SES Solar Two, LLC
Application for Certification
Supplemental Cumulative Analysis

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1.0 INTRODUCTION

1.1 INTRODUCTION TO SUPPLEMENTAL CUMULATIVE ANALYSIS

This supplement to the Application for Certification (AFC) for the Stirling Energy Systems, LLC Solar Two Project (Project) is designed to provide additional data and analysis supporting the cumulative impact assessment in the AFC submitted in June 2008. This analysis is based on discussion and findings from the staff workshop to discuss potential alternatives and cumulative impacts held on February 10, 2009.

The purpose of cumulative impact analysis in Section 5.18 of the AFC is to identify past, present, and reasonably foreseeable actions in the vicinity of the Project and its ancillary systems that could affect the same resources, and provide the following analysis:

- Determine if the effects of the Project and the other actions would overlap in time or geographic extent;
- Determine if the effects of the Project would interact with, or intensify, the effects of the other actions; and
- Identify any potentially significant cumulative effects.

Where potentially significant effects were identified for the Project, an assessment of cumulative effects was provided under each respective resource in Section 5.18 (Environmental Information) of the AFC.

This supplemental analysis expands the geographic area considered for past, present, and reasonably foreseeable development surrounding the proposed Project location to more thoroughly examine Project effects that could be "cumulatively considerable". The analysis also includes some data that were not available or incomplete in the AFC as well as further specification for parameters that could be used to measure significance of potential effects. The additional data allows better definition of reasonable foreseeable future actions and specific conclusions regarding significance of cumulative impacts than was possible with the data available at the time the analysis was completed for the AFC.

This supplemental cumulative analysis covers the following:

1. Past, Present, and Reasonably Foreseeable Future Actions - a description of the projects and development actions that are considered in the cumulative impact analysis. The geographic scope of the area considered varies by resource, but is generally expanded from the AFC. Tables and maps are included to illustrate actions and explain assumptions regarding future development.

2. Supplemental Cumulative Impact Analysis for each resource except Cultural and Paleontological whose final impact analysis is not complete. Each resource analysis covers geographic scope of past, present, and reasonable foreseeable future actions, parameters that can be used to measure significance of impacts, and supporting data and analysis for determining significant cumulative impacts. A more detailed analysis was conducted for Land Use, Socioeconomics, Biological Resources and Visual Resources because these resources were considered to be more likely to have significant cumulative effects. The remaining resources were analyzed specifically to determine if there would be a difference from the conclusions in the AFC by using

the updated reasonable foreseeable development forecast created for this supplement.

1.2 PAST, PRESENT AND FUTURE ACTIONS IN THE PROJECT VICINITY

The cumulative impact analysis included in the AFC considers actions within a 10-mile radius of the Project location. These actions and associated maps are identified in the following tables and figures in the AFC:

- Table 5.18-2 Past Actions
- Table 5.18-3 Pending BLM Applications for Energy Projects Near the Project and Other Reasonably Foreseeable Future Projects Within 10-Mile Boundary of Project Site
- Table 5.18-4 Imperial County Large-Scale Development Permits Within 10-Mile Boundary of Project Site
- Table 5.18-5 BLM Right-of-Way (ROW) Permits Within 10-Mile Boundary of Project Site
- Figure 5.18-1 Reasonably Foreseeable Project Boundary Map
- Figure 5.18-2 Pending BLM Applications

This supplemental cumulative impact analysis varies the geographic scope of past, present, and reasonably foreseeable future actions by resource depending on the geographic and temporal characteristics of potential impacts. For example, the geographic scope of cumulative socioeconomic effects is determined by the extent of the commute distance for workers. The geographic scope of cumulative visual effects is determined by the extent of the viewshed for the Project. Past and present development for this supplemental cumulative analysis is illustrated in Figure 1 General Zoning Plan (Attachment A – Project Maps). Figure 1 shows the general zoning plans for Imperial County as well as public land designations such as the US Naval Air Facilities, Wilderness Areas, and Areas of Critical Environmental Concern (ACEC). Figure 1 is based on GIS data from Imperial County, BLM and other land managers.

Future urban expansion in Imperial County is mapped in Figure 2 Projected Urban Development (Attachment A - Project Maps) from a recent analysis by the California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program (Cal DLRP [2009]). The results of the analysis include a series of baseline population and urban growth projections for California's 38 urban counties through 2100 in map and table form. The projections are based on extrapolations of current population and urban development trends. In that study, urban development is defined by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. The particular types of development represented by this urban development include residential, industrial, commercial, institutional facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, and water control structures.

In the supplemental cumulative analysis, results from the Cal DLRP study are used to illustrate past, present and future urban development from 1984 to 2020 in the region. Instead of identifying individual housing developments or proposed commercial buildings as in the AFC (Table 5.18-4), the urban development forecast was used to define the past, present, and future geographic extent of “urban” types of development in a generic sense. These generic data are suitable for most resources but had to be further refined for visual

impact assessment and combined with demographic data for the socioeconomic impact analysis as described in the resource analysis sections below.

Reasonably foreseeable future actions for this supplemental cumulative analysis and expanded geographic area are based on data developed for the recently drafted Renewable Energy Transmission Initiative (RETI) Phase IB study (RETI 2009). RETI is a collaborative stakeholder planning process initiated as a joint effort among the California Public Utilities Commission (CPUC), the California Energy Commission (Energy Commission), and the California Independent System Operator (CAISO), together with publicly owned and investor owned utilities. The goal of RETI's work is to identify major upgrades to California's electric transmission system needed to access competitive renewable energy zones (CREZs) sufficient to meet the state's renewable energy target. The RETI renewable energy target is the amount of additional renewable energy needed to provide 33 percent of California's electric energy consumption in the year 2020.

The major difference between the list of BLM Right-of-way (ROW) applications used in cumulative analysis for the AFC (Table 5.18-5) and the RETI data is that the RETI incorporates a screening analysis that further refines the list of possible power projects by indirectly estimating the likelihood that a project will actually get built. The RETI screening process considers the environmental constraints that restrict power project locations as well as the estimated cost to generate renewable power from a suitable location within a CREZ. The CREZs are ranked by estimated costs and those CREZs with the lowest cost renewable power are expected to supply more power and require more transmission capacity than other CREZs. Note that the RETI study considers supply options in Nevada, Arizona, and Mexico.

The renewable energy power resources and associated transmission and collector lines that were determined by the RETI screening analysis to be included in the CREZs surrounding the Project were included in this supplemental cumulative analysis. Specifically, the generation and transmission resources identified for the Imperial North CREZ, Imperial South CREZ, San Diego South CREZ, and Out-of-State Baja sub-CREZ were included in the Reasonably Foreseeable Development data set. These resources are listed in Table 1-1 and mapped in Figure 3 in Attachment A – Project Maps.

Overall, this supplemental cumulative analysis differs from the AFC cumulative analysis by considering a set of renewable energy power projects and associated transmission lines that are likely to be constructed in the area surrounding the Solar Two site by 2020. This supplemental analysis also differs in that the power resource project boundaries are not defined specifically. The RETI does not endorse or define any specific projects or transmission routing. Rather, a proposed project is included in the RETI as a generic renewable energy resource with the capacity and location that meet the RETI economic and environmental screening criteria. Similar to the urban development data shown in Figure 2 (Attachment A), this generic data is generally sufficient for estimating cumulative impacts for most resources in this supplemental report, but may require more definition for estimating cumulative effects to some resources such as visual resources.

Table 1-1. Reasonable, foreseeable development in Project area.

Type of Project[1]	Estimated Footprint (Acres)	MW	Map ID
Solar Thermal Electric	1276	200	ST1
Solar Thermal Electric	1276	200	ST2
Solar Thermal Electric	1276	200	ST3
Solar Thermal Electric	1277	200	ST4
Solar Thermal Electric	1277	200	ST5
Solar Thermal Electric	1277	200	ST6
Solar Photovoltaic	159	20	PV1
Solar Photovoltaic	159	20	PV2
Solar Photovoltaic	159	20	PV3
Solar Photovoltaic	159	20	PV4
Solar Photovoltaic	159	20	PV5
Solar Photovoltaic	159	20	PV6
Solar Photovoltaic	159	20	PV7
Solar Photovoltaic	159	20	PV8
Solar Photovoltaic	159	20	PV9
Solar Photovoltaic	159	20	PV10
Solar Photovoltaic	159	20	PV11
Solar Photovoltaic	159	20	PV12
Solar Photovoltaic	159	20	PV13
Solar Photovoltaic	159	20	PV14
Solar Photovoltaic	159	20	PV15
Wind	6270	45	W1
Wind	7112	216	W2
Wind	4923	161	W3
Wind	5087	113	W4
Wind	7467	188	W5
Wind – Baja Norte	34581	764	BW1
Wind – Baja Norte	36599	973	BW2
Wind – Baja Norte	70821	707	BW3
Wind – Baja Norte	32603	449	BW4
Wind – Baja Norte	42753	573	BW5
Wind – Baja Norte	34247	631	BW6
Geothermal	80	160	G1
Geothermal	10	32	G2
Geothermal	640	1170	G3
Biomass	10	36	B1
Transmission Collector Line	29		CL1
Transmission Collector Line	19		CL2
Transmission Collector Line	12		CL3
Transmission Collector Line	16		CL4
Transmission Collector Line	19		CL5
Transmission Collector Line	35		CL6
Transmission Collector Line	81		CL7
Transmission Collector Line	82		CL8
Transmission Collector Line	91		CL9
Transmission Collector Line	76		CL10
Transmission Collector Line	101		CL11
Transmission Collector Line	57		CL12
Transmission Collector Line	51		CL13
Transmission Collector Line	67		CL14
Transmission Collector Line	42		CL15
Transmission Collector Line	122		CL16

Transmission Collector Line	191		CL17
Transmission Collector Line	120		CL18
Transmission Collector Line	158		CL19
Transmission Collector Line	159		CL20
Transmission Trunk Line	238		TL1
Transmission Trunk Line	173		TL2
Transmission Trunk Line	211		TL3
Transmission Trunk Line	381		TL4
Transmission Trunk Line	122		TL5
Transmission Trunk Line	738		TL6
Collector Substation	10		CS1
Collector Substation	10		CS2
Collector Substation	10		CS3
Collector Substation	10		CS4
Collector Substation	10		CS5
Solar Two	6183	750	Project
Total Renewable Excluding Baja Norte Wind	**52,500**	7718	
Wind Zero Training Facility	1070		WZ
Urban Development 2020	43,900		Green Yellow Red

[1]Sources: RETI 2009, Cal DLRP 2009, Wind Zero 2009.

2.0 AIR QUALITY

2.1 INTRODUCTION

The potential impacts to air quality from the Project are primarily related to dust generated by equipment and vehicle operations. The cumulative analysis in the AFC found that because such a large area would be disturbed there is a measurable possibility of significant air quality impacts during construction. However, because the emissions would be short term and mitigated, they are unlikely to contribute to significant effects. Furthermore, during the operation and maintenance of the Project, emissions of air pollutants would come from vehicles moving through the site to conduct maintenance and cleaning of the solar collectors. Because these are all intermittent sources and because the Project would have best management practices in place to reduce emissions, these effects are likely to be below a level of significance.

According to the AFC, "Past and present activities within the region that have contributed to effects on air quality include other construction projects (e.g., commercial and residential developments involving multiple acres), Naval Air Facility El Centro flight operations (i.e., emissions from aircraft), infrastructure improvements (i.e., highway construction), and OHV use. Each of these activities is expected to continue in the future. The combination of past, present, and future activities are likely to contribute to increased particulates and emissions within the Project area." Considering the potential off-site development associated with the RETI projects and cumulative urban development forecasted by 2020, there could be significant changes to air quality in the air basin surrounding the Project site. Given the potential dust and air emissions from Solar Two that could be "additive" to reasonable foreseeable development, we focus the supplemental cumulative analysis on dust and vehicle emissions.

2.2 SIGNIFICANCE CRITERIA

The criteria used to determine significant air quality impacts are based on air model determinations of how criteria emissions levels from the Project would cause or contribute significantly to a violation of a California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS). The Imperial County Air Pollution Control District (ICAPCD) is the primary agency responsible for planning, implementing, and enforcing federal and State air quality standards in Imperial County. The ICAPCD established an attainment plan for PM_{10} in 1993 (PM_{10} State Implementation Plan [SIP]) and updated the plan in 2005 with Regulation VIII rules that include the "best available control measures" for control of windblown particulate matter and particulate matter from travel on unpaved roads across Imperial County. The ICAPCD also oversees a Natural Events Action Plan that allows the ICAPCD to document and take into account high PM_{10} concentrations caused by qualified natural events, such as windstorms and wildfires. The Regulation VIII Rules and the Natural Events Action Plan are part of the regional plan to comply with PM_{10} standards. ICAPCD also maintains and implements an ozone attainment plan that depends on the State Implementation Plan to achieve reductions of ozone precursors from mobile sources.

2.3 GEOGRAPHIC AND TEMPORAL PARAMETERS

The Imperial Valley/Salton Sea Air Basin includes Imperial County and portions of Riverside County. This air basin encompasses the past, present, and reasonable foreseeable development (including RETI project and future urban development) surrounding the Project site. The major source of particulate matter in Imperial Valley is fugitive windblown dust, with other contributions from entrained road dust, farming, and construction activities.

In August 2004, the United States Environmental Protection Agency (USEPA) proposed to reclassify the Imperial Valley from a moderate to a serious PM_{10} nonattainment area based on monitor readings that exceeded the 24-hour PM_{10} standard. In December 2007, the USEPA finalized the reclassification and required the State to submit an air quality plan that demonstrates that the Imperial Valley air basin will attain the PM_{10} standard. Since the area was designated as nonattainment for PM_{10} Imperial County government agencies and industry groups private and public stakeholders, along with the ICAPCD have proactively worked to reduce PM_{10} emissions to bring the Imperial Valley into compliance with the federal NAAQS. These efforts resulted in amendments to Regulation VIII Best Available Control Methods (BACM) in 2005 and a draft State Implementation Plan (SIP) for PM_{10} in January 2009. There was only a working review copy of the draft SIP at the time of this analysis and it could not be cited or quoted.

2.4 CUMULATIVE AIR QUALITY EFFECTS

The amended Regulation VIII BACM requirements and the new SIP regulations will likely change the allowable emissions for future development in the Imperial Valley. Furthermore, future RETI projects (including Solar Two) and urban development will be required to meet the revised BACM requirements. Even though measurable renewable energy and urban development is forecasted within the Imperial Valley, it will be required to occur in such a manner as to achieve and keep the Imperial Valley air basin in attainment with Federal PM_{10} NAAQS. Therefore, it is unlikely that there would be significant cumulative air quality effects from the Project.

3.0 GEOLOGIC HAZARDS AND RESOURCES

3.1 INTRODUCTION

Geologic hazards are generally not affected by project development activities instead the project development activities are impacted by geologic hazards. The primary geologic hazard that has potential to affect Project development activities is ground motion from a seismic event. A discussion of the potential for seismic activities in the Project area is included in AFC Section 5.3.

Geologic resources can be affected by Project development because it can restrict access or development of sub-surface minerals located beneath surface activities such as renewable energy and transmission line projects. Significant impacts can occur if long term leasing or permanent structures preclude development of known mineral deposits.

3.2 SIGNIFICANCE CRITERIA

Geologic hazards have the potential to impact the Project features through the effects of seismic shaking (ground motion) and surface rupture or surface displacement. These naturally occurring phenomena would not be enhanced or caused by any of the Project features. Seismic activity has the potential to cause damage to the Project features depending on the location and intensity of the seismic event.

Construction activities associated with site preparation (clearing and grading of surface features) would cause localized modification to site topography. The Project construction activities would not require re-routing of any washes or arroyos within the Project area. Based on the generally flat terrain associated with the proposed Project area the amount of cut and fill required for any specific location would be 'minor' according to the AFC although term 'minor' is explicitly not defined.

The long term leasing of the Project area for renewable energy generation would preclude the development of mineral resources within the Project area.

The following criteria may be considered in assessing the cumulative impacts of the proposed Project in combination with potential effects from past, present, and reasonably foreseeable future projects on mineral resources.

- Preclude the development of a known mineral resource that would be of value to residents and or the region.
- Preclude the development of a known mineral resource that has been mapped on a land use plan.

The criteria are specified in CEQA Environmental Checklist Form (CEQA Appendix G) which considers environmental factors in determining impacts.

3.3 CUMULATIVE GEOLOGIC HAZARD AND RESOURCE IMPACTS

With respect to geologic hazards, the expansion of the reasonable foreseeable development to include urban development and RETI resources does not change the analysis included in the AFC. These development activities would be located on the surface and would not affect mineral resources beneath the ground surface.

Mineral resources and existing mineral leases on BLM lands within the proposed Project area and adjacent areas was included in the Geologic Hazards and Resources section of the AFC Section 5.3. It was concluded from the review of the USGS data for mining resources that the Project would not have a significant effect on geologic resources of the region.

4.0 SOILS

4.1 INTRODUCTION

The topography of Imperial County is generally flat, with low levels of natural erosion. Erosion is dependent on texture, moisture content, and agronomic practices. Lacustrine basin soils in the Imperial County area formed on nearly flat ancient lakebeds near prehistoric Lake Cahuilla. The soils in Imperial County generally consist of silty clays, silty clay loams, and clay loams; are deep and highly calcareous; and usually contain gypsum and soluble salts.

Soils within Imperial County have no potential for farming unless irrigated, because of the very dry climate (AFC 2008). Soil types near the proposed Project are described and mapped to the level of soil association for the AFC. The location and properties of the soil associations are based on interpretation of the State Soil Geographic Database (STATSGO) prepared by the Natural Resources Conservation Service (NRCS 1995) with data from the Soil Data Mart.

4.2 SIGNIFICANCE CRITERIA

The criterion used for determining significance of effects to soil resources in the California Environmental Quality Act (CEQA), Appendix G, is that the Project results in substantial soil erosion or loss of topsoil, degradation of soils or farmland, changes in topography, or unstable soil conditions.

4.3 GEOGRAPHIC AND TEMPORAL PARAMETERS

The geographic scope for soil resources includes the soil map units that underlie the proposed Project extended to their farthest connected extent from the Project area. This includes three soil associations, Rositas-Carrizo-Orita [MU s994], Badland-Beeline-Rillito [MU s995], and Meloland-Vint-Indio [MU s996], as defined in Tables 5.4-1 and 5.4-2 of the AFC. The geographic scope includes about 237,600 acres of all three soils types (see Figure Soils-1 in Attachment C).

Table 4-1 shows the past, present, and future projects identified as occurring within the soil resources cumulative analysis area as show in Figure Soils-1 (Attachment C).

Table 4-1. Soil associations and acreage for the past, present, and reasonably foreseeable projects within the soils geographic scope.

	Soil Associations and Map Units (MU)		
	Rositas-Carrizo-Orita [MU s994] (Acres)	Badland-Beeline-Rillito [MU s995] (Acres)	Meloland-Vint-Indio [MU s996] (Acres)
Type of Project			
Past and Present			
OHV Trails (Open and Closed) (5-foot corridor)	400	50	100
Roads (US, State, County) (100 foot corridor)	600	0	100
Open ATV Trails	300	20	30
Plaster City OHV Area	17,300	0	3,700
Naval Ranges	21,800	0	600
Proposed Project			
Solar Two	5,539	0	644
RETI Projects			
Solar – PV	200	0	300
Solar – Thermal	3,500	500	2,200
Wind	6,300	0	0
Proposed transmission lines (100-foot corridor)	500	4	500
Future development			
Wind Zero Training Facility	1,100	0	0
2020 Development plan	300	0	900

4.4 CUMULATIVE SOIL EFFECTS

Construction-related effects to soil resources associated with the development of the Project primarily involve vegetation removal, excavation, grading, and temporary stockpiling. Section 5.4.2.1 of the AFC outlines the potential effects to soils within the Project area from Project construction and operation.

Potential cumulative effects to soils in combination with past, present, and future actions would include erosion and sediment runoff during construction. Table 4-1 lists the soil associations and acreage for the past, present, and reasonably foreseeable projects with the geographic scope. The potential for impacts to soil resources to combine with similar effects of off-site development would occur only if other projects were implemented in the same area coincident with the Project. Furthermore Best Management Practice (BMP) measures are expected to be implemented to reduce or prevent erosion impacts during construction within the Project area and at other project locations. Therefore impacts from the proposed Project are not expected to combine with similar effects from other projects to result in significant effects to soil resources.

5.0 WATER RESOURCES

5.1 INTRODUCTION

The proposed Project lies within the southeastern part of the Colorado Desert Hydrologic Region, which covers approximately 1,870 square miles in Southern California. More specifically, the proposed Project lies within the Brawley Hydrologic Area and is immediately adjacent to the Coyote Wells Hydrologic Area. It is located predominately within the Coyote Wells Valley Groundwater Basin with additional portions of the site lying in the Imperial Valley Groundwater Basin (see Water-1 Figure in Attachment C). The groundwater basins are explained in detail in section 5.5.1.2 of the AFC.

A number of well-defined ephemeral washes cross the proposed Project area and off-site transmission line. These washes are primarily erosion features created by runoff from large scale flood events, and are not representative of riverine features supporting aquatic life or functions and do not support any riparian vegetation or habitat. No open water or intermittent or perennial water resources have been identified in the Project area (AFC 2008).

5.2 SIGNIFICANCE CRITERIA

Significance criteria are based on those listed in CEQA Appendix G, modified to be applicable and relevant to anticipated impacts of the Project. Hydrology and water resources impacts would be significant if the Project would:

- Violate any water quality standards or waste discharge requirements, create new sources of polluted runoff, or otherwise substantially degrade water quality.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted).
- Place within a watercourse or flood hazard area structures that would impede or redirect flood flows, or otherwise substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite/offsite.
- Substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite/offsite, or otherwise create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems.
- Any of the following effects to or within jurisdictional wetland and/or riparian habitats as defined by United States Army Corps of Engineers (USACE), The California Department of Fish and Game (CDFG) or local jurisdictions: removal of vegetation; grading; obstruction or diversion of water flow; adverse change in velocity, siltation, volume of flow, or runoff rate; placement of fill; construction of a road crossing; placement of culverts, other structures, or other underground piping; any disturbance of

the substratum; and/or any activity that may cause an adverse change in native species composition, diversity, or abundance.

5.3 GEOGRAPHIC AND TEMPORAL PARAMETERS

The geographic scope for water resources includes all of the dry washes that run through the proposed Project area as depicted by the National Hydrographic Dataset (NHD) "bluelines." This database provides mapping for surface water features for the United States (USGS 2008). Within the proposed Project area, ephemeral streams were the only features identified in the NHD. The geographic scope for the Project cumulative analysis area includes these ephemeral streams from where they originate upstream of the Project area to where they drain into the canal system of the Imperial Valley. Since groundwater recharge regions are not currently available for this area, the same geographic scope used for surface water features was used to evaluate groundwater resources. The entire cumulative analysis area for water resources includes approximately 57,000 acres (see Water-1 Map in Attachment C).

Table 5-1 shows the past, present, and future projects identified as occurring within the cumulative analysis area as shown in Water-1 Map (Attachment C).

Table 5-1. Past, present, and reasonably foreseeable future projects within the surface and groundwater cumulative analysis area.

Type of Project	Length of NHD "Bluelines" in Project Areas (miles)	Area in NHD "Bluelines" Potentially Affected by Projects (acres)[1,2]
Past and Present		
OHV Trails (Open and Closed) (5-foot corridor)	0.5	4.4
Roads (US, State, County) (100 foot corridor)	0.03	0.3
Open ATV Trails	0.3	2.8
Plaster City OHV Area	0.5	4.4
Total Past and Present	**1.2**	**11.8**
Proposed Project		
Solar Two	11.2	268
Future Projects		
RETI Projects		
Solar – PV	0.6	5.4
Solar – Thermal	6.2	60.1
Proposed transmission lines (100-foot corridor)	0.3	3.1
Other Future development		
2020 Development plan	0.6	5.4
Total future projects	7.6	74.1
Cumulative Total	**20.1**	**353.9**

[1]Acreages determined by multiplying the length (miles) of blueline water features found in each Project area by 5,280 feet in a mile by an approximate average width of 80 feet for each feature and dividing this number by 43,560 square feet in an acre.
[2]Acreage for the Solar Two Project was determined using the baseline survey of all the ephemeral streambeds within the Project area (AFC 2008).

5.4 CUMULATIVE WATER EFFECTS

The proposed Project would obtain water from an off-site waterline and is not expected to use groundwater wells for construction, operation, and maintenance water supplies. This is because the Coyote Wells Valley Groundwater Basin is already in a water overdraft deficient status (CDWR 2004). However, in emergency situations, SES may use groundwater for operation and maintenance. In addition, the proposed Project would discharge water directly to the ground from routine monthly cleaning of the SunCatchers and is anticipated to use only 14.2 acre-feet of water per year for that purpose. Wash water would not contain contaminants or pollutants that could affect water quality within the underlying groundwater aquifers.

The use of water from Seeley, CA is in compliance with the State water use policy (State Water Resources Control Board, Resolution 75-58 and CEC Integrated Energy Policy Report Proceeding [04-IEPR-01E]).

The groundwater aquifers located beneath the Project area lie more than 40 feet beneath the surface. This depth is greater than any anticipated excavation required for Solar Two or other future projects identified as occurring in the cumulative analysis area. Also, the proposed Project does not plan to use groundwater as a source of water, so it would not deplete the Coyote Wells Valley or Imperial Valley Groundwater Basins. Reasonably foreseeable future projects have the potential to impact groundwater aquifers depending on their individual construction plans and how they intend to obtain water for operation.

The proposed Project would not locate any SunCatchers within ephemeral streambeds found on the Project site. However, these dry washes may be impacted by the placement of access roads and utility lines in these areas. A report, the *Review of Federal and State Surface Waters for the Stirling Energy Systems Solar Two Project*, was prepared by URS and sent to the USACE in February 2009 to obtain a determination from the USACE on the jurisdictional status of the ephemeral streambeds within the Project area. This determination is pending of March 2009.

The CDFG also regulates surface water features within the State of California according to Sections 1600-1609 of the Fish and Game Code. The AFC finds that the CDFG routinely asserts jurisdiction on areas demonstrating a minimum of one of three parameters: (1) a dominance of hydrophytic vegetation, (2) hydric soils, or (3) wetland hydrology. CDFG has indicated that a Stream Bed Alteration Agreement would be required if the channels onsite are to be modified.

Section 5.5.1.8 of the AFC identifies limited portions of the Project area that are located within the Federal Emergency Management Agency's (FEMA) 100-year floodplain. Figure 5.5.3 of the AFC maps these areas and the floodplains are completely adjacent to the larger dry wash that drains east along Evan Hewes Highway off of the Project site. SES does not plan to place any SunCatchers in the dry washes and would develop access roads and utility corridors in such a manner that would not impact the 100-year floodplain.

The Project could impact up to about 11 miles or 270 acres of dry washes within its proposed boundaries from the placement of access roads or utility lines within these areas. The Project would impact a small percentage of the overall 6,183 acres with the exact acreage determined when the construction plan is finalized. Other past and future projects identified in the cumulative analysis area would impact, if is assumed that all areas have been or would be affected, an additional 9 miles of dry washes during their construction and operation activities for a total of 86 acres of dry wash areas potentially affected by past,

present, and future projects. These dry washes do not support much if any riparian vegetation and flow only during large flood events. Proper placement of BMP mitigation measures, such as erosion and sediment control devices, would protect these dry washes from increased siltation and/or erosion from Project activities. After the federal and state jurisdictional status of the dry washes is determined, a restoration and/or compensation plan for impacts to the dry washes would be established and submitted to the USACE or CDFG.

6.0 BIOLOGICAL RESOURCES

6.1 INTRODUCTION

The Biological Resources analysis is divided into two sections: General Vegetation/Wildlife and Sensitive Species. The sensitive species chapter is further subdivided into analysis on the flat-tailed horned lizard (FTHL), burrowing owl, migrating birds, and wintering and resident birds. In this report, bird species protected under the Migratory Bird Treaty Act (MBTA) were divided into birds that migrate over the area using the Pacific Flyway and stopover at the Salton Sea 20 miles north of the Project area (migrating birds) and birds that would use the Project area either as a resident or wintering bird. This analysis corresponds to sections 5.6 (Biological Resources) and 5.18 (Cumulative Effects) and Appendix Y (Biological Resources Technical Report) of the AFC.

6.2 GENERAL VEGETATION AND WILDLIFE

The Project's cumulative analysis area for general vegetation and wildlife habitat is located in the Colorado Desert bio-geographic province in gently rolling open terrain dominated by desert scrub vegetation. The Colorado Desert is the western portion of the larger Sonoran Desert that extends across the southwest United States and into Mexico. Perennial and intermittent rivers and streams are rare in this area, and most water flow occurs as ephemeral flash flood flows within defined washes and less defined flood-flow paths during rare major winter rain events (AFC 2008).

Habitats in this region of the Colorado Desert vary with the landscape and availability of water. The Project and associated cumulative analysis area for biological resources is located on the southern extent of the Imperial Valley, with irrigated agricultural lands generally located along the eastern half of the Imperial Valley and undeveloped natural communities located in the western half of the Imperial Valley. Sonoran-Mojave Creosote Bush-White Bursage Desert Shrubland communities, desert pavement, and ephemeral washes dominate the landscape in the undeveloped portions of the Imperial Valley (GAP Analysis 2008). Interstate-8 bisects the cumulative analysis area and Off Highway Vehicle (OHV) trails are common in the undeveloped areas. Vegetation density in the area ranges from sparse, low-growing grasses and shrubs such as creosote in the wide, flat desert basins to virtually non-existent in areas of high OHV use.

Section 3.2.2 of Appendix Y of the Application for Certification (AFC) for the Project describes common wildlife species found in the general Project area. A list of species observed in the vicinity of the Project is provided in Wildlife Species List, Appendix Y of the AFC. Additional information on general wildlife species for the cumulative analysis area, including a checklist of mammal species recorded for Imperial County, is available at the San Diego Natural History Museum's website at: http://www.sdnhm.org/research/birds/impmamm.ht. A copy of the checklist is also provided as Attachment B with this report.

6.2.1 Project Effects Identified in the AFC for General Vegetation and Wildlife Habitat

The AFC identified the following effects to general vegetation and wildlife habitat that could occur as a result of implementation of the Project:

- Direct and indirect effects to approximately 6,183 acres of native habitat (exclusive of the proposed transmission line and water pipeline ROWs.
- A substantial reduction in the carrying capacity of the site for common wildlife species with specific habitat requirements (e.g., California horned lark).
- The AFC indicated that the Project was located outside of wildlife management areas and would therefore not contribute to significant cumulative effects. Portions of the proposed transmission line are located within the Yuha Desert Management Area for the FTHL. However, the proposed transmission line would be adjacent to an existing transmission line, so the only new disturbance would be for the installation of the towers. No new access roads would be necessary.

6.2.2 Significance Criteria

The following criteria may be considered in assessing the impacts of the proposed Project combined with potential effects from past, present, and reasonably foreseeable future projects on general vegetation and wildlife habitat. These criteria are adapted from the CEQA Appendix G Guidelines and BLM's California Desert Conservation Plan and include:

- Direct removal of habitat or the fragmentation of habitat.
- Impacts that would affect the number, range, or regional long-term survival of wildlife species.
- Impacts that prevent wildlife access to foraging habitat, breeding habitat, water sources, or other areas necessary for their survival and reproduction.
- Impacts that interfere with connectivity between blocks of habitat, or block or interfere with a local or regional wildlife corridor or linkage, or impede the use of native wildlife nursery sites.
- Project-related construction, grading, clearing, or other activities that would temporarily or permanently remove sensitive native or naturalized habitat.
- Introduction of exotic species that could substantially adversely affect native vegetation communities.
- Impacts to unique or biologically sensitive vegetative communities or wildlife habitat.

6.2.3 Geographic Extent of the Cumulative Analysis Area

The cumulative analysis area for general vegetation and wildlife habitat is centered on the West Mesa section of the Imperial Valley, California, where natural biological communities are generally characterized by Sonoran Desert shrublands and sparsely vegetated desert pavement. The geographic scope for the general vegetation and wildlife habitat cumulative impacts analysis includes the proposed Project area, the desert environment that extends west from the Project boundaries to the Fish Creek Mountains and the area that extends

east from the Project area to the western edge of the extensive agricultural fields located in the Imperial Valley (Bio-1 Map, Attachment C).

At the request of BLM and USFWS biologists, the cumulative analysis area also extends north and south to include the Yuha Desert and West Mesa Management Areas (MA) (Grant 2009 and Stewart 2009).

The Yuha Desert ACEC is approximately 40,600 acres and lies west of the agricultural center of Imperial County, off of SR98 and south of Interstate-8 and the proposed Project site. It runs from the Jacumba Wilderness Area to the West Side Main Canal near El Centro, and south from Plaster City to Mexico's Mount Signal. It includes several large, sandy desert washes, expanses of desert pavement and gravel, and dry mud flats and hills. The Yuha ACEC is one of four flat-tailed horned lizard (FTHL) management areas located in California; three are in southern Imperial County, and one is located in the Borrego Badlands of Anza-Borrego Desert State Park. One of the most extensive and least disturbed stands of the rare plant, crucifixion thorn (*Castela emoryi*), is located in the Yuha Desert MA. Several other unique attractions are located in this ACEC, including the Juan Bautista de Anza National Historic Trail, geoglyphs created by Native Americans, oyster shell beds, and the Yuha Well (Sunrise Powerlink 2009).

The West Mesa ACEC covers over 136,100 acres of BLM land north of Interstate-8 in the western portion of Imperial County north of the proposed Project area. The West Mesa MA was established in 1997 to protect the FTHL. It has areas of dry mud flats and hills, areas of sandy or gravely substrate, and deeply cut washes. Much of the West Mesa MA is part of the Essential Habitat Recovery Region for the peninsular population of desert bighorn sheep (Sunrise Powerlink 2009).

Most of the three main biological community types identified in the vegetation and wildlife habitat cumulative analysis area (Sonora-Mojave Creosotebush-White Bursage Desert Shrubland, North American Warm Desert Pavement, and North American Warm Desert Wash) are generally continuous from the southern extent of the Yuha Desert MA to the northern extent of the West Mesa MA (GAP Analysis 2008). Gap Analysis Program (GAP) created a new vegetation map with more detailed vegetation types for California in December, 2008 that was not available when the initial AFC was created.

Bio-1 Map (Attachment C) provided with this supplement portrays the almost 322,000-acre extent of the Project's cumulative analysis area boundaries identified for general vegetation and wildlife habitat.

6.2.4 Past, Present, and Future Projects Considered

The past, present and reasonably foreseeable future projects considered in association with the Project have been identified in Table 1-1. Projects from that list that lie within the boundaries of the general vegetation and wildlife habitat cumulative analysis area as presented in Bio-1 Map (Attachment C) are summarized below in Table 6-1.

Table 6-1. Past, present, and reasonably foreseeable future projects identified within the General Vegetation and Wildlife Habitat Cumulative Analysis Area.

Type of Project	Length (miles)	Area (acres)
Past and Present Developments		
OHV Trails (Open and Closed) (5-foot corridor)	1,115	700
Roads (US, State, County) (100-foot corridor)	153	700
Open ATV Trails (5-foot corridor)	618	400
Plaster City OHV Area	N/A	24,800
Naval Ranges	N/A	29,500
Proposed Project		
Solar Two	N/A	6,183
Reasonably Foreseeable Future Projects		
RETI Projects		
Solar – Photovoltaic	N/A	300
Solar – Thermal	N/A	9,100
Wind	N/A	6,300
Proposed transmission lines (100-foot corridor)	81	1,000
Other Future Development		
Wind Zero Training Facility	N/A	1,100
2020 Urban Development	N/A	1,200

6.2.5 Cumulative Analysis Data

To assist in identifying potential cumulative effects to general vegetation and wildlife habitat, we prepared Tables 6-2, 6-3, and 6-4, that list the various biological communities located in the cumulative analysis area as identified through GAP analysis (GAP Analysis 2008) in association with past, present, and reasonably foreseeable developments located within the adopted cumulative analysis boundary as identified in Bio-1 Map (Attachment C). GAP analysis mapped the vegetation of California in December, 2008 based upon digital imagery and classified the communities based upon the dominant species.

Baseline surveys for the AFC mapped the vegetation for the Project area using the Holland Code (AFC 2008) and observed only one vegetation community: Sonoran creosote bush scrub. The GAP analysis uses a different classification system that mapped two different desert vegetation communities for the Project area (North American Warm Desert Pavement and Sonora-Mojave Creosotebush-White Bursage Desert Shrubland). Both of the vegetation communities would be contained within the Sonoran creosote bush scrub community observed during baseline surveys.

In addition, the baseline surveys found no riparian habitat within the Project area while GAP analysis mapped 3 acres of North American Warm Desert Riparian Woodland and Shrubland and 636 acres of North American Warm Desert Wash. This overestimates the amount of dry wash habitat within the Project area. Baseline surveys for the AFC mapped the length and width of all ephemeral streambeds within the Project area and found 268 acres of dry wash habitat. This number will be used to describe the amount of dry wash habitat found on the Project area not the areas mapped by GAP.

GENERAL BIOLOGICAL COMMUNITIES

The following includes a brief description of the major vegetation communities found within the geographic cumulative area of effect (NatureServe 2009). Several vegetative communities included in Tables 6-2, 6-3 and 6-4 are not described below since the amount of acreage that occurs in the cumulative area of effect for these communities is minimal.

Inter-Mountain Basins Shale Badland: This ecological system is relatively widespread and is composed of barren and sparsely vegetated substrates (<10 percent plant cover) typically derived from marine shales; however, it can also include substrates derived from siltstones and mudstones (clay). Landforms found in this community typically include rounded hills and plains that form a rolling topography. Plant species in this community have adapted to the harsh soil conditions and high erosion and deposition rates in this community, and typically include low-lying shrubs such as mat saltbush (*Atriplex corrugata)* and herbaceous vegetation (NatureServe 2009).

North American Warm Desert Pavement: This ecological system occurs throughout much of the warm deserts of North America and is composed of unvegetated to very sparsely vegetated (<2 percent plant cover) landscapes, typically flat basins where extreme temperature and wind develop ground surfaces of fine to medium gravel coated with "desert varnish." This community typically supports desert scrub species such as creosote bush (*Larrea tridentata)*. However, ephemeral herbaceous species may occur seasonally in response to seasonal precipitation, including desert trumpet *(Eriogonum inflatum)* and hairy desert sunflower (*Geraea canescens)* (NatureServe 2009).

North American Warm Desert Wash: This ecological system is restricted to intermittently flooded washes or arroyos that dissect bajadas, mesas, plains and basin floors throughout the warm deserts of North America. Although often dry, the intermittent fluvial processes define this system, which are often associated with rapid sheet and gully flow. This system occurs as linear or braided strips within desert scrub- or desert grassland-dominated landscapes. The vegetation of desert washes is quite variable ranging from sparse and patchy to moderately dense. Vegetation typically is located along banks, but may occur within the channel. The woody layer is typically intermittent to open and may be dominated by shrubs and small trees such as catclaw acacia (*Acacia greggii*), splitleaf brickellbush (*Brickellia laciniata*), desertbroom (*Baccharis sarothroides*), and desert willow (*Chilopsis linearis*) (NatureServe 2009).

Table 6-2. Cumulative analysis area vegetative communities and potential disturbance from past and present development.

	Past and Present Projects											
	All ATV Trails		All Highways		Open ATV Trails		Plaster City OHV Area		Naval Ranges		Past and present project disturbance	
General Habitat Type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type
Developed	41	1%	510	13%	9	0.2%	203	5%	0	0%	763	19%
Agriculture	2	0.1%	0	0%	1	0.1%	48	3%	0	0%	51	3%
North American Warm Desert Bedrock Cliff and Outcrop	12	0.1%	5	0.1%	8	0.1%	1,294	12%	75	1%	1,394	13%
North American Warm Desert Active and Stabilized Dune	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Inter-Mountain Basins Shale Badland	1	0.1%	0	0%	1	0.1%	871	75%	1	0.1%	874	75%
North American Warm Desert Pavement	147	0.2%	17	0.02%	83	0.1%	11,526	15%	14,692	19%	26,465	35%
North American Warm Desert Volcanic Rockland	1	0.3%	0	0%	1	0.2%	48	14%	1	0.3%	50	14%
Inter-Mountain Basins Big Sagebrush Shrubland	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Inter-Mountain Basins Mixed Salt Desert Scrub	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Mojave Mid-Elevation Mixed Desert Scrub	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Sonora-Mojave Creosotebush-White Bursage Desert Shrubland	319	0.2%	109	0.1%	195	0.1%	4,787	3%	11,615	7%	17,025	10%
Sonora-Mojave Mixed Salt Desert Scrub	5	0.1%	6	0.1%	2	0.04%	887	20%	36	1%	936	21%
North American Warm Desert Wash	135	0.3	67	0.1%	69	0.2%	4,945	10%	3,079	6%	8,295	17%
North American Warm Desert Riparian Woodland and Shrubland	14	0.2%	1	0.01%	6	0.1%	222	3%	0	0%	243	3%
Total	**676**		**715**		**374**		**24,831**		**29,499**		**56,095**	

Source: GAP Analysis 2008

Table 6-3. Cumulative analysis area vegetative communities and potential disturbance from the proposed project and future development.

	Future Projects														Proposed Project	
	Solar - PV		Solar - Thermal		Wind		RETI Transmission Lines		Wind Zero		2020 Development Plan		Future Projects Disturbance			
General Habitat Type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type
Developed	7	0.2%	353	9%	155	4%	7	0.2%	119	3%	284	7%	925	23%	30	1%
Agriculture	0	0%	3	0.2%	0	0%	6	0.4%	0	0%	10	1%	19	1%	0	0%
North American Warm Desert Bedrock Cliff and Outcrop	0	0%	2	0.01%	159	1%	22	0.2%	43	0.4%	1	0%	227	2%	0	0.2%
North American Warm Desert Active and Stabilized Dune	0	0%	0	0%	6	4%	0	0.1%	0	0%	0	0%	6	4%	0	0%
Inter-Mountain Basins Shale Badland	33	3%	0	0%	0	0%	1	0.1	0	0%	2	0.2%	36	3%	0	0%
North American Warm Desert Pavement	1	0%	1,972	3%	2	0%	192	0.2%	407	1%	13	0%	2,587	3%	1410	2%
North American Warm Desert Volcanic Rockland	0	0%	1	0.3%	0	0%	0	0%	0	0%	3	1%	3	1%	0	0%
Inter-Mountain Basins Big Sagebrush Shrubland	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Inter-Mountain Basins Mixed Salt Desert Scrub	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Mojave Mid-Elevation Mixed Desert Scrub	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Sonora-Mojave Creosotebush-	121	0.1%	1,942	1%	5,957	4%	502	0.3%	463	0.3%	197	0.1%	9,182	6%	4,475	2%

	Future Projects														Proposed Project	
	Solar - PV		**Solar - Thermal**		**Wind**		**RETI Transmission Lines**		**Wind Zero**		**2020 Development Plan**		**Future Projects Disturbance**			
General Habitat Type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type	Acreage	% of habitat type
White Bursage Desert Shrubland																
Sonora-Mojave Mixed Salt Desert Scrub	112	2%	279	6%	0	0%	17	0.4%	8	0.2%	132	3%	549	12%	0	0%
North American Warm Desert Wash	20	0.04%	4,465	9%	0	0%	172	0.4%	33	0.1%	464	1%	5,153	11%	268	1%
North American Warm Desert Riparian Woodland and Shrubland	25	0.4%	108	2%	0	0%	65	1%	0	0%	77	1%	275	4%	0	0%
Total	319		9,124		6,280		984		1,073		1,183		18,962		6,183	

Source: GAP Analysis 2008

Table 6-4. Cumulative analysis area vegetative communities and potential disturbance from past, present, and future projects.

General Habitat Type	Total Acreage within the Geographic Scope	% of habitat type	Total acres of disturbance	% of habitat type
Developed	4,021	1%	1,717	43%
Agriculture	1,498	0.5%	70	5%
North American Warm Desert Bedrock Cliff and Outcrop	10,810	3%	1,637	15%
North American Warm Desert Active and Stabilized Dune	171	0.1%	6	4%
Inter-Mountain Basins Shale Badland	1,161	0.4%	909	78%
North American Warm Desert Pavement	76,472	24%	30,461	40%
North American Warm Desert Volcanic Rockland	350	0.1%	54	15%
Inter-Mountain Basins Big Sagebrush Shrubland	0.19	0%	0	0%
Inter-Mountain Basins Mixed Salt Desert Scrub	0.47	0%	0	0%
Mojave Mid-Elevation Mixed Desert Scrub	15	0%	0	0%
Sonora-Mojave Creosotebush-White Bursage Desert Shrubland	168,434	52%	30,295	18%
Sonora-Mojave Mixed Salt Desert Scrub	4,545	1%	1,484	33%
North American Warm Desert Wash	47,417	15%	14,084	30%
North American Warm Desert Riparian Woodland and Shrubland	7,071	2%	521	7%
Total	321,965		81,240	

Source: GAP Analysis 2008

North American Warm Desert Riparian Woodland and Shrubland: This ecological system consists of low-elevation (<1200 m) riparian corridors along medium to large perennial streams throughout canyons and desert valleys of the southwestern United States and adjacent Mexico. The vegetation can be a mix of riparian woodlands and shrublands. Dominant trees include boxelder (*Acer negundo*), velvet ash (*Fraxinus velutina*), Fremont's cottonwood (*Populus fremontii*), and Goodding's willow (*Salix gooddingii*). Shrub dominants include Geyer's willow (*Salix geyeriana*), silver buffaloberry (*Shepherdia argentea*), and Coyote willow (*Salix exigua*). Vegetation is dependent upon annual or periodic flooding and associated sediment scour and/or annual rise in the water table for growth and reproduction (NatureServe 2009).

North American Warm Desert Bedrock Cliff and Outcrop: This ecological system is found from subalpine to foothill elevations and includes barren and sparsely vegetated landscapes (generally <10 percent plant cover) of steep cliff faces, narrow canyons, and smaller rock outcrops of various igneous, sedimentary, and metamorphic bedrock types. Also included are unstable scree and talus slopes that typically occur below cliff faces. Species present are diverse and may include elephant tree (*Bursera microphylla*), ocotillo (*Fouquieria splendens*), Bigelow's nolina (*Nolina bigelovii*), teddybear cholla (*Opuntia bigelovii*), and

other desert species, especially succulents. Lichens are predominant lifeforms in some areas. This community may include patches of desert shrublands (NatureServe 2009).

Sonora-Mojave Creosotebush-White Bursage Desert Shrubland: This ecological system is the most common in the Project cumulative analysis area. It typically is found in broad valleys, lower bajadas, plains and low hills in the Mojave and lower Sonoran deserts. This desert scrub community is characterized by a sparse to moderately dense shrub layer (2-50 percent cover). Creosotebush and white bursage (*Ambrosia dumosa*) are typically dominants, but many different shrubs, dwarf-shrubs, and cacti may co-dominate or form sparse understories. Associated species may include four-wing saltbush (*Atriplex canescens*), desertholly (*Atriplex hymenelytra*), brittlebush (*Encelia farinosa*), and Nevada jointfir (*Ephedra nevadensis*). The herbaceous layer is also typically sparse, but may be seasonally abundant depending on climatic conditions. Herbaceous species such as sandmat (*Chamaesyce* spp.), desert trumpet, low woollygrass (*Dasyochloa pulchella*), and three-awn (*Aristida* spp.) are common (NatureServe 2009).

Sonora-Mojave Mixed Salt Desert Scrub: This system includes extensive open-canopied shrublands of typically saline basins in the Mojave and Sonoran deserts. Substrates are generally fine-textured, saline soils. Vegetation often is concentrated around playas and is typically composed of one or more saltbush species, such as four-wing saltbush or cattle saltbush (*Atriplex polycarpa*). Species of iodinebush (*Allenrolfea sp.),* pickleweed *(Salicornia sp.),* seepweed *(Suaeda sp.)*, or other salt-loving plants are often present. Grass species found in this community may include alkali sacaton (*Sporobolus airoides*) or saltgrass (*Distichlis spicata*) at varying densities (NatureServe 2009).

DISTURBANCE ACREAGE

Using GIS analysis, the acres and percentage of the various biological community types that may be affected by the various developments were identified and compared to the acres potentially affected by the proposed Project and to the total amount of habitat found within the entire cumulative effects area (see Tables 6-2 to 6-4).

Approximately 322,000 acres of various biological communities are located within the cumulative analysis area identified for general vegetation and wildlife habitat. Of that amount, the proposed Project may indirectly affect up to 6,183 acres, or about 2 percent, with the installation of the SunCatcher solar arrays and related infrastructure, such as construction of a water pipeline and transmission line, or potential introduction of exotic species. However, the actual acreage of vegetation that is likely to be directly affected is expected to be much lower than 6,183 acres since 74-foot wide strips of vegetation would remain between the rows of the solar arrays and vegetation would remain within each cluster of six SunCatchers (AFC Chapter 3). The proposed project is expected to affect vegetation primarily from three major habitat types found within the cumulative analysis area: North American Warm Desert Pavement (1,410 acres), Sonora-Mojave Creosotebush-White Bursage Desert Shrubland (4,475 acres), and North American Warm Desert Wash (268).

The GAP Analysis mapped 3 acres of North American Warm Desert Riparian Woodland within the proposed Project area; however, vegetation mapping during baseline surveys detected no riparian habitat on the site. The dry washes were dominated by upland vegetation. The project would not disturb any riparian habitat, but would potentially impact the dry washes with the installation of access roads and utility lines.

The amount of riparian habitat mapped by GAP is likely overestimated if the results identified in the baseline surveys conducted for the proposed project are consistent for this vegetation type for the entire cumulative analysis area. The dry washes in the cumulative

analysis area mostly consist of upland vegetation with little or no difference in vegetation from the surrounding upland communities. For the extent of this analysis, riparian habitat will be referred to as dry wash habitat.

Past and present projects have affected up to 17 percent of the total habitat found in the cumulative analysis area; including 35 percent of the North American Warm Desert Pavement community, 10 percent of the Sonora-Mojave Creosotebush-White Bursage Desert Shrubland community, and 21 percent of the Sonora-Mojave Mixed Salt Desert Scrub habitat type found within the cumulative analysis area. These projects have also impacted up to 8,500 acres or 16 percent of the dry wash habitat found within the cumulative analysis area primarily within the North American Warm Desert Wash habitat type.

Reasonably foreseeable future projects, exclusive of the Project, are expected to affect approximately 19,000 acres or about 6 percent of the total habitat found in the cumulative analysis area. A wind project accounts for 6,280 of these acres, though wind projects generally only disturb approximately 3-5 percent of the vegetation within its footprint. This includes effects to about 5,400 acres or 15 percent of dry wash habitat associated with the North American Warm Desert Wash and North American Warm Desert Riparian Woodland and Shrubland communities.

Overall, the proposed Project combined with past, present, and reasonably foreseeable future projects would primarily affect the following communities:

- North American Warm Desert Pavement - 30,500 acres or 40 percent (Solar Two = 2 percent)
- Sonora-Mojave Creosotebush-White Bursage Desert Shrubland - 30,300 acres or 18 percent (Solar Two = 3 percent)
- North American Warm Desert Wash – 14,000 acres or 30 percent (Solar Two = 1 percent)
- North American Warm Desert Riparian Woodland and Shrubland - 500 acres or 7 percent (Solar Two = 0 percent)

All projects within the cumulative analysis area may affect almost 40 percent of the 54,500 acres of desert dry wash habitat found within that area. Although this habitat type represents only 17 percent of the total habitat found in the cumulative analysis area, typically these communities have some of the highest species diversity of any of the biological communities found in the region (CalPIF 2006). This is true even thought the vegetation composition and density does not differ from the surrounding uplands. The dry washes provide topographical diversity, thermal shelter, and increased moisture compared to the surrounding upland areas. Other habitat types that may have a high percentage of their total acreage in the cumulative analysis area potentially affected by projects include Inter-Mountain Basins Shale Badland (78 percent) and Sonora-Mojave Mixed Salt Desert Scrub (34 percent).

In addition to vegetation removal and alteration through introduction of exotic species, habitat fragmentation may be a detriment to animal movement within the cumulative analysis area. Within the geographic scope of this analysis, the largest contiguous tracts of land that may include potentially effected habitat include the Plaster City OHV Area, US Highway I-8, Evan Hewes Highway, the proposed Project, and other adjacent proposed solar thermal projects. The combination of these projects could affect up to 42,800 acres of conterminous desert shrublands (Bio-1 Map, Attachment C).

6.2.6 Proposed Mitigation Measures

The following mitigation measures are outlined in the AFC and would reduce impacts to vegetation and general wildlife habitat:

- Erosion and sedimentation control will be implemented during Project construction to retain sediment on-site, avoid habitat degradation, and prevent potential violations of water quality standards.
- A weed management plan will be implemented to prevent the introduction and spread of noxious weeds and potential habitat degradation.

6.2.7 Cumulative Effects Summary

Baseline surveys for the AFC of the Project area did not observe any unique vegetation communities or wildlife habitat such as those found in the Yuha Desert and West Mesa MAs. In addition, the vegetation within the Project area has already been impacted and degraded by OHV trails. Vegetation cover is sparse to non-existent and would be considered marginal habitat for wildlife species in the area.

Section 4.2.1 identifies the potential effects from the project on vegetation and wildlife habitat in the area. Most of the projects identified in Table 6-1 would result in temporary and permanent losses of native vegetation through grading and clearing activities. Projects such as the Wind Zero Training Facility could result in the clearing of hundreds of acres of vegetation. However, the degraded condition of vegetation and wildlife habitat in the proposed Project area combined with the mitigation measures outlined in the AFC would render the project's contribution to this impact less than cumulatively considerable.

6.3 SENSITIVE SPECIES

Field surveys were completed on the proposed Project site for sensitive species as part of the AFC permit process. No federally-listed species were identified in the Project area during those field surveys and no potential habitat for federally-listed species has been identified in the proposed Project area (Table 6-5) (Grant 2009). Surveyors did not observe any sensitive plant species or sensitive vegetation communities. Surveys of the Project area did locate five special-status wildlife species: the flat-tailed horned lizard (FTHL), burrowing owl, loggerhead shrike, Le Conte's thrasher, and California horned lark.

Table 5.6-1 in the AFC lists all sensitive plant and animal species that have potential habitat within the Project area and were considered during the field surveys. Table 6-5 below identifies the most recent list of federally-listed species in Imperial County that were considered in this analysis.

Table 6-5. Habitat Descriptions and Presence of USFWS listed Threatened (T), Endangered (E), or Candidate (C) species with potential to occur in Imperial County, California.

SPECIES[1]	FEDERAL STATUS	HABITAT ASSOCIATIONS	POTENTIAL HABITAT IN THE PROJECT AREA
MAMMALS			
Peninsular bighorn sheep (*Ovis canadensis*)	E	Restricted to the east-facing, lower elevation slopes [typically below 1,400 meters (4,600 feet)] of the Peninsular Ranges along the northwestern edge of the Sonoran Desert.	None to limited. Species documented in the adjacent In-ko-pah Gorge quad. Usually prefers higher elevations with rocky substrates. The highways that surround the Project area provide a barrier to sheep movement into the Project area. Designated critical habitat is 2.5 miles northwest of the Project area in the Coyote Mountains.
Jaguar *(Panthera onca)*	E	Imperial County, California is at the extreme northern limit of the jaguar's range. Habitats used include Sonoran desert scrub.	Extirpated. No jaguars have been sighted in California since the 1860's.
BIRDS			
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	Breeds in dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil.	None. No dense riparian habitats or perennial water sources found in the Project area.
Yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	C	Nests in cottonwood/willow riparian habitat with dense understory along rivers.	None. No dense riparian habitats or perennial water sources found in the Project area.
Brown pelican (*Pelecanus occidentalis*)	E	Commonly found at the Salton Sea.	None. Project area contains no permanent water sources and is 20 miles from the Salton Sea.
Yuma clapper rail (*Rallus longirostris yumanensis*)	E	Breeds in freshwater marshes in the United States as well as brackish marshes in Mexico.	None. Project area contains no marshes or other wetland features.
California least tern (*Sternula* (*Sterna) antillarum browni*)	E	Occupies areas of light-colored sand, diret, or dried mud close to a lagoon or estuary along the Salton Sea.	None. Project area contains no permanent water sources and is 20 miles from the Salton Sea.
Least Bell's vireo (*Vireo bellii pusillus*)	E	Inhabits structurally diverse woodlands along watercourses, including cottonwood-willow forests, oak woodlands, and mule fat scrub.	None. No riparian woodlands or permanently flowing waterways are found in the Project area.

REPTILES			
Desert tortoise (*Gopherus agassizii*)	T	Occur in a variety of habitats from desert flats and slopes dominated by creosote bush scrub to rocky slopes in blackbrush and juniper woodland ecozones.	Limited. Tortoise range in Imperial County is east of the Salton Sea and El Centro – more than 20 miles from the site.
FISH			
Desert pupfish (*Cyprinodon macularius*)	E	Cienegas, springs, small streams, and margins of large rivers.	None. No permanent water sources are present within the Project area.
Bonytail chub (*Gila elegans*)	E	Endemic to the Colorado River Basin and found in warm water reaches of larger rivers.	None. No permanent water sources are present within the Project area.
Colorado squawfish (*Ptychocheilus lucius*)	E	Endemic to the Colorado River Basin and require pools, deep runs, and eddy habitats.	None. No permanent water sources are present within the Project area.
Razorback sucker (*Xyrauchen texanus*)	E	Endemic to the Colorado River Basin and occur in perennially flowing large rivers.	None. No permanent water sources are present within the Project area.
PLANTS			
Peirson's milkvetch (*Astragalus magdalenae* var. *peirsonii*)	T	Occurs on open sand dunes along a narrow strip of the Algodones Dunes of Imperial Country, California.	None. No open sand dunes located within the Project area. Project is not near the Algodones Dunes.

[1] Obtained from USFWS website accessed in March 2009:
http://www.fws.gov/carlsbad/TEspecies/CFWO_Species_List.htm

6.3.1 Flat-tailed Horned Lizard (FTHL)

The FTHL is a BLM sensitive species that has been proposed for federal listing. It inhabits areas of fine sand in ephemeral washes and desert flats in San Diego, Imperial, and Riverside counties in California, southwestern Arizona, and northern Baja California and Sonora in Mexico. FTHL are suffering habitat loss from development and OHV use. It is estimated that up to 90 percent of the lizards' original geographic range is subject to, or potentially subject to, some form of human disturbance (Turner and Medica 1982). This includes Imperial County where approximately 50 percent of the FTHL habitat has been removed due to the creation of the Salton Sea, the expansion of agricultural fields, and urban development (FTHL ICC 2003).

The FTHL Rangewide Management Strategy report was prepared by the FTHL Interagency Coordinating Committee (FTHL ICC 2003) to provide guidance for the conservation and management of sufficient habitat to maintain extant populations of FTHLs in perpetuity. One of the main objectives of the FTHL Management Strategy was the establishment of FTHL Management Areas (MAs) that would preserve sufficient FTHL habitat to maintain self-sustaining FTHL populations. Two of these MAs (Yuha Desert and West Mesa) are located in close proximity to the proposed Project and the project's proposed transmission line corridor would pass through a portion of Yuha Desert MA.

PROJECT EFFECTS IDENTIFIED IN THE AFC FOR FTHL

The AFC identified the following effects to FTHL populations that could occur as a result of implementation of the Project:

- Mortality due to roadkill, site grading, and loss of suitable forage habitat.
- Mortality due to vehicle usage along access roads.

SIGNIFICANCE CRITERIA

The following criteria could be used to assess the cumulative impacts of the proposed Project combined with past, present, and reasonably foreseeable future projects on FTHL populations and habitat. These criteria were developed from management objectives identified in the FTHL Rangewide Management Strategy (2003).

- Direct removal of FTHL habitat or the fragmentation of habitat.
- Impacts that would affect the number, range, or regional long-term survival of the FTHL.
- Permanent disturbance of FTHL MAs that exceeds 1 percent of the total area of the FTHL MA.
- Interference with the movement of FTHL within the corridor between the West Mesa and Yuha Desert MAs.
- Increase the amount of edge habitat that exposes FTHL populations to greater disturbance and/or predation.

GEOGRAPHIC EXTENT

The geographic scope for the FTHL cumulative analysis area includes the entire Yuha Desert FTHL Management Area (MA) to the south, the corridor between the Yuha Desert and West Mesa MAs, and the entire West Mesa MA (Bio-2 Map, Attachment C). The cumulative analysis area also includes the desert environment that extends west to the Fish Creek Mountains and east to the extensive agricultural fields of the Imperial Valley. This analysis area is based upon mapping identified in the FTHL Rangewide Management Strategy (2003).

The cumulative analysis area lies on the West Mesa in the Imperial Valley, where the vegetation is characterized by Sonoran Desert shrublands and sparsely vegetated desert pavement. This area includes approximately 316,500 acres of potential FTHL habitat which was determined by subtracting the developed land and agricultural fields identified in the GAP vegetation map (Tables 6-2 to 6-4) from the overall area of the geographic scope (GAP Analysis 2008). These vegetation communities are generally contiguous from the southern extent of the Yuha Desert MA to the northern extent of the West Mesa MA. The cumulative analysis area includes the entirety of both the Yuha Desert and West Mesa MAs as requested by the BLM and the USFWS (Grant 2009, Stewart 2009).

REASONABLY FORESEEABLE DEVELOPMENT

The past, present and reasonably foreseeable future projects considered in association with the Project have been identified in Table 1-1. Projects from that list that lie within the boundaries of the FTHL cumulative analysis area as presented in Bio-2 Map (Attachment C) are summarized below in Table 6-6.

Table 6-6. Past, present, and reasonably foreseeable future projects within the FTHL cumulative analysis area.

Type of Project	Length (miles)	Potential FTHL Habitat (acres)[1]	Area (acres) within FTHL Management Areas
Past and Present			
OHV Trails (Open and Closed) (5-foot corridor)	1,115	600	400
Roads (US, State, County) (100-foot corridor)	153	200	200
Open ATV Trails (5-foot corridor)	618	400	200
Plaster City OHV Area	N/A	24,600	0
Naval Ranges	N/A	29,500	29,200
Total past and present	**1886**	**55,300**	**30,000**
Proposed Project			
Solar Two	N/A	6,153	6
RETI Projects			
Solar – PV	N/A	300	0
Solar – Thermal	N/A	8,800	2,800 Yuha Desert – 1,300 West Mesa - 1,500
Wind	N/A	6,100	0
Proposed transmission lines (100-foot corridor)	81	1,000	700 Yuha Desert – 100 West Mesa – 600
Future development			
Wind Zero Training Facility	N/A	1,000	0
2020 Urban Development	N/A	900	100 Yuha Desert – 100
Total future development		**18,100**	**3,600**
Grand Total		**77,553**	**33,606**

[1]-Potential FTHL habitat was calculated using GIS analysis and the GAP vegetation types. Developed land and agricultural fields were deleted to determine potential FTHL habitat.

CUMULATIVE ANALYSIS DATA

In the AFC, it was noted that FTHLs have the potential to occur throughout the site and along the off-site transmission line and waterline. During AFC baseline surveys for the proposed project, two FTHL were observed on the eastern boundary of the proposed project and it is estimated that between 20 and 30 FTHL may occupy the Project Site. AFC baseline surveys observed two FTHL along the proposed off-site transmission line.

The historical range of the FTHL in California encompassed approximately 1.8 to 2.2 million acres that were primarily located within Imperial County. However, approximately 50 percent of this land within Imperial County is now unsuitable for the FTHL, including the Salton Sea, the extensive agricultural fields of the Imperial Valley, and urban development (FTHL ICC 2003).

The proposed project would remove up to 6,153 acres of potential FTHL habitat for the installation of the SunCatchers and necessary infrastructure. However, the actual acreage of vegetation removed would be much lower than 6,153 acres. 74-foot strips of vegetation would remain between rows of SunCatchers and even within the rows of SunCatchers, not all of the vegetation would be removed (AFC Chapter 3). It is not know if FTHLs would use these highly fragmented patches of habitat. When combined with reasonably foreseeable future projects from Table 6-6, there would be the potential to impact up to 24,200 acres of potential FTHL habitat. This is in addition to the 55,300 acres of potential FTHL habitat

that has been impacted from past and present projects (Table 6-6). Up to 79,600 acres of potential FTHL habitat or 25 percent of the overall geographic scope would be impacted by past, present, and reasonably foreseeable future projects.

Not only would the proposed Project directly remove habitat, but it would further fragment habitat outside of the MAs. Currently, the Project area is surrounded by Interstate-8 to the south and Evan Hewes Highway to the north. This puts the proposed project in between two highways that currently fragment the FTHL habitat. Studies have shown that FTHL populations are affected within 0.3 miles of a road with severe impacts within 0.15 miles of a road (Young and Young 2000).

An additional barrier to movement is the Plaster City OHV area that is located north of Evan Hewes Highway (Bio-2 Map, Attachment C). McGrann et. al. (2006) observed that FTHL densities, body mass, and food resources were lower in areas used by OHV when compared with undisturbed areas in the West Mesa MA. Additional studies have found that FTHL avoid OHV areas and utilize less than optimal habitat as a result (Nicolai and Lovich 2000 and Beauchamp et. al. 1998). The proposed Project would utilize an area that currently is used as an OHV area with 37 miles of open OHV trails and unlimited cross-country travel. The project may have the beneficial effect of closing this area down to OHV travel and decreasing overall traffic in the area. Another proposed solar thermal project would impact up to 8,800 acres of habitat between the two MAs. When combined with the Plaster City OHV Area, the two highways, and another proposed solar project, the proposed Project would contribute to the fragmentation of up to approximately 39,800 acres of suitable FTHL habitat.

In addition to habitat removal and fragmentation, Young and Young (2005) observed that there is a clear negative impact on FTHL presence up to at least 450 meters from the edge of development. This effect is most obvious at the interface between agricultural fields and desert habitat. The proposed waterline would be adjacent to a railway and for its entire length. It would not impact any agricultural fields and would be completely contained within previously disturbed areas. It would not create any edge effect habitat for the FTHL. The proposed transmission line is within an existing transmission line corridor, so it would not create any additional edge effect. Reasonably foreseeable future energy development would create up to 400 acres of edge habitat for the construction of solar thermal projects and 50 acres of edge habitat for the construction of new transmission lines (Bio-2 Map, Attachment C). Young and Young (2005) recommended that one way to conserve FTHL populations would be to minimize edge effects on the border areas.

Along the edge of disturbance, there appears to be an increase in roundtail ground squirrel (*Spermophilus tereticaudus*) density. The ground squirrel is the primary predator of the FTHL and likely is a factor in the decreased density of FTHL along the edge of disturbed areas (Young and Young 2005). One potential effect of the SunCatchers is that the SunCatcher would provide shade to vegetation directly underneath the apparatus and that the periodic cleanings would increase water availability in an otherwise extremely arid climate. This combination could have a beneficial impact on adjacent vegetation. However, this increase in vegetation could attract roundtail ground squirrels to an area that previously would not sustain ground squirrel populations (Grant 2009). If this was to occur, there would be direct impacts to FTHL populations in the area. In addition, the proposed Project would be fenced off to protect from trespassing. This could have the unintentional effect of providing ideal hunting perches for loggerhead shrikes, another primary predator of the FTHL, which would further threaten FTHL populations (Grant 2009).

The FTHL Management Strategy includes several conservation measures to preserve FTHL populations and habitat. One was the creation of the FTHL Management Areas that include the Yuha Desert and West Mesa MAs. Within the MAs, the FTHL Management Strategy recommends limiting impacts from projects to less than 1 percent of the total area of the MA. Up until December 2005, 88 acres (0.2 percent) of the Yuha Desert MA and 117 acres (0.1 percent) of the West Mesa MA have been impacted (FTHL ICC 2005). The proposed project would include a transmission line to link up to the power grid and this transmission line would cross the Yuha Desert MA. The installation of the towers would remove up to 6 acres (0.01 percent) of habitat within the MA. Additional reasonably foreseeable projects would impact up to an additional 1,600 acres (3 percent) of the Yuha Desert MA. The proposed project would not impact the West Mesa MA, but other projects would impact up to 2,000 acres (2 percent) of the West Mesa MA (Table 6-6).

Another priority for the FTHL Management Strategy (FTHL ICC 2003) is to preserve the corridor between the West Mesa and Yuha Desert MAs (Bio-2 Map, Attachment C). Currently, the Plaster City OHV Area, the Naval Ranges, US Highway I-8, and Evan Hewes Highway lie in the area between the two MAs. The roads and OHV area likely are a hindrance to movement within the corridor, but there is probably still some potential for gene flow (Grant 2009). FTHL densities are lower in areas with high OHV traffic, but they still use the areas. As for the two major highways, experiments with simulated road crossings observed that FTHL would use culverts to cross under roads such as I-8 (Painter and Ingraldi 2007). These culverts are likely choke-points for movement and their location should be noted when designing the proposed project and movement protected on both sides of the culvert. The proposed project would fragment an additional 6,153 acres of potential FTHL habitat between I-8 and Evan Hewes Highway. This would further restrict movement within the corridor and make it less likely for the exchange of genetic material between the two MAs. Future solar thermal projects would impact up to an additional 9,100 acres of land between the two MAs. Mitigation measures to ensure that FTHL can move freely through the SunCatchers would ease movement through the Project area. Table 6-7 provides a summary of the cumulative impacts of the proposed Project.

Table 6-7. Summary of the cumulative impacts of the proposed Project and reasonably foreseeable future project on FTHL populations and habitat based upon the significance criteria outlined above.

Type of project	Impacts to the FTHL Management Areas (acres)	Impacts to the corridor between the West Mesa and Yuha Desert MAs (acres)	Impacts to potential FTHL habitat (acres)	Increase in edge habitat between the desert shrublands and agricultural fields (acres)
Past and present projects (Includes open ATV trails, Plaster City OHV Area, Naval Ranges, and roads)	Yuha Desert MA – 100 acres or 0.15% of the MA West Mesa MA - 100 acres or 0.14% of the MA	25,000	55,300	N/A
Proposed Solar Two Project	Yuha Desert MA – 6 acres or 0.01% of the MA	6,153	6,153	Total - 0
Future Projects (includes RETI projects, Wind Zero, and 2020 development)	Yuha Desert MA – 1,600 acres or 2.6% of the MA West Mesa MA - 2,000 acres or 1.5% of the MA	8,900	18,100	Total - 450 RETI Transmission Lines – 50 RETI Solar Thermal Projects - 400
Total	Yuha Desert MA - 1,706 acres or 2.8% of the MA West Mesa MA - 2,100 acres or 1.6% of the MA	40,053	79,553	Total - 450

PROPOSED MITIGATION MEASURES

The following mitigation measures, as outlined in the AFC, would be utilized to minimize impacts to FTHL populations and habitat within the Project area and protect FTHL where impacts are unavoidable:

- Clearance surveys for FTHL will be conducted before each phase of Project construction.
- Any FTHLs within the construction area will be relocated to suitable habitat outside the Project footprint.

CUMULATIVE EFFECTS SUMMARY

The proposed Project area lies between two major highways (I-8 and Evan Hewes Highway) and the area has been used as a cross-country area for OHV for many years. The existing vegetation is sparse and would be considered marginal FTHL habitat. Four FTHL were observed during AFC baseline surveys and harvester ants (primary prey of the FTHL) were observed during AFC baseline surveys, so the FTHL presently use the Project area for habitat.

Approximately 316,500 acres within the cumulative analysis area for the FTHL have been identified through GAP analysis as potentially suitable FTHL habitat (see Bio-2 Map, Attachment C). Of this total acreage, approximately 55,300 or 17 percent has been previously or currently disturbed by past or existing projects identified as occurring in the analysis area. An additional 2 percent (6,153 acres) could be affected by the proposed Project. Future proposed actions could affect another 6 percent (18,100 acres) for a cumulative habitat acreage disturbance total of 25 percent of potential FTHL habitat in the cumulative analysis area affected by past, present and future actions.

It should be noted that the above numbers represent the high range of potential FTHL habitat within the geographic scope. The analysis uses the GAP vegetation mapping data to identify potential FTHL. This mapping likely includes areas that are not considered suitable FTHL habitat when investigated on the ground such as hills, desert pavement, and other landforms unsuitable for FTHL. The 6,153 acres of disturbance to potential FTHL habitat by the proposed Solar Two project and the anticipated 18,100 acres of disturbance for other future projects represent the high end of disturbance to FTHL populations. The acreage of potential FTHL habitat disturbed is likely lower and the exact acreage could be determined only by field surveys.

The two FTHL management areas, the Yuha Desert MA and the West Desert MA, encompass approximately 58,900 and 136,200 acres of potentially suitable FTHL habitat, respectively, for a total of 195,100 acres. Past and present actions currently are affecting 0.29 percent or 200 acres of these two MAs. The proposed Project would affect an additional 0.01 percent or 6 acres of the Yuha Desert MA and other future projects are anticipated to affect an additional 2.6 percent or 1,600 acres of the Yuha Desert MA (see Table 6-7). The proposed Solar Two Project would not affect the West Mesa MA, but other future projects are anticipated to affect up to 1.6 percent or 2,000 acres of the West Mesa MA. The total cumulative percentage for both MAs would be up to 4.4 percent or 3,777 of disturbance. The future projects' potential impacts exceed, even without the 0.01 percent addition of the Project, the 1 percent effect recommended in the FTHL Management Plan for each MA separately and cumulatively for both MAs.

The proposed project lies within a corridor between the Yuha Desert and West Mesa MAs that the FTHL Management Strategy has highlighted as an important movement corridor to maintain genetic movement between FTHL populations. The corridor is already impeded by the Plaster City OHV Area, I-8, and Evan Hewes Highway. The proposed project would further fragment the corridor making movement between the MAs even more challenging.

The proposed project would remove up to 6,153 acres of potential FTHL habitat, would have the potential to cause the mortality of individual FTHLs, would impact the Yuha Desert MA, and would further fragment the corridor between the West Mesa and Yuha Desert MAs. According to the significance criteria defined by CEQA and the FTHL Management Strategy, the proposed project could be considered to have a cumulatively significant impact to FTHL populations in combination with other past, present and future projects within the geographic scope of this analysis.

6.3.2 Burrowing Owl

The Imperial Valley contains approximately 5,600 burrowing owl pairs almost exclusively within the agricultural fields of the Imperial Valley. This represents approximately 70 percent of all burrowing owls found in California. Within the agricultural complex, burrowing owls are primarily found adjacent to irrigation canals that they use for burrows and that are closely tied to the roundtail ground squirrel. Their density decreases

significantly within the desert shrubland communities that surround the Project area (DeSante et. al. 2004).

The proposed Project would primarily impact desert shrublands with the proposed waterline following Evan Hewes Highway to Seeley, CA and the proposed transmission line located within 800 feet of the agricultural fields (Bio-3 Map, Attachment C). The AFC identified the loss of borrowing owl habitat as the effect to burrowing owl populations that could occur as a result of implementation of the Project.

SIGNIFICANCE CRITERIA

The following criteria could be used to assess the cumulative impacts of the proposed Project combined with past, present, and reasonably foreseeable future projects on burrowing owl populations and habitat:

- Impacts to the agricultural fields and especially the banks of the irrigation canals of the Imperial Valley.
- Disturbance or harassment within 50 meters (approx. 160 ft.) of occupied burrows.
- Destruction of burrows and burrow entrances. Burrows include structures such as culverts, concrete slabs and debris piles that provide shelter to burrowing owls.
- Degradation of foraging habitat adjacent to occupied burrows.

GEOGRAPHIC EXTENT

The geographic scope includes the proposed Project area with a 2,300 foot buffer into the desert areas where burrowing owl densities are significantly lower than surrounding the agricultural fields. This buffer is based on their estimated home range of 358 hectares (Rosenberg and Haley 2004). The geographic focus of this supplemental cumulative impact analysis is the interface between desert shrublands and the agricultural complex north and south of the where the proposed waterline would follow Evan Hewes Highway to Seeley, CA (Bio-3 Map, Attachment C).

The geographic scope includes approximately 80,900 acres that is divided into 49,900 acres of desert shrubland and 27,200 acres of agricultural fields. It includes approximately 40 miles of the interface between the desert shrublands and the agricultural fields that extends from the Salton Sea to the border with Mexico.

REASONABLY FORESEEABLE DEVELOPMENT

The past, present and reasonably foreseeable future projects considered in association with the Project have been identified in Table 1-1. Projects from that list that lie within the boundaries of the burrowing owl cumulative analysis area as presented in Bio-3 Map (Attachment C) are summarized below in Table 6-8.

Table 6-8. Past, present, and reasonably foreseeable future projects within the burrowing owl geographic scope with their length, area, and area within MAs.

Type of Project	Length (miles)	Area (acres)	Agricultural Lands (acres)	Desert Shrublands (acres)
Past and Present				
OHV Trails (Open and Closed)	228	100	8	111

(5-foot corridor)				
Roads (US, State, County) (100-foot corridor)	76	900	10	109
Open ATV Trails (5-foot corridor)	113	100	5	56
Plaster City OHV Area	N/A	4,100	48	3,847
Shade Tree Naval Range	N/A	800	0	769
Proposed Project				
Solar Two Project	N/A	6,183	0	6,153
RETI Projects				
Solar – PV	N/A	400	100	300
Solar – Thermal	N/A	6,100	400	5,300
Proposed transmission lines (100-foot corridor)	47	600	200	400
Future development				
2020 urban development	N/A	1,700	400	900

CUMULATIVE IMPACT DATA

Potential effects to the burrowing owl from the proposed Project include the loss of habitat through direct removal of vegetation for the construction of the SunCatchers and necessary infrastructure, the fragmentation of habitat that remains between rows of SunCatchers, direct mortality of individual burrowing owls during construction activities and from maintenance vehicle traffic during the operation of the proposed power plant. In addition, the waterline would follow the Evan Hewes Highway ROW from the proposed project site to Seeley, CA. The proposed waterline would not impact any of the Imperial Irrigation District Canals or infrastructure along its path.

During AFC baseline surveys for the proposed project, owl burrows with scat were observed at three sites within the Project area, one location near the off-site waterline and four at adjacent off-site locations. Two burrowing owls were detected on lands adjacent to the Project Site, and two burrowing owls were detected at one location along the off-site transmission line. Burrowing owl densities within the Project area are roughly 0.06 pairs /km^2 while burrowing owl densities within the agricultural matrix were estimated at 8.3 pairs/ km^2 (Rosenberg and Haley 2004).

The proposed project would impact up to 6,153 acres of desert habitat, but no agricultural lands would be impacted by the proposed project, waterline, or off-site transmission line. When combined with reasonably foreseeable future projects, there would be the potential to impact up to 1,100 acres of agricultural fields and 16,900 acres of desert shrublands. This is in addition to the 100 acres of agricultural fields and 4,900 acres of desert shrublands impacted by past and present projects as shown in Table 6-8. Up to 1,200 acres of agricultural fields and 21,800 acres of desert shrubland would be impacted by past, present, and reasonably foreseeable future projects.

Agricultural lands in California are protected from development by many laws including the Williamson Act. This makes it difficult to develop farmland to other uses such as renewable energy or residential development. This provides a measure of security for the burrowing owl populations within the agricultural matrix of Imperial Valley. For this reason among others, reasonably foreseeable future projects are not likely to be sited within agricultural areas and the impacts to burrowing owls would be reduced.

The SunCatchers would provide additional shade immediately surrounding the device and additional water would be available from the periodic washings. This combination of shade and water in an extremely hot and arid climate has the potential to change the vegetation immediately adjacent to the SunCatchers. This could potentially increase the density of round tail ground squirrels within the Project area and a corresponding increase in burrowing owls (Grant 2009). In addition, the project may have the beneficial effect of removing OHV travel from the area which impacts burrowing owl density and behavior. The availability of prey would continue to be scarce in the desert shrublands of the Project area, so burrowing owl densities would be limited.

In addition, the burrowing owl is very tolerant of human encroachment and degradation of their native habitats as long as long as materials and habitat remain for their burrows (Klute et. al. 2003). The proposed Project would not impact the desert washes that they use for burrows in the area and may potentially increase burrowing habitat with the creation of access roads. The access roads would be raised and might act as ideal perches for hunting prey as well.

Table 6-9 provides a summary of the cumulative impacts of the proposed Project.

Table 6-9. Summary of the cumulative impacts of the proposed Project and reasonably foreseeable future project on burrowing owl populations and habitat based upon the significance criteria outlined above.

Type of project	Disturbance of agricultural fields
Past and present projects	100
Future projects	1,100
Proposed Solar Two project	0
Total	1,200

PROPOSED MITIGATION MEASURES

The following mitigation measures, as outlined in the AFC, would be utilized to minimize impacts to burrowing owl populations and habitat within the Project area and protect burrowing owls where impacts are unavoidable:

- Where practicable, ground-disturbing activities will occur outside the burrowing owl breeding season (February 1 through August 20).
- Clearance surveys for burrowing owls will be conducted before each phase of Project construction.
- Burrowing owl burrows within 250 feet of the construction area will be surveyed; any resident owls will be passively removed and unoccupied burrows will be collapsed by following procedures outlines in the *Burrowing Owl Survey Protocol and Mitigation Guidelines* (CBOC 1993).

CUMULATIVE EFFECTS SUMMARY

The proposed project would not impact any agricultural lands along the edge of the Imperial Valley when constructing the proposed waterline. No other construction activities associated with the proposed project or the off-site transmission line are expected to impact agricultural fields. Burrowing owls are primarily associated with agricultural fields and the banks of irrigation ditches within the Imperial Valley. The proposed project would not impact any of the irrigation canal banks where burrowing owls prefer to construct burrows during the construction of the waterline. No owls are expected to be displaced by the installation of the SunCatchers or the construction of the off-site transmission line.

Appropriate mitigation measures outlined above would be taken if any burrowing owls are detected during pre-construction surveys.

Other future projects would impact agricultural lands within the Imperial Valley (Table 6-9), but the proposed project would not add to this impact. According to the significance criteria above, the proposed project would not have a cumulatively significant effect on burrowing owls within the area.

6.3.3 Resident and Wintering Birds

The Mojave and Colorado deserts are among the hottest and driest habitats in North America. As a result, the Colorado desert ecosystems possess a host of endemic plants and animals including a variety of bird species found nowhere else in the United States (CalPIF 2006).

The area surrounding the proposed 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 washes run through the Project area that collects 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, and 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 washes (CalPIF 2006). Appendix Y in the AFC has a full list of bird species observed during baseline studies.

PROJECT EFFECTS IDENTIFIED IN THE AFC FOR RESIDENT AND WINTERING BIRDS

The AFC identified the following effects to resident and wintering bird populations that could occur as a result of implementation of the Project:

- Removal of nesting or wintering bird habitat.

SIGNIFICANCE CRITERIA

The following criteria will be used to assess the cumulative impacts of the proposed Project combined with past, present, and reasonably foreseeable future projects on resident and breeding bird populations and habitat:

- Loss of breeding or foraging habitat for resident and wintering birds.
- Habitat fragmentation to the extent that habitat becomes a disconnected series of fragments of varying shapes and sizes.
- Impacts to the dry washes found within the geographic scope.
- Introduction and spread of exotic plant species into the desert shrublands.
- Impacts to breeding birds during the breeding season.
- Increase in edge habitat along the fringes of the desert ecosystem.

GEOGRAPHIC EXTENT

The geographic cumulative analysis area for resident and wintering birds includes the continuous Sonoran Desert shrubland ecosystem that extends almost 20 miles north of the

proposed Solar Two Project area and south into Mexico (Bio-4 Map, Attachment C). The scope includes desert shrublands that extends west to the Fish Creek Mountains and east to the extensive agricultural fields of the Imperial Valley. The area is bounded by a playa (Laguna Salada) in Mexico and to the north by the northern boundary of the West Mesa FTHL MA.

The geographic cumulative analysis area includes approximately 375,763 acres of desert and the three main vegetation types are Sonora-Mojave Creosotebush-White Bursage Desert Shrubland, North American Warm Desert Pavement, and North American Warm Desert Wash (Bio-1 Map, Attachment C).

REASONABLY FORESEEABLE DEVELOPMENT

The past, present and reasonably foreseeable future projects considered in association with the Project have been identified in Table 1-1. Projects from that list that lie within the boundaries of the general vegetation and wildlife habitat cumulative analysis area as presented in Bio-4 Map (Attachment C) are summarized below in Table 6-10.

CUMULATIVE IMPACT DATA

Potential effects to resident and wintering birds from the proposed Project include the loss of habitat through direct removal of vegetation for the construction of the SunCatchers and necessary infrastructure, the fragmentation of habitat that remains between rows of SunCatchers, and direct mortality of individual birds during construction activities and from maintenance vehicle traffic during the operation of the proposed power plant. Also, vegetation clearing could remove nests and nesting habitat during the breeding season. During baseline surveys for the proposed Project, loggerhead shrikes, LeConte's thrashers, and California horned larks were observed on the project site. Exact locations are mapped on Figure 5.6-6 of the Biological Resources section of the AFC. Appendix Y in the AFC (Biological Resources Technical Report) has a full list of bird species observed during baseline studies.

The USFWS developed the Birds of Conservation Concern (BCC) to track accurately 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 6-11 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 6-10. Past, present, and reasonably foreseeable future projects within the resident and wintering birds geographic scope with their length, area, and area within MAs.

Type of project	Length (miles)	Area (acres)	Dry wash habitat (acres)[1]	% of dry wash habitat in entire geographic scope
Past and Present				
OHV Trails (Open and Closed) (5-foot corridor)	1,115	700	200	0.3%
Roads (US, State, County) (100 foot corridor)	153	700	100	0.1%
Open ATV Trails	618	400	100	0.1%
Plaster City OHV Area	N/A	24,800	5,200	9%
Naval Ranges	N/A	29,500	3,100	6%
Proposed Project				
Solar Two	N/A	6,183	268	0.6%

RETI Projects				
Solar – PV	N/A	300	50	0.1%
Solar – Thermal	N/A	9,100	4,600	8%
Green Hunter/Wind Hunter	N/A	6,300	0	0%
OOS Wind Projects	N/A	13,100	N/A	N/A
Proposed transmission lines (100-foot corridor)	81	1,000	200	0.4%
Future development				
Wind Zero Training Facility	N/A	1,000	50	0.1%
2020 Urban Development	N/A	1,200	500	1%

[1] Dry wash habitat includes the North American Warm Desert Wash and North American Warm Desert Riparian Woodland and Shrubland mapped by GAP (GAP 2008).

Table 6-11. 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).

The proposed project would remove up to 6,183 acres of habitat for the installation of the SunCatchers and necessary infrastructure. However, the actual acreage of vegetation removed would be much lower than 6,183 acres. When combined with reasonably foreseeable future projects from Table 6-10, there would be the potential to impact up to 38,153 acres of potential resident and wintering bird habitat. This is in addition to the 56,100 acres of potential resident and wintering bird habitat that has been impacted from past and present projects (Table 6-10). Up to 94,253 acres of habitat or 25 percent of the overall geographic scope would be impacted by past, present, and reasonably foreseeable future projects.

Habitat fragmentation is a significant threat to resident and wintering birds in this section of the Sonoran Desert. Fragmented shrubland areas may not provide enough continuous acreage to support those birds that require large areas of habitat for an individual to survive (CalPIF 2006). This is even more evident in areas of sparse vegetation and low precipitation such as the geographic scope of this analysis. Normally, a LeConte's thrasher requires approximately 50 acres of land to support its needs (Weigland and Fitton 2008). However, in the Project area, it was estimated that a single LeConte's thrasher would require up to 400 acres of habitat to meet its essential needs (Weigland 2009 pers. comm.).

Within the geographic scope of this analysis, the largest continuous tract of land that would be impacted includes the Plaster City OHV Area, US Highway I-8, Evan Hewes Highway, the proposed Project, and other proposed solar thermal projects. The combination of these projects would impact up to 39,707 acres of desert shrublands (Bio-4 Map, Attachment C). Other projects are not linked as these projects are and would not fragment as many continuous acres as these projects.

Dry washes are found throughout the Project area and the total dry wash habitat within the geographic scope of the analysis is 54,500 acres (includes the North American Warm Desert Wash and North American Warm Desert Riparian Woodland and Shrubland vegetation types) (Tables 6-2 to 6-4). Within the Sonoran Desert, dry washes support a majority of bird species due to their increased biodiversity and greater availability of moisture. The proposed project would impact up to 268 acres of 0.6 percent of the dry wash habitat within the geographic scope. However, SunCatchers would not be installed within the ephemeral streambeds and impacts would be restricted to access roads and other infrastructure needs. The proposed Project would combine with other reasonably foreseeable future projects to impact up to 6,000 acres of 11 percent of dry wash habitat. This would combine with past and present projects to impact up to 14,739 acres or 27 percent of dry wash habitat within the geographic scope of the analysis (Table 6-10).

The geographic scope of the analysis includes the interface between the desert shrublands and the extensive agricultural matrix of the Imperial Valley. The proposed Project includes the waterline that would follow Evan Hewes Highway's ROW from the project site to Seeley, CA. The proposed waterline would not impact any agricultural fields or the Imperial Irrigation District's irrigation canals or related infrastructure. The proposed waterline and transmission line would not increase edge habitat because both are contained within existing ROWs. Reasonably foreseeable future projects would increase edge habitat by an additional 3.4 miles.

Table 6-12 provides a summary of the cumulative impacts of the proposed Project.

Table 6-12. Summary of the cumulative impacts of the proposed Project and reasonably foreseeable future project on resident and wintering bird populations and habitat based upon the significance criteria outlined above.

Type of project	Impacts to dry wash habitat[1] (acres)	% of dry wash habitat in entire geographic scope	Increase in edge habitat between the desert shrublands and agricultural fields (miles)
Past and present projects	8,700	16%	N/A
Proposed Solar Two project	268	0.6%	0
Future Projects	5,400	10%	3.4
Total	14,739	27%	3.4

[1] Dry wash habitat includes the North American Warm Desert Wash and North American Warm Desert Riparian Woodland and Shrubland mapped by GAP (GAP 2008).

PROPOSED MITIGATION MEASURES

The following mitigation measures as outlined in the AFC would reduce the impacts of the proposed Project on resident and wintering birds.

- Where practicable, ground-disturbing activities will be conducted outside the bird nesting season (February through July).
- Clearance surveys for nesting birds will be conducted before each phase of Project construction if the activity must be conducted during the bird breeding season.
- A Weed Management Plan will be implemented to decrease the risk of introduction and spread of noxious weeds on the project site.
- Ephemeral dry washes would be preserved where practicable.

CUMULATIVE EFFECTS SUMMARY

The proposed project would remove vegetation and impact up to 6,183 acres of desert shrublands. The Project area includes 268 acres of dry wash habitat where bird densities are larger than the surrounding sparse desert shrublands; however, no SunCatchers would be placed in the dry washes and impacts to the dry washes would be minimized where possible. Other projects identified within the geographic scope would impact vegetation and remove potential resident and wintering bird habitat including dry wash habitat.

The proposed project would follow the above mitigation measures to minimize impacts to resident and wintering birds in the Project area including pre-construction surveys, construction monitoring, and stopping and deferring work if impacts to nestlings cannot be avoided. This would prevent adverse impacts to resident and wintering birds from occurring as a result of the proposed project. Therefore, the proposed projects' contribution to a cumulative impact to wintering and resident birds would be rendered less than cumulatively considerable and would not be significant.

6.3.4 Migrating Birds

Millions of birds – more than 350 species - follow the Pacific Flyway. They travel this avian highway each year from the Bering Straight to South America, flying over, and some

wintering at the Salton Sea. The Project area is approximately 20 miles south of the Salton Sea and in the path of the Pacific Flyway as it leaves California and follows the Gulf of California.

PROJECT EFFECTS IDENTIFIED IN THE AFC FOR MIGRATING BIRDS

The AFC did not specifically discuss migrating birds in the biological resources (5.6) or cumulative effects (5.18) sections.

SIGNIFICANCE CRITERIA

The following criterion could be used to assess the cumulative impacts of the proposed Project combined with past, present, and reasonably foreseeable future projects on migrating bird populations. This criterion is adapted from the CEQA Appendix G Guidelines as follows "activities that result in the killing of migratory birds or destruction or abandonment of migratory bird nests and/or eggs (Migratory Bird Treaty Act)."

GEOGRAPHIC SCOPE

The geographic scope of analysis for cumulative impacts to migratory birds is a 30-mile radius surrounding the proposed Project area. The radius chosen is not a limit for the area of potential cumulative impacts for migratory birds, but it represents the area within which reasonable foreseeable development activities through 2020 have been reviewed and quantified. In addition, this radius includes the Salton Sea which is an important stopping point and wintering grounds for migratory birds. The geographic scope includes approximately 2,410,400 acres and 51,400 acres of the Salton Sea (Figure 3, Attachment A).

REASONABLY FORESEEABLE DEVELOPMENT

Based on a review of proposed urban development activities and renewable energy development within the analysis area, an additional 97,470 acres may be developed by 2020 (see Table 1-1). The potential acreage of development would represent an increase in the developed land area surrounding the project by 4 percent. A description of the types of developments is provided in Section 1.0. The location of the potential development areas are shown in Figure 3 (Attachment A).

CUMULATIVE IMPACT DATA

Potential effects to migratory birds associated with development activities include: changes in vegetation type, habitat fragmentation, increases in human activity, changes in predator patterns and changes in overall wildlife activity patterns and distribution. Changes in vegetation type will change the type of species that use the area. Habitat fragmentation causes changes in migratory bird usage due to the breaking up of a large habitat into smaller patches or fragments of habitat. Human activity may cause disruption to nesting and changes in habitat usage patterns. Changes in land use, such as the construction of facilities and fencing may cause a change in predator and wildlife activity by providing perching opportunities for predators.

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 6-13 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 6-13. 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).

Seasonal migration is one of the main activities of birds that can bring them into the proximity of wind turbines. Many types of birds migrate primarily at night, when they may be less able to see and avoid tall structures intersecting their flight paths. Most migrants fly well above "turbine height" usually between 50m and 1,000m above the ground. The SunCatchers of the proposed Project would be 56 feet high, which is well below this height. Two wind projects are includes in the reasonably foreseeable future project, one located west of the Project area and one located just south of the border with Mexico. Birds should safely clear these turbines as well (Richardson 1998).

However, birds are at a much lower elevation when taking off or descending to land. One of the key stopping points on the Pacific Flyway is the Salton Sea, which is within the geographic scope of this analysis. Several transmission lines are proposed within 4 miles of the Salton Sea which could be a collision hazard for birds taking off from and descending to the Salton Sea. Power lines present a real threat for migrating birds and are a significant cause of mortality for some bird species (Erickson et. al. 2001).

PROPOSED MITIGATION MEASURES

The mitigation measures outlined in the *Suggested Practices for Avian Protection on Power Lines: The State of the Art 2006* (APLIC 2006), would help prevent bird electrocution and collision from power lines associated with the Solar Two project.

CUMULATIVE EFFECTS SUMMARY

The proposed project is greater than 20 miles from the Salton Sea which is an important stopover point for migrating birds of the Pacific Flyway. The SunCatchers are not tall enough to impact birds migrating between the Salton Sea to the Gulf of California. In addition, the proposed transmission line is not near the Salton Sea and would not pose a risk to birds taking off or landing on the Salton Sea. The appropriate mitigation measures outlined in the *Suggested Practices for Avian Protection on Power Lines: The State of the Art 2006* (APLIC 2006) will ensure that the proposed off-site transmission line would minimize the potential for bird collisions and electrocutions.

This would prevent adverse impacts to migrating birds from occurring as a result of the proposed project. Therefore, the proposed projects' contribution to a cumulative impact to migrating birds would be rendered less than cumulatively considerable and would not be significant.

7.0 LAND USE

7.1 INTRODUCTION

According to the AFC, the potential impacts to land use associated with the Project are due to the conversion of 6,183 acres from Government Service BLM-administered public land and County Open Space use to solar electric generation. The cumulative impacts analysis in the AFC was limited by the uncertainty of future development patterns and changes to the land use codes and plans. This supplemental cumulative analysis considers urban development patterns as forecasted by the Cal DLRP and renewable energy development forecasted by the RETI (see Introduction 1.0).

7.2 SIGNIFICANCE CRITERIA

Determining the significance of potential cumulative impacts to land use associated with the Project can be derived from CEQA and NEPA guidelines. In Appendix G of the CEQA Guidelines (Environmental Checklist Form, Section IX), cumulative impacts are cumulatively considerable if:

- The proposed Project would conflict with applicable land use plans, policies, or regulations of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating environmental effects.
- The proposed Project would divide an established community or disrupt an existing or recently approved land use.
- The Project would conflict with any applicable habitat conservation plan or natural community conservation plan.

While there are no specific NEPA guidelines for determining significance of cumulative land use impacts, the BLM NEPA handbook suggests that authors describe the interaction among the effects of the proposed action and past, present, and reasonably foreseeable actions. This interaction may be:

- Additive: The effects of the actions add together to make up the cumulative effect.
- Countervailing: The effects of some actions balance or mitigate the effects of other actions.
- Synergistic: The effects of the actions together are greater than the sum of their individual effects.

Land use in the area surrounding the project site are described in the AFC in Section Sections 5.9 and 5.18 and Figure 5.8-2. Land use within the region including the Project site is dominated by agricultural with recreational, military, government (BLM), community, and small portions of industrial and urban activities. Past and present activities including development (residential and commercial), OHV use, infrastructure development (highways and roads), and agricultural activities have changed a land use from relatively undeveloped region.

The findings in the AFC for land use impacts using CEQA and NEPA significance criteria include:

1. (CEQA) The Project would not require variances in noise levels, use regulations, or land use ordinances and would not conflict with applicable land use plans policies, or regulations.

2. (CEQA) The Project would not divide an established community or disrupt an existing or recently approved land use.

3. (NEPA) There could be additive impacts associated with land use changes and recreation. Given the heavy use of the Project area and areas surrounding the Project boundary for OHV use, the potential to displace these activities is high. Considering the number of other large development projects that are reasonably foreseeable within the study area including residential and commercial development as well as renewable energy projects, the availability of open space for OHV recreation could be cumulatively affected.

4. (NEPA) The Multiple Class Designation for the Project site would be changed from designation "Limited" to "Intensive" so that future uses planned for the project site (power generation) better match the designations in the CDCA Plan (BLM 1980, as amended).

7.3 GEOGRAPHIC AND TEMPORAL PARAMETERS

The availability of new forecast information for land use patterns in the region including the Project site supports cumulative impacts analysis to land use using expanded the geographic and temporal parameters. The Cal DLRP (2008) completed a forecast of urban development in 38 counties in California from 1984 to 2050. The pattern of urban development anticipated for Imperial County and Eastern San Diego County is shown in Figure 7-1. In addition, the RETI Phase IB Study released in January 2009 includes a list of renewable energy resources and transmission lines that are likely to be located in Imperial County and eastern San Diego County (RETI 2009). These resources are illustrated in Figure 3 (Attachment A) and listed in Table 1-1.

The current land use distribution in Imperial County was as follows (CCBRES 2007):

1. Total land area of Imperial County is about 2,942,080 acres.

2. Approximately half of the Imperial County land is undeveloped and managed by Federal agencies (primary BLM).

3. Less than one percent of the land area is considered "urban" and it is evenly split between incorporated and unincorporated management.

4. Irrigated agricultural lands comprise almost 20 percent of the land area.

5. The Salton Sea covers about seven percent of the land area.

The Imperial Valley extends south into Mexico and joins with the Mexicali Valley to create about 50 square miles of irrigated agricultural production. The total land area of Mexicali was 1,413,980 hectares with about 25,620 hectares or 2 percent considered urban (CCBRES 2008).

7.4 CUMULATIVE LAND USE IMPACTS

Using the urban development forecast and RETI data, it is possible to illustrate the size and speed of land use changes in Imperial County. The size of urban development in 1984 and 2006 as well as forecasted urban development for 2020 and 2050 are shown in Table 7-1. The renewable energy and transmission development forecasted by RETI Phase IB data for Imperial County is estimated to be completed between 2006 and 2020. Renewable energy development beyond 2020 is uncertain and is assumed that the State targets for renewable energy would have been achieved by then requiring no further renewable energy development. This is likely an under-estimate of future development beyond 2020, but is appropriate for this analysis.

Urban development in Imperial County is expected to increase by about 19,000 acres between 2006 and 2020. Renewable energy development in Imperial County is expected to change the land use status of about 34,000 acres during that same time period. Based on these forecasts, the total estimated "developed" land area in Imperial County is expected to increase from about 1 percent to more than 2 percent by 2020, essentially doubling the developed land area in 14 years. This rate of development is much faster than in the past and renewable energy development is the major contributor to the acceleration.

Table 7-1. Estimated Land Use in Imperial County.

Land Use	Past – 1984 Acres	2006 Acres	2020 Acres	2050 Acres
Urban Development	19,160	25,075	44,000	85,700
Renewable Energy & New Transmission			34,000	
TOTAL Estimated Acres	19,160	25,075	78,000	85,700
% of Imperial County Land Area (2,942,080 acres)	0.6%	0.8%	2.7%	3%
Solar Two Project			6,183	

Data sources: RETI 2009, Cal DLRP 2009.

The more specific data available from with RETI and Cal DLRP urban development forecasts allows us to better define future land use impacts than what was possible with the data available for the AFC. The Project would contribute to about 8 percent of the estimated land use change or development between 2006 and 2020. Given the speed and extent of land use change during the time period when Solar Two would be built and operated, it would have an additive cumulative impact on land use. This level of impact does not exceed any of the significance thresholds defined in CEQA; however, it will be measurable and noticeable by Imperial County residents and could motivate future land use code or regulations changes that limit the rate or span of development in the County.

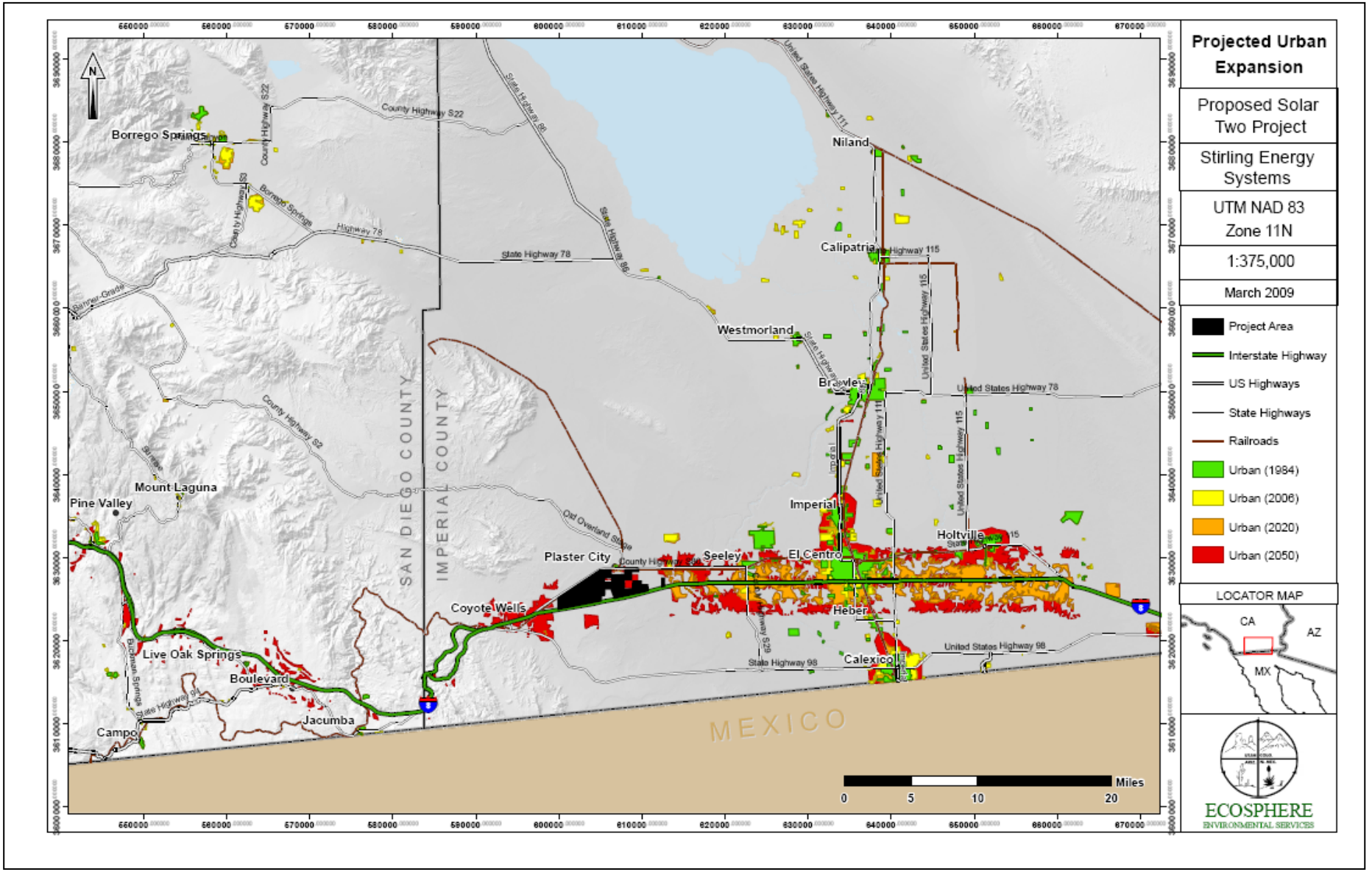

Figure 7-1. Pattern of Urban Development in Imperial and Eastern San Diego Counties

8.0 SOCIOECONOMICS

8.1 INTRODUCTION

This section considers the cumulative socioeconomic analysis using a wider geographic area than the socioeconomic analysis included in the AFC and some updated information on population and employment in the region. A recent New York Times article called El Centro, California the "capital of the Great Recession" (NYT 2009). The Times reported that El Centro (located 5 miles east of the Project site) has one of the highest unemployment rates in the nation at 22.6 percent. Although the relatively high unemployment rate in Imperial County is considered in the AFC socioeconomic analysis, the potential employment impact of other renewable energy projects is not fully evaluated because of data gaps. The recent Renewable Energy Transmission Initiative (RETI) Phase 1B report provides information that can be used to fill the data gaps and support a more complete cumulative analysis.

8.2 SIGNIFICANCE CRITERIA

The criteria used in the AFC to determine whether Project-related socioeconomic impacts would be significant are derived from the CEQA Guidelines, Appendix G. Socioeconomic impacts are deemed significant if they:

- cause substantial growth or reduction of population,
- cause substantial increase in demand for public services and utilities,
- displace a large number of people or existing housing, or
- disrupt or divide the physical arrangement of an established community, or result in substantial long-term disruptions to businesses.

NEPA provides no specific thresholds of significance for socioeconomic impact assessment. Significance varies, depending on the context of the proposed action (40 CFR 1508.27[a]), but 40 CFR 1508.8(b) states that indirect effects may include those that are growth inducing and others related to induced changes in the pattern of land use, population density, or growth rate.

The socioeconomic assessment in the AFC concludes that:

- The Project will not displace any current jobs and will not affect the surrounding agricultural enterprises.
- The Project will also not displace any people, as the Project Site is currently unused.
- The increase in permanent employees is not expected to have an adverse effect on employment, housing, tax revenues, public services, or utilities. In addition, the Project is expected to have a positive effect on the local economy because it will introduce jobs and potentially increase tax revenues, due to the construction and operational employees' economic activities.
- The Project is not located within any established communities; therefore, the Project will not divide an established community.

8.3 GEOGRAPHIC AND TEMPORAL PARAMETERS

The cumulative socioeconomic analysis in the AFC is based on the following assumptions (see Section 5.18 in the AFC):

1. The study area is dominated by small urban centers (El Centro and Ocotillo), military, recreational and agricultural activities.

2. Past contribution of jobs created (1,300 in 2006) from the Naval Air Facility El Centro was significant for this area.

3. Reasonably foreseeable future activities, including development (residential, commercial, roadway), other renewable energy projects, agriculture, and military activities would continue to provide job opportunities in the region. The duration of jobs created by future projects cannot be determined at this time. Whether the work force supporting these projects would be housed locally or commute from other areas within the region is also unknown. Considering that past and present construction- related activities resulted in beneficial effects to the region, it is likely that future projects would also contribute beneficially to the socioeconomic environment in the region.

The RETI Phase IB Study released in January 2009 includes a list of renewable energy resources and transmission lines that are likely to be located in Imperial County and eastern San Diego County. These resources are illustrated in Figure 3 (Attachment A) and listed in Table 1-1. In addition to the Project (750 MW), the RETI Study anticipates that by 2020 the following projects will be built in Imperial County, Eastern San Diego County and Baja Norte, Mexico:

- 6 Solar Thermal Electric projects totaling 1,200 MW
- 15 Solar Photovoltaic project totaling 300 MW
- 5 Wind projects totaling 723 MW
- 6 Large Wind projects in Baja Norte Mexico totaling 4,100 MW
- 3 Geothermal projects totaling 1,362 MW
- 1 Biomass project totaling 36 MW
- 26 Transmission projects totaling 280 miles
- 5 Substations

There will also be further urban development and at least one large non-energy project, the Wind Zero Military Training facility constructed next to the Project site.

To estimate employment associated with the anticipated energy development, we consider the jobs estimated for the Project in the AFC. It is expected that during the construction phase there would be an average of 360 people per month working on the Project, totaling 24,086 personnel months for the 40-month construction period. Monthly construction personnel would peak at a maximum of 731 workers. The AFC estimates that the Project would be operated by a staff of approximately 180 full-time employees at full operation. For the Project, this amounts to about one-quarter full-time permanent employee per MW of operation and 32 personnel months of construction labor per MW over the 40-month construction period. Relative to other types of renewable energy, the SES SunCatchers are more labor intensive to build and operate. Therefore, we assume that on average the

renewable energy projects will require about two-thirds the workforce that the Project will require or 0.17 full-time employees per MW of operation and 21 personnel months of construction labor per MW. The estimated workforce needed in the region for the energy projects anticipated to be built by 2020 (total of 3,620 MW excluding Solar Two and the Baja Norte projects) is 7,600 personnel months of construction labor each year between 2010 and 2020 assuming 362 MW were started each year. In addition 615 permanent employees would be needed to maintain and operate these facilities. This is likely an under-estimate of actual labor needs because the large wind projects in Baja Norte Mexico will require significant labor and a share of it will likely come from the US. Also transmission line and substation construction have not been included explicitly in the estimate.

In the AFC, it is assumed that approximately 90 percent of the workforce required for the Project would reside in southern California. The remainder may come from other areas in California, Arizona, or Oregon. It is anticipated that specialized trades and higher skill level construction personnel would commute to the construction site on a weekly basis and would reside in temporary housing or apartments during the week for the duration of the Project. The socioeconomic analysis in the AFC (Section 5.10) includes detailed information on population, employment and income for the El Centro Metropolitan Statistical Area (MSA), Imperial County, and the San Diego-Carlsbad-San Marcos MSA (Tables 5.10-3 and 5.10-4). These data are used to determine that housing and public services would not be significantly impacted by the Project.

8.4 CUMULATIVE SOCIOECONOMIC IMPACTS

Given the estimated labor needs for the anticipated renewable energy development in the region surrounding Solar Two, would there be a significant cumulative impact to housing or public services? A recent study for the California Energy Commission on the Border region found that "The Imperial Valley–Mexicali border area has a combined population of nearly one million residents. The Imperial Valley's border towns include Brawley, Imperial, El Centro, Calexico, Heber, and Seeley; on the Mexico side of the border is Mexicali. The overall population for Imperial County is expected to double in the next 30 years, from nearly 150,000 to 300,000. To accommodate this growth, Imperial Valley's border towns are expected to add 22,000 new homes in 2005 and beyond. A population forecast for Mexicali shows a steady rise in the current population between now and 2030 from 800,000 to 1.5 million" (CEC 2005). Employment projects for Imperial County estimate a total increase of non-farm employment from 40,700 in 2002 to 51,000 in 2012 or a 25 percent increase. The industries with the most job growth are to be Trade, Transportation, and Utilities adding 3,250 jobs, Government adding 2,450 jobs, and Natural Resources, Mining, and Construction adding 950 jobs (CCBRES 2007). The job growth anticipated in the forecast is not being realized. In fact, recent layoffs at Plaster City (wallboard manufacturing facility) and other large employers in the region have resulted in El Centro having the highest unemployment rate in the US at more than 22 percent (NYT).

The anticipated employment needs of the renewable energy industry (7,600 personnel months of construction labor and 615 permanent employees between 2010 and 2020) are consistent with the optimistic employment forecast for Imperial County for 2012. However, it is unlikely that housing stocks and public service capacity are growing during the recession because of lack of jobs and tax revenues to support growth. This could create a shortage of housing or public services if the anticipated renewable energy projects occur simultaneously starting in 2010 because the housing additions needed to meet future population and employment will not be complete. In 2005, Imperial County had an estimated population of 144,500 and about 4,500 housing units (CCBRES 2007). The labor force was 57,900 persons with 4,400 construction workers and 5,800 unemployed. The housing vacancy rate was just

over 9 percent. If the construction workforce in Imperial County increases by the equivalent of 7,600 personnel-months or more because of renewable energy development in the area, there could be a measurable impact on the availability of housing and capacity of public services, especially if housing stocks and public services do not expand during the recession. The extent of any shortages will depend in part on employment numbers and whether workers occupy permanent or temporary housing. This could result in a measurable socioeconomic impact, but it is not possible to determine whether a significance threshold will be exceeded because the number of new residents in the Imperial Valley as a result of renewable energy development and the amount of housing built between 2006 and 2020 is too uncertain. Therefore, as in the AFC, the Project would not have any significant socioeconomic impacts.

9.0 TRAFFIC AND TRANSPORTATION

9.1 INTRODUCTION

The AFC finds that construction and operations traffic for Solar Two would not coincide with known potential future projects, so its contribution to cumulative traffic would not be cumulatively considerable, and cumulative effects of the Project would therefore be less than significant. With the additional data regarding foreseeable future development for the area surrounding the Solar Two site, we reconsider the potential for significant traffic and transportation impacts.

9.2 SIGNIFICANCE CRITERIA

A project would result in a significant effect when it will "cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system," according to the guidelines established in California Energy Commission Staff Application for Certification Instructions and those set forth in California Environmental Quality Act, Appendix G (1), (Public Resources Code Section 21000 *et seq)*. Generally, the capacity of the street system is determined by the State Highway Level of Service (LOS) Standard acceptable to the local governing agencies. The LOS criteria for the local circulation system are defined by the Imperial County General Plan Circulation and Scenic Highway Element and have set a standard of LOS C. Consequently, LOS A, B, and C are considered acceptable, whereas LOS D, E, and F are unacceptable.

9.3 GEOGRAPHIC AND TEMPORAL PARAMETERS

Recently, the Imperial Valley Association of Governments revised the Highway Element of the Imperial County Transportation Plan (IVAG 2008). According to the draft plan, "Substantial growth in population is anticipated for the County. If that rate of growth continues, the population will more than double in the next 25 years. Future conditions could also include potential developments such as the expansion of the Calexico Port Of Entry, the Silicon Border Development, a cargo airport, and a Calexico casino." (IVAG 2008). This anticipated growth is consistent with the urban development patterns included in the reasonable foreseeable development considered in this cumulative impacts supplement.

9.4 CUMULATIVE TRAFFIC AND TRANSPORTATION EFFECTS

The revised Imperial County Transportation Plan finds that traffic volumes estimated for 2025 will result in LOS D, E, F for Interstate 8 and most major streets and highways east of the Project site (IVAG 2008). The west end of the Evan Hewes Highway and Interstate 8 are

not forecast to drop below LOS C. Therefore, considering urban development patterns anticipated for Imperial County, the conclusion in the AFC that the contribution of the Project to cumulative effects on traffic and transportation circulation is not likely to be significant is valid.

10.0 NOISE

10.1 INTRODUCTION

This section generally supplements information on sound resources (Noise) provided in the AFC and also incorporates modifications to equipment levels for the Project made after release of the AFC, as well as recent applicable information on the Project area identified in the Sunrise Powerlink EIR/EIS (2009).The AFC has indicated that no significant cumulative effects to sound levels in the Project area are expected during construction, concurrent construction and partial Project operation, and full operation when construction is complete.

Construction noise would be temporary and would conclude upon completion of Project construction. Although operation of the Project would add noise to the ambient sound environment, the AFC indicated that the magnitude was not considered significant and would dissipate with increasing distance from the Project boundary.

The AFC predicted that operational noise levels would be in compliance with all applicable local LORS at sensitive receivers (limited to less than 50 dBA L_{eq} daytime/45 dBA L_{eq} nighttime) and at Project property lines (75 dBA hourly limit). Additionally, the calculated increase of ambient sound level generated by Project operation was calculated to be no more than +4 decibels at a representative nearby noise-sensitive receiver, which is an increase of less than 5 dBA L_{eq} (AFC 2008).

10.2 SIGNIFICANCE CRITERIA

The following criteria may be considered in assessing the cumulative impacts of the proposed Project combined with potential effects from past, present, and reasonably foreseeable future projects on sound levels. These criteria are adapted from BLM, EPA, and CEQA noise guidelines, and Imperial County Land Use Compatibility Guidelines. Factors to consider in determining impacts on sound levels include:

- **EPA Guidelines**
    - EPA has published a guidance document that specifically addresses issues of community noise (EPA Levels Document, Report Number 550/9-74-004). This report, commonly referred to as the "Levels Document," contains goals for noise levels pertaining to public health and welfare and is not a legal document. It, however, does recommend that noise levels in outdoor residential use areas not exceed Ldn levels of 55 dBA (EPA 1974).

- **Imperial County Policy C3 and C4 Guidelines**
    - The Project would be located entirely within unincorporated Imperial County, where noise is regulated by the Imperial County Code (Section D.8.3.3) Ambient Noise Levels.

- If future noise levels after the Project is completed will be within "normally acceptable" noise levels as outlined by the State of California General Plan Guidelines (as shown in Table 5.12-9 of the AFC) and the Imperial County General Plan Noise Element (2003), but will result in an increase of 5 dB community noise equivalent level (CNEL) or greater, it will be considered a potentially significant noise effect. In the case of the proposed Project, normally acceptable noise levels would be up to approximately 70 dB (CNEL) for industrial, utilities, and agricultural land use categories.
- If future noise levels after completion of the project are greater than the "normally acceptable" noise levels outlined by the State of California General Plan Guidelines (see Table 5.12-9 in the AFC), a noise increase of 3 dB CNEL or greater would be considered to be a potentially significant effect.
- The one-hour average sound level limit for general industrial zones is 75 dB (CNEL). No guidelines have been specified for agricultural lands, or County open space and Government Service BLM-administered public lands, which is the current zoning for the Project area. If the ambient sound level meets or exceeds the property line standard, the increase of the existing or proposed noise shall not exceed 3 dB L_{eq}.
- Construction noises shall not exceed 75 dB when averaged over an 8-hour period.
- Under Imperial County Code Section 90702.00, Subsection A, average hourly noise in residential areas is limited to 50 to 55 dBA from 7 am to 10 pm and to 45 to 50 dBA from 10 pm to 7 am. With respect to the lower values of these ranges, this effectively prohibits sources that cause more than 53 dBA CNEL on a day-night basis.
- A 1-hour average sound level over 75 dB L_{eq} should not be exceeded during construction (Sunrise EIR/EIS 2009, AFC 2008).
- Construction equipment operation shall be limited to the hours of 7 am to 7 pm Monday through Friday and 9 am to 5 pm on Saturday. No construction operations are permitted on Sunday or holidays.

- **State of California (CEC) Guidelines**
  - Increases in operation noise above ambient background noise levels by 5 dBA or greater at noise-sensitive receptor locations would be considered significant (Sunrise Powerlink EIR/EIS 2009, AFC 2008).

10.3 GEOGRAPHIC AND TEMPORAL PARAMETERS

The cumulative analysis area for the sound environment was determined based upon the distance from the project site boundaries to the nearest sensitive receptors identified in the area and the boundary where modeled noise levels for project construction and operation would be below 55 dBA or where increases in the ambient noise levels from project activities would be below 5 dBA, whichever boundary was greater. This area effectively is approximately a 2.5 to 3-mile radius from all project boundaries and generally equates to the area shown in Figure 5.12-1 in the AFC (2008). The calculations used to confirm this cumulative analysis boundary are detailed below.

To confirm the boundaries for the general cumulative analysis geographic extent of changes to the sound environment, it was first assumed that the highest noise-producing activities

would occur during construction actions. Since release of the AFC, the number and timing of equipment use for the Project has been modified from information presented in Table CC-3-1 in Appendix CC-3 of the AFC. The revised monthly construction equipment projection information is provided as Table 1, Attachment D to this text,

Using the numbers provided in the new monthly construction equipment projection list and decibel levels as identified in Table CC-3-1, in Appendix CC-3 of the AFC, it was also assumed that the highest noise-producing construction equipment (generally dozers, cranes, concrete pumps, dump trucks, flatbed trucks, loaders and water trucks at 114 dBA at 1 meter from the equipment) could be used within approximately 50 meters of the project boundaries. Additionally, it was assumed that a combination of equipment would be used near the boundaries during the "noisiest" construction month (which appears to be the 2nd month of construction with 37 uses of equipment with base sound values of 114 dBA at 1 meter as shown on the new equipment numbers projection table and Table CC-3-1). The noise levels generated during this period are expected to be higher than during subsequent periods when both construction and SunCatcher operation activities coincide, or when only operation activities are occurring. It was further assumed that at 100 percent utilization as indicated on Table 1, Attachment D, that all 37 pieces of equipment would be utilized continuously throughout that month. This scenario is considered to be very conservative; a more realistic expectation is that varying numbers of high-level noise equipment would be used throughout the month at varying locations in the Project area; however, to simplify the development of a cumulative analysis area, the full scale equipment use scenario was used to represent the highest possible noise levels that could be associated with the Project.

Because noise is measured on the decibel scale (a logarithmic scale), combining two noise levels is not achieved by simple addition. For example, combining two 60 dBA noise levels does not equal a noise level of 120 dBA (which is near the threshold of pain), but yields 63 dBA, which is lower than the volume at which most people listen to their televisions. In addition, when the difference between two noise levels is 10 dBA or more, the amount to be added to the higher noise level is zero. In such cases, no adjustment factor is needed because adding in the contribution of the lower value in the total noise level makes no perceptible difference in what people can hear or measure. For example if a workplace noise level is 95 dBA and another machine is added that produces 80 dBA noise, the workplace noise level will still be 95dBA (FTA 2006). Table 10-1 identifies how to calculate combined noise levels.

Table 10-1. Calculating combined noise levels

When Two Decibel Values Differ by	Add the Following Amount to the Higher Value
O or 1 dB	3 dB
2 or 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0 dB

Source: FTA 2006 and Canadian Center for Occupational Health and Safety 2009

For the Project, it was assumed that all equipment operating during the second construction month that operated at dBAs less than 114 would not be perceptible when combined with the 37 pieces of equipment that would be operating at 114 dBA. To determine noise levels generated from the use of multiple 114-dBA equipment, the following methodology was used:

1. One 114 dBA level reading for one piece of construction equipment was subtracted from the second 114 dBA level reading for another piece of construction equipment to get a difference of 0.

2. Since the value between the two readings is 0, the amount that is added to one of the readings is 3 (see Table 10-1).

3. 114 + 3 = 117

4. This value was then taken and subtracted from the next 114-dBA equipment reading, repeating the process over again:

5. 117 dBA – 114 dBA = 3 dBA

6. Because the difference in the readings is 3 dBA, the amount to be added to the higher reading value is 2 dBA:

7. 117 dBA + 2 dBA = 119 dBA

8. This process was repeated until the difference between the two values reached 10 and no additional dB were added.

    - 119-114 = 5 dB
    - 119+1 = 120
    - 120-114 = 6
    - 120 + 1 = 121
    - 121-114 = 7
    - 121+1=122
    - 122-114=8
    - 122+1=123
    - 123-114=9
    - 123+1=124
    - 124-114=10
    - 124+0=124

It is assumed, worse case, that the highest dB levels that would be achieved with all 37 pieces of 114-dB level construction equipment being used in close proximity would be 124 dB at 1 m. To further confirm cumulative analysis area boundaries for noise effects, it was assumed that that construction and operation would generally occur approximately 50 meters within the project boundaries.

When one doubles the distance from a noise source, the recorded noise level is reduced by 6 dB. This is also called the *Rule of 6* (FTA 2006, Wiki 2009). To determine the cumulative analysis boundary for the Project where levels would drop below 55 dBA or less than 5 dBA of change, the noise levels during the nosiest construction month were assessed using the general calculations identified below.

1. Assumed 124 dB at 1 meter from equipment located approximately 50 meters within the boundary based on the calculations developed previously.

2. 2 meters from the equipment the noise level would be 124 - 6 = 118 dB

3. 4 meters from the equipment, noise levels would be 118 – 6 = 112

4. 8 meters; 112 – 6 = 106

5. 16 meters; 106 – 6 = 100

6. 32 meters; 100 - 6 = 94

7. 64 meters; 94 – 6 = 88

For the cumulative analysis boundary determination, noise levels at the project boundaries were conservatively estimated at between approximately 88 and 90 dB during the noisiest construction period. Actual levels should be considerably less than this assuming varying numbers of equipment use and location, and additional reductions due to air absorption and ground attenuation.

The nearest sensitive receptors to the project boundaries are located approximately 3,200 feet northwest of the northwestern corner of the project boundary (CR or near 1510 Painted Gorge Road), approximately 5,000 feet from the western project boundary (ML-1, near 426 Evan Hewes Highway) and about 3,000 feet northeast of the 25-acre laydown area (ML-5 or 2828 Evan Hewes Highway) (ML-1 and ML-5 are represented on Figure 5.12-1 in the AFC). Using the calculations identified above for distance doubling, the predicted dBA at these locations from construction sound levels would be approximately 60 to 62 dBA or less as follows:

1. 64 meters (at property boundary) = 88 dB (Actual calculations indicate that the construction noise levels at the property boundary are predicted to be between approximately 75 and 80 dBA – see Section 10.4 for a detailed discussion).

2. 128 meters: 88-6=82

3. 256 meters; 82-6=76

4. 512 meters; 76-6=70

5. 1024 meters (or approximately 3072 feet); 70-6=64

6. 2048 meters ; 64-6=58

7. 4096 meters (or approximately 12,288 feet or 2.3 mile radius); 58-6=52

Operational noise levels would be significantly lower than construction levels.

Once the boundary locations for the cumulative analysis area for noise effects was confirmed, additional GIS mapping was used to identify which past, present and reasonably foreseeable future projects as identified in Table 1-1 would be located within the sound resource cumulative analysis area. Table 10-2 identifies those projects that were included in the cumulative analysis for noise; locations may also be seen on Figure 3 Reasonable Foreseeable Development in Attachment A.

Table 10-2. Past, present and reasonably foreseeable future projects located within the sound resources cumulative analysis area.

Map Reference Number Figure 3	Type of Project	Average Distance from Project Boundaries to Solar Two Boundaries

Past and Present Development		
	OHV Trails (Open and Closed) (5-foot corridor)	2 miles or less
	Roads (US, State, County)	Less than 1 mile
	Open ATV Trails	2 miles or less
	Plaster City OHV Area	2 miles or less
	Plaster City Drywall Plant	Shared boundary
Future Development		
W1	Wind Project	0.5 mile or less
CL3	Collector Line (100-foot corridor)	Less than 1 mile
CL4	Collector Line (100-foot corridor)	Less than 1 mile
CL5	Collector Line (100-foot corridor)	Less than 1 mile
CL6	Collector Line (100-foot corridor)	Less than 1 mile
CL7	Collector Line (100-foot corridor)	Less than 1 mile
CL8	Collector Line (100-foot corridor)	Less than 1 mile
CL9	(100-foot corridor)	Less than 1 mile
CL10	Collector Line (100-foot corridor)	Less than 1 mile
CL12	(100-foot corridor)	Less than 1 mile
CL16	Collector Line (100-foot corridor)	Less than 1 mile
CS1	Collector Substation	Within the project boundaries
CS4	Collector Substation	Within 0.5 mile
	2020 Urban Development Plan	Within 1 mile
WZ	Wind Zero Training Facility	Within 1 mile

Sources: RETI 2009, Cal DLRP 2009, Wind Zero 2009.

10.4 CUMULATIVE NOISE SUMMARY

Due to changes associated with modifications to the estimated number of equipment needed for construction of the Solar Two Project, revisions to noise level calculations presented in the AFC are included in the following sections. Prediction methods used for this analysis are generally consistent with those described in Section 5.12.2.2 of the AFC, with a few minor exceptions as noted.

Using the revised monthly construction equipment project list from March 20, 2009, which is attached as Table 1 Attachment D, construction noise was re-estimated for the Solar Two Project for both a SunCatcher 18-megawatt (MW) block construction activity zone and for overall construction activity as delineated in the AFC. For this discussion, the "noisiest" construction location in the Project area was generally defined as the project boundary line position located closest to the southeast corner of the proposed Main Services Complex and the southwest corner of the proposed 750-MW Substation (as identified in AFC Figure 5.12-1). At this location, and conservatively ignoring air and ground attenuation effects, the re-

estimated construction noise level for overall construction and 18-MW block activity was modeled to be 75 dBA and 80 dBA L_{eq}, respectively. If air and ground attenuation are considered, it is anticipated that project construction levels would be below the 75 dBA construction average limit for an 8-hour period as required by County code.

During operations, the "noisiest" project boundary line position was identified as being co-linear with either the northern or southern edge of the existing transmission line ROW that generally splits the Solar Two Project area into eastern and western portions. Such a position would be located, for instance, near ML-3 as shown on Figure 5.12-1 of the AFC. At this position, the operational noise model using the new equipment information identified operation noise levels at the property boundary of about 70 dBA L_{eq}.

Noise modeling for the Solar Two Project activities used the Cadna/A Noise Prediction Model (Version 3.7.124), as discussed in Section 5.12.2.2 in the AFC, which incorporates industry-accepted air and ground acoustical absorption factors. Air absorption and ground attenuation factors were applied to the Solar Two Project model using the following assumptions:

- an approximate air absorption rate of -1dBA per 1,000 feet (ISO 9613-2:1996b(E), Table 2);
- sound is traveling through "standard air" (70° F, 50% RH); and
- an industry-accepted ground attenuation formula was used (ISO 9613-2:1996b(E), Eq. 10.

In addition, it was assumed that 18-MW Suncatcher block construction would be oriented north-to-south and dimensioned roughly 4000 feet (North-South) by 1,000 feet (East-West) (see Figure 3.13 in the AFC) and that there would be room for only one 18-MW construction block along the western portion of the property boundary. Additional 18-MW blocks (built before or after any construction located along the western boundary of the Project area) would have to be located further from the western property boundary by at least 1,000 feet.

To predict expected future noise levels in the Solar Two Project cumulative noise analysis area, the following assumptions were made regarding future projects located within the analysis area:

- The "W1" Wind Project located west of the Solar Two Project area was conceptually considered to be a wind farm composed of twenty-four 1.8-MW Vestas V80 wind turbine generators (WTG), spaced in three east-to-west rows of eight with approximate rectangular grid spacing centers of 750 m in each direction. Operation was assumed to be day and night at 9 meters per second wind speed, corresponding with a sound power level (PWL) of 104.4 dBA per WTG). The southeast corner of this farm would be located approximately 1,500 meters west of the sensitive receptor near 426 Evan Hewes Highway (ML-1) and about 2,800 meters west of the sensitive receptor represented as 1510 Painted Gorge Road (CR, or the closest identified receptor to the Solar Two project).

- Traffic volumes on Interstate 8 and Evan Hewes Highway would need to double in order to increase their noise component by 3 dB. A 25 percent increase in traffic volumes, assuming vehicle mixes/proportions remain the same, would only create a 1 dB increase from ambient levels. For some locations, especially those near such roadways, these increases would likely increase the ambient noise by the same

decibel amount in the absence of other sources (i.e., the cumulative projects under consideration). At other locations, however, where other ambient sources may have comparable or even dominant contribution (e.g., aircraft overflights, existing operating machinery, flows of water in exposed irrigation canals, wildlife, etc.), these increases in traffic noise may not meaningfully influence the aggregate. Hence, traffic noise increases were not considered in the above table.

- The "Wind Zero" Project was identified as a proposed private racetrack based on data identified on the project website. The project would feature an east-to-west straightaway section that lies approximately 1,600 m south of sensitive receptor site ML-1, and 3,200 m south of sensitive receptor site CR. Based on information obtained from similar projects, the following input parameter assumptions were used for a coarse operation noise model for the Wind Zero Project:
    - 0.5 mile length of the raceway straightaway segment that passes closest to the sensitive receptor (pass-by)
    - 124 dBA (PWL) per 750 HP sports car
    - 5 cars would occupy the straightaway during a pass-by
    - Average of 100 miles per hour for vehicles on the track
    - 6 mile length of track
    - 16 laps per hour
    - 0.8 minutes for a group of cars to pass-by
    - 14 minutes out of an hour that a group of cars are on the pass-by
    - 3 hour length for a typical race event during one active racing day

If the assumptions identified here are changed to better reflect future action characteristics, cumulative noise estimates identified for the Solar Two Project would need to be modified.

Based upon the preceding assumptions, cumulative noise estimates were generated for sensitive receptor sites located closest to the Solar Two Project area and compared to estimated construction and operation levels identified for the Project. These estimates are summarized in Table 10-3. The cumulative noise totals represent logarithmic additions of the indicated predicted activity noise levels.

Table 10-3. Modeled sound levels at sensitive receptor locations from the AFC.

Project	Activity	Estimated Sound Levels at Sensitive Receptor Locations, Average Daytime L_{eq} (dBA)		
		ML1[1]	CR[2]	ML5[3]
Solar Two (S2)	"Overall" Construction	32	38	27
	"18MW Block" Construction	54	54	43
	Operation	47	50	46

W1	Operation	29	26	< 20
Wind Zero (WZ)	Operation	55	44	< 20
Cumulative Operations (W1 + WZ + S2)		56	51	46
Cumulative (W1 Operations + WZ Operations + S2 Overall & Block Construction)		58	55	43
Ambient Levels		48	48	55

[1] Measurement location and receptor at 426 Evan Hewes Highway residence yard
[2] receptor at 1510 Painted Gorge Road, called ML1 in section 5.12.2.2 of the AFC, assumed to have ambient levels similar to 426 Evan Hewes Highway
[3] 2828 Evan Hewes Highway residence property line
Source: URS 2009

As identified in Table 10-3, construction activities in the Solar Two Project area may temporarily increase noise levels at sensitive receptor sites ML-1 and CR; however, out of the 40-month total construction period during which 18-MW blocks are being installed, no more than two of those months, when construction is occurring on the western portion of the Project area, would exhibit an estimated construction noise level high enough to cause an increase greater than 5 dBA over ambient noise levels.

The additional noise levels associated with future projects through 2020 in the area may add incrementally to the overall noise levels in the area, particularly effects associated with activities at the Wind Zero training facility and W1 Wind Project. Although the Solar Two Project does not, by itself, result in significant long term changes in the noise environment during operations, additions to ambient noise levels from the Wind Zero facility and W1 Wind Project in combination with Solar Two Project actions may result in significant changes.

Operational levels at the Wind Zero Project alone may create an increase in noise levels greater than 5 dBA over ambient noise levels. It is assumed that the Wind Zero Project will be required to implement noise reduction mitigation if it is determined during the permitting process for that project that noise control regulations would not be met.

In its cumulative effects analysis, the Sunrise Powerlink EIR/EIS (2009) has indicated that cumulative effects from construction of the Sunrise Powerlink transmission line in concert with the Project would not create long-term, operational noise impacts. Operating the Solar Two facility or the associated 230 kV transmission line would cause an increase in ambient noise that would be more than 5 dBA, but because of sufficient distance and noise attenuation, no sensitive receptors would be adversely affected.

11.0 VISUAL RESOURCES

11.1 INTRODUCTION

This report generally supplements information on visual resources provided in the AFC and also incorporates recent applicable information on the region identified in the Sunrise Powerlink EIR/EIS (2009).

11.2 PROJECT EFFECTS IDENTIFIED IN THE AFC FOR VISUAL RESOURCES

The AFC has indicated that significant impacts to visual resources in the Project area are anticipated from the proposed Project. Travelers along Interstate-8 and local area highways, several local residences, sensitive recreational users, and OHV use areas could experience

significant or cumulatively considerable visual effects due to changes in existing conditions if no mitigation is implemented. No significant effects were anticipated due to night lighting and no effects to aviation are expected. The AFC indicates that some positive effects could occur due to viewer perceptions and positive visual interest in renewable energy.

11.3 SIGNIFICANCE CRITERIA

The following criteria may be considered in assessing the cumulative impacts of the proposed Project combined with potential effects from past, present, and reasonably foreseeable future projects on visual resources. These criteria are adapted from Appendix G of the CEQA Guidelines, criteria outlined in the Sunrise Powerlink EIR/EIS (2009), and BLM Visual Resource Management (VRM) guidelines (BLM 2009). Factors to consider in determining impacts on visual resources include:

- Existing management requirements, such as BLM visual resource management classes,
- Scenic quality of the project site and vicinity,
- Available visual access and visibility,
- Frequency and duration that the landscape is viewed,
- Viewing distance and degree to which project components would dominate the view of the observer,
- Contrast of the proposed facilities or activities with existing landscape characteristics,
- The extent that project features or activities would block views of higher value landscape features, and
- The level of public interest in the existing landscape characteristics and concern over potential changes.

Adverse visual impacts can occur if:

- An action changes existing conditions to the extent that they no longer appear to be characteristic of the area;
- An action introduces features to the landscape that are noticeably different from those typically found in the area;
- Important scenic aspects of the landscape become less visible (e.g., partially or totally blocked from view) or are removed;
- Visual impacts degrade the integrity of setting and feeling for NRHP or CRHR-eligible historic properties;
- Project construction or the long-term presence of project components would cause a substantial effect on a scenic vista;
- Project construction or the long-term presence of project components would substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within view of a State Scenic Highway;

- Project construction or the long-term presence of project components would substantially degrade the existing visual character or quality of a site and its surrounding landscape;
- Project construction or the long-term presence of the Proposed Project would create a new source of substantial light or glare that would adversely affect day or nighttime views in the area or be hazardous to motorists or pedestrians;
- The presence of the Proposed Project or Alternative would result in a long-term (greater than three years) inconsistency with established (or interim) BLM Visual Resource Management Class objectives (applies only to public lands administered by the BLM). This would typically occur where a landscape with a relatively high visual quality and viewer concern is noticeably altered;
- Construction of the Proposed Project or the presence of project components would result in an inconsistency with local regulations, plans, and standards applicable to the protection of visual resources; or
- The presence of the Proposed Project would add to a cumulative visual alteration.

11.4 Extent of the Cumulative Analysis Area for Visual Resources

11.4.1 Geographic Extent

The cumulative analysis area was identified by first completing a computerized viewshed analysis modeling exercise to determine areas where the proposed Project may be visible. An approximate boundary was then drawn around the furthest visible, or seldom seen points located within this viewshed. The results of this modeling are provided in Figure V-1 (Attachment D).

The viewshed used to generate the cumulative analysis boundary was derived using a 1 Meter Digital Elevation Model (1 meter DEM) viewshed analysis program with a Geographic Information System (GIS) to determine line of sight locations from several points within the Project area that represented the approximately 50-foot tall apex of a "SunCatcher" unit. The 1 meter refers to the pixel size (1x1 meter pixels). A 1-meter grid size Digital Elevation Model (DEM) was extracted and cast into the UTM projection. The viewshed analysis routine analyzed whether each cell in the DEM grid would be in line of sight of the 50-foot high SunCatcher units. In the program, the SunCatcher units were given a height offset of 50 feet from the ground elevation of the location on the DEM and all other cells were given a 6-foot offset to simulate the view from a standing adult (shown as Offset A and Offset B in the attached diagram). This is shown as Offset A and Offset B in Figure 5-1 provided below.

Figure 11-1. Line of Sight Analysis

The viewshed analysis modeling took into account topography between the SunCatchers and viewpoints as well as the curvature of the earth; it did not include vegetative or atmospheric screening. This modeling roughly represents where the project may be visible from; however, local factors such as vegetation height, micro-topographic features not represented in the DEM, atmospheric conditions, and distance from the project site would need to be included to determine exactly where the SunCatchers would actually be visible from a location within the modeled line of sight.

Relative visibility generated by the modeling was classified into distance zones. The three zones are based upon definitions provided in the BLM's VRM Manual (BLM 2009) and include foreground-middleground, background, and seldom seen. These zones are defined as:

- Foreground-Middleground Zone - This is the area that is less than 3 to 5 miles away from the proposed project boundary and where activities might be viewed in detail. The outer boundary of this distance zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape. In some areas, atmospheric conditions can reduce visibility and shorten the distance normally covered by each zone.
- Background Zone - This is the area between approximately 5 to 15 miles away. It does not include areas in the background that are so far distant that the only thing discernible is the form or outline. In order to be included within this distance zone, vegetation is visible at least as patterns of light and dark.
- Seldom-Seen Zone - These are areas that are not visible within the foreground-middleground and background zones (i.e., hidden from view). This may be due to vegetative screening or topographic relief.

11.4.2 Past, Present, and Future Projects Considered

Once the boundaries were defined, additional GIS mapping was used to identify which past, present and reasonably foreseeable future projects as identified in Table 1-1 would be located within the visual resource cumulative analysis area. Table 11-1 identifies those projects that were included in the cumulative analysis; locations may also be seen on Figure V-1 (Attachment D).

Table 11-1. Past, present and reasonably foreseeable future projects located within the visual resources cumulative analysis area.

Map Reference Number on Figure 3 – Attachment A	Type of Project	Average Height used in Viewshed Analysis (feet)
Past and Present Development		
	OHV Trails (Open and Closed) (5-foot corridor)	NA
	Roads (US, State, County)	NA
	Open ATV Trails	NA
	Plaster City OHV Area	NA
	Plaster City Drywall Plant	80
	Border Fence	10
Future Projects		
ST4	Solar Thermal	50
ST6	Solar Thermal	50
W1	Wind	300
BW1	Wind	300
BW5	Wind	300
BW6	Wind	300
B1	Biomass	90
CL1	Collector lines - 100 foot corridor	100
CL2	Collector lines - 100 foot corridor	100
CL3	Collector lines - 100 foot corridor	100
CL4	Collector lines - 100 foot corridor	100
CL5	Collector lines - 100 foot corridor	100
CL6	Collector lines - 100 foot corridor	100
CL7	Collector lines - 100 foot corridor	100
CL8	Collector lines - 100 foot corridor	100
CL9	Collector lines - 100 foot corridor	100
CL10	Collector lines - 100 foot corridor	100
CL12	Collector lines - 100 foot corridor	100
CL16	Collector lines - 100 foot corridor	100
CL18	Collector lines - 100 foot corridor	100
CL20	Collector lines - 100 foot corridor	100
TL1	Transmission lines - 100 foot corridor	100
TL2	Transmission lines - 100 foot corridor	100
TL4	Transmission lines - 100 foot corridor	100
TL5	Transmission lines - 100 foot corridor	100
CS1	Collector Substation	50
CS4	Collector Substation	50
Other Development Projects		

Map Reference Number on Figure 3 – Attachment A	Type of Project	Average Height used in Viewshed Analysis (feet)
	2020 Urban Development	50
WZ	Wind Zero Training Facility	45

Sources: RETI 2009, Cal DRLP 2009

11.5 CUMULATIVE ANALYSIS DEVELOPMENT

11.5.1 General Landscape Overview

The visual resources cumulative analysis area for the Solar Two Project includes the southern portions of the Imperial Valley located within the Salton Trough of the Basin and Range physiographic province. This area is generally characterized by a large valley bordered by rugged mountains formed by northerly trending fault blocks. Landscapes in this province typically include broad desert basin valleys, jagged mountain ranges, and desert alluvial slopes (bajadas) (Hunt 1974). Irrigated agricultural lands characterize views along the eastern sections of the Imperial Valley immediately west of the towns of El Centro and Imperial. Vegetation in this region ranges from sparse, low-growing grasses and desert shrubs in the wide, flat desert basins to completely absent in areas of high four-wheel drive (4WD) recreational use.

Views from travel routes within the area tend to encompass broad, sweeping desert expanses bordered on the west by rugged mountain ranges of the Jacumba, Coyote, and Fish Creek Mountains. The Yuha Desert basin and West Mesa desert area lie south and north of the Project area, respectively and include flat, desert landscapes with sparse vegetation and heavily eroded washes. The Yuha Desert area also includes the historic Fages–De Anza Trail–Southern Emigrant Road, sections of which have been determined to be eligible to the National Register of Historic Places (NRHP) under Criterion A (association with significant events in the past) and Criterion B (association with significant persons in the past) and is also listed on the CRHR (Sunrise Powerlink EIR/EIS 2009). A portion of this trail passes through the Project area (see Figure V-2) (Sunrise EIR/EIS 2009), however, these sections have not been designated as historic. Therefore, further visual resource impacts for the trail have not been pursued.

The cumulative analysis area is relatively undeveloped and the linear forms of Interstate-8, SR78, and SR86, railroad grades, and existing transmission lines are the prominent manmade features. The existing lattice towers of the Southwest Powerlink transmission line currently transect the Project site and the unincorporated town of Plaster City lies to the north of the Project area. Plaster City is primarily comprised of a large gypsum quarry and plant, operated by United States Gypsum that is a prominent industrial feature in the surrounding landscape. From surrounding elevated viewpoints, Plaster City is the most prominent feature on the existing landscape near the Project site.

There are many viewing opportunities within the cumulative analysis area, including Interstate-8, State Routes (SR) 78, 86, and 98, local roads, the many 4WD access roads on public lands, and recreational and visitor areas. Several residences were also identified within several miles of the proposed Project area in the AFC. The Coyote Mountains and Jacumba Mountains Wilderness Areas lie west and southwest of the Project area.

11.5.2 Cumulative Analysis Methodologies

Several steps were completed to obtain information for the visual resources analysis. These steps are outlined in the following sections.

VIEWSHED ANALYSIS FOR PAST, PRESENT AND FORESEEABLE PROJECTS IN CUMULATIVE ANALYSIS AREA

Once past, present, and reasonably foreseeable future projects were identified within the cumulative analysis area for visual resources (Figure V-1 in Attachment D and Section 5.4.2), a viewshed analysis was completed for each project using the methodology described in Section 5.4.1. To simplify the analysis process, one point located on the highest elevation of each past, present, and foreseeable future Project area was typically used as the modeling point. These points have been identified on Figure V-2 (Attachment D) with each project's identification number as shown on Table 1-1 and on Table 11-1. Projects with larger surface disturbance areas, such as the Mexico wind project (BW), used several analysis points.

The offset height used for each project's viewshed analysis is also provided in Table 11-1. The extent of the projects' viewsheds were limited to only those portions that occur within the boundaries of the Solar Two cumulative analysis area and only the areas that overlap with the viewshed of the Project. This was done to ensure that only those areas with potential effects from the Project were being considered cumulatively in conjunction with the other projects.

Cumulative impacts to visual resources could occur where projects are visible within the same field of view as other developments or impacted landscapes. When all viewshed analyses were completed, the viewsheds were overlapped to determine locations where views of multiple projects could occur. To further simplify the process, viewshed analysis for projects other than the proposed action were only completed for the foreground-middleground distance zones. This viewshed distance was chosen since it was assumed that foreground-middleground areas would be the zones most readily visible to sensitive viewers and the areas most likely to experience the greatest changes in the visual character of the landscape. Beyond these zones it was expected that views would likely be screened by vegetation, topography, and atmospheric effects and changes to the visual landscape would not be as dramatic.

A ranking system was created to group viewshed overlap occurrences; one or fewer viewshed overlaps, 2 overlaps, 3 overlaps, and 4 or more viewshed overlaps. The results of these rankings are portrayed on Figure V-2 (Attachment D).

The occurrence values on the cumulative analysis viewshed map (Figure V-2, Attachment D) were derived by assigning a value of 1 to each separate project entity. A sum was then derived for each cumulative analysis area viewshed pixel based on the overlapping entity values for totals ranging from 1 to 39 (one point for each of the 39 projects that are located within the cumulative analysis area). Generally, the higher the number, the more viewsheds that overlap and the more projects that can be seen in a viewer's foreground at one time.

For example:

> At one particular spot or pixel location, three project viewsheds overlapped; the Wind Farm, the Gypsum Plant, and the Project Area Foreground. 1 + 1 + 1 = 3

This overlapping cumulative viewshed pixel point then receives a value of 3.

OR

Gypsum Plant Background (1) + Project Area Foreground (1) = 2

Pixel point values were then aggregated and color-coded to produce the Cumulative Analysis Area Map Figure V-2 (Attachment D).

IDENTIFICATION OF VIEWSHED MANAGEMENT CLASSES

The proposed Project is located mainly within BLM-managed lands. A majority of the lands that lie within the visual resources cumulative analysis area are also managed by the BLM. Visual resource analysis on lands subject to administration by the BLM is based on the BLM's Visual Resource Management (VRM) system (BLM 2007). This is a system that the BLM requires for use in determining effects to visual resources on BLM-administered lands (BLM 1998); it, however, cannot be applied to non-BLM lands because the BLM has no visual resource management authority over non-BLM lands. All of the BLM lands in the Project visual resources cumulative analysis area are located within the California Desert Conservation Area (CDCA) and are managed under the CDCA Plan. VRM classifications have not currently been formally established for non-wilderness area BLM lands managed under the CDCA in Imperial County. The Coyote Mountains and Jacumba Wilderness Areas, located west of the Project area have BLM VRM classifications of Class I due to their designation as wilderness areas. Based on information provided in the Sunrise Powerlink EIR/EIS (2009), the Jacumba and Coyote Wilderness Areas and the Yuha Desert ACEC are located in VRM Class I and Class II areas, respectively.

The Sunrise Powerlink EIR/EIS (2009) has identified interim VRM classes or visual resource inventory (VRI) classes using the BLM's methodology for non-wilderness BLM-managed lands within its project boundaries. These lands overlap those located within the Project's visual resources cumulative analysis area in Imperial County. The interim designations developed as part of the Sunrise Powerlink Project have been incorporated into this analysis as they are expected to become final once the interim visual management classes have been adopted in an amendment to the CDCA Land Management Plan. Complete discussions on how the VRI designations were derived for the area are available in Section D.3 of the Sunrise Powerlink EIR/EIS (2009). VRI designations identified in the Sunrise Powerlink EIR/EIS (2009) have been mapped on Figure V-2 (Attachment D).

VRI classes portray the relative value of visual resources in a select area and provide a management tool that describes visual management objectives. They do not establish management direction. The four VRI Classes (I, II, III, and IV) generally mirror VRM class definitions and include:

- **Class I.** The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
- **Class II.** The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic

elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

- **Class III.** The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- **Class IV.** The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements (BLM 2007a).

IDENTIFICATION OF KEY OBSERVATION OR SENSITIVE VIEW POINTS

The AFC and the Sunrise Powerlink EIR/EIS (2009) established several Key Observation Points (KOPs) or Key Viewpoints (KVPs) within the visual cumulative analysis area. These points typically represent the most sensitive viewpoints in the area and are used to evaluate existing landscapes and potential changes that could occur. Typical KOP locations may include: important travel corridors such as Interstate-8, scenic view points, recreation areas, residential areas, and representative examples of the existing landscape context and viewing conditions.

The 12 KOPs summarized in Table 11-2 were identified from the AFC and Sunrise Powerlink EIR/EIS (2009) as generally representative of viewpoints located within the Project's viewshed and cumulative analysis area. Detailed descriptions and analysis associated with these KOPs, including coordinates, viewing angles, and exposure times, is available in Section 5.13 of the AFC and Section D.3 of the Sunrise Powerlink EIR/EIS. The locations of these KOPs are provided on Figures V-1 and V-2 (Attachment D).

In addition to these established KOPs, viewshed mapping on Figure V-2 (Attachment D) indicates that areas of high viewshed overlap (i.e. those areas with 3 or more foreground-middleground areas overlapping with the Project viewshed) for past, present, and foreseeable future projects in the cumulative analysis area occur in the following locations:

- North of the Project area in the U.S. Naval Air Facility;
- West of the Project area in the Jacumba Wilderness and the Coyote Mountains Wilderness Areas; and
- Scattered locations in the Yuha Desert ACEC south of the Project.

Established AFC KOPs 1, 2 and 4 and Sunrise KOP 28 also lie in high viewshed overlap areas as shown on Figure V-2 (Attachment D).

ANALYSIS AT SENSITIVE VIEW LOCATIONS

With the information provided in Figure V-2 (Attachment D), locations with high concentrations of cumulative project viewshed overlap within the Project's cumulative analysis area for visual resources can be identified. The relationship between these areas, sensitive viewpoints, and locations with strictly defined regulatory requirements related to viewshed changes (e.g. wilderness areas) can also be compared.

The ratings or values identified in Figure V-2, Attachment D can help identify areas with more cumulatively collected foreground-middleground views and potentially more cumulative effects where visual resource analysis criteria should be applied to determine the level of contrast or modification to the environment. This mapping also helps to identify projects that can be seen from sensitive viewpoints (past, present, and future) and where contrast rating analysis for cumulative effects should be conducted. If contrast rating analysis in sensitive locations in areas with a high degree of viewshed overlap indicates a high degree of change or attention from viewers, visual resource cumulative effects would likely be considered to be high. Conversely, if contrast rating analysis indicates minimal change or attraction in a high ranking cumulative analysis area, effects would be considered to be low.

Several KOPs (e.g.; AFC KOPs 1,2 and 4) are located within high viewshed overlap areas in the cumulative analysis area. High concentration viewshed overlap areas also occur within the Coyote Mountains Wilderness Area, the Jacumba Wilderness Area (both VRM Class I areas), and the US Naval Facility north of the Project area, suggesting that additional KOPs may need to be established in those locations. All of these areas can be evaluated for cumulative changes to visual resources by modifying two existing visual resource analysis methodologies; the BLM's VRM methodology (BLM 2007) for KOPs located on BLM-administered public lands and a Visual Sensitivity–Visual Change (VS-VC) method similar to that used in the Sunrise Powerlink EIR/EIS (2009) for all other KOPs located on non-BLM and non-USFS public and private lands. Little, if any, USFS-managed lands are present in multiple viewshed overlap areas in the cumulative analysis area; however, the U.S. Forest Service's Scenery Management System could be used if necessary for analysis of KOPs located on National Forest lands.

Table 11-2. Key Observation Points established in the Cumulative Analysis Area.

KOP Number	Description	Analysis Method**	BLM VRI Status (from Sunrise Powerlink EIR/EIS)	BLM Scenic Quality Classification	Distance Zone	Viewer Sensitivity/Concern*	Existing Scenic Integrity Level	Visual Quality	Project Visibility	Viewer Exposure	Visual Effect Susceptibility / Visual Sensitivity	Results of Analysis (AFC 2008, Sunrise Powerlink EIR/EIS 2009)
AFC (2008)												
1	OHV area north of Solar Two looking south	BLM	III	Not identified	Foreground-Middleground	High	Moderate		High	Moderate	Moderate/High	ESIL from this area was characterized as Class C.
2	Evan Hewes Highway looking SW towards Solar Two	BLM	III	Not identified	Foreground-Middleground	High	Moderate		High	Moderate	Moderate/High	ESIL from this area was characterized as Class C.
3	From residence looking west towards transmission line	VS-VC	III? ACEC?	Not identified	Foreground-Middleground	Moderate	Low		Low	Low	Low	ESIL from this area was characterized as Class C.
4	Interstate-8 at Ocotillo looking east	BLM	III	Not identified	Foreground-Middleground	High (AFC = Moderate/Low)	Low		High	High	Moderate	ESIL from this area was characterized as Class C.
5	Interstate-8 westbound looking NW towards Solar Two	BLM	III? ACEC?	Not identified	Foreground-Middleground	High (AFC = Moderate)	Low		High	High	Moderate/High	ESIL from this area was characterized as Class C.
Sunrise Powerlink EIR/EIS (2009)												
1	westbound I-8, just west of the Westside Canal	VS-VC	NA	Not identified	Foreground-Middleground	Moderate	Not identified	Low to Moderate	Not identified	High	Moderate	Increased structure contrast, industrial character, view blockage, and skylining when viewed from KOP 1 on westbound I-8
2	Westmorland Road, just north of Evan Hewes Highway	VS-VC	NA	Not identified	Foreground-Middleground	Low to Moderate	Not identified	Low to Moderate	Not identified	Moderate	Low to Moderate	Increased structure contrast, industrial character, view blockage, and skylining when viewed from KOP 2 northbound on Westmorland Road.
28	Northbound Dunaway Road	BLM	III	C	Foreground-Middleground	High	Not identified	Not identified	Not identified	Not identified	Not identified	Inconsistency with Interim BLM VRM Class III management objective due to introduction of structure contrast, industrial character, view blockage and skylining when viewed from Key Viewpoint 28 on Dunaway Road

KOP Number	Description	Analysis Method**	BLM VRI Status (from Sunrise Powerlink EIR/EIS)	BLM Scenic Quality Classification	Distance Zone	Viewer Sensitivity/Concern*	Existing Scenic Integrity Level	Visual Quality	Project Visibility	Viewer Exposure	Visual Effect Susceptibility / Visual Sensitivity	Results of Analysis (AFC 2008, Sunrise Powerlink EIR/EIS 2009)
44	South of the Dunaway Road/I-8 overpass	BLM	III	C	Foreground-Middleground	High	Not identified	Not identified	Not identified	Not identified	Not identified	Increased structure contrast, view blockage, and skylining when viewed from Key Viewpoint 44 at Dunaway OHV Staging Area
45	Yuha Desert I-8 Span	BLM	III	C	Foreground-Middleground	High	Not identified	Not identified	Not identified	Not identified	Not identified	Increased structure contrast, view blockage, and skylining when viewed from Key Viewpoint 45 on Westbound I-8, Crossing the Yuha Desert
46	Plaster City West OHV Staging Area	BLM	III	C	Foreground-Middleground	High	Not identified	Not identified	Not identified	Not identified	Not identified	Inconsistency with BLM VRM Class III management objective due to introduction of structure contrast, industrial character, view blockage and skylining when viewed from Key Viewpoint 46 at the Plaster City West OHV Staging Area
47	Sugarloaf Mountain to Interstate 8 (	BLM	III	C	Foreground-Middleground	High	Not identified	Not identified	Not identified	Not identified	Not identified	Increased structure contrast, view blockage, and skylining when viewed from Key Viewpoint 47 on Eastbound I-8, South of Sugarloaf Mountain

**VRM=BLM's Visual Resource Management methodology, SMS=the Forest Service's Scenery Management System, VS-VC= the Visual Sensitivity-Visual Change methodology for non-BLM/non-USFS lands.

* Areas lying within the California Desert Conservation Area on BLM-managed lands have high viewer sensitivity (Sunrise Powerlink EIR/EIS (2009)

The details of completing BLM and VC-VS analysis are included in Section D.3.1 of the Sunrise Powerlink EIR/EIS (2009). BLM VRM methodology analysis is also described at: http://www.blm.gov/nstc/VRM/vrmsys.html. If required to meet BLM impact analysis requirements, these methodologies could be used to assess the cumulative visual impacts of the Project as described below:

- **BLM VRM Methodology**: Contrast rating sheets could be completed for each KOP identified for the cumulative analysis generally using the same BLM analysis approach as that used for a single proposed project analysis. However, under the "Characteristic Landscape Description" section of the standard rating sheet, the evaluation could be completed as if the proposed Project was already in place. Contrast rating sheets and/or simulations completed previously for the proposed project or associated KOP information, such as that included in evaluations for KOPs 4 and 47 (see Table 11-2), may be used to help complete this section. Changes that could then occur from cumulative projects identified as having viewsheds that would overlap with the Project at that KOP could then be considered under the "Proposed Activity Description" section of the standard rating sheet. Photo simulations may be required to help evaluate multiple project effects.
- The degree to which multiple projects or activities affect the visual quality of a landscape will depend on the extent of the visual contrast created between the projects' components and the major features, or predominant qualities, in a landscape that considers the proposed Project. Contrast between the "look" of the anticipated Project landscape and a landscape that includes multiple cumulative projects could be compared and ranked using the standard BLM ranking methodology. A conclusion on the overall level of change may then be made (ranging from very low to high) and compared to the applicable VRM Class objective for the location for a determination of consistency with the existing management objectives and level of visual impact.
- If a determination is made that the resulting level of change between the proposed action and implementation of multiple cumulative projects would be inconsistent with the VRM class objective for that location, and the inconsistency is considered to be a significant visual impact, the impact situation can be further evaluated against the application of feasible mitigation measures in an effort to reduce the visual impact to a level of less than significant if possible.
- **VC-VS Methodology:** Under this methodology, changes in the visual landscape from the proposed action could again be compared against changes associated with multiple cumulative projects identified as occurring at that location. Evaluation could occur as if the proposed action was already in place and was, in fact, the "new" existing environment with other projects added to that viewshed. Again, visual simulations may help in the comparison evaluations. This evaluation methodology is explained in detail in Section D3.4.1 of the Sunrise Powerlink EIR/EIS (2009) and incorporates aspects of the State of California's visual analysis methodology. The methodology for the VC-VS analysis includes Visual Contrast, Project Dominance, View Blockage or Impairment, and Overall Visual Change components.

11.6 CUMULATIVE VISUAL RESOURCE SUMMARY

In its cumulative effects analysis, the Sunrise Powerlink EIR/EIS (2009) indicated that cumulative effects from construction of the Sunrise Powerlink transmission line in concert with the Project would create long-term, operational visual impacts that would be experienced by travelers on Interstate-8, Dunaway Road, Evan Hewes Highway, and other local roads, and recreationists accessing BLM lands in the Yuha Basin. The EIR/EIS indicated that views would be dominated by a vast expanse of thousands of 45-foot-high solar collection dishes, which would be visible in the foreground of travelers on area roads. It stated that the projects would transform the existing desert landscape into an industrial setting with prominent structures that would skyline (extend above the horizon line) and cause view blockage of the background sky, the distant Superstition Mountains, and the Coyote, Fish Creek and Jacumba Mountains. The EIR/EIS also indicated that, from some vantage points, viewers could be subjected to glare from the solar arrays, and that the overall resulting level of change would be high, which would not meet the BLM's VRM Class III objective of a moderate (or lower) degree of visual change. No mitigation was identified in the EIR/EIS to reduce the cumulative impacts to levels that would be less than significant.

The cumulative summary in the AFC (2008) indicated that if ROW permits are granted for large-scale solar and wind power facilities in the vicinity of the Project area and construction of these facilities is completed, then "there is a potential for significant impacts to the visual resources in the area resulting specifically from the cumulative effects of a succession of intensive development in an area that has historically been left to open space and recreation. Conversely, there could be some positive cumulative impacts related to the development of these areas as a regional and/or national center for alternative renewable energy. Positive visual resource effects could draw tourists, students, and researchers to the area, and appeal to residents who are interested in working in the field of renewable energy."

Based upon the results of the GIS viewshed mapping used in this analysis, it appears that select areas within existing VRM Class I and Class II areas (Coyote Mountain and Jacumba Wilderness Areas and the Yuha Desert ACEC, respectively) may experience modifications to their viewsheds from multiple overlapping foreground-middleground views of past, present, and future projects, including the Solar Two Project viewshed (see Figure V-2). Tables 11-3 and 11-4 summarize the extent of the Project's viewshed that overlaps with the wilderness areas and Yuha Desert ACEC. If it is determined that these changes to the viewsheds in the wilderness and ACEC areas are significant and alter the characteristics of these areas, these modifications could potentially result in inconsistencies with BLM management objectives for those locations.

Table 11-3. Cumulative viewshed area within selected Wilderness Areas and ACECs.

	Area within Solar Two Viewshed (Acres)	Total Wilderness Area (Acres)	Proportion of Area within Solar Two Viewshed
Coyote Mountains Wilderness	993	18,644	5%
Jacumba Wilderness	3,603	32,691	11%
Yuha Basin ACEC	779	71,848	1.10%

Table 11-4. Solar Two viewshed area located within selected Wilderness Areas and ACECs for each viewshed distance classification.

	Total Area (Acres)	Seldom Seen Area (Acres)	Proportion of Area within Seldom Seen Area	Background Area (Acres)	Proportion of Area within Background Area	Middleground -Foreground Area (Acres)	Proportion of Area within Middleground-Foreground Area
Coyote Mountains Wilderness	18,644	0	0.00%	390	2.10%	811.94	4.40%
Jacumba Wilderness	32,691	0	0.00%	4914	15%	686	2.10%
Yuha Basin ACEC	71,848	0	0.00%	693	1%	450	0.60%

Measurable changes are expected to the viewsheds in the vicinity of the residence near KOP 2 and in portions of the OHV area located north of the Solar Two Project site. Also, multiple project views overlap in the military area located north of the Solar Two Project area; however, viewers in this area would likely not be as sensitive to viewshed changes as those in the other areas previously identified. Other effects from past, present and future projects in the visual resources cumulative analysis area may also include:

- Short-term visibility of construction activities, equipment, and night lighting.
- Long-term visibility of land scars in arid and semi-arid landscapes.
- Increased structural contrast, industrial character, view blockage, glare, and skylining.

12.0 WASTE MANAGEMENT

12.1 INTRODUCTION

Waste management has three aspects that have potential to affect a project and or Project area. There is the potential for off-site waste management practices to impact a site through public nuisance (visual and odor), through off-site impacts to surface water quality that run on to a site, or from impacts to ground water quality due to off-site sources. There is also the potential for on-site waste management practices to impact a site, through the same methods (nuisance, impacts to surface water or impacts to ground water). A final impact of waste management is the potential for site construction or operation activities to impact the capacity of area waste disposal facilities.

12.2 SIGNIFICANCE CRITERIA

The following criteria may be considered in assessing the cumulative impacts of the proposed Project in combination with potential effects from past, present, and reasonably foreseeable future projects on waste management.

- Create a hazard to the public or the environment due to waste handling in the vicinity of existing or proposed schools.
- Create a hazard by locating a project on existing waste disposal site.

The criteria are specified in CEQA Environmental Checklist Form (CEQA Appendix G) which considers environmental factors in determining impacts from waste management.

12.3 GEOGRAPHIC AND TEMPORAL PARAMETERS

The AFC has indicated that there would be no significant cumulative effects to public health or the environment as a result of waste management practices at the Project area during construction, concurrent construction and partial project operation, and full operation. Waste streams generated by the project construction and project operations activities would include non hazardous solid waste, small quantities of hazardous waste and waste water (sanitary sewer, equipment wash water and storm water runoff). All of these waste streams would be handled per federal, state and local regulations. Impacts to public health and the environment would only occur in the event of accidental releases of the waste stream material. The severity of the impact of the release would depend on the material released, the volume released, the location of the release and the response to the release.

A Phase 1 Environmental Site Assessment (Phase 1 ESA - AFC Appendix T) was completed at the Project Site to determine the potential for recognized environmental conditions to occur on the project site or on adjacent or non adjacent parcels (1 mile radius from the Project boundary). The 1 mile radius search was completed to evaluate a larger area of adjacent properties. The standard search radius specified in the ASTM standard for Phase1 ESAs (ASTM Standard E 1527-05) range from ¼ mile to ½ mile based on the database searched. The Phase 1 ESA identified one adjacent parcel as having a recognized environmental condition with potential to impact the project site.

12.4 CUMULATIVE WASTE MANAGEMENT EFFECTS

Based on a review of proposed development activities in the vicinity (1 mile radius) of the Project site (Table 1-1), there are no proposed development activities that would be a

source of impacts created by waste management and handling activities. There are no hazardous material - treatment, storage and disposal (TSD) facilities or solid waste disposal facilities currently proposed in the vicinity of the Project site. With any development the potential exists for spills and releases, which may cumulatively contribute to existing conditions.

The reasonably foreseeable development activities for the project area vicinity (see Figure 3 Attachment A) include potential residential development adjacent to the project area by the year 2020. Residential development may include proposed schools in the vicinity of the proposed project. The current project schedule would have all construction activities completed before 2020. Based on the type and volume of waste streams generated during project operation activities it is not anticipated that the project activities would create a hazard to potential schools in the vicinity of the project (significance criteria 1 – Section 1.2).

The Phase 1 ESA for the project site identifies one recognized environmental condition present within the project area vicinity (1 mile radius) that has potential to impact the project site. Details on the extent and magnitude of potential contamination (if any) at the site (US Gypsum Company) are not currently known. The site was reported to be operating as a Class III non-hazardous waste disposal site. The site also had other activities reported to regulatory agencies that classified the site as a recognized environmental condition as defined in ASTM Standard E 1527-05.

The proposed development and operation activities have the potential for spills and releases of waste stream material. If these releases occurred in the vicinity of the US Gypsum Company site, there would be potential for the spills or releases to combine with the existing recognized environmental condition. If this scenario were to occur it would meet the second significance criteria listed in Section 1.2 above. The likelihood of this occurring is considered low.

13.0 HAZARDOUS MATERIALS

Similar to waste management, past, present and future activities that have affected or would affect hazardous materials management include infrastructure development, creation of landfills, agricultural activities, and residential and commercial development. Section 5.15 of the AFC, Hazardous Materials Handling, includes a discussion of the potential effects from storage and use of hazardous materials during construction and operational phases of the Project on the project site. On-site storage procedures are designed to keep maximum potential effects below defined thresholds of significance.

The reasonable foreseeable development anticipated for the area surrounding the Project site is assumed to meet the same standards and best management practices as the Project. However, the Wind Zero Military Training Facility proposed near the Solar Two site has potential to handle more hazardous materials than other anticipated development in the region. Considering the reasonable foreseeable development in the area surrounding the Project and the limited amount and type of hazardous materials to be used as part of the Project, no significant contribution to cumulative effects from hazardous material handling would be expected from the Project.

14.0 PUBLIC HEALTH AND WORKER SAFETY

The public health and worker safety analyses are included in Sections 5.16, Public Health and Safety and 5.17 Worker Safety of the AFC. Past and present activities that may have affected public health and safety include industrial activities, construction projects (e.g., diesel engine emissions) and the agricultural activities throughout Imperial County (e.g., use of pesticides and herbicides). These activities are likely to continue in association with reasonably foreseeable development and may pose minor risks to public health and safety.

The health risk assessments applicable to the Project contain uncertainty from emissions estimates, dispersion modeling, exposure characteristics, and extrapolation of toxicity data in animals for application to humans. For this reason, assumptions used in HRAs are designed to provide sufficient health protection to avoid underestimation of health risk to the public. No sensitive receptors were identified within three miles of the Project. Cancer risk was not calculated at any of the sensitive receptors since the risk at the point of maximum effect would be well below the significance threshold. When considering other past, present and reasonable foreseeable future activities surrounding the Project area, the contribution of the Project to cumulative effects are not expected to be significant.

Worker exposure to hazards associated with the Project and past, present and reasonably foreseeable development can be minimized through adherence to appropriate engineering design criteria and administrative controls, use of applicable personal protective equipment, and compliance with all applicable health and safety LORS. Given the comprehensive health, safety, and fire prevention program and an accident/injury prevention program that would be implemented for the Project, effects on worker safety are not likely to be significant. Additional renewable energy project and similar development in the region may increase worker safety by providing support for relevant technical training programs at community colleges and training centers in the Imperial Valley. The Project could contribute to a better trained, more experience local workforce in the region and result in a cumulative benefit to worker safety.

15.0 REFERENCES

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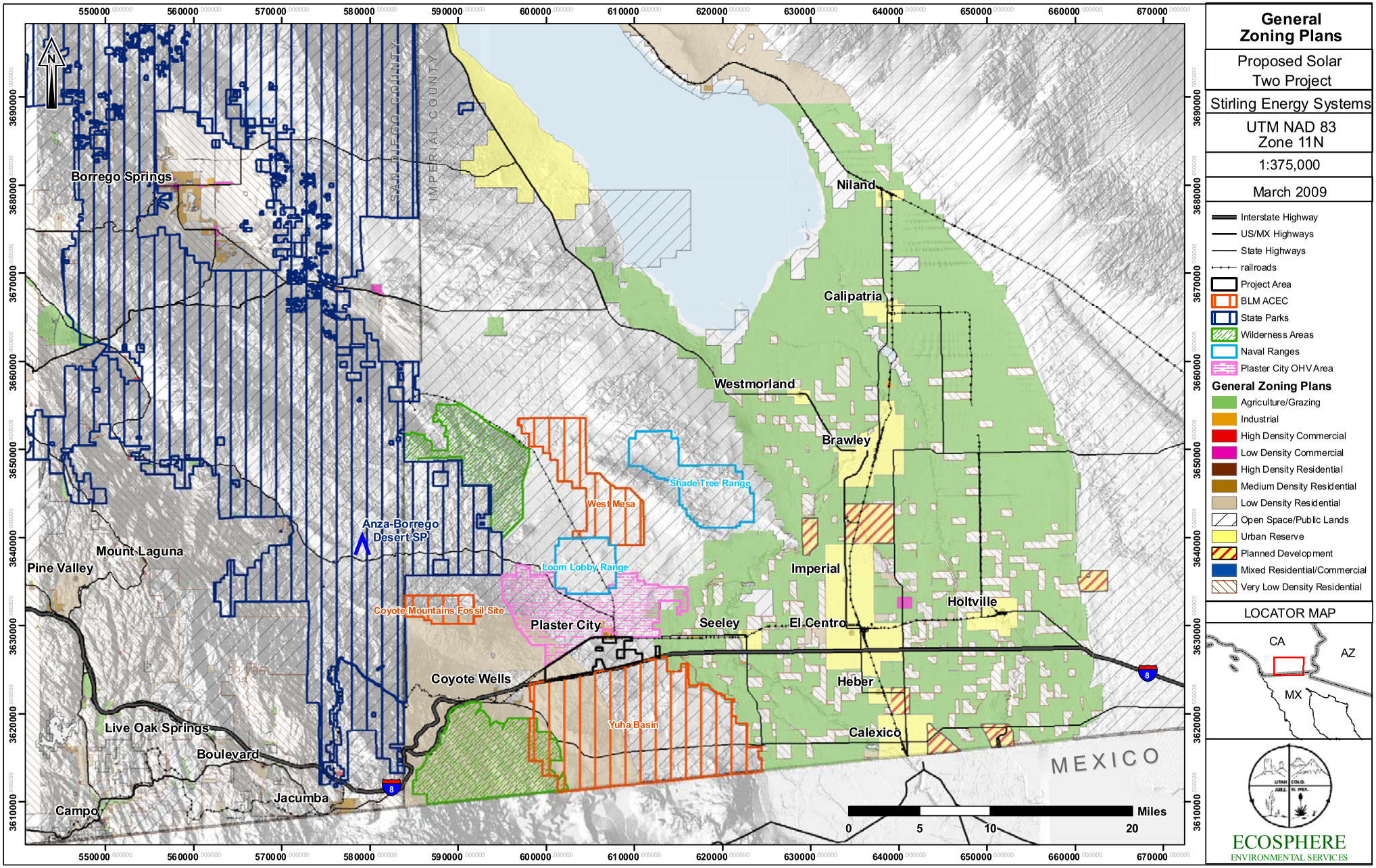
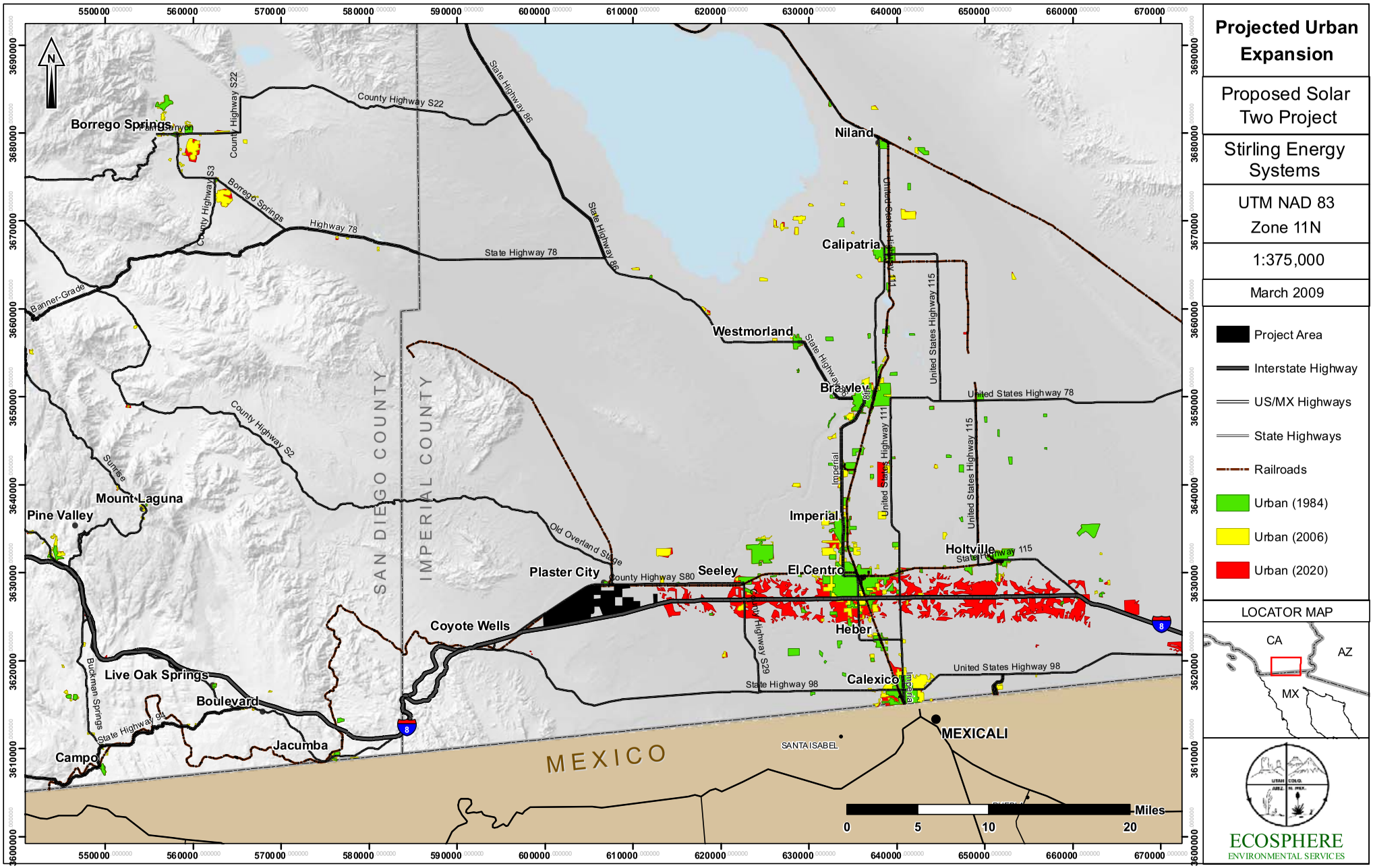
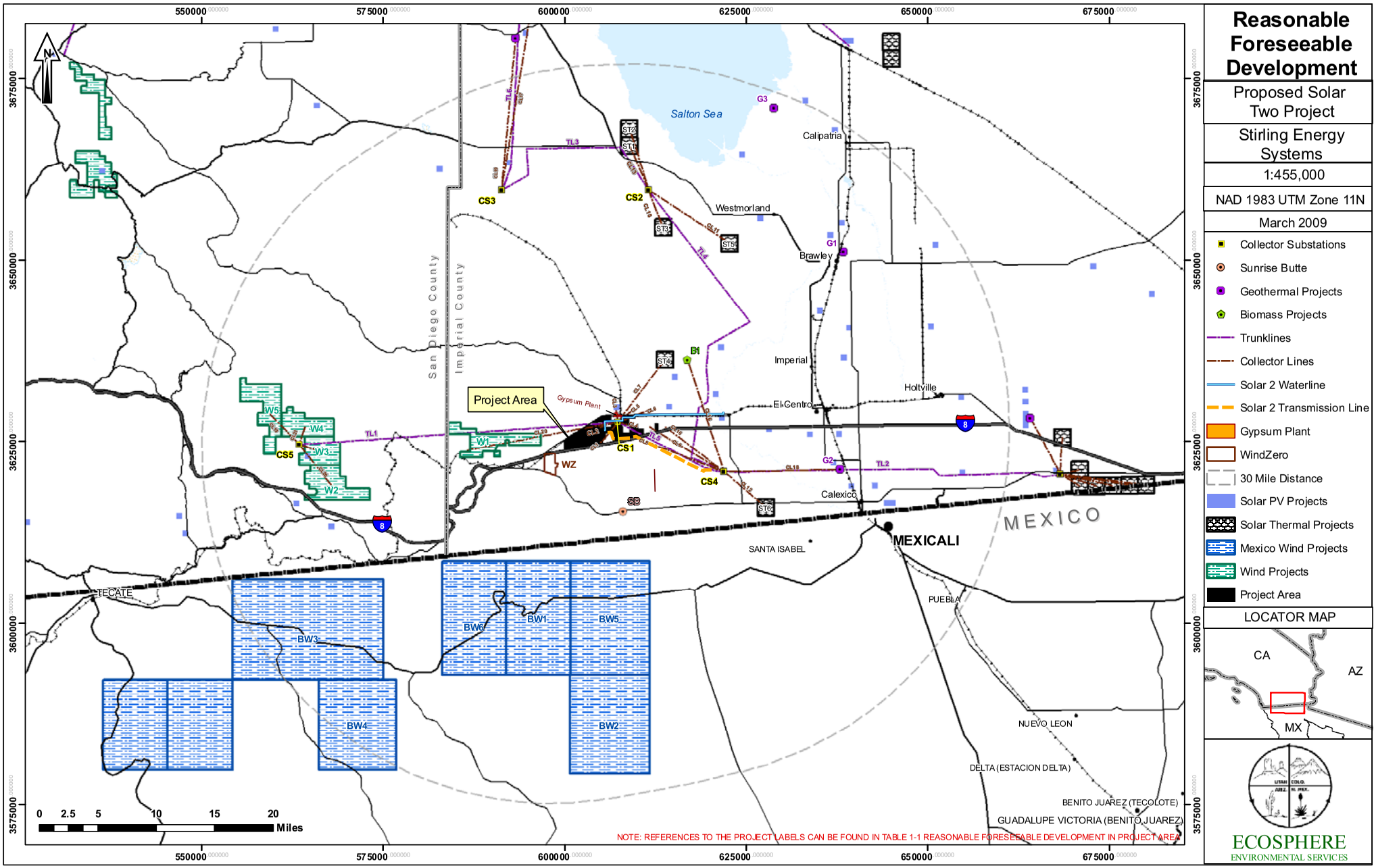
ATTACHMENT A: PROJECT AREA MAPS

Figure 1


General Zoning Plans
Proposed Solar Two Project
Stirling Energy Systems
UTM NAD 83 Zone 11N
1:375,000
March 2009
Interstate Highway
US/MX Highways
State Highways
railroads
Project Area
BLM ACEC
State Parks
Wilderness Areas
Naval Ranges
Plaster City OHV Area
General Zoning Plans
Agriculture/Grazing
Industrial
High Density Commercial
Low Density Commercial
High Density Residential
Medium Density Residential
Low Density Residential
Open Space/Public Lands
Urban Reserve
Planned Development
Mixed Residential/Commercial
Very Low Density Residential
LOCATOR MAP
CA
AZ
MX
ECOSPHERE
ENVIRONMENTAL SERVICES
Borrego Springs
Niland
Calipatria
Westmorland
Brawley
Imperial
Holtville
El Centro
Seeley
Heber
Calexico
Plaster City
Coyote Wells
Yuha Basin
Shade Tree Range
West Mesa
Loom Lobby Range
Coyote Mountains Fossil Site
Anza-Borrego Desert SP
Mount Laguna
Pine Valley
Live Oak Springs
Boulevard
Jacumba
Campo
IMPERIAL COUNTY
SAN DIEGO COUNTY
MEXICO
Miles
0
5
10
20


Projected Urban Expansion
Proposed Solar Two Project
Stirling Energy Systems
UTM NAD 83 Zone 11N
1:375,000
March 2009
Project Area
Interstate Highway
US/MX Highways
State Highways
Railroads
Urban (1984)
Urban (2006)
Urban (2020)
LOCATOR MAP
CA
AZ
MX
ECOSPHERE
ENVIRONMENTAL SERVICES
Borrego Springs
Niland
Calipatria
Westmorland
Brawley
Imperial
Holtville
El Centro
Seeley
Plaster City
Heber
Calexico
Coyote Wells
Mount Laguna
Pine Valley
Live Oak Springs
Boulevard
Jacumba
Campo
MEXICALI
SANTA ISABEL
MEXICO
SAN DIEGO COUNTY
IMPERIAL COUNTY
County Highway S22
State Highway 86
Highway 78
State Highway 78
Banner Grade
County Highway S2
Sunrise
Old Overland Stage
County Highway S80
State Highway S29
State Highway 98
United States Highway 78
United States Highway 98
United States Highway 111
United States Highway 115
Imperial
Buckman Springs
State Highway 94
Miles
0
5
10
20


Reasonable Foreseeable Development
Proposed Solar Two Project
Stirling Energy Systems
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NAD 1983 UTM Zone 11N
March 2009
Collector Substations
Sunrise Butte
Geothermal Projects
Biomass Projects
Trunklines
Collector Lines
Solar 2 Waterline
Solar 2 Transmission Line
Gypsum Plant
WindZero
30 Mile Distance
Solar PV Projects
Solar Thermal Projects
Mexico Wind Projects
Wind Projects
Project Area
LOCATOR MAP
CA
AZ
MX
Salton Sea
Calipatria
Westmorland
Brawley
Imperial
El Centro
Holtville
Calexico
Project Area
Gypsum Plant
San Diego County
Imperial County
MEXICO
MEXICALI
SANTA ISABEL
TECATE
PUEBLA
NUEVO LEON
DELTA (ESTACION DELTA)
BENITO JUAREZ (TECOLOTE)
GUADALUPE VICTORIA (BENITO JUAREZ)
CS1
CS2
CS3
CS4
CS5
WZ
SB
G1
G2
G3
B1
W1
W2
W3
W4
W5
BW1
BW2
BW3
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3675000
3650000
3625000
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3575000
0 2.5 5 10 15 20
Miles
NOTE: REFERENCES TO THE PROJECT LABELS CAN BE FOUND IN TABLE 1-1 REASONABLE FORESEEABLE DEVELOPMENT IN PROJECT AREA
ECOSPHERE
ENVIRONMENTAL SERVICES

ATTACHMENT B
MAMMALS OF IMPERIAL COUNTY, CALIFORNIA

Checklist of Mammal Species
Recorded in Imperial County

Classification at the species level follows "Mammal Species of The World," 2nd ed., 1993, by D. E. Wilson and D. M. Reeder; that at the subspecies level "The Mammals of North America," 2nd ed., 1981, by E. R. Hall. English names refer to the species as a whole, not individual component subspecies. If a species has a restricted range or multiple subspecies occur in Imperial County, this range is indicated briefly.

** Double asterisks specify that the mammal's occurrence in Imperial County is supported by specimens in the San Diego Natural History Museum.
* Single asterisks specify that specimens in other museums have been reported in the literature.

Source: San Diego Natural History Museum 2009; http://www.sdnhm.org/research/birds/impmamm.html

MARSUPIALS: MARSUPIALIA	
Opossums: Family Didelphidae	
Opossum	*Didelphis virginiana virginiana* (introduced)

INSECTIVORES: ORDER INSECTIVORA	
Shrews: Family Soricidae	
Desert or Desert Gray Shrew	*Notiosorex crawfordi crawfordi***

BATS: ORDER CHIROPTERA	
Leaf-nosed Bats: Family Phyllostomatidae	
California Leaf-nosed Bat	*Macrotus californicus***
Plain-nosed Bats: Family Vespertilionidae	
Pallid Bat	*Antrozous pallidus pallidus*
Big Brown Bat	*Eptesicus fuscus pallidus***
California Myotis	*Myotis californicus stephensi***
Little Brown Myotis	*Myotis lucifugus occultus***
Cave Myotis	*Myotis velifer brevis*
Yuma Myotis	*Myotis yumanensis yumanensis***
Western Pipistrelle	*Pipistrellus hesperus hesperus***
Townsend's Big-eared Bat	*Plecotus townsendii pallescens***

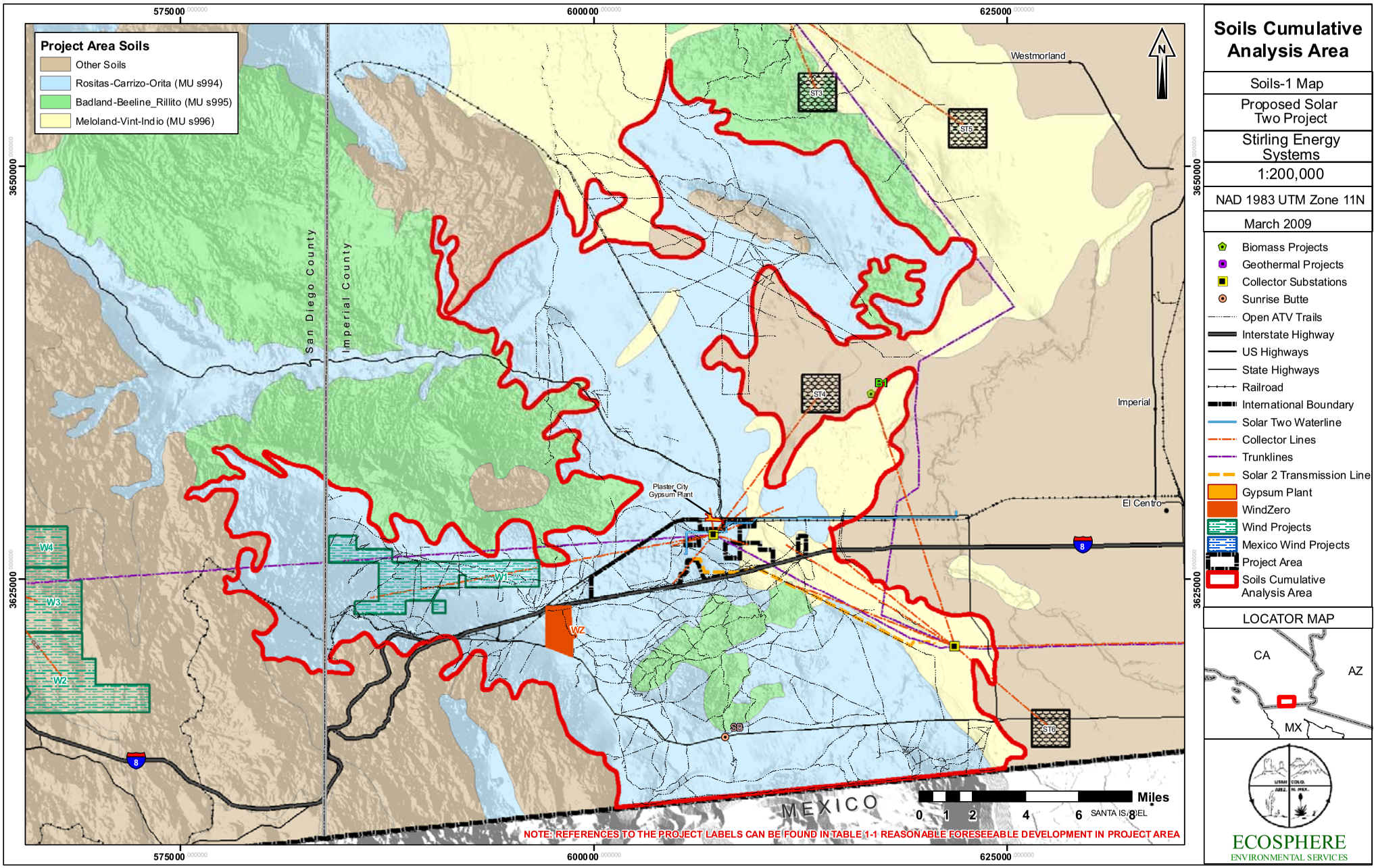
Free-tailed Bats: Family Molossidae	
Western Mastiff Bat	*Eumops perotis californicus*
Pocketed Free-tailed Bat	*Nyctinomops femorosaccus*
Mexican Free-tailed Bat	*Tadarida brasiliensis mexicana***
CARNIVORES: ORDER CARNIVORA	
Dogs: Family Canidae	
Coyote	*Canis latrans mearnsi***
Gray Fox	*Urocyon cinereoargenteus scottii***
Kit Fox	*Vulpes velox arsipus***
Cats: Family Felidae	
Bobcat	*Lynx rufus baileyi***
Mountain Lion	*Puma concolor browni*
Jaguar	*Panthera onca arizonensis* (extirpated)
Weasels and Relatives: Family Mustelidae	
River Otter	*Lontra canadensis sonora*
Striped Skunk	*Mephitis mephitis estor***
Spotted Skunk	*Spilogale putorius phenax**
Badger	*Taxidea taxus berlandieri***
Raccoons and Relatives: Family Procyonidae	
Raccoon	*Procyon lotor pallidus***
Ringtail	*Bassariscus astutus yumanensis**
EVEN-TOED UNGULATES: ORDER ARTIODACTYLA	
Deer and Relatives: Family Cervidae	
Mule Deer	*Odocoileus hemionus eremicus*
Pronghorn: Family Antilocapridae	
Pronghorn	*Antilocapra americana americana* (extirpated)
Cattle, Sheep, and Relatives: Family Bovidae	
Bighorn Sheep	*Ovis canadensis* (threatened)
	O. c. cremnobates (SW corner of county)
	O. c. nelsoni (Chocolate Mts.)

RODENTS: ORDER RODENTIA	
Squirrels: Family Sciuridae	
White-tailed Antelope Squirrel	*Ammospermophilus leucurus leucurus***
Round-tailed Ground Squirrel	*Spermophilus tereticaudus tereticaudus***
Baja California Chipmunk	*Tamias obscurus obscurus** (SW corner of county only)
Beaver: Family Castoridae	
Beaver	*Castor canadensis repentinus***
Pocket Gophers: Family Geomyidae	
Valley or Botta's Pocket Gopher	*Thomomys bottae*
	*T. b. albatus*** (Imperial Valley and eastern Imperial Co.)
	*T. b. boregoensis*** (western Imperial Co.)
	*T. b. crassus** (E side Salton Sea)
	*T. b. rupestris** (Chocolate Mts.)
Pocket Mice: Family Heteromyidae	
Agile Kangaroo Rat	*Dipodomys agilis cabezonae* (SW corner of county only)
Desert Kangaroo Rat	*Dipodomys deserti deserti***
Merriam's Kangaroo Rat	*Dipodomys merriami*
	*D. m. trinidadensis*** (SW corner of county)
	*D. m. arenivagus*** (Imperial Valley and west)
	*D. m. merriami*** (east of Salton Sea and Imperial Valley)
Bailey's Pocket Mouse	*Chaetodipus baileyi hueyi**
San Diego Pocket Mouse	*Chaetodipus fallax pallidus*** (SW corner of county only)
Long-tailed Pocket Mouse	*Chaetodipus formosus mesembrinus***
Desert Pocket Mouse	*Chaetodipus penicillatus angustirostris***
Spiny Pocket Mouse	*Chaetodipus spinatus*
	*C. s. spinatus***
	*C. s. rufescens** (SW corner of county only)
Little Pocket Mouse	*Perognathus longimembris***
	*P. l. internationalis*** (SW corner of county)
	*P. l. bombycinus*** *(near Colorado River)*

Rats and Mice: Family Muridae	
California Vole	*Microtus californicus sanctidiegi* (SW corner of county only)
Muskrat	*Ondatra zibethicus bernardi***
House Mouse	*Mus musculus*** (introduced)
Norway Rat	*Rattus norvegicus* (introduced)
Roof Rat or Black Rat	*Rattus rattus* (introduced)
White-throated Woodrat	*Neotoma albigula venusta***
Desert Woodrat	*Neotoma lepida*
	*N. l. gilva*** (SW corner of county)
	*N. l. lepida*** (central and western Imperial Co.)
	*N. l. grinnelli*** (eastern Imperial Co.)
Southern Grasshopper Mouse	*Onychomys torridus pulcher***
Brush Mouse	*Peromyscus boylii rowleyi** (SW corner of county only)
California Mouse	*Peromyscus californicus insignis** (SW corner of county only)
Canyon Mouse	*Peromyscus crinitus stephensi***
Cactus Mouse	*Peromyscus eremicus eremicus***
Deer Mouse	*Peromyscus maniculatus sonoriensis***
Piñon Mouse	*Peromyscus truei martirensis** (SW corner of county only)
Western Harvest Mouse	*Reithrodontomys megalotis megalotis***
Hispid Cotton Rat	*Sigmodon hispidus eremicus***

RABBITS AND PIKAS: ORDER LAGOMORPHA	
Rabbits and Hares: Family Leporidae	
Black-tailed Jackrabbit	*Lepus californicus deserticola**
Desert Cottontail	*Sylvilagus audubonii arizonae***

ATTACHMENT C
BIOLOGICAL RESOURCES FIGURES



Soils Cumulative Analysis Area

Soils-1 Map

Proposed Solar Two Project

Stirling Energy Systems

1:200,000

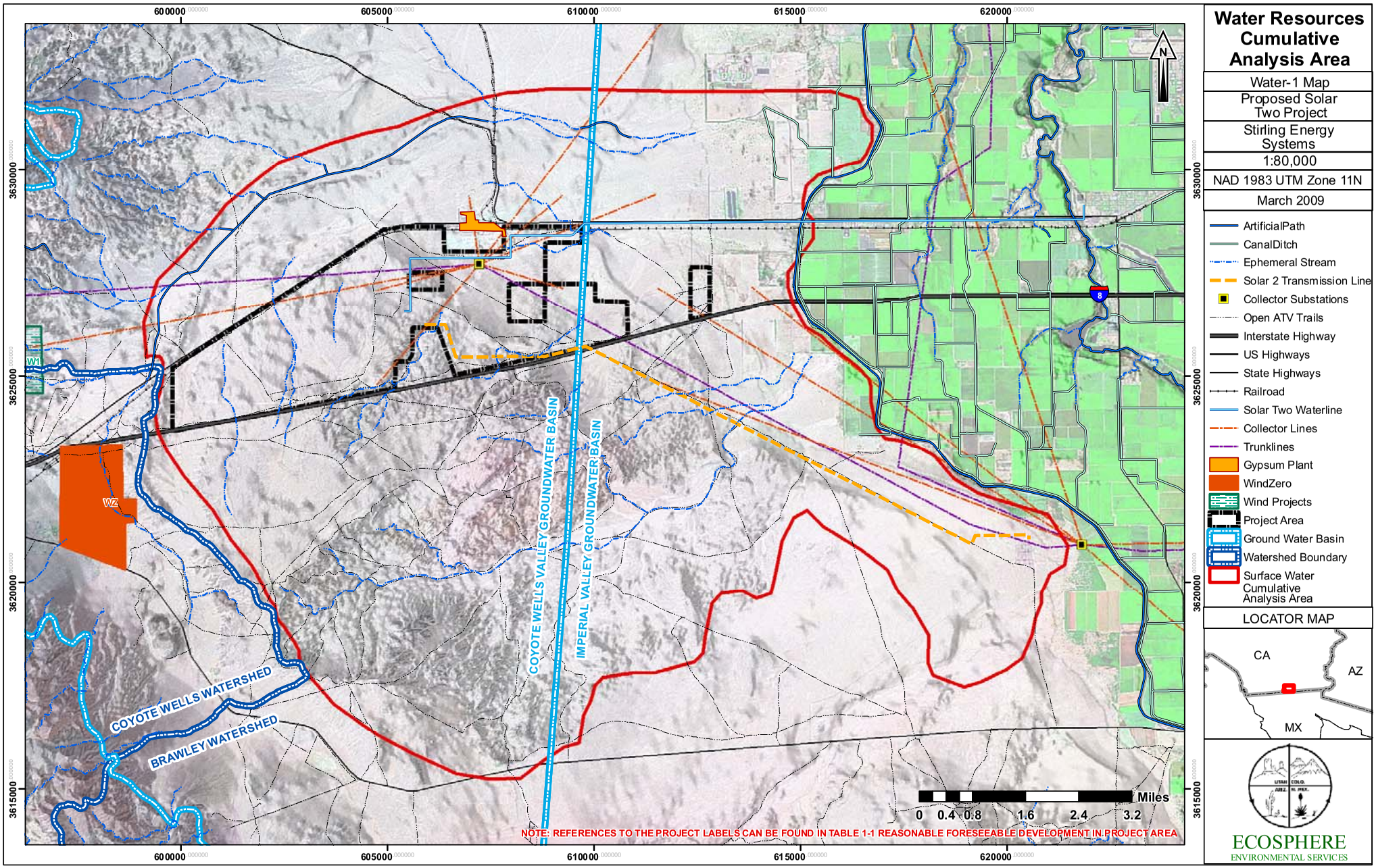
NAD 1983 UTM Zone 11N

March 2009

- Biomass Projects
- Geothermal Projects
- Collector Substations
- Sunrise Butte
- Open ATV Trails
- Interstate Highway
- US Highways
- State Highways
- Railroad
- International Boundary
- Solar Two Waterline
- Collector Lines
- Trunklines
- Solar 2 Transmission Line
- Gypsum Plant
- WindZero
- Wind Projects
- Mexico Wind Projects
- Project Area
- Soils Cumulative Analysis Area

LOCATOR MAP

ECOSPHERE
ENVIRONMENTAL SERVICES



Water Resources Cumulative Analysis Area

Water-1 Map

Proposed Solar Two Project

Stirling Energy Systems

1:80,000

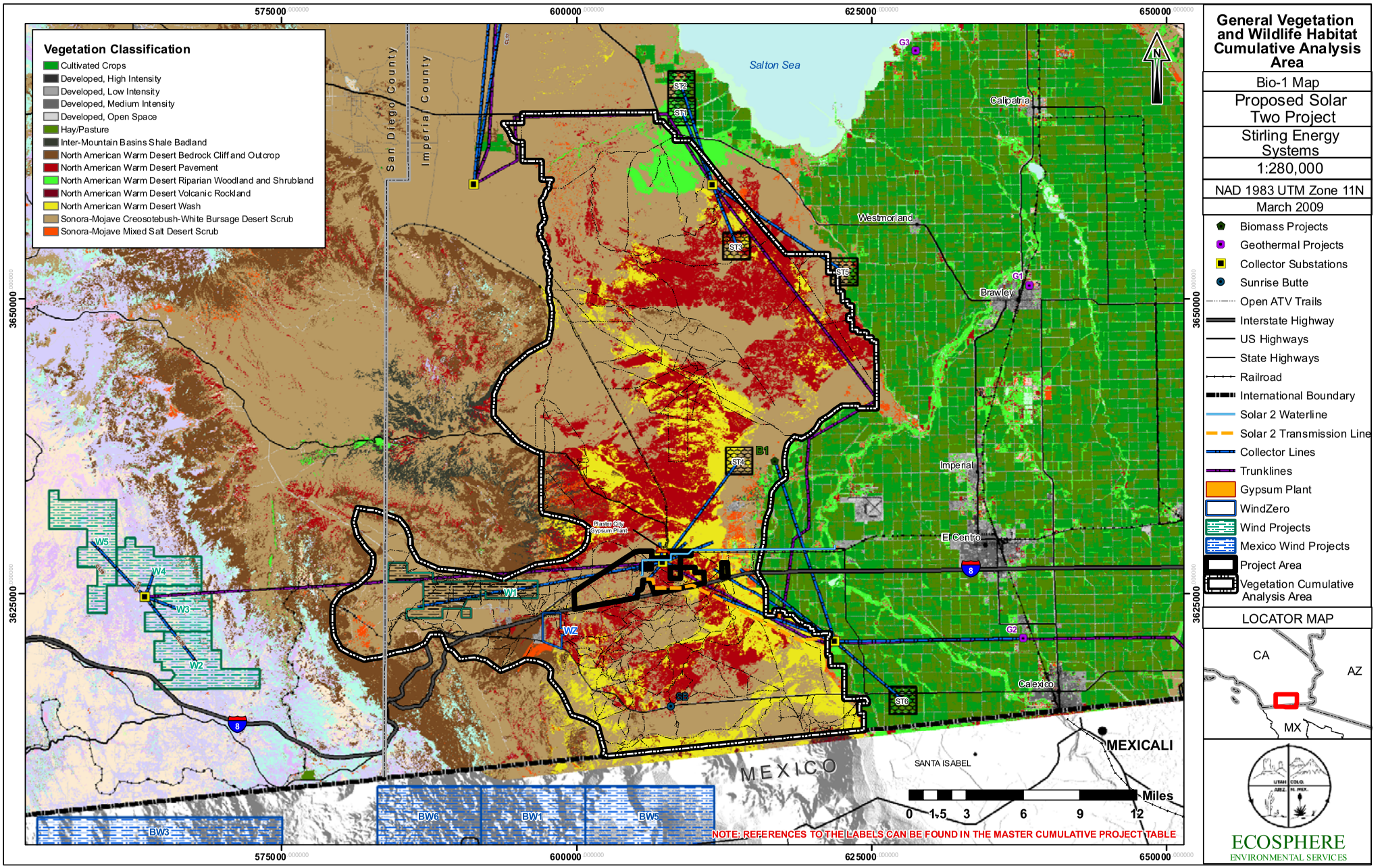
NAD 1983 UTM Zone 11N

March 2009

- ArtificialPath
- CanalDitch
- Ephemeral Stream
- Solar 2 Transmission Line
- Collector Substations
- Open ATV Trails
- Interstate Highway
- US Highways
- State Highways
- Railroad
- Solar Two Waterline
- Collector Lines
- Trunklines
- Gypsum Plant
- WindZero
- Wind Projects
- Project Area
- Ground Water Basin
- Watershed Boundary
- Surface Water Cumulative Analysis Area

LOCATOR MAP

ECOSPHERE
ENVIRONMENTAL SERVICES



General Vegetation and Wildlife Habitat Cumulative Analysis Area

Bio-1 Map

Proposed Solar Two Project

Stirling Energy Systems

1:280,000

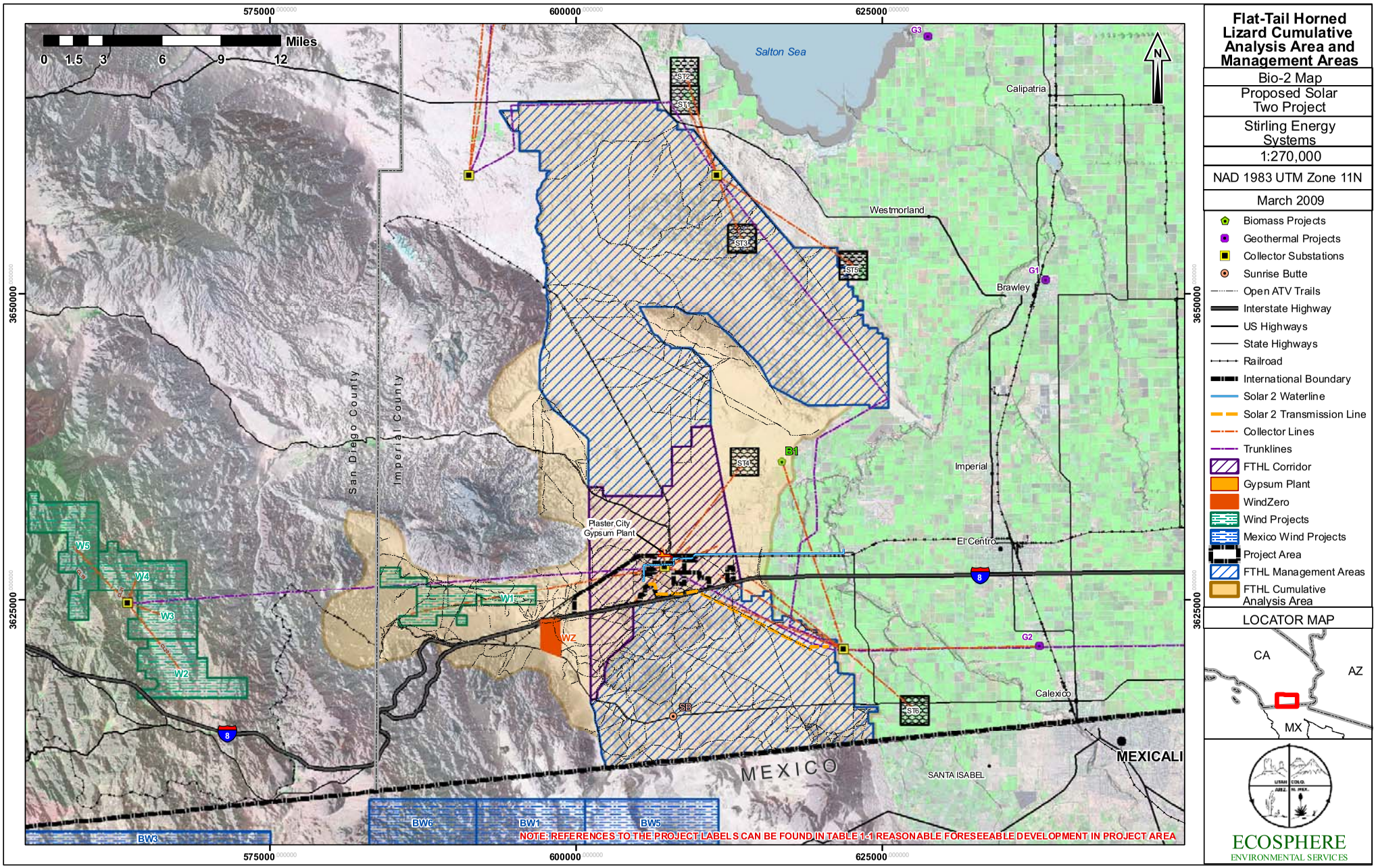
NAD 1983 UTM Zone 11N

March 2009

- Biomass Projects
- Geothermal Projects
- Collector Substations
- Sunrise Butte
- Open ATV Trails
- Interstate Highway
- US Highways
- State Highways
- Railroad
- International Boundary
- Solar 2 Waterline
- Solar 2 Transmission Line
- Collector Lines
- Trunklines
- Gypsum Plant
- WindZero
- Wind Projects
- Mexico Wind Projects
- Project Area
- Vegetation Cumulative Analysis Area

LOCATOR MAP

ECOSPHERE
ENVIRONMENTAL SERVICES


Flat-Tail Horned Lizard Cumulative Analysis Area and Management Areas
Bio-2 Map
Proposed Solar Two Project
Stirling Energy Systems
1:270,000
NAD 1983 UTM Zone 11N
March 2009
Biomass Projects
Geothermal Projects
Collector Substations
Sunrise Butte
Open ATV Trails
Interstate Highway
US Highways
State Highways
Railroad
International Boundary
Solar 2 Waterline
Solar 2 Transmission Line
Collector Lines
Trunklines
FTHL Corridor
Gypsum Plant
WindZero
Wind Projects
Mexico Wind Projects
Project Area
FTHL Management Areas
FTHL Cumulative Analysis Area
LOCATOR MAP
CA
AZ
MX
ECOSPHERE
ENVIRONMENTAL SERVICES
Miles
0 1.5 3 6 9 12
575000
600000
625000
3650000
3625000
N
Salton Sea
Calipatria
Westmorland
Brawley
Imperial
El Centro
Calexico
MEXICALI
SANTA ISABEL
MEXICO
San Diego County
Imperial County
Plaster City Gypsum Plant
ST1
ST2
ST3
ST4
ST5
ST6
G1
G2
G3
B1
SB
W1
W2
W3
W4
W5
WZ
BW1
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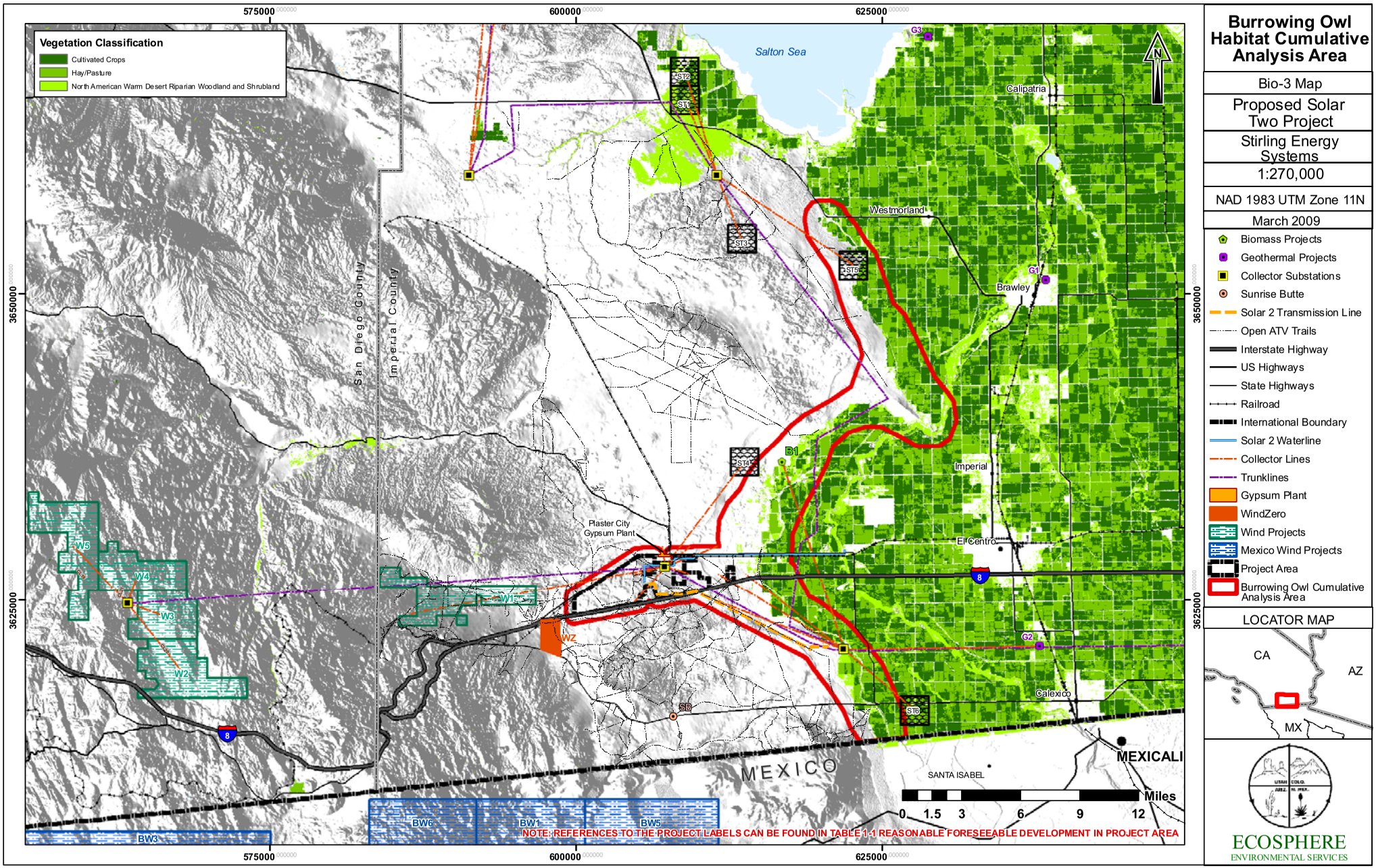
BW6
NOTE: REFERENCES TO THE PROJECT LABELS CAN BE FOUND IN TABLE 1-1 REASONABLE FORESEEABLE DEVELOPMENT IN PROJECT AREA



Burrowing Owl Habitat Cumulative Analysis Area

Bio-3 Map

Proposed Solar Two Project

Stirling Energy Systems

1:270,000

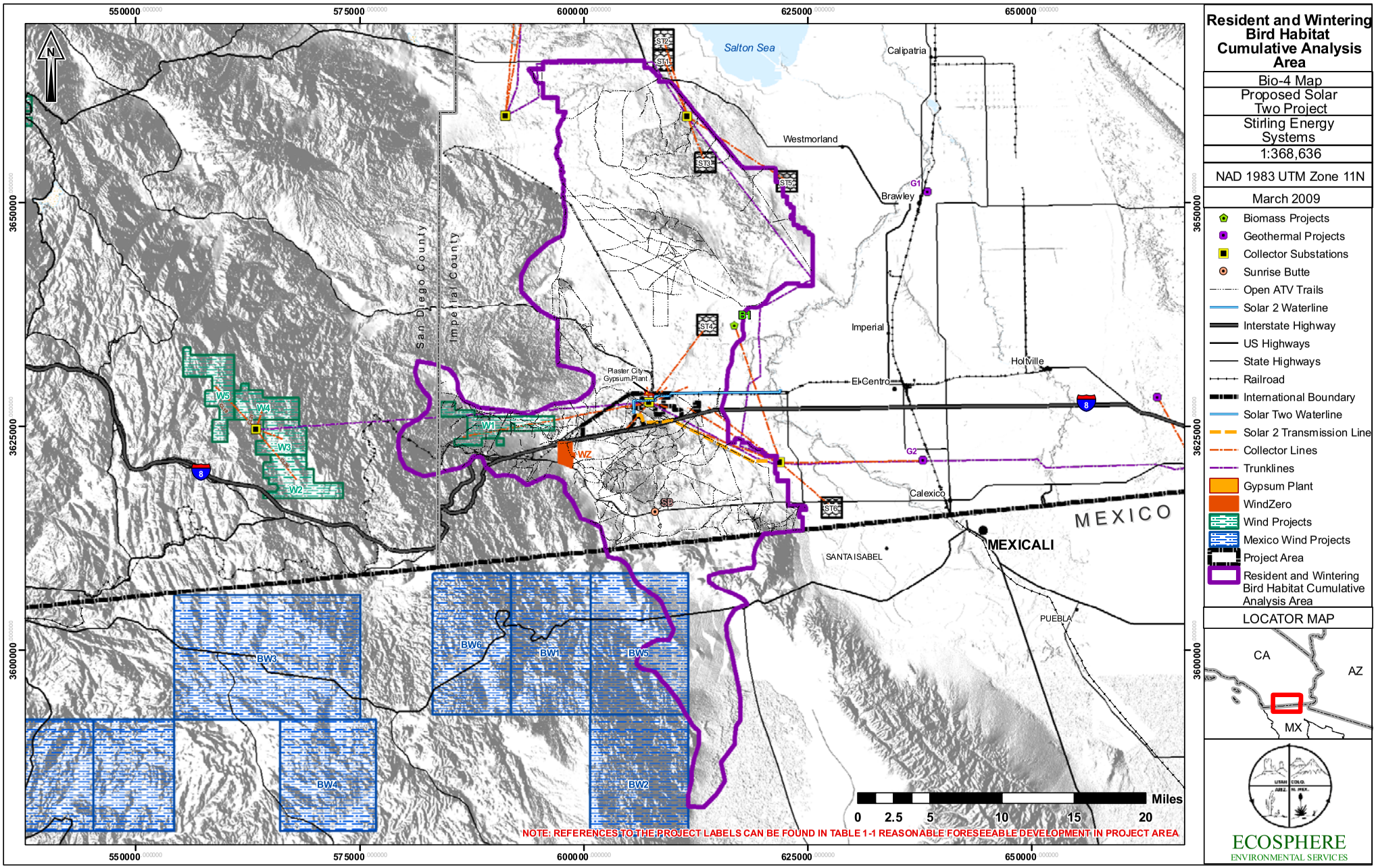
NAD 1983 UTM Zone 11N

March 2009

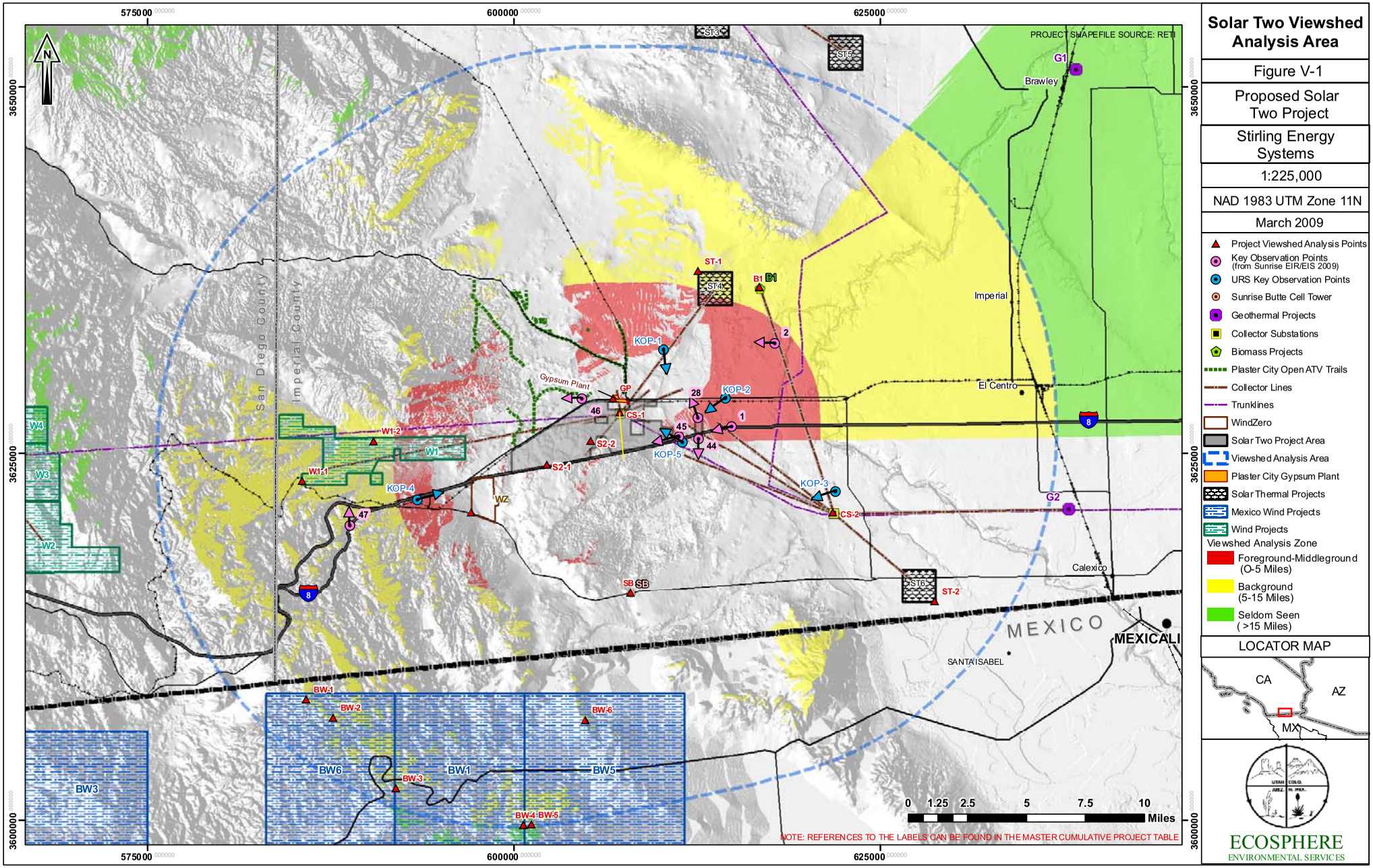
- Biomass Projects
- Geothermal Projects
- Collector Substations
- Sunrise Butte
- Solar 2 Transmission Line
- Open ATV Trails
- Interstate Highway
- US Highways
- State Highways
- Railroad
- International Boundary
- Solar 2 Waterline
- Collector Lines
- Trunklines
- Gypsum Plant
- WindZero
- Wind Projects
- Mexico Wind Projects
- Project Area
- Burrowing Owl Cumulative Analysis Area

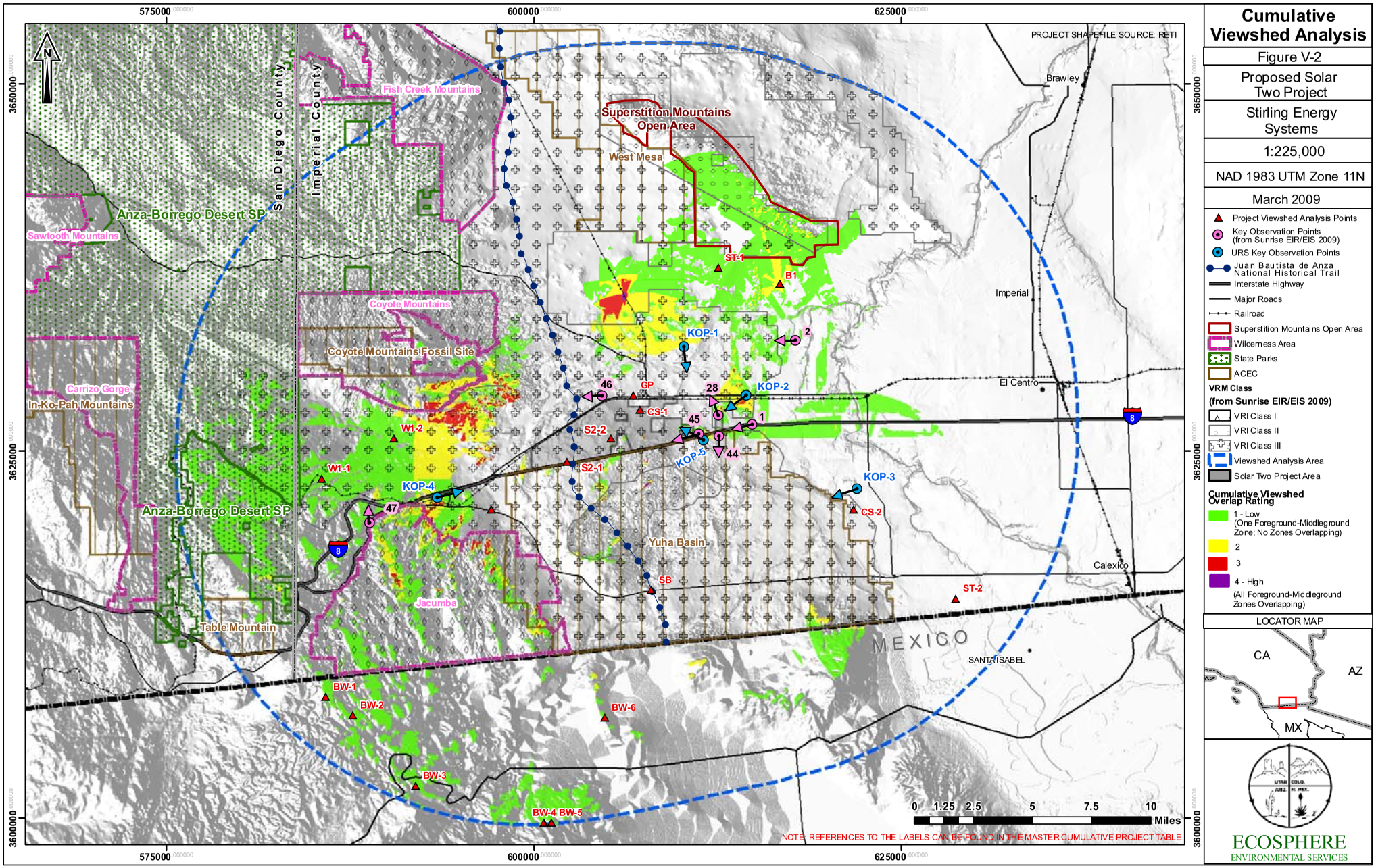
LOCATOR MAP

ECOSPHERE
ENVIRONMENTAL SERVICES


Resident and Wintering Bird Habitat Cumulative Analysis Area
Bio-4 Map
Proposed Solar Two Project
Stirling Energy Systems
1:368,636
NAD 1983 UTM Zone 11N
March 2009
Biomass Projects
Geothermal Projects
Collector Substations
Sunrise Butte
Open ATV Trails
Solar 2 Waterline
Interstate Highway
US Highways
State Highways
Railroad
International Boundary
Solar Two Waterline
Solar 2 Transmission Line
Collector Lines
Trunklines
Gypsum Plant
WindZero
Wind Projects
Mexico Wind Projects
Project Area
Resident and Wintering Bird Habitat Cumulative Analysis Area
LOCATOR MAP
CA
AZ
MX
ECOSPHERE
ENVIRONMENTAL SERVICES
Salton Sea
Calipatria
Westmorland
Brawley
Imperial
Holtville
El Centro
Plaster City Gypsum Plant
Calexico
MEXICO
MEXICALI
SANTA ISABEL
PUEBLA
San Diego County
Imperial County
ST1
ST2
ST3
ST4
ST5
ST6
G1
G2
B1
SP
WZ
W1
W2
W3
W4
W5
BW1
BW2
BW3
BW4
BW5
BW6
Miles
0 2.5 5 10 15 20
NOTE: REFERENCES TO THE PROJECT LABELS CAN BE FOUND IN TABLE 1-1 REASONABLE FORESEEABLE DEVELOPMENT IN PROJECT AREA
550000
575000
600000
625000
650000
3650000
3625000
3600000

ATTACHMENT D
NOISE AND VISUAL RESOURCES FIGURES AND TABLES


Solar Two Viewshed Analysis Area
Figure V-1
Proposed Solar Two Project
Stirling Energy Systems
1:225,000
NAD 1983 UTM Zone 11N
March 2009
PROJECT SHAPEFILE SOURCE: RETI
575000
600000
625000
3650000
3625000
3600000
N
San Diego County
Imperial County
Brawley
Imperial
El Centro
Calexico
MEXICALI
SANTA ISABEL
MEXICO
Gypsum Plant
ST-1
ST-2
B1
KOP-1
KOP-2
KOP-3
KOP-4
KOP-5
GP
CS-1
CS-2
SB
WZ
W1
W1-1
W1-2
W2
W3
W4
S2-1
S2-2
BW-1
BW-2
BW-3
BW-4
BW-5
BW-6
BW1
BW3
BW5
BW6
G1
G2
1
2
28
46
45
44
47
Project Viewshed Analysis Points
Key Observation Points (from Sunrise EIR/EIS 2009)
URS Key Observation Points
Sunrise Butte Cell Tower
Geothermal Projects
Collector Substations
Biomass Projects
Plaster City Open ATV Trails
Collector Lines
Trunklines
WindZero
Solar Two Project Area
Viewshed Analysis Area
Plaster City Gypsum Plant
Solar Thermal Projects
Mexico Wind Projects
Wind Projects
Viewshed Analysis Zone
Foreground-Middleground (O-5 Miles)
Background (5-15 Miles)
Seldom Seen (>15 Miles)
0 1.25 2.5 5 7.5 10
Miles
NOTE: REFERENCES TO THE LABELS CAN BE FOUND IN THE MASTER CUMULATIVE PROJECT TABLE
LOCATOR MAP
CA
AZ
MX
ECOSPHERE
ENVIRONMENTAL SERVICES



Cumulative Viewshed Analysis

Figure V-2

Proposed Solar Two Project

Stirling Energy Systems

1:225,000

NAD 1983 UTM Zone 11N

March 2009

- Project Viewshed Analysis Points
- Key Observation Points (from Sunrise EIR/EIS 2009)
- URS Key Observation Points
- Juan Bautista de Anza National Historical Trail
- Interstate Highway
- Major Roads
- Railroad
- Superstition Mountains Open Area
- Wilderness Area
- State Parks
- ACEC

VRM Class (from Sunrise EIR/EIS 2009)

- VRI Class I
- VRI Class II
- VRI Class III
- Viewshed Analysis Area
- Solar Two Project Area

Cumulative Viewshed Overlap Rating

- 1 - Low (One Foreground-Middleground Zone; No Zones Overlapping)
- 2
- 3
- 4 - High (All Foreground-Middleground Zones Overlapping)

LOCATOR MAP

ECOSPHERE
ENVIRONMENTAL SERVICES

Construction Equipment Projection (750 MW)
Table Noise-1 and Revised Table 5.2-19

					Month After Construction Start																																							
Construction Equipment Description	**HP**	**D**	**G**	**P**	**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**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
Air Compressor	50	X			1	1	1	1	3	3	3	3	2	2	2	2	2	2	2	2	1	1																						
Asphalt Paver	120	X				1																																						
Backhoe	120	X			3	9	5	5	5	6	6	5	4	4	4	4	4	4	4	4	1	1	1																					
Compactor	120	X			1	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2																								
Crane small	175	X			1	3	4	5	5	8	8	8	7	6	6	6	8	8	6	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Crane large	500	X						3	3	3	1													3	3	3	3	3																
Dozer	250	X			1	1	1	1	1	1	1	1	1				1	1	1	1																								
Generator	50	X			1	1	1	2	2	4	4	4	6	6	6	6	3	3	3	3	3	2	2	2	2	2	1	1	1															
Grader	175	X			1	3	3	3	3	3	2	2	1				2	2	1	1																								
Light Tower	50	X						1	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1																			
Loader	250	X			1	3	3	4	4	4	3	3	2	1	1	1	3	3	3	2	1																							
Maxi Sneeker (Trencher)	50	X				2	2	2	2	5	5	4	4	4	4	4	5	5	5	5	5	2	2	1																				
Skid Steer (Bobcat)	50	X				1	1	2	2	4	3	3	2	2	2	2	4	4	4	4	4																							
Welding Machine	50	X				1	2	3	4	4	4	4	4	4	4	3	3	3	3	2	1	1	1																					
Equipment fueled with Propane																																												
Aerial Lift	120			X	2	5	5	5	6	6	5	3	3	2	2	2	4	5	5	5	5	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	5	5	5	5	5	5	5
Fork Lift	50			X	2	5	7	7	7	8	8	8	8	8	8	8	8	9	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5										
Telehandler	120			X			1	1	2	5	4	3	3	3	3	3	4	7	5	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Vehicles with Onroad Engines for Emissions Estimates																																												
Busses	175		X		4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Concrete Pump	250	X			2	5	5																																					
Dump Truck	250	X			3	8	7	6	4	4	4	3					3	2	2																									
Flatbed Truck	250	X			2	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2	2	2	2	2
Staff & Security Truck	187	/			5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Pickup Truck	175		X		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Water/Soiltac Truck	250	X			4	14	8	8	6	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	0
General Materials Delivery Trucks	250	X				3	3	3	3	3	3	3																																
Suncatcher Pedestals Delivery Trucks	250	X						3	3	3	1													3	3	3	3	3																
Total					44	99	92	98	100	115	104	96	86	81	81	80	93	96	88	82	69	53	52	51	50	48	47	47	41	40	40	38	38	38	33	33	33	36	36	32	32	32	32	31