, IVSP's approved cultural resources contractor/permittee will notify BLM and the appropriate land managing agency within 24 hours and may be authorized to undertake limited additional excavation and examination to assess whether the materials are within the protected classes of remains covered by the PA. The notification will include the following information:

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A. A verbal description of what was found and the context in which NAGPRA items are located
B. The location of the NAGPRA items
C. A preliminary assessment of the type of NAGPRA items
D. An assessment of the complexity of the burial(s), human remains, and/or other NAGPRA items, and the likelihood of disturbance if left in place
E. Any other pertinent information

BLM shall notify the tribes promptly after the initial discovery of items protected under NAGPRA and provide written confirmation by certified mail, or alternatively Express Mail, of the discovery within 3 working days (see Attachment A and B). The information to be provided to the tribes will include the following:

A. A verbal and written description of what was found and the context in which NAGPRA items are located
B. The location of the NAGPRA items
C. A preliminary assessment of the type of NAGPRA items
D. An assessment of the complexity of the burial(s), human remains, and/or other NAGPRA items, and the likelihood of disturbance if left in place
E. A request that the tribe(s) respond within 24 hours if the tribe(s) wish to view the remains or objects in place
F. Any other pertinent information

BLM will additionally afford the tribes the opportunity to conduct field visits, viewings of the items in question, and appropriate and reasonable ceremonies or rituals related to the items in question. The tribes are responsible for any costs to and from the discovery site.

7) Kind of traditional treatment to be afforded the human remains:

The tribes will be afforded the opportunity to examine the remains prior to and during removal unless the remains are in direct danger of further disturbance or destruction. Tribal representatives will be afforded the opportunity to perform traditional treatments, as needed, to the remains.

8) Nature of reports to be prepared:

A comprehensive report on the results of the archaeological investigation, including the recovery of cultural items, will be prepared and distributed in accordance with the terms of the aforementioned PA, developed in accordance with Section 106 of the NHPA.

9) Planned disposition of human remains pursuant to 43 CFR 10.6:

In the event that discovered NAGPRA items must be removed, BLM will determine, pursuant to 43 CFR 10.6, which Native American tribe will receive custody of the items. BLM intends to repatriate human remains and associated funerary objects when cultural affiliation can be

determined. BLM will provide notification of intent to transfer possession and subsequently return the items to the appropriate tribe within the limitations of 43 CFR 10.15.

Upon determination of a lineal descendant(s) or culturally affiliated tribe that, under Federal regulations, appears to be entitled to custody of the human remains, the agency official will transfer custody of the deceased to that lineal descendant or culturally affiliated tribe in accordance with 43 CFR 10.6(c).

Prior to any such disposition, the agency official will publish a general notice of the proposed disposition in three separate newspapers of general circulation in the areas where interested tribes now reside. The notices will be published at least two times at least 1 week apart, and the transfer will not take place until at least 30 days after publication of the second notice to allow time for any additional claimants to come forward.

If additional claimants do come forward and the agency official cannot clearly determine which claimant is entitled to custody, the agency official will not transfer custody of the deceased until such time as the proper recipient is determined, pursuant to regulations found at 43 CFR 10.

In the event the remains are of Native American descent, but are not claimed by any tribe within the geographical area, they will not leave the custody of the Federal agency. Should custody of remains be transferred to claimant tribes under 10.6, the tribes may request reburial on BLM land. Reburial of NAGPRA items on lands administered by BLM is subject to the provisions found in Instructional Memorandum No. 2007-002. The reburial locations will be determined through consultation with the tribes, and any locational information will be kept confidential to the extent allowed by law.

10) The role of tribal monitors during survey and excavation:

Individuals who are approved tribal monitors on the Project will notify the Principal Investigator(s) about items they feel are funerary objects, sacred objects, and/or objects of cultural patrimony. The Principal Investigator will notify BLM within 24 hours that monitors identified funerary objects, sacred objects, and/or objects of cultural patrimony. The report will include a description of the find(s), photograph(s) or drawing(s) were applicable, artifact(s) numbers or identification were applicable, and a description of the tribal monitor's opinion(s).

11) BLM personnel and tribal representatives involved in this NAGPRA effort:

As a result of tribal consultation, the following parties will be involved in this NAGPRA effort:

Campo Band of Kumeyaay Indians, the Cocopah Indian Tribe, the Fort Yuma Quechan Indian Tribe, the Ewiiaapaayp Band of Kumeyaay Indians, the Jamul Indian Village, the Kwaaymii Laguna Band of Indians, the La Posta Band of Kumeyaay Indians, the Manzanita Band of Kumeyaay Indians, the San Pasqual Band of Diegueno Indians, and the Santa Ysabel Band of Diegueno Indians (tribes), and the Ah-Mut Pipa Foundation and Kumeyaay Cultural Repatriation Committee (Tribal Organizations).

The names and addresses of the tribal members are in Attachment B.

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Federal Officials

California State Director, Bureau of Land Management Date

California Desert District Manager, Bureau of Land Management Date

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Invited Signatories

_____
Date

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Date

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Date

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Date

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Attachment A

Upon The Discovery of Human Remains, Funerary Objects, Sacred Objects, or Objects of Cultural Patrimony

The monitor will halt construction within 100 feet of a discovery and barricade an area of at least 50 feet in diameter around the discovery. The remains will be left in place and exclusionary fencing will be placed in a 50-foot radius around the discovery.

↓

The archaeological monitor will notify BLM and the Native American monitor on-site (if not present at the discovery location) immediately. This notification will be the initial step in the consultation procedures under NAGPRA. Decisions regarding additional identification procedures and the continuation or permanent suspension of work at the discovery location will then be made by BLM.

↓

Items determined as modern (50 years old or less) and/or involved in a crime.

↓

Sheriff and/or Coroner assumes responsibility.

↓

Items determined as prehistoric or historic.

↓

BLM contacts Native American tribes within 24 hours by phone and provides the tribe(s) written documentation of the find within 3 days.

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Attachment B

List of Native American Tribal Contacts

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Appendix 4:
Environmental and Construction Compliance Monitoring Program

IMPERIAL VALLEY SOLAR PROJECT

Environmental and Construction Compliance Monitoring Program

Imperial Valley Solar CACA-47740

For the

El Centro Field Office
El Centro, California

September 2010

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J: Amendment to the 2007 Memorandum of Understanding
K: Summary of California Energy Commission Conditions of Certification and Bureau of Land Management Monitoring

List of Acronyms and Abbreviations

AO	Authorized Officer
BLM	United States Bureau of Land Management
CBC	California Building Code
CBO	Chief Building Officer
CDFG	California Department of Fish and Game
CEC	California Energy Commission
Corps	United States Army Corps of Engineers
CPM	Compliance Project Manager
CWA	Clean Water Act
ECCMP	Environmental and Construction Compliance Monitoring Program
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy Management Act
IVS	Imperial Valley Solar
Lead EIs	Lead Environmental Inspectors
LORS	laws, ordinances, regulations, and standards
MW	megawatt
MOU	Memorandum of Understanding
NPS	United States Department of the Interior National Park Service
NTPs	Notices to Proceed

POD	Plan of Development
ROD	Record of Decision
ROW	right-of-way
RWQCB	Regional Water Quality Control Board
SWPPP	Storm Water Pollution Prevention Plan
USFWS	United States Fish and Wildlife Service

1.0 Introduction

1.1 Purpose of This Report

This report presents the objectives of the United States Bureau of Land Management (BLM) Environmental and Construction Compliance Monitoring Program (ECCMP) for the Imperial Valley Solar (IVS) Project. This report:

- Describes the responsibilities of the contractor hired to conduct the ECCMP on behalf of the BLM (referred to in this report as the Monitoring Contractor);
- Outlines the level of effort anticipated from the Monitoring Contractor in implementing the ECCMP'
- Defines the decision-making authority of the Monitoring Contractor; and
- Describes participation by the Monitoring Contractor in Tessera Solar's Environmental Training Program.

The BLM requires holders of right-of-way grants to prepare and fund an environmental compliance monitoring program to ensure compliance with the BLM terms, conditions, and stipulations in the right-of-way grants, the POD, and other project specific mitigation, terms, and conditions (listed in detail in Chapter 2.0, Objectives of the Environmental and Construction Compliance Monitoring Program.

This report also discusses the monitoring reporting and documentation requirements, stop work authority, and the variance process.

1.2 Memorandum of Understanding with the California Energy Commission

In 2007, the BLM and the California Energy Commission (CEC) formalized a Memorandum of Understanding (MOU) for the joint environmental review of solar thermal power plant projects to be located on public lands. In September 2010, that MOU was amended to ensure that the BLM and CEC "…share in construction compliance, environmental compliance, design review, plan check, and construction, maintenance, operation and termination inspection (collectively "compliance review") of solar thermal power plant projects on public lands, to avoid duplication of staff efforts, to share staff expertise and information, to promote intergovernmental

coordination at the state and Federal levels, to develop a more efficient compliance review process, and to meet state and Federal requirements." The MOU amendment is provided in Attachment J, Amendment to the 2007 Memorandum of Understanding.

2.0 Objectives of the Environmental and Construction Compliance Monitoring Program

The overall objective of the Environmental and Construction Compliance Monitoring Program (ECCMP) for the Imperial Valley Solar (IVS) LLC Project is to conduct inspections of construction activities, evaluate compliance or noncompliance with the project measures and conditions during project construction, and document that compliance or noncompliance. This ECCMP specifically focuses on the construction phase of the IVS project. A similar program with phase-specific measures and conditions would be developed and implemented during the project operation and decommissioning phases. The contractor hired to implement the ECCMP on behalf of the United States Bureau of Land Management (BLM), referred to in this report as the Monitoring Contractor, will provide a Compliance Manager and on-the-ground Compliance Monitors to meet this objective.

The environmental mitigation requirements for the IVS project comprise the following:

- Environmental mitigation measures proposed by Tessera Solar, LLC, the project applicant, throughout the environmental document and permitting phases of the IVS Project
- Mitigation measures, project design features, and other measures documented in the Final Environmental Impact Statement (FEIS)
- Terms, conditions, and stipulations in the BLM Record of Decision (ROD), right-of-way (ROW) grant, and Notices to Proceed (NTPs) for the project
- Construction procedures and mitigation measures in the approved Plan of Development (POD) for the project
- Stipulations, terms, conditions, and other measures from other authorizing Federal agencies' permits and approvals, specifically the United States Army Corps of Engineers (Corps) Individual Permit, the United States Fish and Wildlife Service (USFWS) Biological Opinion and Conference Opinion, and the United States Department of the Interior National Park Service (NPS) input related to the Juan Batista de Anza National Historic Trail

- Stipulations, terms, conditions, and other measures from State and regional agencies' permits and approvals, including the California Energy Commission (CEC) decision on the IVS Project, the California Department of Fish and Game (CDFG) Lake and Streambed Alteration Agreement (if one is determined to be needed), and the Section 401 Certification of Water Quality or Waiver from the responsible Regional Water Quality Control Board (RWQCB) or Boards

During construction of the IVS Project, the Compliance Monitors will conduct inspections of construction activities and the implementation of the required mitigation measures, and will provide regular feedback on compliance issues to the BLM and the Monitoring Contractor's Environmental Inspection Team. The Monitoring Contractor will involve other agencies such as USFWS or CDFG in the monitoring and documenting of environmental compliance to the extent requested by those agencies and authorized by the BLM. Construction progress and environmental compliance will be tracked and documented in daily logs and weekly reports prepared and submitted as described in detail later in Section 4.0, Reporting and Documentation. The Compliance Monitors will report directly to the Compliance Manager. The Compliance Manager will report directly to the BLM Compliance Project Manager (CPM or Authorized Officer [AO]) and other identified Compliance Contacts, such as the CEC CPM, as directed by the BLM.

Other objectives of the ECCMP are to:

- Facilitate the timely resolution of compliance-related issues in the field
- Provide continuous information to the BLM and other agencies and parties as authorized regarding noncompliance issues and their resolution
- Review, process, and track construction-related changes to project plans (as described later in Section 5.0, Variances, the Monitoring Contractor will assist with implementation of the variance process in accordance with a predetermined level of decision-making authority granted by the BLM)
- Develop and implement a system for storing the information collected during the ECCMP in a format that will allow easy retrieval and search functions

The Monitoring Contractor shall act as the CEC delegate and Chief Building Official (CBO) for enforcement of applicable local building codes; the California Building Code (CBC); the Facility Design, Geology and Transmission System Engineering Conditions of Certification; the Storm Water Pollution Prevention Plan (SWPPP) and Erosion Control Plan (as directed by the CPM); other engineering laws, ordinances, regulations, and standards (LORS) applicable to the IVS

Project to ensure health and safety; and all environmental conditions of certification/mitigation measures contained in the CEC Decision. The Monitoring Contractor will also be responsible for the design review, plan check, and construction inspection of the foundation, anchorage, and connections for those building and nonbuilding structures, process-related systems and equipment required for power and steam generation, and equipment located either inside or outside of buildings that are designated in Facility Design Condition of Certification GEN-2.

3.0 Environmental Compliance Monitoring and Management

3.1 Construction Plan

In the event the United States Bureau of Land Management (BLM) approves the Imperial Valley Solar (IVS) Project, a right-of-way (ROW) grant will be issued to Tessera Solar, LLC. Tessera Solar filed an application with the BLM for a ROW grant pursuant to the Federal Land Policy and Management Act (FLPMA). Under FLPMA Title V (Rights-of-Way), the United States Secretary of Interior is authorized to grant rights-of-way for the purpose of allowing systems for generation, transmission, and distribution of electric energy.

The IVS Project would be a primary power-generating facility constructed in multiple phases. Phase IA would include the construction and operation of a 9-megawatt (MW) facility with the following phases adding more SunCatchers, resulting in a 709 MW facility. That power would be generated by up to 28,360 SunCatcher solar dish collectors. In addition to the SunCatcher fields, the IVS Project would include an administration building, an operations and maintenance building, substation, generation-tie, transmission, and facility roads.

3.2 Compliance Monitoring and Management

The Monitoring Contractor's compliance team will consist of the following personnel:

- Compliance Manager: point of contact position designated by the Monitoring Contractor for all compliance related issues; reports to the BLM Authorized Officer or the designated BLM Compliance Project Manager for all compliance related issues.
- Compliance Monitors: on the ground Monitoring Contractor personnel responsible for observing and reporting compliance with the terms and conditions of the BLM right-of-way authorization for all phases of project construction.

The BLM's compliance representatives for the IVS Project are:

- BLM Authorized Officer (AO): El Centro Field Manager, the BLM official with the administrative authority for the right-of-way grant issuance and authority for accepting and approving project related changes

- BLM Compliance Project Manager (CPM): staff level position designated by the BLM AO as the point of contact for all compliance issues.

El Centro FO Compliance Lead The BLM may also identify additional persons as designated Compliance Contacts, as needed.

The Monitoring Contractor will shall enter into a contract for the project with Tessera Solar, LLC for the payment of the compliance monitoring services provided by the Monitoring Contractor. Those fees will be based on hourly rates, or as otherwise agreed to by the Monitoring Contractor and Tessera Solar. Payments to the Monitoring Contractor for work satisfactorily completed may be paid directly to the Monitoring Contractor in advance, in arrears, or from a credit account established with the Monitoring Contractor by Tessera Solar. The contract between Tessera Solar and the Monitoring Contractor will include a provision that Tessera Solar may not terminate the contract with, or payments to, the Monitoring Contractor without prior authorization of the BLM AO.

The Monitoring Contractor works for, reports to, and takes direction from the BLM and not Tessera.

3.2.1 Tessera Solar Contacts

Tessera Solar, LLC has designated the following contact persons for the construction of the IVS Project:

- **David Ling, Senior Director Construction Management and Procurement**
- **Richard Knox, Project Manager**

3.2.2 Compliance Manager

The Monitoring Contractor's Compliance Manager for the IVS Project will oversee management of the Environmental and Construction Compliance Monitoring Program, prepare project materials, participate in any BLM preconstruction meeting; participate in Tessera Solar's Environmental Training Program; supervise the monitoring activities, materials, and schedules; supervise the Compliance Monitors; provide guidance on and review of compliance issues; review and process variance requests; and review and distribute daily and biweekly reports.

Specific Compliance Manager responsibilities are:

- Report directly to the BLM CPM or BLM AO or other designated BLM Compliance Contacts;
- Participate in the BLM preconstruction meeting;
- Participate in Environmental Training Program/kick-off;
- Verify Tessera Solar's compliance with the project environmental requirements;
- Supervise the monitoring activities, materials, and schedules;
- Supervise the Compliance Monitors;
- Ensure that all reported noncompliances are tracked for resolution by Tessera Solar;
- Review, approve, and distribute monitoring reports, correspondence, and scope of work and schedule changes;
- Review work progress, schedules, and budgets related to compliance monitoring activities;
- Confer with the BLM CPM and Compliance Contacts on a regular basis;
- Serve as the contact between BLM and Tessera Solar for compliance issues;
- Serve as BLM's representative to permitting agencies, private landowners, and special interest groups regarding the environmental mitigation efforts on the project; and
- Coordinate with the BLM and other agencies, as determined necessary, on reviewing and approving variance requests.

3.2.3 Compliance Monitors

Based on discussions with the BLM CPM and the California Energy Commission (CEC) CPM, the Monitoring Contractor will provide sufficient full-time on-the-ground Compliance Monitors during construction of all phases of the project. The number of Compliance Monitors will be determined based on the specific activities during each construction phase. Specifically, the need for the full-time Compliance Monitors may be reevaluated throughout the construction phase and a schedule adjusted, as necessary, as conditions demand.

During construction, many factors may affect the specific deployment of the Compliance Monitors. These include the activity occurring at specific times of inspection, any noncompliance or problem areas documented during previous inspections by the Compliance Monitors, site-specific conditions at the time of construction, skill levels and attitudes of the contractor crews and foremen, and the number of inspection team members.

The Monitoring Contractor's planned monitoring coverage assumes that the construction contractors will demonstrate a high level of environmental compliance, and that Tessera Solar's environmental inspectors and biological monitors will be qualified and experienced.

The Compliance Manager will regularly evaluate the effectiveness of the environmental compliance monitoring in consultation with the BLM and CEC CPM and Compliance Contacts to ensure adequate staffing. If determined necessary, the Monitoring Contractor will provide additional, adequately trained support staff to act as Compliance Monitors on an as-needed basis.

The primary responsibility of the Compliance Monitors will be to monitor and document Tessera Solar's construction, compliance, and/or noncompliance with the project building, engineering, installation, and environmental requirements. The Compliance Monitors will also review and approve variance requests, as appropriate to their authority level, for implementation of limited variations from mitigation measures previously agreed to by Tessera Solar or stipulated by other agencies (refer to Section 5.0, Variances).

Prior to the start of construction, the Compliance Monitors will become familiar with the Tessera Solar environmental compliance management program, participate in the BLM preconstruction meeting, participate in the Tessera Solar Environmental Training Program, and receive additional training as needed from the Monitoring Contractor. The Compliance Monitors will become familiar with the roles and responsibilities of the Tessera Solar field team and biological monitors, the organizational structure of the construction methods, the required building codes, fire codes, construction documents, other relevant building standards, environmental reporting responsibilities, and the chain of communication. It is assumed that Tessera Solar will provide the Compliance Monitors and the Compliance Manager with copies of all permit requirements for the project prior to initiation of construction.

At a minimum, the Compliance Monitors will maintain daily contact with the Tessera Solar environmental inspection team. Construction activities will be inspected on a daily basis by the Compliance Monitors, and environmentally sensitive areas will be regularly inspected to ensure protection of the identified resources.

The Compliance Monitors will communicate with the Tessera Solar Inspectors on a regular basis. This approach will allow the Inspectors and the Compliance Monitors to exchange information on the status of construction and to discuss any significant construction events scheduled over the next 2 or 3 days. The Compliance Monitors may inspect all activities either with the Tessera Solar inspectors or independently. The Compliance Monitors will have the authority to order the halt of a specific noncompliance activity that is damaging, has the potential to damage a sensitive environmental resource, or is not being performed according to building and construction standards.

The Compliance Monitors will record daily observations, including digital photodocumentation at each location visited. This process will ensure consistent and accurate reporting of site conditions at the time of inspection. Each activity monitored will be assigned a compliance level and documented in a weekly report (refer to Section 4.1, Weekly Reports).

4.0 Reporting and Documentation

The Monitoring Contractor and all compliance monitoring personnel will use a comprehensive weekly summary database reporting system that is posted on an Imperial Valley Solar (IVS) Project website and available for review to other jurisdictional agencies. Under this program, each entire weekly report, consisting of all compliance levels and photographic documentation from daily logs, will be available each week and will provide the United States Bureau of Land Management (BLM) project personnel, Tessera Solar, and applicable agencies with a readily accessible record of construction progress, photographic documentation, and documentation of compliance with the project environmental requirements. The specifics of the reporting and documentation to be used for the IVS Project are described in the following sections.

4.1 Daily and Weekly Reports

Each Compliance Monitor will compile his/her daily activity logs and contact information documents into a weekly report on the required cover and form provided in Attachments A and B, respectively. A separate weekly report will be maintained for each right-of-way (ROW) grant issued to Tessera Solar for the IVS project. The Compliance Monitor will document the construction level as a percent complete or other identifying method as agreed to by the BLM; the presence of sensitive species or habitat and culturally sensitive sites; and provide a brief description of the construction activities observed (such as road grading, pedestal installation, SunCatcher fabrication, erosion control, etc.). When appropriate, relevant digital photographs will be taken and included in the weekly report.

Each separate activity monitored and documented in a daily log will be assigned a compliance level. The compliance levels that will be used for the IVS project are:

- Communication;
- Acceptable;
- Problem Area;
- Noncompliance; and
- Serious Violation.

4.1.1 Communication

A communication report will be prepared when necessary to document and track relevant meetings or discussions between the Compliance Monitor and agencies, Tessera Solar representatives, monitors, inspectors, or other contractor personnel.

4.1.2 Acceptable

An acceptable report will be prepared when a Compliance Monitor determines that an inspected area or activity is in compliance with the project specifications and all mitigation measures have been adequately implemented.

4.1.3 Problem Area

The Compliance Monitor will prepare a problem area report to record an observation that a location or activity does not meet the definition of acceptable but is not considered a noncompliance. The problem area category will be used to report a range of events and observations including:

- An incident that is accidental or unforeseeable but is not out of compliance with the project specifications, and Tessera Solar's response is appropriate and timely. An example would be a fuel leak where project personnel respond properly by stopping, containing, and cleaning up the spill in accordance with the project specifications.
- A location where the project is not out of compliance with the specifications but, in the judgment of the Compliance Monitor, damage to resources could occur if corrective actions are not taken. Some examples are:
  - A topsoil pile located on the bank of a drainage; or
  - An improperly constructed/located erosion control structure.
- An activity that the Compliance Monitor determines is an unintentional and isolated departure from the project specifications, with no damage to resources. An example would be a small amount of blading or mowing outside the access pathway that has no effect on sensitive resources such as sensitive plant habitat or a water body.

If a problem area is resolved in a timely manner, it will not be considered a noncompliance. If a problem area is found to be a repeat situation or multiple instances of a similar nature occur, is not corrected within the established time frame, or results in resource damage because timely

corrective action failed to occur, the Compliance Monitor may document the problem area as a noncompliance as described in the following section.

4.1.4 Noncompliance

A noncompliance report will be issued when a Compliance Monitor observes an activity that violates (defined as not in compliance with) the project specifications, building codes, or other requirements; results in damage to resources; or places sensitive resources, personal safety or worker safety at unnecessary risk. Some examples of noncompliance activities are:

- Failure to install or maintain required erosion control devices;
- Ground-disturbing activities conducted outside the approved ROW and disturbance limits; or
- Surface-disturbing activities conducted without an appropriate biological or cultural resources monitor present.

The Compliance Monitor will notify Imperial Valley Solar LLC inspector or monitor about a noncompliance before issuing a noncompliance report. The noncompliance report will include the name of the inspector or monitor and the time of notification. Where practicable and where the nature of the noncompliance activity warrants, the inspector or monitor will work closely and collaboratively with the Compliance Monitor to determine the appropriate corrective action.

Resolution of noncompliance activities will involve close coordination with the Tessera Solar inspectors, the Compliance Building Officer (CBO), the BLM Compliance Project Manager (CPM), and contractor construction supervisory personnel to ensure that the corrective measures are properly understood and implemented. It is the responsibility of the Tessera Solar environmental inspection team to provide follow-up documentation to the BLM and other agencies with appropriate jurisdiction over the issue as well as to the Compliance Manager. Once Tessera Solar documents the resolution of a noncompliance, the applicable Compliance Monitor will inspect the area and verify and document that the noncompliance has been adequately resolved.

4.1.5 Serious Violation

A serious violation report will be issued by a Compliance Monitor immediately on observing an activity that is not in compliance with the project specifications and causes substantial harm to resources or poses a serious threat to sensitive resources or worker/public safety. Examples of

serious violations include deliberately conducting an activity that results in disturbance within an exclusion zone for a sensitive resource, repeated or cumulative noncompliance activities that could lead to a substantial impact on resources, and failure to correct previously identified noncompliance activities in an established time frame.

A serious violation report requires that the Compliance Manager and the BLM CPM participate in a conference call or meeting with the Tessera Solar Environmental Lead for the project and Environmental Inspection Manager to discuss the violation, the proper corrective actions, and possible follow-up enforcement actions that could be imposed. It will be the responsibility of the Tessera Solar environmental inspection team to provide follow-up documentation to the BLM and other agencies with appropriate jurisdiction over the issue as well as to the Compliance Manager. Once Tessera Solar documents the resolution of a serious violation, the Compliance Monitor will inspect the area and verify that the issue has been adequately resolved.

Daily inspections and relevant photodocumentation completed by each Compliance Monitor will be sent electronically to the Monitoring Contractor's database server at the end of each work week. The following morning, the separate reports will be compiled into one Weekly Monitoring Report, reviewed by the Compliance Manager, and posted on the non-public password-protected project website (refer to Section 4.3, Non-Public Project Website). A flow diagram of the electronic web-based reporting system is shown on Figure 1. When the reports are posted, the Compliance Manager will send an email to the authorized distribution stating that the reports are available. The email will summarize the compliance levels for the reports issued each day and include the link to the website. The BLM, Monitoring Contractor, and authorized Tessera Solar representatives will be included in the distribution for all reports.

4.2 Monthly Summary Reports

Monthly summary reports will be issued that briefly describe construction activities during the reporting period and summarize by compliance level the number of reports completed by the Compliance Monitors during that reporting period and cumulatively for the construction period for that project phase. The monthly summary report will also include a table of problem area and noncompliance reports issued by the Compliance Monitors during the reporting period and the Level 1, 2, and 3 variance requests approved by the Compliance Monitors and the Compliance Manager during the reporting period. The monthly summary report will also include a table summarizing the net acreage of land affected by approved variances on federal land and, for the Archeological Resources Protection Act and Endangered Species Act, nonfederal land for the reporting period as well as cumulatively. The Monitoring Contractor's baseline electronic database reporting system will be designed to generate all the information in the tables of the monthly summary report.

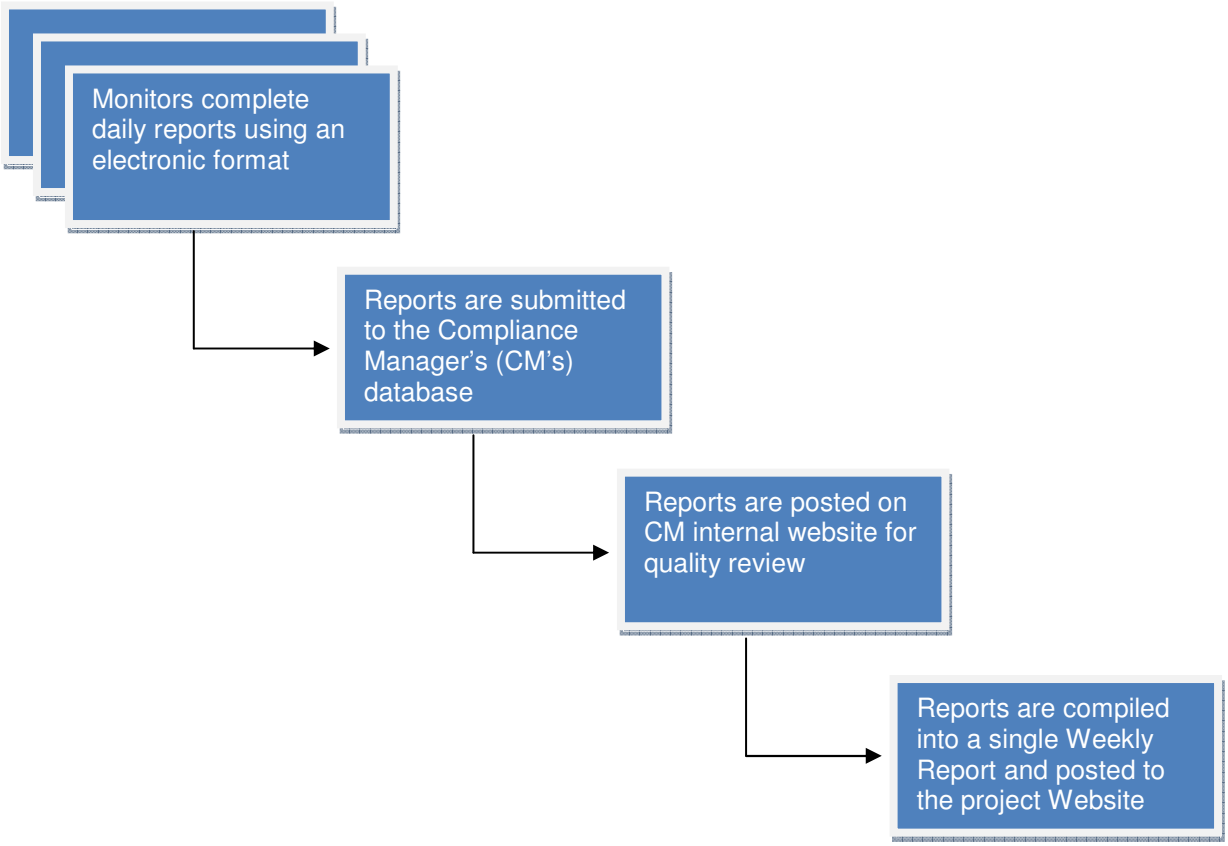


Figure 1: Electronic Web-Based Reporting System

The monthly summary reports will be posted on the non-public project website (refer to Section 4.3). When the monthly summary report is posted, the Compliance Manager will send an email to the authorized distribution that it is available. The email will include the link to the website. The BLM, Monitoring Contractor, and Tessera Solar representatives will be included in the distribution for the monthly summary report. A sample monthly summary report is provided in Attachment C.

4.3 Non-Public Project Website

The Monitoring Contractor will establish and maintain a non-public, password-protected project website to display the weekly and monthly monitoring reports and the approved Level 1, 2, and 3 variances (refer to Section 5.0, Variances). The IVS Project website may also be used to post

meeting minutes, notes from conference calls, and guidance from agencies regarding interpretation of environmental requirements. The BLM and Monitoring Contractor representatives will have access to the entire website. The Tessera Solar representatives will have access to parts of the website as authorized by the BLM CPM and Information Technology.

5.0 Variances

During construction of the Imperial Valley Solar (IVS) Project, unforeseen or unavoidable site conditions could result in the need for changes from the approved mitigation measures and construction procedures. Additionally, the need for route realignments, extra workspace, or changes to previously approved construction work areas may arise. Changes to previously approved mitigation measures, construction procedures, and construction work areas will be handled in the form of variance requests to be submitted by Tessera Solar and reviewed and approved or denied by the United States Bureau of Land Management (BLM), with the delegation of some authority for variances to the Monitoring Contractor. The variance process will also be a good mechanism to clarify discrepancies or inconsistencies discovered in project materials and/or to distribute information to the entire project team.

A system of three variance levels (Levels 1, 2, and 3) will be used to categorize and process variance requests. The three variance levels, the review and distribution process, and the decision-making authority proposed for each level are discussed in the following sections. A sample variance request form is provided in Attachment I.

5.1 Level 1 Variances (Field Decisions)

Level 1 variances are site-specific, minor, performance-based changes to project specifications, construction methods, or mitigation measures that provide equal or better protection to environmental resources or better constructability. These minor variance requests can be reviewed and either approved or denied by the Compliance Monitors in the field during normal construction operations.

Examples of Level 1 variance requests include:

- Allowing rubber-tired vehicles to use additional access roads that would not require any improvement to the road or repairs after construction (“like use”);
- Modifications to erosion control structure locations to minimize erosion potential;
- Minor variations in site-specific plans that reflect differences in site conditions from those that were expected when the plan was developed (e.g., relocation of a spoil storage area within previously approved work areas); and
- Minor changes to the project design that are required due to site-specific restrictions.

Level 1 variances may also be used to document and disseminate agency-directed changes to mitigation measures.

To initiate a Level 1 variance request, Tessera Solar's representative will fill out a variance request form using the form in Attachment H and obtain the appropriate signatures. Tessera Solar's representative will then contact a Compliance Monitor to review the proposed change. Tessera Solar's representative and the Compliance Monitor will work together to evaluate the site-specific situation and determine if the variance request is appropriate.

The Compliance Monitor may approve a Level 1 variance request if the results of implementing the change will provide equal or better protection for the resource than the original mitigation measure or if the original mitigation measure is not applicable to that specific site. If a Level 1 variance request is approved in the field, the Compliance Monitor will sign the variance request form. A Level 1 variance request can be implemented in the field as soon as it is approved by the Compliance Monitor.

The Compliance Monitor will document the variance approval in his/her daily log and will include the variance in the weekly report (refer to Section 4.1, Weekly Reports) and will transmit the approved form to the Compliance Manager for posting on the project website (refer to Section 4.3, Non-Public Website).

If the requested variance exceeds the Compliance Monitor's authority level, the Compliance Monitor will inform Tessera Solar's representative that a Level 2 or Level 3 variance request is required.

5.2 Level 2 Variances

A Level 2 variance request exceeds the field decision authority of the Compliance Monitor and requires processing by the Compliance Manager. Before the Compliance Manager can issue approval of a Level 2 variance request on federal land, the BLM Compliance Project Manager (CPM) must approve the request. Level 2 variance requests generally involve project changes that would affect an area outside the previously approved work area, but within the areas previously surveyed for cultural resources, sensitive species, and biological resources. Level 2 variance requests typically require the review of supplemental documents, correspondence, and records.

Examples of Level 2 variance requests include:

- The use of extra workspace outside the previously approved work area but within previously surveyed areas;

- The use of existing access roads that have not been previously approved if the use would not be considered “like use” that could be approved as a Level 1 variance (refer to Section 5.1, Level 1 Variances);
- Modifying a previously approved erosion control structure in ways not previously identified; and
- Modifications to the plans that are specifically different than those in the approved Plan of Development (POD).

To initiate a Level 2 variance request, Tessera Solar’s representative or other designated representative will fill out a variance request form, prepare the appropriate supporting documentation, and obtain the required signatures.

A Tessera Solar representative will complete and submit the variance request form and supporting documentation by e-mail (scanned copy) or fax to the applicable BLM CPM with a copy to the Compliance Manager. Once the approval of the BLM CPM is obtained, the Compliance Manager will process the request.

If the Level 2 variance request is approved, the Compliance Manager will sign the variance request and e-mail the approved form (scanned copy) to the designated Tessera Solar representatives, the Compliance Monitors, and the BLM CPM and Compliance Contacts. The variance may be implemented in the field as soon as the approved variance is received. Verbal approval for Level 2 variance requests will not be granted. The Compliance Manager will document the variance approval in the daily log and will include it in the weekly report (refer to Section 4.1) and post the approved variance request form on the project website (refer to Section 4.3).

5.3 Level 3 Variances

Level 3 variance requests generally involve project changes that would affect an area outside the previously approved work area that are outside the areas previously surveyed for cultural resources, sensitive species, and biological resources, or one that would change the function, structure, technology required, or other part of the project previously approved in the POD. Level 3 variances may need to be implemented through an amendment to the right-of-way (ROW) grant.

To initiate a Level 3 variance request, Tessera Solar’s representative or other designated representative will fill out a variance request form, prepare the appropriate supporting documentation, and obtain the required signatures.

The designated Tessera Solar representative will complete and submit the variance request form and supporting documentation by e-mail (scanned copy) or fax to the applicable BLM CPM and the Compliance Manager. Once the approval of the BLM CPM is obtained, the Compliance Manager will process the request.

Level 3 variance request approvals must be signed by the BLM CPM or the BLM Authorized Officer (AO) in the case of a ROW grant amendment. The variance may be implemented in the field as soon as the approved variance is received. The Compliance Manager will document the variance approval in the daily log and weekly report (refer to Section 4.1) and post the approved variance request form on the project website (refer to Section 4.3).

6.0 Stop Work Authority

The United States Bureau of Land Management (BLM) has the authority to stop construction of the Imperial Valley Solar (IVS) project if an activity is determined to be a deviation from the project environmental and cultural resource protection requirements or approved construction plans authorized by the BLM ROW grant. This authority may be delegated to the Monitoring Contractor, the Compliance Manager, and/or the Compliance Monitors, as determined appropriate by the BLM. Any order to stop an activity will be followed by a formal written immediate temporary suspension from the BLM Construction Project Manager (CPM) or the BLM Authorized Officer (AO).

7.0 Training and Preconstruction Meeting

The Monitoring Contractor will ensure that Tessera Solar prepares and conducts an Environmental Training Program for the Environmental Inspection Team and construction contractor personnel prior to the start of construction. The United States Bureau of Land Management (BLM) Project Manager and Compliance Contacts, and the Monitoring Contractor's Compliance Manager, Assistant Compliance Manager, and Compliance Monitors will participate in the Environmental Training Program to present an overview of the Environmental and Construction Compliance Monitoring Program (ECCMP) and to become familiar with Tessera Solar's environmental inspection program and personnel. The Monitoring Contractor's Compliance Manager or the BLM Compliance Project Manager (CPM) will explain the various components of the ECCMP, emphasizing the objectives of the ECCMP. The discussion will focus on the daily activities of the Compliance Monitors and their interactions with Tessera Solar's inspection and construction personnel.

The monitoring and documentation of compliance issues and construction progress will be described. A clear and concise explanation will be presented with respect to the variance request decision authority that the Compliance Monitors will have in the field. Procedures that may be required to address variance requests will also be presented, as well as the time frame required for decisions to be made prior to implementation.

Before the Tessera Solar training, the Monitoring Contractor will ensure that BLM holds a preconstruction meeting, which is required prior to issuance of any Notices to Proceed (NTPs). At that meeting, the BLM CPM will discuss the requirements of the Record of Decision (ROD), the additional stipulations, and the right-of-way (ROW) grant as well as those of the Plan of Development (POD). The Mitigation Monitoring Contractor's Compliance Manager and one Compliance Monitor will participate in this preconstruction meeting.

In addition to participation in the Tessera Solar Environmental Training Program and the BLM preconstruction meeting, the Monitoring Contractor will train the Compliance Monitors in all project-specific procedures, duties, responsibilities, reporting requirements, and authorities, which includes the authority to grant variances, to complete their assigned tasks during monitoring of the IVS Project construction activities.

8.0 Equipment

Personnel responsible for monitoring and documenting compliance with the measures in the Environmental and Construction Compliance Monitoring Program (ECCMP) will require field support equipment. Specifically, the Monitoring Contractor's Compliance Manager, Assistant Compliance Manager, and each Compliance Monitor will be equipped with the following:

- Notebook computer and appropriate software to facilitate the compilation, transfer, and storage of data
- Digital camera
- Cellular phone (smart phone) and vehicle adapter for power charge
- Four-wheel drive vehicle

Additional equipment such as binoculars may also be needed, but would be provided on an as-needed basis.

Attachment A

Daily Monitoring Report Cover Page Form

PROJECT: IMPERIAL VALLEY SOLAR PROJECT

COMPLIANCE MONITORING PROGRAM DAILY MONITORING REPORT COVER PAGE

SAMPLE DAILY MONITORING REPORT (COVER PAGE)

The following report is a compilation of the daily monitoring reports issued by the Compliance Monitors and/or Compliance Manager for activities conducted on [Month] [Day], 20[XX]. Should you have any questions regarding the information contained in this report, please contact MONITOR at (XXX) XXX-XXXX (office) or (XXX) XXX-XXXX (cell phone).

Communication
Acceptable
Problem Area
Noncompliance
Serious Violation
Approved Level 1 Variance
Approved Level 2 Variance pp
Approved Level 3 Variance

Compliance Level

Total Reports

Attachment B

Daily Monitoring Report Form

PROJECT: IMPERIAL VALLEY SOLAR PROJECT

ENVIRONMENTAL COMPLIANCE MONITORING PROGRAM DAILY MONITORING REPORT

Report Number: _____ Date of Report: _____

Compliance Monitor: _____ Compliance Level: _____

Environmental Inspector: _____ Construction Method: _____

Location

Construction Spread: _____ Tract #: _____ Tract #: _____ Tract #: _____

Begin Milepost: _____ End Milepost: _____

Begin Station: _____ End Station: _____

Inspection Notes:

Photos:

Attachment C

Monthly Summary Report Form

DEVELOPER: TESSERA SOLAR

PROJECT: IMPERIAL VALLEY SOLAR PROJECT

Environmental Compliance Monitoring Program Summary Report for the Period: XX-XX, 20XX

The following is a summary of the reports issued by the Compliance Monitors and Compliance Manager for activities conducted between XX-XX, 20XX. This report also summarizes Level 1, 2, and 3 variance requests approved during the same period. The environmental compliance monitoring program for the _____ Project is being implemented under the direction of the Bureau of Land Management (BLM). Copies of the daily monitoring reports and approved Level 1, 2, and 3 variance requests are posted and available for review on the environmental compliance monitoring program website.

Should you have any questions regarding the information contained in this report, please contact MONITOR at (XXX) XXX-XXXX (office) or (XXX) XXX-XXXX (cell phone).

SUMMARY OF ACTIVITIES

Between XX-XX, 20XX, the Compliance Monitors and Compliance Manager issued eight daily monitoring reports. A tabular summary of the reports by compliance level is presented below.

PROJECT: Imperial Valley Solar Project

ENVIRONMENTAL COMPLIANCE MONITORING PROGRAM
Summary of Daily Monitoring Reports for the Period: XX-XX, 20XX

Compliance Level	Compliance Reports for the Period	Cumulative Compliance Reports for the Project
Communication	X	X
Acceptable	X	X
Problem Area	X	X
Noncompliance	X	X
Serious Violation	X	X
Approved Level 1 Variance	X	X
Approved Level 2 Variance	X	X
Approved Level 3 Variance	X	X
Total Reports	**X**	**X**

During this period, three full-time Compliance Monitors conducted daily inspections of project-related activities and documented _____'s compliance with the project documents and permits. The Compliance Monitors continued to coordinate with the Lead Environmental Inspectors (Lead EIs) and other EIs to inspect and discuss areas of concern prior to construction, review areas potentially subject to variance requests, assist with resolution of landowner complaints, and clarify interpretations of the project requirements. The activities of the three Compliance Monitors were directed by the Compliance Manager who continued to coordinate with the BLM as well as with _____'s field management and support staff.

A brief summary of the activities conducted during the reporting period is presented below. Copies of the detailed daily monitoring reports that were used to prepare this summary are posted and available for review on the environmental compliance monitoring program website.

Summary of Activities
A brief text summary of activities that occurred by spread during the reporting period will be provided here

PROBLEM AREAS AND NONCOMPLIANCES

One problem area report and no noncompliance reports were issued by the Compliance Monitors between XX-XX, 200X as shown in the table below. The Compliance Monitors were notified of one noncompliance report issued by _____'s EIs.

SUMMARY OF PROBLEM AREA AND NONCOMPLIANCE REPORTS

Compliance Level/Report Number	Date Issued	Location (Spread/ Milepost)	Description	Corrective Action
Problem Area				
-None-				
Daily Monitoring Report #XX	X/X/200X	Spread X – X.X	A construction vehicle was parked outside of the approved right-of-way.	The Lead EI was notified and contacted the foreman to have the vehicle moved back onto the approved workspace.
Noncompliance				
-None-				
It was reported to the Compliance Monitors that the _____ EIs issued one noncompliance report. This noncompliance occurred on Spread X on XX, 200X and was issued to the trenching crew for partially burying the windrowed seedbank with trench spoil for approximately 1,000 feet.				

VARIANCES

One Level 1 variance request was approved during the period. No Level 2 and no Level 3 variance requests were approved between XX-XX, 200X as shown in the table below. A summary of the acreage of land affected by the approved variance requests is also provided below.

SUMMARY OF APPROVED LEVEL 1, 2, AND 3 VARIANCES

Variance Number	Date Issued	Location (Spread/Milepost)	Brief Description	Net Acreage Affected – Federal Land	Net Acreage Affected – Non-Federal Land
LEVEL 1					
XX-XX-001	X/X/200X	Spread X - X.X	Approved the like-use of an existing gravel road. This road is needed to allow travel around and 8-inch-diameter aboveground waterline that crosses the right-of-way.	X.X	X.X
LEVEL 2					
-None-					
LEVEL 3					
-None-					

SUMMARY OF ACREAGE AFFECTED BY VARIANCES

	Acreage Affected This Reporting Period	Cumulative Acreage Affected
Federal Land	X.X	X.X
Non-Federal Land with some Federal Jurisdiction	X.X	X.X
Total	**X.X**	**X.X**
Includes variances on non-Federal land that are within 300 feet of previously identified cultural resources or listed species or their habitat.		

Attachment D

BLM Authorized Officer Weekly Report

BLM Authorized Officer Weekly Report

Address: Phone: Website:
City, State Zip Fax:

Project: Imperial Valley Solar

Weekly Project Update

Project:

Week Ending:

Prepared By:

1. Executive Summary of Current Issues

The following construction activities were observed onsite:

General:

Civil:

STG:

BOP Equipment:

Concrete Placement:

BLM Authorized Officer NOTE:

Plan Review Submittal Items

Submittal Type	Description
Received, Review Pending	
Reviewed and Approved / Conditionally Approved	
Reviewed and Correction List Issues	

Inspection:

2. General Activities Occurring at the Project Site

3. Completion Percentage of Overall Construction

WEEK	PERIOD OF PROJECTION	% COMPLETE (PROJECTED)	% COMPLETE (UPDATED)

Table Note 1: The percentage complete is an estimate only and is not derived directly from the project schedule.

Table Note 2: Number of weeks from project CEC Notice to Proceed/Start Date.

4. Compliance Issues with Applicable LORS and Applicable Conditions of Certification (e.g., areas out of compliance, interpretational disagreements, etc.)

5. Issues of Concern with or by the Applicant

6. Status of Interconnections (e.g., Fuel Gas, Water Connections, Electricity to Grid, etc.)

7. Scheduled Activities for Next Week

8. Potential Delays to the Online Date of the Project

9. Project Photographs from Week

Attachment E

Certification of Completion of Worker Environmental Awareness Program

Certification of Completion
Worker Environmental Awareness Program

This is to certify these individuals have completed a mandatory Bureau of Land Management-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the Monthly Compliance Report.

No.	Employee Name	Title/Company	Signature
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			

Cultural Trainer:_____ Signature: _____ Date: ____/____/_____

Paleo Trainer: _____ Signature: _____ Date: ____/____/_____

Biological Trainer: _____ Signature: _____ Date: ____/____/_____

Attachment F

Complaint Report/Resolution Form

COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME: AFC Number:
COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number: _____
Date and time complaint received: Indicate if by telephone or in writing (attach copy if written) Date of first occurrence:
Description of complaint (including dates, frequency, and duration):
Findings of investigation by project personnel: Indicate if complaint relates to violation of the ROW Grant. Indicate if complaint relates to violation of a BLM requirement. Date complainant contacted to discuss findings: _____
Description of corrective measures taken or other complaint resolution: Indicate if complainant agrees with proposed resolution. If not, explain: Other relevant information:
If corrective action necessary, date completed: _____ Date first letter sent to complainant: _____ (copy attached) Date final letter sent to complainant: _____ (copy attached)
This information is certified to be correct. Project: _____ Manager's Signature: _____ Date: _____

(Attach additional pages and supporting documentation, as required.)

Attachment G

Key Events List

KEY EVENTS LIST

PROJECT: _____ DOCKET #: _____

BLM'S AUTHORIZED OFFICER: _____

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
Online Date	
PROJECT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Roll of Steam Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
GENERATION TIE LINE ACTIVITIES	
Start Generation Tie Line Construction	
Synchronization with Grid and Interconnection	
Complete Generation Tie Line Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

Attachment H

Non-Conformity Report

NON-CONFORMITY REPORT

Company Name

Address: Phone: Website:
City, State Zip Fax:

Inspection Agency:	**Date:**
Building:	**Reference:**
Type of Inspection:	**Inspected By:**

DATE, LOCATION AND ITEMS INSPECTED:

DATE, LOCATION & TESTS PERFORMED:

LIST NON-CONFORMING ITEMS *WITH* **CORRECTIONS:**

LIST NON-CONFORMING ITEMS *WITHOUT* **CORRECTIONS:**

LIST AUTHORIZED CHANGES TO THE APPROVED PLAN – *INCLUDE R.F.I. NUMBER*

R.F.I. #	

Attachment I

Variance Request Form

Variance Request Form

LOGO

COMPANY
ADDRESS
CITY, STATE ZIP
PHONE

Variance:_____
Request No.:_____
Date Submit:_____
Date Approval Needed:_____
Date Agency Received:_____
Agency Approval Reference No.:_____

Request Prepared by:
Spread/ Location (Milepost):
Alignment Sheet / Sta. No.:
Net acreage affected:
Tract No:
Landowner:
In or within 50 feet of a wetland: ☐ Yes ☐ No
Current Land Use/ Vegetative Cover:
Within 50 feet of a water body: ☐ Yes ☐ No
Nearby Features (Water body, T&E Habitat, Wetland, Noxious Weed) Area, Residence, Cultural Resource Site (distance, etc.):

Variance Level: ☐ Level 1 ☐ Level 2 ☐ Level 3 **(To Be Assigned by Designated Representative)**

Variance From: ☐ Permit ☐ Plan/Procedure ☐ Specification ☐ Drawing ☐ Mitigation Measure ☐ Other:

Detailed Description of Variance: Attachments? ☐ Yes ☐ No Photos? ☐ Yes ☐ No

Variance Justification:

For (Company Name) Use Only

Additional Surveys Required	Surveyed Corridor Description	Additional Surveys Completed
Cultural Survey ☐ Yes ☐ No		☐ Yes ☐ No
T & E Survey ☐ Yes ☐ No		☐ Yes ☐ No

Report Documenting Survey:

Sign-off (as appropriate)	Name (print)	Approval Signature	Conditions (See Attached)
Contractor Sup't. or Env. Coordinator			☐ Yes ☐ No
Lead Environmental Inspector			☐ Yes ☐ No
Spread Supervisor			☐ Yes ☐ No
Environmental Field Manager			☐ Yes ☐ No
ROW Agent			☐ Yes ☐ No

For BLM Project Manager or Compliance Contact Use Only

Variance Approved: ☐ Variance Denied: ☐ Date:

Signature:

For Compliance Manager and Monitor Use Only

Variance Approved: Variance Denied: Date:

Signature:

Stipulations:

Spread: OPPC Variance Request No.:

VARIANCE CONDITIONS

Name: Title: Organization:

Conditions:

Name: Title: Organization:

Conditions:

Name: Title: Organization:

Conditions:

Attachment J

Amendment to the 2007 Memorandum of Understanding

AMENDMENT TO THE 2007 MEMORANDUM OF UNDERSTANDING
BETWEEN THE BUREAU OF LAND MANAGEMENT and THE CALIFORNIA ENERGY COMMISSION

CONCERNING CONSTRUCTION COMPLIANCE, ENVIRONMENTAL COMPLIANCE, DESIGN REVIEW, PLAN CHECK, AND CONSTRUCTION INSPECTION OF SOLAR THERMAL POWER PLANT PROJECTS ON PUBLIC LANDS

I. BACKGROUND

On August 8, 2007, the Bureau of Land Management ("BLM") and the California Energy Commission ("Commission") formalized a Memorandum of Understanding ("2007 MOU") for joint environmental review of solar thermal power plant projects to be located on public lands. It is in the interest of the Parties to share in construction compliance, environmental compliance, design review, plan check, and construction, maintenance, operation and termination inspection (collectively "compliance review") of solar thermal power plant projects on public lands, to avoid duplication of staff efforts, to share staff expertise and information, to promote intergovernmental coordination at the state and Federal levels, to develop a more efficient compliance review process, and to meet state and Federal requirements.

II. PURPOSE

The purpose of this Amendment to the 2007 MOU is to ensure that jointly reviewed and approved solar thermal power plant projects, located on public lands, are constructed, operated, maintained, and terminated in conformity with the decisions issued by the BLM and the Commission.

III. ROLES AND RESPONSIBILITIES

Under California State law, the Commission has permitting authority for solar thermal power plants designed to generate over 50 megawatts in California under the California Public Resources Code 25500 et seq. If approved, the Commission's Decision will contain Conditions of Certification for preconstruction, construction, and operation for the life of the project.

Under Federal law, the BLM has authority to grant rights-of-way over the public lands for generation, transmission, and distribution of electric energy systems under Title V of FLPMA, 43 U.S.C. sec. 1761 et seq. If approved, the BLM will issue a Record of Decision and an accompanying right-of-way grant containing terms and conditions to minimize damage and otherwise protect the environment, require compliance with applicable air and water quality standards, require compliance with state standards for public health and safety, environmental protection, and siting, construction, operation, and maintenance of rights-of-way if those state standards are more stringent than applicable Federal standards, and other requirements. The BLM will grant rights-of-way over the public lands in a manner that protects the natural resources associated with the public lands and adjacent lands, prevents unnecessary or undue degradation to public lands, promotes common use, and coordinates to the fullest extent possible with state government and others. The right-of-way grant will ensure the protection of public health and

safety, preclude unnecessary damage to the environment, and prevent the unnecessary or undue degradation of the public lands. The right-of-way holder ("Holder") must comply with Title 43 of the Code of Federal Regulations (CFR) Part 2800, and by accepting the grant, is bound to the terms and conditions of the grant.

Under the terms of this Amendment to the 2007 MOU, the Commission will provide primary oversight for the Holder's compliance with the California Building Standards Code (CBSC), and other applicable state laws, ordinances, regulations, and standards (LORS) to ensure health and safety of the public, and protection of the environment. The BLM will provide primary compliance oversight for the right-of-way terms and conditions that are required by the BLM, and that are separate and apart from those for which the primary oversight is being administered by the Commission.

Both the BLM and Energy Commission agree to communicate and cooperate in a manner in order to avoid duplication of efforts and to assist each other in effective implementation of compliance efforts.

Under the terms of this Amendment to the 2007 MOU, the Commission will provide the BLM with access to all relevant documents and records applicable to the Holder's compliance with State Laws and standards for the construction, operation, maintenance and termination of approved solar thermal power plant projects, if appropriate. Should the Commission seek assistance from the BLM with enforcement of state requirements, requests for assistance will be directed to the BLM's authorized officer.

Under the terms of this Amendment to the 2007 MOU, the BLM will provide the Commission with access to all relevant documents and records applicable to the Holder's compliance with requirements of the right-of-way grant for the construction, operation, maintenance and termination of approved solar thermal power plant projects, if appropriate. Should the BLM seek assistance from the Commission with enforcement of federal requirements, requests for assistance will be directed to the Commission's Certified Building Official.

Under the terms of this Amendment to the 2007 MOU, the respective staff of the BLM and the Commission, working cooperatively on compliance efforts, are encouraged to enter into local operating agreements. These local operating agreements will reflect the principles outlined in this Amendment and further describe the processes and protocols that will be established for communication and cooperation between the BLM and the Commission in conducting compliance review operations.

IV. IMPLEMENTATION AND AMENDMENT

This Amendment to the 2007 MOU becomes effective upon signature by the BLM California State Director and the California Energy Commission Executive Director, and may be subsequently amended or modified through the written agreement of both directors.

V. RESOLVING DISAGREEMENT

If there is disagreement between the Commission staff and the BLM staff regarding the provisions of this Amendment, representatives of each staff will meet to discuss the issue(s) in dispute and shall work in good faith towards resolution of the issue(s). If agreement is not reached within 21 days of this initial meeting, the signatories of this Amendment to the 2007 MOU, or delegate, shall confer to resolve the

disagreement. If resolution is not achieved, the BLM and the Commission may agree to disagree and to resolve the issue under respective principles of Federal or state law.

VI. TERMINATION

This Amendment to the 2007 MOU will remain in effect until satisfied or terminated, or until the 2007 MOU is satisfied or terminated. This Amendment to the 2007 MOU may be terminated in writing by either the BLM or the Commission by providing 30 days written notice of termination to the other .

VII. SIGNATURES AND EFFECTIVE DATE

The BLM and the Commission have executed, and this Amendment to the 2007 MOU becomes effective as of the date of the last signature shown below.

CALIFORNIA ENERGY COMMISSION

DATED:_____ _____

Melissa Jones, Executive Director
California Energy Commission

BUREAU OF LAND MANAGMENT

DATED:_____ _____

James W. Abbott, Acting State Director
California Bureau of Land Management

Attachment K

Summary of California Energy Commission Conditions of Certification and Bureau of Land Management Monitoring

Summary of California Energy Commission Conditions of Certification and Bureau of Land Management Monitoring

Condition	Summary	CEC	BLM	Comment
Air Quality				
Exhaust Emissions Control	Follow exhaust emissions control standards for construction equipment	X		Component of monitoring to be managed by the California Energy Commission (CEC)
Fugitive Dust Control	Follow fugitive dust control standards during construction	X		Component of monitoring to be managed by CEC
Emergency Generator	Best available control technology requirements for emergency generator engine during operations	X		Component of monitoring to be managed by CEC
Gasoline Tank	Requirements for gasoline storage tank on-site during operations	X		Component of monitoring to be managed by CEC
Operational and Maintenance Vehicles	Vehicle standards during operations	X		Component of monitoring to be managed by CEC
AQ-SC1	Designate an Air Quality Construction Mitigation Manager	X		Component of monitoring to be managed by CEC
AQ-SC2	Develop an Air Quality Construction Mitigation Plan	X		Component of monitoring to be managed by CEC
AQ-SC3	Fugitive Dust Control Plan for Construction	X		Component of monitoring to be managed by CEC
AQ-SC4	Monitoring and response to dust plumes	X		Component of monitoring to be managed by CEC
AQ-SC5	Diesel-fueled engine control	X		CEC-specific requirement
AQ-SC6	New model year vehicles for maintenance and mirror washing	X		CEC-specific requirement
AQ-SC7	Fugitive Dust Control Plan for Operations	X		Component of monitoring to be managed by CEC
AQ-SC8	Provide copies of ATC and PTO	X		CEC-specific requirement
AQ-SC9	Follow emissions standards for emergency generator and fire pump engines	X		CEC-specific requirement
AQ-SC10	Gasoline tank and appurtenances vapor recovery and standing loss requirements	X		Component of monitoring to be managed by CEC

Condition	Summary	CEC	BLM	Comment
Biological Resources				
BIO-1	Designated Biologist selection and qualifications	X		Component of monitoring to be managed by CEC
BIO-2	Designated Biologist duties	X		Component of monitoring to be managed by CEC
BIO-3	Biological Monitor selection and qualifications	X		Component of monitoring to be managed by CEC
BIO-4	Biological Monitor duties	X		Component of monitoring to be managed by CEC
BIO-5	Designated Biologist and Biological Monitor authorities	X		Component of monitoring to be managed by CEC
BIO-6	Worker Environmental Awareness Program	X		Component of monitoring to be managed by CEC
BIO-7	Biological Resources Mitigation Implementation and Monitoring Plan	X		Component of monitoring to be managed by CEC
BIO-8	General biological impact avoidance and mitigation measures	X		Component of monitoring to be managed by CEC
BIO-9	FTHL impact avoidance and mitigation measures	X	X	
BIO-10	FTHL compensation lands	X	X	
BIO-11	Provision of access to project site and mitigation by project owner and CEC, BLM, CDFG, USFWS, and Corps to verify compliance and effectiveness of mitigation measures	X	X	
BIO-12	Raven Management Plan	X	X	
BIO-13	Exclusionary fencing and covering on and around the evaporation ponds	X	X	
BIO-14	Pre-construction nest surveys	X		Component of monitoring to be managed by CEC
BIO-15	Pre-construction surveys for American badgers and desert kit fox	X		Component of monitoring to be managed by CEC
BIO-16	Burrowing owl impact avoidance and minimization measures	X		Component of monitoring to be managed by CEC
BIO-17	Jurisdictional streambed and waters of the U.S. impact minimization and compensation measures	X		Other state regulation (CDFG and Corps)
BIO-18	Noxious Weed Management Plan	X	X	
BIO-19	Provide information on special-status plant species and conduct surveys as directed by BLM		X	
BIO-20	Decommissioning and Reclamation Plan	X	X	

Condition	Summary	CEC	BLM	Comment
Climate Change				
None	Not applicable	--	--	--
Cultural and Paleontological Resources				
CUP-1	Identify and evaluate cultural resources in Area of Potential Effects	X	X	
CUP-2	Good faith and reasonable effort to avoid and protect potentially significant cultural resources	X	X	
CUP-3	Develop and implement Historic Properties Treatment Plan(s)	X	X	
CUP-4	Conduct data recovery or other actions to resolve adverse effects	X	X	
CUP-5	Monitor construction at known environmentally sensitive areas	X	X	
CUP-6	Train construction personnel	X	X	
CUP-7	Properly treat human remains	X	X	
CUP-8	Monitor construction in areas of high sensitivity for buried resources	X	X	
CUP-9	Continue consultation with Native American and other traditional groups		X	
CUP-10	Protect and monitor National Register- and/or California Register-eligible properties	X	X	
CUP-11	Complete identification efforts for the Anza Trail and coordinate mitigation efforts		X	
PAL-1	Designate PRS and Monitors	X		Component of monitoring to be managed by CEC
PAL-2	Provide maps and drawings to the PRS	X		Component of monitoring to be managed by CEC
PAL-3	Develop PRMMP if directed by PRS	X		Component of monitoring to be managed by CEC
PAL-4	Worker Environmental Awareness Program, and conduct weekly training, if required by PRS	X		Component of monitoring to be managed by CEC
PAL-5	Monitor in areas on grading, excavation, trenching, and augering	X		Component of monitoring to be managed by CEC

Condition	Summary	CEC	BLM	Comment
PAL-6	Collect fossil materials in accordance with the PRMMP	X		Component of monitoring to be managed by CEC
PAL-7	Develop Final Paleontological Resources Report	X		Component of monitoring to be managed by CEC
Fire and Fuels Management				
WORKER SAFETY-1	Submittal of Construction Safety and Health Program	X	X	
WORKER SAFETY-1	Submittal of Operations and Maintenance Safety and Health Program	X	X	
Geology, Soils, Topography, Mineral Resources, and Seismic				
GEO-1	Comply with the most current California Building Code standards in the design and construction of the project	X	X	
GEO-2	Submittal of erosion and sedimentation control plan, soils, geotechnical, or foundation reports, grading plan, and design of proposed drainage structures.	X	X	
Grazing, and Wild Horses and Burros				
None	Not applicable	--	--	--
Land Use and Corridor Analysis				
None	Not applicable	--	--	--
Noise and Vibration				
NOISE-1	Notify residents within 2 miles of the of the commencement of construction	X		Component of monitoring to be managed by CEC
NOISE-2	Noise Complaint Process	X		Component of monitoring to be managed by CEC
NOISE-3	Noise Control Program and Statement	X		Component of monitoring to be managed by CEC
NOISE-4	Noise level restrictions and survey	X		Component of monitoring to be managed by CEC
NOISE-5	Noise Hazard Surveys	X		Component of monitoring to be managed by CEC
NOISE-6	Construction time restrictions	X		Component of monitoring to be managed by CEC
Public Health and Safety, and Hazardous Materials				
None	Not applicable	--	--	--
Recreation				
REC-1	Develop a Comprehensive Interpretive Plan for the Anza Trail		X	Component of monitoring to be managed by BLM

Condition	Summary	CEC	BLM	Comment
Socioeconomics and Environmental Justice				
None	Not applicable	--	--	--
Special Designations				
None	Not applicable	--	--	--
Traffic and Transportation				
TRANS-1	Construction Traffic Control Plan	X		Component of monitoring to be managed by CEC
TRANS-2	Authority to construct from the railroad for the railroad crossing	X		Component of monitoring to be managed by CEC
TRANS-3	Repair damaged public road rights-of-way	X		Component of monitoring to be managed by CEC
TRANS-4	SunCatcher Mirror Positioning Plan and monitoring	X		Component of monitoring to be managed by CEC
Visual Resources				
VIS-1	Surface treatment of project structures and buildings	X		Component of monitoring to be managed by CEC
VIS-2	Temporary and permanent exterior lighting	X		Component of monitoring to be managed by CEC
VIS-3	Realignment of proposed transmission interconnection	X		Component of monitoring to be managed by CEC
VIS-4	Setback of SunCatchers from Interstate 8	X		Component of monitoring to be managed by CEC
VIS-5	Contribute funds to the BLM and NPS to provide improvements to benefit visitors on the Anza Trail	X	X	Component of monitoring to be managed by BLM
VIS-6	Reflective glare mitigation	X		Component of monitoring to be managed by CEC
VIS-7	Setback and revegetation of staging areas	X		Component of monitoring to be managed by CEC
Hydrology, Water Use, and Water Quality				
SOIL&WATER-1	Drainage, Erosion, and Sedimentation Control Plan	X		Other State regulation (Water Board)
SOIL&WATER-2	Monitoring and verification of water use	X	X	
SOIL&WATER-3	Industrial Facility SWPPP	X		Other State regulation (Water Board)
SOIL&WATER-4	Potable water requirements	X	X	
SOIL&WATER-5	NPDES General Permit for Construction Activity	X		Other State regulation (Water Board)
SOIL&WATER-6	Waste Discharge Requirements	X		Other State regulation (Water Board)
SOIL&WATER-7	Storm Water Damage Monitoring and Response Plan	X	X	
SOIL&WATER-8	Septic system and leach field requirements	X		Other State regulation (Water Board)

Condition	Summary	CEC	BLM	Comment
SOIL&WATER-9	Assured water supply	X		Other State regulation (Water Board)
SOIL&WATER-10	Decommissioning Plan	X	X	

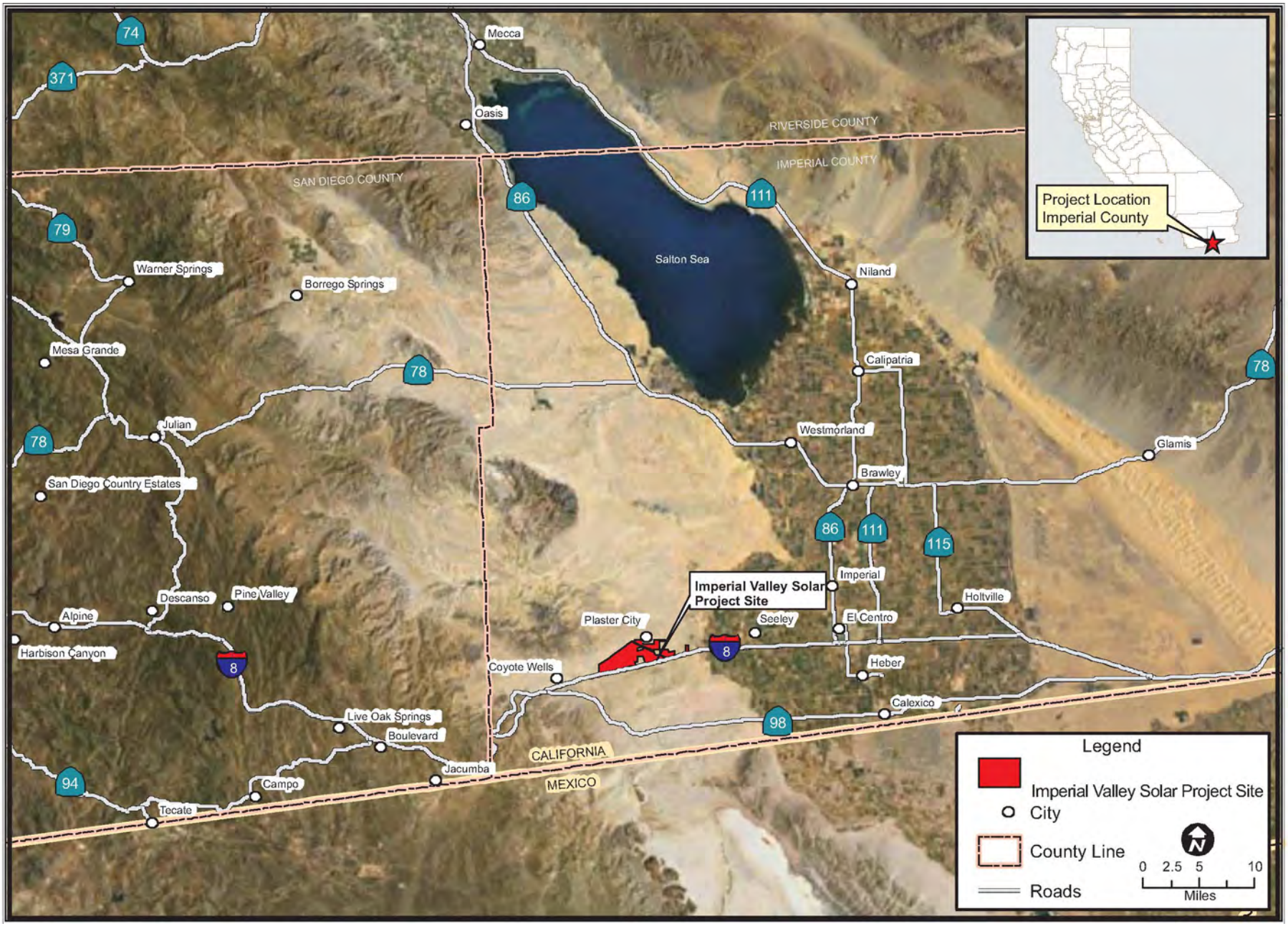
Table Source: United States Bureau of Land Management and LSA Associates, Inc. (2010).

Table Key: Anza Trail = Juan Bautista de Anza National Historic Trail; ATC = Authority-to-Construct; BLM = United States Bureau of Land Management; California Register = California Register of Historical Resources; CDFG = California Department of Fish and Game; CEC = California Energy Commission; Corps = United States Army Corps of Engineers; FTHL = flat-tailed horned lizard; National Register = National Register of Historic Places; NPDES = National Pollutant Discharge Elimination System; NPS = National Park Service; PRMMP = Paleontological Resources Monitoring and Mitigation Plan; PRS = Paleontological Resources Specialist; PTO = Permit-to-Operate; SWPPP = Storm Water Pollution Prevention Plan; USFWS = United States Fish and Wildlife Service.

Appendix 5:
Location Maps

FIGURE 1

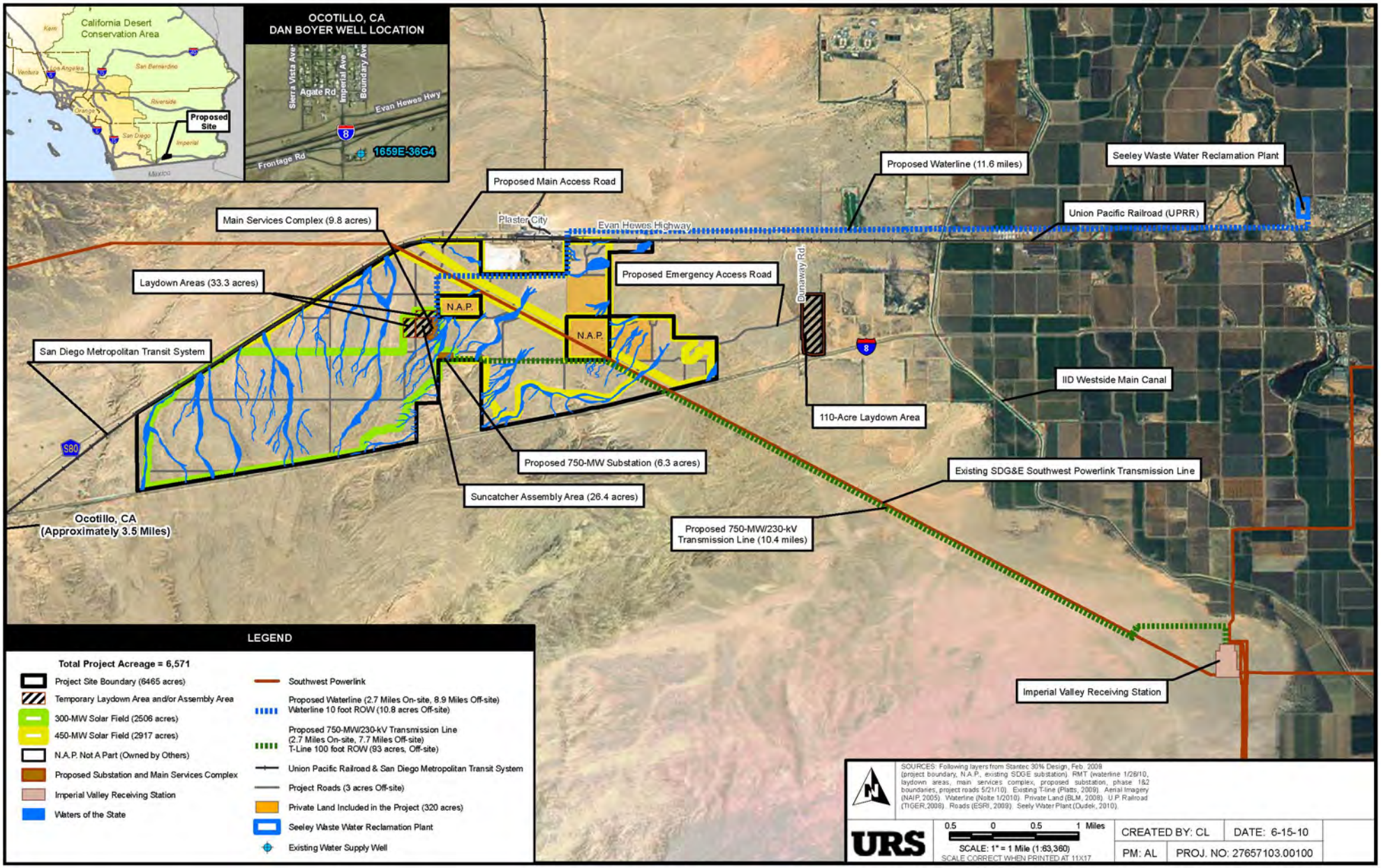
Regional Overview Map



SOURCE: Final Environmental Impact Statement (July 2010)

FIGURE 2

Imperial Valley Solar Project Layout



SOURCE: Final Environmental Impact Statement (July 2010)

Appendix 6:
Additional Agency Approvals and Review

U.S. Army Corps of Engineers

Final 404(b)(1) Alternatives Analysis

For the Imperial Valley Solar Project (IVSP)

(aka "SES Solar II")

U.S. Army Corps of Engineers, Los Angeles District

Regulatory Division, South Coast Branch
6010 Hidden Valley Road, Suite 105
Carlsbad, CA 92011

Project Contact:

Michelle Lee Mattson
Senior Project Manager

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September 21, 2010

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List of Acronyms and Abbreviations

Full Name	Acronym or Abbreviation
Above Market Funds	AMF
Application for Certification	AFC
Area of Critical Environmental Concern	ACEC
Army Corps of Engineers	ACOE
Best management practices	BMPs
Birds of Conservation Concern	BCC
Bureau of Land Management	BLM
California Energy Commission	Energy Commission
California Environmental Quality Act	CEQA
California Independent System Operator	CAISO
California Native Plant Society	CNPS
California Public Utilities Commission	CPUC
California Rapid Assessment Model	CRAM
California Wetlands Monitoring Workgroup	CWMW
Colorado River Regional Water Quality Control Board	RWQCB
Cubic feet per day	cfd
Cubic feet per second	cfs
Debt service coverage ratio	DSCR
Department of Energy	DOE
Designated Critical Habitat	DCH
Dollar per megawatt-hour	$/MWh
Drainage, Erosion and Sediment Control Plan	DESCP
Federal Emergency Management Agency	FEMA
Federal Highway Administration	FHWA
Final Environmental Impact Statement	Final EIS
Flat-tailed horned lizard	FTHL
Gallons Per Day	gpd
Interstate 8	I-8
Imperial Valley Solar Project (aka Solar II)	IVSP
Kilovolt	kV
Kilowatt	kW
Least Environmentally Damaging Practicable Alternative	LEDPA

Full Name	Acronym or Abbreviation
Market Price Referent	MPR
Megawatt	MW
Milligram/liter	mg/L
mmhos per centimeter	mmhos/cm
National Environmental Policy Act	NEPA
National Renewable Energy Laboratory	NREL
National Wetlands Inventory	NWI
Natural Resources Conservation Service	NRCS
Naval Air Facility	NAF
Organophosphorus insecticides	OP
Peninsular bighorn sheep	PBS
Photovoltaic	PV
Power conversion unit	PCU
Power Purchase Agreement	PPA
Programmatic Agreement	PA
Regional Water Quality Control Board	RWQCB
Renewable Portfolio Standard	RPS
Revised Universal Soil Loss Equation	RUSLE2
Right-of-way	ROW
San Diego Gas & Electric	SDG&E
Seeley Waste Water Treatment Facility	SWWTF
Soil Conservation Service	SCS
Soil erosion factor	K
Solar Programmatic Environmental Impact Statement	PEIS
Southern California Coastal Water Research Project	SCCWRP
Staff Assessment/Draft Environmental Impact Statement	SA/DEIS
Supplemental Staff Assessment	SSA
Standard Individual Permit	IP
Stormwater Pollution Prevention Plan	SWPPP
Tessera Solar North America	TSNA
Total dissolved solids	TDS
United States Army Corps of Engineers	Corps
United States Department of Agriculture	USDA
United States Department of Defense	DOD

Full Name	Acronym or Abbreviation
United States Environmental Protection Agency	EPA
United States Fish and Wildlife Service	USFWS
United States Geological Survey	USGS
Waters of the United States	WUS

1.0 Introduction

On November 4, 2009, U.S. Army Corps of Engineers (Corps) received an application from Tessera Solar North America (TSNA) (the Applicant) for a Clean Water Act (CWA) Section 404 Standard Individual Permit (IP) for the Imperial Valley Solar Project (IVSP) previously known as "SES Solar II". The Applicant sought authorization to fill 165 acres of the total 881 acres of waters of the United States (WUS) supported on a 6,571 acre site (the project site) located in Imperial County, California. The site is primarily on federal lands managed by the United States Department of the Interior, Bureau of Lands Management (BLM). The original project proposed to BLM included the installation of solar generating facilities capable of generating up to 900-megawatts (MW) of electricity on approximately 7,650 acres of land (900-MW Project, Alternative 2). Site investigation by archeologists hired by the Applicant and BLM staff archeologists revealed that development in the eastern portion of the larger site would result in significant and unavoidable impacts to sensitive environmental resources. The project was therefore redesigned by the Applicant to avoid these impacts, resulting in a reduction of the developable area to approximately 6,571 acres with the capacity of generating 750 MW of electricity (750-MW Project, Alternative 1). Since submittal of the IP application to the Corps, the Applicant has further incorporated project revisions to avoid and minimize impacts to WUS. As is described in detail below, this effort has resulted in avoidance and minimization of impacts to aquatic resources [(from 177 acres of permanent direct impacts as proposed in the 900-MW Project (Alternative 2) to 38.2 acres of permanent direct impacts in the 709-MW Project (Alternative 3) associated with fill material.)] The Applicant has subsequently submitted a request to modify the project description and request for Corps authorization to permanently fill the 38.2 acres of WUS associated with the 709-MW Project; herein determined by the Corps to be the Least Environmentally-Damaging Practicable Alternative (LEDPA).

The following impact analysis is provided in accordance with Section 404(b)(1) of the Clean Water Act. To avoid duplication of pertinent information, there are multiple references to sections within the California Energy Commission's (Energy Commission) Supplemental Staff Assessment (SSA) (July 2010) and BLM's Final Environmental Impact Statement (Final EIS) (July 2010).

1.1 Regulatory Setting

Any activity requiring an IP under Section 404 of the Clean Water Act must undergo an analysis of alternatives in order to identify the LEDPA pursuant to the requirement of the guidelines established by the United States Environmental Protection Agency (EPA), known as the *Section 404(b)(1) Guidelines*. The *Section 404(b)(1) Guidelines* prohibit discharges of dredge or fill material into WUS if there is a "practicable alternative to the proposed discharge that would have less impact on the aquatic ecosystem, provided that the alternative does not have other significant environmental consequences." [40 C.F.R. § 230.10(a).]. An alternative is practicable "if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purposes." [40 C.F.R. §§ 230.10(a) and 230.3(q).] "If it is otherwise a practicable alternative, an area not presently *owned* by an Applicant which could reasonably be obtained, utilized,

expanded or managed in order to fulfill the basic purpose of the proposed activity may be considered." [40 C.F.R. § 230.10(a)(2).]

If the proposed activity would involve a discharge into a special aquatic site such as a wetland, the *Section 404(b)(1) Guidelines* distinguish between those projects that are water dependent and those that are not. A water dependent project is one that requires access to or proximity to or siting within a special aquatic site to achieve its basic purpose, such as a marina. A non-water dependent project is one that does not require access to or proximity to or siting within a special aquatic site to achieve its basic purpose, such as a housing development. The IVSP is not water dependent.

The *Section 404(b)(1) Guidelines* establish two presumptions for non-water dependent projects that propose a discharge into a special aquatic site, such as wetlands. First, it is presumed that there are practicable alternatives to non-water dependent projects, "unless clearly demonstrated otherwise." [40 C.F.R. § 230.10(a)(3).] Second, "where a discharge is proposed for a special aquatic site, all practicable alternatives to the proposed discharge which do not involve a discharge into a special aquatic site are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise." [Id.] The thrust of the Guidelines is that Applicants should design proposed projects to meet the overall project purpose while avoiding impacts to aquatic environments. This approach is emphasized in a Memorandum of Agreement between the EPA and the Corps Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines (1990) ("MOA") as modified by the Corps and EPA Final Mitigation Rule (33 CFR Parts 325 and 332 and40 CFR Part 230). The MOA articulates the Guidelines "sequencing" protocol as first, avoiding impacts; second, minimizing impacts; and third, providing practicable compensatory mitigation for unavoidable impacts and no overall net loss of functions and values. These presumptions do not apply to the IVSP as no special aquatic sites are directly impacted.

In addition to requiring the identification of the LEDPA, the *Section 404(b)(1) Guidelines* mandate that no discharge of dredged or fill material shall be permitted if it causes or contributes to violations of any applicable State water quality standard, 40 C.F.R. 230.10(b)(1), violates any applicable toxic effluent standard or prohibition, 40 C.F.R. § 230.10(b)(2), jeopardizes the continued existence of any endangered or threatened species (or destroy or adversely modify critical habitat), 40 C.F.R. § 230.10(b)(3), or causes or contributes to significant degradation of WUS, 40 C.F.R. § 230.10(c).

1.2 Basic and Overall Project Purpose

Basic Project Purpose -The basic project purpose is used to determine whether a proposed project is water dependent (i.e., whether it requires a location that affects waters of the U.S.). The basic project purpose comprises the fundamental, essential, or irreducible purpose of the proposed project, and is used by the Corps to determine whether the applicant's project is water dependent. The basic project purpose is: **"Energy Production."** The basic project purpose is not water dependent.

Overall Project Purpose – The overall project purpose serves as the basis for the Corps' Section 404(b)(1) alternatives analysis and is determined by further defining the basic project

purpose in a manner that more specifically describes the Applicant's goals for the project, and which allows a reasonable range of alternatives to be analyzed. The overall project purpose is: **"To provide a solar energy facility ranging in size from 300 Megawatts to 750 Megawatts in Imperial County, California."**

1.3 Location

TSNA's IVSP, a proposed solar thermal electricity generation facility, would be located in Imperial County, California, primarily on public land managed by the BLM. The project site is approximately 100 miles east of San Diego, 14 miles west of El Centro, and 4 miles east of Ocotillo. The following sections or portions of sections within Township 16 of the San Bernardino Meridian, identify the project site and the planned boundary for development of the IVSP. A regional overview map is included in Figure 1 and the IVSP description is included in Figure 2. The IVSP is within U.S. Geological Survey (USGS) 7.5-minute map quadrangles; Plaster City, Painted Gorge, and a small portion on Coyote Wells.

- Within Township 16 South, Range 11 East of the San Bernardino Meridian defined by:
    - the portion of Section 7 south of the railroad right-of-way (ROW),
    - the portion of the southwest quarter section and the north half of the southeast quarter section of Section 9 south of the railroad ROW,
    - the southeast quarter-quarter section of the northeast quarter section and the east half of the southeast quarter section of Section 14 north of the Interstate 8 (I-8) ROW and east of Dunaway Road,
    - the southwest, northwest, and southeast quarter-quarter sections of the southwest quarter section of Section 15, and the southwest quarter-quarter of the southeast quarter section of Section 15,
    - the northwest quarter and southeast quarter of Section 16,
    - all of Section 17,
    - Section 18, excluding the southwest and southeast quarter-quarter sections of the northeast quarter section,
    - the northwest quarter and the portion of the west half of the southwest quarter of Section 19 north of the I-8 ROW,
    - the portion of Sections 20 and 21 north of the I-8 ROW, and
    - the portion of the north half of the northwest quarter section and the northwest quarter-quarter section of the northeast quarter section of Section 22 north of the I-8 ROW.
- Within Township 16 South, Range 10 East of the San Bernardino Meridian defined by:
    - the portions of Sections 12, 13, and 14 south of the railroad ROW,
    - the portions of Section 22 south of the railroad ROW,
    - all of Sections 23 and 24, and
    - the portions of Sections 25, 26, and 27 north of the I-8 ROW.

Generally, the IVSP boundary consists of the Union Pacific Railroad on the north and I-8 on the south. The eastern boundary is approximately 1½ miles west of Dunaway Road; and the western boundary is the westerly section line in Section 22 in Township 16 South, Range 12 East. An additional 125 acre construction area is located east of Dunaway Road. The IVSP would also include an electrical transmission line, water supply pipeline, and a site access road. An off-site 6-inch-diameter water supply pipeline would be constructed a distance of approximately 11.8 miles from the Seeley Waste Water Treatment Facility (SWWTF) to the

IVSP boundary. The water supply pipeline would be routed in the Evan Hewes Highway right-of-way (ROW), or adjacent to this ROW on public and private lands and would be buried 30 inches below ground or spanned across water bodies as described below. Approximately 7.56 miles of the 10.3-mile double-circuit generation interconnection transmission line would be constructed off-site. The transmission line would connect the proposed IVSP substation to the existing San Diego Gas and Electric (SDG&E) Imperial Valley Substation. A site access road would be constructed from Evan Hewes Highway to the northern boundary of the project site as shown in Figure 2.

1.5 General Description

The IVSP would be a solar thermal generating facility utilizing the Stirling engine (Figure 2 and Attachment B), with construction planned to begin in the fall of 2010. The primary equipment for the generating facility would include 25-kilowatt (kW) SunCatchers, their associated equipment and systems, and their support infrastructure. The SunCatcher is a 25-kW solar dish that is designed to automatically track the sun and collect and focus solar energy onto a power conversion unit (PCU), which generates electricity. The system consists of a 38-foot high by 40-foot wide solar concentrator in a dish structure that supports an array of curved glass mirror facets. These mirrors collect and concentrate solar energy onto the solar receiver of the PCU. The SunCatcher is 38-foot diameter dish, which is mounted on a 2-foot diameter, round steel pipe that is hydraulically vibrated into the ground to a depth of approximately 17 feet. When vertical (SunCatcher dish perpendicular to the ground), the bottom of the SunCatcher dish is approximately 2-feet off the ground and approximately 40 feet in height. No mass site grading is required to install a solar field using SunCatchers because of the flexibility of positioning pedestals on varying topography versus the conventional flat photovoltaic (PV) panels on table-like platforms.

The IVSP would occur on a 6,571 acre property that includes approximately 6,251 acres of federal land managed by the BLM and approximately 320 acres of privately-owned land (herein referred to as the project site).

The IVSP would be constructed in one or two phases depending on the timing of additional transmission lines. Phase I of the project would consist of up to 12,000 SunCatchers configured in 200 1.5-MW solar groups of 60 SunCatchers per group and have a maximum net generating capacity of 300 MW (300-MW Project, Alternative 4). The renewable energy from Phase I would be transmitted via the existing 500- kV SDG&E Southwest Powerlink transmission line. The project would be connected to the grid at the SDG&E Imperial Valley Substation via a 10.3-mile long, 230-kV interconnection transmission line that would be constructed as part of the project in a corridor parallel to the existing Southwest Powerlink transmission line. Phase I would require approximately 2,846 acres of land and require Corps authorization for 9.7 acres of permanent impacts and 7.3 acres of temporary impacts to WUS as described in Section 2.5.

Phase II would include a maximum of 18,000 SunCatchers; expanding the project to a total of no more than 30,000 SunCatchers configured in 500 1.5-MW solar groups with a total combined net generating capacity of up to 750 MW (e.g. 30,000 x 25kW = 750,000 kW or 750 MW) (750-MW Project, Alternative 1). Phase II would require an additional approximately

3,725 acres of the project site. Any additional energy generated in Phase II would require a new transmission capacity within the grid. This is anticipated to be provided by the proposed 500-kV Sunrise Powerlink (or equivalent) transmission line (a project independent of the IVSP). The construction and operation of Phase II is contingent on the development of either the Sunrise Powerlink transmission line or additional transmission capacity in the SDG&E transmission system. However, Phase 1 is not practicable because the cost per kW on its own is higher than price negotiated with SDG&E in the Power Purchase Agreement (PPA)[1] , which was based on the cost associated with development of a 750-MW Project (Alternative 1).

Regardless of the ultimate generation capacity of the IVSP, the infrastructure would also include office and maintenance buildings, evaporation ponds, an electrical transmission line, water supply pipeline, a site access road, interior arterial and maintenance roads and a perimeter road. A new 230-kV substation would be constructed approximately in the center of the project site. This new substation would be connected to the existing SDG&E Imperial Valley Substation via an approximately 10.3 mile, double-circuit, 230 kV transmission line. Approximately 7.56 miles of the new line would be constructed off-site.

The water supply pipeline would be constructed a distance of approximately 11.8 miles from the SWWTF to the IVSP. The water pipeline would be routed in the Evan Hewes Highway ROW to Plaster City, entering the project site at that location. A site access road would be constructed from Dunaway Road to the eastern boundary of the project site, generally following an existing road. The water pipeline would cross the New River, several irrigation ditches, and a desert stream ("Wash E" off-site). The water pipeline would be placed adjacent to Evan Hewes Highway and would cross each channel above ground (i.e. suspended either on Evan Hewes Highway bridge crossings or separate from each bridge, but elevated above the flow line (see example photographs in Attachment F). The only impacts to WUS anticipated by the water pipeline are 0.025 acres of temporary disturbance due to trenching to bury the pipeline across "Wash E" where it occurs off-site. No directional boring is proposed; however, due to a requirement by the Energy Commission, a frac-out contingency plan has been prepared. In the uplands, the water pipeline will be buried 30 inches below ground primarily within disturbed areas of the Evan Hewes Highway ROW. See Attachment F for a description, vegetation map, and photographs of the water pipeline route and frac-out contingency plan.

The Final 404(b)(1) Alternatives Analysis (this document) considers six (6) off-site alternatives, two (2) of which met the siting criteria and were analyzed for practicability. The Final 404(b)(1) Alternatives Analysis also considers six (6) on-site alternatives and a "No Project/No Development Alternative." Through the analysis, the 709-MW Project (Alternative 3) was determined to be the LEDPA and is fully analyzed for potential effects on the physical, biological, and human use characteristics.

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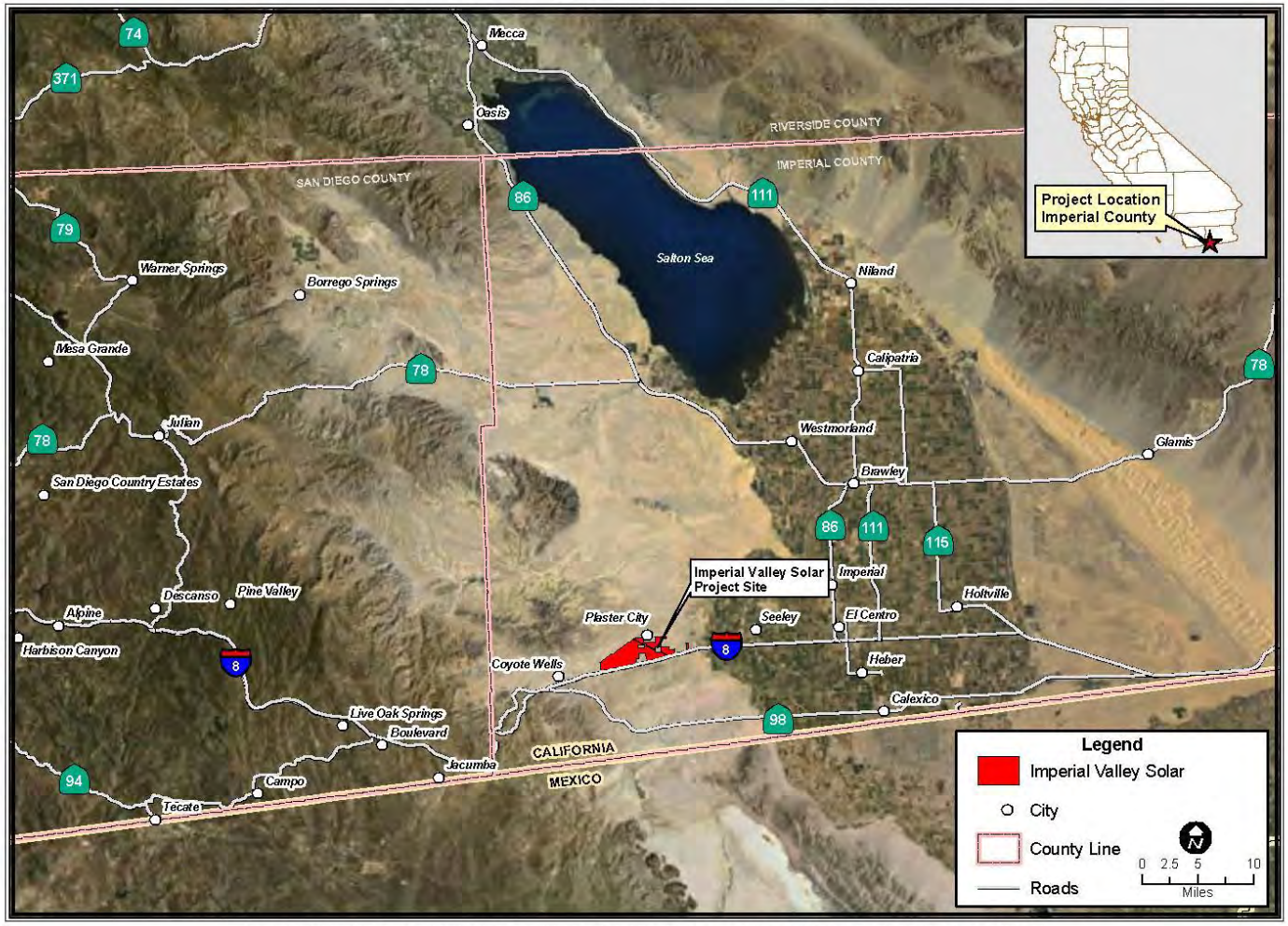
[1]Due to Confidentiality Issues, TSNA could not provide the Corps with a copy of the Power Purchase Agreement (PPA) between with SDG&E to further substantiate the practicability analysis relative to construction costs and resulting cost per kilowatt used to evaluate on-site alternatives. A letter to this effect was received by the Corps on September 13, 2010 and is in the administrative record.

PROJECT DESCRIPTION - FIGURE 1

Imperial Valley Solar - Regional Overview Map



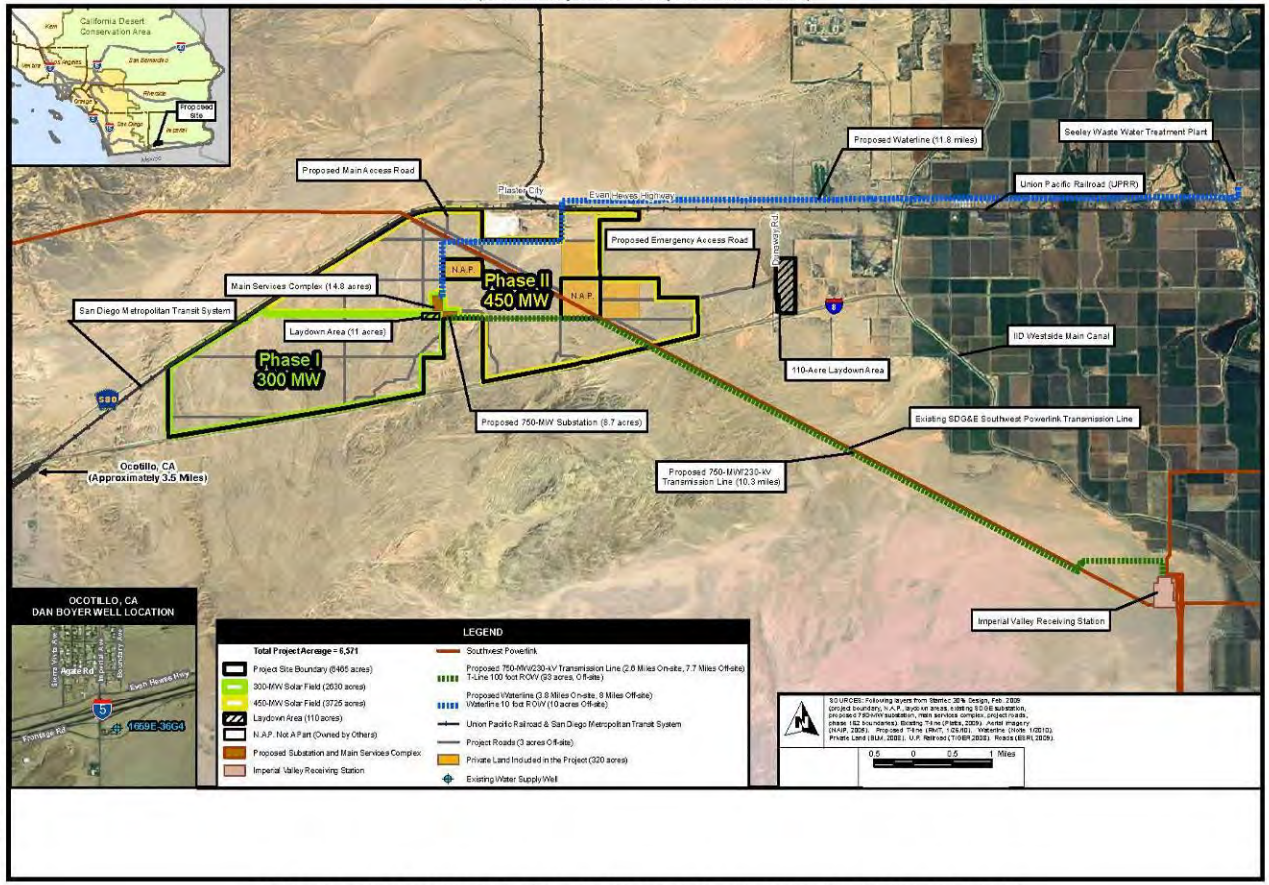
CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: ESRI Image - Multinet 09 Roads- URS Corp.

PROJECT DESCRIPTION

Figure 1. Regional Overview

Figure 2. Proposed Project Description



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: URS

PROJECT DESCRIPTION

2.0 Alternatives Analysis

2.1 Off-Site Alternatives

As described in the IP application and required by the *Section 404(b)(1) Guidelines*, the Corps evaluated alternative project sites to determine if there is an alternative site available on which the proposed project could be constructed that would involve fewer impacts to aquatic resources than the proposed project and would not have additional concomitant adverse impacts to other sensitive resources such as listed species. This involved a two-tiered review. First, alternative sites were subject to a detailed evaluation of the key siting criteria required for similarly sized, concentrating solar projects. Input was obtained on potential alternative locations through discussions with the Energy Commission, the California Independent Systems Operator (CAISO), and the BLM. The "key siting criteria" are described below.

Key siting criteria include:

- **Size: The site must be able to support construction of a comparably sized solar energy facility that meets the overall project purpose, a minimum of 300 MW and up to 750 MW of energy.**

- **Regional Location: The site must be located in an area of long hours of sunlight (low cloudiness), solar insolation should be at least seven kW-hours per square meter per day (7 kWh/m^2/day); the site must be relatively flat with a grade less than 5%; the site must have wind speeds less than 35 miles per hour 98% of the time.**

- **Proximity to Utilities: The site must be located in proximity to high-voltage CAISO transmission lines with adequate capacity and must have an adequate water supply; the site must have ease of access for construction vehicles and proximity to existing roads.**

- **Availability: The land must be available for sale or use as a utility-scale solar facility. Alternative sites must be available for purchase and development within a reasonable time frame (e.g. the number of parcels and landowners contribute to these criteria). Sites for which there is a pending application for use would not be available for development of the proposed project.**

- **Constructability: The proposed use should be consistent with existing laws, regulations, and standards such that the activity can be constructed. Sites located within Department of Defense "no fly," "no build" areas would preclude installation of the proposed project due to height restrictions for low flying aircraft. (i.e. There are large areas surrounding the U.S. Naval Air Facility at El Centro where they fly aircraft at low elevations. These areas have one of three height restrictions; 0-feet, 20-feet, and 20 to 200-feet. Individual SunCatchers are approximately 40 feet in height when the solar dish is vertical; therefore, SunCatchers and transmission lines can only be constructed in unrestricted areas or within the 20 to 200-feet zones.)**

The following six (6) off-site alternative sites were evaluated in this document per the *Section 404(b)(1) Guidelines* and are shown graphically in Attachment A:

1. Alternative Site 1 (AS-1)
2. Alternative Site 2 (AS-2)
3. Alternative Site 3 (AS-3)
4. Mesquite Lake Site
5. Agricultural Lands
6. South of Highway 98

Additional detailed descriptions of these alternatives and a discussion of why they were selected is included in Section B.2 of the SSA. Off-site alternatives were not analyzed as part of the Final EIS because they did not require any action by BLM (e.g. BLM can't issue a ROW on private land) and subsequently would not meet the BLM project purpose and need. These reasons are summarized in Section 2.8.2 of the Final EIS.

After evaluation with the siting criteria, each alternative that met these criteria was further screened for environmental impacts to WUS and sensitive species habitat to evaluate if they would be likely to have greater environmental impacts than the project site. If so, the alternative was not carried through the practicability analysis. In order to complete this comparison, the density and type of WUS, including wetlands and biological resources on each potential off-site alternative location were evaluated by the Applicant in December 2009 through additional field surveys and aerial interpretation of site conditions. Data used in developing the environmental factors below and a summary of these findings and analysis are included in Table 1.

Environmental factors for post-siting screening:

- **Streams**: The density of intermittent streams, total length of intermittent or ephemeral streams, and total Corps WUS on the land should be similar to or less than the resources supported in the project site. Table 1 includes the density and length of intermittent and ephemeral streams for each off-site alternative as mapped by the USGS National Hydrologic Dataset (USGS 2008). Potential WUS for each site was estimated using the acres of jurisdictional WUS for the proposed project site, the density of mapped intermittent and ephemeral streams for the proposed site, and extrapolating for the off-site alternatives.

- **Presence of Special Aquatic Sites:** Special aquatic sites, including wetlands, afford additional protection under the CWA and provide habitat for sensitive wildlife species such as the Yuma clapper rail. In order to estimate the presence of special aquatic sites on each property, the Applicant provided a review of the National Wetlands Inventory (NWI), additional aerial interpretation to evaluate NWI mapping units, and provided the acres of mapped wetlands in Table 1 (USFWS 2008).

- **Presence of Federally-listed Species:** The Imperial Valley has several listed species as described in greater detail in Section 3.3.2. Table 1 includes acres of mapped as potential habitat for the flat-tailed horned lizard (*Phrynosoma mcallii*, FTHL) in the FTHL Management Strategy (FTHL ICC 2003) and as critical habitat for the federally-endangered Peninsular bighorn sheep (*Ovis Canadensis nelsoni*, PBS) in the U.S. Fish

and Wildlife Service (USFWS) Critical Habitat Designation (USFWS 2000) for the off-site alternatives.

2.2 Screening of Off-Site Alternatives

Table 1 provides a summary of the siting and environmental screening criteria for the off-site alternatives. Sections 2.2.1-2.2.6 provides details on why only offsite alternatives AS-3 and the Agricultural Lands meet the siting criteria.

Table 1. Summary of Off-Site Alternatives

Siting Criteria Measures	AS-1	AS-2	AS-3	Mesquite Lake	Agricultural Lands	South of Hwy 98
Land Area (acres)	7,195	8,818	5,007	5,112	4,103	5,833
Estimated MW[1]	830	1,017	578	590	473	672
Cost and Availability Siting Criteria						
Number of Landowners	3+	2+	2+	52	3+	1
Number of Land Parcels	1	1	1	70	7	1
Available Land Use	No	No	Yes	Yes	Yes	Yes
Post-Siting Environmental Factors						
Density of Intermittent Streams (Miles/Sq. Mile)	2.2	1.5	1.3	0	0.5	0
Length of Int. or Ephem. Streams (Miles)	25.2	20.0	9.8	0	3.2	0
Waters of the US (acres)[2]	2,737	2,174	1,069	716	346	291
National Wetlands Inventory Wetlands[3]	0	0	0	716	0	291
Potential FTHL Habitat[4]	100.0%	100.0%	0.1%	0.0%	29.9%	0.0%
Designated USFWS PBS[5] Critical Habitat	10.6%	15.1%	0.0%	0.0%	0.0%	0.0%
Meets Siting Criteria & Environmental Factors?	**No** – Does not meet constructability or availability criteria (e.g. located in DOD no-fly, no-build zone.)	**No** – Does not meet constructability or availability criteria (e.g. located in DOD no-fly, no-build zone.)	**Yes**	**No** – Does not meet availability criteria (e.g. the number of landowners and parcels are substantially large). Additionally, this site supports a high number of wetlands relative to the project site	**Yes**	**No -** Meets Siting Criteria, but doesn't meet Environmental Factors due to high number of wetlands relative to the project site and thus unlikely to be the LEDPA

[1] – Estimated based on the logistical requirements of the SunCatcher technology (e.g. grid layout and spacing requirements) of approximately 8.67 acres per MW [(6,500 acres/750-MW Project (Alternative 1)]

[2] – Estimated miles of intermittent or ephemeral streams for each site was interpreted from data obtained from USGS (2008) and the acres of WUS mapped for the Project Site (881 acres).

[3] – NWI mapping was obtained from the USFWS (2008).

[4] – Potential FTHL habitat based on current distribution mapping from the FTHL Management Strategy (FTHL ICC 2003).

[5] – PBS USFWS Critical Habitat Mapping was created by the USFWS in 2006.

2.2.1 Alternative AS-1

This 7,195 acre site is located primarily on BLM land (80%) with some private in-holdings (18%) and state lands (1%) and along the border between San Diego and Imperial counties approximately 30 miles north of the proposed project location as shown in Figure 1 of Attachment A. This site is located in a Department of Defense (DOD) "no-fly" and "no build" restricted area. In December 2007, OptiSolar, Inc submitted an application to the BLM for use of a portion of this site for construction and operation of a 500-MW PV solar facility.

Siting Criteria Review: Off-site Alternative AS-1 was eliminated as an alternative location for the proposed project because it is located within a DOD "no fly" and "no build" restricted area and height restrictions preclude SunCatchers from being installed here. Additionally, it is no longer available for development of the IVSP as there is an application pending for development of a PV solar facility on a portion of the site. PV panels are not subject to the height restrictions because PV arrays can be constructed low to the ground, below the 20-feet restriction. However, the transmission lines may still be problematic for these other technologies because they would have to be constructed on parcels where either no height restrictions are mapped or within the 20 to 200-feet designation with special approval by the U.S. Navy. Additionally, PV technology generates very little noise, especially if the PV panels are stationary and are not tracking the sun. This site does not meet the Corps availability and constructability siting criteria. The SSA also excluded this alternative from further analysis stating that it would have similar impacts to biological and cultural resources and greater impacts to soils and visual resources compared to the IVSP site, and infeasibility due to an already-pending application for ROW by OptiSolar.

2.2.2 Alternative AS-2

This 8,818 acre site is located primarily on BLM land (62%) with some private in-holdings (38%) east of AS-1 approximately 30 miles north of the proposed project location as shown in Figure 1 of Attachment A. This site is located in a DOD "no-fly" and "no build" restricted area. In December 2007, OptiSolar, Inc submitted an application to the BLM for use of a portion of this site for construction and operation of a 500-MW PV solar facility.

Siting Criteria Review: Off-site Alternative AS-2 was eliminated as an alternative location for the proposed project because it is located within a DOD "no fly" and "no build" restricted area and height restrictions preclude SunCatchers from being installed here. Additionally, it is no longer available for development of the proposed project as there is an application pending for development of a PV solar facility on a portion of the site. Photovoltaic panels are not subject to the height restrictions because PV arrays can be constructed low to the ground, below the 20-feet restriction. However, the transmission lines may still be problematic for these other technologies because they would have to be constructed on parcels where either no height restrictions are mapped or within the 20 to 200-feet designation with special approval by the U.S. Navy. Additionally, PV technology generates very little noise, especially if the PV panels are stationary and are not tracking the sun. This site does not meet the Corps availability and constructability siting criteria. The SSA also excluded this alternative from further analysis stating that it would not substantially lessen the effects of the 750-MW Alternative and infeasibility due to an already-pending application for ROW by OptiSolar.

2.2.3 Alternative AS-3

This 5,007 acre site is located primarily on BLM land (96%) with some private in-holdings (4%) approximately 30 miles north of the proposed project location as shown in Figure 1 of Attachment A.

Siting Criteria Review: Alternative AS-3 meets the Corps siting criteria and it was analyzed for practicability, the results of which are described below in Section 2.3. The SSA excluded this alternative from further analysis stating that it would not substantially lessen the effects of the 750-MW Alternative and infeasibility due to an already-pending application for ROW by another applicant.

2.2.4 Mesquite Lake

This site is disturbed land that is zoned for industrial use. Figure 2 of Attachment A shows the site boundaries and details. The Mesquite Lake site encompasses approximately 5,100 acres of land. However some of this land is already in use by the Holly Sugar Plant, the Mesquite Lake Recovery Facility, and the Imperial Valley Resource Recovery Plant. The Mesquite Lake Specific Plan Area is made up of approximately 70 parcels with 52 land owners.

Siting Criteria Review: The Mesquite Lake alternative site is not available for purchase and development within a reasonable timeframe due to the large number of parcels and individual land owners (e.g. 70 parcels and 52 landowners), which makes securing the site infeasible. The IVSP is time sensitive due to government stimulus money and the SDG&E PPA. Therefore, this site does not meet the availability criteria. The SSA (2010) also found that obtaining site control of these parcels would be unreasonably difficult and, based on Energy Commission experience, probably impossible. Additionally, the Mesquite Lake site supports approximately 716 acres of wetlands roughly mapped by the NWI that may also be Corps jurisdictional wetlands WUS. Development of this site would likely result in greater impacts to WUS, particularly to wetlands relative to the project site, which does not support wetlands. The SSA evaluated this alternative under CEQA.

2.2.5 Agricultural Lands

This site was considered because it would use some of the existing disturbed low-quality agricultural land in Imperial County (Figure 3 in Attachment A). This alternative consists of 25 parcels aggregated into 7 different parcel groups. The parcel groups range in size from 40 acres to 1,435 acres totaling approximately 4,100 acres. Figure 3 of Attachment A shows the size and location of the seven disconnected parcel groups.

Siting Criteria Review: The Agricultural Lands Alternative meets the siting criteria and therefore it was analyzed for practicability, the results of which are described below in Section 2.3. The SSA evaluated this alternative under CEQA.

2.2.6 South of Highway 98

The South of Highway 98 Alternative is located on BLM designated land that is operated by the Bureau of Reclamation (Figure 4 of Attachment A). This site was recently identified by the BLM and Department of Energy (DOE) for in-depth study completed for the preparation of a draft Programmatic Renewable Energy Environmental Impact Statement (PEIS). The maps

obtained for this alternative were dated June 30, 2009. Figure 4 of Attachment A shows the location of this site approximately four miles southeast of the greater El Centro area and along the US/Mexico international border. This site totals approximately 5,833 acres and the All American Canal flows through the site. This site is relatively undisturbed supporting native habitat with low to moderate potential for certain rare plants to be present (SSA 2010). NWI mapping for the area includes palustrine shrub/scrub and emergent wetlands adjacent to the All American Canal (USFWS 2008). The NWI mapping includes approximately 291 acres of wetlands, including 172 acres of palustrine scrub/shrub habitat, 6 acres of emergent wetlands, and 113 acres of riverine wetlands within the alternative site boundaries. Using the lay-out required by the SunCatcher technology (e.g. grid-like layout required by all solar technologies and spacing limitations of SunCatchers) and the energy production achieved by the fully engineered layout of IVSP Alternative 1, with a land requirement of 8.67 acres per MW, the land area of this alternative could accommodate approximately 672 MW.

Siting Criteria Review: The South of Highway 98 site meets the siting criteria; however, the site supports approximately 291 acres of wetlands roughly mapped by the NWI that may also be Corps jurisdictional wetlands WUS. Given the reduced size of the alternative site, the Corps estimates that substantial avoidance of these wetlands resources would not be practicable. Therefore, construction on this site would likely result in more impacts to WUS, particularly to wetlands compared to the project site which does not impact wetlands. The SSA evaluated this alternative under CEQA, but also concluded that this alternative site would not be preferable to the IVSP location for biological resources, hazardous materials, noise, and transmission line safety and nuisance. The Energy Commission states that there are substantial sensitive habitats, jurisdictional waters, including stabilized sand dunes and riparian habitats. The South of Highway 98 alternative site meets the Corps siting criteria, but results in substantially more environmental effects and was subsequently not evaluated for practicability because it's unlikely to be the LEDPA.

2.3 Practicability of Alternatives

2.3.1 Practicability Criteria

The following criteria were used to screen the practicability of off-site and on-site alternatives.

2.3.1.1 Project Purpose

To be practicable, an alternative must meet the overall project purpose, which is **"To provide a solar energy facility ranging in size from 300 Megawatts to 750 Megawatts in Imperial County, California."**

2.3.1.2 Cost Criteria

Cost practicability was determined by integrating several major components of developing a utility-scale solar project, the cost of constructing the project, which is based primarily on the size of the project, and the cost of the energy generated. The cost of constructing the project is fairly simple and includes the cost of manufacturing the SunCatchers, cost of water pipeline, transmission line, hydrogen lines, construction grading and installation, etc. The cost of the energy is more complicated. **The Corps integrated and evaluated the cost of**

construction and solar energy generation and determined that an increase of $50 per kW was an appropriate target for comparison across on-site and off-site alternatives for cost practicability.

Some of the factors that influence cost of construction, and the price and costs of generating electrical power from the IVSP used by the Corps to establish the cost practicability target are discussed below.

Price Ceiling

The price that California utilities are willing-to pay for electricity generated by the IVSP is set, in part, by the California Public Utilities Commission (CPUC) which regulates power purchases by California's largest utilities. Before a PPA is finalized, the CPUC must find that the prices in the PPA are fair and reasonable to consumers.

The CPUC sets a price ceiling for the purchase of renewable power in the annual Market Price Referent (MPR) [CPUC Resolution E-4298 December 17, 2009]. The MPR values are used in the (Renewable Portfolio Standard) RPS solicitations issued by electric utilities to purchase the power that they need to meet the RPS requirements[2]. In other words, the MPR values serve as the price reasonableness benchmark for renewable PPAs. The power provided by the IVSP falls into this category of power purchase.

In determining the reasonableness of RPS power purchase contracts, the CPUC compares the levelized all-in costs of each long-term RPS contract on a dollar per megawatt-hour ($/MWh) basis to the MPR, and to the prices in other renewable PPAs and bids by developers for renewable PPAs. The goal is to compare an RPS contract's costs to the costs of the presumptive conventional alternative such as natural gas-fired and coal generation. The MPR is updated annually and driven primarily by natural gas prices. Since natural gas prices have dropped significantly between 2008 and 2009, the MPR is trending downward (see Table 2). The downward trend in pricing for natural gas and coal generated energy is attributed to the slow economy, which has reduced the demand for steel production and standard construction of residential, commercial, and other developments. In addition, rapidly dropping prices for PV panels has placed significant downward price pressure on PPA bids for non-PV solar projects. The rapidly dropping PV manufacturing prices are attributed to the age and growing use of the technology. However, straight PV panel technology has environmental consequences that SunCatcher technology does not, including but not limited to the need for mass grading (DOE 2010), the higher use of water for mirror washing (SSA 2010 and DOE 2010)[3], and issues related to unstable or unpredictable energy production for straight PV

[2] The RPS program administered by the CPUC requires each utility to increase its total procurement of eligible renewable energy resources by at least one percent of retail sales per year so that 20 percent of the utility's retail sales are procured from eligible renewable energy resources no later than December 31, 2010.

[3] Water use by the IVSP is estimated at 33,500 gallons per day (gpd) with a total annual use of approximately 32.7 acre ft. for the 750MW Project (Table 4-73; Final EIS 2010). The U.S. Department of Energy (DOE 2010) Report to Congress on "Reducing Water Consumption of Concentrating Solar Power Electricity Generation" states that parabolic trough plant consumes about 800 gal/MWh, 2% of which is used for mirror washing. Dish/engine systems such as the SunCatcher only require water for mirror washing (approximately 20 gal/MWh) and no water is used for cooling. There are other issues here such as dish/engine systems does not lend itself to easy storage and may not be as efficient at energy production during certain periods, but the point to this literature review and analysis is the effect of the SunCatchers technology on the Corps regulated WUS and associated environmental resources.

projects vs. solar thermal generation such as SunCatchers (Milss et al. 2009 and NERC 2009)[4]. Alternative technologies are not evaluated by the Corps as they were by the Energy Commission (see Technology Criteria later in this section).

Utilities have the option to negotiate prices with power providers that are higher than the MPR and risk disapproval by the CPUC or they can tap into their Above Market Funds (AMF) allocation. Utilities can use AMF to make up the difference between the MPR and the price for electricity from power providers that have prices higher than the MPR. The MPR uses natural gas power plants as the market referent and renewable energy sources are generally more costly than natural gas generators especially when natural gas prices are low. For SDG&E's, the utility that holds the power purchase agreement with TNSA for electricity from the IVSP, the $69 million AMF allocation had been fully utilized by May 2009; SDG&E's AMF balance is zero. Therefore, SDG&E has no alternative funding source to purchase power priced higher than the MPR. The MPR has been trending down since 2008 as shown in Table 2, primarily because of lower natural gas prices. The combination of a decreasing MPR, exhausted AMF balances, and rapidly dropping PV prices is increasing pressure on renewable power generators such as TSNA to keep costs as low as possible and offer power at prices close to the MPR.

Table 2. Comparison of 2008 and 2009 Market Price Referent Prices

PPA Contract Start Date	2008 MPR ($/MWh)	2009 MPR ($/MWH)	Difference between 2008 and 2009 MPR
2010	$ 113.90	$ 96.74	-18%
2011	$ 117.30	$ 100.98	-16%
2012	$ 121.26	$ 105.07	-15%
2013	$ 125.27	$ 108.98	-15%
2014	$ 128.97	$ 112.86	-14%
2015	$ 132.90	$ 116.47	-14%
2016	$ 137.06	$ 120.20	-14%
2017	$ 141.44	$ 124.04	-14%
2018	$ 146.03	$ 128.00	-14%
2019	$ 150.80	$ 132.09	-14%
2020	$ 155.78	$ 136.30	-14%

[4] "The rising and setting of the sun regularly leads to 10-13% changes in PV output over a period of 15 minutes for single-axis tracking PV plants. Clouds, however, are largely responsible for rapid changes in the output of PV plants that concern system operators and planners. Changes in solar insulation at a point due to a passing cloud can exceed 60% of the peak insulation in a matter of seconds." (Mills et al. 2009) "PV systems can experience variations in output of +/- 50% in to 30 to 90 second time frame and +/- 70% in a five to ten minute time frame. Furthermore, the ramps of this magnitude can be experienced many times in a single day during certain weather conditions." (NERC 2009)

Cost of Electricity from Imperial Valley Solar Project

The cost of power from the IVSP is related to several factors including the cost to manufacture the SunCatchers and the capital cost to construct the project facilities. The cost of power from IVSP is premised on high volume production of SunCatchers. Each SunCatcher is assembled from component parts that are manufactured in former automobile manufacturing facilities in the United States. As with manufacturing any new technology, the cost to manufacture a single part is reduced with each additional part that is manufactured. The cost for a SunCatcher is reduced by as much as 50% if there is a high volume of SunCatchers manufactured compared to a low volume scenario. The higher cost for low volume manufacturing is due to the difficulty and cost premium required to get suppliers to dedicate manufacturing capacity to manufacture specialty parts for the SunCatcher, as well as higher materials costs because the materials are purchased in lower quantities. Additionally, setup and tooling costs are spread across fewer parts. Therefore, for every MW that the IVSP is reduced by, the cost of each individual SunCatcher increases.

Similarly, the capital cost to construct a reduced MW IVSP would be higher on a $/MW basis because the cost of common facilities would be spread across fewer installed generators. Some of the common facilities that have to be constructed and sized the same, no matter what the size of the final IVSP include:

- Necessary transmission lines (10.3 miles of 230kV transmission lines on the proposed project site)
- Necessary water supply lines (11.8 miles of water supply line from the SWWTF for the proposed project site)
- Wastewater treatment facilities
- Hydrogen production facility
- Maintenance building
- Administration building
- Access roads and site fencing

The arrangement of the SunCatcher generator groups also has a measurable impact on construction costs. For example, SunCatcher generator groups that are arranged in a standard grid format allow for standard cable and conduit lengths that can be pre-cut and installed directly. For non-standard generator groups, conduit and cables must be measured and cut on-site increasing labor and materials costs as well as increasing installation time. Therefore, construction costs would be higher the greater the number of non-standard SunCatcher generator groups that are included in a project.

Price Ceiling for Electricity from Imperial Valley Solar Project

TSNA has negotiated a PPA with SDG&E assuming the costs and efficiencies associated with the 750-MW Project (Alternative 1). Specifically, these assumptions include a construction cost of $2,950/kW or a total construction cost of $2,212,500,000 for the 750-MW Project. As discussed above, changes to the size, arrangement, or location of the project would increase construction costs per kW. SDG&E has stated that it would not under any circumstances increase the price paid for the energy generated by the IVSP. Therefore, the price ceiling for the IVSP is set by the PPA and any changes to the 750-MW Project that increase costs affect the project's cost practicability. Based on a review of cost for similar projects and through negotiations with the Corps, TSNA has agreed that it would be practicable to absorb an increase of up to $50 per kW, although an increase in excess of this amount could render an alternative not practicable since they would not be capable of selling energy at a competitive price and within the restrictions of the PPA. As an example, an increase of $50 per kW is a cost increase of $35,450,000 per kW when reducing a project from $2,212,500,000 for 750-MW Project to 2,127,000,000 for the 709-MW Project [709 MW x 1,000 kW/MW x ($3,000/kW - $2,950/kW) = $35,450,000]. Cost per kW for each on-site alternative is shown in Table 5 and discussed in Section 2.5.

An additional $50 per kW to the negotiated pricing in the PPA for the 750-MW Project of $2,950/kW would allow for pricing up to $3,000/kW, an increase of 1.7%. This increase would typically be a practicable increase in construction costs or loss of revenue for projects such as residential and commercial developments. However, the fact that the cost and pricing for solar energy is already at least twice that of natural gas or coal supports TSNA's statement that this increase is significant and any additional increases would render the project cost prohibitive. The levelized cost of a resource represents a constant cost per unit of generation that is commonly used to compare one unit's generation cost with other resources over similar periods. These levelized costs are useful for comparing the financial feasibility of different electricity generation technologies. The levelized cost of electricity for power plants put into service in 2009 in California are listed in Table 3 and obtained from the California Energy Commission's Final Staff Report on the Comparative Costs of California Central Station Electricity Generation (Klein 2009).

Table 3. Comparative Costs for Energy for California (Klein 2009)

Type of Power	Average Plant Size	Average Levelized Cost (Nominal 2009 $)
Natural Gas - Advanced Combined Cycle	800 MW	10.62 cents/kWh
Coal – Integrated gasified combined cycle (IGCC)	300 MW	9.83 cents/kWh
Solar Parabolic Trough	250 MW	23.83 cents/kWh
Solar Photovoltaic (Single Axis)	25 MW	27.87 cents/kWh

2.3.1.3 Logistics Criteria

In order to be practicable, an alternative should optimize a cost effective layout of SunCatchers and related necessary infrastructure that minimizes ground disturbance and environmental impacts. There are a number of logistical considerations that constrain the engineering layout of the proposed action both on and off-site. These constraints include

industry and/or regulatory design standards usually having to do with safety and in other cases are driven by design efficiencies having to do with cost controls and/or best engineering practices. These include:

SunCatcher Groupings:

Spacing: SunCatchers must be spaced at least 60 feet x 112 feet apart and potentially farther apart depending on surrounding grade. Spacing is dependent upon the site latitude and the slope of the natural terrain. Shading will cause a differential heating of the SunCatcher heat exchanger which will adversely affect the operation and life of the Stirling Engine. Because of this spacing requirement, larger land parcels provide better configuration options to avoid sensitive resources (refer to siting criteria above).

Configuration: SunCatchers must be bundled together in 1.5 MW (60 SunCatchers) and then into 9 MW unit generation groups (360 SunCatchers) in order to utilize standard utility electrical transformers and hydrogen compressors, respectively. The 9 MW generation groups require approximately 67.5 to 75 acres due to these spacing requirements depending on topography (e.g. terrain, slope, and aspect of the landscape). The SunCatcher units are required to be placed in a rectangular grid pattern in order to maximize the efficient conversion of solar energy directly into utility grade electric current. Configuring SunCatchers into non-standard configurations increases the length of hydrogen tubes, electrical and fiber optic cables which increases the material and installation costs for the generator group. Non-standard configurations also reduce the operating efficiencies. The increase in length of hydrogen tubes increases the hydrogen gas pressure drop. To compensate for the increased pressure drop, a larger hydrogen compressor may be required which will increase the electrical demand to operate the compressor. Power for the hydrogen generators are supplied by the SunCatchers, therefore the increased size of the hydrogen compressor will reduce the electrical output of a 9 MW unit block. The increased length of electrical cables will also cause higher electrical losses and therefore reducing the efficiency of the generator group. A standard 1.5 MW group includes 7,700 feet of electrical wire and 7,700 feet of hydrogen piping (Figure 3). If the configuration changes from a standard group to a non-standard configuration as shown in Figure 3, the costs can increase up to 8% based upon the extra length and the efficiency of the electrical line decreases up to 3%, thus reducing overall plant output. The extra length of trenching needed to accommodate these non-standard configurations also increases ground disturbance which increases impacts to site resources (soils, vegetation, etc.). The added length of utilities also increases compression requirements for the hydrogen system thereby increasing noise and emissions. Spreading out a 1.5 MW group lowers the efficiency of the system and increases the infrastructure and operation costs.

Bundling the 1.5 MW and the 9 MW generation groups allows for the economic development of the SunCatcher field by having the ability to standardize lengths for electrical connection wires and hydrogen gas tubing. The electrical connections and hydrogen tubing connections can be precut and the ends terminated at the factory allowing better electrical terminations with the factory installed terminals for the electrical lines and leak free fittings for the welded hydrogen connections. The standardization of the electrical connections and hydrogen

connections saves installation time, labor costs and material costs. The non-standard units require the field technicians to field measure each nonstandard run, cut the cable from a spool of wire or stainless steel tubing spool, and hand fit the termination lugs for the electrical connections and field weld the connections for the hydrogen tubing.

For the IVSP, deviations of more 50% of the generator groups to non-standard configuration would render the alternative impracticable.

Isolation: The isolation of SunCatcher groups, removing groups from the site grid layout to accommodate resource or land feature avoidance, has an exponentially greater impact on operational design efficiency and cost relative to that described for standard versus non-standard generator group configurations. In some instances, these factors would render an isolated group of SunCatchers impracticable due to logistics and cost. For example, if the placement of SunCatchers in Wash K and Wash A was avoided (Alternative 5) the area of land between these drainages would not be fully utilized for plant development. Length of utilities would have to be significantly lengthened in order to bundle utility crossings and roads into the fewest possible to return to the main layout grid. For this example, over 45 utility and maintenance road crossings of these washes would have to be bundled into a number of crossings deemed adequate for meeting the purpose for the avoidance. Additionally, bundling utilities in this way would require that hydrogen system compressors be upsized due to the increase of friction loss within the distribution system from spreading out the SunCatcher field.

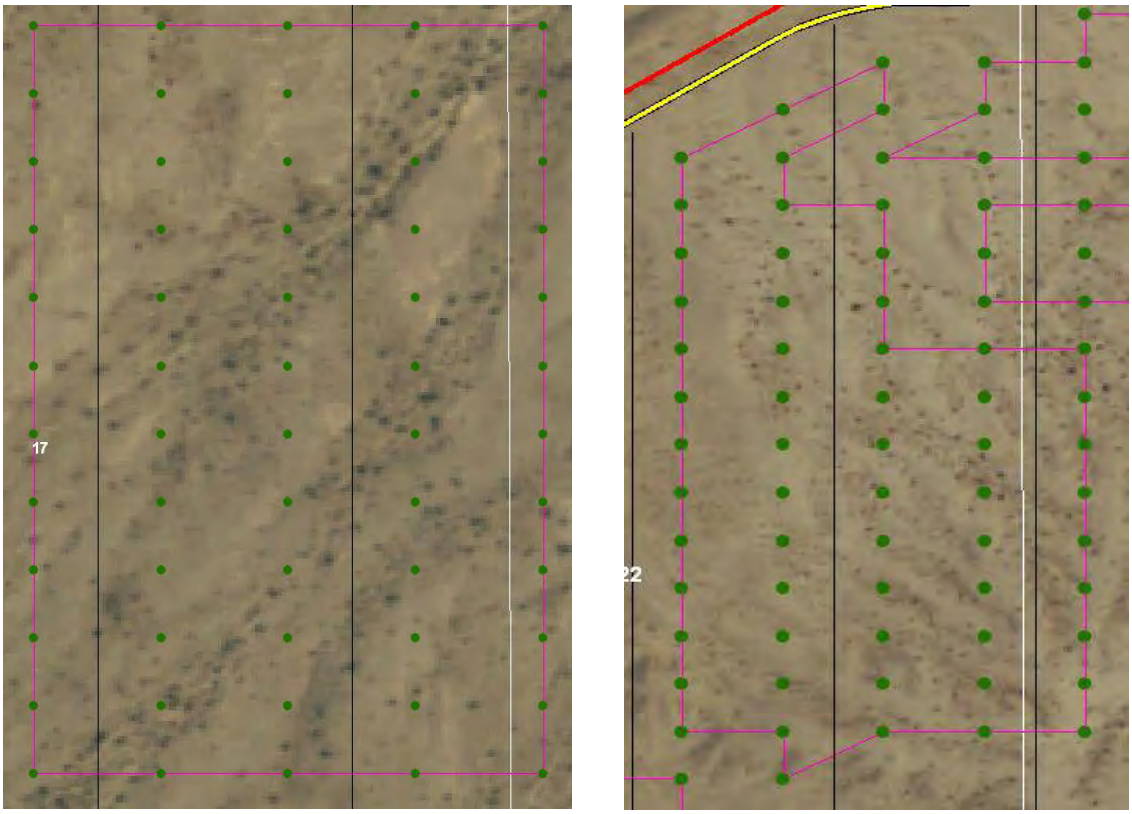


Figure 3. Comparison of a standard 1.5 MW group (left) and a non-standard 1.5 MW group (right).

- **Topography**: SunCatchers in rugged (hilly) terrain require grading to eliminate shading from one unit to the next and to create a safe operating slope for the maintenance cranes and lift equipment. The maintenance roadways that access SunCatchers rows also require additional earth work (at an additional construction cost) to ensure worker and equipment safety during transportation and various maintenance operations. Maintenance road slopes are limited to 10% for service crane safety.

Roads Layout:

- The arterial roads will serve as the main routes for maintenance technicians servicing the units. Arterial roads are 24-feet wide. Maintenance roads would be placed between every other row of SunCatchers and are necessary for accessing the units by maintenance technicians to service and periodically wash the units. Maintenance roads would be unpaved and 10 feet wide. There will also be a 10-foot wide unpaved perimeter road adjacent to the fence line for plant security as required by the Energy Commission. All unpaved roads in the uplands would be treated with a soil tackifier to reduce dust and erosion. No soil tackifier would be placed on the roads at stream crossings. Diagram 1 of Attachment C, *Construction Drawings*, shows a typical at-grade road crossing for ephemeral streams.

- Each SunCatcher must be accessible from one of the road types described above to allow for necessary maintenance; elimination of access roads would result in elimination of SunCatcher units and groups. Maintenance roads should be configured to minimize and avoid dead ends such that they connect to an arterial road. This design allows for maintenance and perimeter roads to the minimum required by the American Association of State Highway and Transportation Officials Geometric Design of Highways and Streets, page 312, Paragraph 2, "Lanes 3.0 m [10 feet] wide are acceptable on low-speed facilities, and lanes 2.7 m [9 feet] wide are appropriate on low-volume roads in rural and residential areas. Dead ends would require turnabouts and potentially regularly placed passing areas for safety purposes.

Main Service Complex:

- In order to minimize costs for interconnection of the SunCatchers to the transmission grid, for travel access roads to the site, and for other common facilities that provide services to the entire project site, at any site utilizing the SunCatcher technology, the Main Services Complex should be approximately centrally located, providing the shortest average distance to the farthest points of the project site.

2.3.1.4 Technology Criteria

Existing Technology was determined by the Corps to have no bearing on the practicability analysis because all alternatives analyzed propose use of the same solar generation technology (e.g. Stirling Energy SunCatchers). The Energy Commission analyzed alternative energy generation technologies and found that there would not be a substantial difference in impacts to visual, biological resources, and cultural resources, although land requirements vary among the technologies (SSA 2010). Alternative technologies analyzed by the Energy Commission include parabolic trough, solar power tower, linear fresnel, solar PV at the utility scale, natural gas, coal, nuclear, wind, and others. In addition, the 404(b)(1) guidelines do

not require the Corps or applicant to evaluate alternative project types. For example, the Corps would not request a single-family home builder to evaluate whether their project would avoid or minimize effects on WUS if they were to construct a multi-family apartment complex. The same is true in the case of TSNA, the developer and operator of the SunCatchers solar dish and Stirling engine system technology by Stirling Energy Systems, Inc. (SES). TSNA is not in the business of generating energy using technologies other than the SunCatchers solar dish and Stirling engine system.

2.4 Practicability of Off-Site Alternatives

In considering the practicability of the off-site alternatives that were not eliminated by the siting criteria (AS-3 and Agricultural Lands), the Corps analyzed alternative project configurations for each site. Table 4 summarizes the practicability analyses for the AS-3 and Agricultural Lands off-site alternatives. Sections 2.4.1 and 2.4.2 below provide further detail for each of the practicability criteria and explain why neither alternative is practicable.

2.4.1 Off-Site Alternative AS-3

Overall Project Purpose: Off-Site Alternative AS-3 is estimated to have approximately 5,007 acres available for development (Attachment A, Figure 1). Using the lay-out required by the SunCatcher technology (e.g. grid-like layout required by all solar technologies and spacing limitations of SunCatchers) and the energy production achieved by the fully engineered layout of IVSP Alternative 1, with a land requirement of 8.67 acres per MW, the land area of AS-3 could accommodate approximately 578 MW. This meets the Overall Project Purpose due to its capability of producing between 300 MW and 750 MW of solar energy.

Cost: Based on the preliminary design for this site, the cost to develop a project at this alternative location will be similar to the IVSP location except for the difference in transmission and water supply line costs. The current market costs for transmission line and water supply lines were estimated by the Applicants engineering company, RMT, and are approximately $1.5 million per mile and $400,000 per mile, respectively. Off-site alternative AS-3 would require 17 additional miles of transmission line and a 5.5 mile reduction in the length of the water supply line. Therefore, the increased cost between implementing a project at the AS-3 location would be an additional $23.1 million, which amounts to approximately $40/kW. In addition, because the size of this site will only accommodate 578 MW, the construction costs for this project would be approximately $3,200/kW or $100/kW more than Alternative 1. These additional construction costs are associated with low volume SunCatcher production and the cost of infrastructure facilities such as substations, transmission, and water supply being spread across a lower amount of total generation. Therefore, the estimated cost to construct a project at the AS-3 location would be approximately $140/kW greater than Alternative 1. These exceed the cost criteria allowing for an increase of $50/kW and therefore AS-3 would not be a practicable project.

Logistics: The logistics for a project at the AS-3 location would be similar to the IVSP location except that 17 additional miles of right-of-way would be required for the extended length of overhead transmission line. There would be a 5.5 mile reduction in the length of right-of-way needed for the buried water supply pipeline. This alternative meets the logistics criteria.

Technology: Existing technology was determined by the Corps to have no bearing on the practicability analysis because all alternatives analyzed propose use of the same solar technology (e.g. Stirling Energy SunCatchers).

Environmental: Based on a review of aerial photographs of the site and other data available for the AS-3 location, the Corps estimates that there are approximately 9.8 miles of intermittent or ephemeral streams (USGS 2008) amounting to approximately 1,069 acres of WUS that could be impacted by development at this alternative location (Table 1). This is 188 acres more than the miles of intermittent or ephemeral streams at the IVSP location which supports 881 acres of ephemeral WUS and no intermittent streams. Given the smaller size of the project site and additional 188 acres of WUS, there would be reduced opportunities to avoid aquatic resources due to costs limitations. Therefore, development of IVSP at this location would likely result in a higher acreage of impacts to WUS including impacts to intermittent streams, which are not present at the proposed location.

AS-3 is located in similar desert scrub habitat to the proposed site and it is expected that similar wildlife species to the project site would be present. The West Mesa Flat-tailed Horned Lizard Management Area is located immediately adjacent to the west side of the site; however, the entire site is located adjacent to mapped potential FTHL habitat. The desert scrub is potential forage habitat for PBS and designated critical habitat is 11 miles west of the site. This alternative was not evaluated in detail in the SSA because the Energy Commission noted that it would have similar impacts as Alternative 1 (Energy Commission 2010) and thus no reduction to environmental affects would be achieved.

Conclusion: This alternative does not meet the cost criteria threshold by increasing the cost per kW by more than $50 and would result in greater environmental impacts due higher acreage of WUS and presence of intermittent streams; therefore, it is not likely to result in the LEDPA.

2.4.2 Agricultural Lands

Overall Project Purpose: The Agricultural Lands Off-Site alternative is estimated to have approximately 4,103 acres available for development (Attachment A, Figure 3). Using the lay-out required by the SunCatcher technology (e.g. grid-like layout required by all solar technologies and spacing limitations of SunCatchers) and the energy production achieved by the fully engineered layout of IVSP Alternative 1, with a land requirement of 8.67 acres per MW, the land area of this alternative could accommodate approximately 473 MW. This meets with the overall project purpose due to its capability of producing between 300 MW and 750 MW of solar energy.

Cost: Based on a preliminary design for this location, it is estimated that approximately 4.5 miles of transmission line and 1.5 miles of water supply line will be required. Because this off-site alternative is comprised of seven different land parcels across a 100 square mile area, there would be additional costs for a power collection system including an additional substation. The current market costs for transmission line and water supply lines were estimated by the Applicants engineering company, RMT, and are approximately $1.5 million per mile and $400,000 per mile, respectively. Therefore, this alternative location would

require an additional $28.1 million for power collection. The cost difference between implementing a project at the Agricultural Lands location and the proposed location would be an additional $4.1 million or $9/kW. In addition, because the size of this site will only accommodate 473 MW, the construction costs for this project would be approximately $3,200/kW or $250/kW more than the IVSP Alternative 1. These additional construction costs are associated with low volume SunCatcher production and the cost of infrastructure facilities such as substations, transmission, and water supply being spread across a lower amount of total energy generation. Therefore, the estimated cost to construct a project at the Agricultural Lands location would be approximately $259/kW greater than the Alternative 1, which exceeds the $50/kW cost criteria threshold and would not be a practicable project for the SunCatcher technology.

Logistics: The logistics for the proposed project at the Agricultural Lands location would be problematic relative to the IVSP location as SunCatcher groups, utilities and roads would be dispersed across seven discontinuous land parcels. This fragmentation of the development area would not allow for a similar continuous grid layout as the proposed action and therefore would likely be smaller than the estimated 473 MW. The irregular configuration of the facility, essentially building isolated groups of SunCatchers, does not provide for a reasonable utility collection or transportation network for the site(s). Further, it is uncertain that this site could accommodate a centrally located main services complex nor be reasonably secure as no perimeter fence or road would be possible. This alternative does not meet the logistics criteria including the ability to construct a majority of standardized groupings, have a centrally located services complex, and secure each property as required by the Energy Commission with fencing.

Technology: Existing Technology was determined by the Corps to have no bearing on the practicability analysis because all alternatives analyzed propose use of the same solar technology (e.g. Stirling Energy SunCatchers).

Environmental: The environmental impact assessment for this alterative is based on a review of aerial photographs, field visits by the applicant, and the use of USGS stream mapping data (2008), USFWS critical habitat mapping for PBS (2006), USFWS management planning for the FTHL (2003), and NWI mapping (USFWS 2008). There are several different potentially jurisdictional water features within the seven parcels that constitute the Agricultural Lands Alternative. Parcel BL-1 is located on the edge of the agricultural lands and a small section of desert scrub habitat with 0.4 miles of ephemeral streams mapped. The remaining parcels (BL-2 to BL-7) are located within the agricultural lands of the Imperial Valley. There are approximately 9.7 miles of mapped canals that traverse these parcels that may have adjacent wetland areas. Greeson Wash bisects parcels BL-4 and BL-5 and is mainly fed by irrigation. During a site visit, it was observed that parcel BL-4 has patches of tamarisk and common reed (*Phragmites australis*). It is likely that the ephemeral washes within BL-1, some portion of the irrigation ditches, and Greeson Wash would be considered jurisdictional by the Corps.

Solar development on these parcels would have higher impacts to intermittent streams and potentially adjacent wetlands to perennially flowing irrigation canals than the IVSP location.

However, the total acreage of resources is lower than the IVSP location (Table 1) due the fact that these lands are a combined 4,103 acres compared to 6,500 acres of the IVSP location and due to past agricultural uses. Parcel BL-1 is located on fallow agricultural fields immediately to the east of the IVSP location. This parcel has reverted back to Sonoran mixed salt desert scrub and Colorado Desert wash scrub which is similar to the IVSP location. This parcel would have similar wildlife species to the proposed project site including potential FTHL habitat and is within the FTHL rangewide management plan. With the exception of Parcel BL-1, these parcels may be good opportunities for small scale developments because of the past disturbances. Therefore, the environmental effects of this alternative are similar to, possibly less than, the IVSP location. The Final EIS did not analyze off-site alternatives because they would not require any action by BLM (e.g. BLM can't issue a ROW on private land) and subsequently would not meet the BLM project purpose and need. The analysis in the SSA also determined that this alternative site was superior with regards to biological resources and soils and water because of past agricultural uses.

Conclusion: As described above, this alternative would not meet the cost or logistics criteria and is not a practicable alternative for SunCatcher technology. Many of these parcels may provide good opportunities for small scale solar energy project or other developments because of their past disturbances limiting ecological and cultural resources on each parcel. The SSA (2010) conclusions support that this alternative is economically infeasible due to the size of the parcels, stating that several off-site alternatives would be necessary to construct a project comparable to the IVSP location, but that these sites would be ecologically superior.

Table 4. Summary of Off-Site Alternative Preliminary Project Design

Practicability Criteria	Alternative AS-3	Agricultural Lands
Meets Cost Criteria	**No** - The additional 17 miles of transmission line combined with the smaller overall capacity (578 MW) would increase the production approximately $140/kW compared to the proposed project.	**No** – The seven discontinuous sites would require additional infrastructure for power collection. In addition, the site's overall capacity is only 473 MW. This would increase production costs $259/kW compared to the proposed project.
Meets Logistics Criteria	**Yes**	**No** – The discontinuous parcels would require the construction of multiple isolated groups of SunCatchers. It would be infeasible to collect power from all of these parcels. In addition, there is no ideal site for a centrally located Main Services Complex, and a reasonable road system and security fencing would not be possible.
Environmental Considerations	This alternative would have similar impacts as Alternative 1. However, the additional 17 miles of transmission line would	This alternative would have fewer environmental impacts than the project site.

Practicability Criteria	Alternative AS-3	Agricultural Lands
	increase off-site impacts by 193 acres compared to the project site.	
Practicable	**No**	**No**

[1] - Estimated based on the logistical requirements of the SunCatcher technology (e.g. grid layout and spacing requirements) of approximately 8.67 acres per MW [(6,500 acres/750 MW (IVSP Alternative 1)]

2.5 On-Site Alternatives

The Corps evaluated four on-site alternatives to the 750-MW Project (Alternative 1) described in the original IP application that could possibly reduce impacts to WUS. Each of these alternatives was analyzed using practicability screening criteria to help identify the LEDPA. In addition to the 750-MW Project and these four alternatives, this document also includes an analysis of the 900-MW Project (Alternative 2) initially proposed to help demonstrate the level of avoidance that has been incorporated into the revised project design beginning prior to the Corps involvement in the project though development of the 709-MW Project (Alternative 3, Avoidance of Highest Flow Resources). Finally, this document also evaluates a no-fill alternative. The on-site alternatives are described as follows:

Alternative #1 - Applicant's Original Project (750-MW Project). The 750-MW Alternative would permanently fill approximately 177 acres of jurisdictional WUS, would incur 5.2 acres of temporary impacts, and 13 acres would be indirectly affected on the project site through scour (Map 3, Attachment B). This alternative would permanently impact approximately 6,500 acres of FTHL habitat, which would be mitigated through in-kind purchase agreements. A small herd of five PBS was observed on the site in March, 2009. This is considered an unusual occurrence because of no known lambing sites or water sites near the project site and no other PBS occurrences have been documented in the vicinity. Nonetheless, the USFWS has determined that the site may be used by PBS during migration or under extreme conditions such as drought and that the site supports approximately 250 acres of potential PBS foraging habitat (28% of the 881 acres of WUS). No direct take of federally listed species are expected to occur, but the USFWS final Biological Opinion (BO) addresses the potential adverse effects of the project through loss of foraging habitat. Effects of this alternative would be complete removal of potential PBS foraging habitat through installation of the perimeter fence. The 750-MW Project could affect at least a 20% subset of approximately 337 known prehistoric and historical surface archaeological resources and may affect an unknown number of buried archaeological deposits, many of which may be determined historically significant. Effects to cultural resources were described in section 4.5 of the Final EIS and would be mitigated under a Programmatic Agreement (PA).

Alternative #2 - Maximum Energy Generation Alternative (900-MW Project). The 900-MW Project was the Applicant's original proposed project to BLM in 2008 (Map 4, Attachment B). During the environmental review process conducted by the Applicant, the 750-MW Project later became the preferred project to help avoid potential significant environmental impacts (specifically to cultural resources). The 900-MW Project was to be constructed on approximately 7,600 acres of land that extended east of the current project boundary to

Dunaway Road. The 900-MW Project was proposed to be built in two phases. Phase I of the 900-MW Project would essentially correspond with both the 300-MW Alternative described below (Alternative 4) and Phase I of the 750-MW Project (Alternative 1). Phase II of the 900-MW Project would added an additional 600-MW of generating capacity. In total, approximately 36,000 SunCatchers would be required for the 900-MW Project.

The Corps worked with the Applicant to determine the extent of jurisdictional WUS within the 750-MW Project (Alternative 1) boundary as described later in section 3.1.1. During that evaluation process, the Corps also requested assistance in the interpretation of aerial photographs and hydrologic data to generate a map of potential WUS into the additional 1,100 acres necessary for the 900-MW Project. Extrapolating from the impacts to WUS from the original site plan, it is estimated that the 900-MW Project would have more than 205 acres and likely up to 250 acres of permanent impacts due to the nature of the WUS in this area spreading into wide braided alluvial fans. In addition, the 900-MW Project would use the same waterline as the 750-MW Project and maintaining the same acres of temporary impacts (5.2 acres). This alternative would impact an additional 1,100 acres of FTHL habitat, potentially 363 acres of PBS foraging (28% of the 1,298 acres of WUS) habitat would be unavailable due to the perimeter fence, and would impact an area with a high density of cultural resource sites. The project was reduced to the 750-MW Project to avoid these additional impacts, particularly the additional impacts to cultural resources.

Alternative #3 - Modified Project to Avoid the Highest Flow Resources (709-MW Project). This alternative was designed to test the practicability of avoiding impacts to the highest flow streams on the site (Map 5, Attachment B). It allows for the generation of approximately 709-MW of solar energy while significantly reducing impacts to aquatic resources. This alternative avoids the entirety of washes I, H, K, and C and avoids all of washes E and G southwest of the transmission line corridor as well as providing a 200 foot wide corridor in washes E and G northeast of the transmission line corridor. The Corps has been working with the Applicant since the preparation of the SA/DEIS to maximize avoidance of WUS. In order to accomplish the avoidance demonstrated in the alternative, the Applicant has redesigned the project substantially, including moving the Main Services Complex and narrowing and removing roads. The following is a list of avoidance, redesign, or minimization measures taken to reduce impacts to WUS to the maximum extent practicable:

Primary Design Modifications in order to Maximize Avoidance and Minimization to WUS:

1. Reduced total generating capacity from 750-MW to 709-MW allowing for the complete avoidance of ephemeral main-stem streams H, I, K, and C, as well as complete avoidance of the majority of stream G and the upper half of stream E (Map 5 of Attachment B). This removed 1,163 SunCatchers from WUS and reduced permanent impacts from 177.4 acres to 38.2 acres. The streams chosen for avoidance were based primarily on flow characteristics, but also on the Corps' qualitative evaluation of the stream condition in the field prior to the California Rapid Assessment Method (CRAM) analysis described in section 3.1.2. The Corps' qualitative evaluation was substantiated by the CRAM analysis since 4 of the 6 main stem streams avoided in this alternative are among the highest scoring. The only high scoring stream not avoided in

this alternative is D and it is located in the approximate center of the project site flowing from south to north.

2. SunCatchers were removed from 200-foot corridors in the northern sections of ephemeral main-stem streams E and G. This reduced the number of SunCatchers in WUS by 228. These corridors combined with the complete avoidance of the streams south of the transmission corridor provide unobstructed hydrologic and sediment transport and FTHL with clear routes to travel across the proposed project area (Map 5 of Attachment B).

3. Reduced the number of the east-west roads to minimize the number of roads in washes and the number of wash crossings.

4. The waterline that extends to the SWWTF was shifted and co-located beneath site arterial and maintenance roads to reduce temporary impacts to WUS to 0.025 acres due to trenching to bury the pipeline across "Wash E" where it occurs off-site.

5. Reducing the width of SunCatcher maintenance roads from 15-feet to 10-feet which is the narrowest road width allowed by industry standards.

6. The removal of spur roads to individual SunCatchers from the maintenance road that runs down the middle of the two roads of SunCatchers (Figures 4 and 5). This increases the temporary disturbance for the construction of the SunCatchers by the use of a temporary 50-foot road that includes the 2-foot wide trench for the installation of an underground utility line and hydrogen pipeline, but decreases the permanent impacts to WUS substantially.

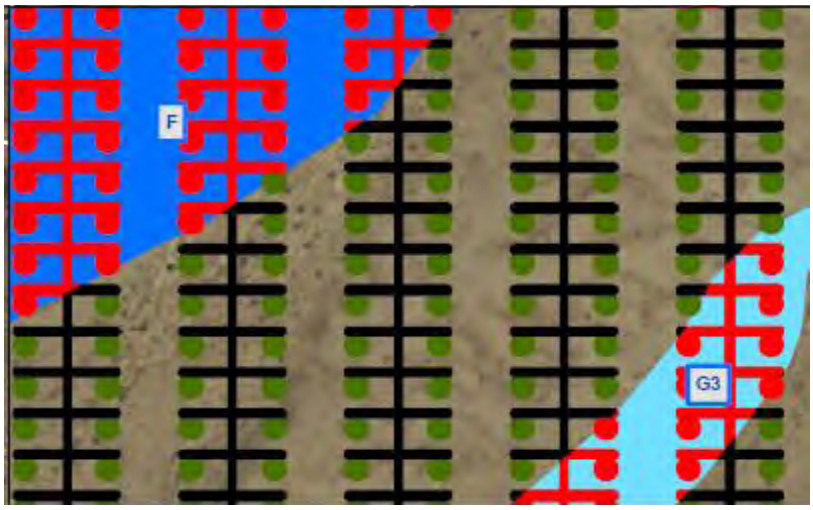


Figure 4. Original design for access roads to the SunCatchers that includes the 55 foot spur roads to each Sun Catcher.

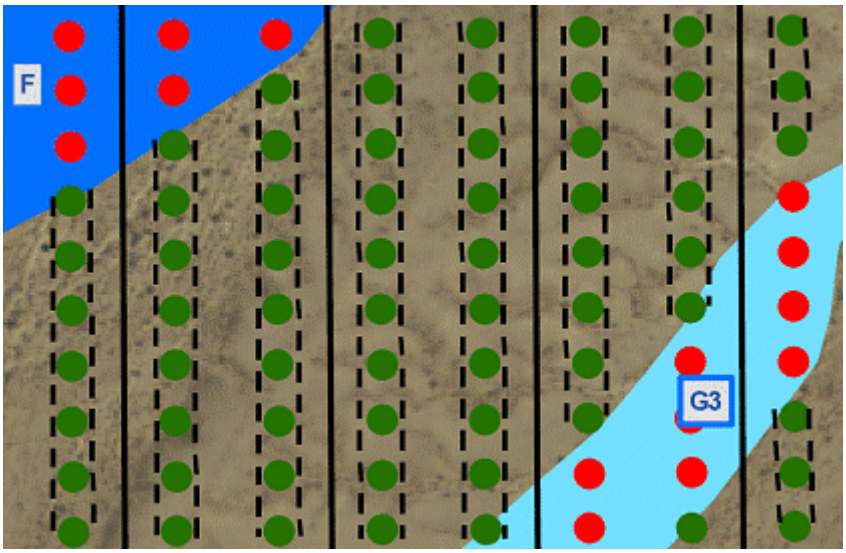


Figure 5. Current design for the SunCatchers and Maintenance roads. Dashed lines are utility trenches for the electrical and Hydrogen distribution lines.

7. Originally, sediment basins were proposed to retard water flow through the property and trap sediment. Hydrology and sediment modeling determined that the sediment basins would substantially change the pattern of sediment delivery for the ephemeral streambeds and result in a deficit of sediment transport downstream (Chang Consultants 2010a). The Applicant removed the sediment basins from the proposed project as a result of these findings which decreased the permanent impacts to WUS by 3.3 acres and reduced impacts to sediment transfer through the project area.

8. The Main Services Complex was moved north to move it out of a secondary wash complex. This reduced permanent impacts to WUS by 17.4 acres. In addition, it removed the two retention ponds from the wash and reduced the risk of pollutants entering the ephemeral wash system.

9. The main access road crosses Wash G and the crossing originally was planned to use culverts. Chang's initial report indicated that the culvert crossing would impede sediment and alter downstream sediment transfer (Chang 2010a). The crossing was changed to a precast concrete arches culvert system (like a bridge) that will not alter the downstream sediment transfer.

The Applicant proposes numerous other avoidance and minimization measures that are intended to reduce, ameliorate, and/or avoid potential adverse effects on the aquatic ecosystem and wildlife. These measures are outlined in the Proposed Conditions of Certification Sections of the Biological Resources and Soil and Water Resources portions of the SSA and individual Mitigation, Project Design Features, and Other Measures within sections 3.3 and 4.3 of the Final EIS.

The 709-MW Project would result in permanent impacts to approximately 38.2 acres of jurisdictional WUS and would incur 14.0 acres of temporary impacts. This is a reduction of 138 acres (78% reduction) of permanent impacts to WUS compared to the 750-MW Project. This

alternative would permanently impact approximately 6,000 acres of FTHL habitat, which would be mitigated through in-kind purchase agreements. Within the 709-MW Project there is approximately 250 acres of potential PBS foraging habitat (28% of the 881 acres of WUS). No direct take of federally listed species are expected to occur. Effects of this alternative would be complete removal of potential PBS foraging habitat through installation of the perimeter fence.

This 709-MW Project could affect at least a 20% subset of approximately 337 known prehistoric and historical surface archaeological resources and may affect an unknown number of buried archaeological deposits, many of which may be determined historically significant. Effects to cultural resources would be mitigated under a PA.

Alternative #4 - 300-MW Project. Alternative 4 was designed to test the practicability of limiting the project to Phase 1 of the 750-MW Project and would allow for the construction of the 300-MW Project (Map 6, Attachment B). This Alternative would reduce the disturbance area to 2,846 acres (40% of the 750-MW Project). The Alternative would result in permanent impacts to approximately 9.7 acres of jurisdictional WUS and would incur 7.3 acres of temporary impacts if constructed with the avoidance and minimization measures developed as part of the 709-MW Project described previously (e.g. avoidance of "primary"[5] streams I, K, and C and reduction of road widths, etc.) It would likely result in an incremental reduction in potential effects to FTHL habitat, and cultural resources by approximately 60%. Within the 300-MW Alternative there is approximately 79 acres of potential PBS foraging habitat (28% of the 283 acres of WUS). No direct take of federally listed species are expected to occur. Effects of this alternative would be complete removal of potential PBS foraging habitat through installation of the perimeter fence. Effects to cultural resources would be mitigated under a PA.

Alternative #5 - Drainage Avoidance #1 Alternative. This alternative was designed to test the practicability of avoiding permanent impacts to the 10 primary streams found within the project site (Map 7, Attachment B). This alternative was developed as an alternative to avoid and minimize impacts to WUS and was not originally developed in consideration of the applicant's engineering logistical constraints. As such, this alternative was evaluated by the California Energy Commission as a 634-MW Project that was based on simply removing SunCatchers from all primary streams. The Corps' Draft 404(b)(1) analysis estimated this alternative to be an approximately 606-MW Project which was based on multiple areas of isolated SunCatcher groups not being developed due to logistical and cost constraints. In finalizing the 404(b)(1) analysis, the Corps requested that the Applicant's engineers further analyze the logistics of avoiding all primary streams. As a result of this supplemental engineering analysis, it is estimated that this alternative would have a generation capacity of

[5] The ephemeral streams on the project site have been categorized by the Corps as "primary" or "secondary" for the purposes of developing and analyzing project alternatives. The categorization is further described in Section 3.1.1, but generally "primary" streams are main-stem streams originating south of the project site with a minimum Strahler order of 3 or higher and "secondary" streams are tributaries that originate on-site with a Strahler order of 1 or 2 (Strahler 1952). Ten (10) primary ephemeral streams traverse the proposed IVSP site from south to north in the western portion of the site and from south to northeast in the eastern half of the site.

approximately 554-MW Project. This additional reduction in the capacity is due to the likely elimination of 47 irregular generator groups that would not meet logistical practicability criteria. In the Draft 404(b)(1) analysis, these same generator groups were a subset of the high proportion of irregular generator groups that also did not meet logistical practicability criteria.

Approximately 5,600 acres of the 6,500-acre site would be developed (86% compared to the 750-MW Project). This alternative would reduce permanent impacts to jurisdictional WUS from 177 acres to approximately 20.2 acres and reduce energy production from 750 MW to 554 MW. Effects to FTHL habitat would be reduced incrementally in proportion to the reduction in acres of impact. Impacts to PBS foraging habitat would be the same as with the 750-MW and 709-MW Projects, there is approximately 250 acres of potential PBS foraging habitat (28% of the 881 acres of WUS). No direct take of federally listed species are expected to occur. Effects of this alternative would be complete removal of potential PBS foraging habitat through installation of the perimeter fence. Effects to cultural resources would be mitigated under a PA.

Alternative #6 - Drainage Avoidance #2 Alternative. This alternative was designed to test the practicability of eliminating development in the eastern and westernmost portions of the project site essentially shrinking the project footprint to the center of the property. Drainage Avoidance #2 Alternative would avoid the largest ephemeral drainage complexes and many more of the cultural resources on the eastern portion of the property. It would reduce the disturbance area to 3,590 acres (55% of the proposed action), would reduce permanent impacts to WUS from 177 acres to 19.4 acres, and would reduce energy production to 438-MW. The impacts to FTHL habitat and to FTHL populations would be decreased by approximately 45%. Impacts to PBS foraging habitat would be the same as with the 750-MW and 709-MW Alternatives, there is approximately 250 acres of potential (28% of the 881 acres of WUS). No direct take of federally listed species are expected to occur. Effects of this alternative would be complete removal of potential PBS foraging habitat through installation of the perimeter fence. Effects to cultural resources would be incrementally reduced in proportion to the reduced acres of impacts and mitigated under a PA.

Alternative #7 - No Project/No Development Alternative. In the case of IVSP, the No Project/No Development Alternative and the FEIS's Drainage Avoidance #3 Alternative (aka the SSA's "Avoidance of WUS Alternative") are synonymous for the purposes of the 404(b)(1) analysis. Drainage Avoidance #3 Alternative requires avoidance of all jurisdictional WUS. However, primary and secondary streams traverse the entire property such that a utility grade solar project could not be reasonably constructed without obtaining a permit from the Corps. SunCatcher technology requires maintenance roads every 225-feet and buried hydrogen and water lines every 112-feet. To span over, or directionally bore under, every stream crossing would be impossible. Therefore, although the Drainage Avoidance #3 Alternative was discussed in both the Final EIS and the SSA (as the "Avoidance of WUS Alternative"), it is replaced with the No Project/No Development Alternative for the purposes of the 404(b)(1) analysis. This alternative essentially means that no project approvals would be in effect, and no future development of the project area would occur. This alternative would avoid the adverse effects associated with construction of the project and operation and

would therefore preserve all WUS and FTHL habitat and PBS potential foraging habitat on-site. The property would remain in its existing condition or would continue to degrade and be subject to further trash deposition, off-road vehicles, weed infestation from on-going disturbances, and other transient use.

The No Project/No Development Alternative would not meet the Corps overall project purpose of producing between 300 MW and 750 MW of solar energy. The No Project/No Development Alternative would not be subject to the cost, logistic, or technology criteria because there would be no cost threshold or modification of logistics to evaluate. Therefore, the No Project/No Development Alternative is not carried through the practicability analysis below.

2.6 Practicability of On-site Alternatives

In considering the practicability of the on-site alternatives, alternative site configurations were evaluated for each alternative. On-site Alternatives 1 thru 4 were designed by the Applicant's engineers, while Alternatives 5 and 6 were drainage avoidance alternatives generated by the Corps for the purposes of the Final EIS, SSA, and this 404(b)(1) analysis. Table 5 below summarizes the results for the practicability analyses for each of the on-site alternatives. Sections 2.6.1 thru 2.6.6 provide the detailed practicability analysis for each alternative.

Table 5. Practicability of onsite alternatives including cost and logistics criteria.

Practicability Criteria	Alt #1	Alt #2	Alt #3	Alt #4	Alt #5	Alt #6
Cost Criteria						
Size of Project (MW)	750	900	709	300	554	438
Cost $/kW	$2,950	$2,900	$3,000	$3,200	$3,075	$3,200
Cost of Construction	$2,212,500,000	$2,610,000,000	$2,127,000,000	$960,000,000	$1,848,300,000	$1,401,600,000
Difference in Construction Cost per kW compared to Alt. #1	-	-$45,000,000	+35,400,000	+75,000,000	+69,250,000	+109,500,000
Meets Cost Criteria	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**
Logistics Criteria						
Number of Std/Non-Std Generator Groups	450/50	600/0	272/200	130/74	210/159[1]	178/108
Percentage of Non-Std Groups	11%	0%	42%	36%	43%[1]	38%
Isolated SunCatcher Groups?	No	No	No	No	No	No
Centrally located Main Services Complex?	Yes	Yes	Yes	No	Yes	No
Meets Logistics Criteria?	**Yes**	**Yes**	**Yes**	**No**	**Yes**[1]	**No**
Impacts to WUS (acres)						
Permanent WUS Impacts	177	205	38.2	9.7	20.2	19.4
Temporary WUS Impacts	5.2	5.2	14.0	7.3	12.0	10.4
Practicable Alternative?	**Yes** – Greater impacts to WUS make it unlikely to result in the LEDPA.	**Yes** – Greater impacts to WUS resources make it unlikely to result in the LEDPA.	**Yes**	**No** – Does not satisfy cost criteria to produce electric power at a price regulated utilities can pay.	**No**[1] – Does not satisfy cost criteria to produce electric power at a price regulated utilities can pay.	**No** – Does not satisfy cost criteria to produce electric power at a price regulated utilities can pay.

[1] – Detailed analysis of Alternative 5 found that 47 of the irregularly shaped or sized Generator Groups included in the Draft 404(b)(1) would be impracticable due to highly irregular sizes or reduced number of SunCatchers. Excluding these groups lowers the number of non-standard generator groups to 43%, which would meet the logistical criteria, but the alternative would be a 554-MW Project. Including these 47 Generator Groups in order to maximize MW capacity at 606MW would increase the number of non-standard generator groups to 53% and would not meet the logistical criteria. Neither the 554-MW Project nor the 606-MW Project would meet the cost criteria.

2.6.1 Alternative #1 – 750-MW Project

Overall Project Purpose: Alternative 1 would allow for the generation of 750 MW of utility grade electricity (Map 3, Attachment B). Alternative 1 would meet approximately 84.1% of SDG&E's renewable energy requirements for 2010. This alternative satisfies the overall project purpose due to its capability of producing between 300 MW and 750 MW of solar energy.

Cost: Alternative 1 would allow for the generation of 750 MW at a cost of approximately $2,950 per kW. The estimated total construction cost for the 750-MW Project is $2,212,500,000. The construction costs for this alternative were used to negotiate the PPA with SDG&E and do not exceed the cost threshold determined by prices in the agreement. This alternative meets the cost criteria.

Logistics: Alternative 1 allows for the installation of 30,000 SunCatcher™ units that can efficiently be grouped into 360 SunCatcher groups, allowing for the efficient generation and transmission of electricity generated. It allows for the installation of perimeter, arterial and maintenance roads necessary to service each of the SunCatcher groups and to meet necessary safety and security requirements. Utilities can be installed to serve each of the units and the central facilities complex can be located in the center of the project site. This alternative meets the logistics criteria.

Technology: Existing Technology was determined by the Corps to have no bearing on the practicability analysis because all alternatives analyzed propose use of the same solar technology (e.g. Stirling Energy SunCatchers).

Environmental: Alternative 1 would result in 177 acres of permanent impacts and 5.2 acres of temporary impacts to WUS (Table 6)

Table 6. Permanent and temporary impacts to waters of the U.S. associated with Alternative #1.

Impacts		Permanent (Acres)		Temporary Acres	
		Primary	Secondary	Primary	Secondary
Roads	Main Access	0.7	0.5	0.0	0.0
	Maintenance	109.8	43.2	0.0	0.0
Debris Basins		3.3	1.5	0.0	0.0
SunCatchers (2 ft diameter)[1]		0.3	0.1	0.0	0.0
Main Services Complex		7.1	10.9	0.0	0.0
Waterline		0.0	0.0	5.2	0.0
Electrical Distribution		Included in maintenance road impacts			
Total		**121.2**	**56.2**	**5.2**	**0.0**

[1] – Impacts for the SunCatcher pedestals were calculated at 8.86 x 10^{-5} acres (4 square feet) per pedestal (4,528 pedestals total).

Conclusion: This alternative is practicable considering cost and logistics, and would meet the overall project purpose, but would have more impacts to environmental and cultural resources than the 709-MW Project (Alternative 3) and therefore is not likely to result in the LEDPA.

2.6.2 Alternative #2 - Maximum Energy Generation (900-MW Project)

Overall Project Purpose: Alternative 2 would involve the construction of a facility capable of generating 900 MW of utility quality electricity (Map 4, Attachment B). This would provide approximately 100% of SDG&E's renewable energy requirements for 2010 and exceeds the overall project purpose of generating between 300 MW and 750 MW.

Cost: Alternative 2 would allow for the generation of 900 MW at a cost of less than $2,900 per kW as negotiated in the PPA with SDG&E. The estimated total construction cost for 900-MW Project is $2,610,000,000. The costs for this alternative are less on a kW basis than those used to negotiate the PPA with SDG&E and do not exceed the cost threshold determined by prices in that agreement [900 MW x 1000 kW/MW x ($2,900/kW - $2,950/kW) = -$45,000,000]. This alternative meets the cost criteria by decreasing the cost by kW and increasing the potential revenue to the Applicant.

Logistics: Alternative 2 allows for the installation of 36,000 SunCatcher units that can efficiently be grouped into 360 SunCatcher groups, allowing for the efficient generation and transmission of electricity generated. It allows for the installation of perimeter, arterial, and maintenance roads necessary to service each of the SunCatcher groups and to meet necessary safety and security requirements. Utilities can be installed to serve each of the units and the main facilities complex can be located in the center of the project site. This alternative meets the logistical criteria.

Technology: Existing Technology was determined by the Corps to have no bearing on the practicability analysis because all alternatives analyzed propose use of the same solar technology (e.g. Stirling Energy SunCatchers).

Environmental: Alternative 2 would result in approximately 205 acres of permanent impacts and temporary impacts to 5.2 acres of WUS (Table 7).

Conclusion: Alternative 2 would be practicable in terms of cost and logistic criteria and would meet the overall project purpose. Although practicable, this alternative would not result in a reduction of impacts to aquatic resources and therefore is not likely to result in the LEDPA.

Table 7. Permanent and temporary impacts to waters of the U.S. associated with Alternative #2.

Impacts		Permanent (Acres)[1]		Temporary Acres	
		Primary	Secondary	Primary	Secondary
Roads	Main Access	0.8	0.6	0.0	0.0
	Maintenance	128	51	0.0	0.0
Debris Basins		3.9	1.8	0.0	0.0
SunCatchers (2 ft diameter)[2]		0.4	0.1	0.0	0.0
Main Services Complex		7.1	10.9	0.0	0.0
Waterline		0.0	0.0	5.2	0.0
Electrical Distribution		Included in maintenance road impacts			
Total		**140.2**	**64.4**	**5.2**	**0.0**

[1] – Permanent impacts were extrapolated using the permanent impacts from Alternative #1 and the 900 MW footprints (7,600 acres).
[2] – Impacts for the SunCatcher pedestals were calculated at 8.86 x 10^{-5} acres (4 square feet) per pedestal.

2.6.3 Alternative #3 – Avoidance of Highest Flow Resources (709-MW Project)

Overall Project Purpose: Alternative 3 would allow for the generation of 709 MW of utility grade electricity (Map 5, Attachment B). This represents a reduction of over 10% of solar energy compared to the 750-MW Project, but would meet approximately 74.1% of SDG&E's renewable energy requirements for 2010. The 709-MW Project would meet the overall project purpose by generating between 300 MW and 750 MW.

Cost: Alternative 3 would allow for the generation of 709 MW at a cost of approximately $3,000 per kW considering the cost of constructing the common facilities and installing the SunCatchers. The estimated total construction cost for the 709-MW Project is $2,127,000,000. By increasing the cost per kW by $50, the construction costs for this project would increase by $35,450,000 as compared to the cost associated with the 750-MW Project for which the PPA with SDG&E was negotiated [709 MW x 1000 kW/MW x ($3,000/kW - $2,950/kW) = $35,450,000]. Although, the costs for this alternative are $50/kW more than those used to negotiate the PPA with SDG&E, TSNA has determined that it is practicable to absorb this cost increase and provide electricity at the prices in the PPA (Table 5). Although this alternative would result in substantial additional costs, it meets the cost screening criteria.

Logistical: Alternative 3 allows for the installation of approximately 28,360 SunCatcher™ units that can efficiently be grouped into 360 SunCatcher™ groups, allowing for the efficient generation and transmission of electricity generated. Approximately 42% of the SunCatcher groupings are non-standard configurations in order to avoid primary streams. This percentage

is less than the 50% threshold established for the logistical criteria. Alternative 3 allows for the installation of perimeter, arterial, and maintenance roads necessary to service each of the SunCatcher groups and to meet necessary safety and security requirements. Utilities can be installed to serve each of the units and the main facilities complex can be located in the center of the project site. This alternative meets the logistical criteria.

Technology: Existing Technology was determined by the Corps to have no bearing on the practicability analysis because all alternatives analyzed propose use of the same solar technology (e.g. Stirling Energy SunCatchers).

Environmental: Alternative 3 would result in permanent impacts to 38.2 acres and temporary impacts to 14.0 acres of WUS (Table 8).

Table 8. Permanent and temporary impacts to waters of the U.S. associated with Alternative #3.

		Permanent		Temporary	
Impacts		Primary	Secondary	Primary	Secondary
Roads	Arterial Roads	7.4	2.7	0.0	0.0
	Perimeter Roads	2.0	0.5	0.0	0.0
	Maintenance Roads	15.2	9.2	0.0	0.0
	Temporary Road	0.03	0.2	0.0	0.0
Waterline		0.0	0.0	0.0	0.0
Main Services Complex		0.01	0.7	0.0	0.0
SunCatchers (2 ft diameter)[1]		0.2	0.1	0.0	0.0
Perimeter Fence		0.1	0.03	0.0	0.0
Electrical and Hydrogen Trenches[2]		0.0	0.0	8.6	5.4
Total		**24.9**	**13.3**	**8.6**	**5.4**

[1] – Impacts for the SunCatcher pedestals were calculated at 8.86×10^{-5} acres (4 square feet) per pedestal (3,214 pedestals total).
[2] – Temporary impacts associated with the electrical and hydrogen trenches necessary to each SunCatcher were calculated using a 12 inch wide trench for the hydrogen trench and a 24 inch wide trench for the electrical trench and 58 feet of trenching for each SunCatcher.

Conclusion: This alternative is practicable and has fewer impacts than the 900-MW and 750-MW Projects.

2.6.4 Alternative #4 – 300-MW Project

Overall Project Purpose: This alternative would allow for the generation of up to 300 MW of utility grade electricity (Map 6, Attachment B). This represents a reduction of over 40% of renewable energy compared to the 750-MW Project, but may still meet the Corps overall

project purpose by generating between 300 MW and 750 MW of energy. Whether or not this alternative meets the Applicant's objective of generating "utility grade" energy was considered by the Corps, but not used specifically in the analysis of meeting the overall project purpose. As shown in Table 3, the Energy Commission reports that average plant size for coal-generated energy is 300 MW and the average plant size for natural gas is 800 MW (Klein 2009). Therefore, the 300-MW Project would be comparable in size to coal facilities, but would be 2.5 times smaller than the average natural gas facility. This is important to note because the cost of energy is regulated by the CPUC and is based, in part, on natural gas prices. See Section 2.3 for details regarding pricing of energy and cost criteria.

Cost: This alternative would allow for the generation of up to 300 MW of energy at a cost of approximately $3,200 per kW (Table 5). By increasing the cost per kW by $250 over the 750-MW Project, the construction cost of this alternative would increase by $75,000,000 per kW. The estimated total construction cost for the 300-MW Project is $906,000,000. Therefore, construction costs for this alternative on a kW basis are substantially higher than those used to negotiate the PPA with SDG&E and exceed the cost threshold determined by prices in that agreement [300 MW x 1000 kW/MW x ($3,200/kW - $2,950/kW) = $75,000,000]. This alternative does not meet the cost criteria.

Logistical: This alternative allows for the installation of 12,000 SunCatcher units that can efficiently be grouped into 360 SunCatcher™ groups, allowing for the efficient generation and transmission of electricity generated. It allows for the installation of perimeter, arterial and maintenance roads necessary to service each of the SunCatcher™ groups and to meet necessary safety and security requirements. Utilities can be installed to serve each of the units, but the main facilities complex is located at one end of the project site, not providing an efficient location for common facilities. This alternative would need to be redesigned to move the main services complex, water pipeline, and transmission lines to be more centrally located. Additional energy generation would also be lost in order to accomplish this redesign and not expand the outer boundary of the project site (Map 6, Attachment B). This alternative does not meet the logistical criteria as designed.

Technology: Existing Technology was determined by the Corps to have no bearing on the practicability analysis because all alternatives analyzed propose use of the same solar technology (e.g. Stirling Energy SunCatchers).

Environmental: The 300-MW Project would result in permanent impact to 9.7 acres and temporary impacts to 7.3 acres of WUS (Table 9). The avoidance measures implemented for the 709-MW Project including avoidance of primary streams I, K, and C were retained in the redesign of this alternative. If the 300-MW Project retained the design of the 750-MW Project and did not avoid these primary streams, the impacts to WUS would still be approximately 32.7 acres of permanent impacts and 8.0 acres of temporary impacts.

Table 9. Permanent and temporary impacts to waters of the U.S. associated with Alternative #4.

Impacts		Permanent (Acres)		Temporary (Acres)	
		Primary	Secondary	Primary	Secondary
Roads	Arterial	1.2	1.1	0.0	0.0
	Perimeter	0.1	0.0	0.0	0.0
	Maintenance	2.0	4.5	0.0	0.0
Debris Basins		0.0	0.0	0.0	0.0
Water Line		0.0	0.0	4.4	0.2
Main Services Complex		0.01	0.7	0.0	0.0
SunCatchers (2 ft diameter)[1]		0.0	0.1	0.0	0.0
Electrical and Hydrogen Trenches[2]		0.0	0.0	1.2	1.5
Total		**3.3**	**6.4**	**5.6**	**1.7**

[1] – Impacts for the SunCatcher pedestals were calculated at 8.86 x 10^{-5} acres (4 square feet) per pedestal (983 pedestals total).
[2] – Temporary impacts associated with the electrical and hydrogen trenches necessary to each SunCatcher were calculated using a 6 inch wide trench for the hydrogen trench and a 24 inch wide trench for the electrical trench and 58 feet of trenching for each SunCatcher.

Conclusion: The 300-MW Alternative does not meet the cost or logistical criteria. Therefore it is not practicable.

2.6.5 Alternative #5 - Drainage Avoidance #1 Alternative

Overall Project Purpose: This alternative has been reevaluated for engineering logistical constraints following the Draft 404(b)(1) and is now estimated to allow for the efficient generation of approximately 554 MW of utility grade electricity (Map 7, Attachment B). This represents a reduction in 26% of the renewable energy compared to the 750-MW Project. As analyzed in the Draft 404(b)(1), this alternative could allow for up to 606 MW, but would be problematic logistically. The generation of 554 MW to 606 MW meets the Corps' overall project purpose of generating between 300 MW and 750 MW of solar energy.

Cost: Due to logistical constraints, this alternative allow for the generation of 554 MW at a cost of approximately $3,075 per kW. By increasing the cost per kW by $125 over 750-MW Project, the construction cost for this alternative would increase by $69,250,000 per kW. The estimated total construction cost for 554 MW is $1,703,550,000 [554 MW x 1000 kW/MW x ($3,075/kW - $2,950/kW) = $69,250,000 kW]. Construction costs for this alternative are substantially higher than those used to negotiate the PPA with SDG&E and exceed the cost threshold determined by prices in that agreement. This alternative does not meet the cost criteria.

Logistics: This alternative allows for the installation of 22,160 SunCatcher™ units grouped into 360 SunCatcher™ groups. This alternative was developed as an alternative to avoid and minimize impacts to WUS and was not originally developed in consideration of the Applicant's engineering logistical constraints. As such, this alternative was evaluated by the Energy Commission as a 634-MW Project that was based on simply removing SunCatchers from all primary streams. The Corps' Draft 404(b)(1) evaluated this alternative more closely and estimated this alternative to be an approximately 606-MW Project because 12 isolated SunCatcher groups did not appear to be feasible due to logistical and cost constraints [634 MW – 606 MW = 28 MW/ 1.5 MW per group = 12 groups excluded by the Corps in the Draft 404(b)(1)]. In finalizing the 404(b)(1) analysis, the Corps' requested that the Applicant's engineers further analyze the logistics of avoiding all primary streams. As a result of this engineering analysis it is estimated that this alternative would have a realistic generation capacity of approximately 554 MW because an additional 47 generation groups would be highly irregular and unlikely constructed. Map 8 of Attachment B shows the results of this additional analysis and Table 10 further details the logistical and cost constraints of this alternative.

Complete avoidance of all primary streams would result in 6 physical/geographical areas on the project site where SunCatcher groups would be isolated by primary streams on both sides and therefore not likely developed due to logistical constraints. The impracticable generator groups are defined as generator groups with highly irregular shapes and/or incomplete generator groups that are missing ten or more SunCatchers. The cost per MW basis of installing the impracticable generator groups would be substantially higher than standard generator groups and therefore would not likely be constructed. The additional cost for installation and the increased electrical losses associated with the 74 non-standard groups were estimated by the Applicant's engineering company, RMT, and included in the cost calculations for this alternative. Any reduction of the number of standard generator groups or increase in the number of non-standard generator groups has a negative impact on the project by increasing the installation costs and reducing the electrical efficiency output. Additionally, an increase in the number of non-standard generator groups results in an increase of land disturbance on a per MW basis.

For comparison, the 750-MW Project consisted of 426 standard and 74 non-standard generator groups (15% non-standard), none of which were highly irregular or isolated. The CECs 624-MW Project included 189 standard and 227 non-standard generator groups (55% non-standard), of which 12 were considered by the Corps' to be obviously highly irregular isolated without consultation with the Applicant's engineer, RMT. The Corps' subsequently analyzed a 606-MW Project which included 189 standard and 214 non-standard generator groups (53% non-standard). The 606-MW Project would not meet the logistical criteria in the 404(b)(1) analysis. In an attempt to evaluate this alternative further and achieve a logistically constructible project, the Corps requested that the Applicant's engineer, RMT, look more closely at the design. This 554-MW Project would require 210 standard and 158 non-standard generator groups, but none of the non-standard generator groups would be highly irregular or isolated and would meet the logistical criteria.

Table 10. Comparison of Generator Groups for Developing Alternative 5

Generator Groups	750-MW (Alternative 1)	Variations of Alternative 5		
		624-MW	606-MW	554-MW
Total Groups (approximate)	500	416	404	369
Standard Configuration	426	189	189	210
Non-standard Configuration	74	227	214	158
Percent Non-Standard	15%	55%	53%	43%
Impracticable Group Configuration or Isolation	0	47	35	0

Technology: Existing Technology was determined by the Corps to have no bearing on the practicability analysis because all alternatives analyzed propose use of the same solar technology (e.g. Stirling Energy SunCatchers).

Environmental: This alternative would result in 20.2 acres of permanent impacts and 12 temporary impacts to WUS (Table 11).

Table 11. Permanent and temporary impacts to waters of the U.S. associated with 554-MW Project for Alternative #5.

Impacts		Permanent (Acres)		Temporary (Acres)	
		Primary	Secondary	Primary	Secondary
Roads	Arterial	6.1	2.8	0.0	0.0
	Perimeter	1.7	0.3	0.0	0.0
	Maintenance	0.0	8.5	0.0	0.0
Debris Basins		0.0	0.0	0.0	0.0
SunCatchers (2 ft diameter)[1]		0.0	0.1	0.0	0.0
Water Line		0.0	0.0	4.4	0.2
Main Services Complex		0.01	0.7	0.0	0.0
Electrical and		0.0	0.0	0.0	7.4

Impacts	Permanent (Acres)		Temporary (Acres)	
	Primary	Secondary	Primary	Secondary
Hydrogen Trenches[2]				
Total	7.8	12.4	4.4	7.6

[1] – Impacts for the SunCatcher pedestals were calculated at 8.86 x 10^{-5} acres (4 square feet) per pedestal (1,218 pedestals total).
[2] – Temporary impacts associated with the electrical and hydrogen trenches necessary to each SunCatcher were calculated using a 6 inch wide trench for the hydrogen trench and a 24 inch wide trench for the electrical trench and 58 feet of trenching for each SunCatcher.

Conclusion: This 554-MW Project alternative is not practicable as it does not meet cost screening criteria. The 624-MW and 606-MW versions of this alternative do not meet the cost or logistics screening criteria.

2.6.6 Alternative #6 - Drainage Avoidance #2 Alternative

Overall Project Purpose: This alternative would allow for the generation of up to 438 MW of utility grade electricity (Map 9, Attachment B); however, it is more likely to allow for fewer MW (possibly down to approximately 400 MW) because the revised alternative design includes the avoidance and minimization measures developed for the 709-MW Project. This represents a minimum reduction of 42% of the renewable energy available to SDG&E relative to the 750-MW Project, but meets the Corps overall project purpose of generating between 300 MW and 750 MW of solar energy. Again, this design is based on reducing project size on the east and west. Within the build area of the alternative, all of the avoidance and minimization measures developed for the 709-MW Project have been incorporated including avoidance of primary stream C, moving the main service complex to the east outside of WUS, and reducing road widths and locations.

Cost: This alternative would allow for the generation of between 400 MW and 438 MW at a cost of approximately $3,200 per kW. By increasing the cost per kW by $250 over the proposed project, the construction cost for this alternative would increase by $109,500,000 as compared to the cost of building 750-MW Project. The estimated total construction cost for 438 MW is $1,401,600,000 [438 MW x 1000 kW/MW x ($3,200/kW - $2,950/kW) = $109,500,000 kW]. Construction costs for this alternative are substantially higher than those used to negotiate the PPA with SDG&E and exceed the cost threshold determined by prices in that agreement. This alternative does not meet the cost criteria.

Logistics: This alternative allows for the installation of up to 15,960 SunCatcher™ units grouped into 266 SunCatcher™ groups. This alternative was developed as an alternative to avoid and minimize impacts to WUS by shrinking the project site on both the east and west ends and was not developed in consideration of the applicant's engineering logistical constraints. While an overall smaller facility, it allows for the efficient generation and transmission of electricity generated. It allows for the installation of perimeter, arterial and maintenance roads necessary to service each of the SunCatcher™ groups and to meet necessary safety and security requirements. However, this alternative would need to be redesigned to move the main services complex, water pipeline, and transmission lines to be more centrally located. Additional energy generation would also be lost in order to accomplish this redesign and not expand the outer boundary of the project site (Map 9,

Attachment B). Therefore, this alternative does not meet the logistics criteria as currently designed.

Technology: Existing Technology was determined by the Corps to have no bearing on the practicability analysis because all alternatives analyzed propose use of the same solar technology (e.g. Stirling Energy SunCatchers).

Environmental: This alternative would result in 19.4 acres of permanent impacts and 10.4 acres of temporary impacts to WUS (Table 12).

Table 12. Permanent and temporary impacts to waters of the U.S. associated with Alternative #6.

Impacts		Permanent (Acres)		Temporary (Acres)	
		Primary	Secondary	Primary	Secondary
Roads	Arterial	2.7	1.8	0.0	0.0
	Perimeter	1.1	0.0	0.0	0.0
	Maintenance	6.8	6.1	0.0	0.0
Debris Basins		0.0	0.0	0.0	0.0
SunCatchers (2 ft diameter)[1]		0.1	0.1	0.0	0.0
Water Line		0.0	0.0	4.4	0.2
Main Services Complex		0.01	0.7	0.0	0.0
Electrical and Hydrogen Trenches[2]		0.0	0.0	3.7	2.1
Total		**10.7**	**8.7**	**8.1**	**2.3**

[1] – Impacts for the SunCatcher pedestals were calculated at 8.86 x 10^{-5} acres (4 square feet) per pedestal (1,550 pedestals total).
[2] – Temporary impacts associated with the electrical and hydrogen trenches necessary to each SunCatcher were calculated using a 6 inch wide trench for the hydrogen trench and a 24 inch wide trench for the electrical trench and 58 feet of trenching for each SunCatcher.

Conclusion: This alternative is not practicable as it does not meet the cost or logistical criteria.

2.7 Summary of Environmental Impacts

This section provides a summary of environmental impacts for the three onsite alternatives that meet the practicability criteria [Alternatives 1 (750-MW Project), 2 (900-MW Project), and 3 (709-MW Project) (See Table 5)]. Alternatives 1 and 2 would have greater impacts to WUS, two federally listed species (FTHL and PBS), and Alternative 2 would have greater impacts to sensitive cultural resources. Because of these greater environmental impacts, these two alternatives were eliminated from further analysis and Alternative 3 was determined to be the LEDPA. The Applicant has submitted a revised application to the Corps for impacts associated with Alternative 3. Alternative 3 is analyzed in detail in Sections 3, 4, and 5 of this document.

2.7.1 Alternative 1 Environmental Impacts Summary

The Alternative 1 (750-MW Project) meets the practicability criteria as stated above; however, it would have a larger environmental footprint when compared to the Alternative 3 (709-MW Project). Alternative 1 would permanently impact approximately 177 acres of WUS compared to 38.2 acres for the Alternative 3 (Table 5). No drainages would be avoided effectively eliminating any pathways for FTHL and other wildlife to traverse the project site. In addition, the additional impacts to WUS would further reduce desert stream habitat available for FTHL and general wildlife use. Due to the increased environmental impacts to WUS, FTHL, PBS, and general wildlife habitat, Alternative 1 is eliminated from further analysis.

2.7.2 Alternative 2 Environmental Impacts Summary

The Alternative 2 (900-MW Project) meets the practicability criteria as stated above; however, it would have a larger environmental footprint when compared to Alternative 3 (709-MW Project). In addition, the area between the eastern boundary of the project site and Dunaway Road is an important cultural resource area that would be impacted with the construction of Alternative 2. A formal delineation has not been completed for the additional area included in the 900-MW Project, but it is estimated that the Alternative would permanently impact up to 205 acres of WUS which is five times greater than the Alternative 3. Similar impacts are expected, but the scale of the impacts would be increased for the Alternative 2. No drainages would be avoided as in Alternative 3 which would inhibit FTHL and other wildlife from traversing the project area. In addition, a greater amount of potential forage for the PBS would be removed.

During the Applicant's initial cultural resources analysis, field surveys, and mapping exercises, a large number of cultural resources, including lithic surface finds, were concentrated between the current eastern boundary and Dunaway Road (Energy Commission 2010). The 900-MW Project would impact these sensitive cultural sites and increase the overall cultural impacts compared to the other Alternatives. Due to the increased cultural resources impacts and increased impacts to WUS, Alternative 2 is eliminated from further analysis.

2.7.3 Alternative 3 Environmental Impacts Summary

Alternative 3 (709-MW Project) incorporates several avoidance and mitigation measures as outlined in Section 2.5 to minimize impacts to WUS and associated wildlife. This alternative would reduce impacts to WUS by 78% (38.2 acres of permanent impact vs. 177 acres for Alternative 1). It would also eliminate the installation of SunCatchers in washes H, I, K, C, and the southern sections of washes E and G. This would allow for FTHL movement through the project area from the Yuha Desert FTHL Management Area to the south to the West Mesa FTHL Management Area to the north. In addition, Alternative 3 includes 200-foot corridors in the northern sections of Washes E and G to provide FTHL movement corridors on the eastern portion of the project site (Map 5 in Attachment B). Compared with Alternative 1, Alternative 3 would clear approximately 35 less acres of vegetation providing more forage to PBS in the area and protect a greater proportion of the desert wash habitat within the project site. Alternative 3 would greatly reduce impacts to WUS, FTHL habitat, and PBS foraging habitat within the project site and Sections 3.0 and 4.0 describe the environmental impacts

of this alternative with greater detail. Proposed mitigation for the unavoidable 38.2 acres of permanent impacts is described in Section 5.0.

3.0 Existing Conditions

This section describes the baseline conditions on the project site. It includes a description of the ephemeral streambeds including the physical, chemical, and biological characteristics. Portions of the descriptions were taken or updated from the SSA and Final EIS.

3.1 Location and General Description

The project site lies within the Imperial Subregion of the Colorado River Regional Water Quality Control Board (RWQCB). There are no perennial or intermittent streams on the project site. The closest perennial water feature is the West Side Main Canal, located east of the project site by approximately 3 miles. The closest natural perennial drainage to the project site is the New River, created in the early 1900's when the Colorado River overflowed a dike, and with the Alamo River further east, flowed through the Imperial Valley to form the Salton Sea. Both the New and Alamo Rivers flow from Mexico north to the Salton Sea collecting discharge from Mexican factories, Mexican sewage, and inflow from large and small irrigation canals that feed and drain the agricultural fields of Imperial Valley. Subsequently, the New River is highly polluted as described in detail later in this section.

The ephemeral streams on the project site have been categorized by the Corps as "primary" or "secondary" for the purposes of developing and analyzing project alternatives. The categorization is further described in the next section, but generally "primary" streams are main-stem streams originating south of the project site with a minimum Strahler order of 3 or higher and generally "secondary" streams originate on-site with a Strahler order of 1 or 2 (Strahler 1952). Ten (10) primary ephemeral streams traverse the proposed IVSP site from south to north in the western portion of the site and from south to northeast in the eastern half of the site. Headwaters for these streams originate from gently sloping upland areas south and west of the property in the Yuha Desert. Culverts under the I-8 Freeway allow flows from primary streams south of the freeway to flow across and into the site. Some large secondary streams (i.e., C-5) that have large watersheds south of the interstate have been effectively intercepted by the interstate and as a consequence had their flows diverted by CalTrans to the culverts feeding the primary streams (Map 1 in Attachment B).

Ephemeral streams in the project area provide beneficial functions and services typical of high quality, low disturbance desert scrub wash systems. Riverine functions are generally categorized into hydrologic, physical, and biologic. Functions performed include, but are not limited to, groundwater recharge, flood peak attenuation, floodwater storage, sediment trapping and transport, nutrient trapping, and maintenance of wildlife corridors and habitat. These functions could be impaired to varying degrees by construction and operation of the proposed IVSP.

3.1.1 Jurisdictional Determination

Jurisdictional WUS were defined using a combination of the preliminary jurisdictional delineation report and map prepared by URS (2009), limited field verification by the Corps on

November 10, 2009, review of high resolution aerial photography, hydrological information provided in the October 2009 Revision of the "Hydrologic Assessment Report IVSP Site" by RMT (2009), and personal communication between the Corps and Imperial Irrigation District (IID) (January 7 and August 17, 2009). As stated previously, the streams on the site were categorized as "primary" or "secondary" streams (essentially equivalent to main-stem and tributary streams) based upon their size, the acreage of the watershed upstream of the drainage, and whether the drainage originates on-site. A total of 637 acres of primary streams and 244 acres of secondary streams were mapped (Table 13) and shown in Map 1 in Attachment B.

Table 13. Corps Jurisdictional Waters of the U.S.

Drainage ID	Area (acres)	Length (feet)	Drainage ID	Area (acres)	Length (feet)
I	24	7,106.5	E	199	26,150.5
J	11	4,159.5	E1	22	12,954.5
K	37	7.079.5	E2	2	2,146.7
K1	5	2,930.0	E3	3	2,549.1
K2	3	1,095.8	E4	2	1,905.7
A	25	7,209.2	E5	8	5,479.7
B	10	7,780.2	F	104	10,249.5
C	40	9,477.9	F1	12	7,827.6
C1	12	5,666.3	F2	5	2,645.1
C2	10	8,038.9	F3	7	3,697.7
C3	13	7,922.8	G	115	20,849.3
C4	7	5,222.5	G1	18	6,564.5
C5	2	1,279.0	G2	9	4,382.3
D	75	17,869.5	G3	10	4,163.6
D1	27	11,155.7	H	7	959.8
D2	29	14,883.6	SI	22	6,371.9
D3	6	3,051.7			
Total Drainage Length: **240,826 feet** Total Drainage Acreage: **881 acres**					

Most of the primary streams on the project area are compound ephemeral channels. Compound ephemeral channels (Lichvar et al. 2009; Lichvar and McColley 2008) are characterized by a mosaic of terraces within a wide, active floodplain by a single, low-flow meandering channel inset into a wider braided channel network and mosaic of terraces (Graf 1988). These channels are highly susceptible to widening and avulsions (channel relocation)

during moderate to high discharges, reestablishing a low-flow channel during subsequent low flows (Lichvar et al. 2009; Lichvar and McColley 2008).

A high density of closely spaced braided channels with high width-to-depth ratio and low sinuosity generally characterize the larger streams on the study site. High width-to-depth ratios, braided channels and low sinuosity are often the result of high sediment concentrations and coarse grain sizes (Bull and Kirkby 2002).

Some of the secondary streams on the project site are discontinuous ephemeral streams (Lichvar et al. 2009; Lichvar and McColley 2008), characterized by alternating erosional and depositional reaches. They are constantly in flux, as headcuts (knick points) originating at the downstream end of the sheet flood zone migrate upstream, causing dramatic temporal and spatial changes in channel morphology for any given location. Headwater streams on the site are characterized by some gullying and "badland" development. Most of the channels on the project site appear to have deep sediments composed of sands and gravels, with widely scattered vegetation growing within the channel and its floodplain.

3.1.2 Condition of Ephemeral Streams

Southern California Coastal Water Research Project (SCCWRP) was contracted by TSNA at the recommendation of the Corps in order to evaluate the baseline condition of the desert streams on the project site utilizing the California Rapid Assessment Method (CRAM; SCCWRP, May 2010, Attachment D). The State and Federal agencies that comprise the California Wetlands Monitoring Workgroup (CWMW)[6] are promoting the use of rapid assessment methods as a core tool to evaluate aquatic resource condition. Currently, CRAM is the most widely used wetland rapid assessment in the State (www.cramwetlands.org). CRAM is intended to provide a rapid and repeatable assessment method that can be used routinely for wetland monitoring and assessment throughout the State of California. It provides consistent and comparable assessments of wetland condition for all wetlands and regions in California, yet accommodates special characteristics of different regions and types of wetlands. The CRAM typology currently recognizes six major wetland types, four of which have subtypes (Attachment D, Table 1). For the purposes of CRAM, *condition* is defined as the state of a wetland assessment area's physical and biological structure, the hydrology, and its buffer and landscape context relative to the best achievable states for the same type of wetland. Condition is evaluated based on observations made at the time of the assessment, the results of which can be used to infer the ability to provide various functions, services, values and beneficial uses to which a wetland is most suited (Collins et al. 2008), although these are not measured directly by CRAM. CRAM also identifies key anthropogenic stressors that may be affecting wetland condition.

In April 2008, the Corps, together with the EPA issued regulations, known as the "Mitigation Rule," governing compensatory mitigation for losses of aquatic resources(33 CFR Parts 325 and 332, and 40 CFR Part 230). The Corps' Los Angeles District is in the process of updating

[6] The CWMW is a subcommittee of the California Water Quality Monitoring Council (Senate Bill 1070; Kehoe, 2006),

its Mitigation and Monitoring Guidelines (Guidelines) to comply with the Mitigation Rule. The Mitigation Rule emphasizes the watershed approach and functional assessment methodology in evaluating project impacts and mitigation strategies. The use of CRAM in the context of the IVSP is used to first understand the baseline condition of the desert streams on the project site described in this section, estimate the effects of direct impacts and indirect impacts post-project described in section 4.3.1, and evaluate the adequacy of the proposed mitigation in section 5.0. In addition, this CRAM analysis is the first phase of a long-term research effort to refine, modify, and validate the Riverine CRAM module for application to ephemeral streams in desert regions of California.

A total of 84 stream sites or Assessment Areas (AA) within the study site was assessed with CRAM (Appendix 4; Appendix 5a-b of the CRAM report [Attachment D]). None of the sites contained flowing surface water at the time of the CRAM assessment. All sites were classified as unconfined riverine systems (i.e., the width of the valley across which the system can migrate without encountering a hillside, terrace, or other feature that is likely to prevent further migration is at least twice the average bankfull width of the channel).

Overall CRAM index scores for these sites ranged from 53 to 80 (SCCWRP; Attachment D). AA 154 (C-44) received the highest overall index score and AA 356 (E-105), 269 (E-86), and 124 (B-35) were the three lowest scoring sites in the study area (Appendix 1 of the CRAM Report [Attachment D]). Based on the known precision for overall index scores, AA scores that differ by 11 CRAM points or greater should be considered to represent differences in overall condition. For example, AA 154 (C-44), with an Overall Index Score of 80, can be interpreted as having higher ecological condition than AA 103 (A-30), which received a score of 67. However, AA 53 (G-19) and AA 57 (G-21), which received overall index scores of 79 and 72, respectively, do not represent significant differences in overall condition. A similar interpretation can be made for Attribute scores. Two scores for the same Attribute that differ by less than 5 CRAM points should not be regarded as representing differences in condition. Table 14 lists the distribution of metric and submetric scores (A-D) for all sites combined.

Table 14. Summary statistics of CRAM scores from the study site.

CRAM Index and Attributes	Mean	SE	SD	Median	Maximum	Minimum
Overall Index Score	68	1	6	69	80	53
Landscape Context	95	1	9	100	100	48
Hydrology	91	1	5	92	100	67
Physical Structure	41	1	13	50	75	25
Biotic Structure	46	1	9	44	75	31

It was noted at the beginning of the CRAM analysis that the current CRAM Riverine module would have limited applicability to the arid, ephemeral streams found on the project site due to the lack of species rich plant communities with vertical and horizontal structure complexity. The CRAM Riverine module was originally designed for coastal Riverine systems that typically have greater plant diversity and cover and greater ecological complexity. The

results of the CRAM analysis indicate that the CRAM Riverine module can be applied to arid, ephemeral streams but some of the metrics will need to be recalibrated. The Landscape and Buffer Attribute appeared adequate as currently constructed while the Hydrology Attribute performed reasonably well, but some of the current metrics will need to be revised. The Biological and Physical Attributes were problematic when applied to the ephemeral streams on site due to the lack of physical and biological complexity. When compared to CRAM scores for perennial, coastal streams, scores for the project area were consistently lower for the Physical and Biological Attributes since these attributes of the CRAM Riverine module were designed to detect complexity within a system (Collins et al. 2008).

No dramatic spatial trends in drainage condition scores were evident on the study site (Table 14 and Appendix 6 of the CRAM report [Attachment D]). Some assessments areas located near the perimeter of the study site tended to score lower than sites located near its center. These sites scored lower because of their proximity to I-8 to the south, and Evan Hewes Highway, the raised railroad bed, and the Plaster City industrial Complex to the north. These structures affected the Buffer and Landscape Connectivity Attribute; there were greater infestations of noxious weeds along the perimeter of the site, and there were signs of abnormal aggradations (near the raised railroad bed) and degradation (near where the culverts discharged under I-8).

No primary drainage differs from another by at least 11 points, so no differences in overall score can be assessed. For individual attributes, six CRAM points denote a difference in the condition of that attribute. The CRAM scores show some significant fluctuations for Physical and Biotic Structure. Primary streams A, F, B, and I had the lowest scores for Physical Structure and primary streams C, G, and H had the highest Physical Structure scores. Likewise, differences were observed in the biotic structure with streams B, E, and K having the lowest scores and D, F, and H having the highest scores (Table 15).

Table 15. Average CRAM scores for each primary drainage.

Primary Streams	Number of Stream Sites	Overall Index Score	Landscape Context	Hydrology	Physical Structure	Biotic Structure
A	3	64.0	90.4	91.7	25.0	49.1
B	5	64.0	94.8	88.3	35.0	37.8
C	4	71.6	98.3	87.5	50.0	50.7
D	4	72.7	100.0	93.8	43.8	53.5
E	6	64.0	88.0	88.9	37.5	41.7
F	2	68.1	100.0	91.7	25.0	55.6
G	9	70.4	93.3	89.8	48.6	49.7
H	1	75.2	84.0	91.7	50.0	75.0
I	2	63.8	83.1	87.5	37.5	47.2
K	4	68.3	96.3	91.7	40.6	44.4

Similar to the primary streams, none of the combined secondary streams had overall scores that differed by greater than 10 CRAM points except for stream J. As with the primary streams, there were some fluctuations with the Physical Structure and Biotic Structure with scores ranging from 33 to 50 for Physical Structure and 39 to 56 for Biotic Structure (Table 16).

Table 16. CRAM scores for the combined secondary streams.

Secondary Streams	Number of Stream Sites	Overall Index Score	Landscape Context	Hydrology	Physical Structure	Biotic Structure
C	8	67.87	95.49	90.00	40.42	45.56
D	10	70.82	99.71	94.17	44.38	45.05
E	8	72.61	97.66	91.67	50.00	51.11
F	5	67.59	100.00	92.59	33.33	44.44
G	3	66.46	97.77	91.67	37.50	38.89
J	1	62.91	80.80	91.67	37.50	41.67
K	1	69.44	100.00	75.00	50.00	52.78
S	1	74.31	100.00	91.67	50.00	55.56

3.1.2.1 Buffer and Landscape Context

Because this attribute of CRAM addresses general landscape aspects of the riparian vegetation and buffer of a site, the metrics as scored with the Riverine Module are generally applicable to sites within the study area. Although the existing riparian vegetation on the study site may differ in complexity, structure, and species composition from more mesic riparian systems, the connectivity of the riparian corridor and buffer of arid, ephemeral streams still provide important structural habitat for a variety of wildlife species, play an important role in the dispersal of both animals and plants, and also shade and stabilize fluvial environments, providing habitat for aquatic organisms (Naiman et al. 1993, Patten 1998).

For riverine CRAM, this attribute is scored with two metrics: (1) the continuity of the riparian corridor over a prescribed distance upstream and downstream of the assessment area, and (2) the amount, size, and condition of the buffer on both sides of the assessment area. Final condition scores for the Landscape and Buffer Context attribute ranged from 48-100 (μ= 95, σ= 9; Table 14). Overall, this was the highest scoring CRAM attribute, with 67% of sites assessed receiving a score of 100 (the highest obtainable for this attribute). These sites were located primarily in the center of the project area where there is little development. The remaining 33 percent of sites were located on the perimeter of the site where I-8 to the south, and Evan Hewes Highway, the raised railroad bed, and the Plaster City industrial

complex to the north, interrupted the landscape connectivity metric and buffer which lowered the scores.

3.1.2.2 Hydrology

For riverine CRAM, this attribute is scored with three metrics: (1) Water Source (direct fresh water sources to the channel during the dry season), (2) Channel Stability (the degree of channel aggradation or degradation), and (3) Hydrologic Connectivity (assessed based on the degree of channel entrenchment, calculated as the flood-prone width divided by the bank full width; Leopold *et al*. 1964, Rosgen 1996, Montgomery and MacDonald 2002). These metrics are discussed in detail in the attached CRAM report (Attachment D). Final scores for the Hydrology attribute ranged from 67-100 (μ= 91, σ= 5; Table 14). Overall, this CRAM attribute scored relatively high, with 86% of sites assessed receiving a final score of 92 or greater. Metrics of the Hydrology attribute in CRAM assess the sources, quantities, and movements of water, plus the quantities, transport, and fates of water-borne materials, particularly sediment as bed load and suspended load (Collins et al. 2008).

Overall, channel stability within the project area can be characterized as generally being in equilibrium with minor signs of aggradation which is expected for normally functioning arid, ephemeral streams. Signs of incision/downcutting were observed just downstream of where culverts discharged under I-8. The culverts focused flow from the upstream side of I-8 resulting in greater, narrower flows downstream of the culverts until the energy dissipated. Signs of excess aggradation were observed west of Plaster City where streams were diverted by the raised railroad bed to an underpass. Sediment was dropped out of the water column where the streams were diverted and flow was impeded.

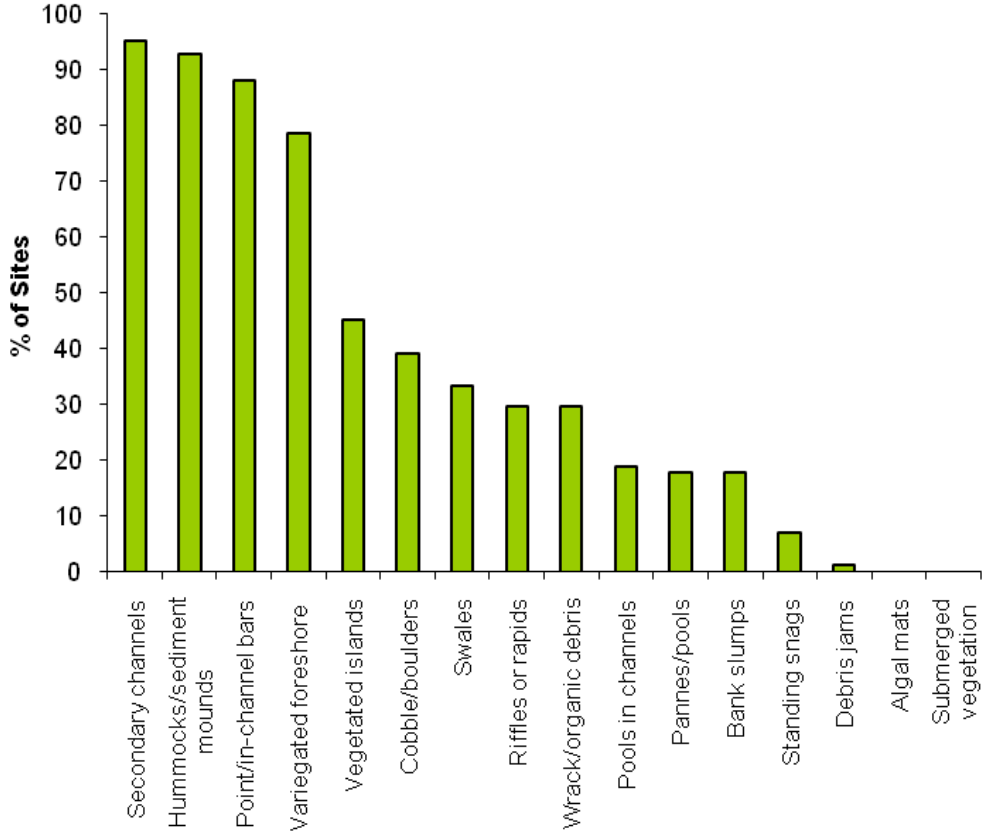
Hydrologic Connectivity is assessed based on the degree of channel entrenchment, or the inability of flows in a channel to exceed the channel banks. Where an entrenchment ratio was measured, (93%) scored an "A (12)" for this metric, indicating that channels are not entrenched (mean entrenchment ratio for sites was 6.6 m). Although most sites assessed in the study area scored high for this metric (i.e., channels were generally not entrenched), the conceptual model and field techniques used to assess this metric in the field under the current CRAM Riverine Module will require reevaluation for aridland streams.

3.1.2.3 Physical Structure

The metrics used to score the Physical Structure Attribute of CRAM (physical patch types and topographic complexity) generally scored very low for the ephemeral streams assessed on the study site. Overall, this attribute did not apply well as constructed to the arid, ephemeral streams found on the project site. For CRAM, this attribute is scored with two metrics: (1) Patch Richness (the number of different obvious types of physical surfaces or features that may provide habitat for aquatic, wetland, or riparian species) and (2) Topographic Complexity (the spatial arrangement and interspersion of patch types). A detailed discussion of the two metrics is provided in the CRAM report (Attachment D). Final scores for the Physical Structure attribute ranged from 25-75 (μ= 41, σ= 13; Table 14). Overall, this was the lowest scoring CRAM attribute, with 30% of sites assessed receiving a final score of 25 (the lowest possible for this metric).

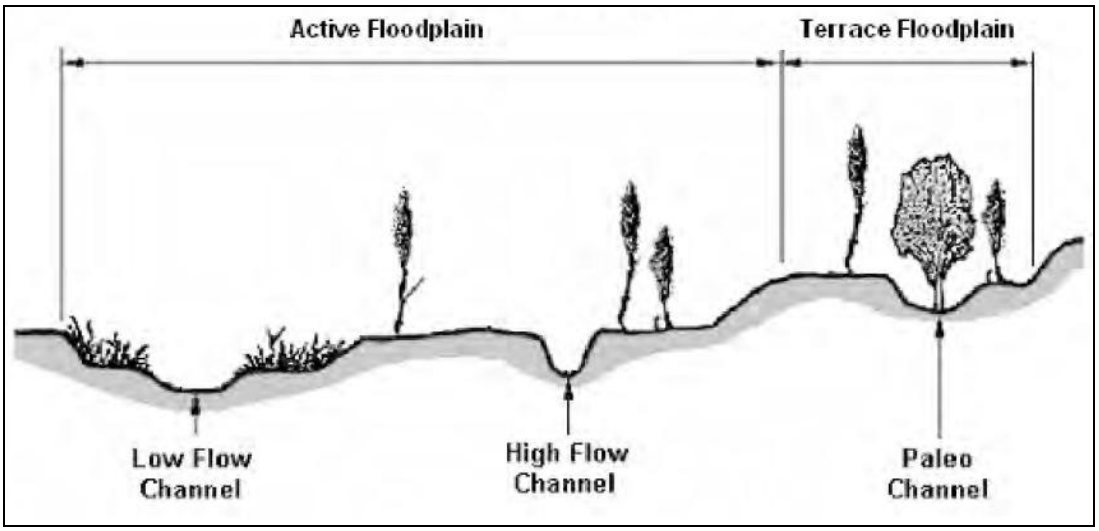
For the physical patch type richness metric, most sites scored low due to the few patch types observed in the field. This is somewhat misleading because some of the patch types listed in the current Riverine module would not occur within an arid system such as algal mats and submerged vegetation. Figure 6 shows the patch types that occurred within the project area. The first four patch types were found in over 75% of the stream sites while the remaining patch types were observed in less than 45% of the stream sites. There was no discernible trend for which sites scored higher than others.

Figure 6. Occurrence of patch types based on the percent of sites assessed in the study area.



To receive a high for the Topographic Complexity CRAM metric, the presence of two elevational changes (i.e., "benches" or breaks in channel slope) is required. In perennial streams, benching is facilitated by variations in flow and sediment regimes. Because arid land streams experience extreme and rapid variations in flood regime, the formation of benches is not a process that is expected to occur. Revised cross-section diagrams for arid stream systems would assist in interpretation of the topographic complexity metric, and potentially generate more variable scores for this metric. For example, in Figure 7, these cross-section diagrams could depict representations of in-channel features (e.g., low flow channel, active floodplain, and adjacent terraces) rather than elevation changes associated exclusively with the edge of the assessment area as was seen within the project area.

Figure 7. Typical arid, ephemeral/intermittent stream cross section and its associated hydrogeomorphic floodplain units (Lichvar et al. 2009).



3.1.3.4 Biological Structure

The metrics used to score the Biological Structure Attribute of CRAM (physical patch types and topographic complexity) generally scored very low for the ephemeral streams assessed on the study site. Overall, this attribute did not apply well as constructed to the arid, ephemeral streams found on the project site because the CRAM Riverine module uses complexity of plant communities and their position within the landscape to score this attribute. The arid, ephemeral streams of the project area are simple systems with few plant species, low plant cover, and low complexity across the landscape.

Metrics comprising this attribute focus on aspects of the vascular vegetation that contributes to a wetland's material structure and architecture. It is scored with three metrics: (1) Plant Community (number of vegetation layers, dominant plant species richness, and the number of invasive co-dominant species), (2) Horizontal Interspersion and Zonation (the number of distinct plant zones and the amount of edge between them), and (3) Vertical Biotic Structure (the degree of overlap among plant layers) and are discussed in greater detail in the CRAM Report (Attachment D). Final condition scores for the Biotic Structure attribute ranged from 53-80 (μ= 46, σ= 9; Table 14). Overall, this was the second lowest scoring CRAM attribute, with 73% of sites assessed receiving a final score of 47 or less.

In general, the sites near the northern perimeter of the site scored lower for the Plant Community Metric due to an increased presence of non-native species that decreased the scores for the metric. No sites scored high for the Horizontal Interspersion and Zonation and Vertical Biotic Structure metrics due to the simplistic nature of the plant communities that contain little to no horizontal and vertical overlap of plant communities.

3.2 Physical and Chemical Characteristics

3.2.1 Physical Substrate Determinations

Soil map units on the project site primarily correspond to the Rositas, Carrizo, and Orita soil series, as classified by the United States Department of Agriculture (USDA) in *Soil Survey of Imperial County California Imperial Valley Area* (USDA, Soil Conservation Service [SCS] 1981) and *Web Soil Survey* (USDA, Natural Resources Conservation Service [NRCS] 2010). Soil map units in the eastern 300 acres of Phase II, the laydown area, and portions of the proposed water line correspond to the Meloland, Vint, and Indio soil series or the Imperial, Glenbar, and Gilman soil series. A small area, consisting of soil map units that correspond to the Badland miscellaneous land type and Beeline and Rillito soil series, occurs along the alignment for the proposed transmission line.

The Rositas, Carrizo, and Orita soil series consist of sands to gravelly loams that typically formed on alluvial fans, floodplains and alluvial basin floors. These soils are extremely to highly erodible, and exhibit high permeability and potential for wind erosion. Erosion factors are used to predict the erodability of a soil and its tolerance to erosion related to specific land uses and treatments. The soil erosion factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible, with values ranging from 0.10 to 0.64. To estimate the annual soil loss per acre, the K value is modified by site-specific and/or regional parameters that include vegetative cover, grade and length of slope, management practices, and climate. The K value is relatively low for these soils at 0.20, which generally indicates a low potential for erosion-related annual soil loss per acre. However, since K also factors in climate as a modifier and total precipitation is very low in the region, a low K value does not necessarily indicate that these soils are resistant to erosion during precipitation events.

The Meloland, Vint, and Indio soil series consist of sands, sandy loams, or silty loams that formed in recent mixed alluvium on floodplains, and alluvial basin floors. These soils are highly erodible to erodible, and exhibit moderate permeability and potential for wind erosion. The K value is generally moderate to high for these soils (~0.40, but up to 0.55), which suggests these soils have a higher potential for erosion-related annual soil loss per acre than the above soil series.

The Imperial, Glenbar, and Gilman soil series are included among the highly productive farmland soils located in the agricultural area of Imperial County. These soils are erodible to moderately erodible, and exhibit low permeability and potential for wind erosion. The K value is moderate for these soils (~0.40), indicating these soils have a moderate potential for erosion-related annual soil loss per acre.

The Badland miscellaneous land type consists of barren land on unconsolidated, stratified alluvium, and generally includes clays to gravelly sands in steep to very steep barren lands that are dissected by streams. This land type is extremely erodible, with surface runoff that is rapid or very rapid and the hazard of erosion is high. However, the K value is low for this miscellaneous land type at 0.10, which implies a low potential for erosion-related annual soil loss per acre. As previously discussed, the K value factors in climate as a modifier and total

precipitation is very low in the region; therefore, a low K value does not always indicate soil resistance to erosion during flood events.

The Beeline soil series consists of shallow and very shallow, well-drained sandy loams that formed in mixed alluvium, and typically occur on fan terraces and hill slopes. Beeline soils are well-drained with medium to rapid runoff and moderately rapid permeability. The Rillito soil series consists of very deep, somewhat excessively drained sandy loams that formed in mixed alluvium that are found on fan terraces or stream terraces. Rillito soils are somewhat excessively drained, and exhibit slow or medium runoff and moderate permeability.

3.2.2 Water Circulation, Fluctuation, and Salinity Determinations

As presented in Section 3.1, no perennial or intermittent streams are present within the project site, with the closest perennial drainage being the New River. Several ephemeral streams traverse the project site, generally conveying water from the south to north in the western portion of the site and toward the northeast in the eastern portion of the site (see Maps 1 and 2 in Attachment B).

The ephemeral streams on the site are normally dry. They convey water infrequently and only following precipitation events of intensities sufficient to result in flowing water. Rainfall is minimal in this region and long periods of time may pass between rain events. When it does occur, flowing water within the streams is generally activated by summer monsoons that produce short-duration, high-intensity flash flooding. According to Chang (2010a), a 100 year flood event would result in approximately a one foot depth of water flowing in project area streams. Winter storms typically result in greater rainfall totals on average than the summer monsoons, but they are widespread, low-intensity events that result in little runoff. For example, stream gage records for San Felipe Creek located approximately 20 miles north of the project site indicate that August and September flows are nearly five times higher than the December to February flows. Although the majority of the rainfall occurs during winter, the majority of annual runoff occurs during the summer months of July to September.

Figure 1 of the SSA Soil and Water Resources section shows the location, watershed areas, and estimated 100-year peak discharges of 12 streams entering the project site from the south. Stream flow estimates have been made for these watersheds using a rainfall/runoff model (SES, 2008a). This model uses rainfall estimates (2.62 inches over a 6-hour period for a 100-year event), soil type, and area and topographic information to estimate peak runoff. Watershed areas for the streams, shown in Figure 1 of the SSA Soil and Water Resources section, range from 58 to 1,574 acres, averaging 548 acres. The estimated 100-year discharges range from 57 cubic feet per second (cfs) to 777 cfs.

The 100-year discharge represents the discharge from a flood event with an annual probability of occurrence of 1%. Commonly called the 100-year flood, a flood of this magnitude is expected to occur, on average, once every 100 years. Since there is a 1% chance that this flood occurs every year, it is possible for more, or fewer, than one flood of this magnitude to occur in a 100-year period. The 100-year flood has been designated by the Federal Emergency Management Agency (FEMA) as the national regulatory flood for flood insurance and floodplain management purposes (See Map 2 in Attachment B).

As the ephemeral streams pass through the project site, some combine and form new watersheds. Figure 1 of the SSA Soil and Water Resources section shows the location, watershed areas, and 100-year peak discharges for ten watercourses exiting the site toward the north and east. Watersheds for these streams range from 147 to 18,856 acres in area, averaging 3,246 acres (median 1,274 acres). The 100-year discharge for these watersheds ranges from 126 cfs to 4,223 cfs.

Discharges for more frequent floods have also been determined. The 25-year peak discharges, with 4% chance of occurrence in any given year, are roughly 50% of the 100-year peaks given in Figure 3.17-1 of the Final EIS *Hydrology, Water Use & Water Quality* section. The 10-year discharges, with 10% chance of occurrence per year, are roughly 30% of the 100-year peaks. The 5-year discharges, with 20% chance of occurrence per year, are roughly 15% to 20% of the 100-year peaks. For instance, for concentration point "CS", the estimated discharges are: 100-year = 777 cfs; 25-year = 397 cfs; 10-year = 217 cfs; and 5-year = 119 cfs.

Flows exiting the site on the north in the Phase I area are returned to the site at a point east of Plaster City, where they join other on-site flows in the Phase II area. All Phase II flows eventually exit the site on the east, overtop Dunaway Road, and drain toward the Westside Main Canal. This large drainage feature located south of Plaster City consolidates flows from much of the eastern portion of the property and is mapped as a FEMA floodplain. Flows of sufficient volume and discharge would be conveyed east to the Westside Main Canal, where IID has created a series of rough sediment detention basins to mitigate the effect of sediment discharge on water quantity and quality of the irrigation canals. Nonetheless, IID has communicated to the Corps Senior Project Managers, Robert Revo Smith, Michelle Lee Mattson, and Laurie Monarres that regular overflow into the Westside Main Canal occur (personal communication, January 7 and August 17, 2009). The Westside Main Canal flows north and at several locations can, in large events, confluence with the New River. Both the Westside Main Canal and the New River empty into the Salton Sea.

Flooding can occur anywhere there is a natural drainage on the project site. The FEMA prepares 100-year flood maps for flood insurance purposes and for floodplain management use by local agencies. FEMA map panels 06025C-1650C and 06025C-1675C cover the project site. Two watercourses, corresponding to E2 to Dunaway and C North on Figure 1 of the SSA Soil and Water Resources section have been mapped by FEMA as Zone A, which means 100-year flood zone with no base flood levels determined. These are considered approximate flood zones. Figure 2 of the SSA Soil and Water Resources section and Map 2 of Attachment B shows the location of the FEMA-mapped floodplain on the project site. FEMA mapping and flood hazards are also discussed in 3.17 of the Final EIS.

FEMA maps do not cover all floodplains. Rural areas, such as the project site, are commonly not mapped. Independent floodplain mapping has been performed based on the discharges given in Figure 1 of the SSA Soil and Water Resources section and Figure 3.17-1 in the Final EIS Hydrology, Water, and Water Quality Section. This flood mapping is shown in Figure 3 of the SSA Soil and Water Resources section and shows floodplains associated with 24 streams and one sink area (Basin D Lake) on the project site.

Salinity is expressed as the electrical conductivity of the soil saturation extract, in mmhos per centimeter (mmhos/cm) at 25 degrees Celsius. Salinity estimates for soil series types present on the site were derived by the USDA, SCS (1981) based on field and laboratory measurements of soils at representative sites in the Imperial Valley area. Results of these estimates indicated that: Glenbar, Indio, and Rositas soil series generally exhibited salinity levels of less than 4 mmhos/cm; Meloland and Vint soil series generally exhibited salinity levels of 2-8 mmhos/cm; and Imperial soil series generally exhibited salinity levels of 4-8 mmhos/cm.

3.2.3 Suspended Particulate/Turbidity Determinations

No perennial or intermittent streams are located within the project site, and no water quality data is available for the site. Water quality of surface runoff flows would be dependent on materials picked up on the ground surface, which is currently natural desert. The downstream disposition of surface runoff from the site is the desert area north of the project site in Coyote Wash and west of the Westside Main Canal, possibly the Westside Main Canal itself, local drainage and irrigation ditches west of the Westside Main Canal, the New River, and eventually the Salton Sea (See Maps 1 and 2 in Attachment B).

3.2.4 Contaminant Determinations

As previously stated, the downstream deposition of surface runoff from the site is the desert area west of the Westside Main Canal, possibly the Westside Main Canal itself, local drainage and irrigation ditches west of the Westside Main Canal, the New River, and eventually the Salton Sea.

The New River is considered highly polluted from agricultural runoff, sewage from Mexico, and discharges from manufacturing plants in Mexico, and is listed as impaired under Section 303(d) of the Clean Water Act for a wide range of pollutants including, but not limited to: trimethylbenzene, chlordane, chloroform, chlorpyifos, copper, DDT, diazinon, dieldrin, mercury, meta-para xylenes, nutrients, organic enrichment, pesticides, and selenium. The Salton Sea is listed as impaired for nutrients, salinity, and selenium.

The RWQCB identifies beneficial uses of waters in the State that may be protected against water quality degradation. These include such uses as domestic, municipal, agricultural, recreation, natural resources, and aesthetic enjoyment. Beneficial uses identified for streams in the west Colorado River basin (Colorado River Basin Regional Water Quality Control Board, 2006) include groundwater recharge, non-contact water recreation, and wildlife habitat.

Groundwater in the Coyote Wells Valley Groundwater Basin is type sodium bicarbonate-chloride. Total dissolved solids (TDS) content ranges from 750 to 1,240 milligram/liter (mg/L) in shallow wells to 300 to 450 mg/L in deeper wells (California Department of Water Resources, 1973). Fluoride levels in some wells are as high as 3.5 mg/L (California Department of Water Resources, 2003). Water quality in the Imperial Valley Groundwater Basin varies extensively throughout the basin. TDS content ranges from 498 to 7,280 mg/L in the basin. Department of Health Services data from five public supply wells show an average TDS concentration of 712 mg/L with a range from 662 to 817 mg/L. In general, groundwater beneath the basin is unusable for domestic and irrigation purposes without treatment. TDS values typically exceeding 2,000 mg/L are reported from a limited number of test wells

drilled in the western part of the basin. Groundwater in areas of the basin has higher than recommended levels of fluoride and boron. Approximately 7,000-acre-feet per year of groundwater is estimated to recharge the basin from the New River which drains the Mexicali Valley. This groundwater is related to surface flow from the highly polluted New River and negatively affects groundwater quality in the basin (California Department of Water Resources, 2003).

3.3 Biological Characteristics

As described previously, ephemeral desert streams traverse the site from south to north and south to northeast conveying flows following a substantial rainfall. The vegetation community type of the streams, classified as Sonoran creosote bush scrub, also contain sparse and isolated stands of mesquite (*Prosopis* spp.) (SES 2008a). Within the streams several species supported that are indicative of surface and shallow surface flows and which do not occur in the uplands include burrobush (*Ambrosia dumosa*), big galleta (*Pleuraphis rigida*), button brittlebrush (*Encelia frutescens*), and Schott's dalea (*Psorothamnus schottii*). The ephemeral streams generally contain greater vegetative diversity and density than the creosote bush scrub habitat outside of the streams (SES 2009d). For the IVSP site, the Corps jurisdictional WUS is approximately 881 acres. The condition of the desert streams was evaluated using the CRAM as summarized previously in Section 3.1.2.

During the CRAM effort, point intercept transects were used on certain plots to better classify the vegetation of the streams within the project area. Overall, the percent cover of plants was 28.0 percent, which is higher than the surrounding upland areas where there are wide areas that are almost barren. The average number of native plant species observed on primary streams is 6.8 whereas the average number of non-native plant species is 1.6. For secondary streams, the average number of native and non-native species observed within each transect were 5.7 and 0.8 species, respectively.

The Co-Dominant Species submetric of CRAM is assessed as living vegetation that comprises at least 10% relative cover within each plant layer identified in the AA. To be classified as a plant layer, the cover in that height layer must be at least 5% total cover. Most stream sites assessed had short (< 0.5 m tall) and medium (0.5-1.5 m tall) layers with seven of 84 sites (eight percent) having a tall layer (1.5-3.0 m tall). The seven most common co-dominant native species were burrobush, six-week threeawn (*Aristida adscensionis*), button brittlebrush, creosote bush (*Larrea tridentata*), big galleta, and Schott's dalea. Non-native species that were co-dominant in some stream sites are tumble mustard (*Sisymbrium altissimum*), Asian mustard (*Brassica tournefortii*), and common Mediterranean grass (*Schismus barbatus*).

Primary streams on the project site originate in the Yuha Desert to the south and flow under I-8. The primary streams are typically wider with larger flows than the secondary streams. During the CRAM effort, measurements of Ordinary High Water Mark (OHWM) and width of the active floodplain were wider than the secondary streams. The average OHWM for the primary streams measured was 10.9 m and the average active floodplain width was 57.4 m. The average OHWM for the secondary streams was 7.3 m and the average active floodplain width was 28.2 m. In addition, the species composition of the primary streams differed from the

secondary streams. The primary streams had 21.9% cover of plants compared with 34% cover for the secondary streams.

Off-site linear features, such as the reclaimed water pipeline, would either span the seven irrigation canals and the New River via attachment to bridge crossings or other structures or go under the waterbodies via directional boring. The canals and the New River are considered WUS (SES 2009c). Seepage from some of the canals has created adjacent wetlands with large stands of tamarisk scrub (*Tamarix* sp.) and arrow weed (*Pluchea sericea*) scrub, which are under federal jurisdiction. The estimated acreage of WUS is 2.33 acres (SES 2009c). The water pipeline would trench through Wash E off the project site for a total temporary disturbance of 0.025 acres.

The SWWTF is located at 1898 West Main Street in Seeley, California, approximately 13 miles east of the project site. According to the Draft MND for the SWWTF upgrades (Dudek 2009), the SWWTF site supports developed/disturbed land with limited to no vegetative growth, and discharges up to 0.15 cfs of effluent to the New River through an unlined earthen channel that is approximately 800 feet long and 50 feet wide (0.92 acre). The approximately 0.92 acre channel supports narrow-leaved cattail (*Typha latifolia*), tamarisk, arrow weed, and Emory's baccharis (*Baccharis emoryi*), but because of its small size and fragmented character it was considered sub-optimal for breeding use by Yuma clapper rail and other riparian bird species (Dudek 2009). A vegetation map has been completed for the area around the SWWTF, including 500 feet upstream and downstream of the site on the New River. This map is included in the Seeley Environmental Review Update which is part of the EIS (Dudek 2010).

3.3.2 Threatened and Endangered Animals

One species proposed for listing as threatened and one federally listed endangered species have been detected on the project site. FTHL is proposed for listing as Threatened and PBS (Distinct Population Segment of desert bighorn sheep: *Ovis canadensis nelsoni,* PBS) is federally listed as endangered. Designated Critical Habitat (DCH) for PBS exists approximately four miles west of the project site.

Another federally listed endangered species, the Yuma clapper rail (*Rallus longirostris yumanensis*), has potential habitat and known populations within 2 miles north of the SWWTF near where the New River empties into the Salton Sea, and one mile south in an area known as Fig Lagoon (Dudek 2010). Another state-listed bird, the California black rail (*Laterallus jamaicensis coturniculus*), had potential habitat in similar areas as the Yuma clapper rail. Surveys for the special status species in the vicinity of SWWTF have been negative. Endangered and threatened species and impacts associated with the Proposed Action and the various alternatives are discussed in detail in Section C.2 – Biological Resources of the SSA and in Section 4.3 of the Final EIS. Formal Section 7 consultation with the United States Fish and Wildlife Service (USFWS) was initiated on December 16, 2009 (letter dated December 14, 2009) for the PBS and December 28, 2010 (letter dated December 24, 2010) for the FTHL. The Biological/Conference Opinion released by the USFWS concluded that 709-MW Project is not likely to adversely affect the Yuma clapper rail (USFWS 2010).

In the summers of 2007 and 2008, focused protocol surveys were conducted for the FTHL. Two FTHL were detected along the eastern boundary, one within the Project Site and one just outside, and four desert horned lizards were detected in the Project Site during 2007 focused surveys. Two deceased FTHLs were observed along the off-site transmission line in 2007. One FTHL and two desert horned lizards were detected on the Project Site during 2008 focused surveys. Based on the findings, it was determined that the entire plant site and off-site transmission line provide suitable habitat and food sources to support FTHLs.

The Corps has determined that the upgrade to the SWWTF is a separate and distinct project. However, the USFWS included evaluation of the wetlands adjacent to the SWWTF in their Final Biological/Conference Opinion for the Yuma clapper rail, least Bell's vireo (*Vireo bellii pusillus,* LBVI) and southwestern willow flycatcher (*Empidonax traillii extimus*, SWWFL). Due to the small size and fragmented character of the small wetland area below the SWWTF, the area is considered sub-optimal for breeding use by Yuma clapper rail and other riparian bird species (Dudek 2009). Focused protocol surveys for the Yuma clapper rail, California black rail and other sensitive were conducted by URS (2010) near the SWWTF in April and May of 2010. No individuals of any sensitive species had been detected. It should be noted that most protocol surveys for listed birds are designed to detect birds during migration and courtship behavior on territories, with later surveys focused on determining breeding status and brood fledging. Early negative surveys usually result in no birds being detected during the breeding period either. The Final Biological/Conference Opinion released by the USFWS concluded that the 709-MW Project is not likely to adversely affect the Yuma clapper rail (USFWS 2010). The final Biological/Conference Opinion released by the USFWS concluded that the 709-MW Project would have no effect on the LBVI or SWWFL.

PBS were not observed during field surveys in 2007 and 2008; however, a small herd of five females and/or juveniles were observed in the north-central portion of the Project site during a site visit by Dr. Joe Platt of the company PBS&J on March 25, 2009. On December 14, 2009, the USFWS received a letter from the BLM requesting their concurrence that the project, may affect, but is not likely to adversely affect PBS. After further review of project impacts and information received on April 2, 2010, from Dr. Vern Bleich, the USFWS concluded the project is likely to adversely affect PBS. The project may adversely affect bighorn sheep by: 1) reducing the ability of bighorn sheep to travel between mountain ranges, 2) eliminating access to forage resources, 3) incrementally adding to the permanent conversion of natural desert plant communities to human industrial uses, 4) hazards associated with fencing the project site.

3.3.3 Fish, Crustaceans, Mollusks, and Other Aquatic Organisms in the Food Web

As presented in Section 3.1, no perennial or intermittent streams are present within the project site, with the closest perennial drainage being the New River. In addition, the waterline from the project site to the SWWTF would avoid all irrigation canals, ditches, and the New River either through spanning the water features along existing bridges or by directional boring.

As for aquatic organisms downstream of the SWWTF, it is well documented that the New River is highly polluted making it difficult for any aquatic life to thrive. The Regional Water Quality Control Board monitoring data show that dissolved oxygen (DO) concentrations in the New River near the Mexican Border are consistently below 1.0 mg/l, which represents a lethal environment for most aquatic organisms (e.g., there is not enough DO for the fish to breath) and violates the State standards for the New River. The SWWTF has in fact been a contributor to this problem—having been cited on multiple occasions for violating NPDES pollutant limits with their discharge to the river system.

Between 1993 and 2002, DeVlaming et al. (2004) conducted a series of studies to assess water quality using three aquatic species from the New River: a cladoceran (*Ceriodaphnia dubia*), a mysid (*Neomysis mercedis*), and a larval fish (*Pimephales promelas*). Although no mortality was observed with the P. promelas, high-level toxicity to the invertebrate species was documented in samples from the New River during many months of each year. Toxicity identifications and chemical analyses identified the organophosphorus insecticides (OP), chlorpyrifos, and diazinon as the cause of *C. dubia* toxicity. The extent of the *C. dubia* mortality was highly correlated with quantities of these OPs applied in the watersheds. *C. dubia* mortality occurred during more months of our 2001/2002 study than in the 1990s investigations. During 2001/2002, the extensive *C. dubia* mortality observed in New River samples was caused by OP insecticide pollution that likely originated from Mexico. Mortality to *N. mercedis* in New River samples was likely caused by contaminants other than OP insecticides. No aquatic sampling was conducted along the New River related to the IVSP.

3.3.4 Other Wildlife

The project area is known to support a variety of special status wildlife species. Due to the suitable habitat being present, most of the special status wildlife species listed in Biological Resources Table 2 of the SSA have a moderate potential of occurring on the project site, though they were not detected during surveys. Species which were detected on-site, the detection of wildlife signs (i.e., scats, burrows, or tracks), or those species with a high potential for occurrence are discussed in more detail in the SSA, and in Sections 3.3 and 4.3 the Final EIS. Vegetation in the desert wash contains a greater vegetative diversity and density than the areas outside of the streams and provide wildlife habitat and movement corridors for the species listed in Biological Resources Table 2 of the SSA.

The area surrounding the project is dominated primarily by Sonoran creosote bush desert shrubland. Resident birds in this vegetation community include black-throated sparrows, loggerhead shrikes, LeConte's thrashers, and greater roadrunners. Several dry streams run through the Project area that collect precipitation and nutrients from the surrounding watershed, which promotes greater floral variety. These desert wash habitats are scarce within the arid environment but are estimated to support ninety percent of Sonoran Desert birdlife. Phainopeplas, ashthroated flycatchers, verdin, crissal, LeConte's, Bendire's thrashers, long-eared and western screech owls, black-tailed gnatcatchers, Gila and ladder-backed woodpeckers, Lucy's warblers, northern mockingbirds, and loggerhead shrikes, all inhabit desert streams (CalPIF 2006).

The USFWS developed the Birds of Conservation Concern (BCC) to accurately track the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities and draw attention to species in need of conservation action (USFWS 2002). Table 17 lists the BCC species for Region 33 (Sonoran and Mojave Deserts-U.S. portion only) that have the potential to use the desert shrublands of the geographic scope as resident or wintering grounds.

Table 17. Birds of Conservation Concern for Region 33 (Sonoran and Mojave Deserts-U.S. portion only) that have the potential to be resident or wintering birds in the geographic extent.

Species	Status[1]
Mountain plover	Wintering
Burrowing owl	Resident
Gila woodpecker	Resident
Gilded flicker	Wintering
Loggerhead shrike	Resident
Le Conte's thrasher	Resident
Sage sparrow	Wintering

[1]Determination of whether birds had potential habitat in the Project area and their status was determined using *Birds of North America Online* (Poole 2005) and *Wildlife of Salton Sea National Wildlife Refuge, California* (USFWS 1993).

USFWS has identified several BCC that have the potential to migrate over the Project area and use the Salton Sea as a breeding area or wintering area. Table 18 identifies the BCC species for Region 33 (Sonoran and Mojave Deserts-U.S. portion only) that have the potential to migrate over the geographic scope of this analysis.

Table 18. Birds of Conservation Concern for Region 33 (Sonoran and Mojave Deserts-U.S. portion only) that have the potential to be resident or wintering birds in the geographic extent.

Species	Status[1]	Breeds at the Salton Sea	Winters at the Salton Sea
Black rail	Migrating	Y	N
Snowy plover	Migrating	Y	N
Whimbrel	Migrating	N	Y
Long-billed curlew	Migrating	N	Y
Marbled godwit	Migrating	N	Y
Red knot	Migrating	N	Y
Gull-billed tern	Migrating	Y	N
Black skimmer	Migrating	Y	N

[1]- Determination of whether birds had potential habitat in the Project area and their status was determined using *Birds of North America Online* (Poole 2005) and *Wildlife of Salton Sea National Wildlife Refuge, California* (USFWS 1993).

3.3.5 Special Aquatic Sites

The IVSP site does not contain any special aquatic sites. The jurisdictional WUS found on the project site include ephemeral streams that are largely dominated by upland plant species.

As described above, a small (less than 0.3 ac) brackish water emergent wetland occurs immediately downstream from the SWWTF outfall discharge. The wetland type typically occurs in streams, seeps, and other perennially-moist low places where the water table is close to or at the ground surface.

3.4 Potential Effects on Human Use Characteristics

3.4.1 Municipal and Private Water Supplies

Runoff from the ephemeral streams within the project site does not recharge municipal or private water supplies.

3.4.2 Recreational and Commercial Fisheries

There are no recreational or commercial fisheries located in the New River, Westside Canal, or the Salton Sea.

3.4.3 Water-Related Recreation

The SSA and Final EIS did not identify any water-related recreation in the vicinity of the project site or any water-related recreation activities downstream of the project site that would be affected (Land Use, Recreation, and Wilderness section of the SSA and Land Use and Corridor Analysis, Recreation, and Special Designations of the Final EIS). The nearest water-related recreation is boating, kayaking, fishing, and migratory bird watching at the Salton Sea. There are seven marinas surrounding the Salton Sea, from which boaters and fisherman launch.

3.4.4 Aesthetics

The Visual Resources section of the SSA and Final EIS provides a comprehensive analysis of the Alternative 1 (750-MW Project) in relation to the surrounding viewshed. The impacts of the 709-MW Project would be the same or lower than the 750-MW Project because there would fewer SunCatchers installed on the project site.

3.4.5 Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

The project site is not located near any National Parks, Monuments, Seashores, or research sites. The wilderness areas closest to the project site are: the Yuha Area of Critical Concern—which is adjacent to the southern boundary of the project site, the Jacob Wilderness located approximately 4 miles southeast of the project site, and the Coyote Mountains Wilderness located approximately 7 miles northeast of the project site immediately beyond the Anza Borrego State Park. For more information, see section C.8 – Land Use, Recreation, and Wilderness of the SSA or subsections 3.0 titled Land Use and Corridor Analysis, Recreation, Special Designations of the Final EIS.

4.0 Impacts Analysis

4.1 Impacts to Waters of the U.S.

4.1.1 Construction Impacts

Permanent impacts to the ephemeral streams will result from the placement of SunCatchers on 24-inch bases, and the construction and/or maintenance of the arterial and perimeter roads across streams. All stream crossings, with the exception of the Lifeline Road G crossing will be at grade Arizona crossings. The Lifeline Road G crossing will span over Wash G with a concrete box culvert structure. Temporary impacts to the ephemeral streambeds include the underground placement of the electrical collection system and the hydrogen distribution system, and temporary construction disturbances associated with vehicle and equipment movement in streambeds (SES 2009e).

All arterial roads would be 24 feet in width and the main access route would be unpaved. All the perimeter roads and maintenance routes down SunCatchers rows would also be unpaved and 10 feet in width (Table 19). The unpaved roads would be treated with a soil tackifier to maintain the integrity of the road; however, none of the road sections located within streams would be treated. Map 5 of Attachment B shows the 709-MW Project layout with the location of all roads, SunCatchers, the Main Services Complex, the off-site transmission line, and the off-site waterline that connects to the SWWTF.

The layout of the 709-MW Project would maintain the local pre-development drainage patterns except in a few locations such as the Main Services Complex and Substation, which are primarily situated in the uplands, but adjacent to secondary streams. Water discharge from the site would remain the same with western streams discharging to the north and eastern streams discharging at the eastern boundary of the project site. The roadways would have a low-flow, unpaved swale or roadway dip as needed to convey nuisance runoff to existing stream channels. It is expected that stormwater runoff would flow over the crown of the roadways, which are typically less than 6 inches from swale flow line to crown at centerline of roadway, thus maintaining existing local drainage patterns during storms. This design is preliminary and may change upon further review by the Corps when final engineer drawings are submitted to the Corps and RWQCB per Special Conditions of the IP and/or CWA Section 401 Certification. In addition, the Final EIS includes a section titled “Mitigation, Project Design Features, and Other Measures” within each discipline area including Hydrology, Water Use and Water Quality. The Corps would incorporate these measures as Special Conditions of the permit to minimize stormwater impacts should it decide to issue a permit.

Table 19. Types of impacts and the width or area of their disturbance.

Type of Impact	Width or Area of Disturbance
Arterial Roads (Unpaved)	24 feet
Perimeter Roads (Unpaved)	10 feet
Maintenance Roads (Unpaved)	10 feet
Main Services Complex	0.7 acres
Utility Trench	3 feet
SunCatcher Pedestal	4 square feet
Waterline	Co-located beneath perimeter road over Stream E

Arterial roads would cross 93 jurisdictional WUS, 36 of which would be at-grade Arizona crossings. Diagram 1 of Attachment C shows a diagram of how they would be constructed. The crossing would be a low water crossing that is not paved and no tackifier would be applied.

Some impacts to jurisdictional streams were unavoidable due to safety and security concerns. According to multiple publications prepared by the American Association of State Highway and Transportation Officials (AASHTO), 10 foot wide lanes are acceptable on low-speed facilities to ensure the safety of the driver and any passengers. Likewise, on Page C.5-11 of the SSA, Energy Commission's final conditions of certification HAZ-4 and HAZ-5 address both construction security and operations security plans and require that there be a perimeter fence and road installed to ensure the security of the site. In addition, the intersections of the arterial roads need to be a certain width in order to allow the flatbed trucks that transport the SunCatchers to the field to safely negotiate the intersections.

This alternative would not place SunCatchers or associated maintenance roads in the entirety of streams H, I, K, and C and the southern portions of streams E and G (Map 5 of Attachment B). Along the northern portions of streams E and G, a 200 foot wide corridor was left through the center of the wash as a FTHL movement corridor where SunCatchers will not be installed, but maintenance roads are still proposed. While placing SunCatchers in these streams was avoided or minimized, the applicant needs access throughout the project area and requires arterial and perimeter road crossings of the avoided streams. Under this alternative, the number of crossings has been reduced to only those the applicant currently believes to be necessary for operation of the facility and to ensure that the perimeter of the project is secure. Table 20 lists the avoided streams and the number and type of road crossings per stream.

Table 20. Number and type of road crossings for the avoided washes.

	Primary Streams											
	I		C		K		E		G		H	
Type of Road	Number Of Crossings	Acres Of Impacts	Number Of Crossings	Acres Of Impacts	Number Of Crossings	Acres Of Impacts	Number Of Crossings	Acres Of Impacts	Number Of Crossings	Acres Of Impacts	Number Of Crossings	Acres Of Impacts
Arterial	0	0	4	0.41	3	0.39	3	0.39	1	0.01	0	0
Perimeter	0	0	0	0	0	0	0	0	0	0	0	0
Fence	1	0.002	3	0.004	3	0.003	1	0.002	2	0.013	1	0.005
Total	1	0.002	7	0.533	5	0.533	7	0.393	3	0.015	1	0.005

The construction and installation of the SunCatchers and the requisite electric and hydrogen gas utilities requires excavation of two trenches that would parallel the rows of SunCatchers in a north-south direction. The necessary electrical lines would be in one trench and the hydrogen system would be in the other trench (Figure 8). The electrical trench would be 24 inches wide and 30 inches deep and the hydrogen trench would be 4 inches wide and 24 inches deep. Table 23 shows the temporary impacts that the trenching will have to primary and secondary streams.

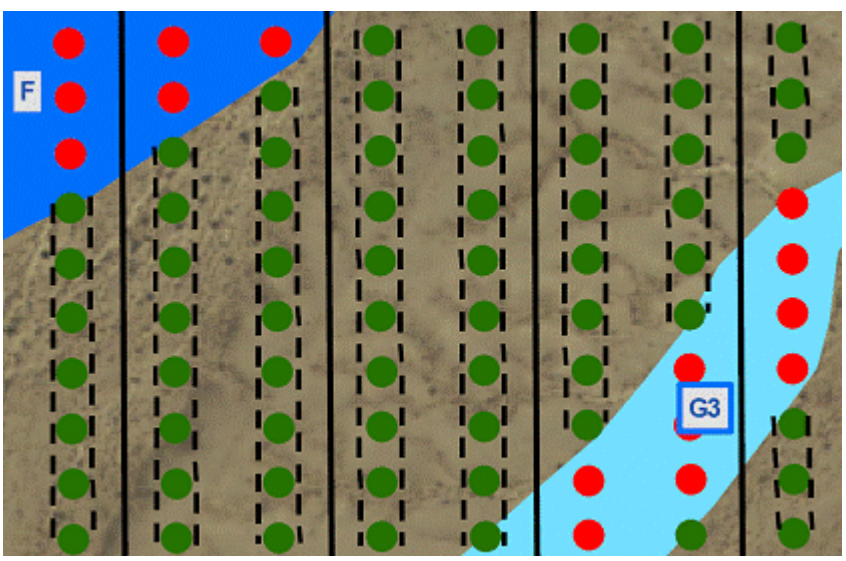


Figure 8. Current design of SunCatchers with maintenance roads bisecting two rows of SunCatchers with utility trenches running parallel to each side of the maintenance road. A utility trench then extends to each SunCatcher to connect it to the overall system.

Brush trimming in upland areas would be conducted between alternating rows of SunCatchers during construction only, in an effort to reduce fire ignition potential and to provide safe construction conditions. Brush trimming would consist of cutting the top of the existing brush

while leaving the existing native plant root system in place to minimize soil erosion. It is anticipated that trimming would be limited to individual or groups of shrubs (no grasses or forbs) that occur along the utility trenches, at SunCatcher locations, and along project area road networks, to the extent practical. Within defined bed-and-bank areas of WUS, mowing will be limited to the occasional removal of shrubs that occur within the road crossing of a stream. Across streams, some vegetation will be trampled or uprooted during trenching (for hydrogen and electrical lines) activities in these areas. No mowing would occur within streams H, I, K, C, within the areas south of the transmission corridor for streams E and G or within the 200 foot wide wildlife movement corridors in streams E and G north of the transmission line. A restoration plan for temporary construction related impact areas would be developed that would include the reestablishment of the elevations and contours of the disturbance areas, revegetation to minimize soil and wind erosion, and weeding until the sites meet pre-disturbance conditions. During operation and to minimize shading on SunCatchers and prevent potential brush fire hazards, vegetation trimmings would occur by hand as necessary.

After brush has been trimmed, blading for roadways and foundations would be conducted between alternating rows to provide access to individual SunCatchers. Blading would consist of limited removal of terrain undulations. Although ground disturbance would be minimized wherever possible, localized rises or depressions within the individual 1.5 MW solar groups would be removed to provide for proper alignment and operation of the individual SunCatchers. Roadways would be constructed as close to the existing topography as possible, with limited cut-and-fill operations to maintain roadway design slope to within a maximum of 10%.

A perimeter fence is required by the Energy Commission for security purposes and would surround the entire site (Diagram 2 of Attachment C). The perimeter fence would be installed 6-inches above the ground at stream crossings to allow for FTHL movement within the washes. In addition, the height and type of fence is expected to allow for unrestricted hydrologic and sediment transport because the soils on site are sand and there is an absence of woody vegetation or debris that can be caught up in the fence. The fence is chain link and would not affect FTHL movement in upland areas where the fence runs to the ground. The substation would also require an additional section of fencing. Fence posts would be constructed every ten feet and would be pushed into the substrate. Corner posts would require a concrete base be poured for stability. Corner posts would require a hole 12 to 18 inches wide and at least three feet deep (Diagrams 4 and 5 of Attachment C). Table 21 includes the total acres of permanent impacts from the installation of fence posts within jurisdictional streams. In total, the perimeter fence would have 0.13 acres of permanent impacts to WUS.

Table 21. Perimeter fence impacts to primary and secondary streams and the total number of crossings.

	Permanent		
Impacts	Primary	Secondary	Total
Perimeter Fence[1]	0.1	0.03	0.13

[1] –Acres of impacts were calculated assuming a hole two feet in diameter.

The water supply pipeline would be constructed a distance of approximately 11.8 miles from the SWWTF to the IVSP. The water pipeline would be routed in the Evan Hewes Highway ROW to Plaster City, entering the project site at that location. A site access road would be constructed from Dunaway Road to the eastern boundary of the project site, generally following an existing road. The water pipeline would cross the New River, several irrigation ditches, and a desert stream ("Wash E" off-site). The water pipeline would be placed adjacent to Evan Hewes Highway and would cross each channel above ground (i.e. suspended either on Evan Hewes Highway bridge crossings or separate from each bridge, but elevated above the flow line (see example photographs in Attachment F). The only impacts to WUS anticipated by the water pipeline are 0.025 acres of temporary disturbance due to trenching to bury the pipeline across "Wash E" where it occurs off-site. No directional boring is proposed; however, due to a requirement by the Energy Commission, a frac-out contingency plan has been prepared. In the uplands, the water pipeline will be buried 30 inches below ground primarily within disturbed areas of the Evan Hewes Highway ROW. See Attachment F for a description, vegetation map, and photographs of the water pipeline route and frac-out contingency plan.

Overall permanent and temporary impacts of the associated with Alternative 3 are listed in Table 23. This includes the permanent disturbance of placing 3,248 SunCatchers in jurisdictional streams (Table 22), all unpaved roads constructed within jurisdictional streams, the construction of the Main Services Complex and Substation, and buried electric and hydrogen utility line trenches. No fill or dredging operations are anticipated with the proposed upgrade to the SWWTF.

Table 22. Number of SunCatchers in ephemeral streams for Phases 1 and 2 of construction if phasing is necessary.

Number of SunCatchers	Primary Streams	Secondary Streams	Total
Phase 1	376	568	944
Phase 2	1,591	713	2,304
Overall	1,967	1,281	3,248

The substation would be constructed within a small area (0.7 acres) of primary and secondary streams and would require a diversion ditch to reroute water away from the facility. Diagram 3 in Attachment C provides an engineered drawing that depicts how the stream would be diverted around the Substation building and complex. This preliminary design has been

reviewed by the Corps. The applicant will be required to submit final design plans and cross sections prior to implementation for review by the Corps to ensure that the diversion does not retard hydrologic or sediment transport of the secondary stream and cause indirect impacts to downstream areas.

Table 23. Temporary and permanent impacts to jurisdictional streams due to construction of the 709-MW Project.

		Permanent		Temporary	
Impacts		Primary	Secondary	Primary	Secondary
Roads	Arterial Roads	7.4	2.7	0.0	0.0
	Perimeter Roads	2.0	0.5	0.0	0.0
	Maintenance Roads	15.2	9.2	0.0	0.0
	Temporary Road	0.03	0.2	0.0	0.0
Waterline		0.0	0.0	0.0	0.0
Main Services Complex		0.01	0.7	0.0	0.0
SunCatchers (2 ft diameter)[1]		0.2	0.1	0.0	0.0
Perimeter Fence		0.1	0.03	0.0	0.0
Electrical and Hydrogen Trenches[2]		0.0	0.0	8.6	5.4
Total		**24.9**	**13.3**	**8.6**	**5.4**

[1] – Impacts for the SunCatcher pedestals were calculated at 8.86 x 10^{-5} acres (4 square feet) per pedestal (3,214 pedestals total).
[2] – Temporary impacts associated with the electrical and hydrogen trenches necessary to each SunCatcher were calculated using a 6 inch wide trench for the hydrogen trench and a 24 inch wide trench for the electrical trench and 58 feet of trenching for each SunCatcher.

4.1.2 Operational Impacts

During operation of the 709-MW Project, the perimeter road would be regularly patrolled for security purposes. On average, the perimeter road would be used for surveillance 2 times a day. The perimeter road has 59 stream crossings. There would be approximately 3,592 stream crossings by vehicles per month for security purposes (Table 24).

The SunCatchers require washing once a month to maintain efficiency. In addition, maintenance would be required as SunCatchers break down or require regular maintenance. There are 3,248 SunCatchers located in jurisdictional streams. It is assumed that all SunCatchers within a stream would be visited at the same time. Over the course of an average month, there would be 669 crossings of the ephemeral streams for the regular washing and maintenance of the SunCatchers. The vehicles would include a maintenance truck and a water truck. Table 24 shows the approximate number of stream crossings per month.

The Applicant would not cross the streams when the streams are flowing or after rain events when the ground is soft except for emergency situations. As required by the Final EIS, the Applicant is required to prepare multiple plans to protect water quality from the construction and operation of the project. In particular, mitigation measures required by the Final EIS in the Hydrology, Water Use, and Water Quality Section include development of a Drainage Erosion and Sedimentation Control Plan, Industrial Facility SWPPP, and an NPDES General Permit for Construction Activity. One or several of these documents would include proper BMPs and protocols that require vehicles to be regularly maintained at appropriate locations within the Main Services Complex. No maintenance of vehicles in streams or along roads would be permitted unless in emergency situations. In the event that an emergency occurs and contaminants are released, one or several of these plans will contain BMPs and cleanup measures to be followed. See the Final EIS for details required within each plan.

Table 24. Number of roads that intersect streams and the stream crossings required monthly during normal operation of the 709-MW Project including the type of vehicle.

Type of Road		Number of Streams Crossed			Number of Crossings per Month		
		Unimproved	Arizona	Total	Unimproved	Arizona	Total
Maintenance	Total	398	0	**398**	N/A	N/A	**0**
	Washing[1]	N/A	N/A	**N/A**	398	0	**398**
	Maintenance[2]	N/A	N/A	**N/A**	271	0	**271**
Perimeter (Patrol)[3]		43	16	**59**	2,618	974	**3,592**
Arterial		38	19	**57**	289	145	**434**
Total		**479**	**35**	**514**	**3,576**	**1,119**	**4,695**

1 – It is assumed that TSNA wash all SunCatchers within a given wash at the same time.
2 – It is assumed that each SunCatcher would require maintenance once a year.
3 – It is assumed that TSNA would patrol the perimeter of the project twice a day.

4.1.3 Indirect Effects Related to Scour and Vegetation Removal in Streams

An indirect effect of SunCatchers installed in streams would be the scour created around the pedestals during and after a rain event due to the obstruction in the flow path and due to the exposed bare soil following vegetation removal. The hydraulics of flow were used to compute the depth of local scour as well as the area affected by scour using the equation recommended by the Federal Highway Administration given in Hydraulic Engineering Circular No. 18, FHWA, 2006 by Chang Consultants (2010b). Wash D was used as a sample wash to model the indirect effects of scour around SunCatcher pedestals placed in streams. Chang's modeling used a 100-year flood event as the precipitation event and determined that the average scour radius during the storm event was 44.9 square foot circle around the SunCatcher pedestal. The scour hole gets partially refilled during the falling stage of the storm flow (i.e., the scour hole becomes smaller by the end of the storm). The modeling calculates that 50% of the scour depth is refilled toward the end of the storm for a scour disturbance of 21.9 square feet around the SunCatcher pedestal (Chang 2010b). Table 25 quantifies the indirect effects related to scour of the SunCatchers placed in the streams on the project site.

It is anticipated that scour repair would be ongoing throughout the life of the project but would only require maintenance following large flood events. In addition, it is anticipated that trimming and/or removal of vegetation within the streams would continue throughout the life of the project; however, maintenance trimming would consist primarily of removing any shrubs or trees that shade the SunCatchers and any vegetation that would impede the ability of the SunCatcher to track the sun.

Table 25. Acres of scour around the bases of the SunCatcher pedestals during a 100-year flood event.

	Primary		Secondary		Total	
Construction Phase	**# of SunCatchers**	**Acres of Scour[1]**	**# of SunCatchers**	**Acres of Scour[1]**	**# of SunCatchers**	**Acres of Scour[1]**
Phase 1	376	0.19	568	0.29	944	**0.47**
Phase 2	1,591	0.80	713	0.36	2,304	**1.16**
Overall	1,967	1.00	1,281	0.65	3,248	**1.64**

1 – Acres of scour were determined using 21.9 square feet of disturbance per SunCatcher pedestal during a 100-year storm event (Chang 2010b).

4.1.4 Direct and Indirect Impacts to the Stream Condition

The above direct and indirect effects during construction and operation of the 709-MW Project have the potential to adversely affect the ephemeral streams found on the project site. CRAM was used to assess the functionality of these streams and the results are discussed in Section 3.1.2. By dividing the four attributes of the CRAM methodology into their respective metrics, it is possible to frame a discussion about projecting (e.g. estimating) the above direct and indirect effects of Alternative #3 on the functionality of the ephemeral streams. Using the above impacts combined with how CRAM calculates a score, it is possible to estimate how individual metrics such as buffer condition, structural patch richness, and number of plant layers would be affected by 709-MW Project. Some of the projections will be quantitative, but given how certain attributes of the established CRAM Riverine module (Physical and Biological) did not adapt well to the ephemeral streambeds, some of the projections will be qualitative. The projections below are used in section 5.0 to determine adequate mitigation to replace the functionality lost due to the 709-MW Project. More detailed impacts analysis for the physical, chemical, and biological properties of the ephemeral streams are included in sections 4.2 and 4.3.

It should be noted that multiplying a CRAM score by the area or linear distance of an ephemeral streambed may not represent the true relationship between conditions at different scales. CRAM scores do not represent a functional capacity on a per acre or per unit basis (CWMW 2009). The use of CRAM in estimating potential impacts onto the functionality of the ephemeral streams is only one component of calculating impacts and of determining the proper mitigation ratios.

4.1.4.1 Buffer and Landscape Context Attribute

Landscape Connectivity Metric

For riverine wetlands, landscape connectivity is assessed as the continuity of the riparian corridor over a distance of about 500 meters upstream and 500 meters downstream of the assessment area. Of special concern is the ability of wildlife to enter the riparian area from adjacent upland buffer area and to move easily with adequate cover along the riparian corridor through the assessment area from upstream and downstream. Non-buffer land cover measuring more than 10 meters in length on either side of the stream riparian corridor upstream or downstream are considered breaks in the Landscape Connectivity. A description of what constitutes buffer can be found below in the "Buffer Metric" section.

The majority of the 709-MW Project would be impacted by a network of unpaved maintenance roads, arterial and perimeter roads, utility trenches, and SunCatcher units spaced approximately 60 feet (north/south) by 112 feet (east/west) apart. The 709-MW Project layout extends the roads and SunCatcher units through many of the ephemeral streams and up to the edge of most of the avoided primary streams (I, K, C, G, E, and H). Based on the current Riverine Module CRAM scoring method, this would effectively reduce the post-project scoring of the Landscape Connectivity metric to a "D" for all of the stream area in which the combined total length of non-buffer segments is greater than 200 meters either upstream or downstream.

Buffer Metric

The CRAM definition of Buffer "is the area adjoining the assessment area that is in a natural or semi-natural state and currently not dedicated to anthropogenic uses that would severely detract from its ability to entrap contaminants, discourage forays into the assessment area by people and non-native predators, or otherwise protect the assessment area from stress and disturbance." The buffer metric is composed of three submetrics: (1) percentage of the AA perimeter that has a buffer; (2) the average buffer width; and (3) the condition or quality of the buffer.

The 709-MW Project would introduce a level of anthropogenic use that would not fit the current CRAM definition or examples of buffer (Collins et al. 2008). The SCCWRP assessment found the highest scoring areas for this metric were in the center of the site away from existing anthropogenic uses such as I-8, Even Hewes Highway, and Plaster City. This is the only metric that uses a formula incorporating the 3 submetrics to determine the final scoring. If the percent of the AA perimeter that has a buffer is reduced to 0 percent, the entire metric score automatically becomes the equivalent of an overall score of "D". Except for ephemeral streams at the perimeter (I, G, and H) where the SunCatcher network will only be placed on a single side of the stream, the percent of the perimeter with buffer of all streams is effectively reduced to 0 percent. The Buffer Metric was calculated based on the Riverine module (Collins et al. 2008) for each AA within streams I, G, and H.

4.1.4.2 Hydrology

Water Source Metric

Water sources directly affect the extent, duration, and frequency of saturated or ponded conditions. Water sources include both natural and unnatural direct sources. Natural direct sources would include rainfall, groundwater discharge, and flooding. An example of an unnatural direct water source would be direct storm drain discharge.

The majority of the project site would remain 100 percent pervious, except for the building sites. The building sites consist of approximately 28 acres of impervious surfaces (buildings, paved parking, storage areas, etc.). The increased runoff expected from the building sites would be over-mitigated by capturing 100 percent of the runoff in a retention basin, where the storm runoff would be infiltrated and/or evaporated to the atmosphere. Unpaved arterial, maintenance and perimeter roads account for 323 acres and would be treated with a soil tackifier to maintain the integrity of the road except for within WUS. Unpaved roads treated with the tackifier have some degree of imperviousness necessary to stabilize the soil, but this percentage of impervious is currently unknown.

The maintenance plan requires that each SunCatcher unit be washed 12 times per year. Total water use for 28,360 SunCatchers distributed over the 6,571 acre site is estimated to be 14.2 acre feet of water annually. The pan evaporation rate at the Site is over 140 inches per year, far exceeding the approximately 0.025 inches of water per year used over the 6,571 acre project site.

All of the 84 CRAM assessment areas scored an "A" for this metric (i.e. their freshwater sources are either precipitation or they naturally lack water in the dry season). There was no indication that unnatural (anthropogenic) sources of water contributed to any dry season flows. Because the majority of the project site will remain pervious and due to the high evaporation rate in the Yuha Desert, there would be virtually no change in the extent, duration, and frequency of saturated or ponded conditions of the ephemeral streams throughout the site and scoring of the Water Source metric would remain unchanged.

Channel Stability Metric

Channel stability is assessed as the degree of aggradation (i.e., net accumulation of sediment on the channel bed causing it to rise over time), or degradation (i.e., net loss of sediment from the bed causing it to be lower over time). Eighty three (83) percent of the CRAM assessment sites scored a "B" for the Channel Stability metric, 12 sites scored an "A," and 5 sites scored a "C." Some indicators of aggradation were observed at most sites, none of which were considered severe. This is supported by the description of flow characteristics contained in the Initial Drainage Study Report conducted by Stantec (2008). The report describes the project site as an alluvial plain in which sediment is still being deposited from the upstream alluvial fan areas.

The CRAM assessment sites scoring lower then a "B" were primarily located at the downstream (northern) end where diversion of the ephemeral streams toward culverts under the railroad and Evan Hewes Highway caused additional deposition of sediment.

The majority of direct impacts to ephemeral streams would consist of the unpaved arterial and perimeter roads, maintenance roads, and utility trenches. Additionally, the placement of SunCatcher units within ephemeral streams would have direct and indirect impacts. All project maintenance roads and perimeter roads (10 feet wide) and arterial (24 feet wide) would be constructed at-grade to minimize their impact to site hydrology and sediment transport. The at-grade roads would be similar in their construction to the existing transmission line access road and the BLM road network throughout the site.

Chang Consultants (2010a) determined that the at-grade road crossing would not cause major changes in sediment pattern. Chang Consultants (2010c) conducted an updated evaluation of the 750-MW Project in which they reviewed changes associated with the 709-MW Project along with areas of the project site not covered in the previous study; north of the existing transmission line and south of Evan Hewes Highway. From their modeling study, Chang Consultants determined that the streams within the proposed area of impact would not be subject to substantial changes in channel bed profiles for the existing and proposed conditions. This is additionally supported by the CRAM assessment where the 6 assessment areas located directly upstream and downstream of the existing transmission line road all scored a "B" or above.

Chang Consultants (2010b) also conducted a study of local scour around the 2 foot diameter pedestals on which the SunCatcher units will be installed. The pedestal supporting the each SunCatcher unit placed within the ephemeral streams would induce local scour during storm flow similar to that found around bridge piers. Scour analysis was based on modeling for the 100 year storm event. The results of the study indicate that while the area and depth of scour is largest during peak flow, the scour area becomes partially filled back in as storm flow recedes. Chang Consultants determined that the total area affected by the indirect effects of local scour around SunCatcher pedestals is less than one percent of the wash area.

The Channel Stability metric is assessed using a worksheet to identify observed field indicators of channel equilibrium, active degradation, and active aggradation. The 84 CRAM assessment sites had a cumulative total of 198 indicators of equilibrium, 31 indicators of degradation, and 162 indicators of aggradation. Because of the landscape position of the project site in the watershed, there is a continuous input of sediment delivered to the project site from the upstream areas. While some localized scour is expected directly around SunCatcher pedestals, the effects are minimal in relation to the overall area of the ephemeral streams and the amount of sediment coming into the project site.

The indirect effects of the roads, utility lines, and SunCatcher pedestals and vegetation clearing on Channel Stability as assessed in CRAM would not be expected to change for the six streams that are avoided or almost entirely avoided (I, K, C, E, G, and H). It is probable; however, that the network of unpaved roads, particularly maintenance roads, that would need to be constructed (e.g. cut) into stream banks would cause localized erosion at each bank crossing. In addition, where SunCatchers are placed near the banks of each stream, either within the streambed or in the uplands adjacent to the bank, localized scour and erosion would likely occur. The degree that localized scour and erosion would occur is exacerbated by the proposed vegetation removal both in the uplands and in the streambeds

surrounding the SunCatchers. Neither the effects of vegetation removal, nor the location of the placement of each SunCatcher can be accounted for in the hydrologic and sediment transport modeling completed by Chang Consultants. Nonetheless, these types of effects are likely and observed regularly along dirt roads and stream crossings throughout the arid west. Therefore, it is the Corps' determination that the increased erosion at these locations would amount to substantially more indicators of aggradations and degradation within the post-project CRAM assessment areas (e.g. maintenance road crossings would occur on average every 200-feet, which would be approximately 3 or more crossings per CRAM assessment area for the post-project condition). The Corps therefore concludes that the 709-MW Project would effectively reduce the post-project scoring of the Channel Stability metric to an average of "C" for the streams not avoided. For streams that are avoided by the project and within the center of the site (C, K, and E), the letter score would be reduced by one; from "A" to "B" or "B" to "C" depending on the existing condition. For the streams that are avoided by the project and located on the boundary of the project site (G, H, and I), the score would not change since there would be no construction activities within the streams.

The Corps is including a special condition to monitor the effect of the dirt and road crossings on the stream sediment transport. If monitoring after the first two winters determines that the roads are causing scour or aggradation then modifications to the grade or design of the road will be completed that minimize the adverse effects on sediment transport.

Hydrologic Connectivity Metric

Hydrologic connectivity is assessed based on the degree of channel entrenchment, or the inability of flows in a channel to exceed the channel banks. For riverine systems, this metric is calculated as the flood-prone width divided by the bankfull width. As mentioned previously in 3.1.2.2, the conceptual model and field techniques used to assess this metric under the current CRAM Riverine Module (Version 5.02) will require reevaluation for arid streams. Using this CRAM User's Manual, 93% of the assessment areas scored and "A", indicating that channels were generally not entrenched.

The SCCRWP CRAM assessment (Attachment D) found that the concept of "bankfull" as described in the CRAM User's Manual (Collins et al. 2008) does not appear to apply to arid ephemeral systems such as those found on the project site. SCCWRP indicated a revision of this metric that considers the connectivity between multiple channels in the floodplain as well as the upstream condition of the contributing watershed may be a more appropriate measure for arid streams. This concept is further supported by the drainage study of the primary ephemeral streams on the site conducted by Stantec (2008) in which 10 and 100-year discharges were modeled. The 10-year modeled cross section could be considered analogous to the current CRAM riverine concept of flood prone area. The cross sectional depth of modeled 10-year discharges was less than 2 feet deep in all of the modeled cross-sections for primary ephemeral streams except one of the four cross-sections for stream G. The estimated cross-sectional widths ranged up to 575 feet and all except 4 of the 21 modeled cross-sections were greater than 100 feet in width.

The indicators of bankfull and floodprone width and depth, as described in the CRAM User's Manual, could not be accurately measured in most of the ephemeral streams on the project

site because of the very subtle changes in channel depth (<2 foot) relative to the channel width (>100 feet in many cases). Therefore visual estimates of entrenchment were used to determine scoring for many of the CRAM assessment areas. The shallow, wide nature of most of the onsite ephemeral streams along with the subtle topographic transition to adjacent upland areas indicates that there is little to no entrenchment.

Channel entrenchment can also be described as the degree to which the channel is incised. Chang Consultants (2010a and 2010c) assessed stream longitudinal profiles through the project site and the effects of post-709-MW Project impacts. The 709-MW Project incorporates changes recommended by Chang Consultants (2010a) to mitigate sediment transport impacts which could produce localized scour and incision of the ephemeral stream channels throughout the project site. Chang Consultants (2010c) reevaluated the impacts after incorporation of recommended mitigation measures; primarily the removal of all sediment basins and the use of at-grade road crossings throughout the entire project. With these mitigation measures, the changes in channel bed elevation due to general scour were estimated to be less than 1 foot during the modeled 100-year flood and even less during the 10-year event. The general scour analysis provides the best indication of potential for channel entrenchment (channel incision). Additionally, the at-grade road crossings, utility lines, and SunCatchers have been designed to minimally impact the existing morphology of the ephemeral stream channels. Therefore, using similar methods to the SCCRWP CRAM assessment for estimating Hydrologic Connectivity, no significant changes in metric scoring are expected.

4.1.4.3 Physical Structure

Physical Patch Type Metric

Several components of the 709-MW Project would impact the physical structure of the ephemeral streams (See Sections 4.1.1, 4.1.2, and 4.1.3 for details). The construction of the roads and utility trenches would impact approximately 5.6% of the ephemeral streams (Table 27). It is expected that the roads and utility trenches constructed within the project site and would have some impacts on the physical features of the streams, including the physical patch types that are measured for this metric. Roads would be constructed in a grid across the project site and the two utility trenches would run parallel to the rows of SunCatchers including all the streams not designated for avoidance (Map 5 of Attachment B). Heavy equipment including flatbed trailers, cranes, and water trucks would be driving to each SunCatcher location for the installation and/or maintenance of the SunCatchers. Even though there will be no grading done within the streams, there will be grading at stream banks for road crossings and the weight of the vehicles accessing SunCatchers in the streams will create a disruption in the natural physical patch types measured for this metric.

The majority of sites had four patch types observed within the assessment area boundaries (Figure 6). Of the four major patch types observed (secondary channels, hummocks/sediment mounds, point/in-channel bars, and variegated foreshore), it is projected that the 709-MW Project would remove an average of one of these patch types within primary streams. Since the secondary streams are not as wide as the primary streams assessed within the project area (average active floodplain width of 28.2 m versus 57.4 m for primary streams), it is

projected that the 709-MW Project would remove an average of two patch types within the secondary streams. For the avoided streams, there are only a few road and fence crossings and no SunCatchers are placed within these streams (Table 20). No reduction in physical patch types is expected for these areas.

The Physical Patch Type Metric is scored by the number of patch types observed within an assessment area. For the project site, the majority of sites scored a "D" (48%) for this metric, which is the lowest score possible (See section 3.1.2.3 for a summary or Attachment D for a full report). Therefore, the scores for these sites would not change. For primary streams that are not avoided, there were ten sites that scored a "B" or a "C" for this metric. Reducing the patch types by one would decrease 3 sites from a "C" to a "D" and no sites from a "B" to a "C". Since CRAM metric scoring of 6-7 patch types is a "B" and 4-5 patch types is a "C," a reduction of two patch types for secondary streams would reduce all scores of a "B" to a "C" and a "C" to a "D." 16 assessment sites scored a "C" and five sites scored a "B" for structural patch richness for secondary streams. These assessment sites would all be reduced by one letter grade. Scores would not change for assessment sites within primary streams that are avoided.

It should be noted that this is one of the metrics identified in the SCCWRP CRAM report that would require modification for arid, ephemeral stream systems, such as deleting/adding patch types for more accurate scoring of this metric (Attachment D). The initial low scoring of this metric may tend to diminish any differences seen between assessment sites and separate streams because to achieve higher scores the metric requires more patch types than are present within these less complex, ephemeral streams.

Topographic Complexity Metric

The ephemeral streams in the project site did not contain any elevation changes or "breaks," which is what this metric measures. The 709-MW Project would need to grade stream banks at road crossings in order to create safe slopes for each dirt maintenance road; however, the 709-MW Project would not grade the bottom of the roads within the streams. Therefore, the at-grade crossings are not expected to disrupt sediment transfer through the project area (Chang 2010a; Chang 2010b: RMT 2009). All sites scored a "C" or "D" for this metric and it is not expected that the 709-MW Project would interfere with the topographic complexity of the streams except at road crossings. In order for an assessment site to score a "D," there needs to be a man-made change to the channel bottom (Figure 9) which is not projected for this project (Chang 2010a; Chang 2010b; RMT 2009). Therefore, no change is currently projected for this metric from the 709-MW Project. However, it's important to note that this has been estimated using a hydrologic model in which small changes in sediment transport are not expected to be captured.

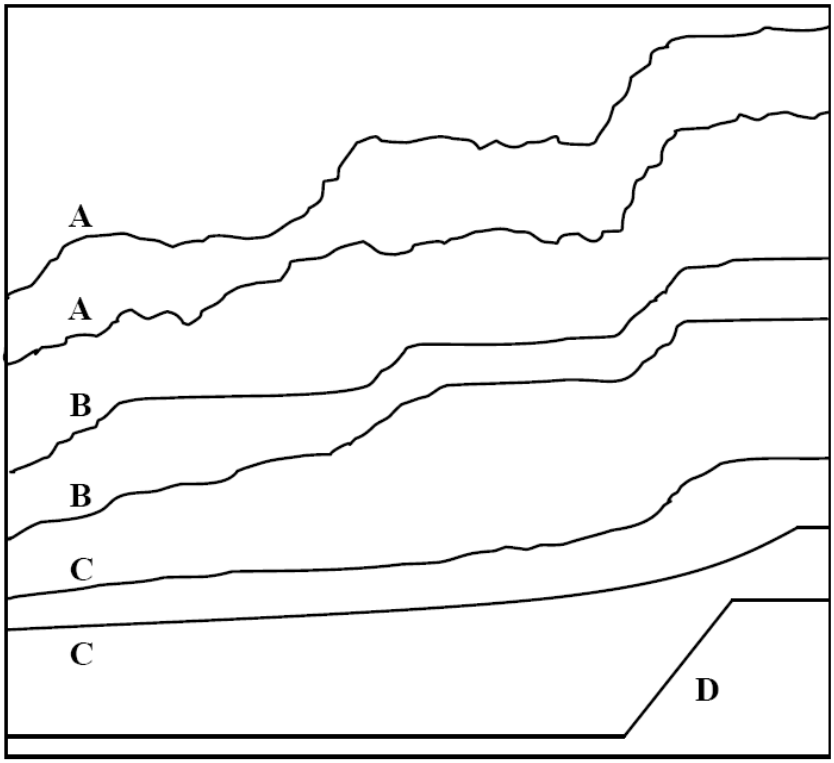


Figure 9. Rating of Topographic Complexity for all Riverine Wetlands.

It should be noted that this is another of the metrics where the current Riverine module does not adapt well to arid ephemeral stream systems (Attachment D). The CRAM report states; "Because aridland streams experience extreme and rapid variations in flood regime, the formation of benches is not a process that is expected to occur. Revised cross-section diagrams for arid stream systems would assist in interpretation of the topographic complexity metric, and potentially generate more variable scores for this metric [Attachment D]." It is expected that this metric will be altered in future CRAM Riverine Module revisions to better assess the topographic complexity observed within ephemeral stream systems.

4.1.4.4 Biological Structure Attribute

Biotic Structure also generally scored low for all assessment areas due to the extreme nature of the Yuha Desert environment. The Biological Structure Attribute measures how plants influence the "quantity, quality, and spatial distribution of water and sediment within wetlands" (Collins et al. 2008). Since the diversity and cover of plants is sparse within the project site, the corresponding CRAM scores for Biological Structure are lower than for other Riverine systems.

Plant Community Composition Metric

The plant community composition metric is composed of three sub-metrics. Projections of CRAM scores for each sub-metric are described below.

Number of Plant Layers Sub-Metric

Vegetation clearing within ephemeral streams would be limited to construction of roads and utility trenches. There would also be trampling and crushing of vegetation associated with the temporary impact areas for installation of the SunCatchers (Section 4.3.1). Only the taller plant species (ocotillo, mesquite, and smoke tree) would be systematically removed near SunCatchers to allow for movement of the SunCatcher and to prevent shading. However, these species are rarely present in most streams and when present provide sparse cover (usually less than 1% cover). None of the species that would be included in the medium and short plant layers would be specifically targeted during vegetation removal, but the potential effects of shading by the SunCatchers may affect their persistence and be indirectly affected.

It is estimated that approximately 1.6% of vegetation would be cleared within the ephemeral streams for the construction of roads and the utility trenches (Table 27). An additional 10% of vegetation has the potential for trampling or crushing within the temporary impact areas for SunCatcher installation; however, a certain percentage of these plants would remain intact (Table 28). It is currently estimated that approximately 11.6% of the vegetation within the streams is exposed to potential impacts.

The majority of sites assessed had 1-2 plant layers (75 assessment sites) with only nine sites having three plant layers (includes a tall plant layer). Since the ephemeral streams would retain approximately 27% of their plant cover after construction with an additional 10% of vegetation exposed within the temporary impact areas (Table 28), all assessment sites would likely retain 1-2 plant layers and still score as a "C." A tall plant layer was observed in nine of the assessment sites. This included four assessment sites that are located within primary streams proposed for avoidance. It is likely that the vegetation clearing would remove the tall plant layer from the five sites where it was observed outside of the avoided streams. This would reduce the scores for these sites from a "B" to a "C."However, the tall plant layer would remain in the primary streams where SunCatchers would not be installed and these scores would not change.

Number of Co-Dominant Species Sub-Metric

As described above, only species that have a very limited distribution within the ephemeral streams on the Site (i.e. those species in the tall layer) would be systematically removed where they interfere with the operation of the SunCatchers. Overall, the 1.6% reduction in plant cover with another 9% exposed to impacts within the temporary impact areas would have the potential to decrease the number of co-dominant species within an assessment site.

47 of the 84 sites scored a "D" (five or less co-dominant species) for this sub-metric and these scores would not change with the implementation of the 709-MW Project. Of the remaining assessment sites, 35 scored a "C" (6-8 co-dominant species) and two scored a "B" (9-11 co-dominant species). Of these scores, seven of the assessment sites that scored a "C" and one that scored a "B" are located in primary streams where the applicant would not install SunCatchers. In order for a species to be considered a co-dominant, it must contain at least 10% of the relative cover within the coverage area of an individual plant layer. If approximately 11.6% of plant cover is at risk for vegetation clearing, trampling, or crushing, it is expected that up to two co-dominant species would no longer meet the criteria for a co-

dominant for a given assessment site. This would reduce the scores for these assessment sites one letter (i.e., a "B" to a "C" and a "C" to a "D"). This would not apply to the eight assessment sites that are located within the avoided primary streams. These scores would remain the same since there would only be a few perimeter and arterial road crossings (Table 20).

Percent Invasion Sub-Metric

The number of invasive co-dominant species is assessed as a percentage of the total number of co-dominants. There were several invasive co-dominant species observed within the project area. Asian mustard was the most commonly observed (40 of the 84 assessment sites). It is well documented that invasive species excel at colonizing areas after ground disturbance as proposed for the 709-MW Project. The Asian mustard is already established on the northern sections of the project area and any other areas of ground disturbance would likely be invaded by this species and others.

The applicant has committed to a Noxious Weed Management Plan for the entire project site (SES 2009b). Certain species, including the Asian mustard, have been identified for eradication wherever encountered within the project area. With ongoing implementation of the Noxious Weed Management Plan, it is anticipated that scores for this sub-metric would not change. If implemented correctly, it is likely that Asian mustard infestations across the project site would decrease and this would have the potential to increase scores in this sub-metric. However, no projections of increased CRAM scores for the Percent Invasion sub-metric would be anticipated at this time.

Horizontal Interspersion and Zonation Metric

During vegetation clearing for the road system and electric and hydrogen trenching, it is not expected for any one plant community to be targeted above the others. In addition, only approximately one percent of plant cover within the streams would be removed during construction activities and will be confined to defined areas (road construction and trenching activities) (Table 27). However, some of the horizontal structure of the plant communities may be affected by construction activities from the removal of discrete patches of vegetation.

The majority of assessment sites scored a "C" or a "D" for this metric. However, there was some variability in the scores for this metric with 26% of the sites assessed scoring an "A" or "B". Assessment sites that scored a "C" or "D" are already simplistic systems without much variation or interspersion between plant communities and the amount of vegetation clearing proposed would not disrupt plant communities on a large enough scale to reduce scores for these sites.

However, sites that scored an "A" or a "B" indicate that these sites have greater horizontal biotic structure (i.e. there are larger number of unique plant zones that are interspersed throughout the riparian area). It is likely that the construction of the access roads and installation of the SunCatchers within these sections of the streams would have a greater impact on this metric. It is projected that the vegetation clearing combined with the

potential for trampling and/or crushing of vegetation within the temporary disturbance areas would impact the horizontal structure of the plant communities within these assessment sites and reduce the scores for these systems by one letter (i.e., an "A" to a "B" and a "B" to a "C"). There is one site that scored an "A" that would be reduced and 14 sites that scored a "B" that would be reduced by a letter grade. Seven of the sites that scored an "A" or "B" are located within avoided primary streams where there will be no vegetation clearing for the installation of SunCatchers. The scores for these sites would not change.

Vertical Biotic Structure Metric

The vertical component of biotic structure is assessed by using the number of plant layers calculated in the Plant Community Composition Metric and observing the vertical overlap of the identified plant layers. The ephemeral stream plant systems are by necessity simple with very few plant layers (average of 2 plant layers for the CRAM assessment [Attachment D]) that do not contain much if any vertical structure overall due to the scarcity of water and other necessary resources. The majority of sites scored a "D" for this metric and will not be further impacted by the 709-MW Project. Six assessment sites scored a "C" due to the presence of three plant layers. As discussed above for the Plant Community Composition Metric, it is expected that those sites with three plant layers (includes a tall plant layer) would be reduced to two plant layers through vegetation clearing. Two of these sites are located within the primary streams that where no SunCatchers would be installed. These two sites would retain their tall plant layer and their Vertical Biotic Structure scores would not be reduced. The remaining four sites would have their scores for the Vertical Biotic Structure reduced to a "D" as defined in the CRAM manual (Collins et al. 2008).

4.1.4.5 Summary of Impacts to Stream Condition

The Corps has completed an evaluation of the CRAM scores in order to estimate direct and indirect effects of the 709-MW Project. The final evaluation and estimate of indirect effects have been calculated for avoided streams (e.g. I, K, C, E, G, and H) and impacted streams. As described above, the Corps estimates that the scores for avoided and unavoided streams will be reduced most significantly for the Buffer and Landscape Attribute lowering from an average of "A" to the lowest score possible ("D"); with the exception of three primary streams that are avoided and on the border of the project area (e.g. I, G, and H) that would be reduced depending on their location within the project site and the surrounding conditions. Changes in the Hydrology Attribute will be less severe. The average baseline score for the Hydrologic Attribute is "A" and this would be reduced to a "B" for an unavoided streams and a few of the avoided streams (e.g. K, C, and E) due to arterial road crossings at three or four locations. These crossings have the potential of causing severe degradation and aggradation. The Applicant and the Corps have evaluated the potential scour for SunCatcher pedestals, fencing, and road crossings (Attachment E). The Corps is including a special condition to monitor the effect of the dirt and road crossings on the stream sediment transport. If monitoring after the first two winters determines that the roads are causing scour or aggradation, then modifications to the grade or design of the road will be completed that minimize the adverse effects on sediment transport. The Physical and Biological Attributes scored the lowest for the baseline due to the absence of structure typical in the desert environment compared to coastal stream systems for which CRAM is currently most applicable. The scores for both attributes range from the low end of "C" to "D". These scores

are all estimated to be lowered to “D” for impacted streams due to maintenance roads and removal of vegetation and remain unchanged for avoided streams (e.g. I, K, C, E, G, and H). This is a small effect on the CRAM scores because the Physical and Biological Attributes undervalue the existing conditions of desert streams. Therefore, the full effect of impacts may not be captured and conversely the benefit of avoidance isn’t captured in the scores.

In summary, it’s estimated that there would be an approximately 18% reduction (functional loss) in CRAM scores for avoided streams due primarily to impacts to the Buffer and Landscape Attribute and to a smaller extent the Hydroperiod/Channel Stability metric. In addition, there would be an approximately 30% reduction in CRAM scores (functional loss) in impacted streams due to effects of roads, SunCatchers, and vegetation removal on the four attributes. See Table 26 for CRAM Summary Scores and Attachment G for CRAM data spreadsheets with existing and projected scores for secondary streams, impacted primary streams, and avoided primary streams. The reduction of the 709-MW Project will be mitigated by improving the functions and services at Carrizo Creek and marsh within the Anza Borrego State Park. See section 5.0 for details regarding the mitigation site.

Table 26. CRAM Summary: Existing Scores and Post-Project Projections

	Secondary Streams				Impacted Primary Streams				Avoided Primary Streams			
CRAM Projection	Original Avg Scores	Projected Average Scores	Impact delta	Percent Reduction	Original Avg Scores	Projected Average Scores	Impact delta	Percent Reduction	Original Avg Scores	Projected Average Scores	Impact delta	Percent Reduction
Buffer and Landscape Connectivity	23.6	6.0	17.6	-74.6%	22.0	6.0	16.0	-72.8%	22.5	9.2	13.3	-59.0%
Landscape Connectivity	11.9	3.0	8.9	-74.8%	10.8	3.0	7.8	-72.3%	11.2	3.0	8.2	-73.1%
Buffer Metrics	11.7	3.0	8.7	-74.4%	11.2	3.0	8.2	-73.2%	11.6	6.4	5.2	-44.7%
% of AA with Buffer	12.0	3.0	9.0	-75.0%	12.0	3.0	9.0	-75.0%	12.0	6.5	5.5	-45.8%
Average Buffer Width	11.9	3.0	8.9	-74.8%	11.8	3.0	8.8	-74.5%	11.8	6.8	5.0	-42.3%
Buffer Condition	11.5	3.0	8.5	-73.9%	10.6	3.0	7.6	-71.7%	10.8	5.8	5.0	-46.2%
Raw Score	23.6	6.0	17.6	-74.6%	22.1	6.0	16.1	-72.8%	22.5	9.2	13.3	-59.0%
Final Score	98.6	25.0	73.6	-74.6%	92.0	25.0	67.0	-72.8%	93.9	38.5	55.4	-59.0%
Hydrology	33.0	29.6	3.5	-10.5%	32.5	29.9	2.7	-8.2%	32.3	30.7	1.7	-5.2%
Water Source	12.0	12.0	0.0	0.0%	12.0	12.0	0.0	0.0%	12.0	12.0	0.0	0.0%
Hydroperiod/Channel Stability	9.5	6.0	3.5	-36.5%	8.7	6.0	2.7	-30.7%	8.8	7.2	1.7	-18.9%
Hydrologic Connectivity	11.6	11.6	0.0	0.0%	11.9	11.9	0.0	0.0%	11.5	11.5	0.0	0.0%
Raw Score	33.0	29.6	3.5	-10.5%	32.5	29.9	2.7	-8.2%	32.3	30.7	1.7	-5.2%
Final Score	91.7	82.1	9.6	-10.5%	90.4	83.1	7.3	-8.1%	89.9	85.2	4.7	-5.2%
Physical Structure	10.0	8.4	1.6	-15.8%	8.5	8.3	0.2	-2.7%	11.2	11.2	0.0	0.0%
Structural Patch Richnes	5.0	3.4	1.6	-31.8%	4.3	4.0	0.2	-5.4%	6.0	6.0	0.0	0.0%
Topographic Complexity	5.0	5.0	0.0	0.0%	4.3	4.3	0.0	0.0%	5.2	5.2	0.0	0.0%
Raw Score	10.0	8.4	1.6	-15.8%	8.5	8.3	0.2	-2.7%	11.2	11.2	0.0	0.0%
Final Score	41.6	35.0	6.6	-15.9%	35.6	34.7	0.9	-2.5%	46.6	46.6	0.0	0.0%
Biotic Structure	16.4	15.3	1.1	-6.9%	16.3	14.6	1.8	-10.8%	17.7	17.7	0.0	0.0%
PC: No. of plant layers	6.0	6.0	0.0	0.0%	6.6	6.0	0.6	-8.8%	6.7	6.7	0.0	0.0%
PC: No. of codominants	4.4	3.1	1.4	-30.5%	4.3	3.0	1.3	-29.7%	4.5	4.5	0.0	0.0%
PC: Percent Invasion	10.7	10.7	0.0	0.0%	9.8	9.8	0.0	0.0%	9.8	9.8	0.0	0.0%
Plant Community Metrics	7.0	6.6	0.5	-6.4%	6.9	6.3	0.6	-8.9%	7.0	7.0	0.0	0.0%
Interspersion	6.3	5.6	0.7	-10.7%	6.0	5.3	0.7	-11.5%	7.3	7.3	0.0	0.0%
Vertical Biotic Structure	3.1	3.1	0.0	0.0%	3.5	3.0	0.5	-13.3%	3.3	3.3	0.0	0.0%
Raw Score	16.4	15.3	1.1	-6.9%	16.3	14.6	1.8	-10.8%	17.7	17.7	0.0	0.0%
Final Score	45.6	42.5	3.1	-6.8%	45.5	40.5	5.0	-11.0%	49.1	49.1	0.0	0.0%
Overall AA Score	69.2	49.4	19.8	-28.7%	66.3	49.0	17.3	-26.1%	69.7	57.3	12.5	-17.9%

4.2 Physical and Chemical Impacts

4.2.1 Physical Substrate Impacts

Construction and Operation Impacts

Construction of the 709-MW Project is expected to take approximately 40 months to complete. Construction would include soil excavation, clearing, grading, installation of solar disks, construction of the Main Services Complex, roads, utilities, water pipeline, substation, and other ancillary features. During these activities there would be both permanent and temporary impacts to the physical substrate of WUS from dredge and fill activities and construction of permanent facilities. Of these impacts, only the installation of SunCatcher pedestals into streams would penetrate into the substrate of WUS (to a depth beyond sand layers in streams). SunCatcher pedestals would be vibrated into the ground to approximately 17 feet in depth at 3,248 locations resulting in 0.3 acre of disturbance to WUS. This small disturbance is not expected to fracture shallow substrate layers that could result in cross mixing between shallow aquifers or result in drainage of perched aquifers. In fact, the shallowest known depth to groundwater on the project site is 45 feet but is in the 100-300 feet depth range for most of the site.

Other potential impacts to the surface substrate of WUS would be from periodic vehicle crossings of WUS via at-grade, unsurfaced crossings. Chang (2010a) determined that impacts to site geomorphology, as well as downstream morphology, would be insignificant (and in witness testimony to the Energy Commission). As detailed in the SSA and in the Final EIS, the 709-MW Project is expected to generate short-term increases in erosion during construction.

Mitigation Measures

In accordance with the Final EIS, Soil&Water-1 and Soil&Water-3, the Applicant has prepared ***Drainage, Erosion and Sediment Control Plan (DESCP)*** and an ***Industrial Facility SWPPP***, respectively which describes a series of BMPs intended to reduce erosion during construction and operation of the facility. Multiple additional conditions of certification to minimize erosion are also detailed in the SSA and Final EIS and will be incorporated as Special Conditions of the IP by the Corps as necessary to further mitigate these potential affects.

4.2.2 Water Circulation, Fluctuation, and Salinity Impacts

Construction and Operational Impacts

SunCatcher foundation poles in the flow path would create local areas of flow turbulence, resulting in local stream scour around the foundation poles. Scour such as this occurs on bridge piers, resulting in the need to bury bridge piers to a depth below the depth of scour to ensure stability. Chang (2010b) modeled the extent of scour for a SunCatcher pedestal during a 100-year flood event and determined the extent of scouring was a 21.9 square foot circle around the pedestal. Table 25 includes the indirect impacts of pedestal scouring during a 100-year flood event for the project site. Because project area streams are generally very wide, flows are typically very shallow and of low velocity. Flow velocities and depths for the 100-year flood as estimated from the HEC-RAS modeling are fairly uniform across the site. Flow depths on the site average approximately 1.2 feet, with flow velocities approximately 3 feet

per second (Stantec Consulting, Inc. 2008), HEC-HMS (Stantec Consulting, Inc. 2008), HydroCAD (RMT, Inc. 2009), and FLUVIAL-12 (CHANG 2010a). Chang's sediment modeling study (2010a) and subsequent testimony submitted to the Energy Commission showed that the 709-MW Project would not change hydrology, sediment flow or delivery towards areas downstream from the project site, or change stream morphology on or off site.

Mitigation Measures

Final EIS Mitigation Measures *Soil&Water*-7, **Stormwater Damage Monitoring and Response Plan**, is proposed to prevent soil surface damage and contamination resulting from SunCatcher instability in all areas. Condition of Certification *Soil&Water-1*, ***Drainage Erosion and Sedimentation Control Plan***, would also mitigate impacts associated with stream scour and SunCatcher instability, as well as ensuring no substantial increase in off-site flooding potential. Condition of Certification *Soil&Water-1* and *Soil&Water-7* are designed to ensure hydrology and flooding impacts are kept to less than significant levels. These measures will be incorporated as Special Conditions of the IP by the Corps as necessary to further mitigate these potential affects.

4.2.3 Suspended Particulate/Turbidity Impacts

Construction and Operation Impacts

Stormwater runoff from the site during construction could include excess sediment from construction activities. Chang's sediment modeling study (2010a) showed that with the sediment basins removed from the site plan, that the 709-MW Project would not change sediment flow or delivery towards areas downstream from the project site. Further, as the 709-MW Project would not change flow or sediment flow to off-site areas, there should be no impacts to off-site fluvial morphology.

Mitigation Measures

Per the Final EIS, site construction would require an ***Industrial Facility SWPPP***, Soil&Water-3 which would specify BMPs that would minimize mobilization of sediments and soils on-site and eliminate or reduce non-stormwater discharges to WUS. Mitigation Measures contained in the Final EIS *Soil&Water-1,* ***Drainage, Erosion and Sediment Control Plan (DESCP),*** and *Soil&Water-5*, ***NPDES General Permit for Construction Activity***, would ensure adequate control of construction stormwater pollutants.

Final EIS Mitigation Measures *Soil&Water-1,* ***Drainage, Erosion and Sediment Control Plan (DESCP),*** *and Soil&Water-5*, ***NPDES General Permit for Construction Activity***, would ensure minimization of operations-related stormwater runoff contaminants and mitigate to a level less than significant. These measures will be incorporated as Special Conditions of the IP by the Corps as necessary to further mitigate these potential affects.

4.2.4 Contaminant Impacts

Construction and Operation Impacts

During construction and operation of the IVSP, surface water quality could be affected through the introduction of pollutants such as excess trash, oils, solvents, paints, cleaners, asphaltic emulsions, mortar mix, spilled fuel, vehicle fluids, and other construction or industrial site-related contaminants.

Runoff from the Main Services Complex would be directed into a one-acre stormwater retention pond. Runoff-borne contaminants from the Main Services Complex would be discharged into the retention basin, rather than being discharged into the natural channel system. The project would include an oil/water interceptor to collect oil and other contaminants from the Main Services Complex. Oil collected from this interceptor would be transported to a certified recycling facility.

Mitigation Measures

The Applicant proposes to collect and remove construction waste, including hazardous wastes, according to a regular schedule. Site construction would adhere to the required SWPPP Conditions of Certification *Soil&Water-1* and *Soil&Water-5* would ensure adequate control of construction stormwater pollutants.

Mitigation Measures in the Final EIS *Soil&Water-1* strive to ensure no adverse water quality or soils impact from mirror washing. Condition of Certification *Soil&Water-1* and *Soil&Water-5* would ensure minimization of operations-related stormwater runoff contaminants and mitigate to a level less than significant in all areas. These measures will be incorporated as Special Conditions of the IP by the Corps as necessary to further mitigate these potential affects.

4.3 Biological Impacts

4.3.1 Impacts to the Vegetation Communities

The predominant vegetation community on-site including within the streams is Sonoran creosote bush scrub. Vegetation trimming within the ephemeral streams will be limited to the occasional removal of shrubs that occur within the maintenance, perimeter, and arterial road crossings. Some trampling or uprooting of vegetation is expected to occur during trenching for the hydrogen and electrical lines. Vegetation clearing in the streams will be closely monitored because the highest density of vegetation occurs within the streams and removal would likely increase the potential for erosion and sediment transport to downstream reaches. The applicant has committed to not mow, trim, or otherwise disturb vegetation, nor place SunCatchers within streams I, K, C, H, and the areas of streams E and G south of the transmission line corridor. In addition, roads within these streams have been minimized to only perimeter and arterial road crossings. To accommodate FTHL movement through the site, the Applicant would maintain 200 foot corridors in streams E and G north of the transmission line corridor (Map 5 of Attachment B) where no SunCatchers will be placed, but where maintenance roads would still be needed. The number of maintenance roads within the 200-foot wide corridors is extensive and may be further evaluated during construction, and

likely reduced, by the Corps when final engineering designs are submitted as a special condition of the permit.

Complete and permanent vegetation *removal* is expected for the construction and operation of roads within the streams and in upland areas. Complete temporarily vegetation removal would occur in order to trench and install the utilities (24 inches wide for electric/12-inches wide for hydrogen). A total of 14.3 acres of vegetation is estimated to be cleared for both temporary and construction related impacts within the streams for the entire project area; representing approximately 1.6 percent of site vegetation cover in WUS (Table 27). However, total vegetation clearing across the project site including the uplands is approximately 135 acres.

Table 27 calculates the acres of vegetation that would be *removed, both temporarily and permanently* during the construction and maintenance of the road system and during construction of the electric and hydrogen trenches within ephemeral streams.

Table 27. Estimated vegetation removal by stream for construction of the road system and the electric and hydrogen trenches.

Label	Size of Drainages	% Overall Plant Cover	Acres of Disturbance	% of Drainage Impacted	Estimated Acres of Vegetation Cleared[1]	% of Vegetation Remaining	Decrease in % Cover
A	25	22%	1.80	7.2%	0.40	20%	1.6%
B	10	22%	0.93	9.3%	0.20	20%	2.0%
C	40	22%	0.42	1.0%	0.09	22%	0.2%
Secondary C Streams	44	34%	3.04	6.9%	1.04	32%	2.4%
D	75	22%	5.88	7.8%	1.29	20%	1.7%
Secondary D Streams	62	34%	4.48	7.2%	1.52	32%	2.5%
E	199	22%	13.33	6.7%	2.93	21%	1.5%
Secondary E Streams	37	34%	2.15	5.8%	0.73	32%	2.0%
F	104	22%	7.21	6.9%	1.59	20%	1.5%
Secondary F Streams	24	34%	1.65	6.9%	0.56	32%	2.3%
G	115	22%	3.96	3.4%	0.87	21%	0.8%
Secondary G Streams	37	34%	2.39	6.5%	0.81	32%	2.2%
H	7	22%	0.0	0.0%	0.00	22%	0.0%
I	24	22%	0.0	0.0%	0.00	22%	0.0%
J	11	34%	0.90	8.2%	0.31	31%	2.8%
K	37	22%	0.54	1.5%	0.12	22%	0.3%
Secondary K Streams	8	34%	0.56	7.0%	0.19	32%	2.4%
SI	22	34%	1.81	8.2%	0.62	31%	2.8%
Total	881	28%	51.06	5.8%	14.30	26%	1.6%

[1] – Estimated acres of vegetation cleared include the width of the roads and the width of the utility and hydrogen trenches (3 feet).

Direct, but temporary impacts to vegetation is also expected through trampling and/or crushing during the installation of the SunCatchers and construction of the two utility trenches (electrical and hydrogen) from heavy equipment operation in streams. It is estimated that a forty foot radius around each SunCatcher would be impacted by vehicle and equipment movement during installation of SunCatchers and an additional temporary

disturbance from vehicle/equipment overland travel from the maintenance road network to the 40 foot radius impact area around individual SunCatchers.

Construction activities that would occur within the 40 foot radius temporary impact area are detailed as follows:

- Installation begins with delivery of the SunCatcher pedestal by a flatbed truck via the maintenance road to individual SunCatcher locations.

- The pedestal is then unloaded and put in position with a forklift. The installation is accomplished using a track crane fitted with a vibratory pile driving system. The crane is capable of picking up the pedestal off the ground, aligning the pedestal over the insertion point and vibrating the pedestal into the ground. The entire pedestal process takes 20 to 30 minutes.

- There are three other operations requiring man lifts and cranes:; (1) the azimuth drives – which are mounted on top of the pedestal: (2) the dish structure—which is mounted on the azimuth drive, and (3) the final stage is to mount and connect the Power Conversion Unit to the Dish Structure and the hydrogen lines and electrical connections which are mounted on the pedestals.

- The final stages require the use of a crane and the delivery of the SunCatcher apparatus on a flatbed truck.

All of these activities would occur within the 40 foot radius around the SunCatcher pedestal. It is expected that the activities would be short-term but of high intensity and would result in the trampling and crushing of vegetation. Because of the overlap of this 40 foot radius impact area between SunCatchers, all trenching activities for utilities would fall within this temporary impact area.

As shown in Table 28, approximately 332 acres of temporary construction activities would occur in WUS and another 2,559 acres outside of the WUS in the uplands. Based on an average vegetation cover of 22% in primary streams and 34% in secondary streams, approximately 93.0 acres of vegetation within the streams may be damaged or destroyed during temporary construction activities.

Indirect impacts associated with vegetation clearing include weed infestation from permanent and temporarily disturbed areas, and the potential destruction of natural soil binding and stabilization structures of live root systems from both temporary construction-related activities and operational activities. These disturbances can have widespread long lasting effects on the surrounding landscape and in particular downstream reaches if not mitigated adequately. If unmanaged, weeds would spread from the matrix of dirt maintenance roads and other facilities into the avoided uplands and streams to compete with native desert vegetation for water and nutrients.

Table 28. Estimated temporary impacts to vegetation by trampling during installation of the SunCatchers and construction of the electric and hydrogen trenches.

Label	Size of Drainage	% Overall Plant Cover	Acres within the Temporary Disturbance Zone	Potential Indirect Impacts to Vegetation[1]
A	25	22%	15.7	3.5
B	10	22%	5.6	1.2
C	40	22%	0.0	0.0
Secondary C Streams	44	34%	24.9	8.5
D	75	22%	46.8	10.3
Secondary D Streams	62	34%	33.2	11.3
E	199	22%	70.6	15.5
Secondary E Streams	37	34%	13.3	4.5
F	104	22%	47.8	10.5
Secondary F Streams	24	34%	11.6	3.9
G	115	22%	21.2	4.7
Secondary G Streams	37	34%	16.3	5.5
H	7	22%	0.1	0.0
I	24	22%	0.0	0.0
J	11	34%	6.4	2.2
K	37	22%	0.1	0.0
Secondary K Streams	8	34%	4.3	1.5
SI	22	34%	14.1	4.8
Total	881	28%	332.0	93.0

[1] – Acres of vegetation exposed to trampling and/or crushing was estimated using the acres of the temporary disturbance zones multiplied by the average plant cover for primary and secondary streams.

Mitigation Measures

The SSA and Final EIS propose numerous measures to mitigate the direct and indirect impacts to biological resources. Specific to vegetation, *Bio-7,* ***Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP)****, Bio-8,* ***Construction- & Operation-Related Minimization Measures****, Bio-10,* ***Mitigation for FTHL***, Bio-17, ***Mitigation for CDFG Jurisdictional Streambeds and Corps Jurisdictional Waters of the U.S.***, and Bio-18, ***Noxious Weed Management Plan.*** Combined these measures would allow only the minimum vegetation clearing and disturbance necessary to construct the 709-MW Project, require the management of noxious weeds during construction and operational of the plant, and require mitigation for all unavoidable impacts to Corps WUS.

In addition, the Applicant and the Corps are working together on the development of an on-site revegetation plan for temporary impact areas, as well as an off-site mitigation plan in accordance with the Mitigation Rule for unavoidable direct, indirect, and cumulative impacts (see section 5.0). Any temporary impacts to Corps WUS associated with trenching or installation of SunCatchers would require restoration of the stream and contributing uplands within the buffer areas to the pre-existing elevations, contours, and vegetation communities immediately following construction. Bio-17, ***Mitigation for CDFG Jurisdictional Streambeds and Corps Jurisdictional Waters of the U.S.***, describes the current approach of the Corps in mitigating unavoidable impacts through requiring mitigation in the form of enhancement and rehabilitation of Carrizo Creek and marsh on the Anza Borrego State Park. Mitigation ratios would likely range from 3:1 to 5:1 based on the final evaluation of direct and indirect impacts to the functions and services on-site relative to the benefit of the enhancement and rehabilitation activities on Carrizo Creek. Per the Final BO from the USFWS, mitigation for PBS and Corps jurisdictional WUS would be similar, on the order of 250 acres of enhancement and rehabilitation in Carrizo Creek and marsh, known foraging areas for the PBS.

4.3.2 Threatened and Endangered Animals Impacts

Impacts associated with the 709-MW Project on threatened and endangered species is discussed in detail in Section C.2 of the SSA, in Chapter 4.3 the Final EIS and the Biological Assessment attached to the Final EIS.

Flat-tailed horn lizard

It has been determined that the 709-MW Project would likely adversely affect the FTHL. Approximately 6,500 acres of FTHL suitable habitat would be directly affected by the 709-MW Project. This represents 0.66% of the estimated amount (400,000 hectares) of suitable habitat occurring in California. As described below, the SSA and Final EIS states the Conditions of Certification and Mitigation Measures, respectively the Applicant proposes to reduce and minimize impacts to the FTHL. Alternative 3 would provide corridors for FTHL to traverse the project site. Streams C, I, and K would only have crossings for the Perimeter and Arterial Roads and the perimeter fence (Table 20) with no SunCatchers or maintenance roads built within the stream (Map 5 of Attachment B). These streams traverse the entire site from I-8 to the south to Evan Hewes Highway and the railroad dike to the north. The culvert under I-8 for wash C allows for FTHL movement; however, the culverts underneath I-8 currently restrict movement through streams I and K (Figure 10). These culverts may be further modified to

allow for FTHL movement, but may not be a mitigation measure of this project. The at-grade crossings on the project site would not impede FTHL travel from south to north.

Streams E and G on the eastern section of 709-MW Project would not have SunCatchers or maintenance roads in the southern portion of the project site up to the existing transmission line road. In addition, TSNA has agreed to provide 200 foot corridors that are free of SunCatchers along the northern portion of the streams (reduction of 228 SunCatchers in WUS). The corridor is expected to provide FTHL with the ability to traverse the entire eastern portion of the project area with only a few road crossings; however, at this time there would be 23 maintenance road crossings of Stream E and 8 road crossings of Stream G. The maintenance roads within the streams throughout the site would be used approximately once a month to wash and maintain the SunCatchers (Table 24). This would reduce the potential for FTHL mortality by vehicles and allow the FTHL relatively undisturbed streams for their movement.

The culverts under I-8 restrict movement from the Yuha Desert FTHL Management Area located south of the project site (Figure 10). While providing these FTHL transportation corridors on the eastern and western portions of the project site would not mitigate the impacts to the remaining acres of potential FTHL habitat impacted within the project area, it would allow the FTHL relatively unimpeded passageways through the project area and allow some limited movement between the two FTHL Management Areas (Yuha Desert and West Mesa). The avoidance measures would preserve 242 acres of desert streams and potential FTHL habitat. As stated below, it is expected that the applicant would still mitigate the loss of FTHL habitat as defined by the FTHL Management Strategy and outlined in the Section C.2 of the SSA and in Bio-10 of the Final EIS.

Mitigation Measures

The full list of mitigation measures for biological resources is listed on pages C.2-74 through C.2-100 of the SSA and in section 4.3 of the Final EIS. There are three Mitigation Measure specifically designed for the FTHL; Mitigation Measure *Bio-9*, ***Construction Related Avoidance and Minimization Measures for the FTHL***, *Bio-10*, ***Mitigation for the FTHL, and*** Bio-11, ***FTHL Designative Biologist***. These measures would minimize and/or mitigate for impacts to FTHL populations and habitat through implementing pre-construction surveys and removal of FTHLs from construction areas, providing the regulatory agencies reasonable access and an experienced biological monitor, and by acquiring compensation lands equal to the acreage of the project site within the FTHL Management Area, which is approximately 6,527 acres of lands.

Peninsular Bighorn Sheep

PBS were not observed during field surveys in 2007 and 2008; however, a small herd of five females and/or juveniles were observed in the north-central portion of the Project site during a site visit by Dr. Joe Platt of the company PBS&J on March 25, 2009. The group was observed in an ephemeral stream on the western half of the project site. Although this species could use the IVSP site as foraging habitat, data collected for this project suggests that use of the project site by PBS is transitory and likely a result of drought conditions. As the IVSP is located on flat terrain, sheep entering the area are far from escape habitat and would be in a

highly stressed state. This could put them at great risk as the project site is already surrounded by busy highways and the railroad. Nonetheless, in preliminary consultation with the USFWS, it has been determined that the project site provides some forage and may possibly function as a corridor for PBS movement. The USFWS and BLM biologists agree that the observation of PBS on the site in spring 2009 was an unusual occurrence because no known lambing sites or water sites are known near the project site and no other PBS occurrences been documented in the vicinity.

On December 14, 2009, the USFWS received a letter from the BLM requesting their concurrence that the project, may affect, but is not likely to adversely affect PBS. After further review of project impacts and information received on April 2, 2010, from Dr. Vern Bleich, the USFWS concluded the project is likely to adversely affect PBS. The project may adversely affect bighorn sheep by: 1) reducing the ability of bighorn sheep to travel between mountain ranges, 2) eliminating access to forage resources, 3) incrementally adding to the permanent conversion of natural desert plant communities to human industrial uses, 4) hazards associated with fencing the project site. After reviewing the current status and environmental baseline of bighorn sheep in the Peninsular Ranges, effects of the 709-MW Project, and cumulative effects, it is the USFWS' biological opinion that the implementation of the 709-MW Project is not likely to jeopardize the continued existence of the distinct population segment of bighorn sheep in the Peninsular Ranges (USFWS 2010). The 709-MW Project would not adversely affect PBS Designated Critical Habitat (USFWS 2010). Potential incidental take would likely be in the form of harassment and no mortality of PBS is anticipated. Subsequently, the USFWS is requiring mitigation in the form of enhancement or restoration for the estimated at approximately 250 acres foraging habitat on the project site. Mitigation for this foraging habitat would be consistent and overlapping with the Corps proposed mitigation approach at Carrizo Creek and marsh described previously.

Mitigation Measures

Condition of Certification of the SSA and Final EIS Mitigation Measure Bio-8, ***Construction and Operation Minimization Measures***, requires that a perimeter fence and gates to prevent wildlife access to the site be constructed. The measure also requires that construction equipment is contained on-site excavated areas are covered, and that wildlife escape ramps in the excavated areas should be constructed in the event that sheep wander on-site. Mitigation Measure BIO-17, ***Mitigation of CDFG Streambeds and Corps Waters of the U.S***, would include mitigating impacts to Corps jurisdictional WUS through the enhancement of Carrizo Creek and Marsh on Anza Borrego State Parks in known PBS territory. Mitigation at Carrizo Creek and the adjacent marsh consisting of riparian enhancement and creation is expected to benefit PBS by restoring historical forage areas that have been lost due to tamarisk invasion. Enhancement efforts are expected to remove tamarisk and restore the drainage and marsh to a condition of native forage for PBS. With implementation of the identified Mitigation Measures and mitigation required by the USFWS, the 709-MW Project is not likely to adversely affect special-status mammals.

Other sensitive species

The 709-MW Project is not likely to adversely affect the Yuma clapper rail (USFWS 2010). This determination is based on the potential that marginal habitat downstream of the SWWTF

would be degraded from the small reduction in flows. Focused surveys along the New River near the SWWTF for the Yuma clapper rail and for burrowing owl, California black rail, least Bell's vireo, southwestern willow flycatcher, and western yellow-billed cuckoo have all been negative in 2010.

4.3.3 Fish, Crustaceans, Mollusks, and Other Aquatic Organisms in the Food Web

No fish, crustaceans, mollusks, or other aquatic organisms were observed within the project site. Therefore, no impacts are expected to these organisms from the 709-MW Project.
The SWWTF expansion would not fill any wetlands along the New River. During operation of the project, a small portion of the effluent from the SWWTF would be used for the project (up to 33.7 acre feet). The small reduction in effluent discharge is not anticipated to impact the small wetland located immediately downstream of the SWWTF discharge point, as this wetland is also fed by agricultural return flow. The minimal decrease in flows to the New River (estimated to represent between 0.03% to 0.16% of the total flow in the New River) is not anticipated to a have a measurable impact on the New River or the Salton Sea.

4.3.4 Other Wildlife

Impacts to other BLM or state listed wildlife are discussed in section C.2 of the SSA and 4.3 of the Final EIS. The full list of mitigation measures for biological resources is listed on pages C.2-74 through C.2-100 of the SSA.

The 709-MW Project would reduce permanent impacts to streams within the project area by 138.4 acres compared to the 750-MW Project (Tables 6 and 8). In addition, the 709-MW Project would not place SunCatchers or associated maintenance roads in streams C, I, and K and the southern portions of streams E and G (Map 5 of Attachment B). The only impacts to these sections are perpendicular arterial or perimeter road crossings and the perimeter fence (Table 20). This would provide habitat for the numerous animal species that utilize the denser wash vegetation and provide corridors of movement through the project area. In addition, 200-foot wide corridor without SunCatchers through the northern portions of streams E and G would provide corridors through the eastern half of the project area.

4.3.5 Special Aquatic Sites

The project site does not include any special aquatic sites.

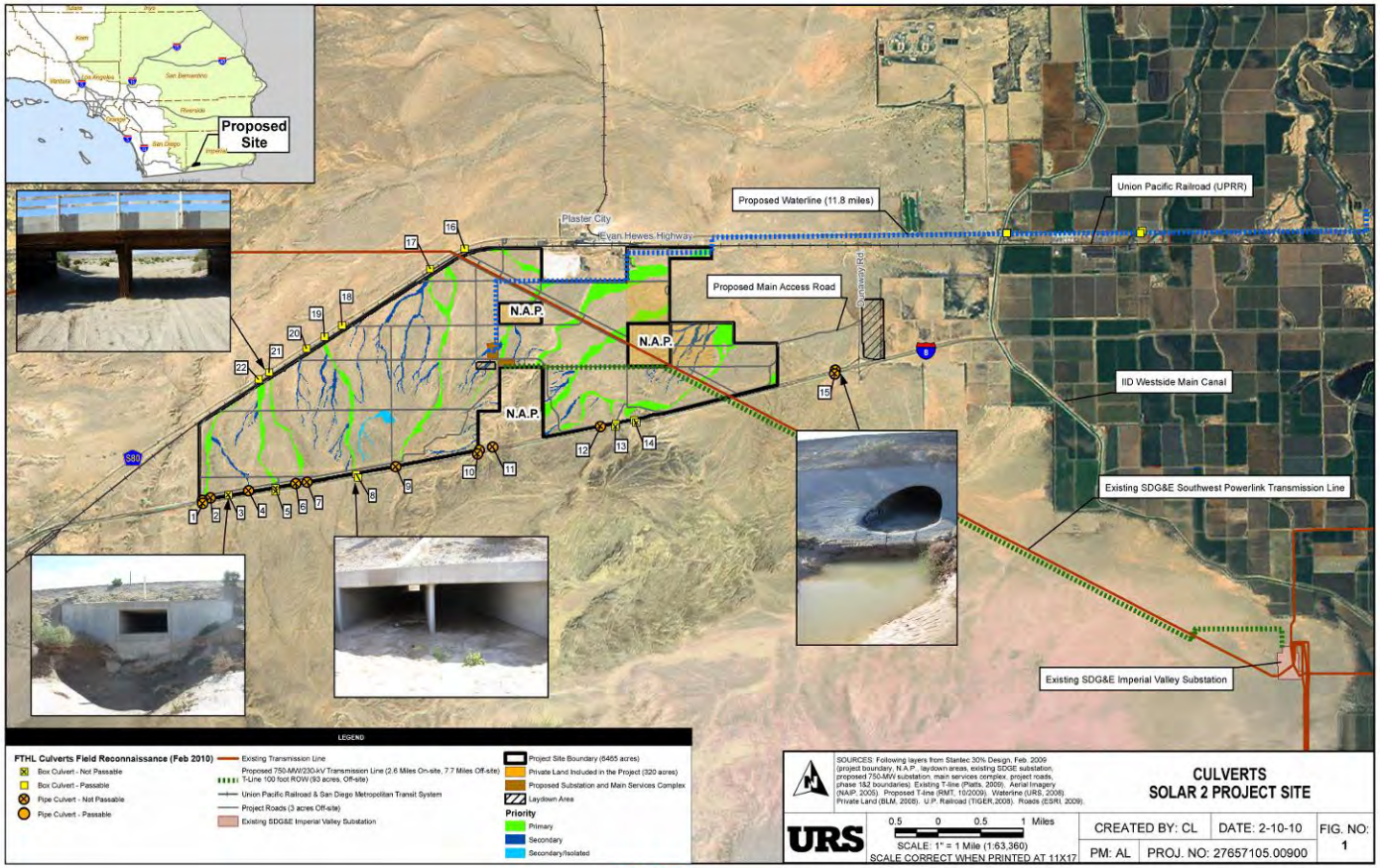


Figure 10. Culverts on the perimeter of the project site and the ability of FTHL to cross them.

4.4 Impacts on Human Use Characteristics

4.4.1 Municipal and Private Water Supplies

None.

4.4.2 Recreational and Commercial Fisheries

None.

4.4.3 Water-Related Recreation

None.

4.4.4 Aesthetics

See the Visual Resources section (C.13) of the SSA for a detailed discussion of the 750-MW Project impacts to the viewshed. Impacts associated with the 709-MW Project would be the same or less than what was evaluated in the SSA.

4.4.5 Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites and Similar Preserves

See the Land Use, Recreation, and Wilderness section of the SSA and Final EIS for a detailed description of the impacts analysis.

4.5 Determination of Cumulative Effects on WUS

Cumulative effects associated with the 709-MW Project are described in detail in the SSA and in the Final EIS. The SSA and Final EIS determined there would be no cumulative impacts to Air Quality, Facility Design, Geology, Paleontology, and Minerals, Hazardous Materials, Noise, Public Health and Safety, Socioeconomics and Environmental Justice, Traffic and Transportation, Transmission Line Safety/Nuisance, Transmission System Engineering, Waste Management, and Worker Safety and Fire Protection. The SSA and Final EIS are referenced for detailed analysis on these environmental parameters. The SSA and Final EIS found that cumulative impacts were significant and unavoidable after implementing mitigation measures for Land Use and Recreation and Visual Resources. The SSA and Final EIS found that with implementation of SSA Conditions of Certification and Final EIS Mitigation Measures, cumulative impacts were reduced to less than significant for Hydrology, Soils and Water Resources. The SSA found that even with implementation of Conditions of Certification that the project would have unavoidable adverse cumulative impacts to FTHL. The Final EIS found the impacts associated with 709-MW Project and to FTHL and WUS to be acceptable with implementation of Mitigation Measures BIO-10 and BIO-17 (see below).

The Corps geographic scope of analysis for cumulative impacts to jurisdictional WUS is the three HUC 12 watersheds to which the IVSP contributes hydrology, sediment, and biological resource values. These are Lower Coyote, Plaster City, and Middle Coyote watersheds, which are all located in the southwestern part of the HUC 8 Salton Sea Watershed. As described previously, mitigation that the Corps will require for unavoidable impacts to WUS would occur in Carrizo Creek, which is located in the HUC 8 Carrizo Creek Watershed directly to the north of the IVSP, draining into San Felipe Creek and then to the Salton Sea. Enhancement and

rehabilitation of Carrizo Creek and marsh at this location will mitigate the functions, services, and acreage of direct and indirect impacts to WUS and restore known PBS historic foraging resources.

A search of the Corps database produced no completed permit actions within the geographic scope of the Corps analysis. These three HUC 12 watersheds are essentially open space with some detrimental, but unregulated activities on-going including site scraping on a property south of the southwest corner of the project site, off-road vehicle use, and past agriculture to the east near the Westside Main Canal on the BL-1 Parcel described as part of the off-site Agricultural Lands Alternative. It is assumed that the development of Plaster City, Evan Hewes Hwy, the railroad, and I-8 were developed either prior to the CWA, activities were unregulated, or activities were minor in nature and permitted through the Corps Nationwide Permit Program for mining/industrial/commercial facilities and linear transportation projects, respectively. Subsequently, the Corps expanded the database search beyond the three HUC 12 watersheds to Imperial County and found that 25 regulatory actions had been completed, two of which were Standard Individual Permits (SIP). These permit actions across Imperial County amounted to approximately 136 acres of impacts to WUS. Eleven (11) of the 25 regulatory actions completed had noted mitigation required in the database. The mitigation entered into the database amounted to 29.26 acres. It is expected that more of these projects required mitigation, but that the conversion from the Corps previous database program to the new program did not transfer all data accurately. On average, the 11 permits with mitigation requirements did so at a 2:1 ratio. In addition, many of the impacts permitted by the 25 permits were recorded as temporary in nature.

On-going and reasonably foreseeable permit actions (e.g. those actively engaging the Corps in pre-application meetings) with the Corps are shown in Table 29.

Table 29. Corps On-Going and Reasonably Foreseeable Projects

File Number	Project Name	Status	Location	Impact acreage	Mitigation acreage
2010-00024	Black Rock Geothermal Plant	Permit pending	33.04851°N,-115.7375°W	~0.15 acre ephemeral stream	TBD
2010-00140	Wind Zero Police Academy	Pre-application	32.72942°N, -115.9485°W	TBD	TBD
2009-00445	Calexico Clean-up	Permit issued July 24, 2009	32.67782°N, -115.5428°W	Temporary 2.0 acre of wetland	Re-vegetate 2.0 acre of wetland
2009-00569	Brawley Closure	Pre-application	32.99861°N, -115.5398°W	approx. 1600 linear feet of New River	TBD
2009-00141	Calexico New River Project (Underground New River)	Pre-application	From 32.665°N, -115.499°W To:	3 miles of New River	TBD

File Number	Project Name	Status	Location	Impact acreage	Mitigation acreage
			32.6789°N, -115.5424W°		
2010-00643	Bridge Replacements County of Imperial Brockman Road	Pre-application	32.7375°N, -115.6378°W	>0.10 acre New river	TBD
	Lyons Road		32.7169°N,-115.6042°W	>0.10 acre New river	TBD
	Drew Road		32.7616°N,-115.6903°W	>0.10 acre New river	TBD
	Worthington Road		32.8471°N,-115.6826°W	>0.10 acre New river	TBD
	Evan Hewes Highway		32.7910°N,-115.7017°W	>0.10 acre New river	TBD
	Hetzel Road Bridge		32.8218°N, -115.7296°W	>0.10 acre Salt Creek	TBD
	Brockman Road		32.7001°N,-115.6398°W	>0.10 acre JD Canal	TBD
	Westmorland Road		32.8422°N, -115.7378°W	>0.10 acre JD Canal	TBD
2010-00645	Observational Deck Sonny Bono	Pre-application	33.0829°N, -115.7092°W	TBD	TBD
2010-00543	Habitat Pond Restoration Sonny Bono	Pre-application	33.183°N, -115.6228°W	TBD	TBD
2010-00142	DFG Habitat Ponds 2400 acres	Pre-application	New River mouth: 33.1022°N, -115.6869°W and/or Alamo River mouth: 33.1841°N, -115.5976°W	TBD	TBD
2010-00391	Anza Borrego Carrizo Creek ILF	Pre-application	32.8477°N, -116.1974°W	TBD	TBD
2010-00461	Superstition Solar	Pre-application	33.0628°N, -115.756°W	TBD	TBD
2007-00567	Imperial Solar Energy South	Pre-application	32.65879°N, -115.6611°W	TBD	TBD
2000-00570	Imperial Solar Energy West	Pre-application	32.77145°N, -115.7834°W	TBD	TBD
2007-00704	Sunrise Powerlink	Permit	Linear: from	Approx. 2.86	TBD

File Number	Project Name	Status	Location	Impact acreage	Mitigation acreage
		Pending	Suncrest Substation in San Diego County to Imperial Valley Substation in Imperial County	acres of permanent impacts (0.078 wetland) and 7.28 acres of temporary impacts to waters of the U.S.	
2009-00971	Ocotillo Express Wind Energy	Pre-application	32.743°N, -116.054°W	TBD	TBD
2009-00969	Tule Wind	Pre-application	32.72840°N, -116.31°W	Approx. 0.15 acre of ephemeral stream	TBD

Per the Final EIS, the 709-MW Project would be expected to contribute only a small amount to the possible short term cumulative effects related to biological resources because the proposed mitigation measures described below would minimize and offset the project's contributions to the cumulative loss of habitat for native plant communities and wildlife, including special-status species. Mitigation Measure BIO-10 requires the applicant to pay for the acquisition of approximately 6,620 acres of suitable habitat for FTHL. This habitat would be connected to other suitable habitat for other special-status species, and would offset any habitat loss associated with the project. In addition, the Alternative #3 design has avoided all or most of six of the ten primary streams (I, K, C, E, G, and H) and avoiding a 200-foot wide corridor within the two primary streams not completely avoided (E and G) for the FTHL. This avoidance allows the FTHL to continue to utilize the project site to some degree. Cumulative loss of foraging habitat for PBS is also expected to be insubstantial and will be mitigated through the enhancement and rehabilitation of equal acreage of foraging habitat (approximately 250 acres) within known PBS populations and movement corridors (e.g. Carrizo Creek as described above). The Final EIS further includes a host of measures designed to mitigate the direct, indirect, and cumulative effects of Alternative #3 on biological resources. These include Mitigation Measures BIO-16 requires protection and passive relocation for burrowing owls and BIO-12 (the Raven Management and Monitoring Plan) includes measures that would address the cumulative regional increases in raven predation on FTHL. Mitigation Measure BIO-19 requires pre-construction surveys and a special-status plant protection plan. Mitigation Measure BIO-17 requires that the effects to the desert streams be mitigated by offsetting cumulative losses to WUS and CDFG jurisdictional streambeds also designed to mitigate the losses to PBS foraging habitat. The contribution of the IVSP to cumulative effects will be less than significant with appropriate levels of compensatory mitigation, when Mitigation Measures BIO-10 and BIO-17 are applied. Similarly, the

contribution of the IVSP to the combined effect of the cumulative projects in the FTHL habitat can be mitigated with Mitigation Measures BIO-10 and BIO-17.

The 709-MW Project would be located in the Yuha Desert of Imperial County in an area characterized by braided, erosive stream channels, flash flooding, alluvial fan conditions, low rainfall, sparse vegetation, and the potential for wind erosion. There are no perennial or intermittent drainages on the project site. Hydrology and the water quality of surface runoff flows would be dependent on materials picked up on the ground surface, which is currently natural desert. The downstream disposition of surface runoff from the site is the desert area west of the Westside Main Canal, possibly the Westside Main Canal itself, local drainage and irrigation ditches west of the Westside Main Canal, the New River, and eventually the Salton Sea. Cumulative impacts to water quality are not anticipated because of the low amount of rainfall received in the region and the irregularity of subsequent flow events, the lack of impervious surfaces in the watersheds, and the type of project (e.g. limited imperious surfaces). Mitigation Measures within the Final EIS have been designed to limit the potential effects on hydrology and water quality and ensure that Alternative #3 complies with applicable regulatory requirements for both construction and post-development surface runoff water quality. These regulatory requirements not only apply to the IVSP, but all future projects. Therefore, cumulative impacts on surface water quality of receiving waters from the 709-MW Project and future alternative energy projects in the watershed would be addressed through compliance with the applicable regulatory requirements that are intended to be protective of beneficial uses of the receiving waters. In addition, Mitigation Measures in the Final EIS include Soil&Water-1, Development of a Drainage, Erosion and Sediment Control Plan (DESCP), which would include monitoring and rectifying any observed problems during operation; Soil&Water-5, NPDES General Permit for Construction Activity, would ensure adequate control of construction stormwater pollutants; and Soil&Water-3. Industrial Facility SWPPP, which would specify BMPs that would minimize mobilization of sediments and soils on-site and eliminate or reduce non-stormwater discharges to WUS.

5.0 Mitigation Proposed by the Applicant

For unavoidable impacts to WUS associated with the 709-MW Project, the Applicant proposes to replace the functional losses through active wetlands and riparian habitat enhancement, rehabilitation, and preservation. The permanent direct impacts to WUS (e.g., ephemeral streams) are 38.2 acres, temporary impacts from the utility trenches are 14.0 acres, indirect impacts due to scour are estimated at 1.64 acres, and temporary disturbances have the potential to disturb through crushing up to 93.0 acres of vegetation within the ephemeral streams during construction. Direct and indirect impacts associated with construction and operation of the project on stream condition (functions and services) have been estimated using CRAM as previously described in Section 4.1.4. This loss of stream condition has not been converted into acreage losses directly. Instead, the loss of stream condition is mitigated by comparing the on-site baseline versus post-project conditions with the mitigation site baseline versus post-mitigation conditions.

The Corps is requiring mitigation in the form of enhancement and rehabilitation of Carrizo Creek and marsh located west/northwest of the project on the Anza Borrego State Park. Carrizo Creek was initially chosen by the Corps in coordination with the Applicant and the

State Park because of its close proximity to the project, its current protected status (State Park), and because it's within known PBS populations. The USFWS and EPA have subsequently concurred that Carrizo Creek is a suitable location for mitigation and beneficial to the PBS. Both the IVSP and Carrizo Creek are located in the HUC 8 Salton Sea Watershed. However, the ephemeral streams on the IVSP are within the HUC 12 Coyote Wash and the HUC 12 New River watersheds (now draining first to the Westside Main Canal) prior to flowing into the Salton Sea. Carrizo Creek is located in the HUC 12 Carrizo Creek watershed immediately to the north. Carrizo Creek receives flow from Vallecito Creek, Bow Willow Creek, and other tributaries before draining into San Felipe Creek and then to the Salton Sea.

In coordination with the Corps and State Parks, the Applicant prepared the Conceptual Carrizo Creek Habitat Mitigation and Monitoring Plan (Carrizo Creek HMMP) for the enhancement and rehabilitation of approximately 25 miles of the Carrizo Creek from the headwaters downstream through Carrizo Marsh. State Parks provided preliminary Tamarisk (*Tamarix* spp.) infestation mapping which was evaluated by the Applicant, methods for removal, and potential costs. The HMMP was prepared in accordance with the Corps' and EPA Final Mitigation Rule (33 CFR Parts 325 and 332 [40 CFR Part 230]) and includes detailed methods for the initial removal, retreatment methods, limited native replanting of honey and screw bean mesquite trees (*Prosopis glandulosa* and *P. pubescens,* respectively) and arrow weed, in Carrizo Marsh, monitoring and reporting protocols, and performance standards partly based on CRAM.

To determine the location and extent of mitigation required in Carrizo Creek, the Corps' estimated the effects of the 709-MW Project on stream condition by projecting CRAM scores as discussed in section 4.1.4.5, Table 26. The reduction in CRAM scores were used in comparison to the projected increase in scores at the Carrizo Creek and marsh to set the mitigation ratio. The Corps determined the ratio to be approximately 6:1 (actual ratio is 5.86:1 for impacted primary streams and 5.97:1 for impacted secondary streams) based primarily on five (5) of the six (6) factors that the Corps currently uses to assess mitigation approaches. These five factors include the following: 1. CRAM scores on-site versus Carrizo Creek; 2. Mitigation site location outside of the HUC 8 watershed; 3. Net loss of aquatic resource acreages because mitigation is enhancement and rehabilitation based, not creation of new acreage; 4. Uncertainty due to presence of tamarisk upstream even though is planned for management; and 5. Temporal loss of aquatic resources due to the fact that mitigation activities cannot commence until October 2011 in Carrizo Creek due to bird breeding season and ideal time for fire and herbicide treatment of tamarisk. In addition, the Corps determined that the 14 acres of temporary construction impacts require mitigation off-site at a ratio of 1:1 to mitigate temporal loss due to the type of slow growing desert vegetation on-site.

Therefore, mitigation required for 39.84 acres of direct and indirect impacts to ephemeral streams is approximately 239 acres (38.2 direct + 1.64 indirect scour = 39.84 x 6 = 239 acres). An additional 14 acres of enhancement and rehabilitation (1:1 ratio) for extended temporal loss of desert stream vegetation between construction and reestablishment. Thus a total 253 acres of enhancement and rehabilitation in the Carrizo Creek and marsh is required by the Corps to offset the direct and indirect effects of the 709-MW Project on desert stream

condition. Temporary impacts would also be mitigated on-site through restoration by re-establishing the elevations, contours, and revegetation with desert grasses and forbs. An on-site restoration plan for temporary impact areas will be required by the Corps as a special condition of the IP that must be met prior to construction related activities.

In review of the Carrizo Creek HMMP, the Corps has determined that the most appropriate location for the Applicant to complete the mitigation within the watershed is from the Highway S2 approximately 4.5 miles downstream (east) through the Carrizo Marsh. The 4.5 mile reach is estimated to have less than 1% tamarisk cover, but the removal of tamarisk individuals and long-term management of the reach will provide an upstream buffer from future infestation. The Carrizo Marsh is estimated to be approximately 319 acres with an 80% cover of tamarisk or 255 acres of enhancement and rehabilitation potential. The HMMP calls for removal of all tamarisk within the 4.5 mile reach and 319 acre marsh through a combination of mechanical removal, hand cutting with herbicide application, and prescribed fire beginning in October 2011. Following initial removal there may be grading within the marsh to lower the entrenched creek banks and create secondary channels to allow for better overbank flows. The creek appears entrenched due to the dense tramarisk scrub holding banks in place versus allowing for the meandering channels as was historically observed in the marsh. From October 2011 through October 2012, there will be monthly retreatment of any seed growth or resprouting stumps. Planting honey and screw bean mesquite and arrow weed in low densities would occur in the marsh between October and December 2012. There will be a minimum of 5-years of monitoring and reporting completed prior to the site being transferred to State Parks for long-term management along with a non-wasting endowment. The details of the enhancement and rehabilitation activities, responsible parties, implementation schedule, and monitoring and success can be found in the HMMP.

This mitigation approach has been developed with State Parks to meet a watershed-based goal of restoring Carrizo Creek. The State Park has secured over $750,000 dedicated to tamarisk removal within the Carrizo Creek watershed. The State Park has stated that they would initiate removal in the headwaters of Carrizo Creek and move downstream towards Highway S2 within the next year, prior to implementation of the large scale enhancement and rehabilitation effort by the Applicant in the marsh. The State Park and the Applicant are working diligently to determine the costs of implementing the mitigation, the cost of a long-term non-wasting endowment, and the mechanism with which the marsh would be protected in perpetuity. All three requirements will be included in the IP as special conditions that must be met prior to construction related activities.

In the Final Biological Opinion for PBS, the USFWS concurs with the Corps that the negative effects on PBS from the 709-MW Project are adequately mitigated through the enhancement and rehabilitation of an equal amount of desert stream habitat in the Carrizo Creek and marsh. The acreage of foraging habitat on-site estimated by the USFWS is based on the percent cover within the desert streams collected during the CRAM baseline assessment (e.g. 28% cover within 881 acres of WUS = 247 acres). The Biological Opinion states that tamarisk adversely effects the PBS because it reduces or eliminates the standing water on which bighorn sheep depend, it out competes plant species on which bighorn sheep feed, and it occurs in thick, often impenetrable stands that block access to water sources and provides

cover for predators. The Carrizo Creek and marsh were known to support PBS prior to the flood of 1976 causing the infestation of tamarisk with seed originating primarily from Vallecito Creek. The State Park has an on-going tamarisk removal project in Vallecito Creek that has reduced the potential for this creek to be a source of tamarisk seed to Carrizo Creek and marsh. Therefore, the Corps and USFWS agree that following enhancement and rehabilitation of the marsh, these areas would again provide needed foraging and water sources for the PBS. The 253 acres of enhancement and rehabilitation required by the Corps for mitigation exceeds the 247 acres required by the USFWS.

In addition, approximately 6,527 acres of creosote bush shrubland will be preserved to offset adverse impacts to the FTHL (see Condition of Certification and Mitigation Measure *Bio-10,* ***Mitigation for FTHL*** in the SSA and Final EIS, respectively). The exact location of the preservation lands are unknown at this point, but it is anticipated that these locations would have similar ephemeral streams as the IVSP site and that these streams would be preserved.

In summary, the mitigation required by the Corps as part of the 404(b)(1) alternatives analysis, the Mitigation Measures required by BLM in the FEIS, the Conditions of Certification required by the Energy Commission in the SSA/PMPD, and the mitigation required by the USFWS Biological Opinion will off-set the direct and indirect effects to WUS, PBS, and FTHL in accordance with the Clean Water Act Section 404 and 404(b)(1) guidelines and Section 7 of the Endangered Species Act.

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Appendix 7:
Tables

Appendix 7 contains the following tables:

- 7-1: Summary of Alternatives Evaluated in Detail in the Final Environmental Impact Statements
- 7-2: Alternative Sites Evaluated Under CEQA and Section 404 of the Federal Clean Water Act
- 7-3: Alternatives Considered But Eliminated from Detailed Analysis
- 7-4: Summary of Consultation and Coordination with State, Regional, and Local Agencies

Table 7-1 Summary of Alternatives Evaluated in Detail in the Final Environmental Impact Statement

Alternative	Comments
IVS Project: 750 MW Alternative 750 MW 6,500 ac (6,144 ac BLM managed and 332 ac privately owned) 30,000 SunCatchers	This is the IVS project and was the original proposed action. This Alternative meets the BLM project purpose and need. This Alternative was not selected because it resulted in greater impacts to drainages compared to the Agency Preferred Alternative (709 MW) Alternative
709 MW Alternative: Agency Preferred Alternative 709 MW 6,500 ac (6,144 ac BLM managed and 332 ac privately owned) 28,360 SunCatchers	This is the BLM Agency Preferred Alternative. It is also the Corps' Least Environmentally Damaging Practicable Alternative. It is the selected alternative which will be the subject of the BLM right-of-way grant and CDCA Plan amendment.
300 MW Alternative 300 MW (40% of the megawatts of the IVS project) 2,600 ac (40% of the acreage of the IVS project) 12,000 SunCatchers (40% of the IVS project)	This is a reduced project using the same SunCatcher technology as the IVS project. This Alternative meets the BLM project purpose and need. This Alternative was not selected because it would not meet the overall project purpose, does not provide for different use of the site, and the Corps determined it was not practicable.
Drainage Avoidance #1 Alternative 632 MW (83% of the megawatts of the IVS project) 4,690 ac (72% of the acreage of the proposed action) 25,000 SunCatchers (83% of the IVS project)	This is a reduced project using the same SunCatcher technology as the IVS project. This alternative was developed in consultation with the Corps to avoid drainages on the project site. This Alternative meets the BLM project purpose and need. This Alternative was not selected because it would not meet the overall project purpose, does not provide for different use of the site, and the Corps determined it was not practicable and it would result in only a very minor reduction in impacts to aquatic resources compared to the 709 MW Alternative.
Drainage Avoidance #2 Alternative 423 MW (56% of the megawatts of the IVS project) 3,153 ac (49% of the acreage of the proposed action) 10,240 SunCatchers (42% of the IVS project)	This is a reduced project using the same SunCatcher technology as the IVS project. This alternative was developed in consultation with the Corps to avoid drainages on the project site. This Alternative meets the BLM project purpose and need.

Alternative	Comments
	This Alternative was not selected because it would not meet the overall project purpose, does not provide for different use of the site, and the Corps determined it was not practicable and it would result in only a minor reduction in impacts to aquatic resources compared to the 709 MW Alternative.
No Action Alternative: No ROW Grant and No CDCA Plan Amendment BLM does not approve the ROW grant for the IVS project. BLM does not amend the CDCA Plan.	This No Action Alternative was evaluated in the SA/Draft EIS under both CEQA and NEPA. This Alternative was not selected because it did not meet the BLM project purpose and need.
Land Use Plan Amendment Alternative – No Action Alternative: No ROW Grant and Amend the CDCA Plan for No Solar BLM does not approve the ROW grant for the IVS project. BLM amends the CDCA Plan to make the project site unavailable for future solar development.	This Land Use Plan Amendment Alternative was evaluated in the SA/Draft EIS under NEPA only. This is not a typical no action alternative because the BLM would take action to amend the CDCA Plan under this No Action Alternative. However, it was evaluated because it provided an opportunity for the BLM to consider the effects of not approving the ROW grant application and also amending the CDCA Plan to make the specific IVS project site unavailable for further solar development. This Alternative was not selected because it did not meet the BLM project purpose and need.
Land Use Plan Amendment Alternative – No Action Alternative: No ROW Grant and Amend the CDCA Plan for Other Solar BLM does not approve the ROW grant for the IVS project. BLM amends the CDCA Plan to make the project site available for future solar development.	This Land Use Plan Amendment Alternative was evaluated in the SA/Draft EIS under NEPA only. This is not a typical no action alternative because the BLM would take action to amend the CDCA Plan under this No Action Alternative. However, it was evaluated because it provided an opportunity for the BLM to consider the effects of not approving the ROW grant application and also amending the CDCA Plan to make the specific IVS project site available for further solar development. This Alternative was not selected because it did not meet the BLM project purpose and need.

Table Source: Final Environmental Impact Statement (2010).

Table Key: ac = acres; BLM = United States Bureau of Land Management; CDCA = California Desert Conservation Area; CEQA = California Environmental Quality Act; Corps = United States Army Corps of Engineers; IVS = Imperial Valley Solar; MW = megawatts; NEPA = National Environmental Policy Act; ROW = right-of-way; SA/Draft EIS = Staff Assessment/Draft Environmental Impact Statement.

Table 7-2 Alternative Sites Evaluated Under CEQA and Section 404 of the Federal Clean Water Act

Alternative Site	Description of Alternative	Comparison of Alternative Sites to Other Alternatives and Why Not Considered by the BLM Under NEPA
Mesquite Lake Alternative	The Mesquite Lake site is approximately 1 mi north of the City of Imperial and 4 mi south of the City of Brawley. That site would be accessed via the Keystone Road exit from State Route 86R-86. The Mesquite Lake Alternative would require approximately 6,500 ac to accommodate a 750 MW solar project although it is possible that fewer than 6,500 ac could be required because this site is flatter than, and does not contain large washes like, the IVS project site. The parcels constituting this alternative site are in private ownership.	This was evaluated in detail in the SA/Draft EIS under the requirements of CEQA but not by the BLM in the Final EIS because the site consists of approximately 70 individual parcels owned by 52 different parties. The BLM does not own or manage any of those parcels. As a result, obtaining control over sufficient land at this site for the IVS project would be extremely remote. This site could result in substantial impacts to Corps jurisdictional waters. The use of this alternative site is speculative because the applicant has expressed no interest in attempting to acquire the land to develop the IVS project on this site and to the best of BLM's knowledge, the CEC has not received any applications proposing solar or other renewable energy projects on this site. Finally, although this site was evaluated by the CEC, it was not carried forward for analysis and evaluation under NEPA by the BLM because a project on this site would not require any action by BLM and would not meet the BLM project purpose and need. For these reasons, the BLM did not consider this to be a reasonable site alternative. This alternative was evaluated in the Corps' *Final 404B-1 Alternatives Analysis* provided in Appendix 8, Additional Agency Approvals and Review. However, it was considered impracticable and unreasonable by the Corps for two reasons: the site supports approximately 716 ac of wetlands mapped by the National Wetlands Inventory that may be all or partially Corps jurisdictional wetland waters of the U.S. and use of the site for the IVS project would likely result in greater impacts to waters of the U.S., particularly to wetlands, which are special aquatic sites under Section 404 of the CWA; and obtaining ownership or access to 70 parcels owned by 52 different parties makes securing the site for solar development impracticable.

Alternative Site	Description of Alternative	Comparison of Alternative Sites to Other Alternatives and Why Not Considered by the BLM Under NEPA
Agricultural Lands Alternative	The Agricultural Lands site is approximately 7 mi west of Calexico, adjacent to the Wisteria and Wormwood Canals. This alternative would require approximately 4,600 ac to accommodate a 750 MW solar project. The parcels constituting this alternative site are in private ownership.	This Alternative was evaluated in detail in the SA/Draft EIS under the requirements of CEQA but by the BLM in the Final EIS because the site consists of 7 separate and unconnected parcels owned by different parties. The BLM does not own or manage any of those parcels. In addition, using noncontiguous parcels, although viable because the SunCatchers could be constructed in separate groups, would result in the need for an unknown amount of additional land to accommodate the same number of SunCatchers as the IVS project and to avoid shading effects outside the boundary of this site. Site security would be far more complicated, but not impossible, than a contiguous parcel of land. This site would also require 2 separate transmission interconnections because the parcels are about 6 mi apart. Because the site consists of 7 separate parcels owned by different parties, obtaining site control would be challenging. The use of this alternative site is speculative because the applicant has expressed no interest in attempting to acquire the land to develop the IVS project on that site and to the best of BLM's knowledge, the CEC has not received any applications proposing solar or other renewable energy projects on this site. Finally, although this site was evaluated by the CEC, this site alternative was not carried forward by the BLM in the Final EIS because a project on this site would not require any action by BLM and would not meet the BLM project purpose and need. For these reasons, the BLM did not consider this to be a reasonable site alternative. This alternative was evaluated in the Corps' *Final 404B-1 Alternatives Analysis* provided in Appendix 8. That analysis indicates this alternative would meet the Corps stated overall project purpose, but may not meet the cost, logistical, and environmental screening criteria. As such, although this site alternative would be within the jurisdiction of the Corps, it was determined not to be a reasonable site location.

Alternative Site	Description of Alternative	Comparison of Alternative Sites to Other Alternatives and Why Not Considered by the BLM Under NEPA
South of Highway 98 Alternative	The South of Highway 98 Alternative site is on Federally owned land that is designated as BLM land, but it was withdrawn from BLM management by the Bureau of Reclamation in 1928. The approximately 5,000 ac site is about 4 mi southeast of El Centro. Highway 98 is the northern border of the alternative site and the United States/Mexico border is the southern border of the site. The site is between the Lake Cahuilla-D ACEC and would surround the BLM Tamarisk LTVA campground. It is north and south of the All-American Canal. The site is accessible from I-8 and Highway 98.	The South of Highway 98 Alternative was evaluated in detail in the SA/Draft EIS under the requirements of CEQA but was not evaluated for NEPA purposes by the BLM in the Final EIS because the site is directly adjacent to the Cahuilla-D ACEC and the Tamarisk LTVA. This site would require an approximately 38 mi long water transmission pipeline from the SWWTP to the site and an approximately 30 mi transmission line to the SDG&E Imperial Valley Substation, which far exceed the public lands required for water and transmission lines for the project on the IVS site. The use of this alternative site is speculative because the applicant has expressed no interest in attempting to acquire the land to develop the IVS project on that site and to the best of BLM's knowledge, the CEC has not received any applications proposing solar or other renewable energy projects on this site. Finally, although this site was evaluated by the CEC, this site alternative was not considered reasonable by the BLM because a project on this site would not require any action by BLM and would not meet the BLM project purpose and need. For these reasons, the BLM did not consider this to be a reasonable site alternative. This alternative was evaluated in the Corps' *Final 404B-1 Alternatives Analysis* provided in Appendix 8. That analysis indicates this alternative would meet the Corps stated overall project purpose, but may not meet the cost and environmental screening criteria. As such, although this site alternative would be within the jurisdiction of the Corps, it was determined not to be a reasonable site location.

Table Source: Staff Assessment/Draft Environmental Impact Statement (2010).

Table Key: ac = acres; ACEC = Area of Critical Environmental Concern; BLM = United States Bureau of Land Management; CEC = California Energy Commission; CEQA = California Environmental Quality Act; Corps = United States Army Corps of Engineers; CWA = Clean Water Act; Final EIS = Final Environmental Impact Statement; I-8 = Interstate 8; IVS = Imperial Valley Solar; mi = miles; LTVA = Long Term Visitor Area; MW = megawatts; SA/Draft EIS = Staff Assessment/Draft Environmental Impact Statement; SDG&E = San Diego Gas and Electric; SWWTP = Seeley Wastewater Treatment Plant; waters of the U.S. = waters of the United States.

Table 7-3 Alternatives Considered But Eliminated from Detailed Analysis

Alternative	Description of Alternative	Why Alternative was Eliminated from Detailed Analysis
900 MW Alternative	The 900 MW Alternative was the original project proposed by the applicant. A total of 36,000 SunCatchers were proposed to be constructed in two phases on approximately 7,600 ac at the same location as the 750 MW Alternative. This Alternative would be dependent on expansion of the Sunrise Powerlink project. The 900 MW Alternative would impact the same drainages as the IVS project as well as additional drainages on the easternmost side of the site that flow toward the Westside Main Canal.	Early analysis indicated that this alternative would result in substantial adverse impacts related to the ancient Lake Cahuilla, cultural resources, drainages, and biological resources among others. As a result, the applicant withdrew that proposal and submitted an application for certification to the CEC and a right-of-way grant application to the BLM proposing the 750 MW Alternative which was then identified by the CEC and the BLM as the proposed project/action and was evaluated in detail in the SA/Draft EIS. This alternative was eliminated from detailed analysis in the SA/Draft EIS because it would result in greater impacts for all resource elements. Further, implementation of a 900 MW Alternative is speculative because the applicant has expressed no interest in attempting to develop a 900 MW facility on the project site, and the BLM and the CEC have not received any applications proposing a 900 MW facility on the IVS project site. The BLM determined that this site is ineffective in meeting the purpose and need for the project; is inconsistent with basic policy objectives and was eliminated during early application procedures; its early implementation is remote and speculative; the site is similar to the proposed action with similar, although greater environmental effects; and is, therefore, not an alternative that will avoid or minimize adverse effects of the 750 MW IVS project.
Alternative Site #1	Alternative Site #1 is in the WECO amendment area along the border between San Diego and Imperial Counties. It is north of the Fish Creek Mountains Wilderness, approximately 1 mi east of Anza-Borrego Desert State Park, and less than 2 mi east of the Vallecito Mountain Wilderness in that State Park. The Juan Bautista de Anza National Historic Trail (Anza Trail) crosses this site.	This Alternative was eliminated from detailed analysis because it would not substantially reduce the impacts of the IVS project; the ground slope on parts of the site exceed the 5 percent threshold identified for the SunCatcher solar fields; the site is distant from existing roads and would require longer access roads; and it lacks an adequate water supply. The site is in a DOD no fly/no build area and it would violate the DOD height restrictions for these zones; as such it is not a reasonable alternative within the jurisdiction of the DOD. This site is also much closer than the IVS project to the Anza-Borrego Desert State Park and the Vallecito Mountain Wilderness than the IVS site; and because of its location, implementation of a project on this site may be remote or

Alternative	Description of Alternative	Why Alternative was Eliminated from Detailed Analysis
		speculative. Further, implementation of the project on this alternative site is speculative because the applicant has expressed no interest in developing a solar facility on this site. Finally, there is a pending right-of-way grant application for the use of this site which, if approved, would preclude the use of this site as an alternative site for the IVS project. The BLM determined that this site is ineffective in meeting the purpose and need for the project; it may be inconsistent with basic policy objectives due to wilderness considerations; its implementation is remote and speculative because, although it is within their jurisdiction, it is an unreasonable alternative to DOD and State Park's interests; the site is similar to the proposed action with similar, although greater environmental effects; and is, therefore, not an alternative that will avoid or minimize adverse effects of the 750 MW IVS project.
Alternative Site #2	Alternative Site #2 is in the WECO amendment area along the border between San Diego and Imperial Counties. It is northeast of the Fish Creek Mountains Wilderness and is just west of and overlaps with the boundary of the West Mesa ACEC. It is approximately 1 mi east of Alternative Site #1.	This Alternative was eliminated from detailed analysis because it would not substantially reduce the impacts of the IVS project; the site is in a DOD no fly/no build area and it would violate the DOD height restrictions for these zones; the ground slope on parts of the site exceed the 5 percent threshold identified for the SunCatcher solar fields; the site is distant from existing roads and would require longer access roads; and it lacks an adequate water supply. This site also includes some privately owned parcels which may result in site acquisition and control difficulties. The site is also much closer to the Fish Creek Mountains Wilderness and the West Mesa ACEC than the IVS site. Further, implementation of the project on this alternative site is speculative because the applicant has expressed no interest in developing a solar facility on this site. Finally, there is a pending right-of-way grant application for the use of this site which, if approved, would preclude the use of this site as an alternative site for the IVS project. The BLM determined that this site is ineffective in meeting the purpose and need for the project; it may be inconsistent with basic policy objectives due to wilderness and ACEC considerations; its implementation is remote and speculative because, although it is within its jurisdiction, it is an unreasonable alternative to DOD interests; site

Alternative	Description of Alternative	Why Alternative was Eliminated from Detailed Analysis
		control is complicated and, therefore, speculative; the site topography is incompatible with the project design; and there is pending application for the site.
Alternative Site #3	Alternative Site #3 is due west of Westmorland and southwest of the Salton Sea. It is in the WECO amendment area along the border between San Diego and Imperial Counties and approximately 1 mi southwest of the Salton Sea National Wildlife Refuge.	This alternative site was eliminated from detailed analysis because the ground slope on parts of the site exceed the 5 percent threshold identified for the SunCatcher solar fields; it lacks an adequate water supply; and it would require off-road access, additional transmission capacity, and extensive off-site transmission lines. The site is also much closer to the Salton Sea National Wildlife Refuge than the IVS site. Further, implementation of the project on this alternative site is speculative because the applicant has expressed no interest in developing a solar facility on this site. Finally, there is a pending ROW grant application for the use of this site which, if approved, would preclude the use of this site as an alternative site for the IVS project.
Wind Zero Site (Ocotillo)	The Wind Zero Alternative site is on approximately 944 ac of privately owned land.	This site was eliminated from detailed analysis because it is not large enough, at 944 ac, to accommodate a 750 MW project; and a military training facility and motorsport race resort are already proposed for the site and undergoing environmental review. Implementation of the IVS project on this site is speculative because there are previous projects proposed on it which, if approved, would preclude the use of this site for the IVS project and because the applicant has expressed no interest in developing a solar facility on this site.
Parabolic Trough Solar System Technology	A parabolic trough solar system converts solar radiation to electricity by using sunlight to heat a fluid, such as oil, which is then used to generate steam. The plant consists of a large field of trough-shaped solar collectors arranged in parallel rows, normally aligned on a north-south horizontal axis. A parabolic trough power plant would include parabolic trough collectors, solar boilers, heat transfer fluid oil heater. It would require approximately 3,750 to 6,000 ac to accommodate a 750 MW facility.	The use of this technology on the IVS project site was eliminated from detailed analysis because it is not the technology proposed by the applicant; it would likely require more grading than the IVS project, and it could require approximately 600 AFY of water per 100 MW of capacity if wet cooling is used and 18 AFY of water per 100 MW if dry cooling is used. Implementation of this technology on the IVS project site is speculative because the applicant has its own proprietary technology it is proposing to use, the applicant has expressed no interest in using this technology; and the BLM has not received any applications to use this technology on the IVS project site.

Alternative	Description of Alternative	Why Alternative was Eliminated from Detailed Analysis
Solar Power Tower Technology	Solar power tower technology converts thermal energy to electricity by using heliostat (mirror) fields to focus energy on a boiler on power tower receivers near the center of each heliostat array. The solar power towers can be up to 459 ft tall with additional 10 ft tall lightning rods. In general, a solar power tower power plant requires 5 to 10 ac of land per megawatt of power generated. A 750 MW solar power tower field would require from 3,750 to 7,500 ac of land.	The use of this technology on the IVS project site was eliminated from detailed analysis because it would have towers substantially taller than any of the SunCatcher features which could conflict with aviation and military activities; it would be in the DOD Airspace Consultation Area for the nearby El Centro Naval Air Facility; and this is not the technology proposed by the applicant. Implementation of this technology on the IVS project site is speculative because the applicant has its own proprietary technology it is proposing to use, the applicant has expressed no interest in using this technology; and the BLM has not received any applications to use this technology on the IVS project site.
Linear Fresnel Technology	A solar linear Fresnel power plant converts solar radiation to electricity by using flat moving mirrors to follow the path of the sun and reflect its heat on the fixed pipe receivers located above the mirrors. During daylight hours, the solar concentrators focus heat on the receivers to produce steam, which is collected in a piping system, delivered to steam drums located in a solar field, and transferred to steam drums in a power block. The steam transferred to the power block is used to turn steam turbine generators and produce electricity. The steam is then cooled, condensed into water, and recirculated back into the process. A 750 MW solar linear Fresnel field would require approximately 3,000 to 3,750 ac of land. The Fresnel solar technology is a proprietary technology owned by Ausra, Inc. However, Ausra, Inc. has changed its focus to being a technology and equipment provider rather than an independent power developer and owner and will focus on medium-sized (50 MW) solar steam generating systems.	The use of the linear Fresnel technology on the IVS project site was eliminated from detailed analysis because it a proprietary technology that may not be appropriate for a facility as large as 750 MW and this is not the technology proposed by the applicant. Implementation of this technology on the IVS project site is speculative because the applicant has its own proprietary technology it is proposing to use, the applicant has expressed no interest in using the Fresnel technology, and the BLM has not received any applications to use this technology on the IVS project site.

Alternative	Description of Alternative	Why Alternative was Eliminated from Detailed Analysis
Utility Scale Solar Photovoltaic Technology	A utility scale solar PV power generation facility would consist of PV panels that would absorb solar radiation and convert it directly to electricity. For this analysis, a utility scale project was assumed to consist of any solar PV facilities that would require transmission to reach the load center, or center of use. The land requirement for PV facilities varies from approximately 3 ac per MW of capacity for crystalline silicon to more than 10 ac per MW produced for thin film and tracking technologies. A nominal 750 MW solar PV power plant would require between 2,250 and 7,500 ac. Utility-scale solar PV installations require land with less than a 3 percent slope. Solar photovoltaics only require water for only for washing the solar PV arrays.	The utility scale solar PV technology was eliminated from detailed analysis because it could require slightly more water than the IVS project, it could require a larger site to accommodate a 750 MW facility, and it could require more grading than the IVS project. Implementation of this technology on the IVS project site is speculative because the applicant has its own proprietary technology it is proposing to use, the applicant has expressed no interest in using the solar PV technology; and the BLM has not received any applications to use this technology on the IVS project site.
Distributed Solar Technology	A distributed solar alternative would consist of PV panels that would absorb solar radiation and convert it directly to electricity. The PV panels could be installed on building rooftops or in other disturbed areas such as parking lots or adjacent to existing substations. Installations of 750 MW distributed solar PV panels would require up to approximately 5,000 ac.	The distributed solar technology was eliminated from detailed analysis because it is uncertain whether it would be possible to achieve 750 MW of distributed solar energy from this technology on the project site, there are barriers related to interconnection with the existing electric distribution grid, this is already one of the components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements, and it may be technologically or economically infeasible at the 750 MW scale. Implementation of this technology on the IVS project site is speculative because the applicant has its own proprietary technology it is proposing to use, the applicant has expressed no interest in using the distributed solar technology; and the BLM has not received any applications to use this technology on the IVS project site.
Wind Energy	Wind carries kinetic energy that can be used to spin the blades of a wind turbine rotor and an electrical generator, which would then feed AC into the existing utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind's kinetic energy to electricity. A single 1.5 MW turbine operating at 40	Wind energy technology was eliminated from detailed analysis because wind energy is already is one of the components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements, the tall wind turbines could conflict with civilian aviation operations, and this technology would not meet the BLM purpose and need to respond to the applicant's proposal to develop a solar facility on

Alternative	Description of Alternative	Why Alternative was Eliminated from Detailed Analysis
	percent capacity factor generates 2,100 MW annually. Approximately 3,750 to 12,750 ac of land would be required for a 750 MW wind electricity power plant. Wind turbines are often over 400 ft high for 2 MW turbines.	the IVS project site. In addition, implementation of this technology on the IVS project site is speculative because the applicant has its own proprietary technology it is proposing to use, the applicant has expressed no interest in attempting to use wind energy technology; and the BLM has not received any applications to use this technology on the IVS project site.
Geothermal Energy	Geothermal technologies use steam or high-temperature water from naturally occurring geothermal reservoirs to drive steam turbines or generators. There are vapor-dominated resources (dry, super-heated steam) and liquid-dominated resources where various techniques are used to extract energy from the high-temperature water. It is expected that 5 to 10 small projects would be required to achieve 750 MW of geothermal energy. The land requirement for geothermal energy facilities could range from 900 to 6,000 ac to achieve 750 MW of energy. Additionally, while the power plant, cooling towers and brine ponds would likely be fenced, there would not likely be fencing required for the wells and well pads. Because 5 to 10 geothermal facilities could be required to generate 750 MW, depending on the locations of the new facilities, more transmission lines and switchyards may be required for grid interconnection compared to the IVS project.	Geothermal energy technology was eliminated from detailed analysis because there are no geothermal resources on the project site and this technology would not meet the BLM purpose and need to respond to the applicant's proposal to develop a solar facility on the IVS project site.
Biomass Energy	Biomass energy generation creates electricity by burning organic fuels in a boiler to produce steam, which then turns a turbine. Biomass can also be converted into a fuel gas such as methane and burned to generate power. Wood is the most commonly used biomass for power generation. Major biomass fuels include wastes from forestry and mills, agricultural field crops and food processing, and construction and urban wood. Techniques to convert these fuels to electricity include direct combustion, gasification, and anaerobic	Biomass energy technology was eliminated from detailed analysis because most biomass facilities produce only small amounts of electricity in the range of 3 to 10 MW; it would not meet the project objectives related to the California Renewable Portfolio Standard; between 75 and 250 facilities would be needed to generate 750 MW which could result in impacts substantially greater than the IVS project; and this technology would not meet the BLM purpose and need to respond to the applicant's proposal to develop a solar facility on the IVS project site. In addition, implementation of this technology on the IVS project site is speculative because the applicant has its own

Alternative	Description of Alternative	Why Alternative was Eliminated from Detailed Analysis
	fermentation. Biomass facilities do not require the extensive amount of land required by other renewable energy sources, but they generate only small amounts of electricity, in the range of 3 to 10 MW. Biomass facilities can also generate substantial air emissions and require numerous truck deliveries to supply the plants with the biomass waste materials. In waste-to-energy facilities, there is some concern regarding the emission of toxic chemicals, such as dioxin, and the disposal of the toxic ash that results from biomass burning.	proprietary technology it is proposing to use, the applicant has expressed no interest in using biomass energy technology; and the BLM has not received any applications to use this technology on the IVS project site.
Tidal Energy	The oldest technology to harness tidal power for the generation of electricity involves building a dam, known as a barrage, across a bay or estuary that has large differences in elevation between high and low tides. Water retained behind a dam at high tide generates a power head sufficient to generate electricity as the tide ebbs and water released from within the dam turns conventional turbines. To produce practical amounts of power for tidal barrages, a difference between high and low tides of at least 5 meters is required.	Tidal energy technology was eliminated from analysis because it has not been demonstrated and proven at the scale that would be required to generate 750 MW, particularly with Pacific Ocean tides; there are no water bodies near the IVS project site that experience tides; and this technology would not meet the BLM purpose and need to respond to the applicant's proposal to develop a solar facility on the IVS project site.
Wave Energy	Wave power technologies have been used for nearly 30 years. Setbacks and a general lack of confidence have contributed to slow progress towards proven devices that would have a good probability of becoming commercial sources of electrical power using wave energy. The highest energy waves are concentrated off the west coast of the United States in the 40- to 60-degree latitudes range north and south. The power in the wave fronts varies in these areas between 30 and 70 kW/m with peaks to 100 kW/m. Many wave energy devices are still in the research and development stage, and would require large amounts of capital to get started. Additional costs from permitting and environmental assessments	Wave energy technology was eliminated from analysis because it has not been demonstrated and proven at the scale that would be required to generate 750 MW, particularly with Pacific Ocean tides; there are no water bodies near the IVS project site that generate waves; and this technology would not meet the BLM purpose and need to respond to the applicant's proposal to develop a solar facility on the IVS project site.

Alternative	Description of Alternative	Why Alternative was Eliminated from Detailed Analysis
	also make wave energy problematic.	
Natural Gas	Natural gas power plants typically consist of combustion turbine generators, heat recovery steam generators, a steam turbine generator, wet or dry cooling towers, and associated support equipment. An interconnection with a natural gas pipeline, a water supply, and electric transmission are also required. A gas-fired power plant generating 750 MW would generally require less than 80 ac of land.	Natural gas was eliminated from detailed analysis because it would not meet the basic project objective of generating renewable power to help meet California's renewable energy needs, it results in GHG gas emissions, it would not reduce dependence on nonrenewable petroleum resources, and it would not meet the BLM purpose and need to respond to the applicant's proposal to develop a solar facility on the IVS project site.
Coal	Traditional coal-fired plants generate large amounts of GHG. New clean coal technology includes a variety of energy processes that reduce air emissions and other pollutants from coal-burning power plants. The Clean Coal Power Initiative is providing government co-financing for new coal technologies that help utilities meet the Clear Skies Initiative to reduce sulfur, nitrogen, and mercury pollutants by nearly 70 percent by 2018. These technologies are not yet in use.	Coal was eliminated from detailed analysis because it would not meet the basic project the objective of generating renewable power to help meet California's renewable energy needs; it would generate GHG; it is not a feasible alternative in California; and this energy source would not meet the BLM purpose and need to respond to the applicant's proposal to develop a solar facility on the IVS project site.
Nuclear Energy	Due to environmental and safety concerns, California law currently prohibits the construction of new nuclear power plants in the State until the CEC finds that the Federal government has approved and there exists demonstrated technology for the permanent disposal of spent fuel from these facilities.	Nuclear energy was eliminated from detailed analysis because the permitting of new nuclear facilities in California is not currently allowable by law and, therefore, this technology is infeasible.
Conservation and Demand-Side Management	Conservation and demand-side management are approaches to reduce electricity use, including energy efficiency and conservation, building and appliance standards, and load management and fuel substitution.	Conservation and demand-management were eliminated from detailed analysis because they alone are not sufficient to address all of California's energy needs, and would not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements. In addition, these types of measures are outside the jurisdiction and authority of the BLM to implement.

Alternative	Description of Alternative	Why Alternative was Eliminated from Detailed Analysis
Drainage Avoidance #3 Alternative (to avoid Waters of the United States)	This was the third avoidance alternative developed in consultation with the Corps to avoid waters of the U.S., typically referred to as the No Federal Action Alternative when the Corps is the lead agency. This alternative would avoid all permanent effects on waterways on the project site. All the drainages on the site were determined to be under the Corps' jurisdiction. This alternative would allow limited crossings of streams by roads and electric collection system lines, but would not allow any permanent facilities such as SunCatchers) to be installed within the boundaries of Waters of the U.S. There are primary and secondary streams throughout the site. As a result, this alternative would allow development only in the centermost part of the site. This alternative would result in elimination of 6,580 SunCatchers and would isolate an additional 19,976 SunCatchers, making them infeasible to construct and operate. Only about 3,444 SunCatchers would remain, retaining only about 10 percent of the total SunCatchers proposed by the applicant). Permanent structures would be allowed on only about 10 percent of the project site. This alternative would result in the generation of less than 100 MW of energy.	This Alternative was eliminated from detailed analysis because, by avoiding all Corps jurisdictional waters of the U.S., which form a complex web of streams across the project site, permanent structures would be limited to approximately 10 percent of the project site resulting in the generation of less than 100 MW of energy. Therefore, from the applicant's perspective, this alternative would be considered infeasible because it would not meet the applicant's objectives for the project which include generating 750 MW of energy.

Table Source: Final Environmental Impact Statement (2010).

Table Key: ac = acres; AC = alternating current; ACEC = Area of Critical Environmental Concern; AFY = acre-feet/year; BLM = United States Bureau of Land Management; CEC = California Energy Commission; Corps = United States Army Corps of Engineers; DOD = United States Department of Defense; ft = feet; GHG = greenhouse gases; IVS = Imperial Valley Solar; kV/m = kilowatts per meter; mi = miles; MW = megawatt; PV = photovoltaic; ROW = right-of-way; SA/Draft EIS = Staff Assessment/Draft Environmental Impact Statement; Waters of the U.S. = Waters of the United States; WECO = Western Colorado Desert Routes of Travel Designations.

Table 7-4 Summary of Consultation and Coordination with State, Regional, and Local Agencies

Type and Name of Agency	Potential Role or Responsibilities	Consultation Activities
State Agency		
California Energy Commission	Certification of the construction, modification, and operation of electric power plants in California which generate 50 or more MW of electricity	Preparation of the SA/DEIS and the Final EIR. Certification of the Final EIR.
California Department of Fish and Game	Permit and mitigation for project impacts to FTHL habitat and possible impacts to waters of the State	The applicant is responsible for consultation with State agencies and obtaining any needed State permits and/or approvals for the project and has been consulting with the CDFG.
California Department of Transportation	Responsible for issuing encroachments permits for any project work in State highway rights-of-way	Provided written comments on the Draft EIS.
State of California Department of Parks and Recreation	Possible mitigation in State Park	Provided written comments on the Draft EIS.
Regional Agency		
Imperial Irrigation District	Owner/operator of irrigation channels throughout Imperial County	Provided written comments on the proposed project and the EIS preparation during the scoping period.
Local Agency		
City of El Centro	None.	Provided written comments on the Draft EIS.
Imperial County	Land use planning and authority in unincorporated Imperial County.	Provided written comments on the Draft EIS.

Table Source: LSA Associates, Inc. (2010).

Table Key: CDFG = California Department of Fish and Game; DEIS = Draft Environmental Impact Statement; EIR = Environmental Impact Report; EIS = Environmental Impact Statement; FTHL = flat-tailed horned lizard; MW = megawatts; SA = Staff Assessment.

Appendix 8:
Letter from Tessera Solar

Tessera Solar™
power from stirling energy systems

September 29, 2010

Mr. Jim Stobaugh
Bureau of Land Management
Nevada State Office
P.O. Box 12000
1340 Financial Blvd
Reno, NV 89520-0006

RE: Imperial Valley Solar Project Protest Resolution

Dear Mr. Stobaugh:

Tessera Solar is pleased to advise you that we have reached an agreement with NRDC and The Wilderness Society to resolve their protests to the CDCA land use plan amendments related to the Imperial Valley Solar Project (IVSP), under which the Tessera Solar will agree to certain specified conditions on the development of IVSP, and the environmental organizations will, among other things, withdraw their protests. The conditions to which Tessera Solar agrees will be incorporated into the ROD. Those conditions are attached hereto as Attachment A.

Sincerely,

Sean Gallagher
Vice President
Market Strategy & Regulatory Affairs
Tessera Solar

cc: Erin Dreyfuss
BLM California State Office
2800 Cottage Way, Suite W1623
Sacramento, CA 95825

2.1 **Staging of Project.** IVSP proposed by Imperial Valley Solar will be developed in two Stages. For the purposes of this Agreement, Stage 1 consists of what has been called in other documents Phase 1A, Phase 1B, plus 50 MW of what has been called Phase 2. Stage 2 consists of what has been called in other documents Phase 2 minus 50 MW.

2.2 **Imperial Valley Solar's Obligations**. Imperial Valley Solar agrees to comply with each of the Conditions set forth in sections 2.3 and 2.4 below.

2.3 **Conditions for Construction of Stage 2.** The conditions that must be met before BLM will issue a Notice to Proceed to Imperial Valley Solar to proceed with Stage 2 and develop more than 350 MW of SunCatchers include and are limited to the following:

2.3.1 Transmission Sunrise Powerlink Project is substantially constructed. The parties have agreed to define "substantially constructed" as the point in time when 70% of the total number of new transmission towers required for the Sunrise Powerlink Project have been completely erected.

2.3.2 Availability. Stage 1 has achieved 90% availability, as certified by the project's Independent Engineer. The Independent Engineer must provide to BLM certification that Stage 1 of the project has met or exceeded 90% availability at two points: 1) one year after the first power from this project is brought on line; and 2) prior to the commencement of construction of Stage 2. Commencement of construction of more than 350 MW of SunCatchers will be conditioned on certification by the Independent Engineer of the availability of more than 90% for all SunCatcher megawatts online at the time certification is made, as defined immediately below.

2.3.2.1 "Availability" is defined to mean the ratio of the number of hours that the installed SunCatchers are generating electricity divided by the number of hours that the installed SunCatchers are capable of producing energy.

2.3.2.2 "Installed SunCatchers capable of producing energy" is defined as when 1) the sun is present and delivering direct energy to the SunCatchers in excess of 350 watts/square meter; 2) site conditions are within the technical limits of the equipment (i.e., wind is less than 35 miles/hour and ambient temperature is between 14 and 122 degrees Fahrenheit; 3) the delivery point on the transmission grid is capable of receiving energy; and 4) the power purchaser is willing to take the energy.

2.3.3 Flat-tailed Horned Lizard. Imperial Valley Solar shall provide to the relevant agencies a report that evaluates FTHL mitigation measures, including whether mitigation and adaptive management measures are necessary, and any other information needed to demonstrate compliance with the measures described in the CEC's Conditions of Certification.

2.3.3.1 The Parties agree that BLM should review the report, as well as other available and relevant information, such as BLM's own monitoring of this species, should prepare a summary of the impacts to the species, and should assess the success of the various measures already required to determine whether adaptive management measures are warranted. In addition, BLM should consult with the relevant agencies, Imperial Valley Solar, and the Environmental Parties in making this determination, and should make this determination before Stage 2 commences.

2.3.3.2 Imperial Valley Solar agrees to implement adaptive management measures, if any, which the BLM and/or CEC require as a condition of compliance.

2.4 **Additional Conditions**. In addition to the conditions set forth above, Imperial Valley Solar agrees to the following conditions.

2.4.1 Air Quality. Imperial Valley Solar agrees to purchase and install equipment for periodic and ongoing PM10 and ozone air quality monitoring at its on-site meteorological station at the Imperial Valley Project, and to maintain this equipment throughout the life of the project until decommissioning for the purpose of providing PM10 and ozone monitoring data from this equipment to the Imperial County Air Pollution Control District (APCD). The equipment that is purchased shall satisfy applicable requirements, if any, for such equipment of the State of California Air Resources Board as of the date of Imperial Valley Solar's permit approval and shall be capable of taking readings and transmitting data to the Imperial County APCD that are at least equivalent to readings and data that the APCD acquires at its existing monitoring stations. Imperial Valley Solar will transmit these data to the Imperial County APCD in a format and at the same or greater frequency as the data provided by the APCD's existing monitoring stations as of the date of Imperial Valley Solar's permit approval. This monitoring equipment shall be added to the meteorological station as soon as it is erected or, alternatively, if the station has already been erected, prior to the start of construction.

2.4.2 Water. Imperial Valley Solar agrees to use wastewater from the Seeley Waste Water Treatment Facility (SWWTF) for all operations, including

construction, at the Imperial Valley Project as soon as that water is available. The water will be considered available when all permits that are required for Imperial Valley Solar to use the treated waste water have been obtained and Imperial Valley Solar is authorized under the CEC certification to utilize the treated waste water. Imperial Valley Solar agrees to truck SWWTF water to the project site if it becomes available before the pipeline is completed for operation of IVSP, including construction, if authorized by the CEC. Imperial Valley Solar further agrees that it will not use water from the Dan Boyer Water Company (DBWC) for IVSP for more than 36 months for any purpose, including project construction and/or operations.

2.4.2.1 To mitigate for the use of groundwater from the DBWC well, Imperial Valley Solar will provide for the conservation of DBWC well water as follows:

2.4.2.2 When Imperial Valley Solar concludes its use of water from the DBWC for the Project, Imperial Valley Solar will begin immediately to purchase from the DBWC an amount of groundwater equal to the total amount used by the Project prior thereto (the "DBWC Groundwater"), and will not permit this amount of groundwater to be pumped from the well until such time as the DBWC Groundwater has been conserved as defined herein. The period of time required to conserve the DBWC Groundwater will be as short as possible subject to the restrictions included in the DBWC County Well Registration and any conditions imposed by the CEC (conservation ratio of 1:1).

2.4.2.3 Within 15 days of executing this Agreement, Imperial Valley Solar will execute an option agreement with DBWC for up to 20 months of water for conservation as defined herein. The agreement shall include an additional option to extend its terms for up to a total of 36 months.

2.4.2.4 If Imperial Valley Solar uses the DBWC water for construction or operations for more than 20 months, the conservation ratio will be 2:1 for the total number of months thereafter that the DBWC water is used – i.e., for month 21 and up to and including the last month in which DBWC is used.

2.4.2.5 Imperial Valley Solar shall submit an annual compliance report to the BLM that includes an annual summary of water sales by the DBWC which clearly differentiates between the groundwater sold to Imperial Valley Solar and the water purchased by

customers other than /Imperial Valley Solar (which need not be identified and which may be collectively accounted for). This report shall also include copies of DBWC invoices to Imperial Valley Solar as documentation for the reported sales. The Parties intend that BLM use this report and the DBWC invoices for purposes of determining whether the terms of this section 2.4.2 have been met.

2.4.3 Peninsular Bighorn Sheep. To the maximum extent possible, the acquisition of land to mitigate for impacts to the Flat-tailed horned lizard will be focused on lands which provide bighorn sheep habitat as well as Flat-tailed horned lizard habitat.

2.4.3.1 Imperial Valley Solar affirms that it will mitigate the impacts to Peninsular bighorn sheep by implementing the enhancement and restoration of Carrizo Creek and marsh as described in CEC Conditions of Certification BIO-17 and agrees that the alternative mitigation described in CEC Condition of Certification BIO-17 would be conducted only at the direction of the CEC, BLM, ACOE, USFWS and/or CDFG.

2.5 **Incorporation of Conditions into the POD**. Imperial Valley Solar agrees that the conditions set forth in Sections 2.3 and 2.4 will be incorporated into its Plan of Development (POD) and the revised POD will be submitted to BLM.

Appendix 9:
Documentation of NEPA Adequacy

Appendix 9

Worksheet

Determination of NEPA Adequacy (DNA)

U.S. Department of the Interior

Bureau of Land Management

OFFICE: El Centro Field Office (CA-670)

TRACKING NUMBER: 2010-121

CASE FILE/PROJECT NUMBER: CACA-47740

PROPOSED ACTION TITLE/TYPE: The proposed action is an amendment to the *California Desert Conservation Area Plan* (CDCA Plan) to identify a project site for the Imperial Valley Solar (IVS) LLC project and to approve a right-of-way (ROW) grant for the proposed project.

The IVS Project was originally named and referred to as the Solar Two project. The name was changed to the IVS Project by the project applicant (Imperial Valley Solar, LLC) after the publication of the Staff Assessment/Draft Environmental Impact Statement (SA/DEIS) in February 2010.

LOCATION/LEGAL DESCRIPTION: The IVS Project is a privately proposed solar power generation facility that would be located on approximately 6,500 acres (ac) of vacant land in southwestern Imperial County, California, south of Evan Hewes Highway and north of Interstate 8 (I-8). The project site includes about 6,144 acres of public land managed by Bureau of Land Management (BLM) with a laydown construction area (120 acres), generation-tie transmission line (91.63 acres) and water pipeline (3.93 acres) for 6,359.56 total public lands and approximately 360 ac of privately owned land used for the "project". The site is about 100 miles (mi) east of San Diego, 14 mi west of El Centro, approximately 4 mi east of Ocotillo, and south of a gypsum processing site known as Plaster City.

APPLICANT (if any): Imperial Valley Solar, LLC

A. Description of the Proposed Action and any applicable mitigation measures

Description of the IVS Project

The project applicant filed an Application for Certification (AFC) with the California Energy Commission (CEC) and an application for a ROW grant with the BLM for the IVS Project on June 30, 2008. The AFC application was deemed adequate by the CEC on October 8, 2008.

The IVS Project would be a primary power generating facility constructed in two phases. Phase I would include the construction and operation of a 300-megawatt (MW) facility and Phase II would include the construction and operation of facilities to generate an additional 409 MW, for a total 709 MW project. Power would be generated by 28,360 SunCatcher solar dish collectors which would be supported on individual metal pipe or drilled pier foundations. Each SunCatcher would consist of a solar receiver heat exchanger and a closed-cycle, high-efficiency Solar Stirling engine specifically designed to convert solar power to rotary power and then drive an electrical generator to produce electricity. Supporting facilities would include an operation and administration building, a maintenance building, 3 assembly buildings, a substation, a metal canopy cover for a water treatment plant, and storage tanks for fuel and water. Ancillary facilities include an approximately 7.2-mi long water supply pipeline, and an approximately 10.4-mi long electrical transmission line supported on 85 to 100 double-circuit towers. Other improvements would include an on-site septic system, and paved and unpaved roads for site access.

Joint Environmental Document

In August 2007, the CEC and the BLM California Desert District (CDD) entered into a Memorandum of Understanding (MOU) to jointly develop the environmental analysis documentation for solar thermal projects which are under the jurisdiction of both agencies. The purpose of the MOU was to avoid duplication of staff efforts, share staff expertise and information, promote intergovernmental coordination, and facilitate public review.

The “Notice of Intent (NOI) to prepare an Environmental Impact Statement/Staff Assessment and Proposed Land Use Plan Amendment for the Proposed SES Solar Two Project, Imperial County, CA” was published by the BLM in the Federal Register (FR) on October 17, 2008. The publication of the NOI initiated the 45-day public scoping period for the project. Public information/scoping meetings were conducted jointly by the BLM and CEC on November 24, 2008, and December 18, 2008.

A joint Staff Assessment (SA)/Draft Environmental Impact Statement (Draft EIS) was prepared for the IVS Project to comply with the requirements of the California Environmental Quality Act

(CEQA) and the National Environmental Policy Act (NEPA), respectively. The SA/DEIS was circulated for agency and public review and comment between February 12, 2010 and May 28, 2010.

Final Environmental Impact Statement

Before the FEIS was issued, the project applicant made four changes to the project (list them). Those changes were applied to all of the Build Alternatives. BLM prepared a DNA (July DNA) to determine if the changes to the project required supplementation of the DEIS before the BLM finalized the FEIS. In the July DNA, the BLM determined that the existing DEIS was adequate, that the changes were within the range of alternatives analyzed in the DEIS, and that no supplementation was required. The July DNA was attached to the FEIS.

The BLM prepared the Final Environmental Impact Statement (Final EIS) for the IVS Project. The Notice of Availability (NOA) of the Final EIS was published in the FR on July 28, 2010 and the public review period for the Final EIS ended August 27, 2010. The comments received on the Draft EIS and the responses to those comments are provided in Appendix D, Responses to Comments on the Final Environmental Impact Statement. The BLM reviewed the comments on the Final EIS and determined that they did not raise any significant new circumstances or information relevant to environmental concerns associated with the IVS Project.

The United States Environmental Protection Agency (EPA) NOA of the Final EIS was issued on July 28, 2010. The Final EIS evaluated the following seven alternatives in detail:

- **IVS Project: 750 MW Alternative**. This alternative is the applicant's proposed action. It would generate 750 MW of electricity using 30,000 SunCatchers on a total of approximately 6,500 ac of land.

- **709 MW Alternative (Agency Preferred Alternative)**. The BLM Agency Preferred Alternative is a 709 MW IVS Project. It is also the U.S. Army Corps of Engineers' Least Environmentally Damaging Practicable Alternative. The selected alternative will be the subject of the BLM right-of-way grant and CDCA Plan amendment.

- **300 MW Alternative:** This alternative would generate 300 MW of electricity using 12,000 SunCatchers on approximately 2,600 ac of the total IVS Project site. This alternative would generate 40 percent of the MW of the IVS Project, on about 40 percent of the site used by the IVS Project, with 40 percent of the total SunCatchers as the IVS Project.

- **Drainage Avoidance #1 Alternative:** This alternative was developed in consultation with the United States Army Corps of Engineers (Corps) to avoid certain drainages on the IVS Project site. This alternative would generate 632 MW of electricity using 25,000 SunCatchers on approximately 4,690 ac of the total IVS Project site. It would generate 83 percent of the MW of the IVS Project, on approximately 72 percent of the site used by the IVS Project, with 83 percent of the SunCatchers of the IVS Project.

- **Drainage Avoidance #2 Alternative:** This alternative was also developed in consultation with the Corps to avoid certain drainages on the IVS Project site. This alternative would generate 423 MW of electricity using 10,240 SunCatchers on approximately 3,153 ac of the IVS Project site. This alternative would generate 56 percent of the MW of the IVS Project, on approximately 49 percent of the site, with 42 percent of the SunCatchers of the IVS Project.

- **No Action Alternative – No ROW Grant and No CDCA Plan Amendment:** Under this No Action Alternative, the BLM would not approve the ROW grant application and would not amend the CDCA Plan to allow that solar project on the IVS Project site. Because there would be no amendment to the CDCA Plan and no solar project approved for the IVS Project site under this No Action Alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. However, the site would be available for other uses that are consistent with the CDCA Plan and, in the absence of the IVS Project, other renewable energy projects may be constructed in other locations to meet State and Federal mandates.

- **Land Use Plan Amendment Alternative: No Action Alternative – No ROW Grant and Amend the CDCA Plan for No Solar:** Under this Alternative, the BLM would not approve the ROW grant application and would amend the CDCA Plan to make the IVS Project site unavailable for future solar development. Because the CDCA Plan would be amended under this alternative to make the IVS Project site unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. However, in the absence of the IVS Project, other renewable energy projects may be constructed in other locations to meet State and Federal mandates.

- **Land Use Plan Amendment Alternative: No Action Alternative – No ROW Grant and Amend the CDCA Plan for Other Solar:** Under this Alternative, the BLM would

not approve the ROW grant application and would amend the CDCA Plan to make the IVS Project site available for future solar development. Because the CDCA Plan would be amended under this alternative, it is possible that the site would be developed with the same or a different solar technology in the future.

Release of the Final EIS initiated the 30-day protest period, and a 30 day public comment period, which closed on August 27, 2010. During that period, any person who participated in the planning process and believed they would be adversely affected by the CDCA Plan amendment had the opportunity to protest the proposed amendment to the Director of the BLM. Seven formal protest letters were filed with BLM. The applicant worked with several of the protestors and that consultation resulted in modifications to the project mitigation measures. The agreed upon changes to mitigation strengthen, expand, and/or clarify certain project mitigation measures. Those changes to the project mitigation measures are evaluated in this Determination of NEPA Adequacy (October DNA).

Applicant Proposed Modifications to the Project Mitigation Measures

To resolve the protest filed in August 2010, by certain protesting parties, the applicant and the protesting parties reached agreement, and the applicant modified the POD for the project. The agreed upon modifications follow:

1.0 **Staging of Project.** IVSP proposed by Imperial Valley Solar will be developed in two Stages. For the purposes of this Agreement, Stage 1 consists of what has been called in other documents Phase 1A, Phase 1B, plus 50 MW of what has been called Phase 2. Stage 2 consists of what has been called in other documents Phase 2 minus 50 MW.

Imperial Valley Solar's Obligations. Imperial Valley Solar agrees to comply with each of the Conditions set forth in sections 2.3 and 2.4 below.

2.0 Conditions for Construction of Stage 2. The conditions that must be met before BLM will issue a Notice to Proceed to Imperial Valley Solar to proceed with Stage 2 and develop more than 350 MW of SunCatchers include and are limited to the following:

2.1 **Transmission.** Sunrise Powerlink Project is substantially constructed. The parties have agreed to define "substantially constructed" as the point in time when 70% of the total number of new transmission towers required for the Sunrise Powerlink Project have been completely erected.

2.2 **Availability.** Stage 1 has achieved 90% availability, as certified by the project's Independent Engineer. The Independent Engineer must provide to BLM certification that Stage 1 of the project has met or exceeded 90% availability at two points: 1) one year after the first power from this project is brought on line; and 2) prior to the commencement of construction of Stage 2. Commencement of construction of more than 350 MW of SunCatchers will be conditioned on certification by the Independent Engineer of the availability of more than 90% for all SunCatcher megawatts online at the time certification is made, as defined immediately below.

2.3 "Availability" is defined to mean the ratio of the number of hours that the installed SunCatchers are generating electricity divided by the number of hours that the installed SunCatchers are capable of producing energy.

2.4 "Installed SunCatchers capable of producing energy" is defined as when 1) the sun is present and delivering direct energy to the SunCatchers in excess of 350 watts/square meter; 2) site conditions are within the technical limits of the equipment (i.e., wind is less than 35 miles/hour and ambient temperature is between 14 and 122 degrees Fahrenheit; 3) the delivery point on the transmission grid is capable of receiving energy; and 4) the power purchaser is willing to take the energy.

3.0 **Flat-tailed Horned Lizard.** Imperial Valley Solar shall provide to the relevant agencies a report that evaluates FTHL mitigation measures, including whether mitigation and adaptive management measures are necessary, and any other information needed to demonstrate compliance with the measures described in the CEC's Conditions of Certification.

3.1 The Parties agree that BLM should review the report, as well as other available and relevant information, such as BLM's own monitoring of this species, should prepare a summary of the impacts to the species, and should assess the success of the various measures already required to determine whether adaptive management measures are warranted. In addition, BLM should consult with the relevant agencies, Imperial Valley Solar, and the Environmental Parties in making this determination, and should make this determination before Stage 2 commences.

3.2 Imperial Valley Solar agrees to implement adaptive management measures, if any, which the BLM and/or CEC require as a condition of compliance.

Additional Conditions. In addition to the conditions set forth above, Imperial Valley Solar agrees to the following conditions:

4.0 **Air Quality**. Imperial Valley Solar agrees to purchase and install equipment for periodic and ongoing PM10 and ozone air quality monitoring at its on-site meteorological station at the Imperial Valley Project, and to maintain this equipment throughout the life of the project until decommissioning for the purpose of providing PM10 and ozone monitoring data from this equipment to the Imperial County Air Pollution Control District (APCD). The equipment that is purchased shall satisfy applicable requirements, if any, for such equipment of the State of California Air Resources Board as of the date of Imperial Valley Solar's permit approval and shall be capable of taking readings and transmitting data to the Imperial County APCD that are at least equivalent to readings and data that the APCD acquires at its existing monitoring stations. Imperial Valley Solar will transmit these data to the Imperial County APCD in a format and at the same or greater frequency as the data provided by the APCD's existing monitoring stations as of the date of Imperial Valley Solar's permit approval. This monitoring equipment shall be added to the meteorological station as soon as it is erected or, alternatively, if the station has already been erected, prior to the start of construction.

5.0 **Water.** Imperial Valley Solar agrees to use wastewater from the Seeley Waste Water Treatment Facility (SWWTF) for all operations, including construction, at the Imperial Valley Project as soon as that water is available. The water will be considered available when all permits that are required for Imperial Valley Solar to use the treated waste water have been obtained and Imperial Valley Solar is authorized under the CEC certification to utilize the treated waste water. Imperial Valley Solar agrees to truck SWWTF water to the project site if it becomes available before the pipeline is completed for operation of IVSP, including construction, if authorized by the CEC. Imperial Valley Solar further agrees that it will not use water from the Dan Boyer Water Company (DBWC) for IVSP for more than 36 months for any purpose, including project construction and/or operations.

5.1 To mitigate for the use of groundwater from the DBWC well, Imperial Valley Solar will provide for the conservation of DBWC well water as follows:

5.2 When Imperial Valley Solar concludes its use of water from the DBWC for the Project, Imperial Valley Solar will begin immediately to purchase from the DBWC an amount of groundwater equal to the total amount used by the Project prior thereto (the "DBWC Groundwater"), and will not permit this amount of groundwater to be pumped from the well until such time as the DBWC Groundwater has been conserved as defined herein. The period of time required to conserve the DBWC Groundwater will be as short as possible subject to the restrictions included in the DBWC County Well Registration and any conditions imposed by the CEC (conservation ratio of 1:1).

5.3 Within 15 days of executing this Agreement, Imperial Valley Solar will execute an option agreement with DBWC for up to 20 months of water for conservation as defined herein. The agreement shall include an additional option to extend its terms for up to a total of 36 months.

5.4 If Imperial Valley Solar uses the DBWC water for construction or operations for more than 20 months, the conservation ratio will be 2:1 for the total number of months thereafter that the DBWC water is used – i.e., for month 21 and up to and including the last month in which DBWC is used.

5.5 Imperial Valley Solar shall submit an annual compliance report to the BLM that includes an annual summary of water sales by the DBWC which clearly differentiates between the groundwater sold to Imperial Valley Solar and the water purchased by customers other than /Imperial Valley Solar (which need not be identified and which may be collectively accounted for). This report shall also include copies of DBWC invoices to Imperial Valley Solar as documentation for the reported sales. The Parties intend that BLM use this report and the DBWC invoices for purposes of determining whether the terms of this section 2.4.2 have been met.

6.0 **Peninsular Bighorn Sheep.** To the maximum extent possible, the acquisition of land to mitigate for impacts to the Flat-tailed horned lizard will be focused on

lands which provide bighorn sheep habitat as well as Flat-tailed horned lizard habitat.

6.1 Imperial Valley Solar affirms that it will mitigate the impacts to Peninsular bighorn sheep by implementing the enhancement and restoration of Carrizo Creek and marsh as described in CEC Conditions of Certification BIO-17 and agrees that the alternative mitigation described in CEC Condition of Certification BIO-17 would be conducted only at the direction of the CEC, BLM, ACOE, USFWS and/or CDFG.

The BLM has chosen to use this DNA Worksheet as an internal administrative tool to assess the potential effects of the modifications to the project measures described above.

As noted above, the 709 MW Alternative was identified by the BLM as the Agency Preferred Alternative in the Final EIS. The Agency Preferred Alternative consists of the 709 MW IVS Project, with the modifications to the project measures described above.

B. Land Use Plan (LUP) Conformance

LUP Name* California Desert Conservation Area Plan Date Approved 1980, as amended

Other Document Western Colorado Desert Routes of Travel Designations (WECO) (amendment to the CDCA Plan) Date Approved January, 2003

- *List applicable LUPs (for example, resource management plans; activity, project, management, or program plans; or applicable amendments thereto)*

BLM lands in the CDD are governed by the CDCA Plan. The CDCA Plan, while recognizing the potential compatibility of solar generation facilities on public lands, requires that all sites associated with power generation or transmission not specifically identified in the CDCA Plan be considered through the Plan Amendment process.

The IVS Project site is currently designated as Multiple-Use Class (MUC) L (Limited Use) Designation in the CDCA Plan. The Limited Use designation is intended to protect sensitive, natural, scenic, ecological, and cultural resources values. Public lands designated Limited Use are managed to provide for multiple use of resources at a lower intensity, ensuring that sensitive values are not significantly diminished. The construction and operation of a solar generating project on the IVS Project site would require the BLM to amend the CDCA Plan

to allow wind/solar energy generating activities in the MUC L (Limited Use) on the IVS Project site.

Based on Table 1, Multiple Use Class Guidelines, in the CDCA Plan, Electrical Generation Facilities, wind/solar use types are conditionally allowed in the MUC L designation contingent on NEPA requirements being met for the proposed use. As noted above, Chapter 3, “Energy Production and Utility Corridors Element” of the CDCA Plan specifically requires that new proposed power facilities not already identified in the Plan be considered through the Plan Amendment process. The IVS Project site is not currently identified as a solar site in the CDCA Plan and, therefore, a Plan Amendment is required to include the site with solar uses as a recognized element within that Plan.

The Western Colorado Desert Routes of Travel Designations (WECO) amendment to the CDCA Plan identifies 10 open routes within the IVS Project site and construction laydown site, and 2 open routes in the vicinity of the IVS Project site and construction laydown site. According to BLM policy, open routes on the IVS Project site can be realigned or closed through a decision by the BLM Authorized Officer. Any routes outside the boundary of the IVS Project site would not need to be modified or redesignated as a result of the IVS Project. Closure of open routes on the IVS Project site would be required for the 709 MW project and the other Build Alternatives.

Under Federal law, the BLM is responsible for processing requests for ROW grant applications to authorize proposed projects such as renewable energy projects, transmission lines, and other appurtenant facilities on land it manages. Because the IVS Project is a privately initiated venture that would be sited on lands managed by the BLM, the project applicant has applied for a ROW grant from BLM pursuant to United States Department of Interior (DOI) regulations. If the ROW grant is approved by BLM, it will have conditions based on the Final EIS, the Record of Decision (ROD), and other Federal rules and regulations applicable to Federal lands. The applicant would then be able to construct and operate the proposed IVS Project on the project site.

The approval of the CDCA Plan amendment and the ROW grant application by the BLM, for the IVS Project and the project site would be authorized in accordance with Title V of the Federal Land and Management Policy Act (FLMPA of 1976), and 43 Code of Federal Regulations (CFR) Parts 1600 and 2800.

The proposed action (the IVS Project) is in conformance with the applicable LUP because it is specifically provided for in the following LUP decisions:

> The 709 MW project and the other Build Alternatives would generally conform to the CDCA Plan through the prescribed NEPA compliance, the CDCA Plan amendment process, and the ROW grant application process. The CDCA Plan recognized the potential for future renewable energy development in the CDD. The CDCA Plan requires that site specific location identification occur for solar energy uses through the Plan amendment process. The 709 MW project and all the other Build Alternatives would require a Plan amendment to locate the project in the CDCA Plan Area in the CDD. The agreed upon changes would not alter the need for a plan amendment for site identification, nor would they vary the land use plan amendment analysis since no land use change is contemplated by these changes.

C. Identify applicable National Environmental Policy Act (NEPA) documents and other related documents that cover the proposed action.

List by name and date all applicable NEPA documents that cover the proposed action.

- *Staff Assessment/Draft Environmental Impact Statement and Draft California Desert Conservation Area Plan Amendment SES Solar Two Project, Application for Certification (08-AFC-5)*, CEC and BLM (February 2010).
- *Supplement to the Imperial Valley Solar (formerly Solar Two) Application for Certification (08-AFC-5)*, URS May 2010.
- *Final Environmental Impact Statement Imperial Valley Solar Project*, BLM (July 2010).
- *Determination of NEPA Adequacy, (July, 2010)*

List by name and date other documentation relevant to the proposed action (e.g., biological assessment, biological opinion, watershed assessment, allotment evaluation, and monitoring report).

- Biological Opinion/Conference Opinion issued to the BLM on Sept 23, 2010.

D. NEPA Adequacy Criteria

1. Is the new proposed action a feature of, or essentially similar to, an alternative analyzed in the existing NEPA document(s)? Is the project within the same analysis area, or if the project location is different, are the geographic and resource conditions sufficiently similar to those analyzed in the existing NEPA document(s)? If there are differences, can you explain why they are not substantial?

YES. The proposed modifications to the project measures would strengthen, expand and/or clarify specific measures to address air quality, water, transmission and availability of electricity, PBS, and FTHL. The measures would provide for increased mitigation (air quality, water, PBS, FTHL) and/or documentation of effects during project construction and operations (transmission and availability, FTHL). The 709 MW project and the other Build Alternatives with these modified measures would be essentially the same as evaluated in the project NEPA documents. The project site and areas used for the project would be the same as evaluated in the NEPA documents. These modifications would not materially change or modify the project, its location, or the geographic and resources conditions analyzed in the project NEPA documents.

2. Is the range of alternatives analyzed in the existing NEPA document(s) appropriate with respect to the new proposed action, given current environmental concerns, interests, and resource values?

YES. The proposed modifications to the mitigation measures would not substantially alter the project location or project features, and would not change the operation or physical parameters of the 709 MW project and the other Build Alternatives analyzed in the project NEPA documents. The resource values evaluated in the project NEPA documents have not changed, nor have any adverse impacts been identified as a result of the proposed modifications to the project mitigation measures. Therefore, the modifications of the project measures for the 709 MW project and the other Build Alternatives have no effect on the range of alternatives discussed in the project NEPA documents, and would not result in the need for consideration of additional or different alternatives beyond the alternatives considered in the project NEPA documents.

3. Is the existing analysis valid in light of any new information or circumstances? Can you reasonably conclude that new information and new circumstances would not substantially change the analysis of the new preferred alternative?

YES. The existing analyses and conclusions in the project NEPA documents are valid as of September 2010. The proposed modifications to the mitigation measures would strengthen, expand, and/or clarify existing measures in the project NEPA documents which are applicable to the 709 MW project and the other Build Alternatives. There is no new information and no new

guidance that would trigger the need for additional analyses of the modifications to the project mitigation measures.

4. Are the direct, indirect, and cumulative effects that would result from implementation of the new agency preferred alternative similar (both quantitatively and qualitatively) to those analyzed in the existing NEPA document?

YES. The proposed modifications to the project mitigation measures would not result in the identification of a new agency preferred alternative. The 709 MW project and the other Build Alternatives would be essentially the same with the modified measures and, therefore, would result in the impacts already disclosed in the project NEPA documents.

5. Are the public involvement and interagency review associated with existing NEPA document(s) adequate for the current proposed action?

YES. The public and other agencies had numerous opportunities to review and provide written and public comments on the proposed action and alternatives to the proposed action. The modified measures strengthen, expand, and/or clarify measures already reviewed by the public and agencies in both the Draft and Final EISs.

E. Persons/Agencies/BLM Staff Consulted

Name	Title	Resource/Agency Represented
Jim Stobaugh	National Project Manager, Washington Office (350)	BLM
Erin Dreyfuss	Planning & Environmental Coordinator, California State Office	BLM
Christine Huard-Spencer	Senior Environmental Planner	LSA Associates, Inc.
Jane Dillon	Environmental Planner	LSA Associates, Inc.
Romi Archer	Senior Environmental Planner	LSA Associates, Inc.
Frank Haselton	Principal	LSA Associates, Inc.
Mike Trotta	Principal	LSA Associates, Inc.
Rod McLean	Associate Archaeologist	LSA Associates, Inc.

Conclusion *(If you found that one or more of these criteria is not met, you will not be able to check this box.)* [See following page.]

Based on the review documented above in this DNA and consistent with the Council on Environmental Quality guidelines at Part 1502.9, I conclude that the change in circumstances described above conform to the applicable land use plan inasmuch as the process to amend the plan remains the same for any of the action alternatives, and that the modifications are consistent with the project NEPA documentation for the 709 MW project and the other Build Alternatives, and no supplementation under NEPA is required.

Jim Stobaugh
Signature of Project Lead

Signature of NEPA Coordinator

Thomas E. Zell AUTHG
Signature of the Responsible Official:

9/28/2010
Date

Note: The signed Conclusion on this Worksheet is part of an interim step in the BLM's internal decision process and does not constitute an appealable decision.