

**NEW APPLICATION**

**ORIGINAL**

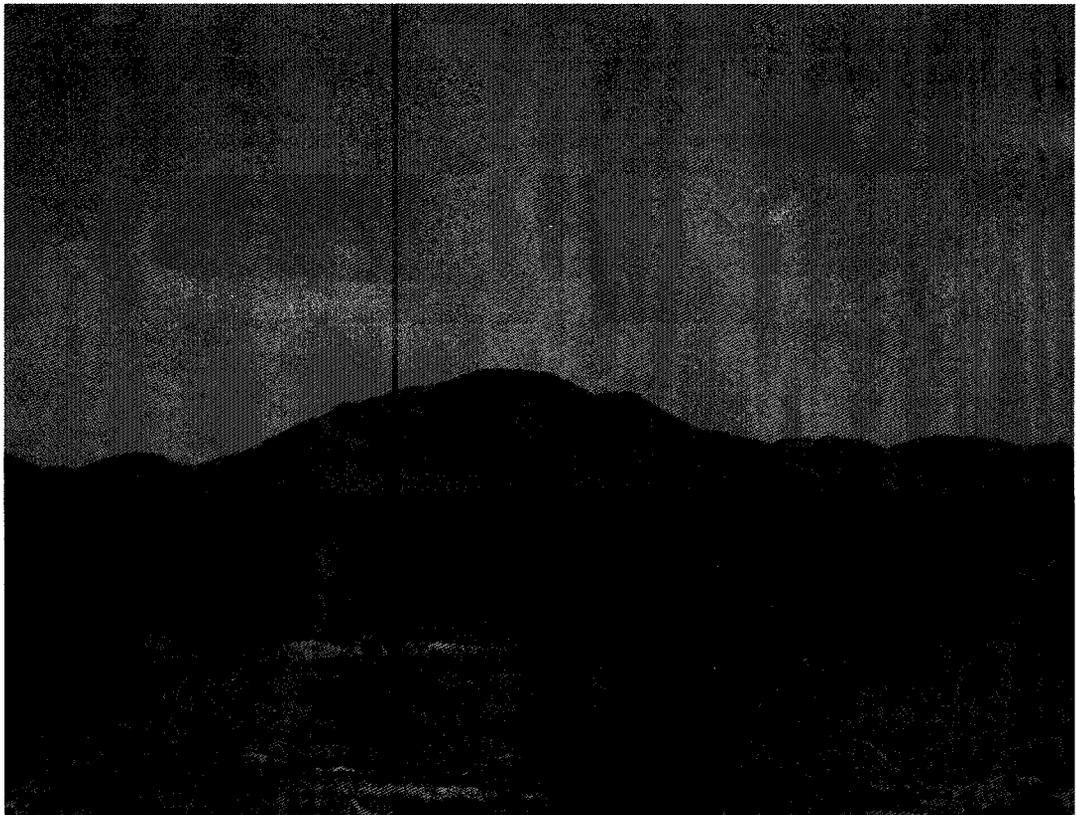


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**Mesquite Solar Gen-Tie Project**

L-00000KK-09-0299-00147

**Application to the Power Plant and Line Siting Committee  
of the Arizona Corporation Commission for  
Certificate of Environmental Compatibility**



Saddle Mountains, Arizona

**Applicant: SEP-II, LLC, a wholly owned subsidiary of Sempra Generation**



Prepared by:

AECOM

June 3, 2009

Arizona Corporation Commission  
**DOCKETED**

JUN - 5 2009

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## Introduction

### Overview

This application by SEP-II, LLC (SEP-II), a wholly owned subsidiary of Sempra Generation, is for a proposed generation-tie power line (Mesquite Solar Gen-Tie) originating at the planned photovoltaic (PV) solar energy facility located southwest of Wintersburg, Arizona (Mesquite Solar project) and terminating at the existing Mesquite Generating Station. The Mesquite Solar Gen-Tie would operate at 230 kilovolts (kV) and would electrically connect the planned Mesquite Solar project 230 kV substation to the existing Mesquite Generating Station 230 kV switchyard (see Figure 1). The Mesquite Solar Gen-Tie would be approximately four miles long and would consist of two circuits supported on a single set of tubular steel poles.

The Mesquite Generating Station switchyard would be modified to provide two new termination positions for the proposed Mesquite Solar Gen-Tie, including bus modifications and installation of new switching devices and termination structures. The Mesquite Generating Station switchyard has a single connection to the adjacent 500 kV Hassayampa switchyard, and a second connection will be placed in service prior to completion of the proposed Mesquite Solar Gen-Tie.

### Purpose and Need

This request for a Certificate of Environmental Compatibility (CEC) is for the proposed 230 kV Mesquite Solar Gen-Tie needed to interconnect the Mesquite Solar project being developed by SEP-II. The Mesquite Solar project will operate year-round, producing electric power whenever the sun is shining. When fully developed, the Mesquite Solar project will produce up to 500 MW of clean solar power.

The Mesquite Solar Gen-Tie would support the Mesquite Solar project in providing benefits to the local community, Maricopa County, and the state of Arizona that include:

- Creating 100 to 300 construction jobs
- Creating approximately four permanent jobs
- Yielding roughly \$1 billion of direct, in-state private investment

### Preferred and Alternative Routes

SEP-II is proposing a Preferred Route and an Alternative Route for the proposed Mesquite Solar Gen-Tie. The Preferred Route and the Alternative Route are shown on Exhibit A3. The Mesquite Solar Gen-Tie will originate at the Mesquite Solar project substation to be located within Section 18, Township 1 South, Range 6 West. The Mesquite Solar Gen-Tie will terminate at the Mesquite Generating Station switchyard located in Section 15, Township 1 South, Range 6 West.

### **Preferred Route**

From the Mesquite Solar project site, the Preferred Route extends east on state land for approximately 0.1 mile, then south on state land for approximately 0.7 mile, and then east on state land for approximately 0.4 mile along the section line between Sections 17 and 20. The Preferred Route continues east along the same alignment for approximately 0.5 mile on private property owned by Dynegy. After exiting that private property, the Preferred Route continues east on state land for approximately 1.0 mile along the section line between Sections 16 and 21, and then continues east on state land for approximately 0.5 mile along the section line between Sections 15 and 22. At the midpoint of Section 15, the Preferred Route then turns north onto the Mesquite Generating Station site and continues along an existing rail spur for approximately 0.8 mile before turning west and terminating at the existing Mesquite Generating Station switchyard.

### **Alternative Route**

From the Mesquite Solar project site, the Alternate Route extends east on state land for approximately 0.1 mile and then north on state land for approximately 0.3 mile to Elliot Road. The Alternative Route then turns east and extends on state land along Elliot Road for approximately 0.4 mile, exits state land and continues east in Maricopa County right-of-way for Elliot Road for approximately 0.5 mile, and then exits the Maricopa County right-of-way and continues east on state land along Elliot Road for approximately 0.2 mile. The Alternative Route then turns south and continues on state land for approximately 1.0 mile to the section line between Sections 16 and 21. From this point onward, the Alternate Route is the same as the Preferred Route.

### **Requested Corridor**

SEP-II requests approval of both the Preferred Route and the Alternate Route with a corridor that is 240 feet wide and centered on the route descriptions provided above. The final route and alignment that will be submitted to Maricopa County will be determined by the applicant and will depend upon right-of-way acquisition constraints. SEP-II plans to acquire a 120-foot-wide right-of-way except in the case of the 0.5-mile segment of the Alternate Route that lies within Maricopa County 60-foot-wide right-of-way for Elliot Road. The right-of-way for the Preferred Route is shown on Exhibit A3.1 and the right-of-way for the Alternative Route is shown on Exhibit A3.2.

### **Summary of Environmental Compatibility**

This application includes evaluation of relevant environmental issues associated with the proposed Mesquite Solar Gen-Tie for the Mesquite Solar project, including route alternatives and the factors to be considered in granting CEC approval, as set forth in ARS § 40 360.06. This application demonstrates the environmental compatibility of the proposed Mesquite Solar Gen-Tie and was prepared in accordance with Arizona Administrative Code R14-3-219. The following summarizes how the Mesquite Solar project satisfies the requirements of Arizona law regarding environmental compatibility:

# MESQUITE SOLAR

## Figure 1 Project Map

### Delineated Areas

- Proposed Mesquite Solar Energy Generation Area (per CPA200807)
- Wildlife Habitat Area

### Proposed Transmission

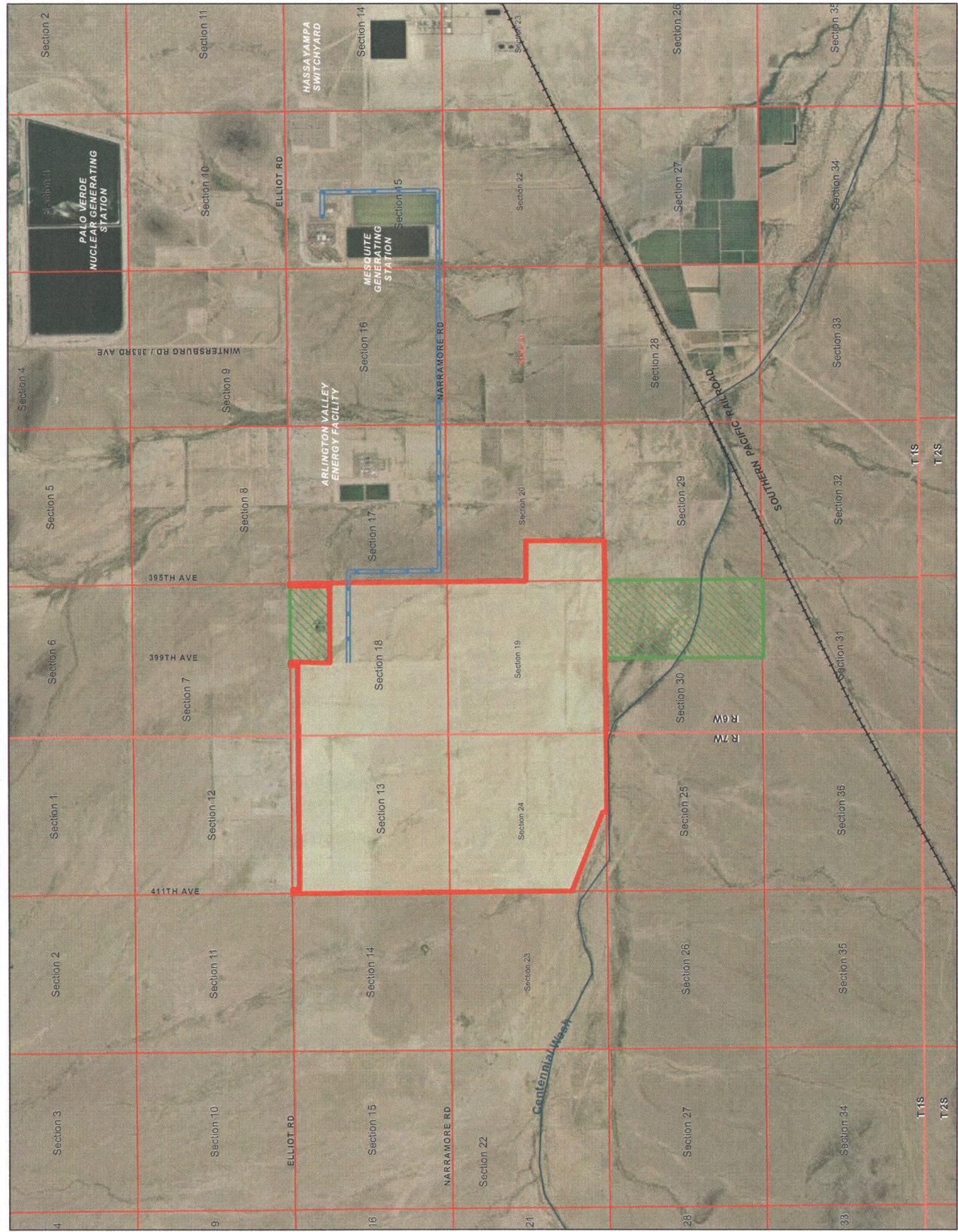
- 230 KV Double-Circuit

### Public Land Survey System

- Townships
- Sections
- Centennial Wash



File Name: project.dwg  
 File Loc: 06180026/GIS/Maps/SUP  
 SOURCES: Arizona Land Resource Information System, Google Earth, USGS, Maricopa County Planning, Semptra Energy



- Power lines and substations are an allowable use within each of the land use designations crossed by the proposed route alternatives. The proposed route alternatives meet local zoning ordinances or general plans of all affected areas of jurisdiction. The proposed Mesquite Solar Gen-Tie would be located near or adjacent to existing transmission lines and/or roads to the extent feasible. There would be no significant or detrimental effects to existing plans of the state, local government, or private entities for other developments at or in the vicinity of the proposed route alternatives.
- The proposed route alternatives would create no significant or detrimental effects to fish, wildlife, or plant life or associated forms of life upon which they are dependent.
- The proposed route alternatives would create no significant or detrimental effects associated with noise emission levels or interference with communication signals.
- No jurisdictional agency within the area has plans for future development of recreational facilities on or near the proposed route alternatives. The construction and operation and maintenance of the proposed Mesquite Solar Gen-Tie would be consistent with all applicable safety considerations and regulations.
- There would be no significant or detrimental effect to scenic areas in the vicinity of the route alternatives. With incorporation of mitigation, no significant or detrimental impacts to historic sites or structures or archaeological sites in the vicinity of the proposed route alternatives would occur.
- There are no areas of critical habitat, as designated by the U.S. Fish and Wildlife Service, crossed by either of the proposed route alternatives. There would be no significant or detrimental effects to areas unique because of biological diversity or to habitats for rare or endangered species.

SEP-II, therefore, respectfully requests approval of this application.

## **Application**

### **1. Name and Address of the Applicant**

SEP-II  
Attention: Timothy Allen  
101 Ash Street, HQ 14A  
San Diego, CA 92101

### **2. Name, address, and telephone number of a representative of the applicant who has access to technical knowledge and background information concerning this application, and who will be available to answer questions or furnish additional information.**

Timothy Allen  
101 Ash Street, HQ 14A  
San Diego, CA 92101  
Phone: 619-696-2980

Fax: 619-696-2791

Email: tallen@semprageneration.com

**3. Date on which the applicant filed a Ten Year Plan in compliance with A.R.S. § 40-360.02, in which the facilities for which this application is made were described.**

In accordance with A.R.S. Section 40-360.02, SEP-II filed a Ten Year Plan with the Arizona Corporation Commission (ACC) on January 30, 2009.

**4. Description of the proposed facility including:**

**a. With respect to an electric generating plant:**

This application does not cover the associated Mesquite Solar project. The Mesquite Solar project is not regulated by the ACC pursuant to applicable Arizona law. SEP-II has submitted an application with Maricopa County for a Special Use Permit for the Mesquite Solar project and will obtain all necessary approvals and permits from Maricopa County.

**b. With respect to a proposed transmission line:**

**i. Nominal voltage for which the line is designed; description of the proposed structures and switchyards or substations associated therewith; and purpose for constructing said transmission line.**

The nominal voltage for the proposed Mesquite Solar Gen-Tie is 230 kV. The Mesquite Solar Gen-Tie will consist of two circuits on common structures and will connect the Mesquite Solar project to the existing Mesquite Generating Station switchyard. The structures will be tubular steel poles on drilled shaft foundations.

The Mesquite Solar Gen-Tie will originate at a new 230 kV switchyard to be located on the Mesquite Solar project site and will extend to and terminate at the existing 230 kV bus of the Mesquite Generating Station.

The Mesquite Solar project's new switchyard will consist of a single 230 kV bus and associated switching devices. The Mesquite Solar project 230 kV switchyard will be located within the Mesquite Solar project substation and be enclosed by a chain link fence.

The existing Mesquite Generating Station switchyard consists of a single 230 kV bus that connects the Mesquite Generating Station to the Hassayampa Substation as shown in Figure 1. The Mesquite Generating Station 230 kV bus will be modified to add two additional 230 kV circuit breakers and associated switches to accommodate the Mesquite Solar Gen-Tie.

- ii. **Description of geographical points between which the transmission line will run, the straight-line distance between such points and the length of the transmission line for each alternative route for which the application is made.**

The Mesquite Solar Gen-Tie will originate at a new 230 kV switchyard to be located on the Mesquite Solar project site and will extend to and terminate at the existing 230 kV bus of the Mesquite Generating Station. Distances and lengths of the proposed Mesquite Solar Gen-Tie routes are provided in Table 1.

**Table 1:  
Mesquite Solar Gen-Tie Alternatives**

Route	Straight-Line Distance (approximate miles)	Length of Gen-Tie (approximate miles)
Preferred Route	2.5	4.52
Alternative Route	2.5	5.15

- iii. **Nominal width of right-of-way required, nominal length of spans, maximum height of supporting structures and minimum height of conductor above ground.**

SEP-II is requesting a nominal 120-foot right-of-way within a 240-foot-wide corridor to accommodate the construction, operation, and maintenance of the proposed double circuit 230 kV Mesquite Solar Gen-Tie. The 240-foot-wide corridor is being requested to minimize potential effects at any site-specific locations (e.g., cultural sites, sensitive habitats, physical features, etc.) where construction of Mesquite Solar Gen-Tie facilities might be constrained.

The nominal length of spans would vary from 500 to 1,000 feet.

The maximum height of supporting structures would be 150 feet.

The minimum height of the conductor above existing grade would be 25 feet.

- iv. **To the extent available, the estimated costs of proposed transmission line and route, stated separately. (If application contains alternative routes, furnish an estimate for each route and a brief description of the reasons for any variations in such estimates.)**

The following estimated costs include a construction cost range assuming 120 feet of right-of-way and excludes costs for land acquisition and switchyard modification.

**Preferred Route (4.52 miles)**

The estimated cost for the Preferred Route is \$5.85M.

**Alternative Route (5.15 miles)**

The estimated cost for the Alternative Route is \$6.92M. The increase in cost for the Alternative Route results from a longer route with additional turns and angle structures as compared to the Preferred Route.

- v. **Description of proposed route and switchyard locations. (If application contains alternative routes, list routes in order of applicant's preference with a summary of reasons for such order of preference and any changes such alternative routes would require in the plans reflected in (i) through (iv) hereof.)**

Descriptions of the Preferred Route and the Alternative Route are provided below.

**Preferred Route**

The Preferred Route consists of Parcels 1, 2, 3, 4, and 5 as described below. The Preferred Route is the shortest route and requires fewer turning structures resulting in the minimum impacts and minimum cost to construct.

**Alternative Route**

The Alternative Route consists of Parcels 1, 5, 6, 7, 8, 9, and 10 as described below. The Alternative Route is longer and requires additional turning structures and one transmission line crossing. Nevertheless, this Alternative Route has been identified as an alternative that does not require acquisition of easements from private parties, which may be necessary.

*Parcel 1*

The southerly 120 feet of the northerly 1,780 feet of Section 17, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian, Maricopa County, Arizona, excepting the easterly 4,840 feet of said Section 17.

*Parcel 2*

The easterly 120 feet of the westerly 560 feet of Section 17, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian, Maricopa County, Arizona, excepting the northerly 1,660 feet and the southerly 120 feet of said Section 17.

*Parcel 3*

The southerly 120 feet of Section 17, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian, Maricopa County, Arizona, excepting the easterly one-half of said Section 17.

*Parcel 4*

The southerly 120 feet of Section 16, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian, Maricopa County, Arizona.

*Parcel 5*

The northerly 120 feet of Section 22, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian, Maricopa County, Arizona, excepting the easterly one-half of said Section 22.

*Parcel 6*

The easterly 120 feet of the westerly 560 feet of Section 17, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian, Maricopa County, Arizona, excepting the northerly 165 feet and the southerly 3,500 feet of said Section 17.

*Parcel 7*

The southerly 120 feet of the northerly 165 feet of Section 17, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian, Maricopa County, Arizona, excepting the westerly 440 feet and the easterly one-half of said Section 17.

*Parcel 8*

The southerly 120 feet of the northerly 165 feet of Section 16, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian, Maricopa County, Arizona, excepting the easterly 4,340 feet of said Section 16.

*Parcel 9*

The easterly 120 feet of the westerly 1,060 feet of Section 16, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian, Maricopa County, Arizona, excepting the northerly 45 feet and the southerly 120 feet of said Section 16.

*Parcel 10*

The southerly 120 feet of Section 16, Township 1 South, Range 6 West, Gila and Salt River Base and Meridian, Maricopa County, Arizona, excepting the westerly 940 feet of said Section 16.

**Mesquite Solar Project 230 kV Switchyard**

The Mesquite Solar project’s switchyard would be on approximately 10 acres just south of the wildlife oasis consisting of the north half of the northeast quarter of Section 18, Township 1 South, Range 6 West as shown in Figure 1 and in Exhibit A.

**Mesquite Generating Station 230 kV Switchyard**

The Mesquite Generating Station 230 kV Switchyard is located in the northeastern quarter of the northwestern quarter of Section 15, Township 1 South, Range 6 West.

- vi. **For each alternative route for which application is made, list the ownership percentages of land traversed by the entire route (federal, state, Indian, private, etc.)**

Table 2 provides a summary of land ownership percentages for the Preferred and Alternate Routes.

**Table 2:  
Mesquite Solar Gen-Tie Alternatives—Land Ownership Percentages**

Route	State	Maricopa County	Sempra and SEP-II	Dynegy	Other Private
Preferred Route	53%	0%	35%	12%	0%
Alternative Route	57%	11%	32%	0%	0%

- 5. **List the areas of jurisdiction [as defined in A.R.S. § 40-360(1)] affected by each alternative site or route and designate those proposed sites or routes, if any, which are contrary to the zoning ordinances or master plans of any of such areas of jurisdiction:**

The Mesquite Solar Gen-Tie would be constructed entirely within Maricopa County. Exhibit A3 shows area land ownership and use. In December 2008, the Maricopa County Board of Supervisors approved SEP-II’s request for a Major Comprehensive Plan Amendment to change the land use designation of the Mesquite Solar project site from Dedicated Open Space and Rural Residential to Industrial. The change to the comprehensive plan resulted in an Industrial land use designation for the total 2,480 acres of the associated Mesquite Solar project.

The proposed Mesquite Solar Gen-Tie is located in an area zoned for industrial use, dedicated open space, and for “rural densities.” The Palo Verde Nuclear Generating Station, Arlington Valley Energy Facility, and Mesquite Generating Station (and transmission lines for these facilities) are located within two miles of the proposed

Mesquite Solar Gen-Tie project area. The proposed Mesquite Solar Gen-Tie would be consistent with these existing land uses. None of the proposed routes are contrary to the applicable ordinances or master plans.

**6. Describe any environmental studies applicant has performed or caused to be performed in connection with this application or intends to perform or cause to be performed in such connection, including the contemplated date of completion.**

SEP-II has performed the following environmental studies in connection with the proposed Mesquite Solar Gen-Tie:

- Biological Site Assessment for the Proposed Mesquite Solar Generation Facility, March 2009 (see Exhibit B)
- Class 1 Cultural Resources Study for the Proposed Mesquite Solar Generation Project, Maricopa County, Arizona—February 17, 2009 (see Exhibit B)
- Class III Cultural Resources Survey of Transmission Line Corridors on State Land for the Proposed Mesquite Solar Generation Project, Maricopa County, Arizona—April 10, 2009 (see Exhibit B)

In addition, other ACC applications for projects in the general vicinity have included environmental studies. These projects are listed below.

- Solana Gen-Tie (August 2008)—located approximately 30 miles southeast of the proposed Mesquite Solar Gen-Tie Project
- Arlington Valley Energy Project (December 1999)—located in the immediate vicinity of the proposed Mesquite Solar Gen-Tie Project
- Palo Verde Hub to North Gila 500kV Transmission line Project (January 2008)—located in the immediate vicinity of the proposed Mesquite Solar Gen-Tie Project

# Exhibits

# **Exhibit A: Project Maps**

## Exhibit A Requirements

1. *Where commercially available, \*\* a topographic map, 1:250,000 scale, showing the proposed plant site and the adjacent area within 20 miles thereof. If application is made for alternative plant sites, all sites may be shown on the same map, if practicable, designated by applicant's order of preference.*
2. *Where commercially available, \*\* a topographic map, 1:62,500 scale, or each proposed plant site, showing the area within two miles thereof. The general land use plan within this area shall be shown on the map, which shall also show the areas of jurisdiction affected and any boundaries between such areas of jurisdiction. If the general land use plan is uniform throughout the area depicted, it may be described in the legend in lieu of an overlay.*
3. *Where commercially available, \*\* a topographic map, 1:250,000 scale, showing any proposed transmission line route of more than 50 miles in length and the adjacent area. For routes of less than 50 miles in length, use a scale of 1:62,500. If application is made for alternative transmission line routes, all routes may be shown on the same map, if practicable, designated by applicant's order of preference.*
4. *Where commercially available, \*\* a topographic map, 1:62,500 scale, of each proposed transmission line route of more than 50 miles in length showing that portion of the route within two miles of any subdivided area. The general land use plan within the area shall be shown on a 1:62,500 map required for Exhibit A-3, and for the map required by this Exhibit A-4, which shall also show the areas of jurisdiction affected and any boundaries between such areas of jurisdiction. If the general land use plan is uniform throughout the area depicted, it may be described in the legend in lieu of on an overlay.*

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\* *Duplication of information shall be avoided in the application and exhibits through the use of cross-references.*

\*\* *If a topographic map is not commercially available, a map of similar scale, which reflects prominent or important physical features of the area in the vicinity of the proposed site or route shall be substituted.*

Applicant requirements 1, 2, and 4 (as provided above) are not applicable to the proposed Mesquite Solar project. Exhibit A3 illustrates the Preferred and Alternative Route on a 1:62,500 scale topographic map. Exhibits A3-1 and A3-2 provide more detailed maps of the Preferred Route and Alternative Route.

# MESQUITE SOLAR

## Exhibit A3 Preferred and Alternative Route Overview

### Delineated Areas

- Proposed Mesquite Solar Energy Generation Area
- Wildlife Habitat Area

### Proposed Gen-tie Route

- Preferred Route
- Alternative Route

### Communication Towers

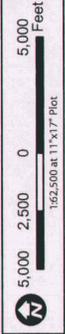
- Land Mobile Transmitter
- Microwave
- Cellular
- Antenna Structure Registration

### Ownership

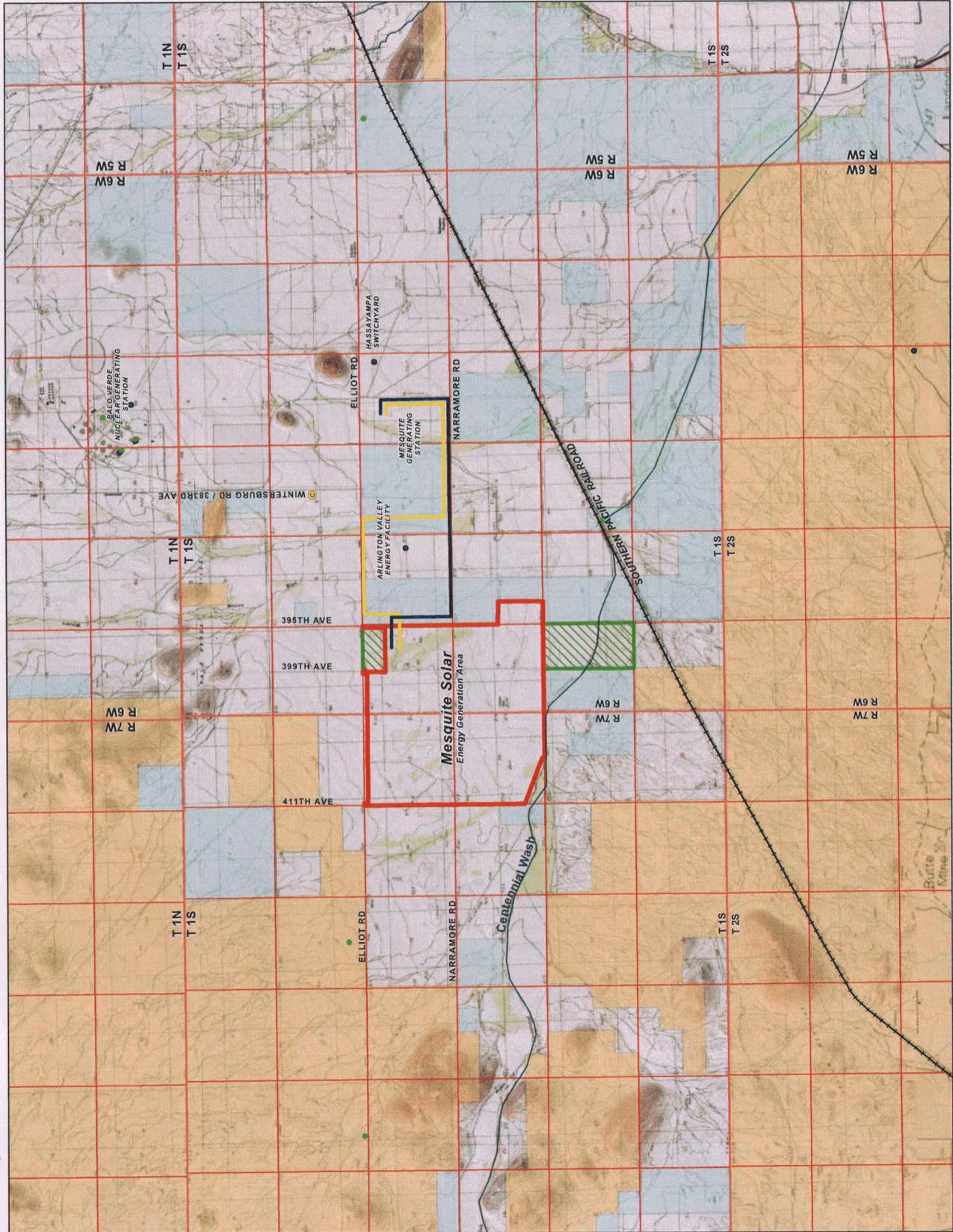
- Bureau of Land Management
- Arizona State Trust

### Public Land Survey System

- Townships
- Sections
- Centennial Wash



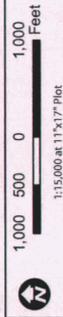
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 ESRI, Bureau of Land Management, FEMA, USGS,  
 Maricopa County Planning, Sempra Energy



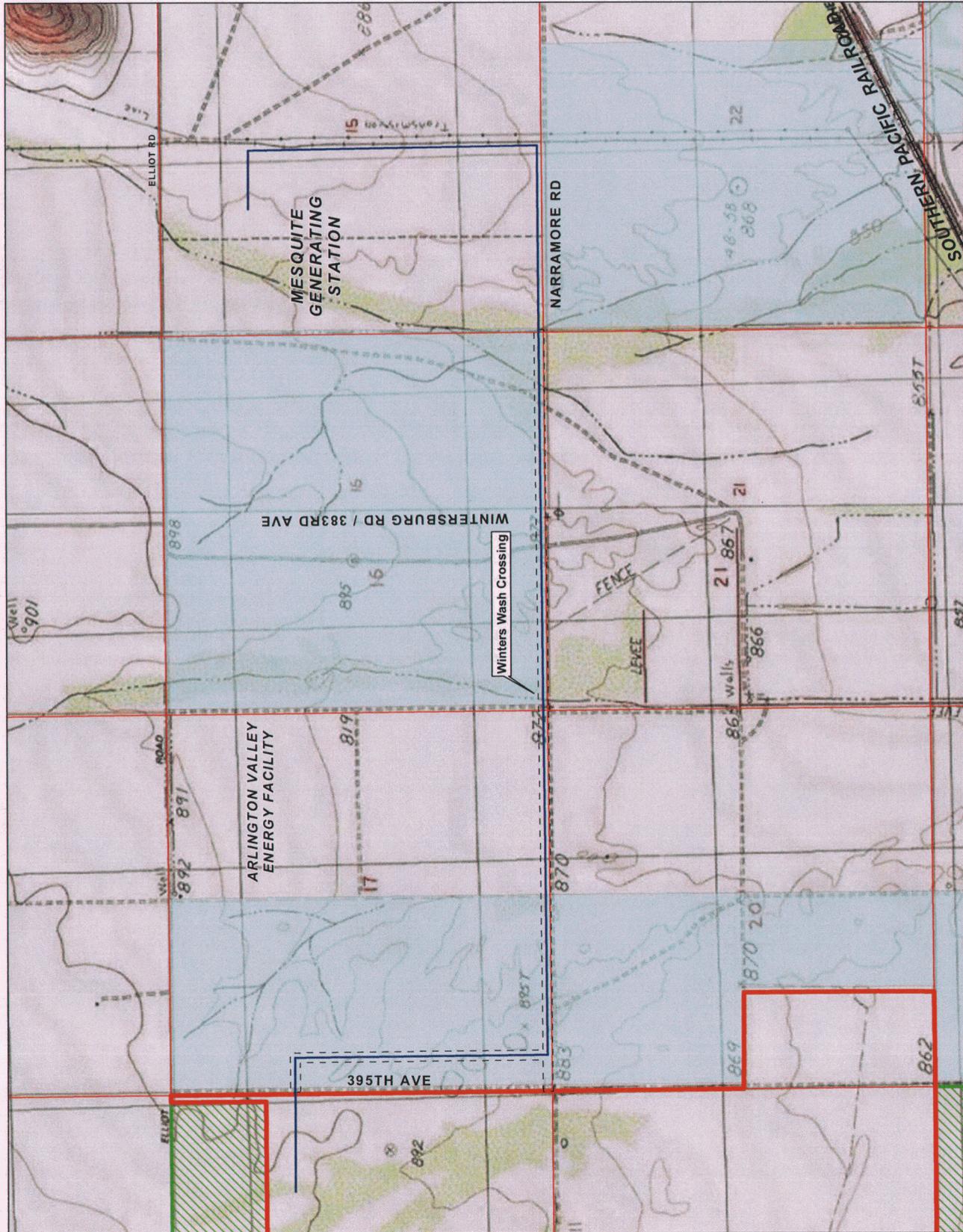
**MESQUITE SOLAR**

**Exhibit A3.1  
Preferred  
Gen-tie Route**

- Delineated Areas**
- Proposed Mesquite Solar Energy Generation Area
  - Wildlife Habitat Area
- Proposed Gen-tie Route**
- Preferred Route
  - Preferred Route ROW
- Ownership**
- Arizona State Trust
- Public Land Survey System**
- Townships
  - Sections
  - Centennial Wash



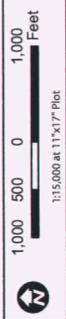
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 ESR, Bureau of Land Management, FEMA, USGS,  
 Maricopa County Planning, Sempra Energy



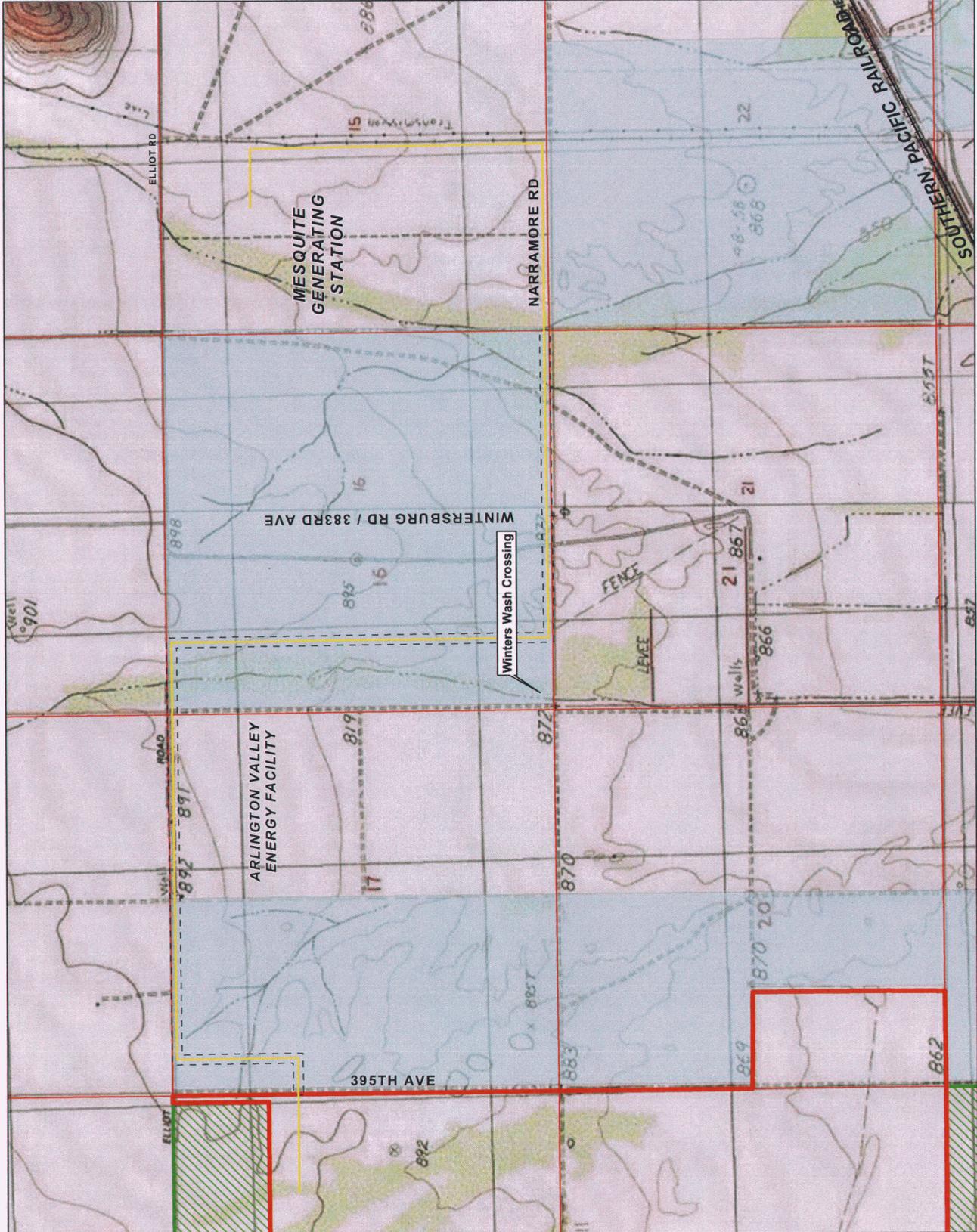
**MESQUITE SOLAR**

**Exhibit A3.2  
Alternative  
Gen-Tie Route**

- Delineated Areas**
- Proposed Mesquite Solar Energy Generation Area
  - Wildlife Habitat Area
- Proposed Gen-tie Route**
- Alternative Route
  - Alternative ROW
- Ownership**
- Arizona State Trust
- Public Land Survey System**
- Townships
  - Sections
  - Centennial Wash



File Name: Alternative 3  
 File Loc: G:\160260\15\Map\CECA  
 SOURCES: Arizona Land Resource Information System; Google  
 ESRI; Bureau of Land Management; FEMA; USGS;  
 Maricopa County Planning; Semptra Energy



# **Exhibit B: Environmental Studies**

## **Exhibit B Requirements**

*Attach any environmental studies which the applicant has made or obtained in connection with the proposed site(s) or route(s). If an environmental report has been prepared for any federal agency or if a federal agency has prepared an environmental statement pursuant to Section 102 of the National Environmental Policy Act, a copy shall be included as part of this exhibit.*

The following reports are attached

- Biological Site Assessment for the Proposed Mesquite Solar Generation Facility, March 2009
- Class 1 Cultural Resources Study for the Proposed Mesquite Solar Generation Project, Maricopa County, Arizona—February 17, 2009
- Class III Cultural Resources Survey of Transmission Line Corridors on State Land for the



# **Biological Site Assessment for the Proposed Mesquite Solar Generation Facility**



Prepared By: AECOM Environment

Prepared for:  
**Sempra Generation**

# Biological Site Assessment for the Proposed Mesquite Solar Generation Facility

AECOM, Inc.  
March 2009  
**Document No.: 06205-127-0002**

| AECOM

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## 1.0 Introduction

To support the Special Use Permit (SUP) application for the proposed Mesquite Solar Generation Facility (project), AECOM Environment (AECOM) has undertaken a recent Biological Site Assessment (assessment) of the project area, near Wintersburg, Arizona. The intent of this assessment is to characterize the environmental conditions within the project area and to identify and analyze special status species that would require surveys, mitigation, or additional permits under federal and Arizona state law. The project includes the construction and operation of a new photovoltaic solar energy generation facility. The project site comprises approximately 2,480 acres of land in Sections 18, 19, and 20 of Township 1 South, Range 6 West, and Sections 13 and 24 of Township 1 South, Range 7 West, Gila and Salt River base and meridian, Maricopa County, Arizona. The project area is depicted in **Appendix A**.

## 2.0 Assessment Methods

Based on our understanding of SUP requirements, this assessment was conducted as a desktop review only. This assessment is based on the review of literature, agency correspondence, and federal and state databases. Ginger Ritter, Project Evaluation Project Specialist for the Arizona Game and Fish Department (AZGFD) provided comments relative to the project on February 18, 2009 (AZGFD 2009). Mike Martinez, Federal Projects Coordinator with the United States Fish Wildlife Service (USFWS) provided comments relative to the project on March 2, 2009 (USFWS 2009).

In addition to agency correspondence, Arizona's Comprehensive Wildlife Conservation Strategy (AZGFD 2006), the Arizona Natural Heritage Program website (AZGFD 2008), the USFWS Arizona Ecological Services website (USFWS 2008), the Arizona Department of Agriculture's website (AZDA 2009a; AZDA 2009b), and various other state agency and supporting websites were utilized to collect information for this report. No field surveys have been performed. A visual site reconnaissance was performed in April 2008 in conjunction with the preparation of the Comprehensive Plan Amendment for this project site.

## 3.0 Assessment Findings

### 3.1 Description of Vegetation

The project is located within the Lower Colorado Desert subdivision of the Sonoran Desert Ecoregion. The Sonoran Desert Ecoregion covers most of southern Arizona, southeastern California and south into Sonora and Baja, Mexico. This eco-region has the highest diversity of North American deserts, and is dominated by desert scrub communities. It is distinguished from the rest of the North American deserts by its striking cactus dominated vegetation communities and the presence of legume trees, such as honey mesquite.

The Sonoran Desert Ecoregion is composed of several subdivisions, with the Lower Colorado desert subdivision occupying the southwestern portion of Arizona. The Lower Colorado desert subdivision is extremely arid, with average precipitation ranging from three to ten inches a year. The vegetation is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*).

The elevation of the project ranges from 900 to 1,500 feet. The major land uses historically have been agriculture and industry. Vegetation types and community characterizations were compiled based on aerial photograph interpretation and Southwest Regional Gap Analysis Project (SWReGAP) Land Cover descriptions (USGS 2004). Plant species names are consistent with the USDA Plants Database (USDA NRCS 2009). Based on the SWReGAP, the project area contains two dominant vegetation communities, agriculture and desert scrub.

The desert scrub is composed primarily of three vegetation types. The majority of the desert scrub vegetation community in the project site is Sonoran-Mojave Creosote Bush-White Bursage Desert Scrub. Very small areas of the desert scrub portions of the project site are identified as Sonoran-Mojave Mixed Salt Desert Scrub and North American Warm Desert Riparian Mesquite Bosque. These vegetation types are described below.

In Maricopa County, the agricultural vegetation community consists predominantly of grain crops such as cotton, wheat, barley, and alfalfa (AZDA 2009a), as well as livestock grazing of cattle and sheep. However, because the project area has not been farmed for several years, the cropland is fallow.

The Sonoran-Mojave Creosote Bush-White Bursage Desert Scrub has a sparse to moderately dense layer of xeromorphic microphyllous and broad-leaved shrubs, with a sparse herbaceous layer. The dominant shrub species are usually creosote bush and white bursage. Other common species include fourwing saltbush (*Atriplex canescens*), desertholly (*Atriplex hymenelytra*), brittlebush (*Encelia farinosa*), rough jointfir (*Ephedra nevadensis*), ocotillo (*Fouquieria splendens*), water jacket (*Lycium andersonii*), and beavertail pricklypear (*Opuntia basilaris*). The herbaceous layer may be composed of species such as sandmat species (*Chamaesyce* spp.), desert trumpet (*Eriogonum inflatum*), low woollygrass (*Dasyochloa pulchella*), threeawn (*Aristida* spp.), cryptantha species (*Cryptantha* spp.), fiddleleaf (*Nama* spp.), and phacelia species (*Phacelia* spp.).

The Sonoran-Mojave Mixed Salt Desert Scrub is found in saline basins and around playas on fine-textured, saline soils. Vegetation communities consist of open-canopied shrublands usually composed of one or more saltbush species (e.g., *Atriplex canescens*, *Atriplex polycarpa*, etc.). Codominant species include halophytic (salt-tolerant) species such as allenrolfea species (*Allenrolfea* spp.), pickleweed species (*Salicornia* spp.), or seepweed (*Suaeda* spp.). Grass species may be present at varying densities.

The North American Warm Desert Riparian Mesquite Bosque is found along low-elevation intermittent streams. Vegetation in these riparian corridors consist of tree and shrub species such as honey mesquite (*Prosopis glandulosa*), velvet mesquite (*Prosopis velutina*), mule-fat (*Baccharis salicifolia*), arrowweed

(*Pluchea sericea*), and narrowleaf willow (*Salix exigua*) that are dependent on the annual rise in the groundwater table for growth and reproduction.

### 3.2 Common Wildlife Species

Representative wildlife species with potential to occur within the project area are included in **Table 3-1**. A comprehensive list of species with potential to occur within project habitat types is available in Arizona's Comprehensive Wildlife Conservation Strategy (AZGFD 2006).

**Table 3-1 Common Wildlife Species in Habitats within the Proposed Mesquite Solar Generation Facility Project Area**

Habitat Type	Common Species
Birds	Cooper's Hawk, Sharp-shinned Hawk, Cassin's Sparrow, Rufous-crowned Sparrow, Western Scrub-Jay, Western Burrowing Owl, Verdin, Red-tailed Hawk, Lark Bunting, Chestnut-collared Longspur, Gambel's Quail, Cactus Wren, Turkey Vulture, Hermit Thrush, Swainson's Thrush, Common Ground-Dove, Olive-sided Flycatcher, American Crow, Common Raven, Chihuahuan Raven, Steller's Jay, Horned Lark, Prairie Falcon, Greater Roadrunner, Cactus Ferruginous Pygmy-Owl, Dark-eyed Junco, Loggerhead Shrike, Western Screech-Owl, Northern Mockingbird, Brown-headed Cowbird, Phainopepla, Common Poorwill, Great-tailed Grackle, Brewer's Sparrow, Chipping Sparrow, Northern Roughwinged Swallow, Western Meadowlark, House Wren, Warbling Vireo, Mourning Dove and White-crowned Sparrow.
Mammals	Pallid Bat, Coyote, Bailey's Pocket Mouse, Sonoran Desert Pocket Mouse, Pale Townsend's Big-eared Bat, Desert Kangaroo Rat, Lesser Longnosed Bat, Black-tailed Jackrabbit, Striped Skunk, California Myotis, Desert Woodrat, Desert Mule Deer, Desert Bighorn Sheep, Arizona Pocket Mouse, Little Pocket Mouse, Western Harvest Mouse, Plains Harvest Mouse, Arizona Cotton Rat, Colorado River Cotton Rat, Round-tailed Ground Squirrel, Rock Squirrel, Western Spotted Skunk, Desert Cottontail, American Badger, Botta's Pocket Gopher, and Kit Fox.
Amphibians/Reptiles	Arizona Glossy Snake, Tiger Whiptail, Zebra-tailed Lizard, Variable Sandsnake, Tucson Shovel-nosed Snake, Tucson Banded Gecko, Desert Banded Gecko, Chihuahuan Greater Earless Lizard, Western Diamond-backed Rattlesnake, Mojave Desert Sidewinder, Sonoran Sidewinder, Northern Mohave Rattlesnake, Great Basin Collared Lizard, Eastern Collared Lizard, Sonoran Collared Lizard, Northern Desert Iguana, Sonoran Desert Tortoise, Banded Gila Monster, California Kingsnake, Desert Threadsnake, Sonoran Whipsnake, Red Arizona (Sonoran) Coralsnake, Desert Horned Lizard, Sonoran Gophersnake, Western Longnosed Snake, Desert Patch-nosed Snake, Common Chuckwalla, Mojave Fringetoe Lizard, Long-tailed Brush Lizard, Ornate Tree Lizard, and Common Sideblotched Lizard.

### 3.3 Special Status Species

The USFWS, Arizona Natural Heritage Program, and Arizona Department of Agriculture species lists for Maricopa County were reviewed (USFWS 2008; AZDGF 2008; AZDA 2009c). Twenty-eight species with potential to occur within the project area were identified by AECOM during initial review and are listed in **Table 3-2**.

**Table 3-2 Special Status Species with Potential to Occur within the Proposed Mesquite Solar Generation Facility Project Area**

<b>Birds</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Status<sup>1</sup></b>
Cactus Ferruginous Pygmy-Owl	<i>Glaucidium brasilianum cactorum</i>	USFWS SC; AZ WSC
Western Burrowing Owl	<i>Athene cunicularia hypugaea</i>	USFWS SC
Common Black Hawk	<i>Buteogallus anthracinus</i>	AZ WSC
<b>Mammals</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Status</b>
Cave Myotis	<i>Myotis velifer</i>	USFWS SC
Lesser Longnosed Bat	<i>Leptonycteris curasoae yerbabuena</i>	USFWS E; AZ WSC
Pale Townsend's Big-eared Bat	<i>Choeronycteris mexicana</i>	USFWS SC
Greater Western Bonneted Bat	<i>Eumops perotis californicus</i>	USFWS SC
Yuma Myotis	<i>Myotis Yumanensis</i>	USFWS SC
California Leaf-nosed Bat	<i>Macrotus californicus</i>	AZ WSC
Western Red Bat	<i>Lasiurus blossevillii</i>	AZ WSC
<b>Amphibians/Reptiles</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Status</b>
Sonoran Desert Tortoise	<i>Gopherus agassizii</i> (Sonoran Population)	USFWS SC; AZ WSC
Mexican Garter Snake	<i>Thamnophis eques megalops</i>	USFWS SC; AZ WSC
Arizona Toad	<i>Bufo microscaphus</i>	USFWS SC
Redback Whiptail	<i>Aspidoscelis xanthonota</i>	USFWS SC
Mexican Rosy Boa	<i>Charina trivirgata trivirgata</i>	USFWS SC
Desert Rosy Boa	<i>Charina trivirgata gracia</i>	USFWS SC
Arizona Chuckwalla	<i>Sauromalus ater</i> (Arizona population)	USFWS SC
Common Chuckwalla	<i>Sauromalus ater</i> (Western population)	USFWS SC
Great Plains Narrow-mouthed Toad	<i>Chionactis paratrostris organica</i>	AZ WSC
Lowland Leopard Frog	<i>Lithobates yavapaiensis</i>	AZ WSC
Lowland Burrowing Treefrog	<i>Ptenohyla fodiens</i>	AZ WSC
<b>Plants</b>		
<b>Common Name</b>	<b>Scientific Name</b>	<b>Status</b>
Toumey Agave	<i>Agave toumeyana</i> var. <i>bella</i>	AZ SR
California Barrel Cactus	<i>Ferocactus cylindraceus</i> var. <i>cylindraceus</i>	AZ SR
Golden Barrel Cactus	<i>Ferocactus cylindraceus</i> var. <i>eastwoodiae</i>	AZ SR
Emory's Barrel-cactus	<i>Ferocactus emoryi</i>	AZ SR
Straw-top Cholla	<i>Opuntia echinocarpa</i>	AZ SR
Tumamoc Globeberry	<i>Tumamoca maddougallii</i>	AS SR

<sup>1</sup> USFWS E – U.S. Fish and Wildlife Service Endangered.  
 USFWS SC – U.S. Fish and Wildlife Service Species of Concern.  
 AZ WSC – State of Arizona Wildlife Species of Concern.  
 AZ SR – State of Arizona Salvage Restricted Protected Native Plants.

Of the species listed in **Table 3-2**, only 2 species of concern were identified during agency consultation, the straw-top cholla and western burrowing owl. Element occurrence data were evaluated for a 5-mile radius centered on the project area. Only one species, the straw-top cholla, was identified in the search. Straw-top cholla and western burrowing owl are discussed in detail in Sections 3.3.1 and 3.3.2.

The USFWS indicated that although unlikely, there is potential for desert tortoise within the project area; however, any desert tortoise in this area would be part of the Sonoran population which is not listed, and currently has no regulatory status (USFWS 2009). Desert tortoise is considered a species of concern by the State of Arizona but does not have regulatory status under Arizona law (AZGFD, 2008).

### 3.3.1 Special Status Vegetation

#### Straw-top cholla

Straw-top cholla, shown in **Figure 3-1**, is found in arid environments in Southern California, Nevada, Utah, western Arizona and Sonoran and Baja California, Mexico (efloras 2008; Quinn 2001). It is most commonly found in the Mojave and Sonoran deserts in creosote bush scrub, desert grasslands, juniper, and oak-juniper woodlands vegetative communities (NatureServe 2009; efloras 2008). It is typically located on bajadas, canyons, benches, slopes, mesas, flats, and washes usually at elevations ranging from 1000 to 5000 feet (NatureServe 2009; efloras 2008, Quinn 2001). Substrates usually consist of sandy loam, alluvium, and gravelly soils (NatureServe 2009; efloras 2008).



Plants are shrubby and can grow from one to 6 feet tall. They are covered in dense spines that can be white or yellow and determine the color of the plant (Quinn 2001). It blooms from March to June (efloras 2008)

**Figure 3-1 Straw-Top Cholla**

The Maricopa, Mohave, and Cocopa Indians rolled the fruits on the ground to remove the spines and ate the fruit raw; as well as eating the buds as greens in the spring (Native American Ethnobotany 2003, Quinn 2001). The straw-top cholla is classified as imperiled in Arizona by NatureServe (2009). Its primary threat is collecting of the species by horticulturists (NatureServe 2009).

Construction in its range could increase access to the species through the building of new roads and facilities. In addition, construction would result in the trampling and removal of aboveground vegetation which could result in the harming or destruction of any potential straw-top cholla in the project site. Permanent impacts from the construction of facilities associated with the site could result in the long-term loss of potentially suitable habitat.

### 3.3.2 Special Status Wildlife

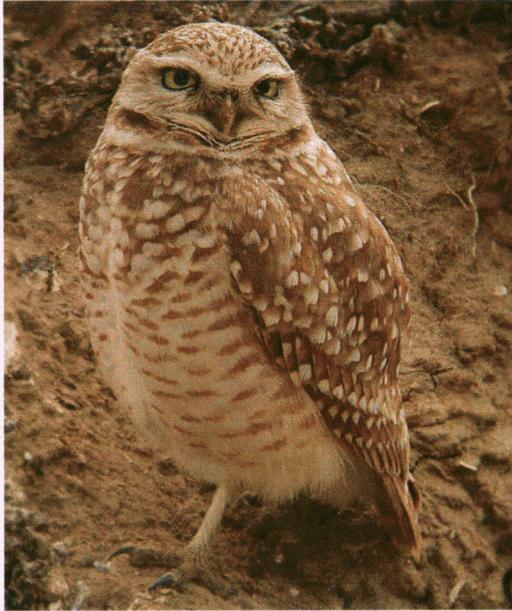
#### Western Burrowing Owl

Western burrowing owl, shown in **Figure 3-2**, inhabits open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands, often associated with burrowing mammals. They sometimes occur in open areas such as vacant lots near human habitation, golf courses or airports (AZGFD 2001).

Burrowing owls sleep and roost in the mouth of nest burrows, satellite burrows, or depressions in the ground. Although they are most active during the period from late afternoon until full dark, they can be observed at

almost any time of the day. They commonly perch on fence posts or on top of mounds outside their burrows. High ambient temperatures seem to limit their daytime activities (AZGFD 2001).

Burrowing owl use of burrows makes them susceptible to impacts from ground disturbing activities. Despite the



fact that burrowing owls are active during the day and are adaptable to human presence, the burrowing owl can go unnoticed in an area due to their secretive nature. Over the past 50 years, most burrowing owl populations have experienced declines throughout their range in North America. Because of this decline, these owls are protected by various federal, state, and local laws. While this species is not considered an Arizona Wildlife Species of Concern, all owls in Arizona are protected by the Migratory Bird Treaty Act (MBTA) and Arizona state law (ARS Title 17). Violation of these laws, intentional or benign, may result in prosecution (AZDGF 2009b).

The project area contains moderate habitat for this species. Direct impacts could occur to this species if construction were to begin during the breeding season for this species, from March 1 through July 15 (AZGFD 2009b). AECOM field survey experience has documented this species establishing a breeding territory within a project area during the construction of a project, especially if vegetation is cleared for a period of time prior to the construction of the project.

**Figure 3-2 Adult Burrowing Owl**

The ADGFD indicated they had concerns regarding impacts to this species and requested that a survey be conducted prior to construction of this project (AZGFD 2009a). Surveys should follow guidelines compiled by the ADGFD for burrowing owl (AZGFD 2009b).

### **3.4 Waters of the United States**

Based on the 2008 visual site reconnaissance results, there are no wetlands or waters of the United States within the boundaries of the proposed project area.

## 4.0 Additional Comments

The AZGFD included a number of comments relative to general wildlife for the project in its consultation letter. The USFWS included brief comments relative to federally protected species for the project in its consultation letter. The letters containing these comments are included in **Appendix B**.

The AZGFD indicated the need for project compliance with the MBTA. A variety of migratory bird species regulated under the MBTA, including both songbirds and raptors, may use the vegetation communities within the project area. Direct impacts to these species and the possibility of a violation of MBTA can be avoided if construction were to occur outside of the breeding season, generally May 1 through August 31 in Arizona (AZGFD 2009b).

The AZGFD recommended consulting with the Arizona State Department of Agriculture, in accordance with the Native Plant Law. On May 3, 2008, the Arizona Department of Agriculture implemented the new rules for native plants (AZDA 2008). These laws pertain to the use and harvest of native plants for commercial purposes. Under these new rules, the movement of a native plant species from its habitat is regulated based on four categories of protection. These categories are Highly Safeguarded Protected Native Plants; Salvage Restricted Protected Native Plants; Salvage Assessed Protected Native Plants; Harvest Restricted Protected Native Plants. The straw-top cholla is a Salvage Restricted species, which requires a salvage permit be issued by the Department of Agriculture before the plant may be removed from its native habitat for commercial purposes.

In addition, the Native Plant Law requires that a notice of intent must be filed with the Department of Agriculture before clearing of native plants on private lands (AZDA 2009b). The notice of intent must be filed 60 days before the clearing of native vegetation on private lands can start. The filing of the notice of intent allows the Department of Agriculture to determine if there are any native plants on the site. If native plants are present, salvage operators can be notified, with the landowner's permission, and can examine the potential for salvage (AZDA 2009b).

## 5.0 Conclusions

Agency consultation identified western burrowing owl and straw-top cholla as of concern for this project. The AZGFD recommended surveys for burrowing owl. The AZDA indicated a notice of intent must be filed as straw-top cholla is designated as a salvage restricted species. See **Appendix B** for additional general project comments.

## 6.0 References

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## **Appendix A**

### **Proposed Project Area Map**

# MESQUITE SOLAR

## Project Map

### Delineated Areas

Proposed Mesquite Solar Energy Generation Area (per CPA200807)

Wildlife Habitat Area

### Proposed Transmission

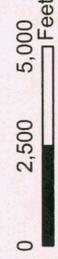
230 KV Double-Circuit

### Public Land Survey System

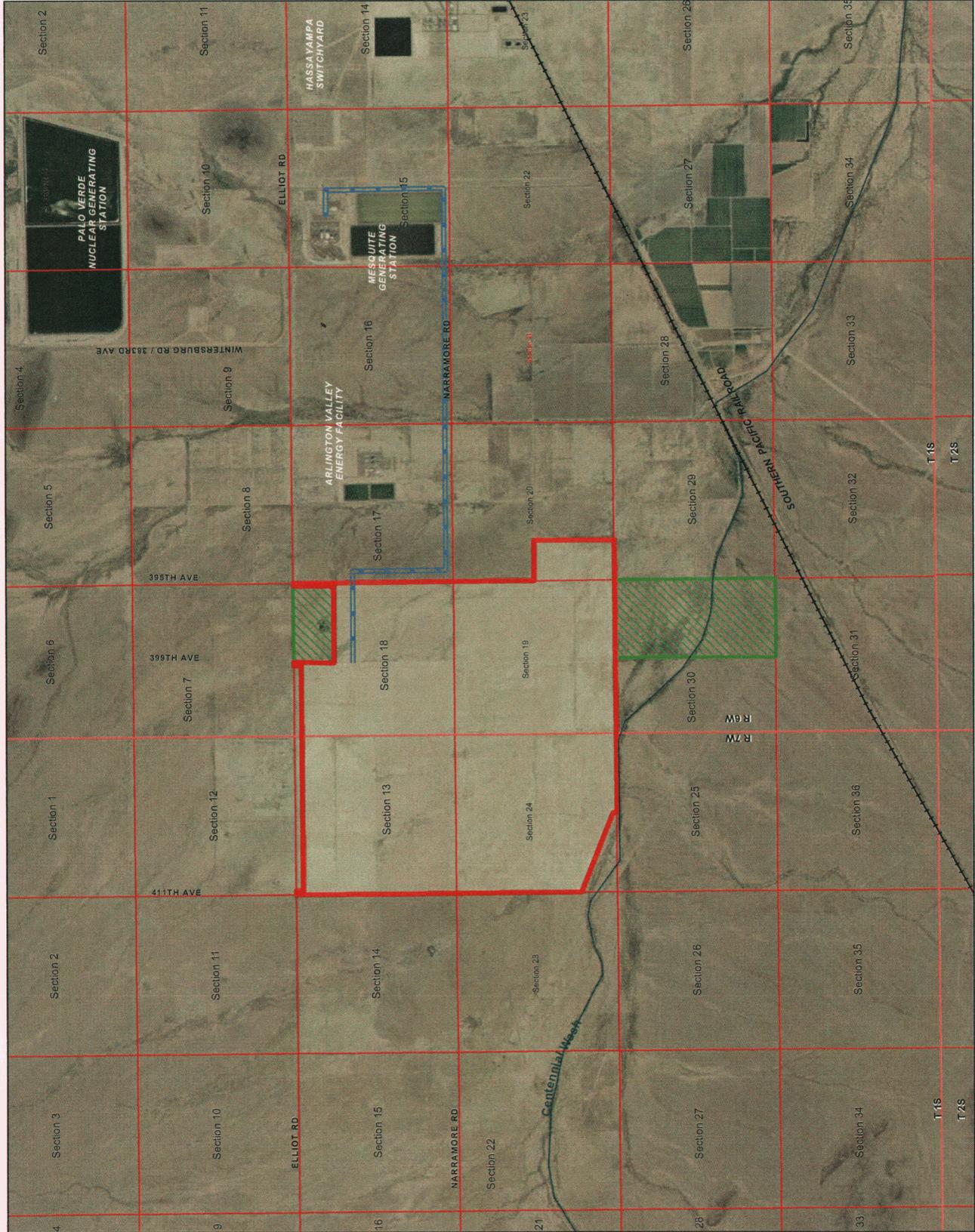
Townships

Sections

Centennial Wash



File Name: projectArea  
 File Loc: US10026151/Map/SUP  
 SOURCES: Arizona Land Resource Information System, Google  
 ESRI, Bureau of Land Management, FEMA, USGS,  
 Maricopa County Planning, Sempra Energy



## **Appendix B**

### **Request for Special Status Species for Mesquite Power Solar Project**



THE STATE OF ARIZONA  
**GAME AND FISH DEPARTMENT**

5000 W. CAREFREE HIGHWAY  
PHOENIX, AZ 85086-5000  
(602) 942-3000 • WWW.AZGFD.GOV

**GOVERNOR**  
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GARY R. HOVATTER  
ROBERT D. BROSCHEID



February 18, 2009

Ms. Jessica Rubado  
AECOM Environment  
1601 Prospect Pkwy  
Fort Collins, CO 80525

**Re: Request for Special Status Species for Mesquite Power Solar Project**

Dear Ms. Rubado:

The Arizona Game and Fish Department (Department) has received your letter dated January 19, 2009, requesting information regarding special status species within or near the Mesquite Power Solar Project near Winterburg, Arizona. The generating station will be located on approximately 2,480 acres of farmland within sections 18, 19, and 20 of Township 1 South, Range 6 West and sections 13 and 24 of Township 1 South, Range 7 West. The Department has the following comments for your consideration in preparation of an application for a Certificate of Environmental Compatibility for the State of Arizona and other environmental analyses.

The Department has concerns that the Mesquite project could negatively impact wildlife due to a reduction of water availability when irrigation ditches are removed to accommodate the project. In addition, converting the current land use from agriculture to solar energy production may impact wildlife and their habitat. The conversion of these agricultural fields into a solar generating station would substantially alter or eliminate approximately 2,480 acres of habitat currently available and utilized by various wildlife species, including lands restored by Sempra Generation. Agricultural fields, particularly grasses, grains, and alfalfa crops, are often utilized by a variety of wildlife species for food, water, cover, and nesting habitat. Therefore, the Department requests to meet with Sempra Generation to discuss ways to mitigate our concerns.

If the project is modified to use solar thermal technology, the Department is also concerned about the potential use of settling ponds in the evaporative cooling component of the proposed project. If used, these ponds may draw waterfowl and other wildlife which could then be inadvertently poisoned due to concentrated salt and other minerals.

***Department Recommendations***

To minimize the potential impacts to wildlife habitat and populations resulting from the development and operation of the Mesquite project, the Department recommends Sempra Generation and AECOM Environment implement the following:

1. Surveys should be conducted for Western burrowing owl, survey protocols and guidelines can be obtained at [http://www.azgfd.gov/w\\_c/BurrowingOwlResources.shtml](http://www.azgfd.gov/w_c/BurrowingOwlResources.shtml).

Ms. Jessica Rubado

February 18, 2009

2

2. If wildlife is encountered during construction of the facility, it should be moved outside the project area within 1 mile of its original location. A scientific collecting permit is required for this activity. A permit can be obtained by emailing [Scpermit@azgfd.gov](mailto:Scpermit@azgfd.gov) for more information. If wildlife will need to be removed from the facility once it is operational, annual renewal of the permit will be required.
3. Project analysis should include evaluating the potential impacts to wildlife resulting from the conversion of 2,480 acres of farmland to a solar generating plant. If negative impacts are anticipated, the Department recommends implementing activities that could mitigate these impacts. Such activities may include, but are not limited to, planting and maintaining moist soils, grasses, grains, and alfalfa crops in nearby fields that are currently fallow to benefit migratory birds and other wildlife.
4. Project analysis should include a thorough evaluation of the anticipated impacts to water resources.
5. If implementing the proposed action involves any work within desert washes, rivers, or wetlands, we recommend contacting the U.S. Army Corps of Engineers, at the address provided below, regarding Clean Water Act issues, best management practices, and guidelines for minimizing and mitigating impacts to riparian areas:  
Ron Fowler  
U.S. Army Corps of Engineers, Regulatory Branch  
3636 N. Central Avenue, Suite 760  
Phoenix, AZ 85012-1936  
Phone: 602-640-5385
6. For any powerlines built:
  - a. Proper design and construction of the transmission line is necessary to prevent or minimize risk of electrocution of raptors, owls, vultures, and golden or bald eagles, which are protected under state and federal laws.
  - b. Limit project activities during the breeding season for birds, generally May through late August, depending on species in the local area (raptors breed in early February through May). Conduct avian surveys to determine bird species that may be utilizing the area and develop a plan to avoid disturbance during the nesting season.
  - c. Coordinate plant salvage and revegetation efforts with the Arizona Department of Agriculture, in accordance with the Arizona Native Plant Law. A reclamation plan is recommended for disturbed sites, where appropriate, including planting native, weed-free seed and vegetation.

Thank you for the opportunity to provide comments on this proposed project. We look forward to continued communications with Sempra generation and AECOM Environment regarding the project development and implementation. Please contact me at 623-236-7606 if you have any questions, or would like to further discuss our concerns and recommendations.

Sincerely,



Ginger Ritter

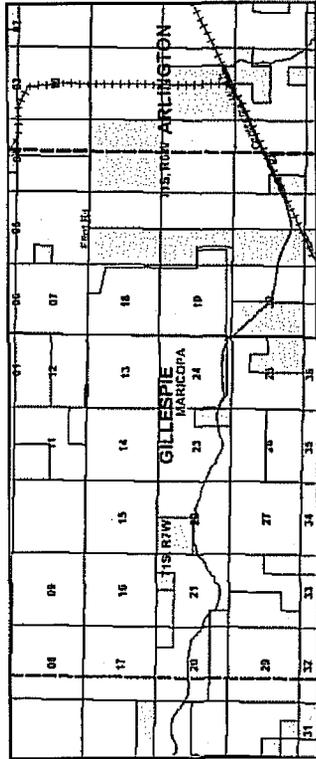
Project Evaluation Project Specialist, Habitat Branch

AGFD #M09-02180338

Arizona's On-line Environmental Review Tool

Search ID: 20090203008004  
 Project Name: Mesquite Power  
 Date: 2/3/2009 9:44:33 AM

**Project Location**



The Department appreciates the opportunity to provide in-depth comments and project review when additional information or environmental documentation becomes available.

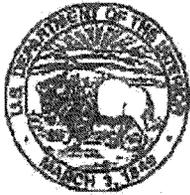
**Special Status Species Occurrences/Critical Habitat/Tribal Lands within 5 miles of Project Vicinity:**

Name	Common Name	ESA	USFS	BLM	State
Opuntia echinocarpa	Straw-top Cholla				SR

**Project Name:** Mesquite Power  
**Submitted By:** PEP Project Evaluation Program  
**On behalf of:** CONSULTING  
**Project Search ID:** 20090203008004  
**Date:** 2/3/2009 9:44:25 AM  
**Project Category:** Energy Storage/Production/Transfer, Energy Production (generation), solar power facility (new)  
**Project Coordinates (UTM Zone 12-NAD 83):** 321391.653, 3689954.303 meter  
**Project Area:** 2408.995 acres  
**Project Perimeter:** 12980.396 meter  
**County:** MARICOPA  
**USGS 7.5 Minute Quadrangle ID:** 1331  
**Quadrangle Name:** GILLESPIE  
**Project locality is currently being scoped**

**Location Accuracy Disclaimer**

Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Receipt is solely responsible for the project location and thus the correctness of the Project Review Receipt content.



**UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
ARIZONA ECOLOGICAL SERVICES FIELD OFFICE  
2321 W. Royal Palm Road, Suite 103  
Phoenix, Arizona 85021-4951  
Telephone: (602) 242-0210 FAX: (602) 242-2513**



FACSIMILE TRANSMISSION

DATE: 3 / 2 / 2009 TIME: 10:46

TO Jessica Rubado

OFFICE/ROOM: \_\_\_\_\_

AGENCY: \_\_\_\_\_

FAX NUMBER: 970-493-0213

FROM: Patricia Gordon (office assistant) for Mike Martinez

SUBJECT: \_\_\_\_\_

COMMENTS: Please note this letter will be mailed today.

NUMBER OF PAGES: 3  
(including this page)

If there are problems with copy quality, please call person who sent the document.

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## United States Department of the Interior

U.S. Fish and Wildlife Service

Arizona Ecological Services Field Office

2321 West Royal Palm Road, Suite 103

Phoenix, Arizona 85021-4951

Telephone: (602) 242-0210 Fax: (602) 242-2513



In Reply Refer to:

AESO/SE

22410-2009-SL-0190

March 2, 2009

Ms. Jessica Rubado  
AECOM Environment  
1601 Prospect Parkway  
Fort Collins, Colorado 80525

**RE: Construction and Operation of Sempra Generation Photovoltaic Solar Energy Generation Facility Near the Mesquite Generating Station in Maricopa County, Arizona**

Dear Ms. Rubado:

Thank you for your recent request for information on threatened or endangered species, or those that are proposed to be listed as such under the Endangered Species Act of 1973, as amended (Act), which may occur in your project area. The Arizona Ecological Service Field Office has posted lists of the endangered, threatened, proposed, and candidate species occurring in each of Arizona's 15 counties on the Internet. Please refer to the following web page for species information in the county where your project occurs: <http://www.fws.gov/southwest/es/arizona>

If you do not have access to the Internet or have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web page, find County Species Lists on the main page. Then click on the county of interest. The arrows on the left will guide you through information on species that are listed, proposed, candidates, or have conservation agreements. Here you will find information on the species' status, a physical description, all counties where the species occurs, habitat, elevation, and some general comments. Additional information can be obtained by going back to the main page. On the left side of the screen, click on Document Library, then click on Documents by Species, then click on the name of the species of interest to obtain General Species Information, or other documents that may be available. Click on the "Cactus" icon to view the desired document.

Please note that your project area may not necessarily include all or any of these species. The information provided includes general descriptions, habitat requirements, and other information for each species on the list. Under the General Species Information, citations for the Federal Register (FR) are included for each listed and proposed species. The FR is available at most Federal depository libraries. This information should assist you in determining which species may or may not occur within your project area. Site-specific surveys could also be helpful and may be needed to verify the presence or absence of a species or its habitat as required for the evaluation of proposed project-related impacts.

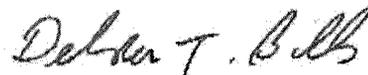
Endangered and threatened species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat may be adversely affected by a federally funded, permitted, or authorized activity, the action agency will need to request formal consultation with us. If the action agency determines that the planned action may jeopardize a proposed species or destroy or adversely modify proposed critical habitat, the action agency will need to enter into a section 7 conference. The county list may also contain candidate or conservation agreement species. Candidate species are those for which there is sufficient information to support a proposal for listing; conservation agreement species are those for which we have entered into an agreement to protect the species and its habitat. Although candidate and conservation agreement species have no legal protection under the Act, we recommend that they be considered in the planning process in the event that they become listed or proposed for listing prior to project completion.

If any proposed action occurs in or near areas with trees and shrubs growing along watercourses, known as riparian habitat, we recommend the protection of these areas. Riparian areas are critical to biological community diversity and provide linear corridors important to migratory species. In addition, if the project will result in the deposition of dredged or fill materials into waterways, we recommend you contact the Army Corps of Engineers which regulates these activities under Section 404 of the Clean Water Act.

The State of Arizona and some of the Native American Tribes protect some plant and animal species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department and the Arizona Department of Agriculture for State-listed or sensitive species, or contact the appropriate Native American Tribe to determine if sensitive species are protected by Tribal governments in your project area. We further recommend that you invite the Arizona Game and Fish Department and any Native American Tribes in or near your project area to participate in your informal or formal Section 7 Consultation process.

For additional communications regarding this project, please refer to consultation number 22410-2009-SL-0190. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area. If we may be of further assistance, please feel free to contact Brenda Smith (928) 226-0614 (x101) for projects in Northern Arizona, Debra Bills (602) 242-0210 (x239) for projects in central Arizona and along the Lower Colorado River, and Sherry Barrett (520) 670-6150 (x223) for projects in southern Arizona.

Sincerely,



for Steven L. Spangle  
Field Supervisor

cc: Josh Avey, Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

February 17, 2009



**P A L E O W E S T**  
Solutions in Archaeology

**Class 1 Cultural Resources Study for the  
Proposed Mesquite Solar Generation  
Project, Maricopa County, Arizona**

Submitted to:

**AECOM**

Technical Report 09-03

**PaleoWest Solutions in Archaeology**  
649 N. 3rd Ave.  
Phoenix, Arizona 85003

**CLASS I CULTURAL RESOURCES STUDY FOR THE PROPOSED MESQUITE  
SOLAR GENERATION PROJECT, MARICOPA COUNTY, ARIZONA**

**Prepared by:**

Douglas R. Mitchell  
Cory Dale Breternitz

**Prepared for:**

AECOM Environment  
1601 Prospect Parkway  
Fort Collins, CO 80525  
(970) 493-8878

**PaleoWest Project Number 09-06**

**Technical Report 09-03**

PaleoWest Solutions in Archaeology  
649 N. Third Avenue  
Phoenix, AZ 85003  
602.261.7253

February 2009

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## ARIZONA SHPO ABSTRACT

**Report Title:** Class I Cultural Resources Study for the Proposed Mesquite Solar Generation Project, Maricopa County, Arizona

**Report Date:** February 17, 2009

**Client:** AECOM

**Land Status:** Private and Arizona State Land Department.

**Project Description:** Class I Cultural Resources Study for a proposed photovoltaic solar energy generation facility and associated transmission line interconnection in Maricopa County, Arizona.

**Location:** Sections 13, 24, T1S, R7W, Sections 13-18, 19-24, T1S, R6W, Gila and Salt River Baseline and Meridian, in Maricopa County, Arizona.

**Map Reference:** USGS Gillespie, AZ, Arlington, AZ 7.5'

**Acreage:** Approximately 2700 acres

**Number of Archaeological Sites:** None in project area.

**Register-Eligible Properties:** None.

**Register-Ineligible Properties:** None.

**Recommendation:** The Class I cultural resource study indentified several previous archaeological surveys adjacent to the proposed facility site and some that overlap with the proposed transmission line corridor. However, no sites have been recorded within the actual project area. Because few archaeological surveys have been conducted in the project area, and sites have been recorded in the vicinity, a Class III archaeological survey of the project area is recommended prior to development.

## INTRODUCTION

This report presents the results of a Class I site file search in support of a Special Use Permit application for a 2,480-acre solar photovoltaic (PV) facility and a 4-mile-long 230 kV transmission line interconnection, all located in Maricopa County, Arizona. The project area occurs in Sections 13, 24, T1S, R7W, Sections 13-18, 19-24, T1S, R6W, Gila and Salt River Baseline and Meridian, in Mohave County, Arizona; USGS Gillespie and Arlington, AZ 7.5' topographic quadrangles (see Figure 1). The project area is a broad valley at the south end of the Harquahala Plain, drained by Centennial Wash. Project area elevation is approximately 900 feet above mean sea level.

The Class I cultural resource study identified several previous archaeological surveys adjacent to the proposed facility site and some that overlap with the proposed transmission line corridor. However, no sites have been recorded within the actual project area. Because few archaeological surveys have been conducted in the project area, and sites have been recorded in the vicinity, a Class III archaeological survey of the project area is recommended prior to development.

## CULTURE HISTORY

The project area lies near the western limit of the Hohokam area near its border with the area typically associated with the prehistoric Yuman (Patayan). Reid and Whittlesey indicate that “[f]rom Gila Bend and Ajo westward to California and from Yuma northeast to the Grand Canyon lies a vast region that was the home of the Patayan people” (1997:111). In the following discussion pertinent features of the prehistoric Hohokam and Patayan cultures are examined, followed by a review of significant historic developments.

### *Archaic Period*

The earliest evidence of human occupation known for this area dates to the Middle Archaic period, approximately 5,000 years ago (Cordell 1997). Middle Archaic use of the area appears to have been on a temporary basis by residentially mobile hunter-gatherers. Habitation structures are generally absent or, if present, they are ephemeral in construction (Cordell 1997). By 2,000 years ago, pit houses, ceramics, and intensively used ground stone assemblages signify the beginnings of sedentism in the Santa Cruz Valley (Huckell 1995). Evidence of agriculture is lacking at this time, which may support a model of short-term sedentism prior to the adoption of maize. However, cultigens are well-documented elsewhere in central and southern Arizona centuries before the Late Archaic period pit house sites known from the nearby Santa Cruz Valley, including sites along the Upper Santa Cruz River (Huckell 1995:139). This strongly suggests that groups living in this area had adopted maize and other cultigens by at least 2,000 years ago. Between 2,000 and 1,600 years ago, there is evidence that Late Archaic period groups across southern Arizona developed into the Hohokam culture.

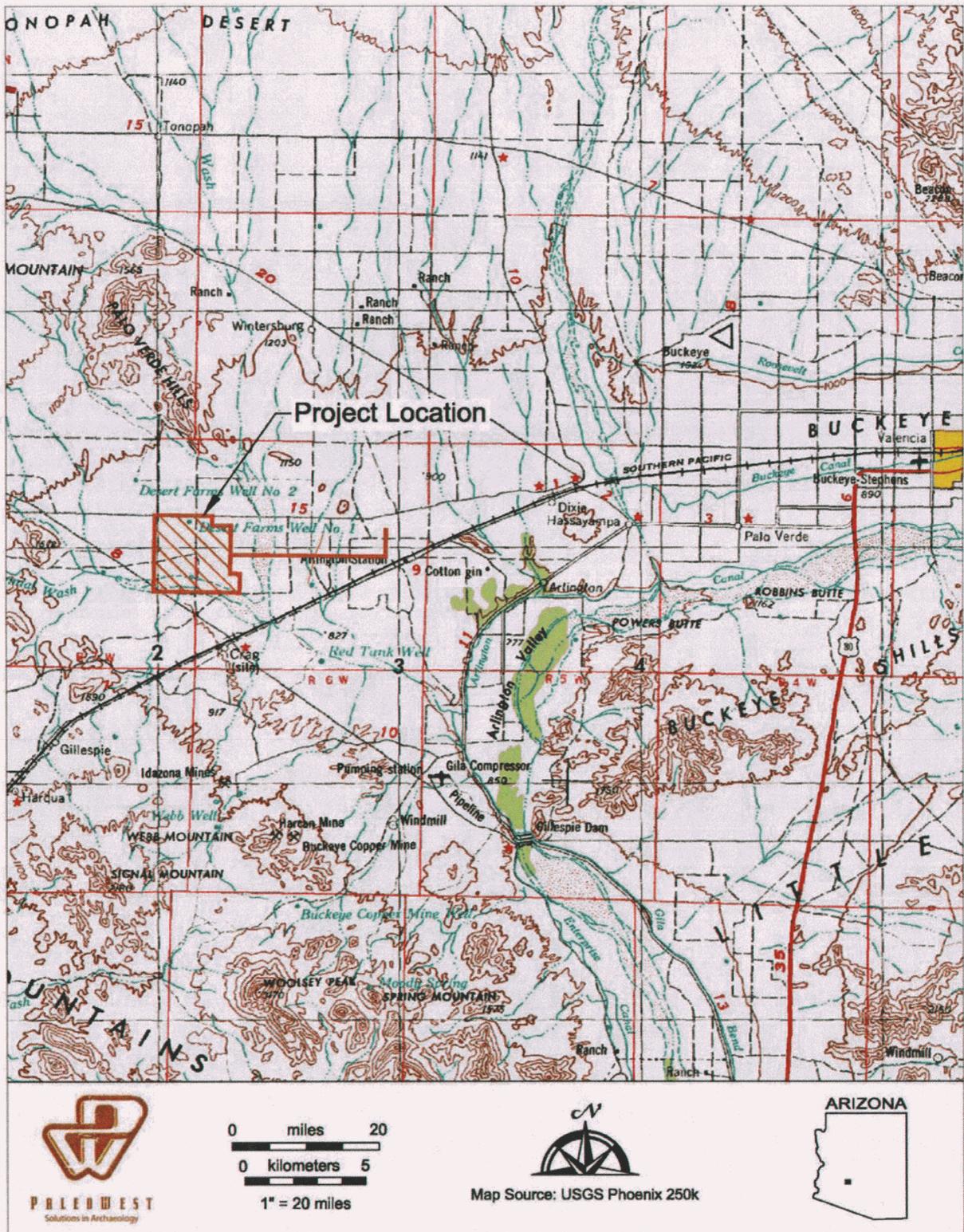


Figure 1. General Location of the Project Area.

## *Hohokam*

The earliest Hohokam manifestation, the Pioneer period (A.D. 100–750) Red Mountain phase (A.D. 1–500) (Dean 1991), is a time when people subsisted on wild resources and agricultural products. House forms included small circular and “bean-shaped” pit houses (Mabry 2000). Around A.D. 400, canal irrigation appears along the Salt River (Ackerly and Henderson 1989). By the Vahki phase, A.D. 500–650, irrigation expands and becomes well established (Ackerly and Henderson 1989; Haury 1976). Subsistence was based on a mixture of wild resources and agricultural produce. Domestic architecture was characterized by square and rectangular pit houses of various sizes (Ciolek-Torrello et al. 2000). The late Pioneer period, A.D. 650–750, saw the appearance of Hohokam decorated pottery (Estrella, Sweetwater, and Snaketown Red-on-buff), which is characterized by red-painted designs on a light-colored buff or brown background (Abbott 2001; Haury 1976; Wallace 2001). House types (moderate-sized pit structures with square or rectangular floor plans and formal, plastered hearths) associated with the late Pioneer period varied greatly.

The Gila Butte and Santa Cruz phases of the Colonial period (A.D. 750–950) were times of cultural expansion and elaboration among the Hohokam (e.g., Haury 1976). It is during this time that the Hohokam achieved their highest level of sophistication in the production of arts and crafts (particularly ceramics and shell). They also expanded their territory and economic interaction with their neighbors. In part, Colonial period Hohokam social organization appears tied to the exchange of ritual and subsistence goods (Doyel 1985).

Ballcourts, which were first built in the early A.D. 800s, became the dominant form of public architecture in southern Arizona (Wallace 2001). They are thought to mark the onset of a regional system bound by religious, economic, and political links that crosscut the geophysical boundaries of the region (Abbott 2001; Wilcox and Shenk 1977). Subsistence was based on a mix of wild resources and agriculture (Bohrer 1987). The construction, expansion, and maintenance of irrigation systems of the Salt and Gila River valleys had a significant impact on Hohokam social and political organization (e.g., Abbott 2000).

The Sedentary period (Sacaton phase—A.D. 950–1150) saw a general decline in the quality of Hohokam material culture. Early, ballcourts were the dominant form of public architecture. However, by the end of the period, few ballcourts were being built and the construction of capped mounds or platform mounds became more common. Platform mounds were built near village centers around plazas surrounded by domestic features. Houses, which exhibited significant variability in form, were more closely packed and organized in courtyard groups or village segments (Wilcox, McGuire, and Sternberg 1981).

Agriculture still provided the majority of foodstuffs, although some wild plant species were intensively exploited. Cotton production (for weaving of textiles and its seeds as food) was also of major importance.

By the end of the Sedentary period, a major reorganization of Hohokam society occurred. Many village sites and areas were abandoned as populations began to concentrate in larger villages along the Salt River. These changes were also reflected in public architecture and in the nature of ceramic and shell production.

The Classic period is divided into the Soho (A.D. 1150–1300) and the Civano (A.D. 1300–1450) phases. Differences in ceramic decoration and architectural styles differentiate these two phases. Low frequencies of red-on-buff ceramics continued to be produced during the Soho phase as redwares become increasingly common. The introduction of long-necked jars also marks a break with earlier ceramic styles. Structures with post-reinforced adobe walls and surface structures are common during the Soho phase. These were replaced by solid, adobe-walled surface rooms in the Civano phase, although the use of some pit houses continued. Houses were more closely spaced or contiguous, and surrounded by compound walls that often also enclosed small plazas. There was a significant increase in the construction and use of platform mounds (Gregory et al. 1988), and the construction of ballcourts declined to its lowest point. The apex of Hohokam public architecture was achieved during the Civano phase with the building of “big houses.” These structures, which often co-occur with platform mounds, likely served multiple functions. It is argued that they were clear symbols of elite status in Hohokam society (Wilcox and Shenk 1977).

The Classic period Hohokam subsisted increasingly upon domesticates, although agave and cholla continued to be commonly used (e.g., Miller 1994), and canal irrigation continued to be very important. Redwares and the disappearance of buffwares mark the Civano phase, although plainwares continue to dominate the total ceramic assemblage. Gila and Tonto Polychrome and local imitations are present after A.D. 1320 (Reid and Whittlesey 1992).

Civano phase Hohokam social organization was clearly different from what preceded it and from what was to follow. Population size and density at many of the large sites reached never-before-seen levels, and although the level of social and political organization actually achieved at this time is much debated, some increase in social complexity was undoubtedly necessary to manage the higher population densities.

By the late Civano phase, the success the Hohokam had enjoyed had vanished. High population densities, depletion of food resources, decline in agricultural productivity, disease and malnutrition, flooding, drought, and the collapse of many irrigation systems are cited as reasons for the collapse of the Hohokam (e.g., Bayman 2001; Van Gerven and Sheridan 1994).

The post-Classic period (Polvorón phase—A.D. 1450–1540) in the Phoenix Basin is somewhat of a hazy gap between the late Classic period Hohokam and the arrival of

the first Europeans (Bayman 2001; Chenault 2000; Henderson and Hackbarth 2000). The Polvorón phase is defined by jacal structures, polychrome ceramics, and an abundance of obsidian. However, many argue that these characteristics, as well as available chronometric dates (e.g., Dean 1991:87) are not sufficient to distinguish it from the late Civano phase. Others have suggested that the Hohokam may have persisted until the early 1500s and that Hohokam and Salado peoples may have been directly encountered by the Spanish (Bayman 2001; Reff 1992). The debate over the cause or causes for the decline and disappearance of the Hohokam is far from resolved.

### *Prehistoric Yuman (Patayan)*

The Prehistoric Yuman (Patayan) people occupied the desert territory in the southwestern part of Arizona. From an archaeological perspective, the Patayan is one of the most poorly known prehistoric cultures of the Southwest (Reid and Whittlesey 1997:111). This sentiment is echoed by Cordell in her observation that “[d]espite considerable research, the Patayan area remains poorly documented compared with other Southwestern regions” (Cordell 1997:211).

Rogers (1939) originally proposed the term “Yuman” to describe the prehistoric ceramic assemblages in the Colorado Desert. He divided the ceramic period into three phases, termed Yuman I, II, and III. He further clarified this idea (1945), claiming that Patayan referred to a specific cultural manifestation, while Yuman referred to a loosely knit constellation of material culture that was contained in the ceramic assemblages of the Colorado Desert, and he asserted that because the material culture and settlement adaptations of prehistoric peoples here continued into the historic period, the term Yuman was more appropriate.

According to Waters (1982), Patayan I (A.D. 700–1000) begins in the A.D. 700s with the expansion of Patayan peoples out of southern California. In southwestern Arizona, these early Patayan came into contact with the Hohokam, while to the north they were influenced by interaction with the Anasazi (Rogers 1945). Patayan I is defined by the presence of four major ceramic types: Black Mesa Buff, Colorado Beige, Colorado Red, Colorado Red-on-beige (Waters 1982).

Patayan I ceramics were made from the fine-textured, buff-colored clays deposited by the Colorado River. Decorative techniques include the direct “chimney neck” rim, notched rims, lug and loop handles, the so-called “Colorado shoulder,” incising, burnishing, and a red clay slip. Sites with Patayan I ceramics extend from near El Centro, California, eastward to the vicinity of Gila Bend, Arizona, with Parker, Arizona, being the point of their most northern distribution and the Sierra Pinacate, Sonora the southern extent (McGuire 1982; Waters 1982). McGuire (1982:219) notes that the distribution of Patayan II and III ceramics does not differ significantly. Patayan I peoples were apparently highly mobile and actively engaged in trade. Excavations at the Willow Beach site resulted in the recovery of pottery, shell, steatite, asphaltum, and turtle shell rattles from California (Schroeder 1952; Stone 1986).

Dramatic changes in the Patayan ceramic assemblage signal the start of the Patayan II period (A.D. 1000–1500). Patayan II ceramics are found in the Mojave Desert, north along the Colorado River, and along the Gila River east to Aqua Caliente. This distribution is taken to indicate a widespread expansion of Patayan groups, perhaps in response to the immigration of other groups and/or internecine warfare along the Colorado River (Stone 1986).

Five Lower Colorado Buffware plainwares and their red-on-buff equivalents define or appear during the Patayan II period: Tumco Buff, Parker Buff, and Topoc Buff (along the Lower Colorado River); Palomas Buff (along the Gila River); and Salton Buff (along the 12-m shoreline of Lake Cahuilla) (Waters 1982:287). The painted varieties borrow design elements from the Hohokam. The new ceramic traits that appear in the Lower Colorado Buffwares include re-curved rims, a stucco finish, new vessel forms, and an increased use of fine-line geometric designs (Rogers 1945:188; Waters 1982:287). Little is known of Patayan II society and socioeconomic and political organization. Sites are common in the Lower Colorado River valley, in the Gila River valley, and along the shore of Lake Cahuilla. Faunal remains at sites along the shore of the lake indicate that Patayan II peoples exploited freshwater shellfish, fish, and birds (Stone 1986:67). There was increased interaction with the Hohokam in the western desert area of Arizona and it appears that a group of Patayan occupied a residential area within the large Hohokam site of Las Colinas in the Phoenix Basin (Reid and Whittlesey 1997:123).

The Patayan III period (A.D. 1500–1850) represents a significant shift in settlement, with movement away from the Salton Trough (although some occupation continued there). It is during this time that Lower Colorado Buffwares reach their maximum distribution; from the Pacific coast eastward to Phoenix, from southern Nevada southward to the Colorado River delta (Waters 1982:291–293). This expansion of Patayan populations is likely associated with the desiccation of Lake Cahuilla (Rogers 1945).

The co-occurrence of Patayan and Hohokam materials over a broad expanse of territory suggests a long history of trade and interaction, and even co-residence, as at the site of Las Colinas in Phoenix (Reid and Whittlesey 1997:122–126). The history of interaction between Hohokam and Patayan groups started as early as A.D. 900, when Patayan ceramics first appear at Hohokam sites in the Gila Bend area. This area is seen as an important locus for the interaction and intermixture of these two cultural groups; however, many of the Patayan sites in these areas were small, specialized procurement loci. After the demise of the Hohokam, prehistoric Patayan populations are believed to have spread east along the Gila River until they reached the distribution observed by Spanish explorers in the eighteenth century (McGuire 1982:219; Reid and Whittlesey 1997:124).

### *Historic Period*

The Historic period began with the first Spanish explorations into Arizona in the late 1600s. Permanent Euroamerican settlements in the Salt River Valley and nearby

environs began in the late 1860s. In the immediate region around the project area, historic uses reflect its marginal setting relative to important historical locations such as Phoenix and Prescott. The Santa Fe, Prescott, and Phoenix Railroad was constructed through the area in 1895, linking Phoenix with the mining communities in Yavapai County and the main Santa Fe transcontinental railroad across northern Arizona. The Southern Pacific Railroad (SPRR) was established further to the south and that corridor, later known as the Gila Trail and which eventually became the Butterfield Stage Overland Route, has a long history. Much of the influx of people into the area can be traced to mining, and subsequent homesteading. Though homesteading, mining, and farming were all tried in the area through the early part of the 20<sup>th</sup> century, the economy and population of the region grew only a small amount until recent master planned residential developments began attracting residents.

## RECORDS REVIEW

A review of the AZSITE database maintained by the Arizona State Museum and the General Land Office (GLO) records housed by the Bureau of Land Management was conducted of the project area and one mile around it. Twenty-nine surveys have been conducted across and near the project area. No archaeological sites are recorded in the project area, but fourteen sites are recorded in the vicinity. Also, the 1915 and 1916 GLO records indicate that roads passed through the project area and a windmill is recorded in the southern half of Section 24. The previous surveys and recorded sites are listed in Tables 1 and 2 and illustrated in the figures at the back of this report (Figures 2-4).

**Table 1.** Previously Recorded Surveys in the 1-mile Study Radius.

Survey No.	Description	In Project Area?	Reference
1955-3 (ASM)	Southern Pacific Pipeline	No	Komerska and Breternitz 1955
1981-129 (ASM)	Solar Vista Associates, SLD	No	Madsen 1981
1981-159 (ASM)	Southern California Edison Palo Verde-Devers 500Kv Transmission Line	No	Berry 1978
1981-162 (ASM)	Yuma 500 Kv Transmission Line	No	Effland et al. 1982
1985-226 (ASM)	All American Pipeline Right-of-Way	Partial	Batcho 1985
1994-270 (ASM)	PacifiCorp Turbine Pipeline Project-Wintersburg Alternatives	Partial	Rogge and Darrington 1994
1999-409 (ASM)	Palo Verde Switchyard Survey	No	Hart 2000
1999-435 (ASM)	Redhawk Power Plant	Partial	Rogge et al. 1999
1999-542 (ASM)	Harquahala Generating Project	No	Rogge et al. 2000
1999-587 (ASM)	PBNS Level 3 Fiber Optic Line	No	Doak 1999
2000-429 (ASM)	Redhawk Pipeline Project	Partial	Rogge and Bauer 2000
2000-118 (ASM)	Sempra Energy Power Station	No	No report
2000-393 (ASM)	Tonopah and Centennial Powerline	No	Punzman 2000
2000-428 (ASM)	Redhawk-Hassayampa Powerline Intertie	No	Rogge and Bauer 2000

**Table 1. Previously Recorded Surveys in the 1-mile Study Radius.**

Survey No.	Description	In Project Area?	Reference
2000-435 (ASM)	Kinder Morgan Pipeline Erosion Sections	No	Rogge and Davies 2000
2000-631 (ASM)	Palo Verde Steam Transportation Route	No	Garcia and Folb 2001
2001-410 (ASM)	Centennial Wash Erosion Control	No	Bauer and Rogge 2001
2001-714 (ASM)	AT&T NexGen/Core project – Addendum	Partial	Smith and Wheeler 2001
2001-767 (ASM)	Redhawk Power Plant Access Road	No	Wilcox 2001
2003-951 (ASM)	Hassayampa to Jojoba Transmission line	No	Chapin-Pyritz and Hill 2002
2004-237 (ASM)	Arlington Valley Project	Partial	Copeland and Breternitz 2000
2005-68 (ASM)	Temporary Work Areas for EPNG	No	North et al. 2004
7.984.SHPO	No information available	No	--
7.204.SHPO	No information available	No	--
BLM-020-10-84	No information available	No	--
BLM-020-10-98	No information available	No	--
BLM-020-11-42	No information available	No	--
BLM-020-10-101	No information available	Partial	--
BLM-020-10-108	No information available	Partial	--

Notes: ASM - Arizona State Museum; SHPO - State Historic Preservation Office; BLM - Bureau of Land Management.

**Table 2. Previously Documented Sites in the 1-mile Study Radius.**

Site No. and NRHP eligibility	Site Type	Reference
AZ T:9:21 (ASM) – E	Hohokam Artifacts Scatter with Possible Hearths	Rogge et al. 2000 Luhnow and Dickenson 2007
AZ T:9:24 (ASM) – U	Historic Homestead	Effland et al. 1982
AZ T:9:34 (ASM) – U	Prehistoric Lithic Scatter	Berry 1978
AZ T:9:55 (ASM) – NE	Historic Farm Labor Camp	Rogge et al. 2000
AZ T:9:56 (ASM) – NE	Historic Ramada	Rogge et al. 1999
AZ T:9:57 (ASM) – NE	Historic Farm Labor Camp	Rogge et al. 2000
AZ T:9:58 (ASM) – NE	Historic and Modern Trash Dump	Walsh 2000
AZ T:9:59 (ASM) – NE	Historic Trash Dump	Walsh 2000
AZ T:9:60 (ASM) – NE	Historic Trash Dump	Hart 2000
AZ T:9:61 (ASM) – NE	Historic Trash Dump	Hart 2000
AZ T:9:62 (ASM) – NE	Historic homestead	Hart 2000
AZ T:9:63 (ASM) – NE	Historic Road Segment	Hart 2000
AZ T:9:70 (ASM) – NE	Prehistoric Lithic Scatter with Two Rockpiles	Copeland and Breternitz 2000
AZ T:10:84 (ASM) – E	Southern Pacific Railroad Phoenix to Eloy Spur	Harmon et al. 1995 Ellis et al. 1999

Notes: ASM - Arizona State Museum.

National Register Eligibility; NE = not eligible; E = considered eligible by recorders, U = unknown, not evaluated

---

## RECOMMENDATIONS

The Class I site file search was conducted for the project area and within a 1-mile radius using the AZSITE database maintained by the Arizona State Museum and the GLO records housed by the Bureau of Land Management. Twenty-nine surveys have been conducted across and near the project area. No archaeological sites are recorded in the project area, but fourteen sites are recorded in the vicinity. Also, the 1915 and 1916 GLO records indicate that roads passed through the project area and a windmill is recorded in the southern half of Section 24.

The Class I cultural resource study identified several previous archaeological surveys adjacent to the proposed facility site and some that overlap with the proposed transmission line corridor. However, no sites have been recorded within the actual project area. Because few archaeological surveys have been conducted in the project area, and sites have been recorded in the vicinity, a Class III archaeological survey of the project area is recommended prior to development.

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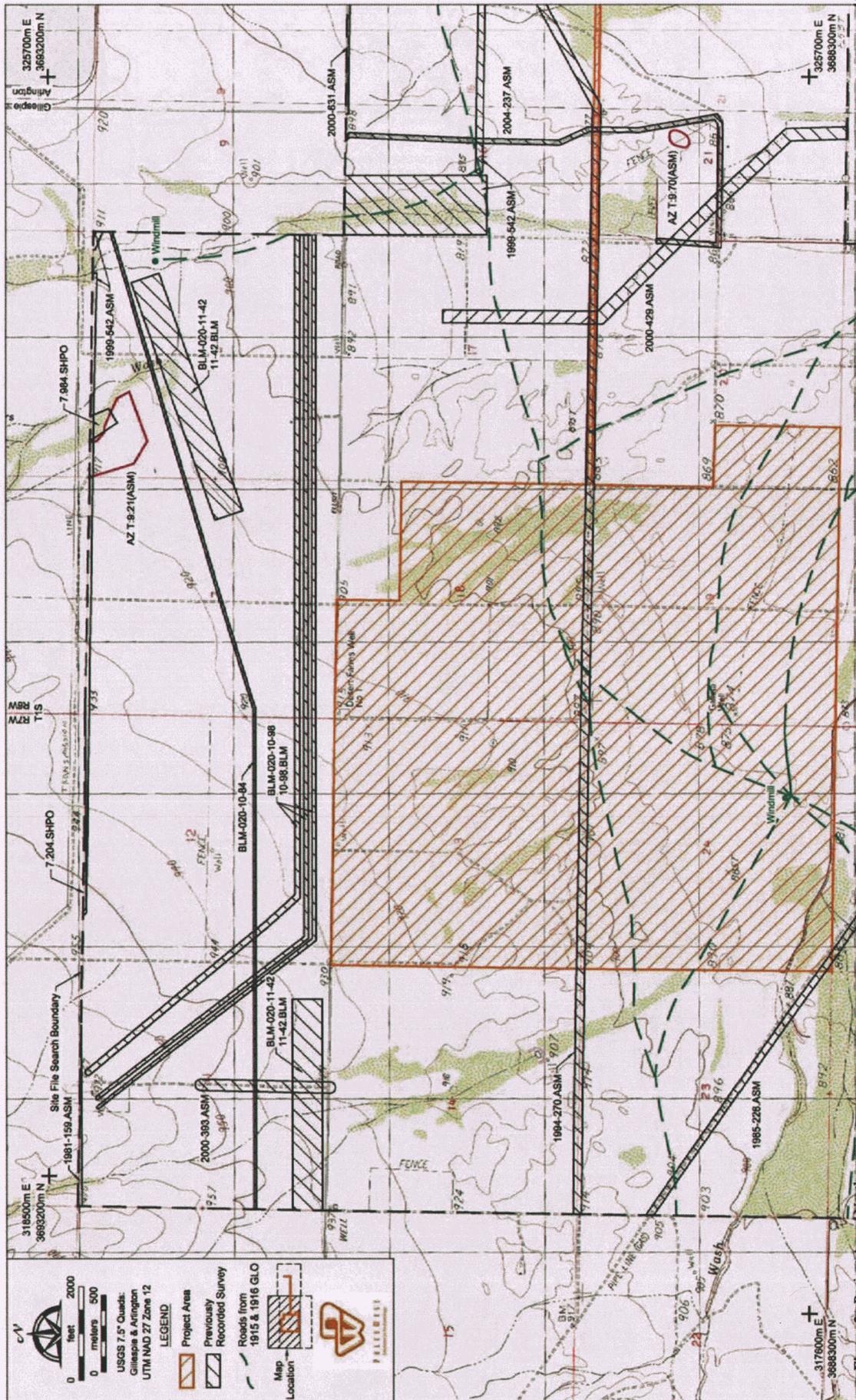


Figure 2. Project Area - North



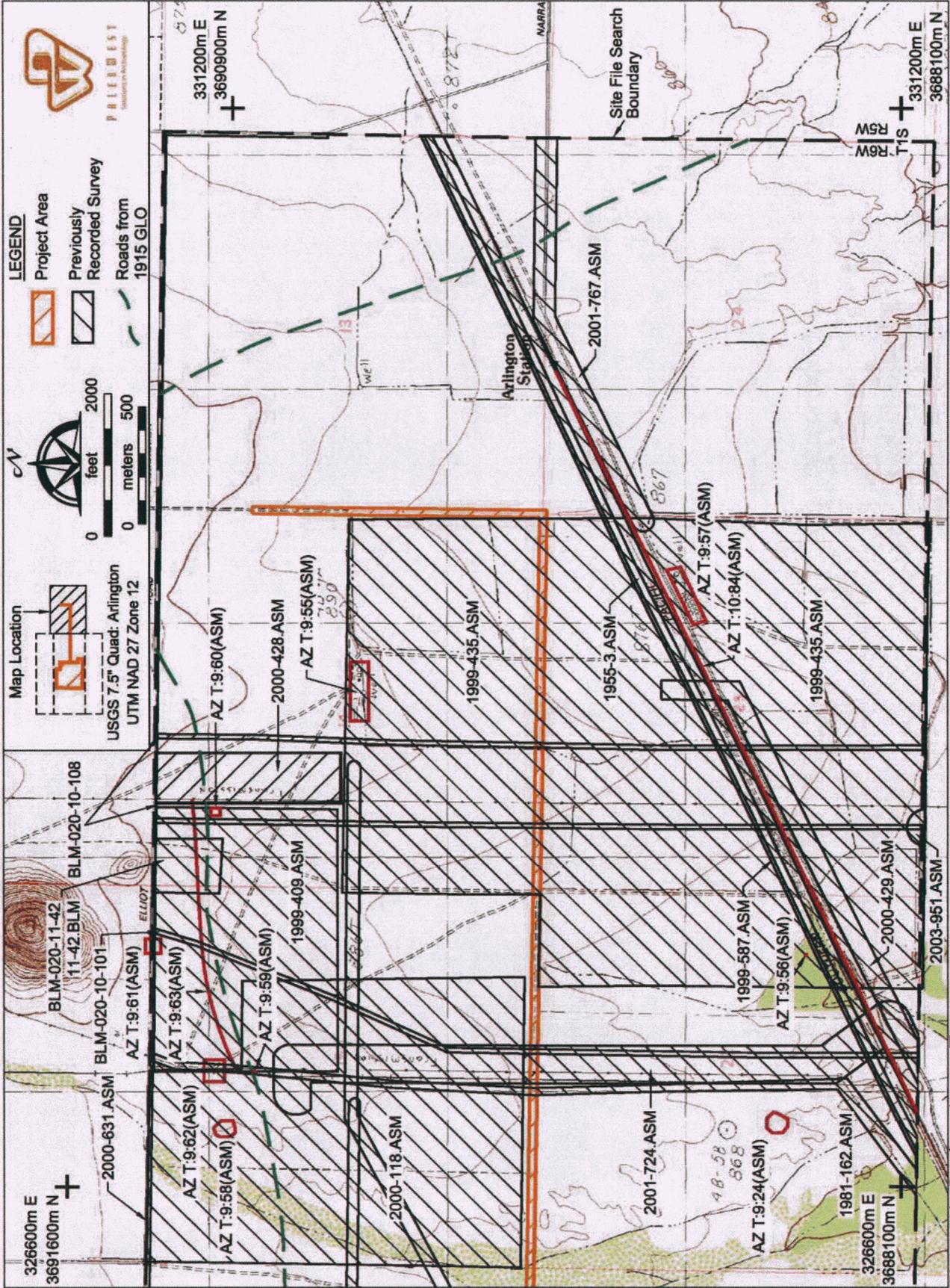


Figure 4. Project Area - East

April 10, 2009



**P A L E O W E S T**  
Solutions in Archaeology

**A CLASS III CULTURAL RESOURCES  
SURVEY OF TRANSMISSION LINE  
CORRIDORS ON STATE LAND FOR THE  
PROPOSED MESQUITE SOLAR  
GENERATION PROJECT, MARICOPA  
COUNTY, ARIZONA**

Submitted to:

AECOM Environment

Technical Report 09-06

**PaleoWest Solutions in Archaeology**  
649 N. 3rd Ave.  
Phoenix, Arizona 85003

**A CLASS III CULTURAL RESOURCES SURVEY OF TRANSMISSION LINE  
CORRIDORS ON STATE LAND FOR THE PROPOSED MESQUITE SOLAR  
GENERATION PROJECT, MARICOPA COUNTY, ARIZONA**

**ASLD Application No. 14-113718**

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April 2009

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## ARIZONA SHPO ABSTRACT

**Report Title:** A Class III Cultural Resources Survey of Transmission Line Corridors on State Land for the Proposed Mesquite Solar Generation Project, Maricopa County, Arizona.

**Report Date:** April 10, 2009.

**Client:** AECOM.

**Land Status:** Arizona State Land Department (ASLD Application No. 14-113718)

**Project Description:** A Class III Cultural Resources Survey of Transmission Line Corridors on State Land for a proposed photovoltaic solar generation facility and its associated transmission line interconnection in Maricopa County, Arizona.

**Location:** Sections 16, 17, 20, 22, T1S, R6W, Gila and Salt River Baseline and Meridian, in Maricopa County, Arizona.

**Map Reference:** USGS Gillespie, AZ, Arlington, AZ 7.5'.

**Acreage:** Approximately 92 acres.

**Number of Archaeological Sites:** One, AZ T:9:63(ASM).

**Register-Eligible Properties:** None.

**Register-Ineligible Properties:** One, AZ T:9:63(ASM).

**Recommendation:** The Class I cultural resource study identified several previous archaeological surveys adjacent to and overlapping the proposed transmission line corridors. One site had been recorded crossing the project area. The Class III survey identified the previously recorded site, AZ T:9:63(ASM), seventeen isolated trail segments, and five other isolated occurrences in the project area. The origin and age of the trail segments could not be determined. The previously recorded site, AZ T:9:63(ASM), is a road dating to the first half of the 20<sup>th</sup> century. It has been determined to be ineligible for inclusion on the National Register of Historic Places (NRHP) by the Arizona State Historic Preservation Office (SHPO). Due to the absence of significant cultural resources within the project area, PaleoWest recommends that the proposed undertaking be determined to have no effect on historic properties. However, if ground-disturbing activities expose previously undocumented archaeological remains, work in the area of the discovery should cease until the discovery can be evaluated by a professional archaeologist.

## INTRODUCTION

This report presents the results of a Class III cultural resources survey of Arizona State Trust Land in support of a Special Use Right-of-Way Permit application (ASLD application No. 14-113718) for a 2,480-acre solar photovoltaic (PV) facility and a 4-mile-long 230 kV transmission line interconnection, all located in Maricopa County, Arizona. This project examined four routes associated with a 150-foot wide corridor for the transmission line connections. These corridors occur in Sections 16, 17, 20, 22, T1S, R6W, Gila and Salt River Baseline and Meridian, in Maricopa County, Arizona; USGS Gillespie and Arlington, AZ 7.5' topographic quadrangles (see Figure 1).

The Class I cultural resource study, prepared for the solar photovoltaic facility site and the transmission line corridor for the Maricopa County Special Use Permit application (Mitchell and Breternitz 2009), identified several previous archaeological surveys adjacent to and overlapping the proposed transmission line corridors. One site had been recorded crossing the project area. The Class III survey identified the previously recorded site, AZ T:9:63(ASM), seventeen isolated trail segments, and five other isolated occurrences in the project area. The origin and age of the trail segments could not be determined. The previously recorded site, AZ T:9:63(ASM), is a road dating to the first half of the 20<sup>th</sup> century. It has been determined to be ineligible for inclusion on the National Register of Historic Places (NRHP) by the Arizona State Historic Preservation Office (SHPO). Due to the absence of significant cultural resources within the project area, PaleoWest recommends that the proposed undertaking be determined to have no effect on historic properties. However, if ground-disturbing activities expose previously undocumented archaeological remains, work in the area of the discovery should cease until the discovery can be evaluated by a professional archaeologist.

## PROJECT SETTING

The project area is a broad valley at the south end of the Harquahala Plain, drained by Centennial Wash within the Phoenix Basin physiographic region, which includes the Lower Colorado River Subdivision of the Sonoran Desert. This area is characterized by the creosote bush-bursage and palo verde-cacti biotic communities (Brown 1994). The area receives approximately nine inches of rainfall annually, with maximum temperatures exceeding 100 degrees (F) during the summer months. The specific project area is dominated by creosote bushes. The most significant drainage in the project area is Centennial Wash. Elevation within the project area varies between 850 and 900 feet above mean sea level (msl).

## CULTURE HISTORY

The project area lies near the western limit of the Hohokam area near its border with the area typically associated with the prehistoric Yuman (Patayan). Reid and Whittlesey indicate that “[f]rom Gila Bend and Ajo westward to California and from Yuma northeast to the Grand Canyon lies a vast region that was the home of the Patayan people” (1997:111). In the following discussion pertinent features of the prehistoric Hohokam and Patayan cultures are examined, followed by a review of significant historic developments.

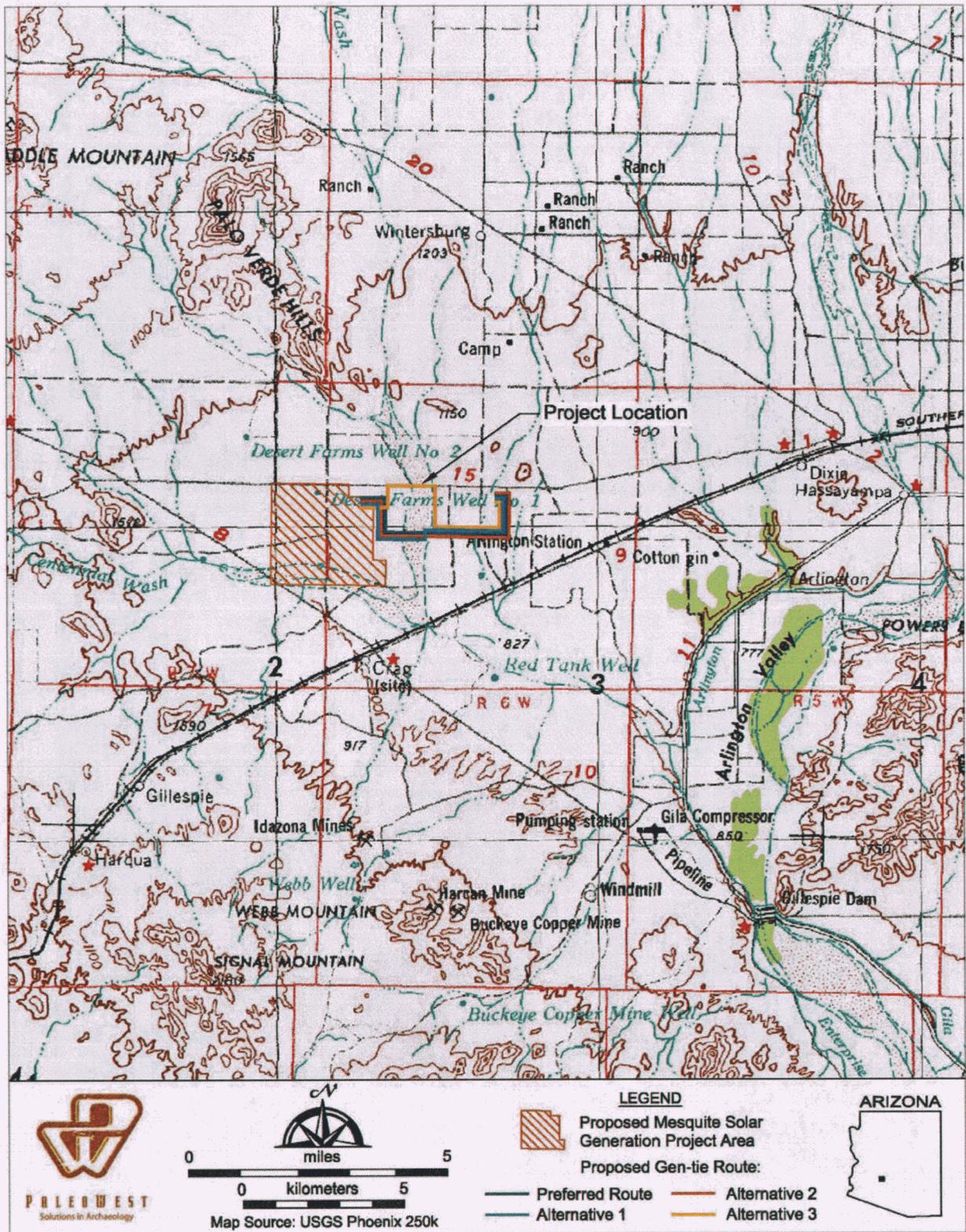


Figure 1. General Location of the Project Area.

### *Archaic Period*

The earliest evidence of human occupation known for this area dates to the Middle Archaic period, approximately 5,000 years ago (Cordell 1997). Middle Archaic use of the area appears to have been on a temporary basis by residentially mobile hunter-gatherers. Habitation structures are generally absent or, if present, they are ephemeral in construction (Cordell 1997). By 2,000 years ago, pit houses, ceramics, and intensively used ground stone assemblages signify the beginnings of sedentism in the Santa Cruz Valley (Huckell 1995). Evidence of agriculture is lacking at this time, which may support a model of short-term sedentism prior to the adoption of maize. However, cultigens are well-documented elsewhere in central and southern Arizona centuries before the Late Archaic period pit house sites known from the nearby Santa Cruz Valley, including sites along the Upper Santa Cruz River (Huckell 1995:139). This strongly suggests that groups living in this area had adopted maize and other cultigens by at least 2,000 years ago. Between 2,000 and 1,600 years ago, there is evidence that Late Archaic period groups across southern Arizona developed into the Hohokam culture.

### *Hohokam*

The earliest Hohokam manifestation, the Pioneer period (A.D. 100–750) Red Mountain phase (A.D. 1–500) (Dean 1991), is a time when people subsisted on wild resources and agricultural products. House forms included small circular and “bean-shaped” pit houses (Mabry 2000). Around A.D. 400, canal irrigation appears along the Salt River (Ackerly and Henderson 1989). By the Vahki phase, A.D. 500–650, irrigation expands and becomes well established (Ackerly and Henderson 1989; Haury 1976). Subsistence was based on a mixture of wild resources and agricultural produce. Domestic architecture was characterized by square and rectangular pit houses of various sizes (Ciolek-Torrello et al. 2000). The late Pioneer period, A.D. 650–750, saw the appearance of Hohokam decorated pottery (Estrella, Sweetwater, and Snaketown Red-on-buff), which is characterized by red-painted designs on a light-colored buff or brown background (Abbott 2001; Haury 1976; Wallace 2001). House types (moderate-sized pit structures with square or rectangular floor plans and formal, plastered hearths) associated with the late Pioneer period varied greatly.

The Gila Butte and Santa Cruz phases of the Colonial period (A.D. 750–950) were times of cultural expansion and elaboration among the Hohokam (e.g., Haury 1976). It is during this time that the Hohokam achieved their highest level of sophistication in the production of arts and crafts (particularly ceramics and shell). They also expanded their territory and economic interaction with their neighbors. In part, Colonial period Hohokam social organization appears tied to the exchange of ritual and subsistence goods (Doyel 1985).

Ballcourts, which were first built in the early A.D. 800s, became the dominant form of public architecture in southern Arizona (Wallace 2001). They are thought to mark the onset of a regional system bound by religious, economic, and political links that crosscut the geophysical boundaries of the region (Abbott 2001; Wilcox and Shenk 1977). Subsistence was based on a mix of wild resources and agriculture (Bohrer 1987). The construction, expansion, and

maintenance of irrigation systems of the Salt and Gila River valleys had a significant impact on Hohokam social and political organization (e.g., Abbott 2000).

The Sedentary period (Sacaton phase—A.D. 950–1150) saw a general decline in the quality of Hohokam material culture. Early, ballcourts were the dominant form of public architecture. However, by the end of the period, few ballcourts were being built and the construction of capped mounds or platform mounds became more common. Platform mounds were built near village centers around plazas surrounded by domestic features. Houses, which exhibited significant variability in form, were more closely packed and organized in courtyard groups or village segments (Wilcox, McGuire, and Sternberg 1981).

Agriculture still provided the majority of foodstuffs, although some wild plant species were intensively exploited. Cotton production (for weaving of textiles and its seeds as food) was also of major importance.

By the end of the Sedentary period, a major reorganization of Hohokam society occurred. Many village sites and areas were abandoned as populations began to concentrate in larger villages along the Salt River. These changes were also reflected in public architecture and in the nature of ceramic and shell production.

The Classic period is divided into the Soho (A.D. 1150–1300) and the Civano (A.D. 1300–1450) phases. Differences in ceramic decoration and architectural styles differentiate these two phases. Low frequencies of red-on-buff ceramics continued to be produced during the Soho phase as redwares become increasingly common. The introduction of long-necked jars also marks a break with earlier ceramic styles. Structures with post-reinforced adobe walls and surface structures are common during the Soho phase. These were replaced by solid, adobe-walled surface rooms in the Civano phase, although the use of some pit houses continued. Houses were more closely spaced or contiguous, and surrounded by compound walls that often also enclosed small plazas. There was a significant increase in the construction and use of platform mounds (Gregory et al. 1988), and the construction of ballcourts declined to its lowest point. The apex of Hohokam public architecture was achieved during the Civano phase with the building of “big houses.” These structures, which often co-occur with platform mounds, likely served multiple functions. It is argued that they were clear symbols of elite status in Hohokam society (Wilcox and Shenk 1977).

The Classic period Hohokam subsisted increasingly upon domesticates, although agave and cholla continued to be commonly used (e.g., Miller 1994), and canal irrigation continued to be very important. Redwares and the disappearance of buffwares mark the Civano phase, although plainwares continue to dominate the total ceramic assemblage. Gila and Tonto Polychrome and local imitations are present after A.D. 1320 (Reid and Whittlesey 1992).

Civano phase Hohokam social organization was clearly different from what preceded it and from what was to follow. Population size and density at many of the large sites reached never-before-seen levels, and although the level of social and political organization actually achieved at this time is much debated, some increase in social complexity was undoubtedly necessary to manage the higher population densities.

By the late Civano phase, the success the Hohokam had enjoyed had vanished. High population densities, depletion of food resources, decline in agricultural productivity, disease and malnutrition, flooding, drought, and the collapse of many irrigation systems are cited as reasons for the collapse of the Hohokam (e.g., Bayman 2001; Van Gerven and Sheridan 1994).

The post-Classic period (Polvorón phase—A.D. 1450–1540) in the Phoenix Basin is somewhat of a hazy gap between the late Classic period Hohokam and the arrival of the first Europeans (Bayman 2001; Chenault 2000; Henderson and Hackbarth 2000). The Polvorón phase is defined by jacal structures, polychrome ceramics, and an abundance of obsidian. However, many argue that these characteristics, as well as available chronometric dates (e.g., Dean 1991:87) are not sufficient to distinguish it from the late Civano phase. Others have suggested that the Hohokam may have persisted until the early 1500s and that Hohokam and Salado peoples may have been directly encountered by the Spanish (Bayman 2001; Reff 1992). The debate over the cause or causes for the decline and disappearance of the Hohokam is far from resolved.

### ***Prehistoric Yuman (Patayan)***

The Prehistoric Yuman (Patayan) people occupied the desert territory in the southwestern part of Arizona. From an archaeological perspective, the Patayan is one of the most poorly known prehistoric cultures of the Southwest (Reid and Whittlesey 1997:111). This sentiment is echoed by Cordell in her observation that “[d]espite considerable research, the Patayan area remains poorly documented compared with other Southwestern regions” (Cordell 1997:211).

Rogers (1939) originally proposed the term “Yuman” to describe the prehistoric ceramic assemblages in the Colorado Desert. He divided the ceramic period into three phases, termed Yuman I, II, and III. He further clarified this idea (1945), claiming that Patayan referred to a specific cultural manifestation, while Yuman referred to a loosely knit constellation of material culture that was contained in the ceramic assemblages of the Colorado Desert, and he asserted that because the material culture and settlement adaptations of prehistoric peoples here continued into the historic period, the term Yuman was more appropriate.

According to Waters (1982), Patayan I (A.D. 700–1000) begins in the A.D. 700s with the expansion of Patayan peoples out of southern California. In southwestern Arizona, these early Patayan came into contact with the Hohokam, while to the north they were influenced by interaction with the Anasazi (Rogers 1945). Patayan I is defined by the presence of four major ceramic types: Black Mesa Buff, Colorado Beige, Colorado Red, Colorado Red-on-beige (Waters 1982).

Patayan I ceramics were made from the fine-textured, buff-colored clays deposited by the Colorado River. Decorative techniques include the direct “chimney neck” rim, notched rims, lug and loop handles, the so-called “Colorado shoulder,” incising, burnishing, and a red clay slip. Sites with Patayan I ceramics extend from near El Centro, California, eastward to the vicinity of Gila Bend, Arizona, with Parker, Arizona, being the point of their most northern distribution and the Sierra Pinacate, Sonora the southern extent (McGuire 1982; Waters 1982). McGuire (1982:219) notes that the distribution of Patayan II and III ceramics does not differ significantly.

Patayan I peoples were apparently highly mobile and actively engaged in trade. Excavations at the Willow Beach site resulted in the recovery of pottery, shell, steatite, asphaltum, and turtle shell rattles from California (Schroeder 1952; Stone 1986).

Dramatic changes in the Patayan ceramic assemblage signal the start of the Patayan II period (A.D. 1000–1500). Patayan II ceramics are found in the Mojave Desert, north along the Colorado River, and along the Gila River east to Aqua Caliente. This distribution is taken to indicate a widespread expansion of Patayan groups, perhaps in response to the immigration of other groups and/or internecine warfare along the Colorado River (Stone 1986).

Five Lower Colorado Buffware plainwares and their red-on-buff equivalents define or appear during the Patayan II period: Tumco Buff, Parker Buff, and Topoc Buff (along the Lower Colorado River); Palomas Buff (along the Gila River); and Salton Buff (along the 12-m shoreline of Lake Cahuilla) (Waters 1982:287). The painted varieties borrow design elements from the Hohokam. The new ceramic traits that appear in the Lower Colorado Buffwares include re-curved rims, a stucco finish, new vessel forms, and an increased use of fine-line geometric designs (Rogers 1945:188; Waters 1982:287). Little is known of Patayan II society and socioeconomic and political organization. Sites are common in the Lower Colorado River valley, in the Gila River valley, and along the shore of Lake Cahuilla. Faunal remains at sites along the shore of the lake indicate that Patayan II peoples exploited freshwater shellfish, fish, and birds (Stone 1986:67). There was increased interaction with the Hohokam in the western desert area of Arizona and it appears that a group of Patayan occupied a residential area within the large Hohokam site of Las Colinas in the Phoenix Basin (Reid and Whittlesey 1997:123).

The Patayan III period (A.D. 1500–1850) represents a significant shift in settlement, with movement away from the Salton Trough (although some occupation continued there). It is during this time that Lower Colorado Buffwares reach their maximum distribution; from the Pacific coast eastward to Phoenix, from southern Nevada southward to the Colorado River delta (Waters 1982:291–293). This expansion of Patayan populations is likely associated with the desiccation of Lake Cahuilla (Rogers 1945).

The co-occurrence of Patayan and Hohokam materials over a broad expanse of territory suggests a long history of trade and interaction, and even co-residence, as at the site of Las Colinas in Phoenix (Reid and Whittlesey 1997:122–126). The history of interaction between Hohokam and Patayan groups started as early as A.D. 900, when Patayan ceramics first appear at Hohokam sites in the Gila Bend area. This area is seen as an important locus for the interaction and intermixture of these two cultural groups; however, many of the Patayan sites in these areas were small, specialized procurement loci. After the demise of the Hohokam, prehistoric Patayan populations are believed to have spread east along the Gila River until they reached the distribution observed by Spanish explorers in the eighteenth century (McGuire 1982:219; Reid and Whittlesey 1997:124).

### ***Historic Period***

The Historic period began with the first Spanish explorations into Arizona in the late 1600s. Permanent Euroamerican settlements in the Salt River Valley and nearby environs began in the late 1860s. In the immediate region around the project area, historic uses reflect its

marginal setting relative to important historical locations such as Phoenix and Prescott. The Santa Fe, Prescott, and Phoenix Railroad was constructed through the area in 1895, linking Phoenix with the mining communities in Yavapai County and the main Santa Fe transcontinental railroad across northern Arizona. The Southern Pacific Railroad (SPRR) was established further to the south and that corridor, later known as the Gila Trail and which eventually became the Butterfield Stage Overland Route, has a long history. Much of the influx of people into the area can be traced to mining, and subsequent homesteading. Though homesteading, mining, and farming were all tried in the area through the early part of the 20<sup>th</sup> century, the economy and population of the region grew only a small amount until recent master planned residential developments began attracting residents.

## RECORDS REVIEW

A review of the AZSITE database maintained by the Arizona State Museum and the General Land Office (GLO) records housed by the Bureau of Land Management was conducted of the project area and one mile around it. Twenty-one surveys have been conducted across and near the project area. Thirteen archaeological sites are recorded in the vicinity but only one crosses portions of the project area. The 1915 and 1916 GLO records indicate that roads passed through the project area and one of these roads had been assigned an Arizona State Museum (ASM) site number by a previous survey (Hart 2000). The previous surveys and recorded sites are listed in Tables 1 and 2 and illustrated in Figure 2.

**Table 1.** Previously Recorded Surveys in the 1-mile Study Radius.

Survey No.	Description	In Project Area?	Reference
1955-3.ASM	Southern Pacific Pipeline	No	Komerska and Breternitz 1955
1981-162.ASM	Yuma 500 Kv Transmission Line	Partial	Effland et al. 1982
1994-270.ASM	PacifiCorp Turbine Pipeline Project–Wintersburg Alternatives	Partial	Rogge and Darrington 1994
1999-409.ASM	Palo Verde Switchyard Survey	No	Hart 2000
1999-435.ASM	Redhawk Power Plant	No	Rogge et al. 1999
1999-542.ASM	Harquahala Generating Project	Partial	Rogge et al. 2000
1999-587.ASM	PBNS Level 3 Fiber Optic Line	No	Doak 1999
2000-429.ASM	Redhawk Pipeline Project	Partial	Rogge and Bauer 2000
2000-118.ASM	Sempra Energy Power Station	No	No report
2000-428.ASM	Redhawk-Hassayampa Powerline Intertie	No	Rogge and Bauer 2000
2000-429.ASM			
2000-631.ASM	Palo Verde Steam Transportation Route	No	Garcia and Folb 2001
2001-724.ASM	AT&T NexGen/Core project – Addendum	Partial	Smith and Wheeler 2001
2003-951.ASM	Hassayampa to Jojoba Transmission line	No	Chapin-Pyritz and Hill 2002
2004-237.ASM	Arlington Valley Project	Partial	Copeland and Breternitz 2000
7.984.SHPO	No information available	No	--

**Table 1. Previously Recorded Surveys in the 1-mile Study Radius.**

Survey No.	Description	In Project Area?	Reference
BLM-020-10-84	No information available	No	--
BLM-020-10-98	No information available	No	--
BLM-020-10-101	No information available	No	--
BLM-020-10-108	No information available	No	--
BLM-020-11-42	No information available	Partial	--

Notes: ASM - Arizona State Museum; SHPO - State Historic Preservation Office; BLM - Bureau of Land Management.

**Table 2. Previously Documented Sites in the 1-mile Study Radius.**

Site No. and NRHP eligibility	Site Type	Reference
AZ T:9:21 (ASM) – E	Hohokam Artifacts Scatter with Possible Hearths	Rogge et al. 2000 Luhnnow and Dickenson 2007
AZ T:9:24 (ASM) – U	Historic Homestead	Effland et al. 1982
AZ T:9:55 (ASM) – NE	Historic Farm Labor Camp	Rogge et al. 2000
AZ T:9:56 (ASM) – NE	Historic Ramada	Rogge et al. 1999
AZ T:9:58 (ASM) – NE	Historic and Modern Trash Dump	Walsh 2000
AZ T:9:59 (ASM) – NE	Historic Trash Dump	Walsh 2000
AZ T:9:60 (ASM) – NE	Historic Trash Dump	Hart 2000
AZ T:9:61 (ASM) – NE	Historic Trash Dump	Hart 2000
AZ T:9:62 (ASM) – NE	Historic homestead	Hart 2000
AZ T:9:63 (ASM) – NE	Historic Road Segment	Hart 2000
AZ T:9:65 (ASM) – NE	Historic Homestead and Trash Scatter	Rogge et al. 2000
AZ T:9:70 (ASM) – NE	Prehistoric Lithic Scatter with Two Rockpiles	Copeland and Breternitz 2000
AZ T:10:84 (ASM) – E	Southern Pacific Railroad Phoenix to Eloy Spur	Harmon et al. 1995 Ellis et al. 1999

Notes: ASM - Arizona State Museum.

National Register Eligibility; NE = not eligible; E = considered eligible by recorders, U = unknown, not evaluated

## SURVEY METHODS

The survey was carried out on March 24, 2009 by PaleoWest archaeologists Douglas R. Mitchell and Cory D. Breternitz. The inventory was conducted by walking a transects spaced approximately 20 m apart within the 150 ft wide survey corridor until it had been completely covered. All methods followed procedures outlined in the Arizona State Museum's *Standards for Conducting and Reporting Cultural Resource Surveys on State Lands*. The project area was dominated by creosote bushes and in general the surface visibility was approximately 85 percent. One site, 17 trail segments, and five isolated occurrences were identified (see Figure 3).



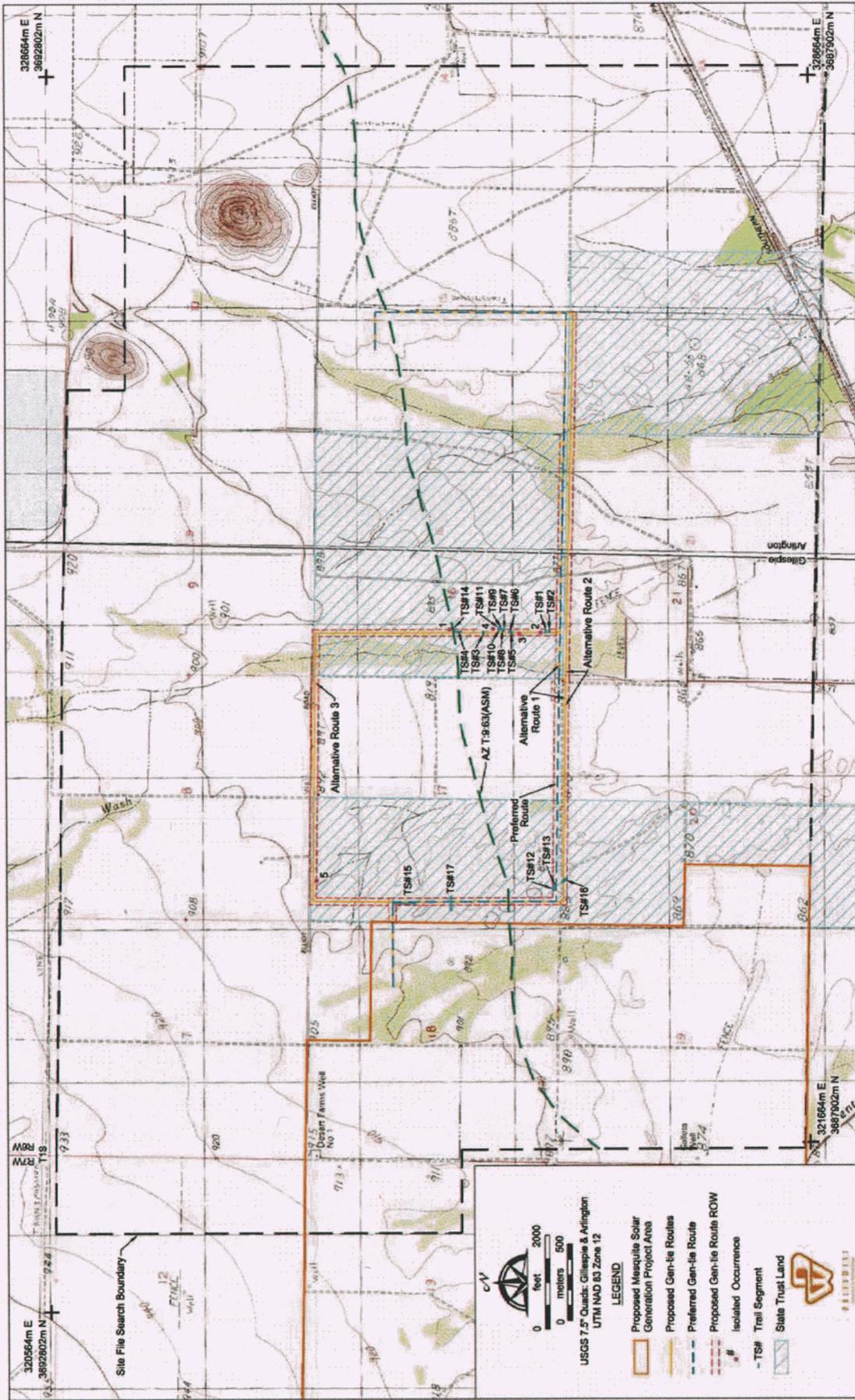


Figure 3. The project area alignments and the results of the archaeological survey.

## SURVEY RESULTS

### AZ T:9:63(ASM)

**Site Type/Function:** Road/transportation

**Cultural Affiliation:** Euro-American

**Temporal Affiliation:** 1900-1950

**Dimensions/Area:** 12 feet wide by several miles long

**Elevation:** 890 feet amsl

**Vegetation:** Creosote, mesquite

**Local Topography:** Creosote flat

**Center UTM Location:** (Zone 12, NAD 83): intersects project area at two points: 323126E, 3690230N; and 324904E, 3690593N,

**Legal Description:** Sections 15-18, Township 1 South, Range 6 West, Maricopa County, on the USGS Gillespie and Arlington, Arizona, 7.5-minute quadrangle

**Description:** As described by Hart (2000), the historic road segment is oriented west by southwest to east by northeast and passes through Sections 14 and 15 and continues in either direction. The road is affiliated with the Anglo-historic occupation of the area and is most likely associated with the homesteading activity. The GLO plat maps indicate that the road did not exist in 1883, but was in place by 1916 and is not shown on the 1984 USGS topographic map. The road continues to the southwest into Sections 16, 17, and 18 and is clearly visible on an aerial photograph of the area (see Figure 4).

**NRHP Eligibility Recommendation:** The site was recommended as **ineligible** in the original survey report (Hart 2000) because of the unlikelihood that further archaeological investigation of this site would yield new or significant information on the local or regional history of the area (Criterion D) and the SHPO concurred with that recommendation.

### *Trail Segments*

Several portions of the proposed transmission line corridor occur in areas where the ground is covered in desert pavement, that consist of "large flat areas devoid of vegetation and covered by a layer of tightly packed small stones" (McAuliffe 2000:94). This physiographic setting is easily disturbed and in certain locations, trails become very visible. A number of trails and tracks were observed in the project area; some were obviously created by modern vehicles and some were clearly made by animals but the origins of many of these tracks could not be determined. We recorded the trail segments crossing the survey corridor that were not obviously modern or animal. This resulted in the recording of 17 trail segments.

Seventeen trail segments were identified in the project area. The trails were all visible in the desert pavement as straight to slightly curving linear features varying between 20 to 30 cm in width. Trail lengths varied from 20 to over 100 meters and their orientations also varied. Characteristics for each trail segment are included in Table 3 (also see Figure 5-7). No prehistoric artifacts were found along any of the trails.

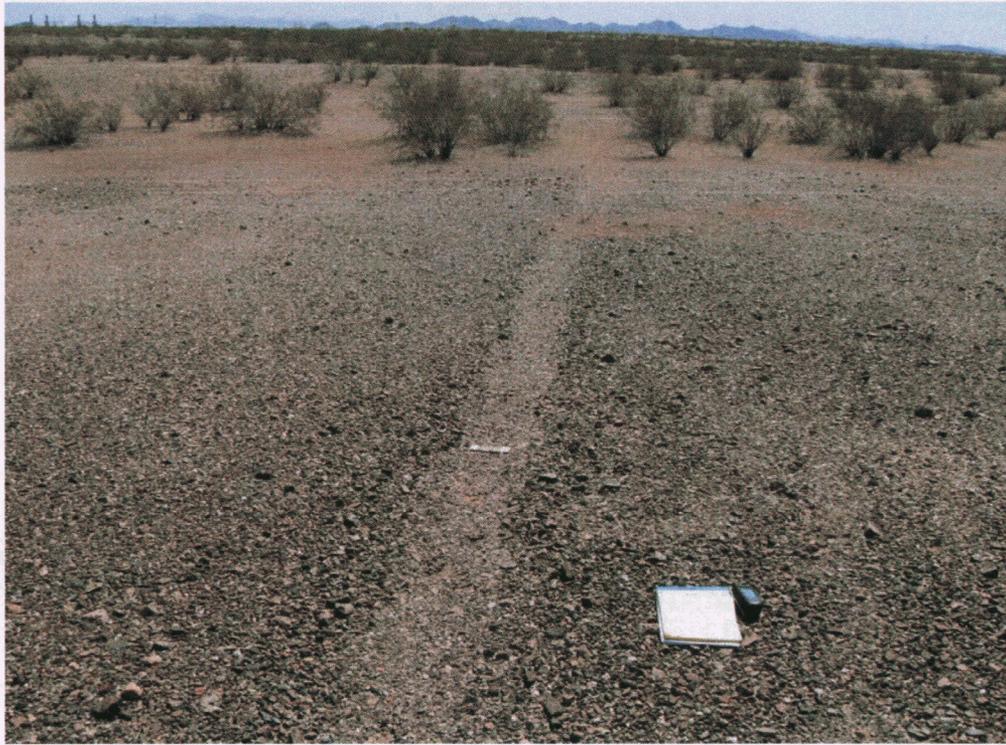


**Figure 4.** Aerial photograph of Section 17 showing the road identified on the 1916 GLO map and designated as AZ T:9:63(ASM). The proposed transmission line alignment is parallel to, and approximately 500 ft east of, 395th Avenue.

**Table 3.** Characteristics of the trail segments recorded during the survey.

Trail Segment No.	UTM coordinates (Zone 12S, NAD 83)	Width (m)	Length (m)	Orientation
1	324894E 3689991N	0.20	30	E-W
2	324893E 3689967N	0.20	20	E-W
3	324885E 3690393N	0.25	25	E-W
4	324891E 3690560N	0.20	60	N-S
5	324889E 3690212N	0.20	20-25	E-W
6	324892E 3690223N	0.20	20	E-W
7	324900E 3690258N	0.20	20	E-W
8	324904E 3690272N	0.20	20	E-W
9	324908E 3690282N	0.20	20	E-W
10	324909E 3690286N	0.20	20	E-W
11	324911E 3690293N	0.20	20	E-W
12	323198E 3689946N	0.20	35	E-W
13	323202E 3689934N	0.20	30	E-W
14	324905E 3690579N	0.20	30+	E-W
15	323105E 3690909N	0.20	150	N-S
16	323256E 3689875	0.20	20+; 50+	Two forks, one oriented NE-SW and the other NW-SE
17	323104E 3690610N	0.20	100+	E-W

Note: UTM coordinates were taken in the center of the trail segments



**Figure 5.** A trail segment visible crossing a low ridge covered with desert pavement.



**Figure 6.** Archaeologist walking along one of the trail segments.



**Figure 7.** Example of a long trail segment visible in the desert pavement.

***Non-trail Isolated Occurrences***

In addition to the trails, five isolated occurrences were recorded. These IOs consisted of a possible cobble mano, a deflated roasting pit or rock pile, a can dump, and two isolated cans (Table 4).

**Table 4.** Isolated Occurrences recorded during the survey.

IO number	UTMS (Zone 12S, NAD 83)	Description
1	324906E 3690611N	Tobacco tin
2	324883E 3690022N	Deflated rock pile including 20-25 pieces of rock, some cracked; possibly an eroded roasting pit.
3	324877E 3690159N	Possible cobble mano; quartzite cobble appears to have slight grinding on edges and flat surface
4	324909E 3690329N	Small evaporated milk can

**Table 4. Isolated Occurrences recorded during the survey.**

IO number	UTMS (Zone 12S, NAD 83)	Description
5	0323258 3691473	Can scatter with a couple of clear glass bottles. Main concentration is approximately 3 x 5 m in two clusters that blend together. Approximately 20 m south of Elliot Road; appears to be a single dumping episode of domestic trash. 75-100 rusted metal cans that include solder hole in top cans, 2 coffee cans, 2 square meat product cans, 4 clear glass baby food sized jars and a single rectangular, ribbed, clear glass bottle that may be a perfume or liquor bottle. 1 mason jar screw top. No lids or caps to any of the containers were observed. Age is indeterminate but probably greater than 50 years old.

### RECOMMENDATIONS

The Class I cultural resource study identified several previous archaeological surveys adjacent to and overlapping the proposed transmission line corridors. One site had been recorded crossing the project area. The Class III survey identified the previously recorded site, AZ T:9:63(ASM), seventeen isolated trail segments, and five other isolated occurrences in the project area. The origin and age of the trail segments could not be determined. The previously recorded site, AZ T:9:63(ASM), is a road dating to the first half of the 20<sup>th</sup> century. It has been determined to be ineligible for inclusion on the National Register of Historic Places (NRHP) by the Arizona State Historic Preservation Office (SHPO). Due to the absence of significant cultural resources within the project area, PaleoWest recommends that the proposed undertaking be determined to have no effect on historic properties. However, if ground-disturbing activities expose previously undocumented archaeological remains, work in the area of the discovery should cease until the discovery can be evaluated by a professional archaeologist.

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# **Exhibit C: Unique Biological Features**

## Exhibit C Requirements

Describe any areas in the vicinity of the proposed site or route which are unique because of biological wealth or because they are habitats for rare and endangered species. Describe the biological wealth or species involved and state the effects, if any, the proposed facilities will have thereon.

The United States Fish and Wildlife Service (USFWS), Arizona Natural Heritage Program, and Arizona Department of Agriculture (AZDA) species lists for Maricopa County were reviewed (USFWS 2008; AZGFD 2008; AZDA 2009). Twenty-eight species with potential to occur within the Mesquite Solar project area were identified by AECOM during initial review (see Exhibit B for the complete Biological Site Assessment) and are listed in the Table C-1.

**Table C-1 :  
Special Status Species with Potential to Occur within the Proposed Mesquite Solar Gen-Tie Project Area**

Common Name	Scientific Name	Status
<b>Birds</b>		
Cactus Ferruginous Pygmy-Owl	<i>Glaucidium brasilianum cactorum</i>	USFWS SC; AZ WSC
Western Burrowing Owl	<i>Athene cunicularia hypugaea</i>	USFWS SC
Common Black Hawk	<i>Buteogallus anthracinus</i>	AZ WSC
<b>Mammals</b>		
Common Name	Scientific Name	Status
Cave Myotis	<i>Myotis velifer</i>	USFWS SC
Lesser Longnosed Bat	<i>Leptonycteris curasoae yerbabuena</i>	USFWS E; AZ WSC
Pale Townsend's Big-eared Bat	<i>Choeronycteris mexicana</i>	USFWS SC
Greater Western Bonneted Bat	<i>Eumops perotis californicus</i>	USFWS SC
Yuma Myotis	<i>Myotis Yumanensis</i>	USFWS SC
California Leaf-nosed Bat	<i>Macrotus californicus</i>	AZ WSC
Western Red Bat	<i>Lasiurus blossevillii</i>	AZ WSC
<b>Amphibians/Reptiles</b>		
Common Name	Scientific Name	Status
Sonoran Desert Tortoise	<i>Gopherus agassizii (Sonoran Population)</i>	USFWS SC; AZ WSC
Mexican Garter Snake	<i>Thamnophis eques megalops</i>	USFWS SC; AZ WSC
Arizona Toad	<i>Bufo microscaphus</i>	USFWS SC
Redback Whiptail	<i>Aspidoscelis xanthonota</i>	USFWS SC
Mexican Rosy Boa	<i>Charina trivirgata trivirgata</i>	USFWS SC
Desert Rosy Boa	<i>Charina trivirgata gracia</i>	USFWS SC
Arizona Chuckwalla	<i>Sauromalus aterv (Arizona population)</i>	USFWS SC

Common Name	Scientific Name	Status
Common Chuckwalla	<i>Sauromalus ater</i> (Western population)	USFWS SC
Great Plains Narrow-mouthed Toad	<i>Chionactis palarostris organica</i>	AZ WSC
Lowland Leopard Frog	<i>Lithobates yavapaiensis</i>	AZ WSC
Lowland Burrowing Treefrog	<i>Ptenohyla fodiens</i>	AZ WSC
<b>Plants</b>		
Common Name	Scientific Name	Status
Toumey Agave	<i>Agave toumeyana</i> var. <i>bella</i>	AZ SR
California Barrel Cactus	<i>Ferocactus cylindraceus</i> var. <i>cylindraceus</i>	AZ SR
Golden Barrel Cactus	<i>Ferocactus cylindraceus</i> var. <i>eastwoodiae</i>	AZ SR
Emory's Barrel-cactus	<i>Ferocactus emoryi</i>	AZ SR
Straw-top Cholla	<i>Opuntia echinocarpa</i>	AZ SR
Tumamoc Globeberry	<i>Tumamoca macdougalii</i>	AS SR

AZ SR State of Arizona Salvage Restricted Protected Native Plants

AZ WSC State of Arizona Wildlife Species of Concern

USFWS E U.S. Fish and Wildlife Service Endangered

USFWS SC U.S. Fish and Wildlife Service Species of Concern

Of the species listed in Table C-1, only two species of concern were identified during agency consultation, the straw-top cholla and western burrowing owl. Element occurrence data were evaluated for a five-mile radius centered on the Mesquite Solar project area. Only one species, the straw-top cholla, was identified in the search. Straw-top cholla and western burrowing owl are discussed in detail below.

USFWS indicated that although unlikely, there is potential for desert tortoise within the Mesquite Solar project area; however, any desert tortoise in this area would be part of the Sonoran population that is not listed and that currently has no regulatory status (Martinez 2009). The desert tortoise is considered a species of concern by the state of Arizona, but it does not have regulatory status under Arizona law (AZGFD 2008).

### ***Special Status Vegetation***

Straw-top cholla is found in arid environments in Southern California, Nevada, Utah, western Arizona, and Sonoran and Baja California, Mexico (efloras 2008; Quinn 2001). It is most commonly found in the Mojave and Sonoran deserts in creosote bush scrub, desert grasslands, juniper, and oak-juniper woodlands vegetative communities (NatureServe 2009; efloras 2008). It is typically located on bajadas, canyons, benches, slopes, mesas, flats, and washes usually at elevations ranging from 1,000 to 5,000 feet (NatureServe 2009; efloras 2008, Quinn 2001). Substrates usually consist of sandy loam, alluvium, and gravelly soils (NatureServe 2009; efloras 2008). Plants are shrubby and can grow from one to 6 feet tall. They are covered in dense spines that can be white or yellow and determine the color of the

plant (Quinn 2001). It blooms from March to June (efloras 2008) The Maricopa, Mohave, and Cocopa Indians rolled the fruits on the ground to remove the spines and ate the fruit raw; they also ate the buds as greens in the spring (Native American Ethnobotany 2003, Quinn 2001). The straw-top cholla is classified as imperiled in Arizona by NatureServe (2009). Its primary threat is collecting of the species by horticulturists. Construction in its range could increase access to the species through the building of new roads and facilities. In addition, construction would result in the trampling and removal of aboveground vegetation and could result in the harming or destruction of any potential straw-top cholla in the Mesquite Solar project site. Permanent impacts from the construction of facilities associated with the site could result in the long-term loss of potentially suitable habitat. AZDA indicated a notice of intent must be filed because straw-top cholla is designated as a salvage-restricted species.

### ***Special Status Wildlife***

Western burrowing owls inhabit open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands often associated with burrowing mammals. They sometimes occur in open areas such as vacant lots near human habitation, golf courses or airports (AZGFD 2001). Burrowing owls sleep and roost in the mouth of nest burrows, satellite burrows, or depressions in the ground. Although they are most active during the period from late afternoon until full dark, they can be observed at almost any time of the day. They commonly perch on fence posts or on top of mounds outside their burrows. High ambient temperatures seem to limit their daytime activities (AZGFD 2001). Burrowing owl use of burrows makes them susceptible to impacts from ground disturbing activities. Despite the fact that burrowing owls are active during the day and are adaptable to human presence, the burrowing owl can go unnoticed in an area due to their secretive nature. Over the past 50 years, most burrowing owl populations have experienced declines throughout their range in North America, and for this reason, these owls are protected by various federal, state, and local laws. While this species is not considered an Arizona Wildlife Species of Concern, all owls in Arizona are protected by the Migratory Bird Treaty Act (MBTA) and Arizona State law (ARS Title 17). The Mesquite Solar project area contains moderate habitat for this species especially if vegetation is cleared for a period of time prior to the construction of the Mesquite Solar project. Direct impacts could occur to this species if construction were to begin during the breeding season for this species, from March 1 through August 31 in Arizona (AZGFD 2009). The Arizona Game and Fish Department (AZGFD) indicated they had concerns regarding impacts to this species and requested that a survey be conducted prior to construction of this project (Ritter 2009). Surveys should follow guidelines compiled by the ADGFD for burrowing owl (AZGFD 2009).

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<http://www.fws.gov/southwest/es/Arizona/Documents/CountyLists/Maricopa.pdf>.  
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**Exhibit D:  
Lists of Wildlife and Plant Life**

## Exhibit D Requirements

*List the fish, wildlife, plant life and associated forms of life in the vicinity of the proposed site or route and describe the effects, if any, the proposed facilities will have thereon.*

### Common Wildlife

Representative wildlife species with potential to occur within the Mesquite Solar Gen-Tie alternative route areas are included in Table D-1. A comprehensive list of species with potential to occur within Mesquite Solar project habitat types is available in Arizona's Comprehensive Wildlife Conservation Strategy (AZGFD 2006).

**Table D-1 :**

**Common Wildlife Species in Habitats within the Proposed Mesquite Solar Gen-Tie Project Area**

Habitat Type	Common Species
<b>Birds</b>	Cooper's Hawk, Sharp-shinned Hawk, Cassin's Sparrow, Rufous-crowned Sparrow, Western Scrub-Jay, Western Burrowing Owl, Verdin, Red-tailed Hawk, Lark Bunting, Chestnut-collared Longspur, Gambel's Quail, Cactus Wren, Turkey Vulture, Hermit Thrush, Swainson's Thrush, Common Ground-Dove, Olive-sided Flycatcher, American Crow, Common Raven, Chihuahuan Raven, Steller's Jay, Horned Lark, Prairie Falcon, Greater Roadrunner, Cactus Ferruginous Pygmy- Owl, Dark-eyed Junco, Loggerhead Shrike, Western Screech-Owl, Northern Mockingbird, Brown-headed Cowbird, Phainopepla, Common Poorwill, Greatailled Grackle, Brewer's Sparrow, Chipping Sparrow, Northern Roughwinged Swallow, Western Meadowlark, House Wren, Warbling Vireo, Mourning Dove and White-crowned Sparrow
<b>Mammals</b>	Pallid Bat, Coyote, Bailey's Pocket Mouse, Sonoran Desert Pocket Mouse, Pale Townsend's Big-eared Bat, Desert Kangaroo Rat, Lesser Longnosed Bat, Blacktailed Jackrabbit, Striped Skunk, California Myotis, Desert Woodrat, Desert Mule Deer, Desert Bighorn Sheep, Arizona Pocket Mouse, Little Pocket Mouse, Western Harvest Mouse, Plains Harvest Mouse, Arizona Cotton Rat, Colorado River Cotton Rat, Round-tailed Ground Squirrel, Rock Squirrel, Western Spotted Skunk, Desert Cottontail, American Badger, Botta's Pocket Gopher, and Kit Fox
<b>Amphibians and Reptiles</b>	Arizona Glossy Snake, Tiger Whiptail, Zebra-tailed Lizard, Variable Sandsnake, Tucson Shovel-nosed Snake, Tucson Banded Gecko, Desert Banded Gecko, Chihuahuan Greater Earless Lizard, Western Diamond-backed Rattlesnake, Mojave Desert Sidewinder, Sonoran Sidewinder, Northern Mohave Rattlesnake, Great Basin Collared Lizard, Eastern Collared Lizard, Sonoran Collared Lizard, Northern Desert Iguana, Sonoran Desert Tortoise, Banded Gila Monster, California Kingsnake, Desert Threadsnake, Sonoran Whipsnake, Red Arizona (Sonoran) Coralsnake, Desert Horned Lizard, Sonoran Gophersnake, Western Longnosed Snake, Desert Patchnosed Snake, Common Chuckwalla, Mojave Fringetoe Lizard, Long-tailed Brush Lizard, Ornate Tree Lizard, and Common Sideblotched Lizard

The proposed construction of the Mesquite Solar Gen-Tie through the Project area may result in impacts to common wildlife. Potential impacts may include short-term avoidance of the area because of the noise generated by construction activities. Clearing vegetation along the Mesquite Solar Gen-Tie will result in relatively minor habitat fragmentation. Placement of the

Mesquite Solar Gen-Tie may provide raptor perching locations that will result in adverse impacts to their prey base. This impact can be mitigated with the use of perch diverters. The transmission lines may also pose a collision and electrocution threat for birds. The transmission line would be constructed following the APLIC and USFWS guidelines (2006) to mitigate electrocution impacts. Construction and travel along temporary access roads may result in some minimal direct impact to wildlife from crushing. This impact should be minimized by the relatively small construction footprint and minimal footprint for access roads.

The Arizona Game and Fish Department (AZGFD) has indicated the need for project compliance with the Migratory Bird Treaty Act (MBTA). A variety of migratory bird species are regulated under the MBTA, including songbirds and raptors, and these species may use the vegetation communities within the Mesquite Solar project area. Direct impacts to these species and the possibility of a violation of MBTA can be avoided if construction occurs outside of the breeding season, generally May 1 through August 31 in Arizona (AZGFD 2009). It should be noted that breeding season varies according to species and pre-construction surveys should coincide with the breeding habits of the species that are known to occur, or have the potential to occur, in the Mesquite Solar project area.

### ***Plant Life***

The Mesquite Solar Gen-Tie alternatives are located within the Lower Colorado Desert subdivision of the Sonoran Desert Ecoregion. The Lower Colorado Desert subdivision is extremely arid, with average precipitation ranging from three to 10 inches a year. The vegetation is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). The Sonoran-Mojave Creosote Bush-White Bursage Desert Scrub has a sparse to moderately dense layer of xeromorphic microphyllous and broad-leaved shrubs, with a sparse herbaceous layer. The Sonoran-Mojave Mixed Salt Desert Scrub is found in saline basins and around playas on fine-textured, saline soils. Plant communities consist of open-canopied shrublands usually composed of one or more saltbush species. The North American Warm Desert Riparian Mesquite Bosque is found along low-elevation intermittent streams, such as Centennial Wash and Winters Wash, both located in the vicinity of the proposed Mesquite Solar Gen-Tie. Vegetation in these riparian corridors consists of tree and shrub species, such as velvet mesquite, dependent on the annual rise in the groundwater table for growth and reproduction.

Table D-2 provides a common plant species list for the Mesquite Solar Gen-Tie alternatives area. Vegetation types and community characterizations were compiled based on aerial photograph interpretation and Southwest Regional Gap Analysis Project (SWReGAP) Land Cover descriptions (USGS 2004). Plant species names are consistent with the USDA Plants Database (NRCS 2009).

**Table D-2:  
Common Plant Species—Lower Colorado Desert Subdivision/Sonoran Desert Ecoregion**

Type	Common Name	Scientific Name
Trees	honey mesquite	<i>Prosopis glandulosa</i>
	velvet mesquite	<i>Prosopis velutina</i>
Shrubs	creosote bush	<i>Larrea tridentata</i>
	white bursage	<i>Ambrosia dumosa</i>
	fourwing saltbush	<i>Atriplex canescens</i>
	Desert holly	<i>Atriplex hymenelytra</i>
	brittlebush	<i>Encelia farinosa</i>
	rough jointfir	<i>Ephedra nevadensis</i>
	ocotillo	<i>Fouquieria splendens</i>
	water jacket	<i>Lycium andersonii</i>
	beavertail pricklypear	<i>Opuntia basilaris</i>
	mule-fat	<i>Baccharis salicifolia</i>
	sandbar willow	<i>Salix exigua</i>
Herbs	sandmat species	<i>Chamaesyce</i> spp.
	desert trumpet	<i>Eriogonum inflatum</i>
	cryptantha species	<i>Cryptantha</i> spp.
	fiddleleaf	<i>Nama</i> spp.
	phacelia species	<i>Phacelia</i> spp.
	allenrolfea species	<i>Allenrolfea</i> spp.
	pickleweed species	<i>Salicornia</i> spp.
seepweed	<i>Suaeda</i> spp.	
Grasses	low woollygrass	<i>Dasyochloa pulchella</i>
	threeawn	<i>Aristida</i> spp.

The proposed construction of a Mesquite Solar Gen-Tie through the project area may result in permanent removal of an unknown amount of native vegetation. This impact should be minimized by the relatively small construction footprint for Mesquite Solar Gen-Tie pole structures. Temporary impacts to native vegetation may result from the construction of access roads along the Mesquite Solar Gen-Tie route for construction vehicles. Disturbed soils and native plant communities may suffer from noxious weed invasions.

The Arizona State Department of Agriculture (AZDA) should be consulted in accordance with the Native Plant Law. On May 3, 2008, AZDA implemented the new rules for native plants (AZDA 2008). These laws pertain to the use and harvest of native plants for commercial

purposes. Under these new rules, the movement of a native plant species from its habitat is regulated based on four categories of protection. These categories are Highly Safeguarded Protected Native Plants, Salvage Restricted Protected Native Plants, Salvage Assessed Protected Native Plants, and Harvest Restricted Protected Native Plants. The straw-top cholla is a Salvage Restricted species, which requires a salvage permit be issued by AZDA before the plant may be removed from its native habitat for commercial purposes.

In addition, the Native Plant Law requires that a notice of intent must be filed with the Department of Agriculture before clearing of native plants on private lands (AZDA 2009). The notice of intent must be filed 60 days before the clearing of native vegetation on private lands can start. The filing of the notice of intent allows AZDA to determine whether there are any native plants on the site. If native plants are present, salvage operators can be notified, with the landowner's permission, and can examine the potential for salvage (AZDA 2009).

### **References**

- AZDA (Arizona Department of Agriculture). 2009. Arizona Protected Native Plants by Categories. Website: <http://www.azda.gov/esd/protplantlst.htm>. Accessed February 26, 2009.
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# **Exhibit E: Cultural Resources Description**

## Exhibit E Requirements

*Describe any existing scenic areas, historic sites and structures or archaeological sites in the vicinity of the proposed facilities and state the effects, if any, the proposed facilities will have thereon.*

Cultural resources in the general vicinity of the Mesquite Solar project area include prehistoric human artifacts from as early as 5,000 years ago as well as more recent historic artifacts beginning with the first Spanish explorations into Arizona in the late 1600s. A Class I Cultural Resources study was performed for a one-mile-wide Mesquite Solar Gen-Tie corridor in February 2009. The complete Class I report is included as Exhibit B. The study file search was conducted using the AZSITE database maintained by the Arizona State Museum and the General Land Office (GLO) records maintained by the Bureau of Land Management. Twenty-nine surveys have been conducted across and near the Mesquite Solar project area. No archaeological sites are recorded in the Mesquite Solar project area, but 14 sites are recorded in the Mesquite Solar general vicinity of the project.

The Class I study identified several previous archaeological surveys that overlap with the proposed Mesquite Solar Gen-Tie corridor. However, no sites have been recorded within the search area (one-mile-wide corridor).

A Class III Cultural Resources Survey of the transmission corridors located on state lands was performed in April 2009. The entire report is provided in Exhibit B. The 1915 and 1916 GLO records indicate that roads once passed through the Mesquite Solar project area, and a windmill is recorded in the southern half of Section 24, Township 1 South, Range 7 West. The Class III survey identified a previously recorded site, AZ T:9:63 (ASM), 17 isolated trail segments, and five other isolated occurrences in the Mesquite Solar project survey area. The origin and age of the trail segments could not be determined. The previously recorded site, AZ T:9:63 (ASM), is a road dating to the first half of the 20th century. It has been determined to be ineligible for inclusion on the National Register of Historic Places (NRHP) by the Arizona State Historic Preservation Office (SHPO). Given the absence of significant cultural resources within the Mesquite Solar project area, the study recommended that the proposed Mesquite Solar Gen-Tie project be determined to have no effect on historic properties. However, if ground-disturbing activities expose previously undocumented archaeological remains, work in the area of the discovery would cease until the discovery can be evaluated by a professional archaeologist.

The proposed project would include minimal footprint impacts and is not expected to have any adverse effects on cultural resources.

# **Exhibit F: Recreational Use**

## **Exhibit F Requirements**

*State the extent, if any, the proposed site or route will be available to the public for recreational purposes, consistent with safety considerations and regulations and attach any plans the applicant may have concerning the development of the recreational aspects of the proposed site or route.*

There are no plans to offer any recreational opportunities in association with the proposed Mesquite Solar Gen-Tie. There are no public recreational areas within a 10-mile radius of the Mesquite Solar Gen-Tie alternatives. The closest recreation area is the Buckeye Hills Recreation Area, a Maricopa County-managed recreation area, located approximately 13.5 miles southeast of the Mesquite Solar Gen-Tie alternatives. The Mesquite Solar project area is primarily industrial and open lands and the proposed Mesquite Solar Gen-Tie would not affect area recreation amenities.

**Exhibit G:  
Design Drawings**

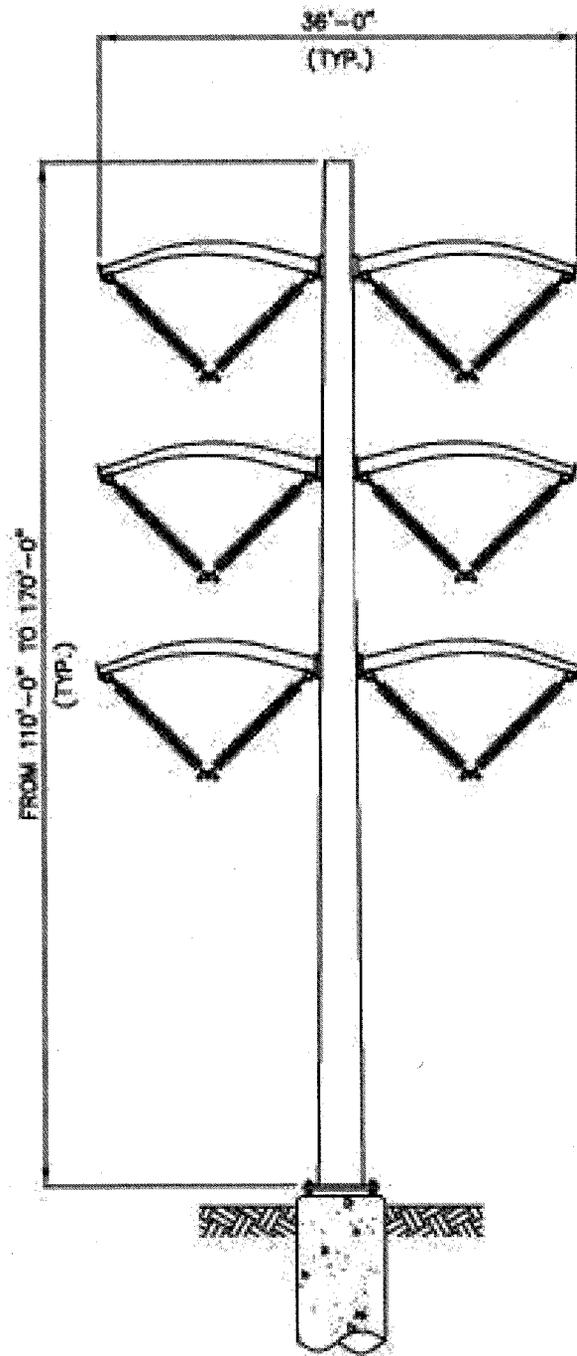
## **Exhibit G Requirements**

*Attach any artist's or architect's conception of the proposed plant or transmission line structures and switchyards, which applicant believes may be informative to the Committee.*

Three drawings are attached:

- Exhibit G-1, Transmission Line Schematic
- Exhibit G-2, Mesquite Solar 230/34.5kV Substation General Arrangement
- Exhibit G-3, Mesquite Solar Site Arrangement, Option 2

## Exhibit G-1, Transmission Line Schematic



**Exhibit G-2, Mesquite Solar 230/34.5kV Substation General Arrangement**



**Exhibit G-3, Mesquite Solar Site Arrangement, Option 2**



# **Exhibit H: Other Developments**

## **Exhibit H Requirements**

*To the extent applicant is able to determine, state the existing plans of the state, local government and private entities for other developments at or in the vicinity of the proposed site or route.*

SEP-II is aware that Dynegy/LS Power plans to develop solar generation in the vicinity of the site and SEP-II has been in discussions with them in an attempt to coordinate gen-tie siting and routes. No existing plans of the state or local government for other developments at or in the vicinity of the proposed site were able to be determined, and none are known.

# **Exhibit I: Noise Levels**

## Exhibit I Requirements

*Describe the anticipated noise emission levels and any interference with communication signals which will emanate from the proposed facilities.*

### **Noise Emission**

Audible noise from an overhead electric transmission line is produced by a phenomenon called corona. Corona is caused by the ionization of the air, due to very high electric-field strength, at the surface of the energized conductor and suspension hardware. Corona is a function of voltage, the diameter of the conductor, the number of conductors per phase and the condition of the conductor and suspension hardware. The electric field around an energized conductor is directly related to the line voltage and is the greatest at the surface. The proposed 230 kV conductors for the Mesquite Solar Gen-Tie will use two conductors per phase of sufficient diameter to control corona effects. With 230 kV overhead construction, standard conductor attachment hardware is typically adequate to control corona. Higher voltages require special low-corona hardware.

Environmental noise, including electric transmission line noise, is usually measured in decibels on the audible scale (dBA), which models the sound to correspond to human perception. Table E-1 shows typical dBA for various settings. The background ambient noise level varies with wind, rain, traffic, or other human activity. There are generally few complaints about electric transmission line noise for levels below 50 dBA. The proposed Mesquite Solar Gen-Tie will meet state noise standards at the property line and edge of the right-of-way.

**Table E-1:**  
**Typical Ambient Noise Levels**

Setting	Typical Ambient Noise Level
Quiet suburban or rural community (remote from large cities and from industrial activity and trucking)	50 dBA
Normal suburban community (not located near industrial activity)	55 dBA
Urban residential community (not immediately adjacent to heavily traveled roads and industrial areas)	60 dBA
Noisy urban residential community (near relatively busy roads or industrial areas)	65 dBA
Very noisy urban residential community	70 dBA

### **Communication Signals**

Exhibit A3 includes locations of communication towers within a three to four-mile radius of the Mesquite Solar Gen-Tie area. Numerous land mobile and microwave towers are located at the Palo Verde Nuclear Generation Station. Microwave towers are located at the Arlington Valley Energy Facility and the Hassayampa Switchyard. Land mobile towers are located

along the Union Pacific Railroad alignment to the south, and a few land mobile towers are scattered three miles to the east and west.

Corona-generated radio interference from transmission lines is most likely to affect the amplitude modulated (AM) broadcast band; frequency modulated (FM) radio reception is rarely affected. An acceptable level of maximum fair-weather radio interference at the edge of a right-of-way is 40 to 45 dBuV/m (decibels above one microvolt per meter). Average levels during foul weather are typically 16 to 22 decibels higher than average fair-weather levels. The predicted fair-weather level for the proposed Mesquite Solar Gen-Tie is 29 dBuV/m at the edge of the right-of-way.

Television interference (TVI) caused by corona occurs during foul weather and is generally caused by transmission lines with voltage more than 345-kV. The level of corona-generated TVI is less than 10 dBuV/m at the edge of the right-of-way. This is a lower level than occurs on many existing lines.

Various techniques exist for eliminating adverse impacts on radio and television reception. SEP-II would address individual complaints concerning radio and television interference as needed.

Corona-generated interference can disrupt communication bands such as the citizen's and mobile bands. However, mobile-radio communications are not susceptible to transmission line interference because they are generally FM. If interference occurs with these types of communications, the same techniques used to alleviate television and radio interference can be used. Shielding, where practicable, would alleviate interference with electronic monitoring equipment.

# **Exhibit J: Special Factors**

## **Exhibit J Requirements**

*Describe any special factors not previously covered herein, which applicant believes to be relevant to an informed decision on its application.*

No additional special factors are submitted.