PINE TREE WIND DEVELOPMENT PROJECT

ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL ASSESSMENT (EIR/EA)

SCH#2004041076
BLM#CA-650-2005-13

TECHNICAL APPENDICES

CEQA Lead Agency

Los Angeles Department of Water and Power
Environmental Services
111 North Hope Street, Room 1044
Los Angeles, California 90012

NEPA Lead Agency

Bureau of Land Management
Ridgecrest Field Office
300 S. Richmond Road
Ridgecrest, California 93555

With technical assistance by:

EDAW

EDAW, Inc.
2737 Campus Drive
Irvine, California 92612

November 19, 2004

LIST OF APPENDICES

Appendix A

CEQA Initial Study

April 16, 2004

TO: State, County, Local Agencies, and Interested Parties

SUBJECT: Notice of Preparation of a Draft Environmental Impact Report,
Pine Tree Wind Development Project
Los Angeles Department of Water and Power, City of Los Angeles

The City of Los Angeles Department of Water and Power (LADWP) will be the lead agency and will prepare an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA) for the proposed Pine Tree Wind Development Project. The proposed project involves the construction of 80, 1.5-megawatt (MW) wind turbine generators, several meteorological towers, an electrical collection system, a substation, a transmission line to connect with the regional electrical grid, an operations and maintenance (O & M) building, and access roads. The project is being undertaken to increase the amount of electrical power that is produced using clean and renewable energy sources and to help meet overall demand for electrical power in the Southern California area.

The purposes of this Notice of Preparation (NOP) are to provide notification that the LADWP will prepare a Draft EIR to assess potential adverse environmental impacts resulting from implementation of the proposed project and to solicit information on the scope of the environmental analysis for the proposed project. The Draft EIR will include topical content required by CEQA and will focus, as appropriate, on environmental impacts determined within the attached Initial Study to be potentially significant (see significance determination on Page 4). This approach is consistent with CEQA Guidelines Section 15063(c)(3)(A) relating to the purposes of an Initial Study that include focusing the EIR on effects determined to be potentially significant.

Since the proposed project also affects lands under jurisdiction of the U.S. Department of the Interior, Bureau of Land Management (BLM), an environmental document pursuant to the National Environmental Policy Act (NEPA) is also required. LADWP, as the CEQA lead agency, and BLM, as the NEPA lead agency, are cooperating to prepare one environmental document for the proposed project that satisfies both Acts.

The LADWP invites the views of your agency or organization regarding the scope and content of the environmental information to be included in the EIR, including any information that would be necessary to meet any statutory responsibilities related to the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other discretionary approval for the project.

The project location, description, and CEQA Initial Study describing the potential effects of the proposed project as they are presently understood are contained in the attached materials.

Pursuant to Section 21083.9 of the Public Resources Code a Scoping Meeting will be held on May 7, 2004 at 1:30 PM at the offices of the Kern County Planning Department located at 2700 M Street, Bakersfield, CA, 93301 to receive agency comments on the preparation of an Environmental Impact Report.

Comments focusing on your area of expertise, your agency's area of jurisdiction, or issues relative to the environmental analysis should be addressed to Mr. Charles Holloway at 111 N. Hope Street, Room 1044, Los Angeles, CA 90012, or sent by FAX to (213) 367-4710. The Initial Study and supporting documentation may also be viewed at this location and also can be accessed via the Internet at http://www.ladwp.com/ladwp/cms/ladwp004156.jsp. Due to time limits imposed by state law, your response to this notice must be received by the LADWP no later than 5:00 p.m. on May 18, 2004. Please include the name and telephone number of the contact person for your agency or organization. The LADWP appreciates your interest and participation in the environmental review process.

Sincerely,

Charles C. Holloway

Charles C. Holloway
Supervisor of Environmental Assessment

enclosures

DEPARTMENT OF WATER AND POWER
CITY OF LOS ANGELES

CEQA INITIAL STUDY
FOR THE PINE TREE WIND DEVELOPMENT PROJECT

April 2004

LADWP Commissioners:
Dominick W. Rubalcava, President
Sid Stolper, Vice President
Annie E. Cho, Commissioner
Gerard McCallum II, Commissioner
Silvia Saucedo, Commissioner

Acting General Manager
Frank Salas

Chief Operating Officer, Power System
Enrique Martinez

Power System Planning & Projects
John Schumann

Environmental Services
Mark Sedlacek

Project Manager
Mohammed Beshir

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CITY OF LOS ANGELES
OFFICE OF THE CITY CLERK
ROOM 395, CITY HALL
LOS ANGELES, CALIFORNIA 90012
CALIFORNIA ENVIRONMENTAL QUALITY ACT
INITIAL STUDY
AND CHECKLIST
(Article IV – City CEQA Guidelines)

LEAD CITY AGENCY	**COUNCIL DISTRICT**	**DATE**
City of Los Angeles, Department of Water and Power 111 N. Hope Street, Room 1044 Los Angeles, CA 90012	N/A	April 14, 2004

PROJECT TITLE/NO.	**CASE NO.**
Pine Tree Wind Development Project	WP007-04

PREVIOUS ACTIONS CASE NO.	
NONE	☐ **DOES have significant changes from previous actions.** ☐ **DOES NOT have significant changes from previous actions.**

PROJECT DESCRIPTION:

The proposed project involves the construction of 80, 1.5-megawatt (MW) wind turbine generators, several meteorological towers, an underground and overhead electrical collection system, a substation, a 10-mile-long, 230 kilovolt (KV) transmission line to connect with the regional electrical grid, an operations and maintenance (O&M) building, as well as access roads. All project facilities except primary site access roads and a portion of the electrical transmission line would be constructed on private property. The primary access road crosses both private lands and lands under jurisdiction of the Bureau of Land Management. Please see the Project Description (starting on page 5) for additional explanation of the proposed project.

PROJECT LOCATION:

The project site is located in the southern Sierra Nevada Mountains in Kern County, California. The project site is approximately 6 miles west of California State Highway 14, about 12 miles north of the town of Mojave and 15 miles northeast of the city of Tehachapi. The primary access to the property is from State Highway 14 (Highway 14) via Jawbone Canyon Road.

PLANNING DISTRICT	**STATUS:**
N/A	☐ **PRELIMINARY** ☐**PROPOSED**___________________ ☐**ADOPTED** **date**

EXISTING ZONING	**MAX. DENSITY ZONING:**	
E-20 (Estate, minimum 20-acre lot size)	N/A	☐ **DOES CONFORM TO PLAN**
PLANNED LAND USE & ZONE: A (Exclusive Agriculture)/ WE (Wind Energy)	**MAX. DENSITY PLAN:** N/A	☐ **DOES NOT CONFORM TO PLAN**

SURROUNDING LAND USES:	PROJECT DENSITY:	
Open Space Agricultural Natural Resource	N/A	☐ **NO DISTRICT PLAN**

☞ **DETERMINATION (to be completed by Lead City Agency)**

On the basis of this initial evaluation:

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

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

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

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

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

Charles C. Holloway	**Supervisor of Environmental Assessment**
SIGNATURE	**TITLE**
Charles C. Holloway	**Environmental Services, LADWP**
PRINTED NAME	**FOR**

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of a mitigation measure has reduced an effect from "Potentially Significant Impact" to "Less Than Significant Impact." The lead agency must describe the mitigation measures and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analysis," cross referenced).

5) Earlier analysis must be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR, or negative declaration. Section 15063 (c)(3)(D). In this case, a brief discussion should identify the following:

   1) Earlier Analysis Used. Identify and state where they are available for review.
   2) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
   3) Mitigation Measures. For effects that are "Less Than Significant With Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A sources list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whichever format is selected.

9) The explanation of each issue should identify:
   1) The significance criteria or threshold, if any, used to evaluate each question; and
   2) The mitigation measure identified, if any, to reduce the impact to less than significant.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☒ I. Aesthetics	☐ II. Agricultural Resources	☒ III. Air Quality
☒ IV. Biological Resources	☒ V. Cultural Resources	☒ VI. Geology and Soils
☐ VII. Hazards and Hazardous Materials	☒ VIII. Hydrology and Water Quality	☒ X. Land Use and Planning
☐ X. Mineral Resources	☐ XI. Noise	☒ XII. Population and Housing
☐ XIII. Public Services	☐ XIV. Recreation	☒ XV. Transportation/Traffic
☐ XVI. Utilities and Service Systems	☒ XVII. Mandatory Findings of Significance	

PROJECT DESCRIPTION

OVERVIEW OF THE PROJECT

The Los Angeles Department of Water and Power (LADWP) proposes a wind energy generation project that would consist of 80, 1.5-megawatt (MW) wind turbine generators. The project would also include several meteorological towers, an underground and overhead electrical collection system, a substation, an operations and maintenance (O&M) facility and yard, and access roads. LADWP is working with Wind Turbine Prometheus, LLC (WTP), a wind energy development company, to develop and construct the proposed project. Upon completion of construction, the project would be owned and operated by LADWP. As part of the proposed project, LADWP would also construct and operate approximately 10 miles of 230-kilovolt (kV) transmission line, which would connect the proposed project substation to an existing LADWP 230-kV transmission line.

PROJECT LOCATION

The proposed project property is located in the southern Sierra Nevada Mountains in Kern County, California. The property is approximately 6 miles west of California State Highway 14 and about 12 miles north of the town of Mojave and 15 miles northeast of the city of Tehachapi (see Figure 1, Project Region). The primary access to the project property is from Highway 14 via Jawbone Canyon Road, which enters the property at its northeastern corner (see Figure 2, Project Location).

PROJECT OBJECTIVES

The goal of the proposed project is to reduce air pollutant emissions and dependence on fossil fuels related to the generation of electrical energy by LADWP. Specific objectives related to this goal are to:

- Provide generation capacity to help meet the electrical energy demand of the Southern California region.

- Provide an increased share of electrical generation capacity with clean and renewable energy sources.

Energy Demand

The purpose of the proposed project is to provide a wind energy electrical generation facility with an annual generating capacity of approximately 330 gigawatt hours (GWh). This capacity would be supplied from 80 wind turbines with a nameplate capacity of 1.5 MW each. Nameplate capacity refers to a turbine's maximum ability to generate electricity under ideal conditions.

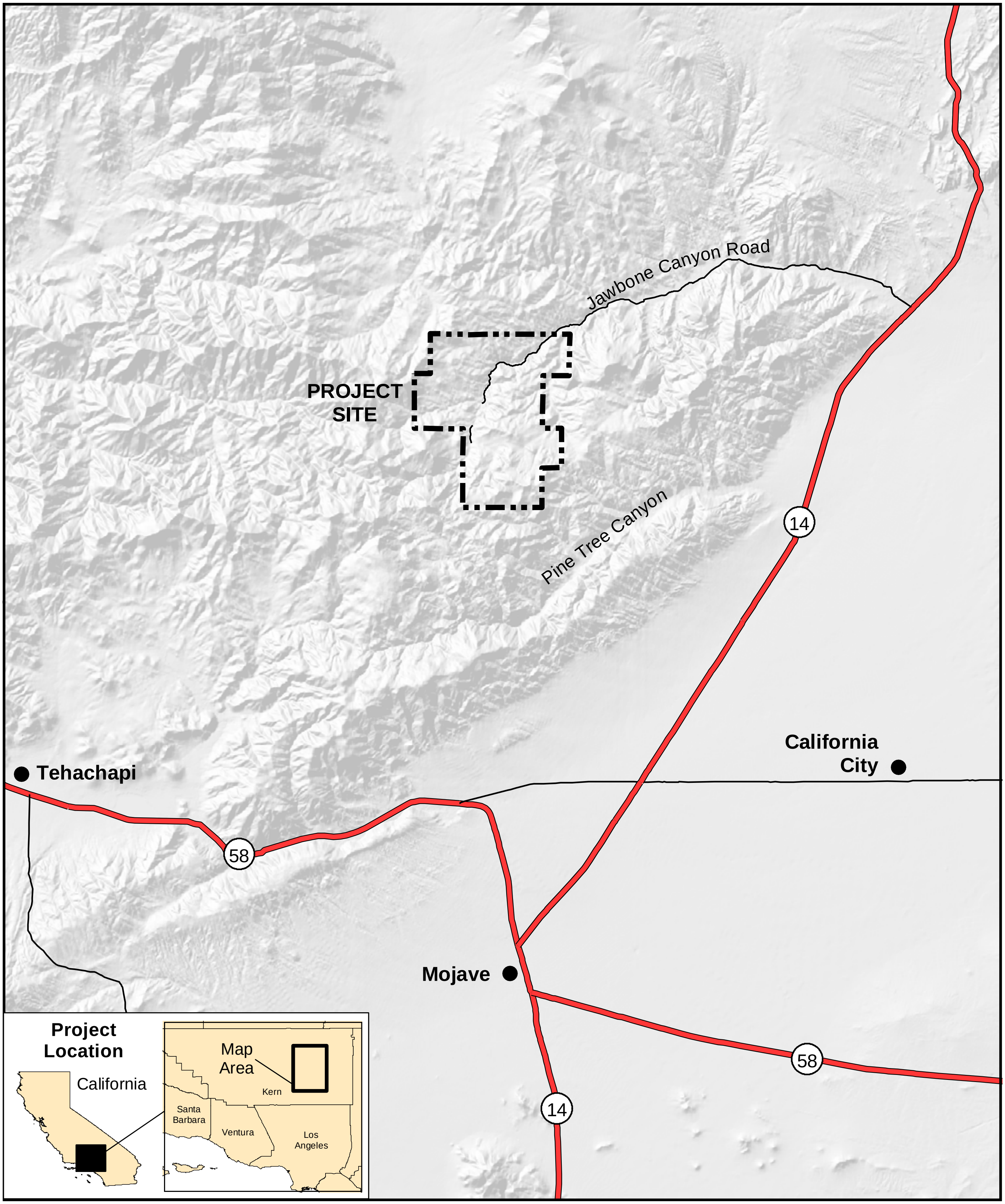


Figure 1
Project Region

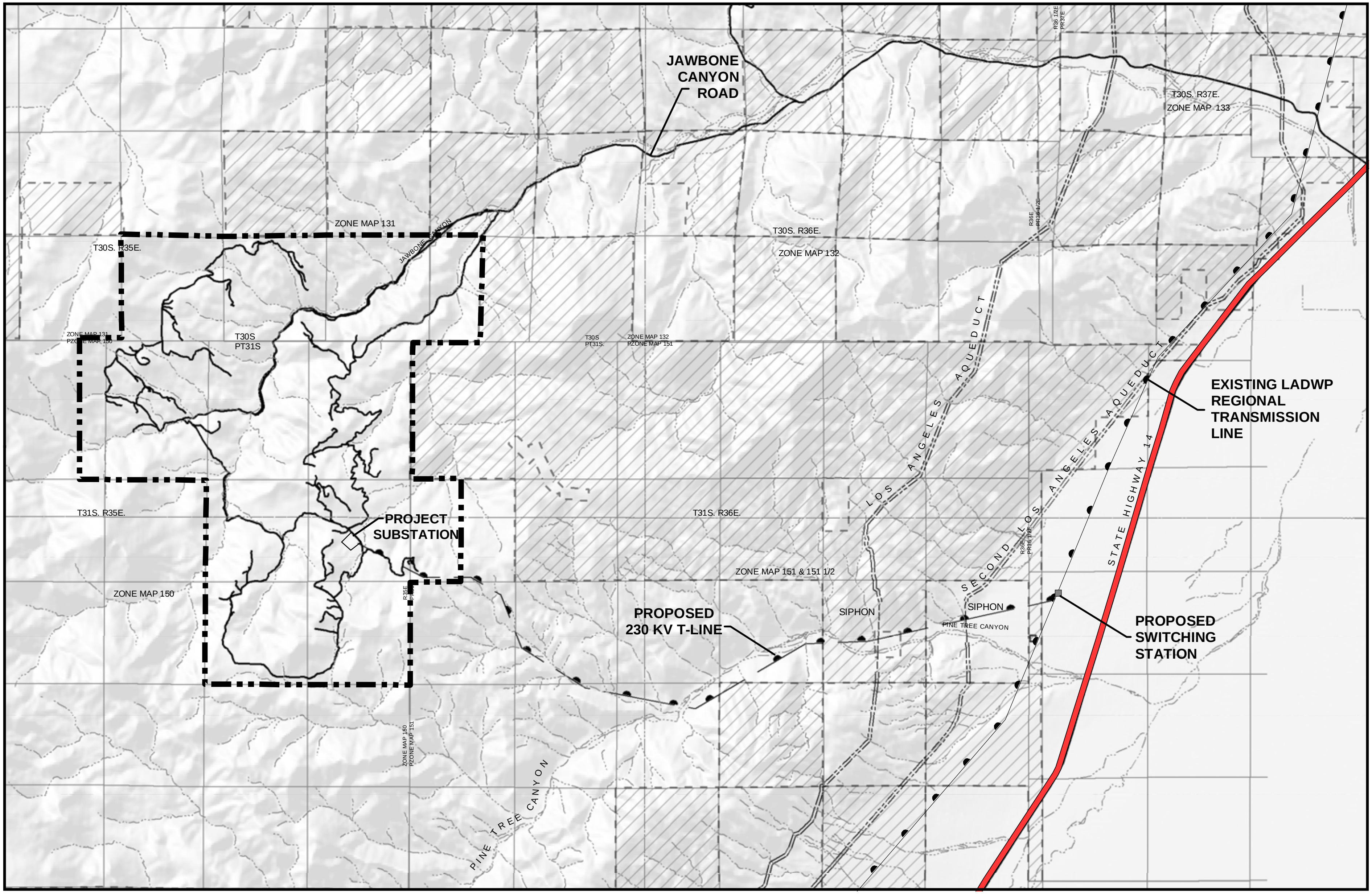


Figure 2
Project Location

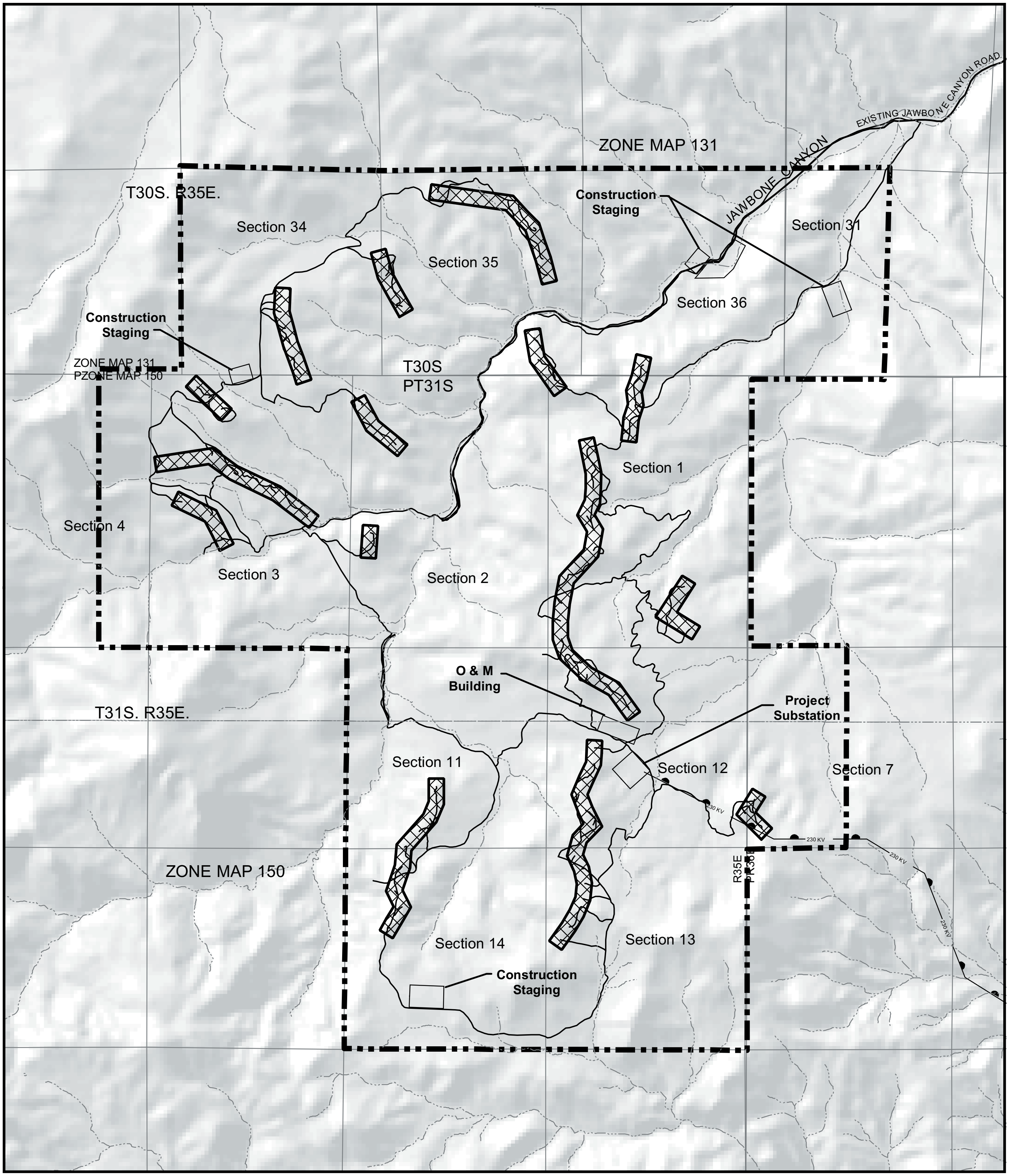
Based on the wind characteristics at the project site, the project is anticipated to produce at an approximate 31 to 32 percent net capacity factor. The net capacity factor is a ratio of the actual total annual production and the total potential annual production for all turbines net of losses. The total potential annual production is a product of total nameplate capacity (120 MW) and the total hours in a year. Using an estimated annual average residential usage for the LADWP service area of 5,900 kilowatt hours (Brown, 2002), the annual electrical production from the project would provide power for approximately 56,000 homes. Using a factor of approximately three persons per home in Los Angeles County (U.S. Census Bureau), the proposed project would meet the residential energy needs of approximately 168,000 people in Southern California.

This generation capacity from the proposed project is needed to help meet the future electrical energy demands of the Southern California region. Demand for electricity in Southern California has grown at a steady, moderate pace since the early 1990s. According to the LADWP Integrated Resource Plan, as amended and adopted by the Board of Water and Power Commissioners and the Los Angeles City Council (August 15, 2000), annual growth in demand in Los Angeles is expected to average about 1.5 percent, or an average of about 80 MW per year, over the next 16 years. It is estimated that between the years 2004 and 2010, the net peak demand for electricity in the city will grow by 450 MW, or approximately 7.5 percent (from 5,920 MW to 6,370 MW).

Clean and Renewable Energy Sources

The proposed wind energy project is needed to meet LADWP commitments to supply an increased share of its electrical generation capacity from clean and renewable energy sources as a means to reduce air pollutant emissions and dependence on fossil fuels. The proposed project would bring LADWP's renewable energy production to about 4 percent of its total electrical production capacity, up from a current level of about 2.5 percent.

Based on wind characteristics at the project site, periods of peak generation for the proposed project are expected to coincide with periods of peak demand for electricity in Southern California, during the summer months. Generation of electricity from the proposed project would produce no air pollutant emissions and would offset the need to provide an equivalent quantity of power through combustion of fossil fuels. Based on the projected generating capacity of the project, the reduction in the combustion of fossil fuels that would be realized from the proposed project is predicted to lower air emissions of nitrogen oxides by at least 8 tons per year and lower emissions of carbon monoxide by at least 11 tons per year, depending on the type of fossil fuel used in generation. In addition, emissions of carbon dioxide, a "greenhouse" gas believed to contribute to global warming, would be reduced by at least 200,000 tons per year. Because it is dependent only on wind to produce electricity, the proposed project would not require the extraction, refinement, or transmission of fossil fuels.



Legend

Study Area
Wind Energy Districts
Stream
Transmission Line
Project Roads

0.5 0 0.5 Miles

Figure 3
Project Site Plan

GENERAL SETTING OF PROJECT SITE AND SURROUNDINGS

The proposed wind turbines would be located along selected ridgelines on privately owned land consisting of approximately 8,000 acres (approximately 12.5 square miles, see Figure 3, Project Site Plan). This land is composed of holdings of the Hansen Ranch (owned by the Hansen Family Limited Trust) and GE Wind Energy, LLC. The property included in the project would be leased from these owners under a long-term agreement.

The property consists of moderately steep terrain ranging from about 3,000 feet above mean sea level (MSL) in elevation in the northeastern corner to about 5,000 feet above MSL in the southwestern corner. A number of small intermittent streams are also located on the site, all of which ultimately drain into either Jawbone Canyon, along the north side of the property, or Pine Tree Canyon, to the south side of the property. Both Jawbone and Pine Tree canyons drain into the Fremont Valley, to the east of the project property. The proposed project site has excellent wind resource characteristics. Average wind speeds at the site are approximately 14 to 18 miles per hour.

Vegetative cover on the property consists of a mix of oak and pinyon-juniper woodland, scrub and chaparral, and grassland. A number of sensitive plant and wildlife species are known to exist in the vicinity of the project. These include desert tortoise (*Gopherus agassizii*), Mohave ground squirrel (*Spermophilus mohavensis*), Kern buckwheat (*Eriogonum kenneryi* var. *pinicola*), and various raptor species.

The property is essentially undeveloped, but it is currently and has historically been used as grazing land for cattle. Because of the relatively small footprint of the wind turbines and other project elements, this grazing use would be essentially unaffected and could continue after project implementation. Given the historical use of the site, there is a relatively extensive system of existing unpaved roads throughout the property. A small ranch headquarters building, which is located in the central portion of the project property, is the only occupied structure within the property. However, it is used only intermittently. There are a few other older, abandoned buildings and ranch facilities also located within the property. There are a number of known archaeological resources located within the property boundaries. The property is designated 8.3 Extensive Agriculture (minimum 80 or 20 acre parcel size) and 8.3/2.4 (Extensive Agriculture/ Steep Slope) in the Kern County Year 2000 General Plan. The property is currently zoned Estate (20) (Estate – minimum lot size of 20 acres).

The area surrounding the proposed project property is also essentially undeveloped. The project property is bounded primarily by privately owned land except along a portion of its eastern boundary and a portion of its northern boundary, which adjoin federally owned land administered by the U.S. Department of Interior, Bureau of Land Management (BLM). The Pine Tree Canyon Road transmission line alignment passes through approximately 1 mile of BLM-administered land east of the project property and a total of approximately 9 miles of private land.

The northern portion of the project property is located within the Jawbone-Butterbredt Area of Critical Environmental Concern (ACEC). This ACEC, which consists of both public and private property, has been designated by the BLM because of cultural and wildlife values. The area within the ACEC adjacent to the project property consists primarily of privately owned land; federal lands in this area are open to the public by permit only. The Jawbone Canyon Road access to the project property passes through the Jawbone-Butterbredt ACEC, including the Jawbone Canyon Open Area (a designated off-road vehicle use area) and approximately five non-contiguous miles of BLM-administered land.

The Sky River Ranch wind turbine development, owned by Florida Light and Power, is located on private property along Sweet Ridge, which rises above 5,000 feet in elevation and runs in a north-south direction approximately 1 mile west of the project property. Sweet Ridge is generally the tallest ridgeline in the vicinity of the project property, and it separates the local watershed east and west. The Sky River Ranch wind development consists of 342 approximately 150-foot-tall turbines, which are visible from various locations within the project property.

A segment of the Pacific Crest National Scenic Trail is also located approximately 1 to 2 miles west of the western boundary of the project property. In the vicinity of the project property, it generally parallels the Sky River Ranch wind development primary access road, usually to the west of the ridgeline (i.e., on the opposite side of the ridgeline from the project). However, to the south of the project property, the trail is located to the east of the ridgeline (i.e., on the same side of the ridgeline as the project). Only intermittent views of the project property may be available from the trail.

Highway 14 is a four-lane, divided highway located east of the proposed project. Along with U.S. Highway 395, which it intersects north of the project site, Highway 14 provides a north-south thoroughfare along the eastern side of the Sierra Nevada. Two existing LADWP high-voltage transmission lines run roughly parallel to and approximately 0.5 to 1 mile west of Highway 14 in the vicinity of the project property. One of these existing lines would provide an interconnection point for the proposed project to the main power transmission grid. The first and second Los Angeles Aqueducts, which are encased in buried and aboveground pipelines in the region of the proposed project, also run roughly parallel to and west of Highway 14, crossing the Jawbone Canyon access road to the project property.

Edwards Air Force Base (EAFB), which is located approximately 20 miles south of the project site, and Naval Weapons Station China Lake (NWSCL), which is located approximately 35 miles northeast of the project site, both maintain low-altitude Military Training Routes (MTRs) in the area of the project property to conduct aviation training exercises. The area is within the Joint Service Restricted R-2508 airspace complex.

PROJECT ZONING AND RIGHTS-OF-WAY

To construct the proposed project, the property surrounding the turbines would require a zone change to be designated as a Wind Energy (WE) Combining District by the County of Kern. According to the Kern County Zoning Code, the intent of the WE designation is to promote the use of wind power as “an alternative to fossil-fuel-generated electrical power in areas of the county which are identified to have suitable wind resources for production of commercial quantities of wind-generated electrical power" and to develop this resource "in a manner that provides a harmonious balance between the suitability of a project site with existing area land use and physical surroundings." According to the Energy Element of the Kern County General Plan, the County "shall allow for the continued development of wind energy in primary wind resource areas." The WE Combining District designation would apply to bands of property approximately 400 feet wide surrounding the wind turbines. This would involve a total of approximately 425 acres within the boundaries of the project property.

The WE Combining District designation can be applied only in zoning districts with an Exclusive Agriculture (A), Natural Resource (NR) with a minimum lot size of 20 acres, or Estate (E) with a minimum lot size of 20 acres. Consistent with this provision, the project property is currently zoned E-20 (Estate, 20-acre minimum lots). However, in the Land Use, Open Space, and Conservation Elements of the Kern County Year 2000 General Plan, the property is designated as 8.3 Extensive Agriculture (minimum 80 or 20 acre parcel size) and 8.3/2.4 (Extensive Agriculture/ Steep Slope). According to the Kern County General Plan, this designation applies to "large amounts of land with relatively low value-per-acre yields, such as livestock grazing" and which are not under a Williamson Act Contract. To establish zoning consistency with this General Plan designation, as required by the California Government Code, the project property would be changed to an A zone (Exclusive Agriculture) designation prior to the assignment of the WE district designation. This would involve a total of approximately 7,800 acres.

A right-of-way grant would be required from the BLM to cross approximately 1 mile of BLM-administered land along Pine Tree Canyon Road for the proposed project transmission line. To provide access to the project property for both construction activities and long-term project O&M, a right-of-way would also be required from the BLM to cross approximately 2.5 miles of BLM-administered land along Jawbone Canyon Road that is not currently located within the county right-of-way.

PROJECT COMPONENTS

Wind Turbines

The primary component of the proposed project is a series of 80, 1.5-MW nameplate capacity wind turbines. Although each turbine has the ability to generate a maximum of 1.5 MW of electricity under ideal operating conditions, the actual conditions related to wind speed at the project property vary considerably on a seasonal, daily, and site-specific basis. Based on wind characteristics and other factors at a particular site, the actual energy output for a turbine over a year's time can be expressed as a percentage of the maximum nameplate capacity. This is known as the turbine's capacity factor. Based on meteorological analysis of the project property, the estimated net capacity factor for the entire project ranges from 31 percent to 32 percent. According to this range of capacity factors, the 80 turbines would provide an annual generation capacity of approximately 330 GWh.

The proposed turbines have a horizontal axis with a three-bladed rotor. The turbines would be mounted on tubular steel towers with internal maintenance access ladders. The total height of the tower to the hub of the rotor blades is 65 meters (213 feet). The diameter of the rotor is 77 meters (253 feet). The total height of the turbine at the highest point of the rotor blade's rotation is 103.5 meters (340 feet). The ground clearance for the rotor blades at their lowest point of rotation is 26.5 meters (87 feet). The base of the tower is approximately 15 feet in diameter. The towers and turbines would be neutral in color and would have a non-reflective finish.

The rotor blades would turn at approximately 20 rpm at peak production. The gearbox in the nacelle would increase the rotational speed of the high-speed shaft that drives the generator at 870 to 1600 rpm to provide electrical power at 60 hertz. The blades are made of fiberglass and epoxy resin and are equipped with a sophisticated lightning suppression system. The turbines are designed to withstand wind speeds in excess of 120 miles per hour, a speed that exceeds recorded and projected maximum wind speeds in the project area. When wind speeds exceed a prescribed level (between 55 and 70 miles per hour), the turbines are equipped to reduce speed through an individual blade pitch control system that feathers the blade out of the wind. During emergency conditions, the mechanical braking system would automatically engage to fully stop the rotor after the rotor reaches a predetermined minimum speed. After an emergency stop is executed, remote restarting is not possible. The turbine must be inspected in person, and the stop-fault must be reset manually before automatic operation will be reactivated.

Each turbine nacelle is equipped with an internal fire detection system with sensors located in the nacelle as well as the tower base. In the event of a fire, the turbine is immediately shut down, and an alarm condition is activated in the control that will notify operating personnel.

Substation and O&M Facility

The substation would consist of a fenced yard area containing the 34.5-kV to 230-kV step-up transformer, substation, and related electrical control equipment. The O&M facility would consist of a storage and equipment yard and an approximate 35-foot-high, 60-foot by 120-foot building containing offices for O&M personnel, a control and relay room, a workshop area, spare parts storage, training rooms, restrooms, and a lunchroom.

Electrical Transmission Line

An overhead 230-kV transmission line would connect the project substation to an existing LADWP transmission line located west of and generally paralleling Highway 14. The proposed transmission line would be approximately 10 miles in length. It would originate at the project substation in the south-central part of the project property and travel southeastward through privately owned land until it intersected Pine Tree Canyon Road to the southeast of the project property. The line would then generally parallel Pine Tree Canyon Road eastward to the existing LADWP transmission line at Highway 14. This proposed route would cross two parcels of BLM land for a total length of approximately 1.1 miles. The conductor wires would be mounted on a tubular steel monopole tower to reduce the transmission line footprint. However, terrain and other factors may require that freestanding steel lattice towers be used in some locations, such as at angles in the alignment. The towers would be approximately 110 feet in height and spaced approximately 1,100 feet apart (approximately five towers per mile). A small switching station would be required at the interconnection between the project transmission line and the existing LADWP transmission line.

PROJECT CONSTRUCTION

Turbine Siting

Previous planning analysis for the siting of the proposed wind turbines considered a broader study area of over 21,500 acres. Due to constraints imposed by such factors as terrain and MTRs, and in an effort to minimize potential impacts to existing sensitive biological and cultural resources, the boundaries of the project property were narrowed to their present configuration, encompassing approximately 8,000 acres. Within these narrowed boundaries, the objective of the project is to optimize wind energy production based on a cost-benefit analysis that balances construction, operations, and maintenance considerations with the anticipated output of each turbine. A primary factor in this analysis is the quality of the wind resource at a particular site within the property. Based on this analysis, 80 turbines would be sited along selected ridgelines within the project property (see Figure 3, Project Site Plan).

Figure 2 illustrates the zones within which the 80 project wind turbines would potentially be located. The turbines would be grouped along separate ridges in "strings" ranging in size from 2 to 16 towers. The spacing between individual towers within a string would be a minimum of 1.4 times the diameter of the rotor blades (approximately 353 feet), but towers within a string would otherwise be located based on existing environmental and engineering considerations to minimize impacts and facilitate construction.

As mentioned previously, the area is within the Joint Service Restricted R-2508 airspace complex and both EAFB and NWSCL maintain MTRs that overfly the vicinity of the proposed project. The military is concerned about any vertical obstructions located within the boundaries of the MTRs because of the potential impact they may have on critical testing and training missions. The proposed project has been closely coordinated with representatives from both EAFB and NWSCL, and significant MTR-related constraints on turbine siting within the broader project study area have been identified. Among other considerations, the proposed turbine sites were selected considering these constraints. Therefore, based on the proposed turbine heights and locations, and in consideration of other environmental factors already present in the area, EAFB and NWSCL have determined that the configuration of the proposed project would create a less than significant impact to their flight operations.

Field Survey and Geotechnical Investigations

Before construction would commence, detailed engineering studies and geotechnical investigations would be performed to identify subsurface conditions that would affect the final design of the project and determine the precise location of the project's permanent and temporary (i.e., construction-related) facilities, including the wind turbines, roads, electrical cables, substation, O&M building, materials laydown/stockpile areas, and equipment staging areas.

Primary Construction Activities

The project construction would be performed in several stages and would include the following primary activities:

- Grading of roads, turbine pads, and crane pads
- Grading of the substation, materials laydown, and equipment staging areas
- Construction of the turbine tower foundations and transformer pads
- Installation of the electrical collection system
- Erection and assembly of the wind turbines
- Construction and installation of the substation and O&M facility including water well and septic system
- Construction of the 230-kV transmission line
- Plant commissioning and energization

Road Construction and Site Grading

To operate and maintain the turbines, the proposed project would require a network of service roads to provide access to the turbine sites, the substation, and the O&M facility. These roads would generally need to be 16 feet wide. However, to deliver large and heavy components and equipment to the turbine sites during project construction, most project roads would need to be 20 feet wide. In addition, to operate large equipment, including a truck- or track-mounted crane required to hoist the turbine components into position, access roads approximately 34 feet wide would be required at the turbine strings to provide access to each turbine site.

As discussed above, an extensive network of roads currently exists within the project property. These roads would be used for the project to the extent possible, but some regrading, reconstruction, and/or widening of most roads would be necessary. Some blasting may be necessary for road grading activities. Approximately 2 miles of existing 16-foot-wide road would be upgraded and utilized for the project construction and operations. Approximately 2 miles of existing 16-foot-wide road would be upgraded to be used during construction only. Approximately 15.5 miles of existing roads would be widened to 20 feet, and approximately 6 miles of existing road would be widened to 34 feet for both construction and operations. About 0.5 miles of new 20-foot-wide road and about 9 miles of new 34-foot-wide road would be required for both construction and operations. In addition, about 0.5 mile of new temporary construction road would be required. Portions of the Jawbone Canyon access road northeast of the project property may also require widening or other improvements.

Figure 3, Project Site Plan, indicates the location of the proposed project roads. A total of approximately 35.5 miles of roads would be necessary for the project, including about 23.5 miles of existing roads (upgraded or widened) for construction and operations; 2 miles of existing roads for construction only; 9.5 miles of new roads for construction and operations; and 0.5 miles of new roads for construction only. All these roads would be unpaved.

In addition to roads, a number of other areas associated with project construction and operations must be cleared and graded. During the construction phase, equipment and materials laydown and staging areas would be required. These areas, totaling approximately 45 acres, would be located in the northeastern, northwestern, and southern portions of the project property. They would provide for the offloading of all major components and construction equipment from flatbed trucks for temporary storage and restaging for delivery to individual wind turbine sites or the substation/O&M facility site. Several relatively small temporary material stockpile and turnout areas would also be located throughout the project property during construction. A small concrete batch plant would also be located at one of the laydown and staging areas to provide concrete for the turbine, substation, and O&M building foundations.

A total of approximately 21 acres would be cleared and graded as a site for the substation/O&M facility. These facilities would be located on relatively level terrain in the south-central portion of the property to minimize the length of the electrical collection system.

Each turbine tower would require a level pad of approximately 50 feet by 50 feet. In order to accomplish the erection and assembly of the turbines, a large truck- or track-mounted crane would be required to hoist the extremely heavy components as high as the hub height of 213 feet. A cleared and level area approximately 35 feet by 60 feet would be required adjacent to each tower site to accommodate the crane.

It is anticipated that any cutting and filling from road and pad grading would be balanced on site. No fill material would be deposited in canyons. Surplus sand and gravel from onsite grading activities are anticipated to be of a sufficient amount to meet the needs of a construction borrow pit. Project road construction and site grading would involve the use of several pieces of heavy machinery, including bulldozers, track-hoe excavators, front-end loaders, dump trucks, motor graders, water trucks, rock drills, and rollers.

A Storm Water Pollution Prevention Plan (SWPPP) will be developed for the project to minimize erosion and the potential for discharge of pollutants from the site due to clearing, grading, and other construction activities. The SWPPP will be prepared along with the project grading plan. Site-specific Best Management Practices will be developed emphasizing the control of erosion and sedimentation through such measures as retaining the original vegetative cover where possible; reducing the velocity of surface runoff and directing it away from disturbed areas; and promptly stabilizing disturbed areas through revegetation or the use of inert materials such as straw mulching or erosion control matting. Silt fences and sediment barriers would be maintained throughout construction and beyond until disturbed areas have been fully stabilized with vegetation. Check structures, such as rock dams, hay bale check dams, dikes, and swales, would be used where appropriate to reduce runoff velocity as well as to direct surface runoff away from disturbed areas.

Turbine Foundations and Erection

Depending on the soil and geotechnical conditions at each turbine site, the turbine tower would be mounted on a spread footing type foundation or a vertical mono-pier foundation. Excavation for the foundation would be required at each turbine site. Some blasting may be required. Some of the excavated material would be used as fill for road and site grading. The remainder would be stockpiled at the turbine site while the concrete foundations were poured and cured. The stockpiled material would be properly protected with coverings, and the surrounding area would be protected with fences, hay bales, or other barriers to contain sediment flows. After the foundations have properly cured, the excavated material would be used as backfill around and above the foundations. Regardless of the foundation type that is used, the area of the foundation that would be exposed at the surface would be only slightly larger than the diameter of the tower base (15 feet) to allow for the bolting of the tower to the foundation. A pad-mounted transformer would be located adjacent to the base of each tower, requiring an approximately 8-foot by 8-foot concrete pad.

Because of its height, the turbine's monotube tower would be erected on the foundation in three sections. The nacelle housing the main mechanical components of the turbine would then be hoisted by crane onto the completed tower. The rotor blades would be erected in one of two methods. Either they would be attached to the nose cone on the ground, and the entire rotor assembly would then be hoisted into place on the nacelle, or they would be individually hoisted into place on the nose cone already attached to the nacelle. The large crane necessary for the turbine erection would move between individual turbine sites along the 34-foot-wide roads within each turbine string. After a string of turbines was completed, the crane would be broken down and transported by tractor trailer to the next turbine string along the 20-foot-wide project access roads. This approach would minimize the amount of road grading required for project construction.

Electrical Collection System

Electrical power generated by the wind turbines would be transformed and collected through a network of cables that would terminate at the project substation. Power from the turbines would be fed through a breaker panel located at the turbine base inside the tower and connected to a pad-mounted step-up transformer. The transformers would be connected to underground cables that would interconnect all of the turbines electrically. The underground cables would be installed in a trench that would generally run at the edge of project roads and would typically be 3 to 4 feet deep. Due to terrain or to avoid excessively long runs, the collection cables would occasionally become overhead lines for relatively short distances. The collection cables would connect to larger feeder lines that would run to the main substation. At the substation, the electrical power from the turbines would be stepped up to transmission level at 230 kV. In locations where two or more sets of underground lines converge, underground vaults and/or pad-mounted switch panels would be used to tie the lines together into one or more sets of larger feeder conductors. The project will require a total of approximately 20 miles of underground and 1 mile of overhead lines to collect all of the power from the turbines and route it to the substation.

Construction Traffic

Traffic generated during construction would include worker traffic; truck traffic associated with the onsite batch plant; truck traffic for transporting wind turbine components, concrete and reinforcing steel, mechanical equipment, and construction consumables; water trucks; and the delivery of construction equipment such as cranes and earth-moving machines. It is anticipated that there will be approximately 30 transportation loads of components and materials per wind turbine location. As many as 2,700 truck trips may be required throughout the construction period for the erection related to the 80 turbines. The heavier loads anticipated would be the main power transformer, which weighs approximately 150,000 pounds, and the turbine nacelles, which weigh approximately 112,000 pounds. The nacelle is assembled in nearby Tehachapi, so trips on public highways would be relatively short. Trucks delivering earth-moving and other construction equipment to the project property would unload the equipment and depart the site, only to return when construction is complete. It is anticipated that approximately four large and nine small cranes would be required during construction, along with approximately 20 bulldozers, trenchers, and other earth-moving machines. Concrete trucks used in the construction of all foundations would be delivered to and remain at the project area until foundation construction was complete.

Construction Schedule and Personnel

It is anticipated that approximately 10 months would be required to construct the project. The average workforce on site would consist of approximately 120 workers. During peak periods, it is expected that about 140 personnel would be on site at once, as multiple disciplines complete their work simultaneously. Construction activity would normally take place during single 10-hour shifts, 6 days per week, for the duration of project construction. However, to ensure that construction activities remain on schedule and to take advantage of weather conditions, additional shifts may be employed at times during construction. The delivery of large loads on Jawbone Canyon Road would be minimized during peak periods of recreational use in the Jawbone Canyon Open Area. During peak periods, it is anticipated that, with carpooling, the daily employee trips would average about 60, in addition to a daily average of 35 trips per day for light duty delivery and construction trucks. The laydown and staging areas would provide sufficient space for construction crew vehicle parking, and no other construction-related parking areas would need to be provided on the property.

PROJECT OPERATIONS AND MAINTENANCE

With completion of construction, approximately 10 to 12 employees would operate and maintain the project on a permanent basis. Routine maintenance of the turbines would be necessary to maximize performance and detect potential problems. Routine activities related to maintenance would consist primarily of daily travel, generally by pickup trucks, of O&M personnel who would test and maintain the wind generation facilities. Most servicing would be performed “up-tower” (within the nacelle, without using a crane to remove the turbine from the tower). Occasionally, the use of a crane and possibly equipment transport vehicles may be necessary for cleaning, repair, adjustments, or replacement of the rotors or equipment contained in the nacelle. Additionally, all roads, pads, and trenched areas would be regularly inspected and maintained to minimize erosion.

Monitoring the operations of the wind turbines would be conducted both from computers located in the base of each turbine tower and from the O&M facility using telecommunication linkages and computer-based monitoring.

Periodic exchanging of lubricants and hydraulic fluids in the operating mechanisms of the turbines and towers would occur. All lubricants and hydraulic fluids would be carefully stored, used, and disposed in accordance with applicable laws and regulations.

DECOMMISSIONING

Decommissioning refers to the dismantling of the project elements and restoration of the site upon completion of the operating life of the facility. Periodic replacement of equipment can extend operating life indefinitely, depending on future demand for electricity generated by the project. Therefore, the estimated life of the project depends primarily on the demand for power, which is expected to continue growing. However, the project is expected to have a life of a minimum of 20 years.

At the end of the project's useful life, LADWP would obtain any necessary authorization from the appropriate regulatory agencies and from the landowners to decommission the facilities. Decommissioning would involve removing the turbines and support towers, transformers, and substation, and removing the upper portion of foundations so that they are not exposed at the surface. Generally, turbines, electrical components, and towers would either be resold or recycled for scrap. All unsalvageable materials would be disposed of at authorized sites in accordance with applicable laws and regulations.

Site reclamation would be based on site-specific requirements and techniques commonly employed at the time the area is reclaimed. As necessary, this could include regrading, spot replacement of topsoil, and revegetation of project-disturbed areas. Foundations would be removed to a depth of 2 feet, or less if bedrock is encountered. Project access roads would be reclaimed or left in place based on landowner preference. The land would then revert exclusively to landowner control.

AGENCIES, PERMITS, AND APPROVALS

The Pine Tree Wind Development Project environmental documentation would be prepared to facilitate approval by federal, state, and local agencies having jurisdiction over one or more aspects of the project, which would include complying with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Based on initial consultations between LADWP and BLM, it has been determined that LADWP would be the lead local agency for compliance with CEQA and BLM would be the lead federal agency for compliance with NEPA. Kern County is a key public agency with authority over land use and would be a "responsible" agency for purposes of complying with CEQA. It is anticipated that the Pine Tree Wind Development Project would require the following permits, approvals, and/or confirmations prior to construction of the project facilities. The list is tentative and may be modified as a result of field investigations and further consultation with responsible and permitting agencies.

Local Agencies

Los Angeles Department of Water and Power (CEQA Lead Agency)

- CEQA compliance
- Approval to construct the proposed project

County of Kern

- Zone Change from “E-20” to “A” and A(WE) Districts (ref. Zone Change: Zone Map 131, Zone Map 150, Zone Map 151).
- Construction, building, and grading permits consistent with Kern County Codes

State Agencies

California Department of Fish and Game

- Streambed Alteration Agreement, CFG Code Section 1602;
- California Endangered Species Act, CFG Code Section 2081 (formal consultation on potential effects on state listed species)

California Regional Water Quality Control Board, Lahontan Region

- Clean Water Act, Section 402 General Construction Activity Storm Water Permit and Storm Water Pollution Prevention Plan

California Department of Transportation

- Right of Way Encroachment Permit for Highway 14
- Permit for transport of oversize loads

California Highway Patrol

- Notification of transport of oversize loads

Federal Agencies

Bureau of Land Management (NEPA Lead Agency)

- NEPA compliance
- Right-of-way grant
- National Historic Preservation Act Section 106 compliance

U.S. Fish and Wildlife Service

- Federal Endangered Species Act, Section 7 (formal consultation on potential effects to federal listed species)

Federal Aviation Agency

- Notice of Proposed Construction or Alteration (Form 7460-1)

REFERENCES

(1) Brown, Richard E. and Jonathan G. Koomey, "Electricity Use in California: Past Trends and Present Usage Patterns." Ernest Orlando Lawrence Berkeley National Laboratory, University of California, Berkeley (2002)

(2) Earth Systems Southwest, "Study of Geotechnical and Seismic Hazards for the Pine Tree Wind Development Project" (2003)

(3) Federal Emergency Management Agency, Flood Insurance Rate Map, Community-Panel Numbers 060075 1125B & 060075 1375B (1986)

(4) Hart, E.W. "Fault Rupture Hazard Zones in California: California Division of Mines and Geology Special Publication 42" (1977)

(5) Kern County Planning Department, "Energy Element of the Kern County General Plan" (1990)

(6) Kern County Planning Department, "Kern County Zoning Ordinance" (2003)

(7) Kern County Planning Department, "Land Use, Open Space, and Conservation Elements of the Kern County Year 2000 General Plan" (1994)

(8) Kern County Planning Department, "Noise Element of the Kern County Year 2000 General Plan" (1994)

(9) Los Angeles Department of Water and Power Integrated Resource Plan (IRP), amended and adopted by the Board of Water and Power Commissioners and the Los Angeles City Council (August 15, 2000)

(10) U.S. Census Bureau, State and County Quick Facts, Los Angeles County, California. http://quickfacts.census.gov/qfd/states/06/06037.html

INITIAL STUDY CHECKLIST **(To be completed by the Lead City Agency)**

PROPONENT NAME	PHONE NUMBER:
City of Los Angeles, Department of Water and Power **Environmental Services, Charles Holloway**	**(213) 367-0285**

PROPONENT ADDRESS
111 N. Hope Street, Room 1044
Los Angeles, CA 90012

AGENCY REQUIRING CHECKLIST	DATE SUBMITTED:
City of Los Angeles, Department of Water and Power	**April 14, 2004**

PROPOSAL NAME (If Applicable)

(Same as Project Title)

1. **AESTHETICS -** *Would the project:*	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
(a) Have a substantial adverse effect on a scenic vista?	X			
(b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	X			
(c) Substantially degrade the existing visual character or quality of the site and its surroundings?	X			
(d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	

Comments: *1(a).* The topography surrounding the project site is mountainous, with tall rocky ridges. In general, views of the project components such as wind turbines from outside of the project boundaries would be blocked by major ridgelines. However, some project components may be visible from specific locations on surrounding property, such as the Pacific Crest Trail. This issue will be further addressed in the EIR. Potentially sensitive viewpoints, if any, will be identified and views of wind turbines and transmission facilities from public vantage points will be analyzed to aid the assessment of the visual impacts.

1(b). Highway 14, to the east of the project site, is an eligible state scenic highway. Some project components, such as access roads and overhead transmission lines may be visible from segments of the highway. However, these project components are not expected to substantially damage scenic resources such as trees, rock outcroppings, or historic buildings. The proposed access road, Jawbone Canyon Road, is an existing County Road with no known scenic resources within its right-of-way. The potential impact of the project relative to Highway 14 will be addressed in the EIR.

1(c). All of the project components, except for existing access roads and a portion of the project transmission line, would be located on private property, portions of which are used for agricultural grazing. Project facilities would change the visual character or quality of the project site. This issue will be addressed in the EIR.

1(d). New lighting of project components would be minimal. Minor surface lighting at the substation in the central portion of the site would affect a very small area and would not be directed to surrounding areas. Aviation obstruction lights could be required on some wind turbines by the Federal Aviation Administration (FAA). However, no significant light and glare impact would occur since such lighting is designed to be effective when directly viewed from above, project components would not generally be visible from public vantage points, and components would be less likely to be seen from these vantage points at night. Also, aviation lighting is not known to be a source of excessive glare that would damage dark sky conditions in state or national parks or wilderness areas, the closest of which are Red Rock Canyon State Park (located approximately 10 miles northeast of the project property) and the Bright Star Wilderness Area (located approximately 12 miles north of the project property.

2.	**AGRICULTURAL RESOURCES -** In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				**X**
(b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?				**X**
(c)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				**X**

Comments: *2(a).* The project site is not designated as Farmland by the California Department of Conservation. Therefore, the project would not convert Farmland to non-agricultural use.

2(b). The project site is not currently encumbered with Williamson Act contracts although portions of the project site are eligible. The project site is designated as Extensive Agriculture, 20 acres minimum, on the County of Kern General Plan, and portions of the site have historically been used for low-intensity cattle grazing. This use could remain at the discretion of the landowner. Though the project would slightly reduce the amount of land that could be used for grazing, the impact would not be significant since agricultural use could continue and the project would bring the site zoning into consistency with the underlying agricultural general plan designation.

2(c). The project site is not designated as Farmland and would not change the existing environment in such a way that would result in conversion of Farmland to non-agricultural use.

3.	**AIR QUALITY -** Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Conflict with or obstruct implementation of the applicable air quality plan [e.g., the South Coast Air Quality Management District (SCAQMD) Plan or Congestions Management Plan?	**X**			
(b)	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	**X**			
(c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?			**X**	
(d)	Expose sensitive receptors to substantial pollutant concentrations?				**X**
(e)	Create objectionable odors affecting a substantial number of people?				**X**

Comments: *3(a).* The project site is located within the Mojave Desert Air Basin, which is under the jurisdiction of the Kern County Air Pollution Control District. The project site is located within an area that is in federal and state non-attainment for ozone and particulate matter less than 10 microns in diameter (PM_{10}). Construction of the project would result in emissions from construction equipment that would include both ozone and PM_{10}. The construction emissions may be substantial in relation to Kern County's air quality attainment plan; therefore, the EIR will include an assessment of the project's potential air emissions and impact on air quality. Once the project is operational, the only pollutants generated would be during maintenance activities that would include a minor amount of travel on unpaved roads. The project's potential air emissions will be estimated and the level of impact will be further addressed in the EIR.

3(b). Because the project site is in an area already in non-attainment for ozone and PM_{10}, project construction activities have the potential to contribute to an existing air quality violation. The EIR will address this potential impact.

3(c). The project site is in a region that is in federal and state non-attainment for ozone and PM_{10}. Emissions during construction of the project would contribute to a cumulative net increase in these criteria pollutants; however, such increase is temporary and short term, limited to the construction period. Relative to operations, the project could offset or defer combustion of fossil fuel emissions needed to generate power for the Southern California area. That is, an increase in the percentage of power produced with clean wind energy would either eliminate or defer the need to produce an equivalent amount of power using fossil fuels somewhere in the LADWP power generation system. A net cumulative reduction in emissions during the operations phase of the project would result; however, the reduction would be realized incrementally throughout the air basins where LADWP produces power.

3(d). The project site is located in a remote area of Kern County and there are no sensitive receptors for local air pollutant emissions or pollution hot spots.

3(e). The project would not include the types of emissions sources or activities that are normally associated with odor impacts.

4.	**BIOLOGICAL RESOURCES -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	**X**			
(b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	**X**			
(c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				**X**
(d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	**X**			
(e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (e.g., oak trees or California walnut woodlands)?				**X**

4.	**BIOLOGICAL RESOURCES -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	**X**			

Comments: *4(a).* The project would be located in an area where candidate, sensitive, and special status species, such as desert tortoise, Mohave ground squirrel, raptors, and various sensitive plant species are known to occur. The potential impact of the project on these species will be addressed in the EIR. The U.S. Fish and Wildlife Service and California Department of Fish and Game were consulted about the potential impacts to species under each agency's jurisdiction. A biological study is currently being prepared to evaluate the project's impact on biological resources.

4(b). The project has the potential to adversely affect some riparian habitats on the site. Several predominantly ephemeral drainages within the project footprint would be modified to facilitate crossing during construction. Most of these improvements will require consideration under Section 1602 of the California Fish and Game Code pertaining to Notification of Streambed Alteration. The EIR will include evaluation of issues and impacts associated with construction affecting riparian areas.

4(c). The project site does not contain any federally protected wetlands or waters as defined by Section 404 of the Clean Water Act. While the majority of the drainages are ephemeral washes, there are approximately four intermittent stretches along Jawbone Creek. Drainages within the project area flow into two large washes (Jawbone Canyon and Pine Tree Canyon), then east into the Mojave Desert and ultimately into Koehn Lake. Koehn Lake is an essentially dry inland lake approximately 12 miles north of California City that has no distributary or other outlet. The Corps of Engineers was consulted and confirmed that the project does not affect waters used for interstate commerce or meet other requirements for navigability under 33CFR Part 328.3(a)(1). Based on this statute and the Solid Waste Agency of Northern Cook County Supreme Court decision (No. 99-1178), the Corps determined that a Section 404 permit is not required. Therefore, the project would not adversely affect federally protected wetlands.

4(d). Biological studies are being conducted to determine whether project components would interfere with movement of wildlife species, impede the use of wildlife nursery sites, or otherwise affect nesting sites. This issue will be addressed in the EIR.

4(e). There are no local County policies or ordinances protecting biological resources, such as Oak Tree Ordinances, that are applicable to the project.

4(f). The project site lies within land covered by the California Desert Conservation Area (CDCA) Plan. The CDCA Plan serves as the land use guide for management of public lands within the CDCA to protect the natural environment while also balancing various other considerations under a multiple use policy. An amendment to the CDCA Plan, the West Mojave Plan (WMP), is currently under consideration. The WMP might serve as the habitat conservation plan applicable to the project site. Included under the WMP is the Jawbone/Butterbredt Area of Critical Environmental Concern (ACEC), within which the northern portion of the project property is located. This ACEC has been designated by BLM because of cultural and wildlife values of these lands. The potential for the project to conflict with the CDCA and ACEC will be addressed in the EIR.

5.	**CULTURAL RESOURCES -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Cause a substantial adverse change in the significance of a historical resource as defined in California Code of Regulations Section 15064.5?	**X**			
(b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to California Code of Regulations Section 15064.5?	**X**			
(c)	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?			**X**	
(d)	Disturb any human remains, including those interred outside of formal cemeteries?	**X**			

Comments: *5(a).* The northern part of the project site was used for cattle grazing, and there are some older structures on site that may be associated with past ranching activities. These structures may be historically significant. A cultural resources study is currently being conducted, the results of which will be addressed in the EIR.

5(b). There are a number of known important archaeological resources located within the project site and area. A cultural resources study is currently being conducted to evaluate the project's potential impacts on archaeological resources. Preliminary site evaluation has allowed cultural resource constraints to be considered in turbine and facility siting decisions. This issue will be addressed in the EIR.

5(c). The project is located in a mountainous area of the southern Sierra Nevada Range northwest of the Fremont Valley. The site is characterized by deeply incised valleys and steep hillsides. Regional lithologic units consist of intrusive and extrusive igneous rocks, metamorphic rocks, Tertiary sedimentary rocks, and Quaternary alluvium. In general, the igneous and metamorphic rock formations and the Quaternary alluvium are not known to be fossiliferous, and the likelihood of encountering fossils during construction in these formations is low. Construction in Tertiary sedimentary rock formations has moderate potential of encountering fossils. The Tertiary sedimentary formations at the site are not known as unique or significant paleontological resource. Though impact to significant resources is unlikely, the project would provide for, through standard construction specification, the protection of any fossils discovered during construction until the find can be evaluated by qualified individual.

5(d). Preliminary cultural resources reconnaissance indicates that a human burial site may exist within the project area. This burial site would be avoided. This aspect is being evaluated in the cultural resources assessment and will be included in the EIR.

6.	**GEOLOGY AND SOILS -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
	i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.		**X**		
	ii) Strong seismic ground shaking?		**X**		
	iii) Seismic-related ground failure, including liquefaction?				**X**
	iv) Landslides?	**X**			
(b)	Result in substantial soil erosion or the loss of topsoil?	**X**			
(c)	Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	**X**			
(d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	**X**			
(e)	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?			**X**	

Comments: *6(a), i).* According to the study of geotechnical and seismic hazards for the Pine Tree Wind Development Project (Earth Systems Southwest, 2003), no known active or potentially active faults are known to exist or were observed within the portion of the project site to be occupied by the wind turbine facilities. The site is not located within any currently designated State of California Alquist-Priolo Earthquake Fault Zone as designated by Hart (1977). However, the proposed 230-kV transmission line would cross the Garlock Fault near the mouth of Pine Tree Canyon (also near the second Los Angeles Aqueduct). The transmission line would be designed in accordance with the values and parameters given in the California Building Code (CBC), and any related impacts are considered mitigated to less than significant.

6(a), ii). According to a study of geotechnical and seismic hazards for the Pine Tree Wind Development Project (Earth Systems Southwest, 2003), the project site could be subject to potentially severe seismic shaking during the design life of the proposed wind turbines. The project site is located within the influence of several fault systems that are considered to be active or potentially active.

In particular, the project site would be subject to strong ground motion from the active or potentially active Garlock and related faults located approximately 1 mile from the southeast corner of the project site and crossing the proposed project transmission line. The project site is located in Seismic Zone 4 of the 2001 CBC. Project structures would be designed in accordance with the values and parameters given in the CBC, and any related impacts are considered mitigated to less than significant.

6(a), iii). According to a study of geotechnical and seismic hazards for the Pine Tree Wind Development Project (Earth Systems Southwest, 2003), the potential for liquefaction to occur is considered negligible because of the shallow depth to bedrock over most of the site, and in particular, at proposed sites for wind turbines.

6(a), iv). Portions of the proposed access roads and some of the turbines are located along steeply sloping terrain with gradients in excess of 50%. Such areas may be susceptible to slope instability such as rock falls and landslides. Proposed grading in these areas could create unstable cut and fill slopes. Additional engineering design would be needed to mitigate this hazard. These impacts and mitigation measures will be addressed further in the EIR.

6(b). Implementation of the project requires vegetation clearing and grading activities that have the potential to result in substantial soil erosion. Widening of existing dirt roads and construction of new dirt roads would be required. Other project components, such as staging areas and power distribution structures, would also require clearing and grading. This issue will be further addressed in the EIR.

6(c). As noted in 6(a) (iv), above, the project site would be constructed partly on steep slopes that may be unstable and necessary grading for access roads and turbines could create unstable cut and fill slopes. However, the potential for liquefaction is low, as noted in 6(a) (iii), above. According to the geotechnical and seismic hazards study (Earth Systems Southwest, 2003), further investigation would be needed to identify potentially unstable slopes, weak or expansive soils, rock and excavation conditions, and foundation conditions. These factors will be further addressed in the EIR.

6(d). As noted in 6(c) above, expansive soils may be encountered at the project site and additional review of these conditions will be included in the EIR.

6(e). A septic tank is proposed for installation at the on-site O&M building. The installation of a septic system is subject to evaluation and permit from the County of Kern.

7.	**HAZARDS AND HAZARDOUS MATERIALS -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?			**X**	
(b)	Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			**X**	

7.	**HAZARDS AND HAZARDOUS MATERIALS -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				**X**
(d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				**X**
(e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?			**X**	
(f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				**X**
(g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				**X**
(h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?			**X**	

Comments: *7(a).* Significant quantities of hazardous materials would not be routinely transported, used, or disposed. Hazardous materials expected to be used during construction of the project include blasting materials and petroleum products for lubrication and fuel. Operation of the project would require routine use of a relatively small amount of hazardous materials, including lubricants and hydraulic fluids. These materials would be transported, used, and disposed according to applicable safety standards, and they do not pose a significant hazard to the public or the environment.

7(b). Hazardous materials expected to be used during construction of the project include blasting materials and petroleum products for lubrication and fuel. Project operations would involve the routine use of a relatively small amount of hazardous materials, including lubricants and hydraulic fluids. Applicable safety standards would be implemented during the use of these materials, and there are no site-specific conditions that would pose reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

7(c). There are no existing or proposed schools within one-quarter mile of the project site.

7(d). Government Code Section 65962.5 refers to a list of facilities that may be subject to the Resource Conservation and Recovery Act (RCRA) corrective action program. No listed RCRA sites occur on the subject property, and there are no known hazardous materials on the project site.

7(e). The project is located in an area overlain by military use airspace, and the FAA has designated the airspace over this region as a military operations area. The area is within the Joint Service Restricted R-2508 airspace complex. The designated flight paths over the project site involve numerous MTRs starting at 200 feet above ground level and increasing in height up to 10,000 feet above sea level. These MTRs are primarily associated with training at EAFB and NWSCL. The total height of each turbine at the highest point of the rotor blade's rotation is approximately 340 feet. At this height, the wind turbines would extend into the lower elevations of flight corridors above the site, creating a potential navigation hazard related to MTRs.

LADWP and WTP have consulted with both EAFB and NWSCL and have developed a configuration of wind turbines that resolves the potential for interference with the MTRs. The military reviewed the site plan and found that the plan as currently proposed would avoid potentially significant impacts on MTRs and, as long as the blade height of the turbines would remain below 360 feet above ground level, would not compromise the training and testing mission of the affected installations.

7(f). There are no private airstrips within 2 miles of project components and no hazards from such operations are applicable to the project site.

7(g). There are no regional or public agency-mandated emergency response or emergency evacuation plans applicable to the proposed project, and the project would not interfere with such plans.

7(h). The project has the potential to increase the risk of wildland fire from construction activities such as sparks emitted during welding and operation of internal combustion engines. During construction, the risk of human-caused accidental wildland fires would be increased. However, proper safety precautions will be implemented to protect both natural resources and investment in equipment. Typical fire safety standards would be implemented, including (1) all construction and maintenance vehicles at the site would carry a shovel and fire extinguisher, (2) a 10-foot fuel break would be constructed around all permanent facilities (except roads), (3) mats, shields, and wind breaks would be used during welding in open areas, (4) cigarette smoking would be prohibited within the project site, and (5) Occupational Safety and Health Administration, County, and LADWP fire prevention requirements would be enforced. With implementation of these standard safety measures, the increased risk of wildland fires is considered less than significant.

8.	**HYDROLOGY AND WATER QUALITY -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Violate any water quality standards or waste discharge requirements?	**X**			
(b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?			**X**	
(c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in a substantial erosion or siltation on- or off-site?	**X**			
(d)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	**X**			
(e)	Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?				**X**
(f)	Otherwise substantially degrade water quality?	**X**			
(g)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				**X**
(h)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	**X**			
(i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				**X**
(j)	Inundation by seiche, tsunami, or mudflow?				**X**

Comments: *8(a).* The project has the potential to cause soil erosion, which could result in impacts to downstream water quality. Potential runoff from equipment wash-off areas could also affect water quality. The project's potential to contribute to water quality standards violations will be further addressed in the EIR.

8(b). Water supplied by LADWP from the Los Angeles Aqueduct (in Jawbone Canyon) would be the primary source of water during the construction phase of the project for concrete mixing, dust suppression, and equipment wash-off. The construction water use would be temporary and of a relatively small quantity. Potable water needed during operation of the project would be supplied by a commercial bottled water supplier. Relatively small volumes of non-potable water for sanitary functions during project operations may be obtained from a new on-site well.

8(c). Access to various project components would require multiple stream crossings during construction and operation of the project. The stream crossings have the potential to cause erosion or siltation. This issue will be further addressed in the EIR.

8(d). Implementation of the project requires vegetation clearing, which has the potential to result in increased surface runoff. Widening of existing dirt roads and construction of new dirt roads would be required and could also increase runoff. Other project components, such as staging areas and power distribution structures, would also require clearing and grading. The project's potential to cause flooding on- or off-site from increased runoff will be further addressed in the EIR.

8(e). The project has the potential to increase surface runoff. However, there are no existing or planned stormwater drainage systems in the project vicinity. Therefore, the project would not contribute to exceeding the capacity of existing or planned public stormwater drainage systems.

8(f). In addition to the water quality impacts discussed above, runoff from equipment wash-off areas has the potential to degrade water quality. The EIR will discuss project-related activities that have the potential to substantially degrade water quality.

8(g). The project does not include the construction of housing and would not place housing within a designated flood hazard area.

8(h). Pine Tree and Jawbone canyons are designated flood zones according to the Federal Emergency Management Agency (FEMA). Flood Insurance Rate Maps have been prepared by FEMA, which graphically depict designated flood zones of "A" within the defined channel ways. Community panel numbers 060075 1375B and 1125B, dated September 29, 1986, identify these areas having a 1-percent chance of flows being equaled or exceeded in any given year. Permanent structures placed in the floodplain would be subject to flood hazard review prior to issuance of building permits. This issue will be reviewed in the EIR.

8(i). The project would not expose people or structures to a significant risk of loss, injury, or death involving flooding. The project does not involve construction of levees or dams and would not result in the failure of levees or dams.

8(j). The project site is not in an area that is at risk of inundation by seiche, tsunami, or mudflows.

9.	**LAND USE/PLANNING -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Physically divide an established community?				**X**
(b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	**X**			
(c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	**X**			

Comments: *9(a).* The project is not located in the vicinity of an established community and would not physically divide any existing communities.

9(b). In the Kern County Year 2000 General Plan (1994), the project site is designated as Map Code 8.3 (Extensive Agriculture, 20-acre minimum) and 8.3/2.4 (Extensive Agriculture/Steep Slope), reflecting the current grazing use of the property. Under the County's Zoning Ordinance, the project site is zoned E (Estate) with a 20-acre Minimum Lot Size. As part of the project, the zoning at the project site would be changed from E-20 to A (Exclusive Agriculture). In addition, the areas surrounding the wind turbines would be designated WE (Wind Energy) Combining Districts. The intent of a WE Combining District is to promote the use of wind power as "an alternative to fossil-fuel-generated electrical power in areas of the County which are identified to have suitable wind resources for production of commercial quantities of wind-generated electrical power," and to develop this resource "in a manner that provides a harmonious balance between the suitability of a project site with existing area land use and physical surroundings." The conformity zone change to Exclusive Agriculture would take place on about 7,800 acres. The WE Combining District would then be applied only to approximately 425 acres of land surrounding the turbines, resulting in a zoning designation in these areas of A-WE. The project would bring the site zoning into consistency with the Kern County Year 2000 General Plan, consistent with the California Government Code. However, because the zoning change is an item of discretion, the compatibility of the project relative to zoning and general plan issues will be addressed in the EIR.

9(c). As noted previously in response to question 4(f), the project site lies within lands covered by the CDCA Plan as amended by the WMP. The CDCA Plan and the WMP serve respectively as the land use management plan and habitat conservation plan for lands within the project area. The potential for the project to conflict with the CDCA, WMP, and other related planning areas, such as the Jawbone/Butterbredt ACEC, will be addressed in the EIR.

10.	**MINERAL RESOURCES -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				**X**
(b)	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				**X**

Comments: *10(a).* There are no known statewide and regionally valuable mineral resources at the project site.

10(b). There are no locally important mineral resource recovery sites at the project site. No mineral resource zones are located within the project site as indicated by the Kern County General Plan.

11.	**NOISE -** *Would the project result in:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			**X**	
(b)	Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				**X**
(c)	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			**X**	
(d)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			**X**	
(e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				**X**
(f)	For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				**X**

Comments: *11(a).* There is one ranch house in the northwest portion of the project site that is occasionally occupied but does not serve as a place of primary residence. In accordance with Chapter

19.64 (WE Combining District) of the Kern County Zoning Ordinance, a legal agreement would be reached with the owner of this ranch house indicating the owner's written consent for the project, and a noise impact easement for the construction and operation of the project would be acquired. The area surrounding the project property is generally undeveloped, with no noise-sensitive uses, as defined in Chapter 19.64 of the Zoning Code and in the Noise Element of the Kern County General Plan, within several miles. Based on the requirements and standards established in Chapter 19.64, which require noise impact analysis if any sensitive uses are located within 1 mile in a prevailing downwind direction or within 0.5 mile in any other direction of the project's exterior boundary, the project would not expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance.

11(b). The operation of the wind turbines would not generate perceptible groundborne vibrations.

11(c). The project would increase the ambient noise levels at the project site due to wind turbine operations. As mentioned above in 11(a), other than a single ranch house located within the project property, the area surrounding the project property is generally undeveloped, with no noise-sensitive uses within several miles. In accordance with Chapter 19.64 (WE Combining District) of the Kern County Zoning Ordinance, which requires noise impact analysis if any sensitive uses are located within 1 mile in a prevailing downwind direction or within 0.5 mile in any other direction of the project's exterior boundary, this increase in ambient noise is not expected to create a significant impact.

11(d). Construction of the project would cause a temporary or periodic increase in ambient noise levels in the project vicinity. Construction noise would include heavy construction equipment and could include blasting to assist site grading. However, the project occurs in an area with no permanent occupants within several miles of the wind area boundaries. While blasting may be audible in areas surrounding the project site, the distance from source to receptor of well over 1 mile would conform to County zoning requirements and would be less than significant.

11(e). The project is not located within an airport land use plan or within two miles of a public airport.

11(f). The project is not located within the vicinity of a private airstrip.

12.	**POPULATION AND HOUSING -** *Would the project:*	**Potentially Significant Impact**	**Less than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	**X**			
(b)	Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				**X**
(c)	Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				**X**

Comments: *12(a).* The construction phase of the project would last approximately 10 months and could require the temporary location of some construction personnel and family members to the communities near the project site. This could induce a potentially significant temporary population growth in the area. The extent of the temporary population growth will be further addressed in the EIR. Once operational, the project would require approximately 10 to 12 permanent workers. In the context of the regional population, this would not be a significant impact. The project is not expected to otherwise induce substantial population growth. The project is being built to accommodate existing and projected energy demands rather than to provide excess capacity for future growth.

12(b). The project would not decrease the existing housing stock and would not require construction of replacement housing elsewhere.

12(c). The project would not displace people from their current housing and would not necessitate the construction of replacement housing elsewhere.

13.	**PUBLIC SERVICES -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
	i) Fire Protection?			**X**	
	ii) Police Protection?				**X**
	iii) Schools?				**X**
	iv) Parks?				**X**
	v) Other public facilities?				**X**

Comments: *13(a), i).* Construction of the project includes welding and use of explosives, which may pose an increased fire hazard. Proper fire-safety standards would be followed relative to construction and operations. For example, such activities would take place in areas cleared of vegetation, and adequate fire fighting equipment would be available on-site. In addition, the Kern County Fire Department would be consulted prior to conducting these activities. Due to the short duration of the potential increase in fire hazard, new fire protection facilities would not be constructed. Operation of the project does not emit sparks or otherwise pose an increased fire hazard. Wind turbines would incorporate state-of-the-art lightning suppression systems. Therefore, the project would not increase the demand for fire protection or necessitate the construction of new fire protection facilities.

13(a), ii). The project would not permanently increase the local population and would not require the construction of new police protection facilities. While the project area is technically under the jurisdiction of the Kern County Sheriff's Department, the project would not necessitate the increase in patrol by the Sheriff's Department. Project lands would remain private, with controlled access. Private security forces would be used to secure on-site facilities.

13(a), iii). The project would not permanently increase the local population and would not require the construction of new schools.

13(a), iv). The project would not permanently increase the local population and would not require the construction of new parks.

13(a), v). Upon completion of project construction, the project would be owned and operated by LADWP, a public utility. In this regard, the project facilities would become public facilities and part of the LADWP power generation infrastructure. The project would not permanently increase the local population and would not require the construction of other new public facilities.

14.	**RECREATION -**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				**X**
(b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				**X**

Comments: *14(a).* The project would not increase the use of existing parks or cause a shift in park usage patterns in existing parks. Therefore, the project would not accelerate the physical deterioration of existing parks.

14(b). The project does not include recreational facilities or require the construction or expansion of recreational facilities.

15.	**TRANSPORTATION/TRAFFIC -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?			**X**	
(b)	Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?			**X**	
(c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?			**X**	
(d)	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	**X**			
(e)	Result in inadequate emergency access?				**X**
(f)	Result in inadequate parking capacity?				**X**
(g)	Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				**X**

Comments: *15(a).* Delivery of materials to the project site is estimated to require approximately 28 trips per turbine over an 8-month period. This increase in traffic would not be significant in relation to the capacity or existing traffic flows on the principal access route (Highway 14).

15(b). The amount of truck traffic delivering materials to the project site is not significant in relation to traffic levels of service.

15(c). The airspace over the project site has flight restrictions established by the FAA due to military activities. This issue has been resolved as discussed in Item 7(e) above.

15(d). Delivery of project components over public roads has a potential to increase road hazards. Some of the project components would require permits for wide/long loads. Turning movements from Highway 14 to Jawbone Canyon Road by oversize trucks could pose traffic hazards. Construction traffic along Jawbone Canyon Road itself could also pose traffic hazards within the Jawbone Open Area. This issue will be addressed in the EIR.

15(e). The project would not block existing emergency access routes. The access roads widened as part of the project would facilitate emergency access to and from the site.

15(f). The project would not affect off-site parking capacity. Project-related parking requirements would be accommodated on-site.

15(g). The project would not conflict with existing use of alternative transportation.

16.	**UTILITIES AND SERVICE SYSTEMS -** *Would the project:*	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				**X**
(b)	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				**X**
(c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				**X**
(d)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?			**X**	
(e)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				**X**
(f)	Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs?				**X**
(g)	Comply with federal, state, and local statutes and regulations related to solid wastes?				**X**

Comments: *16(a).* The project would not be connected to a wastewater treatment facility; thus no impact would occur.

16(b). The project would not require the construction or expansion of new community wastewater treatment facilities. A septic system would be installed for the workers at the O&M building. Non-potable water for construction would be obtained primarily from the Los Angeles Aqueduct (in Jawbone Canyon) and trucked to the site. Additional water for construction may be derived from a new water well on-site. During project operations, bottled water would be used for potable uses, and relatively small amounts of water from a new on-site well may be used for non-potable uses. The well construction would require a permit from the Kern County.

16(c). The project site is not served by existing storm water drainage facilities and would not require the construction or expansion of existing public facilities.

16(d). LADWP has sufficient water supplies to serve the proposed project during construction. Potable water use during operations would be minimal and primarily served via commercial bottled water company. Small volumes of non-potable water for sanitary functions during project operations may be obtained from a new on-site well.

16(e). The project would not be connected to a wastewater treatment plant; thus a determination by the wastewater service provider is not necessary for this project.

16(f). The project would not generate a substantial quantity of solid waste during construction. Once the project construction is completed, a small amount of waste would be generated during O&M activities.

16(g). The project would comply with federal, state, and local statutes and regulations related to solid waste and disposal of other wastes such as lubricating oils and hydraulic fluids.

17.	**MANDATORY FINDINGS OF SIGNIFICANCE -**	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
(a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	**X**			
(b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	**X**			
(c)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	**X**			

Comments: *17(a).* Based on the discussions in the sections above, the project has the potential to have significant impacts on aesthetics, air quality, biological resources, cultural resources, geology and soils, land use/planning, noise, hydrology and water quality, population and housing, and transportation/traffic. The potential impacts to these resource areas will be further addressed in the EIR.

17(b). The project has the potential to have cumulatively considerable impacts. As required under CEQA, the cumulative impacts will be addressed in the EIR.

17(c). Based on the discussions in the sections above, the project has the potential to cause significant environmental impacts that may cause adverse effects on human beings, which will be addressed in the EIR.

PREPARED BY: Charles C. Holloway	**TITLE:** Supervisor of Environmental Assessment	**TELEPHONE NO.:** (213) 367-0285	**DATE:** April 14, 2004

Notice of Preparation (NOP)
Comment Letters

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RESOURCE MANAGEMENT AGENCY
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Environmental Health Services Department
Planning Department
Roads Department

May 18, 2004

File: EIR
ZC 4, ZC 12, ZZ 3
Map 151-1, 151-2

Department of Water and Power
City of Los Angeles
111 North Hope Street, Room 1044
Los Angeles, California 90012

Post-it® Fax Note 7671	Date 5/20/04 # of pages ▶ 2
To Thom Ryan	From Tania Bonfiglio
Co./Dept. EDAW	Co. LADWP
Phone #	Phone # 213-367-3027
Fax # 949-660-1046	Fax #

RE: Pine Tree Wind Development Project
Notice of Preparation – Response

Dear Mr. Holloway,

The Pine Tree Wind Development Project is the approval and construction of 80, 1.5 –megawatt (MW) wind turbine generations, several meteorological towers, an electrical collection system, a substation, a transmission line to connect with the regional electrical grid, an operations and maintenance (O & M) building and access roads. The proposed property is currently zoned E-20 (Estate, 20 acre minimum lots) with a General Plan designation of 8.3 (Extensive Agriculture (minimum 80 or 20 acre parcel size) and 8.3/2.4 (Extensive Agriculture/Steep Slope). Implementation of the project in conformance with the General Plan for a commercial wind energy project will require the processing and approval of a zone change application to A(Exclusive Agriculture) WE (Wind Energy Combing) District. This is a discretionary action by the Board of Supervisors and Kern County is, therefore, a Responsible Agency under CEQA (PRC 21069).

The Kern County Planning Department intends to utilize this Environmental Impact Report for the processing of the zone change application for your project. The following comments are intended to comply with the requirements of CEQA , specifically Section 15096 of the CEQA Guidelines, that discuss the process and role of a responsible agency.

The intent of Chapter 19.64 Wind Energy (WE) Combining District of the Kern County Zoning Ordinance is to "promote the use of proven wind-driven generators for energy recovery, and to promote safeguards ensuring the maintenance of the health, safety, and welfare of the citizens of the County." The WE Combining District includes specific requirements for setbacks, site development, and requirements for acoustical reports. The Environmental Impact Report should include, at a minimum, copies of the Chapter 19.10 A (Exclusive Agriculture) and Chapter 19.64 Wind Energy (WE) Combining District of the Kern County Zoning District. The projects compliance with the provisions of these zone districts should be discussed and appropriate mitigation measures imposed.

State Law requires that zone changes be consistent with the Kern County Airport Land Use Compatibility Plan (ALUCP) which is designed to ensure public health and safety. Section 1.7.1 (c) of the ALUCP requires that "... specific findings shall be made that such development is compatible with the training and operational missions of the military aviation installations. Incompatible land uses that result in significant impacts to the military mission of Department of Defense installations or to the Joint Service Restricted R-2508 Complex that can not be mitigated, shall not be considered consistent with this plan." At the request of Planning Staff your department has conducted extensive discussions with China Lake NAWS and Edwards Air Force Base representatives regarding project design and siting of the project to reduce the impacts on the Joint Service Restricted R-2508 Complex . To ensure land use compatibility, the project description and mitigation measures for this project should specifically limit the total height of all turbines to 340 feet and limit the zone change request for the WE Combining District to this project design only.

The Kern County General Plan update is being presented to the Kern County Board of Supervisors for consideration and a Planning Commission recommendation for adoption on June 15, 2004. The newly adopted General Plan contains more extensive policies and should be discussed in the Environmental Impact Report.

If you have any questions regarding the letter please call the staff planner assigned to this project, Lorelei Oviatt at (661) 862-8866 or email at Loreleio@co.kern.ca.us. Thank you.

Sincerely,

Lorelei H. Oviatt, AICP
Supervising Planner

cc. Kathe Moluf

DEPARTMENT OF TRANSPORTATION
DIVISION OF AERONAUTICS – M.S.#40
1120 N STREET
P. O. BOX 942873
\CRAMENTO, CA 94273-0001
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Be energy efficient!

April 29, 2004

RECEIVED
MAY 04 2004
TANIA S. BONFIGLIO

Mr. Charles Holloway
Los Angeles County
Department of Water and Power
111 North Hope Street, Room 1044
Los Angeles, CA 90012-2694

Dear Mr. Holloway:

Re: Pine Tree Wind Development Project
SCH# 2004041076

Thank you for including the California Department of Transportation (Department), Division of Aeronautics, in the environmental review process for the above-referenced project. We have reviewed the Notice of Preparation for a Draft Environmental Impact Report, dated April 2004, and offer the following comments relative to airport land use compatibility planning.

1. The proposed project includes the development of 80, 1.5-Megawatt wind turbine generators, several meteorological towers, an underground and overhead electrical collection system, a substation, a 10-mile long and 230-Kilovolt transmission line to connect with the regional electrical grid, and operations and maintenance building, and access roads. The project site is located in the southern Sierra Nevada Mountains in Kern County. It is approximately 6 miles west of State Route 14, 12 miles north of the Town of Mojave, and 15 miles northeast of Tehachapi.

2. The Initial Study mentions that Edwards Air Force Base is located 20 miles south of the project site, and the Naval Weapons Station at China Lake is located approximately 35 miles northeast of the project site. Both military facilities maintain low-altitude military training routes in the area of the project property to conduct training exercises. The project site is within the Joint Service Restricted R-2508 complex. The California Environmental Quality Act, Public Resources Code Section 21098, *Notification Requirements in Low-Level Flight Path, Military Impact Zone, and Special-Use Airspace*, explains coordination requirements for airport land use compatibility planning, between a local government agency and a military service. The applicability of these requirements to the proposed project should be clarified in the Environmental Impact Report.

3. Depending on structural heights, the Federal Aviation Administration (FAA) may require the filing of a Notice of Proposed Construction and Alteration (Form 7460-1) pursuant to the Federal Aviation Regulation Part 77. For further technical information and an electronic copy of the form please refer to the FAA's Air Traffic and Airspace Management web page at http://www.faa.gov/ats/ata/ata400/oeaaa.html.

These comments reflect the areas of concern to the Department's Division of Aeronautics with respect to airport land use compatibility planning. We advise you to contact our District 06 office concerning surface transportation issues.

We appreciate the opportunity to review and comment on this environmental document. If you have any questions, please call me at (916) 654-5253.

Sincerely,

D. Cohen

DAVID COHEN
Associate Environmental Planner

c: State Clearinghouse

STATE OF CALIFORNIA — THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, *Governor*

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

May 13, 2004

Mr. Charles Halloway
Los Angeles County Dept. of Water and Power
111 North Hope Street, Room 1044
Los Angeles, CA 90012-2694

RE: Pine Tree Wind Development Project

Dear Mr. Halloway:

The California Energy Commission has several comments on the Notice of Preparation (NOP) on the Pine Tree Wind Development Project. The California Energy Commission is supportive of wind development in order to meet the Renewal Portfolio Standard for the State. In order to assure that the development is pursued in an environmentally sound manner we request that the following items be addressed in the Environmental Impact Report (EIR).

- Baseline surveys for existing bird use should be conducted to determine the potential for impacts to birds using the area to occur. Surveys should typically be conducted for a full year to capture seasonal differentiation and follow established protocol.[1] Survey results should be included in the EIR.

- The EIR should discuss rotor speed, rotor diameter, blade height from the ground, and turbine spacing, and discuss how these features may contribute to the risk of bird collisions with turbine blades.

- If necessary, a detailed plan of mitigation measures to reduce bird fatality from wind development should be incorporated into the EIR.

- A detailed post-construction plan to monitor bird fatality from the wind development should be incorporated into the EIR.

- On page 13 there is a discussion of the 10 mile long electrical transmission line to be constructed as part of the project. A complete description of the line to ensure it is designed and constructed as a bird-friendly line should be included in the

[1] Anderson, Richard et al. Studying Wind Energy/Bird Interactions: A Guidance Document metrics and methods for determining or monitoring potential impacts on birds at existing and proposed wind energy sites. National Wind Coordinating Committee. 1999.

environmental documentation. Design criteria can be found in the Avian Power Line Interaction Committee Guidelines.[2]

- On page 26 section 4(f) there is a discussion of the West Mojave Plan and the California Desert Conservation Area. It gives the West Mojave Plan as the potential habitat conservation plan applicable to the site. The EIR should discuss alternatives for habitat compensation and mitigation measures in the event that the West Mojave Plan Habitat Conservation Plan is not completed prior to the completion of the Pine Tree Wind Development Environmental Documents.

Thank you for the opportunity to comment on this NOP. If you have questions or comments please contact Melinda Dorin at (916) 654-4024 or email at mdorin@energy.state.ca.us. We look forward to receiving a copy of the draft EIR.

Sincerely,

ROGER E. JOHNSON, Manager
Environmental Office

[2]APLIC (Avian Power Line Interaction Committee). 1996. Suggested practices for raptor protection on power lines: the state of the art in 1996. Edison Electric Institute. Washington D.C.

INTEGRATED ENERGIES

21331-C Golden Hills Boulevard Tehachapi California 93561
(661) 822-5221 Tel/Fax
e-mail: integener@inreach.com See our web site: www.integener.com
also Midwest and East Coast Locations

FAX MESSAGE FAX MESSAGE FAX MESSAGE

Mr. Charles C. Holloway,
Supervisor Of Environmental Assessment
111 North Hope Street, Room 1044
Los Angeles, California 90012
Fax #: (213) 367-4710

May 17, 2004

Speaking as the sole proprietor of Integrated Energies, an Internet-based business here in Tehachapi, California, and having reviewed the Los Angeles Department of Water and Power CEQA Initial Study For The Pine Tree Wind Development Project dated April 14, 2004, I wanted to make a comment and send it in hereby via fax. I note that the deadline for comments by state law is tomorrow, May 18th, at 5:00 P.M. I should note also that I attended earlier meetings that were held here in this area of Kern County in February of last year and met several of the officers of the developing company and officials with LADWP and BLM.

My comment is the same as it was at that time, now expanded with more detail. It is clear that a factor offsetting the potential degradation of the environment (extensive grading for roads and facilities, the alteration of drainage paths, the possibilities of erosion, and the movement of vehicles) would be the mounding of fill to form levees or dams, creating a body of water to be a permanent feature of the nearby terrain. This could simply be an expansion of pre-existing seeps and springs to a full-fledged lake of some two acres in area. The only practical justification for this addition to the planned construction is that a source of electrical power would be made available from the new power project, making it possible to pump water up from wells or over from the Los Angeles aqueduct a few miles away.

Three locations are seen as possibilities for this bottom-sealed, non-percolating open fresh water resource in an otherwise dry locale -

- Section 30 or 31 by Jawbone Canyon, possibly to cover the remains of a construction staging area to be located in this vicinity. This location would be somewhat accessible for visitors to the recreational opportunities afforded by Jawbone Canyon (although this would not be the purpose of this improvement).

- Section 24 to the southeast of the project and near Quail Spring. An existing dirt road in this area runs down to the bottom of Pine Tree Canyon and could be the path of a pipeline (should one be necessary) over to the aqueduct, this being the location with the shortest run.

- Sections 15, 16, 21, or 22, a rugged area to the southwest of the project. A canyon could be fitted with a dam to back up some water here. It is near water sources labeled "Golden Oaks Spring" (a cattle watering trough is there now) and "Weldon Pond". This area is near the Pacific Crest Trail and would be accessible to hikers, again, not its primary purpose.

We all tend to concentrate on the most important of necessities when formulating plans for projects such as this in order that costs be saved and the potential for the expansion of wind energy technology be advanced. It only bears mentioning in a word or two that recent wildfires throughout much of Southern California last year and now again early this year are a hazard that should be foreseen with more regularity in these hill regions. It also should be said that providing just a few watering troughs in scattered locations as a convenience for some forms of wildlife does not satisfy the need as well as a generously-sized, purpose-built pond would.

Since the start of this planning process, I have received verbal support from many individuals and several organizations who would have an interest in this extension to the project. This continues to be the case as I discuss it today. I am, besides being a small business person, also on the staff of a well-known local wind farm in the Tehachapi area.

Thanks for your time and for this opportunity to make comments on this project.

Anthony Chessick
Managing Director

CONSULTING PRACTICE

Environment - Culture - Energy

William L. Nelson
Prof. Consultant
785 Tucker Road, #G-424
Tehachapi, California 93561
Tel: (661) 822-7087

May 18, 2004

VIA FACSIMILE

Department of Water & Power
City of Los Angeles
111 North Hope Street, Room 1044
Los Angeles, CA 90012

Attn: Charles C. Holloway, P.E., Manager
Environmental Affairs, Environmental Assessment

RE: Pine Tree Wind Development Project
Preparation of Draft Environmental Impact Report (DEIR)
SCOPING PHASE - COMMENTS

Dear Mr. Holloway:

These comments are made in response to the Notice of Preparation (NOP) of a DEIR for the referenced project for which the LADWP is asserting Lead Agency status, and are largely a memorialization of oral comments made at the public scoping meeting held May 7, 2004 at the offices of the Kern County Planning Dept. The same 9-point framework will be used here to offer comments.

1) NEED FOR A PROGRAM EIR

A Program Environmental Impact Report should be prepared with the Kern County Planning Dept. as the Lead Agency, and the LADWP coordinating necessary information and reasonably pro-rata funding the PEIR documentation. This is essential because:

a) proposed Project falls outside area encompassed by the 1986 Master Environmental Assessment (MEA) area prepared for zoning and permitting clearances of Kern County for facilitating large-scale development of wind resources in the Tehachapi-Mojave wind resource area;
b) examination of Alternates within the project DEIR requires the PEIR context;
c) future expansion-potential of LADWP wind-generation plans in the vicinity can be treated, at at least a "reconnaisance" level;
d) integration of gneration with transmission planning and installation requires wide-area reviews;
e) military airspace-landuse compatibility reviews require a PEIR-level of analysis; and

1) NEED FOR A PROGRAM EIR (cont'd)

f) any institution of payment of "collateral royalties" and agreements by landholders adjacent and near project or otherwise constrained from wind resource development, i.e. agreements to waive development -- requires PEIR treatment and will facilitate resolutions.

2) MILITARY AIRSPACE-LANDUSE COMPATIBILITY REVIEWS

Any reviews, coordinated planning, project assumptions and design predicated on military agency consultations, i.e. regarding the military R2508 complex use, should be fully disclosed and exhibited with the DEIR.

3) OPTIMIZATION OF OUTPUT

Since highest and best use of the natural resources requisitioned for wind-based electricity generation is subject to many factors, the DEIR's analysis should provide balancing assessments. Output and transmission optimization should be sought, to minimize land-use and associated impacts (roads, physical towers and distrbution and transmission lines, etc.).

Reference to the transmission project studies and planning of non-LADWP generators should be incorporated, including FERC-, ISO-, and CPUC-reviewed wind energy transmission facilities in the wider Tehachapi-Mojave wind resource area, and potentially beyond, e.g. N. Los Angles and S. Kern Counties' Antelope Valley region.

4) SOIL-WATERSHED IMPACTS

The area's ecosystems are relatively fragile desert ones, with high potential for soil erosion accelerated by potential project disturbances. The mitigation program for these impacts must be competent and well-defined.

5) PROJECT ALTERNATES

Several avenues of Alternate Project approaches deserve development, including but not limited to:

a) exhibiting at least three (3) levels of project intensity within the boundaries set forth with the NOP;
b) assessing feasibility and desireability of other vicinity sites, including sites within the Willow Springs Specific Plan area of S. Kern County;
c) procurement of renewable wind power from non-LADWP owned sites/generators (market-based);
d) joint development of transmission facilities with other entitites, e.g. through Consortium agreements or creation of a Special (public) District.

6) GROWTH-INDUCING IMPACTS

Is project part of a "load-building" service program of LADWP,

6) GROWTH-INDUCING (cont'd)

or can it be shown that it is substituting and reducing existing nonrenewable and hydro-based power requirements? Justification for and mitigation of impacts is substantially more compelling in the latter instances.

7) CUMULATIVE IMPACTS

If power from project is intended or there is a reasonable expectation that it will facilitate significant artificial water movements, this should be assessed and disclosed.

8) COMMUNITY BENEFITS

LADWP as project proponent should pursue specific and tangible ways to directly benefit and thereby provide mitigation, to the more immediate geographic area, communities and adjacent landholders. Specific ways that should be assessed include:

a) Special (public) District formation with other wind-generators to manage common facilities, parallel mitigation-program management (e.g. soil-erosion, roads, site-access control, night-lighting FAA requirements, etc);
b) preferential contracting of power-use by local public agencies, other Special Districts, especially for off-peak uses; and
c) development of an "Emergency Power Covenant," such that the immediate region obtains defined minimum availabilities of electric power under conditions of extended emergency and/or outages.

9) DATA-SHARING

Optimization of output and transmission, coordination of multiple-entities within a Special District and other internal area-wind industry agreements, furtherance of transmission stability, and use of meteorological data by others including public agencie, illustrate areas where data-sharing between LADWP and other entities can have mutually beneficial and other public benefits. Particularly where these can improve mitigation programs, the DEIR should identify and assess opportunities.

Coordination and integration of studies and data of the California Energy Commission (CEC) should be identified, including assessment of consistency and compliance as applicable, with State/CEC-defined objectives.

Conclusion

Thank you for this opportunity to offer comments. Undertaking a Kern County-Lead Agency PEIR should be considered integral to a sufficient environmental assessment and clearance approach.

Conclusion (cont'd)

The earlier 1986 MEA document cannot be regarded as a sufficient "tiering" document. The scope of the proposed project as well as the scope of reasonably anticipated expansions of similar wind projects in the Tehachapi-Mojave area assert potential impacts requring PEIR assessment. Full coordination of the DEIR with a PEIR context will ultimately prove efficient and prudent for proposed project if implemented.

These comments are made on behalf of general public environmental interests and the more specific welfare of communities and residents in South and East Kern County and the Antelope Valley area of Los Angeles County.

Yours truly,

William L. Nelson

C: Kern County Planning Dept.

1

SIERRA CLUB **KERN-KAWEAH CHAPTER**

May 17, 2004

Mr. Charles Holloway
Department of Water and Power, City of Los Angeles
111 North Hope Street
Box 5111
Los Angeles, CA 90051-0100

Re: Notice of Preparation of a Draft Environmental Impact Report,
Pine Tree Canyon Development Project,
Los Angeles Department of Water and Power

Dear Mr. Holloway,

The following represent the comments of the Kern-Kaweah Chapter of the Sierra Club regarding the proposed 1.5 MW wind generation project above Pine Tree Canyon.

The Sierra Club supports and promotes renewable resource based forms of energy production; however, every project is unique and deserves site-specific consideration to determine development approval. We believe renewable energy production should coordinate with serious efforts to conserve existing energy use. The rapid growth/expansion of Southern California and the greater Los Angeles area must include effective conservation measures and responsible energy use.

We appreciate the opportunity to comment on this proposed project and look forward to future communication and on-site visits.

The proposed project boundary is located within an unfragmented, mostly pristine region which supports healthy and diverse wildlife populations and plant communities. For this reason, we must express hesitation to support industrial development within a remote, highly scenic, and undeveloped area.

The following are the general/specific points of concern and questions which are related to potential environmental impacts which we have at this time.

I. ROAD CONSTRUCTION / SITE GRADING
The notice states that a total of 35.5 miles of road would be necessary for the project. We support use of the existing road network of unpaved roads, and the general use of 16 foot wide roads. However, we are concerned over the proposed widening of 6 miles of roads to over 34 feet wide, and 15.5 miles of roads to 20 feet wide.

1. Where are these proposed road widenings located? Are they above springs or seeps or at stream crossings?
2. What are the locations of the approximately 10 miles of new roads?

We support the plan that no fill material from road or pad grading would be deposited in canyons or drainages. Other areas would be cleared and graded for equipment, materials laydown, staging, and the substation/Oand M facility, as well as a35 x 60 foot level area adjacent to each tower site. Will these areas be re-vegetated once the large construction machinery is finished?

II. AESTHETICS / VISUAL IMPACTS
The Pacific Crest Trail (PCT) is located 1 to 2 miles west of the project boundary's western edge. This portion of the PCT is located within the Cache Peak Segment of the PCT Trail system, and at one time was designated a Class II Experience level, for trail solitude, wilderness experience, and scenic qualities. In addition, a proposal for the Middle Knob Area of Environmental Concern (ACEC) was submitted to the Bureau of Land Management several years ago to protect the biological and scenic resources of the lands west of the porject boundary. Turbines placed on ridgelines, with accompanying maintenance vehicles and lights will surely affect these two resources. We would strongly encourage the use of lights that focus downward to protect a wilderness setting both during the day and at night.

III. BIOLOGICAL RESOURCES
A.Springs/Riparian Areas - There are numerous springs and ephemeral drainages located within the project boundary. We are opposed to modifying any epemeral drainages to facilitate crossings during construction. Improvements made negatively alter the course of the drainage and damage sensitive habitat and related wildlife. What is the plan for water extraction during the course of construction and maintanence? Will wells be drilled and where are they located? Last, are any of the new roads or road widenings planned near springs or riparian areas? What is the plan to protect these sensitive areas?

B. Plant Communities - Large stands of juniper and oaks are located throughout the project boundary. Will there be tree removal for road widening, or any other project development? When clearing occurs during construction, we strongly support re-planting on disturbed areas with Kern County natives. Will consultation be used by local botanists who know the vegetaion indigenous to Kern County and the project native habitat? Are plant surveys being conducted throughout the year to establish a baseline of exisiting plant populations, and any sensitive species?

C. WILDLIFE - Loss of prime, mostly undisturbed habitat and displacement of wildlife needs to be considered as a significant consequence of developing this area. We are concerned with disruption of migration corridors, road kills, avian loss due to collisions, and the increased potential for poaching. The canyons and ridgelines north and south of the project, as well as within the project, are historic mirgration paths for passerine migrants. The ridgelines and lower areas are used by raptors for foraging and nesting. What is the impact of ridgeline turbines and associated windfarm activity on raptors?

Surveys must be conducted year-round to establish a baseline for wildlife populations, both for sensitive and non-sensitive species. We encourage an adequate survey for the Desert tortoise, Mohave ground squirrel, and all potential raptors to be found within the project boundary, as well as adjacent to the project boundary. We ask that vehicle trips are extremely minimized through Jawbone Canyon during eagle nesting season. Last, the northern portion of the project boundary is located within the Jawbone Canyon Area of Critical Environmental Concern and all of the project is located within the California Desert Conservation Area. These designations recognize and address cultural and wildlife values found in the area. How will the potential conflict with these plans be addressed in the DEIR?

IV. CULTURAL VALUES / RESOURCES

The notice states that there may be potentially significant impacts to cultural values. We ask that official surveys be conducted on both the documented and undocumented areas to establish sensitve sites to avoid.

V. GEOLOGY AND SOILS / EROSION

The notice states that "portions of proposed access roads and some of the turbines are located along steeply sloping terrain with gradients in excess of 50%." We must express strong concern for the great potential for rock fall, landslides, and accelerated erosion. We oppose road widening, improvement, or building in these identified areas, especially if they are located near a drainage. The Storm Water Pollution Prevention Plan (SWPPP) is planned to minimize erosion and the potential for discharge of pollutants. We maintain that it is wise to completely avoid high risk areas, instead of attempting to minimize the inevitable erosion and sugsequent resource damage.

VI. HYDROLOGY / WATER QUALITY

The notice indicates potentially significant impacts to water quality standards, exisitng drainage patterns, off-site flooding, and on-site flood impedement by structures. Jawbone Canyon and Pine Tree Canyons are designated flood zones. These issues must be thoroughly addressed in the DEIR. It may be that the appropriate course of action to is to completely avoid and area instead of attempting to mitigate the impacts.

VII. MANDATORY FINDINGS OF SIGNIFICANCE

We agree that this proposed project has the potential to significantly degrade the quality of the environment, and has impacts that are individually limited, but cumulatively considerable. The proposed development will further fragment a region already impacted by windfarms to the south. The potential for windfarm development adjacent to this project on the northern, western, and eastern boundaries exists. While we appreciate the efforts to minimize development impacts on natural resources, the cumulative impacts on the Tehachapi resource area must be considered.

We appreciate the opportunity to comment on this Notice of Intent, and look forward to future communication regarding the Pine Tree Canyon project.

Sincerely,

Georgette Theotig

Georgette Theotig
for the Kern-Kaweah Chapter,
Sierra Club

City of Los Angeles
Department of Water and Power
Attn: Charles Holloway
111North Hope Street, Room 1044
Los Angeles, CA 90012
Fax: (213) 367-4710
May 17, 2004

Re: Comments on the NOP for the Pine Tree Wind Dev. Project
From: Sandy Hare, Tehachapi resident

Introduction

Thank you for the opportunity to comment on the NOP for this project. I would like to preface my concerns about the impacts of the Pine Tree Wind Development Project with a general observation. You (LADWP) are making a decision that will severely impact the wildlife, native plants, scenic resources, nearby property values, recreational resources, etc., of Kern County. You seem to be acting with little regard to the wishes or plans of the people who actually live here. You have developed a bad habit: you propose to acquire a needed resource for L.A.(water, power, etc.), but you completely bypass any discussion about the merits (and negative impacts) of your proposal by placing the actual project OUTSIDE the L.A. area. In other words, L. A. gets all the benefit (clean power, etc.), but Kern County has to deal with the negative impacts your project creates.

May I suggest a new way of doing business? Why not develop a wind energy project in Los Angeles, San Bernardino, or Riverside counties? I used to live in L.A. and Riverside counties and am aware of the wonderful wind resources in that area (as shown on the CEC wind resource maps). Especially great areas for development would be Cajon or Tejon passes, Mira Loma, the coast, or the San Bernardino and San Gabriel Mtns. Transmission lines exist in all these areas and you would be able to gauge public opinion accurately. If the public didn't want mile after mile of wind turbines on every ridge, pass, and seawater jetty (like we have to endure), you could scale down the size of each WTG project to just a few turbines; in other words, spread them out so they aren't so intrusive. The added plus to placing turbines in urban areas is that they impact noise and viewshed resources FAR LESS than putting these giants in a pristine wilderness (like Pine Tree Canyon). You would be putting these huge turbines in an area already lost to urbanization and already filled with man-made machines, buildings, and roads. When you place windfarms in wilderness areas, the open space, scenery, quiet, recreation opportunities are lost forever. The size of your machines makes them visible 30 miles away. There is NO WAY to make a 200 foot tower with noisy, rotating blades "blend in" to a scenic natural landscape. We moved to Kern County years ago to enjoy the benefits afforded by the above-mentioned resources. We have watched those resources destroyed systematically by windfarm development over the past 20 years.

Issues To Be Addressed In Upcoming EIR

WILDLIFE

- Danger to migrating birds (that use the Pine Tree Cyn. and Jawbone Cyn. flyways) from turbine blade and transmission line collisions.
- Disruption of golden eagle nesting site on Cross Mtn. from vehicle/construction noise.
- Loss of desert tortoise habitat where transmission lines cross Pine Tree Cyn.
- Loss of wildlife habitat in area where turbines will be constructed.
- Increased wildlife poaching after new roads are built in this largely roadless area (ORV/hunting enthusiasts come equipped with fence cutters, and you NEVER seem to patrol these windfarms to discourage trespass).

RARE NATIVE PLANTS AND PLANT COMMUNITIES

- This area is prime rare plant habitat. Unusual volcanic/lakebed clay soils in this mountain/desert transition area have yielded a dozen or more rare plant species – two of which have never been recorded elsewhere. The construction and grading activity will severely impact any rare plants that grow here.
- Unusual clay soils that exist in this area are extremely fragile. Once they have been disturbed by grading, unnatural erosion events, or "invasion" by non-native, aggressive grass species (vehicle tires), these soils never seem to recover. What was once a clay playa (or ?) that supported several rare species is quickly turned into a rabbitbrush or sagebrush scrub.
- Impact to native species from the invasion of non-natives (on vehicle tires, etc.) and the introduction of species of buckwheat, etc., that serve as erosion control vegetation. You never seem to use LOCAL species or sub-species of CA buckwheat, etc. Every time I see reveg. buckwheat growing along a freeway, etc., it always looks like a coastal sub-species or a So. CA sub-species, NEVER a local sub-species!

EROSION

- As mentioned before, most of the soils of this area are fragile, lakebed sediment, ash, or volcanic soils. Any kind of surface disturbance seems to disrupt them and discourage the regrowth of native species.

NOISE

- Construction noise, then the continuous noise from wind-turbine generators is going to introduce a great deal of noise pollution to this area. When you stand downwind from these new, "noiseless" turbines, you can hear them for several miles! This will increase ambient noise in the general and adjacent areas, to the Pacific Crest National Scenic Trail, and may disrupt wildlife patterns in the area.

OFF-ROAD TRESPASS

- As mentioned before, you are building roads into prime plant and wildlife habitat. Despite your gates (they carry fence-cutters), this will increase poaching, loss of native plant habitat (wheel tracks and soil impaction), and increase the introduction of non-native species (on tires).

SCENIC RESOURCES

- This is a Class II Scenic Resource Area. Introduction of 200' + towers and turbine blades will permanently degrade the scenic resources of the entire area. These towers and their rotating blades can be seen 30+ miles away. Degrading the scenic resources of this area will seriously impact the surrounding land values, as well as the nearby recreational areas on public land, and the Pacific Crest National Scenic Trail.

CUMULATIVE, LONG-TERM EFFECTS OF THIS PROJECT

- As mentioned in my introduction, placing MORE turbines in this "turbine-cluttered" area of Kern County will lead to the building of even MORE turbines in the future. You are helping E. Kern County turn into a really undesirable area to live; and you are helping to permanently destroy any kind of recreational value this land once had.

THREE QUESTIONS

- Do you have any designs on the water resources of this area? You tried, unsuccessfully, several years ago to pump groundwater from Cantil into your L.A. aqueduct. I can't help but notice that the turbine construction is occurring along 2 of the 3 main watersheds that feed into Cantil/Koehn Dry Lake: Jawbone and Pine Tree.
- Are you aware that the Middle Knob ACEC just south of your project is off-limits to windfarm development? The ACEC states that no windfarm development or construction will be allowed inside the ACEC. This ACEC includes section 30, inside Pine Tree Canyon, where you originally had proposed construction of a power-collection substation, as well as 3 sections along the top of Barren Ridge.
- Are you planning to expand your windfarm into the public and private lands (owned by the Rudnicks) directly north of your construction project? If so, do you plan (with the Rudnick's assistance) to develop along the ridgeline that holds the PCNST? Specifically, along Hamp Williams Pass, Back Cyn., and Weldon Peak? If so, you had better involve the citizens of Twin Oaks. They are violently opposed to the type of "windfarm mess" that exists east of Tehachapi.

Sincerely,

Sandra Lee Hare
19808 Meadows Road
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jshare2001@yahoo.com

KERN KAWEAH CHAPTER OF THE SIERRA CLUB

Charles C. Holloway
Supervisor of Environmental Assessment
LA DWP

May 17, 2004

NOP for Pine Tree Wind Development Project WP007-04

Dear Mr. Holloway:

Nothing is accomplished by building 120 MW of peak generation, in a state that may soon have almost 60,000 MW of peak generation, without decreasing the electricity California wastes by 120 MW. This idea is obvious to a department that has kept water consumption constant while increasing population by 30 per cent. We hope the EIR restates your goal of increased efficiency and conservation. The EIR should answer the questions in this message.

If you tour the wind machines between this project and Tehachapi, we are sure you will agree that more than another 120 MW of peak generation could be secured by repairing established wind machines.

Although efficiency and conservation are the chief ways to having sufficient energy with minimum negative environmental effect, replacing fossil fuel, nuclear and hydro with renewable energy is desirable.

We note that the land for this project has unfortunately been zoned for "20 acre estates". We are glad DWP will treat the land so much better than that. The EIR should clarify who will own this land. If the land is leased, we should know how many acres, for how long, and whether grazing or other destructive practices will be allowed. Will the machines be confined to the 425 acres mentioned in the first paragraph of page 12? We object to machines being placed on the ACEC.

Initial Study Checklist

1. (b) Would any Joshua or other trees be taken?
1. (d) How would ground lights be shielded? Generally lights should be under shades that make a 45 degree angle with the ground.

3. (b) Would oil drip from the machines? If so, will that oil become air borne due to passing maintenance vehicles, cattle or high winds?

4. (a) The EIR must detail take avoidance measures. What are the impacts to Mojave ground squirrels and desert tortoises of construction activity during the time of year they are above ground? Will the plants desert tortoises eat be

significantly disturbed or reduced? How will trucks avoid animals and burrows? How will workers be trained to recognize them? Please inform staff at the Desert Tortoise Preserve of this EIR; I lost their contact information, Laura has it <lstockton@lightspeed.net>.

4. (b) Should vehicles avoid streams unless the stream and its banks are dry? Would bridges, such as concrete cinder blocks help? How will streams be restored?

4. (c) In the desert, ephemeral water ways may support trees that are not otherwise found locally; such areas should be considered wetlands. Decision No. 99-1178 is being litigated; perhaps by the time this project begins, No. 99-1178 will not be in effect. The affect of construction on an ephemeral stream's ability to host wildlife must be discussed.

8. (c,d,h) Erosion is one of the largest negative environmental impacts of wind farms in the Tehachapis. Would the affect of grazing cattle add to the affect of roads. Would the increase in impervious surface redirect flood flow enough to cause erosion? Would steep slopes be avoided?

12 (a) Would the increase in dirt roads attract off road vehicles to these roads and to sensitive areas? If so, would law enforcement be available in this remote area?

We will send a hard copy upon request. Thank you for the opportunity to comment,

Arthur Unger
2815 La Cresta Drive
Bakersfield, CA 93305-1719
(661) 323 5569
alunger@juno.com preferred

Scoping Meeting Summary

Scoping Meeting Summary
Pine Tree Wind Development Project

County of Kern
Public Services Building
2700 "M" Street, First Floor Conference Room
May 7, 2004
1:30 PM

Chuck Holloway, Environmental Assessment Supervisor of Los Angeles Department of Water and Power (LADWP) gave a brief introduction by describing the purpose of the meeting and acknowledging the presence of several persons, including Mohammed Beshir, LADWP Project Manager, Linn Gum of Bureau of Land Management, Dwight Deakin of Edwards Air Force Base, Brenda LeMay and Dave Brown of Zilkha Renewable Energy and Thomas Ryan of EDAW. Other agency personnel in attendance included Dave Rickles and Andrea Zajac of the Planning Division of Kern County, and Tania Bonfiglio of LADWP. John Nielsen of Prometheus Energy Services also attended the meeting. Mr. Holloway summarized the principal components of the proposed project. He asked that speakers precede their remarks by giving their name and address, and that attendees sign in at the table near the entry door.

Mr. Holloway then opened the floor to persons wanting to provide a statement.

1. **Mr. William Nelson**
   785 Tucker Road, #G424
   Tehachapi, CA 93561

Mr. Nelson made a statement in the public interested and noted that he will also present a written comment letter prior to the May 18th close of the NOP period, but he summarized his remarks for the record.

Mr. Nelson discussed five broad concepts (rubrics) that should be addressed with respect to the proposed wind power project. These rubrics would also apply to wind power in general in the Tehachapi area.

The five broad rubrics or concepts are as follows:

1. ***Collateral Royalties and Development Royalties:*** How or will the wind power development at the project site foreclose options for development of wind power on public lands? How will same affect or potentially foreclose royalties accruing to the government?
2. ***Transmission Line Facilities:*** Would transmission line facilities for the project be developed as standalone facilities or could they be developed in concert with the transmission needs of other Tehachapi projects? Wind generating capacity of Tehachapi wind resource area is limited by transmission capacity.
3. ***Special District for Wind Power:*** Consider creating a special district with authority over wind power as a primary mitigation vehicle. Such a special district would require Kern

County Board of Supervisors approval and would have authority with specific elements of wind power development in created Wind Energy Districts such as;

Soils management
Resource Management
Site Security
Data Sharing
Community Benefits

4. ***Community Benefits:*** Suggested that the communities affected by wind power developments receive some benefits, either some of the energy produced or other benefits.
5. ***Military Air Space Issues:*** A comprehensive look at how the military's mission is affected by wind power development in the area should be evaluated.

Mr. Nelson discussed nine specific points for consideration in the environmental document:

1. Independent Analysis and Judgment/Programmatic Documentation - Mr. Nelson questioned whether LADWP could exercise sufficient independent judgment to prepare the necessary environmental documentation. LADWP would be challenged to do this and it was suggested that Kern County may be better equipped to provide independent analysis. It was suggested that the environmental analysis be done as a programmatic EIR document. Kern County did prepare a Master Environmental Assessment (MEA) on wind power (circa 1986). Pine Tree is outside of the area considered in the MEA and the information is probably too old be used for tiering the Pine Tree document.

From a programmatic perspective, future expansion of wind power to areas outside of the strict Pine Tree site boundary should be considered in the document, at least to a reconnaissance level. Transmission lines and military issues relative to wind power could also be considered in a programmatic document. Also, the issue of collateral royalties and whether there are adjacent resources to exploit could be addressed.

2. Military Air Space - Wind power could cause changes in the military's flight activities (mission), possibly triggering NEPA and FAA review. This should be discussed in the document.

3. Renewable Energy - LADWP is to be commended for pursuing renewable energy. However, the public interest is served by "optimization of the output". Will any of the power produced be sold outside of the LADWP grid? If so, the power potential must be integrated with other power supplies. Is California Energy Commission review required?

4. Soil and Watershed Impacts - Soil and watershed impacts must be fully addressed. A reduction in land "extensity" (possibly meaning reduction in the footprint of the project) should be accomplished. These impacts could be best addressed by formation of a special district whose prime objective is land stewardship. Such a district could address compensation for soil erosion, road impacts, and habitat reduction.

5. Project Alternatives – The evaluation should investigate alternatives relative to renewable generation. Project alternatives should include at least three levels of intensity of use or analysis.

First, from the site plan make progressively finer passes at reducing the project footprint to reduce impacts. Second, look at offsite alternative sites for wind power, lesser level of detail, in the north LA County and South Kern County areas. Third, consider specific plans in the Rosamond, Mojave, and other areas.

6. Cumulative Impacts – Cumulative impacts of the project could be extensive. There is concern about opening up areas to human activity through use of wind farm roads. The site should be sealed off from public access. For example, access to the aqueduct and maintenance roads has allowed off-road users access to areas they ordinarily would not have access to.

The cumulative affects of lighting on wind turbines and other FAA requirements should be addressed. This is an area where a special district could be effective.

The extent to which wind power can be used to move water around the west should be revealed. This could be an important issue. Will wind power be used to drain aquifers?

7. Growth Inducing Impacts - Will electric utilities use wind power to support growth in service areas? This would not be good. There should be a demonstrable program of load flattening or the use of electrical power generated by wind should be quantified. There needs to be an environmentally compelling argument for its use.

8. Community Benefits – Community benefits could be coordinated through special district formation. Address local community benefits of establishing wind combining district lands? The EIR should explore the extent to which power generation can be oriented to local use. Explore the feasibility of emergency power covenant with the local community in the event of power outage, for instance.

Another possible community benefit would be to give preferential off-peak access to power produced by local public agencies.

9. Data Sharing - The wind power industry is still in the developmental stage and would benefit from:

- An industry-wide sharing of development and operating data
- Feasibility and issues of special districts
- Proprietary data

In particular, the public sharing of data on meteorology and military issues would benefit the local industry.

Other information that could be shared includes information on the reliability of facilities and transmission needs. This would include seeking to coordinate with other developers about transmission capacity with the goal of minimizing the impacts of constructing new facilities through minimizing the opening of new corridors to impacts.

2. **Mr. Phil Rudnick**
   301 Fairway Drive
   Bakersfield, CA 93309

Mr. Rudnick recounted his experience as chairman of a citizen's board on issues facing Kern County. Over 700,000 citizens were represented by the members of the board. The number one issue of concern was air pollution. LADWP is to be commended for implementing clean energy. This project could set an example for the state. He suggested that the project not be "nit-picked", but that it should be done right. It was noted that Governor Schwarzenegger is pushing for development of renewable energy sources to meet the needs of the state. LADWP commitment to a percentage of renewable energy is positive. He recommended that the impacts of the project be recognized but that it come on-line soon, and stated that we "...do not want to make the perfect the enemy of the great".

3. **Mr. Dwight Deakin**
   Edwards Air Force Base
   Logistic Management Specialist
   AFFTC/XRX Bldg. 0001, Rm. 110
   #1 South Rosamond Blvd.
   Edwards AFB, CA 93524-1036

Mr. Deakin commended LADWP for their willingness to work with the military to resolve flight corridor issues. He wanted to clarify that based on the Isabella Military Operations Area (MOA) requirements, the military is allowed to fly at 200 feet above ground level (not 500 feet mentioned earlier) and that this does not represent a change in mission.

Additional Consultation Letter

SIERRA CLUB KERN-KAWEAH CHAPTER

Printed on 100% Recycled Paper

August 17, 2004

Charles Holloway
Department of Water and Power, City of Los Angeles
111 North Hope Street, Box 5111
Los Angeles, CA 90051-0100

Dear Mr. Holloway,

The following are the comments of the Kern-Kaweah Chapter of the Sierra Club regarding our observations/concerns following our field visit to the Pine Tree Canyon site on July 15, 2004. We appreciate this opportunity to express our concerns and wish to again thank you for accommodating our group on the field trip.

The project site is a highly scenic and biologically rich area which deserves a thorough evaluation before development occurs. We wish to express support for some of the project accommodations which we see as environmentally sensitive: underground power lines (trenches in the road), using aqueduct water for the operations/maintenance building, and using tubular towers.

In addition, the following are suggestions to further minimize environmental impacts: 1)Lights - install lights facing down to preserve the qualities of the night sky and rural environment. 2) Towers - avoid solid red or incandescent lights which studies have shown attract night migrating birds (USFWS). 3) Employees/Worker Contracts - both short term and long term employees should be required to become familiar with the dominant plant and wildlife species on the site. In addition, they should become educated with the designated sensitive species, as well. Too often, a worker's ignorance of local species results in disregard/destruction of local habitat and wildlife. 4) We strongly suggest the use of local native plants for any required revegetation. 5) Laydown area, Section 36 - avoid removal of junipers.

CONCERNS

I. ROAD CONSTRUCTION - The plan to widen existing roads to 34 feet in sections 2, 3, and 11 has potentially significant impacts. The removal of native vegetation will include trees such as: juniper, pinyon pine, digger pines, and riparian species. In the planned multiple stream crossings, widening the road will require extreme modifications to accommodate vehicular traffic. One example is Fall Creek in sections 2 and 11. The Notice of Preparation states that "any cutting and filling from road and pad grading *would be balanced on site" and "surplus sand and gravel from onsite activities are anticipated to be of a sufficient amount to meet the needs of a construction borrow pit." What is the definition of "balanced on site"? Does this practice have the potential for increased surface run-off?*

2. EROSION / HYDROLOGY- Severe accelerated erosion has occurred along the Horned Toad Ridge in Tehachapi from past wind farm development. The widening of existing roads, new road building, clearing, and grading will create potentially significant impacts to soils in the project area as well. In addition, potentially significant impacts are expected to water quality, drainage patterns, and off-site flooding. Both Jawbone Canyon and Pine Tree Canyon are designated flood zones. What modifications or mitigations will be made to minimize effects on stream flows? The best mitigation may be to avoid moderate/high risk areas.

3. BIOLOGICAL RESOURCES: VEGETATION and WILDLIFE–

a. The proposed project has a potentially significant impact on plant and wildlife species designated as a candidate, sensitive, or special status species, of which some are known to occur on the site. What are the planned mitigations for sensitive species?
b. The project may adversely affect some riparian habitats on the site during road widening and stream crossing modifications.
c. We have concerns over possible effects on wildlife movement, disruption of wildlife nursery sites, and nesting sites, as mentioned in the Notice of Preparation.
d. Protocol Surveys were conducted on the site; for which plant or animal species were these surveys conducted?
e. The northern portion of the project is within the Jawbone Butterbredt Area of Critical Environmental Concern (ACEC), designated by the BLM for cultural and wildlife values. How will these values be protected?
f. Introduction of non-native plant or animal species is a concern. How will this potential impact be avoided?
g. Revegetation, where appropriate, must be implemented with local native plant species, not imported species.

4. AVIAN RESOURCES – The eastern Southern Sierran foothills are historic migration pathways for passerine species. Well-known sites such as Butterbredt Spring, Jawbone Canyon, Archie Canyon, and Dove Spring are migration "hotspots" in the both the spring and fall. The avian specialist commented that during his field surveys he noted insignificant numbers of birds in the area. We suggest re-conducting the avian surveys throughout the fall and spring of the coming year to more accurately assess the migration value of this area. In addition to the passerine species, we are concerned with the impacts on local raptor populations. This region is not "raptor-rich" like the

Altamont Pass; therefore, even the death of one raptor is significant. We observed a pair of golden eagles soaring above us on Section 36.

5. VISUAL / AUDIAL IMPACTS – The project site is remote; however, impacts to nearby Pacific Crest Trail (PCT) users, who have already hiked through several miles of wind farms to the south, may be felt. The cumulative impacts must be considered.

In conclusion, this project holds potentially significant impacts to biological and cultural resources, geology and soils, hydrology and water quality, visual and audial impacts. While this project will assist in reducing air pollution, it will certainly contribute to the further fragmentation of the local southern sierran habitat. Wind energy is a positive element in the effort to clean up California's air; however, what could be lost in the process to develop wind facilities requires a thorough evaluation. Of local concern, is the potential for future wind facilities north of this proposed project on the large tracts of open space currently used for grazing. In areas identified as rich in biological, cultural, or visual resources, it may be appropriate to completely avoid development.

Again, we appreciate this opportunity to comment, as well as your consideration of our concerns at this point in the planning process. We look forward to future communications with you and the staff involved in this project.

Sincerely,

Georgette Theotig

Georgette Theotig
P.O. Box 38
Tehachapi, CA 93581

cc: Tania Bonfiglio, Brenda LeMay, Dave Brown

Correspondence Related to the R-2508 Air Space Complex

R-2508 COMPLEX SUSTAINABILITY OFFICE

EDWARDS AIR FORCE BASE, CALIFORNIA

AFFTC/XPX
1 South Rosamond Boulevard
Edwards AFB CA 93524-1036

Mohammed Beshir
City of Los Angeles, Department of Water and Power
111 N. Hope Street, Room 1250
Los Angeles CA 90012

Dear Mr. Beshir

Thank you for the opportunity to comment on the LADWP Pine Tree Project. We have reviewed the preliminary placement of the turbines and transmission line. As you know, this project is being proposed in the middle of several military routes and special use airspace known as the R-2508 Complex. Any such placement of a project of this size will affect the utility of such routes and airspace. However, in specific cases these impacts can be mitigated. The Pine Tree Project is one of those cases where limiting the overall blade tip height to 400' above ground level and reducing the overall footprint of the project helps to mitigate the impacts. Based on this information, we do not anticipate significant mission impacts from this project on the military operations in the area.

The R-2508 Complex Sustainability Office (CSO) appreciates the continued efforts of your department in assuring compatible land use in this region. We look forward to reviewing the EIR when it is released. If the R-2508 CSO can be of any assistance to you in the future, please contact Dwight Deakin at (661) 277-2412, Tony Parisi at (805) 989-9209, or Ray Marler (760) 380-3035.

Sincerely

DWIGHT A. DEAKIN
Complex Sustainability Officer

AIR FORCE FLIGHT TEST CENTER
EDWARDS AFB, CA 93524-1036

NAVAL AIR WARFARE CENTER WEAPONS DIVISION
CHINA LAKE, CA 93555-6001

NATIONAL TRAINING CENTER
FORT IRWIN, CA 92310

Appendix B

Geotechnical Reconnaissance
Ninyo & Moore
September 14, 2004

Ninyo & Moore
Geotechnical and Environmental Sciences Consultants

GEOTECHNICAL RECONNAISSANCE
PINE TREE WIND PROJECT
KERN COUNTY, CALIFORNIA

PREPARED FOR:
EDAW
2737 Campus Drive
Irvine, California 92612

PREPARED BY:
Ninyo & Moore
Geotechnical and Environmental Sciences Consultants
5710 Ruffin Road
San Diego, California 92123

September 14, 2004
Project No. 105284001

Ninyo & Moore
Geotechnical and Environmental Sciences Consultants

September 14, 2004
Project No. 105284001

Mr. Thom Ryan
EDAW
2737 Campus Drive
Irvine, California 92612

Subject: Geotechnical Reconnaissance
Pine Tree Wind Project
Kern County, California

Dear Mr. Ryan:

Transmitted herein are the results of Ninyo & Moore's geotechnical reconnaissance study for the Pine Tree Wind Project. We understand that the results of our study will be incorporated in the Pine Tree Wind Project Environmental Impact Report (EIR), to be prepared by EDAW. Our study was conducted in accordance with our proposal dated July 14, 2003, and presents our preliminary findings and conclusions pertaining to the proposed Pine Tree Wind Project.

We appreciate the opportunity to be of service. Should you have any questions or comments regarding this report, please contact the undersigned at your convenience.

Respectfully submitted,
NINYO & MOORE

Francis O. Moreland, C.E.G
Senior Project Geologist

REGISTERED GEOLOGIST
FRANCIS O. MORELAND
No 2071
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

Erik Olsen, G.E.
Chief Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
ERIK OLSEN
No. 2218
Exp. 3/31/06
GEOTECHNICAL
STATE OF CALIFORNIA

Gregory T. Farrand, C.E.G
Principal Geologist

RTW/FOM/RI/EO/GTF/rlm/msf

Distribution: (4) Addressee

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1. INTRODUCTION

This report presents the results of our limited geotechnical reconnaissance for the proposed Pine Tree Wind Project, located in the southern Sierra Nevada Mountains, in Kern County California (Figure 1). The purposes of this limited study were to evaluate the general geologic and geotechnical conditions, and to present our findings, conclusions, and preliminary mitigation recommendations, for inclusion in the Environmental Impact Report (EIR). Our study was performed in general accordance with our proposal dated July 14, 2003. Subsurface exploration and laboratory testing of materials were not included in the scope of this evaluation.

2. SCOPE OF SERVICES

The scope of services for this study included the following:

- Review of readily available background project documents including geologic maps, geotechnical reports, soil surveys, and aerial photographs.
- Geologic reconnaissance by a California Certified Engineering Geologist of accessible portions of the site, to observe and map surface soil and geologic features.
- Compilation and analysis of the data obtained.
- Preparation of a this report presenting our findings, conclusions, environmental impacts, and preliminary mitigation recommendations for inclusion as a section of the EIR.

3. PROJECT DESCRIPTION

The City of Los Angeles Department of Water and Power (LADWP) and the U.S, Department of the Interior, Bureau of Land Management (BLM) will need an EIR and Environmental Assessment (EA) for the proposed Pine Tree Wind Project, as required by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The project will involve the construction of approximately 80, 1.5-megawatt (MW) wind turbine generators, additional permanent meteorological towers, transmission lines, a substation, and an operations and maintenance building. In addition, existing roads will be improved and new roads constructed to provide construction and maintenance access to the turbine generators. The new roadways will be unpaved and where possible follow existing road alignments. The proposed project will provide clean and renewable electrical power to southern California.

Based on review of project documents, the wind turbines will consist of a horizontal axis with a three-bladed, 253-foot diameter rotor. The turbines/rotors will be mounted on an approximately 15-foot diameter, 213-feet high, tubular steel tower. As discussed, we understand that 80 wind turbines will be installed at the site. The turbines would be constructed along separate ridges in groups or "strings" of between two to 16 towers per string. An approximately 8-foot-by-8-foot concrete pad will be constructed near the base of each tower to support a transformer. It is anticipated that foundations for the turbines will consist of either spread footings or a vertical monopier foundation. The project will also include an approximately 8-mile long 230 kV transmission line and switching station. The line will extend from the project substation down into Pine Tree Canyon, following the canyon out to LADWP's regional transmission line. The switching station will be provided at the project transmission line's connection to the regional line.

4. PROJECT LOCATION

The project site is located in the southern Sierra Nevada/Tehachapi Mountains, approximately 12 miles north-northeast of the community of Mojave, and roughly 10 miles west of Red Rock Canyon State Park, in Kern County, California. We understand the property consists of two primary landholdings, the Hansen Ranch property owned by the Hansen Family and the GE properties owned by General Electric Wind Energy, LLC (GEWE). The primary access to the project is via Jawbone Canyon Road, northwest of Highway SR 14. Access to the site may also be made from the southeast via Pine Tree Canyon. Several locked gates are present along both access routes.

5. SITE DESCRIPTION

The site consists of approximately 8,500 acres of generally undeveloped ranch land. Numerous dirt roads, presumably associated with the ranch activities are present. A small ranch house is located near the mid-portion of the site. We understand that the house is occasionally used; however, it is not permanently occupied. Several abandoned ranch type structures are also present on the property. To the north and west of the site, numerous wind turbines can be seen along an adjacent ridgeline. These wind turbines are associated with the Sky River Ranch wind turbine development and are not a part of this project.

In general, the more topographically prominent features at the site include Jawbone Canyon, Pine Tree Canyon, and Cross Mountain. While Cross Mountain is not located on the subject property, it is a dominant geographic feature in the site area. Jawbone Canyon, located on the northeast portion of the site, generally drains toward the northeast, east, and southeast, while Pine Tree Canyon, located on the southwest portion of the site, generally drains toward the east and southeast. Numerous smaller tributary drainages discharge into Jawbone and Pine Tree Canyons. These drainages are characterized by narrow canyons, which broaden to relatively wide desert washes. Between Jawbone and Pine Tree canyons, the topography varies from rolling grass-covered hills, to brush-covered steep-sided mountain ridges and ravines. Elevations range from approximately 3,000 feet above mean sea level (MSL) near Jawbone Canyon, to over 5,000 feet MSL, near the northwest and southwest portions of the site.

6. GEOLOGY

The following sections present our findings relative to regional geology, site geology, groundwater, faulting and seismicity, slope stability, agricultural soils, and mineral resources.

6.1. Regional Geologic Setting

The project area is situated in the southern section of the Sierra Nevada Geomorphic Province. This geomorphic province encompasses an area that extends approximately 400 miles from near Lassen Peak in Northern California, to the Mojave Desert in Southern California (Norris and Webb, 1990). The province varies in width from approximately 40 to 100 miles. In general, the province consists of rugged mountains underlain by Jurassic metavolcanic and metasedimentary rocks, and Cretaceous igneous rocks.

The Sierra Nevada Geomorphic Province is bounded on the south and east by a group of faults and fault zones trending roughly east-west and north-south. Several of these faults, which are shown on Figure 3, Fault Location Map, are considered active faults, (i.e., faults that exhibit evidence of ground displacement in the last 11,000 years). The closest major active faults to the site include; the Garlock Fault system (left lateral, strike-slip) located to the south, the Southern Sierra Nevada Fault zone (normal fault), located to the east, and the White Wolf Fault zone (reverse fault), located to the northwest. The inactive, Jawbone Canyon fault is mapped approximately 2 miles northeast of the site. Further discussion of faulting relative to the site is provided in the Faulting and Seismicity section of this report.

6.2. Site Geology

Based on our review of published geologic maps and our field observations, the project site is generally underlain by a highly varied series of sedimentary formations (e.g. sandstone, limestone, dolomite, siltstone, shale, chert, conglomerate), volcanic formations (e.g. andesite, basalt, tuff, tuffaceous sandstone, rhyolitic felsite), granitic rocks (e.g. quartz monzonite, granite, quartz diorite, hornblende diorite, gabbro), and metamorphic rocks (e.g. gneiss, schist, quartzite). Unconsolidated materials such as topsoil and colluvium, alluvial sediments, older alluvium, and slopewash deposits overlie these units.

During our field reconnaissance, performed between June 27 and June 29, 2004, we mapped the more prominent geologic units observed along roads that were accessible by a 4-wheel drive Jeep vehicle. Figure 3 presents a geologic map of the subject site. The map was compiled by using information obtained from published geologic maps and modified based on our geologic field observations.

The following table presents a summary of the published geologic units and anticipated geotechnical characteristics that may be encountered during construction of the proposed project. The table includes the geologic unit, relative age, lithologic description, slope stability, excavation characteristics, and occurrence.

Table 1 – Summary of Geologic Units and Geotechnical Characteristics

Geologic Unit (published name)	Age	Lithologic Description	Slope Stability	General Excavation Characteristics	Occurrence	Wind Turbine Towers/ Laydown Areas/ Roads or Structures
Fill (not a mapped unit)	Recent	Loose clay, silt, sand, gravel, and cobbles. (Generally derived from local geologic units).	Unstable on slopes and subject to erosion	Easy	Generally associated with road construction and small earthen dams.	No wind turbine towers, laydown areas, or structures founded on existing fill. Existing roads founded on variable depths of fill.
Alluvium/ Stream channel deposits Colluvium/ Topsoil/ slopewash (not a mapped unit)	Recent to Quaternary	Loose to dense, clay, silt, sand, gravel, and cobbles.	Unstable on slopes and subject to erosion	Easy, relatively large boulders may be present in slopewash	Alluvium is present in Jawbone Canyon, Little Jawbone Canyon, tributary drainages, and locally in broad valleys. Colluvium/ topsoil is present on hillsides and relatively steep slopes. Slopewash is present near the base of moderately steep to very steep slopes.	No wind turbine towers founded on these units. Laydown areas 5, 12, and 13, and a portion of Substation 11 and O & M building may be underlain by alluvium. Roads constructed in or across canyons or drainages may be underlain by alluvium.
Volcanic: (Kinnick Formation)	Tertiary	White tuff, tuffaceous and arkosic sandstone, basalt	Moderately stable	Moderate to very difficult in basalt.	Unit mapped adjacent to site.	No wind turbine towers, laydown areas, or roads founded on this unit.
Sedimentary: (Witnet Formation)	Tertiary	Arkosic sandstone, siltstone, conglomerate	Moderately stable to unstable on steep slopes.	Moderately easy to excavate. Will vary with cementation. Conglomerate more difficult to excavate.	Conglomerate unit mapped across Section Nos. 1 through 4, 10, 11, 14, 15, and 36.	No wind turbine towers or laydown areas founded on this unit. Portions of proposed roads will be underlain by this unit.
Volcanic Intrusive: (Tropico Group)	Tertiary	Rhyolite, rhyolitic felsite	Generally stable	Difficult to very difficult to excavate.	Intrusive rocks generally located on the northeast portion of the site.	Tower No. 35-8 Tower Nos. 1-7, 1-B2, 1-12, 1-16. Tower Nos. 12-1, and 12-2 through 12-8. Portions of proposed roads will be underlain by this unit.

Table 1 – Summary of Geologic Units and Geotechnical Characteristics

Geologic Unit (published name)	Age	Lithologic Description	Slope Stability	General Excavation Characteristics	Occurrence	Wind Turbine Towers/ Laydown Areas/ Roads or Structures
Granitic Rocks	Mesozoic	Undifferentiated, granite, quartz monzonite, tonolite	Generally stable in non-fractured areas. Core stones may produce rock fall hazard.	Variable. Moderate to very difficult, due to weathering and fracture/jointing patterns and frequency. May require blasting.	Granitic rocks mapped across the site, except in Section No. 34.	**Tower Nos.** 1-2 through 1-6, 1-8 through 1-11, 1-13 through 1-15, 1-17, 1-18, 1-B1, 1-B2, 1-B3, and 35-10. **Tower Nos.** 2-4, 2-5. **Tower Nos.** 3-4 through 3-6, 3-8, 3-9, 3-B1, and 3-B2. **Tower Nos.** 7-B1, 7-B2 and 7-B3. **Tower Nos.** 11-1 through 11-4, and 11-B1. **Tower Nos.** 12-9, 12-B2, and 12-B3. **Tower Nos.** 13-1 through 13-6. **Tower Nos.** 14-1 through 14-4. **Tower No.** 1-1. **Tower Nos.** 35-4 through 35-7, and 35-9. **Section 35:** O & M building and a portion of the laydown area, may be underlain by granitic rock. Large portions of proposed roads will be underlain by granitic rock.
Metamorphic Rocks	Pre-Cretaceous	Gneiss, schist, quartzite, with limestone/dolomite roof pendants.	Generally stable, resistant, ridge building material. Fractured zones may produce rock fall hazard.	Difficult to very difficult, depending of fractures and weathering, may require blasting	Generally located near the northwest portion of the site, in portions of Section Nos. 2, 3, 4, 33, 34, and 35.	**Tower Nos.** 2-1 through 2-3. **Tower Nos.** 3-1, 3-2, 3-3, and 3-7. **Tower Nos.** 34-1 through 34-6. **Tower Nos.** 35-1, 35-2, 35-3, and 35-B1 through 35-B-4. **Section 35:** Laydown Area 5 AC. Portions of proposed roads will be underlain by this unit.

Table 1 – Summary of Geologic Units and Geotechnical Characteristics

Geologic Unit (published name)	Age	Lithologic Description	Slope Stability	General Excavation Characteristics	Occurrence	Wind Turbine Towers/ Laydown Areas/ Roads or Structures
Dolomite	Pre-Creta-ceous	Dolomite/ limestone undif-ferentiated Roof pendants	Generally stable, however fractured zones may produce relatively large boul-ders/ rock fall hazard.	Moderately diffi-cult to very difficult, may require blasting	Forms promi-nent ridges. Section Nos. 1, 2, 3, 12, 13, 33, 34, 35, and 36.	Tower No. 35-10. Tower No. 34-5. Portions of proposed roads will be under-lain by this unit.

6.3. Groundwater

Based on the site location and our experience in the vicinity of the site, groundwater is likely to be at depths greater than 100 feet over the majority of the site. In the major valleys on the site, such as Jawbone Canyon, groundwater can be expected near the surface, particularly during periods of wet weather. Portions of Jawbone Canyon, Little Jawbone Canyon, and Pine Tree Canyon to the south of the project are classified as Federal Emergency Management Agency (FEMA) 100-year flood plains. During our field reconnaissance, surface water flow was observed in a portion of Jawbone Canyon. In addition, several springs have been mapped by others within the project boundaries. In general, these springs are not expected to be a constraint to construction of the project and proposed facilities have been sited to avoid these natural areas. Groundwater levels can fluctuate due to seasonal variations, well pumping, and other factors.

6.4. Rippability

Our evaluation of the excavation characteristics of the on-site materials is based on the results of our site observations and our experience with similar materials. In general, excavation for wind generator pads and deep foundations on ridge tops may encounter relatively hard rock at shallow depths which would entail heavy ripping, blasting, or specialized drilling techniques. Roadway construction on steep slopes is also likely to encounter relatively hard rock at shallow depths which would entail blasting. General excavation characteristics for geologic units on the subject site are presented in Table 1.

6.5. Blasting Operations

Blasting operations involve different forms and techniques of drilling and blasting designed to facilitate the mass excavation of non-rippable and marginally rippable earth (rock) materials in an efficient and cost effective manner and can be modified to minimize environmental impacts. Where blasting is required for site construction, it is expected to be confined to excavations for proposed roadways, cut slopes, tower pads, and foundations.

The contractor performing blasting at the site is expected to comply with applicable regulations and standards established by the regulatory agencies, codes and professional societies, including the rules and regulations for storage, transportation, delivery and use of explosives. Whenever blasting operations are in progress, explosives shall be stored, handled, and used as provided by law, including safety and health regulations for construction.

From a geotechnical perspective, potential blasting impacts during construction are expected to be minimal since no existing buildings, structures or offsite properties are located in close proximity to areas of anticipated blasting. Blasting impacts will be minimized with implementation of an approved blasting plan. Potential blasting impacts fall into the following categories: a) flyrock, b) air blast and over pressure, and c) ground vibration.

6.5.1. Flyrock

The generation of flyrock may be a concern to for people, structures, and wildlife. Flyrock impacts are controlled by the proper design and execution of the blasting program. This may be accomplished by using small explosive charges strategically placed within the drill hole, proper stemming of each drill hole above the charge, and proper layout of the drill hole template at the tower foundations and other planned excavations. Use of slow timing sequences between charges allows the fragmented earth material to move within the planned excavation and reduce the energy escaping into the environment.

6.5.2. Air Blast or Over Pressure

Blasting can create a change in barometric pressure or air overpressure of short duration (less than a few seconds), which is sensed by humans and wildlife. This pressure change can be monitored during construction and measured using a standard seismograph that is commonly used in blasting operations. The air blast is the "noise" created by the short duration change in barometric pressure. Specific measures can be implemented to reduce greatly the air blast created from blasting. For example, the proper stemming of drill holes, use of proper confinement factors, control of the blast by the proper selection and size of explosives, and use of environmentally friendly detonation cords can be employed in areas sensitive to air blast or over pressure.

6.5.3. Ground Vibration

Ground vibrations of short duration (less than several seconds) are produced during construction blasting that may cause damage to structures located close to the area of blasting. Vibrations can be monitored during construction and measured using a standard seismograph that is commonly used in blasting operations. For areas sensitive to vibrations, the blasting program shall be designed to minimize ground vibration impacts and shall employ monitoring of vibrations during construction.

6.6. Faulting and Seismicity

The project site is considered to be in a seismically active area. Based on our review of the referenced reports and geologic maps, as well as on our geologic field reconnaissance, the project site is not underlain by known active faults (i.e., faults that exhibit evidence of ground displacement during the last 11,000 years). The Garlock Fault, the nearest known active fault, has been mapped approximately 5 miles southeast of the wind turbine generator site and approximately 2,500 feet southeast of the proposed switching station near State Highway 14. The Garlock Fault is capable of producing a Magnitude 7.3 earthquake and is located within an Alquist-Priolo Earthquake Fault Zone. No portion of the site, transmission line, or switching station is within an Alquist-Priolo Earthquake Fault Zone.

In general, hazards associated with seismic activity in the project area include strong ground motion, ground surface rupture, liquefaction, and seismically induced settlement. These potential hazards are discussed in the following sections.

6.6.1. Strong Ground Motion and Ground Surface Rupture

Based on a Probabilistic Seismic Hazard Assessment for California issued by the United States Geological Survey/California Geological Survey, 2002, (Revised April 2003), the project site is located in a zone where the horizontal peak ground acceleration having a 10 percent probability of exceedance in 50 years is 0.33g (33 percent of the acceleration of gravity). The requirements of the governing jurisdictions and applicable building codes should be considered in the project design.

6.6.2. CBC Seismic Design Parameters

According to the 2001 CBC, the proposed project site is in Seismic Zone 4. The site is within a CBC Near-Source Zone for active faults. Table 1 includes the seismic design parameters for the site as defined in, and for use with, the 2001 edition of the CBC.

Table 2 – Seismic Design Parameters

Parameter	Value*	2001 CBC Reference
Seismic Zone Factor, Z	0.40	Table 16 – I
Soil Profile Type	S_C	Table 16 – J
Seismic Coefficient C_a	0.42	Table 16 – Q
Seismic Coefficient C_v	0.73	Table 16 – R
Near-Source Factor, N_a	1.1	Table 16 – S
Near-Source Factor, N_v	1.3	Table 16 – T
Seismic Source Type	A	Table 16 – U

*Formulated using the computer program UBCSEIS (Blake, 2000)

6.6.3. Liquefaction

Liquefaction of cohesionless soils can be caused by strong vibratory motion due to earthquakes. Research and historical data indicate that loose granular soils and non-plastic silts that are saturated by a relatively shallow groundwater table are most susceptible to liquefaction. Based on topography, the lack of a shallow groundwater table, and the relatively dense nature of the subsurface materials on the upper portions of the site, it is our opinion that the potential for liquefaction in these areas is not a design consideration. In the lower alluvial valleys, such as Jawbone Canyon and Pine Tree Canyon, there is a moderate potential for liquefaction of the alluvial soils within the valleys, particularly after heavy rain storms when the ground water level may rise to near the surface in the valleys. Based on ground water levels measured in nearby wells, ground water beneath the proposed switching station is at a depth greater than 200 feet below the surface and therefore, liquefaction is not a design consideration.

6.6.4. Volcanic Hazards

Based on our review of referenced geologic maps and literature, there are no known active or potentially active volcanic hazards underlying or adjacent to the subject site. Accordingly, the potential for volcanic eruption including ejected pumice and/or airborne ash at the site is not considered a design consideration.

6.6.5. Geothermal Wells

There are no known geothermal wells located on the subject site. Geothermal wells are not expected to be a design consideration.

6.7. Slope Stability

Based on the relatively steep inclination of the slopes on a large portion of the site, stability of these slopes will be a consideration during project construction. Many of these slopes have inclinations steeper than 2:1 (horizontal:vertical) with some slopes exceeding 1:1. Some slopes, consisting of slopewash or alluvium, are approaching the angle of repose. Any additional steepening of these slopes, such as cuts for roadway construction, may cause surficial soils to become unstable. More detailed descriptions of the slope stability conditions at the site are presented below.

6.7.1. Landslides

Based on our review of published geologic literature, aerial photographs, and our limited geologic reconnaissance, no deep-seated landslides were mapped or are known to underlie the subject site. However, a few areas of minor surficial slope failures/movement (generally less than 5-feet thick), were observed during our geologic reconnaissance. The features were generally observed on over-steeped natural slopes, and in areas where previous road grading created steep backcuts.

6.7.2. Debris Flows

During our geologic reconnaissance of the accessible portions of the site, we did not observe the presence of debris flows. However, debris flows, triggered by sustained heavy rainfall or during flash flooding events, may occur in some of the canyons and drainages at the site.

6.7.3. Rock Falls

Based on our review of topographic maps and on our field reconnaissance, minor rock falls have occurred locally at the site. Future rock falls may occur down some of the steep slopes within the subject site, particularly during periods of wet weather, or shaking due to a nearby seismic event. Such rock falls may produce relatively large boulders.

6.8. Agricultural Soils

Based on the United States Department of Agriculture Soil Survey for Kern County (1980), prime agricultural soils have not been identified on the project site. Therefore, the potential for loss of agricultural soils due to further development of the study area is considered low. A generalized description of these soils is presented in the following table.

Table 3 – Site Soil Units

Soil Unit No./Name	Occurrence	Agricultural Use
105 Arujo sandy loam	Deep, well drained soil on mountainous uplands. Derived from metamorphic and igneous rocks.	Single leaf pinion pine
132 Edmundston gravelly sandy loam	Deep, well drained soil on mountainous uplands, generally east facing slope of the Tehachapi Mountains. Derived from granitic rock.	Rangeland, pinion-juniper and mixed grassforb and shrubs
148 Jawbone gravelly loamy sand	Shallow, excessively drained, hilly to very steep soil on mountainous uplands. Derived from granitic rock.	Poor rangeland soil due to shallow depth to bedrock, steep slopes, and erosion,
175 Steuber sandy loam	Very deep, well drained, soil on gently sloped alluvial fans and flood plains. Alluvial material derived from granitic rock.	Rangeland, with scattered oak and shrubs, basin wild rye, Sandberg bluegrass, and filaree.
179 Tehachapi sandy loam	Very deep, well drained soil on gently to strongly sloping terrain, such as old alluvial fans and stream terraces, derived from granitic rock.	Vegetation consists mainly of annual grasses, a few perennial grasses, and scattered hardwoods. Suitable for irrigated apple orchards and dry land grain.
193 Walong sandy loam	Moderately deep, well drained soil, derived from granitic rock, on hilly to mountainous upland terrain.	Rangeland vegetation consisting of blue oak, soft chess, bluegrass, and filaree.
194 Walong sandy loam	Moderately deep, well drained steep soil, derived from granitic rock.	Rangeland, although limited by steep slopes.
204 Whitewolf loamy sand	Very deep, very well drained, granitic rock derived soil on gently sloped alluvial fan and stream terrace terrain. (Transition area between Tehachapi Mountains and Mojave Desert).	Rangeland, vegetation limited by available water.
205 Xererts-Xerolls complex	Moderately deep, well drained, mountainous uplands soils. Clay and clay loam	Suited for single leaf pinion pine.
206 Xeric Torriorthents	Shallow, generally well-drained, mountainous upland soils derived from granitic and metamorphic rocks.	Poorly suited for rangeland due to steep slopes and erosion. Vegetation sparse, consists of cheat grass, buckwheat, rabbit brush, juniper, and Joshua trees.
208 Xerolls-Rock outcrop complex	Shallow, well drained, mountainous upland soils.	Sparse vegetation (due to shallow depth) consisting of grasses, sagebrush, and pinion pine.
211 Xerothents-Rock outcrop complex	Shallow, well drained, mountainous upland soils, derived from granitic rock.	Sparse vegetation (due to shallow depth and steep slopes) consisting of grasses and hardwood trees.

6.9. Mineral Resources

Review of Mines and Mineral Resources of Kern County, California (California Division of Mines and Geology, 1963) indicates that although minor amounts of minerals such as gold, antimony, stone, and tungsten have been mined near the eastern side of the site, no commercial amounts of these minerals have been found within the site limits. Based on our review of referenced data, the proposed site is in an area where no significant mineral deposits are present, or are considered likely to exist. Therefore, the potential for loss of mineral deposits due to development of the study area is considered low.

6.10. Erosion

In general, the geomorphology at the project site includes a variety of terrain regimes, ranging from somewhat broad alluvial valleys near the northeastern portion of the site (Jawbone Canyon), to deeply incised drainages and steep mountainous terrain near the mid-portion of the site, and gently rolling hills that transition to a steep ridgeline on the northwest portion of the site. Erosion potential varies within each region and underlying parent material.

At the lower elevations of the site, such as Jawbone and Little Jawbone canyons, scour erosion due to flash flooding is a possibility, particularly in areas where there is a relatively thin soil mantle and water infiltration is poor. Flash flooding or sustained heavy rainfall may trigger erosive conditions such as rock falls and debris flows, particularly at higher elevations. Soil erodibility may also be linked to material type. In areas underlain by granitic parent material, the granitic rock weathers to relatively coarse-grained, loose, or unconsolidated material that is highly susceptible to erosion, particularly on hillsides or steep slopes.

Rates of erosion will likely vary with seasonal, climatic, and man-made influences. There is a potential for erosion at the site due to construction activities. In addition, erosion may be accelerated due to road building construction in or across stream drainages, along steep-sided slopes, or as a result of off-road vehicular traffic, particularly if terrain is traversed during wet conditions.

7. SITE SPECIFIC CONDITIONS/OBSERVATIONS

Our field reconnaissance was performed between June 27 and June 29, 2004. During our field reconnaissance we observed, documented, and photographed, the general site conditions in the vicinity of the proposed wind turbine towers that were accessible with a 4-wheel drive Jeep vehicle. We also observed the general conditions along the access/maintenance roads with regard to the proposed road improvements.

Mapping and detailed notes were obtained and recorded with the aid of a specialized mapping instrument that included a global positioning system (GPS) feature. For mapping purposes, we utilized the same grid system as was used in the naming of the proposed wind towers. The data points are presented on Figure 2. The following section, presents a summary of the more significant geotechnical field observations.

7.1. Section 1

- Data points 1-1 and 1-2, indicate areas where the underlying granitic rock is likely rippable along the existing road.
- Data point 1-4, indicate an area where the existing road is very steep, with approximately 1:1 (horizontal:vertical) slopes that descend away from the ridge. Blasting due to locally hard, resistant rock may be needed near Towers 35-8, 35-9, and 35-10.
- Data point 1-6, indicates the location of a highly weathered shear zone. Relatively loose, erodable material was observed in the existing road backcut, and may pose a rock fall hazard.
- Data points 1-8 and 1-9, indicate areas that may require blasting due to hard rock.
- Data points 1-13 and 1-19, indicate an area where proposed road grading may result in cuts generating oversize material, and fill being placed across drainages. Drainage culverts may also be needed.
- Data point 1-21, indicates an area where the proposed road widening will cross an existing stream drainage. Accordingly, roughly 20 to 30 feet of fill may be needed to support the road.

7.2. Section 2

Data points 2-1 through 2-8 include areas along the south to southeast side of Jawbone Canyon:

- Data point 2-1 indicates an area where the proposed road improvements may be subject to moderate erosion. Slopewash was also noted along adjacent canyon slopes.
- Data points 2-3 and 2-4, indicate the approximate location of two shear zones. One shear is approximately 12-inches wide (s:N59W 50N), and the second shear zone is approximately 1-foot to 3-feet wide (s:N35W 55N).
- Data point 2-5 indicates the location of an abandon ranch-type house.

- Data point 2-6 indicates the location where the proposed road crosses Jawbone Canyon drainage. Potential flooding and erosion issues associated with road construction are likely.

- Data point 2-8 indicates the location of the abandoned Sky River Ranch complex.

- Data point 2-13 indicates the location where a proposed road will be constructed to access Towers 2-4 and 2-5.

7.3. Section 3

- Data points 3-3 and 3-10 indicate topsoil/colluvium overlying metamorphic rocks. This material may be expansive when wetted.

- Data point 3-11 indicates the general location of the proposed road leading to Tower 3-3. The proposed tower is located on the side of a prominent rock outcrop. Colluvium may be present overlying resistant metamorphic rock. Blasting to build roads may be necessary.

- Data point 3-14 indicates an area of intensely weathered, metamorphic and granitic rocks, which are highly fractured. Resistant corestones and zones of clayey slopewash/colluvium were also observed.

- Data point 3-17 indicates an area where proposed road widening may necessitate blasting due to hard rock.

7.4. Section 11

- Data point 11-1 indicates the location of an unimproved, poorly maintained road, with several washouts, and steep narrow sections. Area susceptible to continued erosion.

7.5. Section 12

- Data points 12-1 through 12-4, a generally unimproved area, similar to that described in the previous section. Several "V" type drainages cross the proposed road alignment. Road construction will involve minor cuts and fills. Dolomite likely forms the ridgelines and granite forms the lower slope in this vicinity of the project.

7.6. Section 13

- Data point 13-4, indicates the location of a intrusive dike which trends roughly N80W 80S.

7.7. Section 14

- Data point 14-2 indicates location of the westerly end of the previously discussed intrusive dike. In this location, the dike trends N70W 50S.

7.8. Section 24

- Data point 24-1 indicates the general beginning of the southern entry road from Pine Tree Canyon. The road descends to Pine Tree Canyon through granitic rock ranging from decomposed to slightly weathered. Cuts to reduce turn radii may encounter unweathered granitic rock requiring blasting.

7.9. Section 34

- Data point 34-1 indicates location of MET tower. Ridgeline underlain by metamorphic rocks, which may require localized blasting.

- Data point 34-3 indicates the location of the proposed road intersection. Colluvium is roughly 3- to 4-feet thick in this area.

7.10. Section 35

Our field reconnaissance in this area was generally along the lower portion of Jawbone Canyon, and near the northern portion of the site.

- Data point 35-1S: We observed a small earthen dam across a tributary canyon near the northwest side of Jawbone Canyon. The dam is breached and does not appear to retain water.

- Data point 35-2S: Indicates near vertical road cuts along portions of the existing access road. In addition, a near 1:1 fill slope, roughly 25-feet high, descends away from the road into the Jawbone Canyon drainage. Numerous large boulders were noted in the fill.

- Data point 35-4S, indicates the approximate location of two surficial slope failures, with approximately 3- to 5-foot high backscarps. Slopewash, roughly 10 to 15-feet thick, was also noted in this area.

- Data point 35-5S, Very steep to near vertical road cuts in jointed, granitic rock. Attitudes along joint surfaces were obtained (N55W 90, N55W 80E, and N75E 60S). A steel drill rod, used to excavate holes for blasting, was stuck in the rock, indicating that blasting has occurred here in the past.

- Data points 35-1 and 35-2 indicate the location of a relatively narrow road underlain by surficial slopewash/alluvium with scattered outcrops of dolomite.

- Data points 35-3 and 35-4 indicate areas of locally hard to extremely hard dolomite. Blasting may be required during construction.
- Data point 35-7 indicates area of jointed metamorphic rock with schistose texture (j:N30E;66W and j:N70W:64SW). In addition, hard rock is locally fractured and may be rippable.
- Data Point 35-8 indicates hard, metamorphic rock and granitic rock underlying proposed towers. Blasting possible.

7.11. Section 36

- Data point 36-1 indicates the location of a limestone/dolomite bed across Jawbone Canyon, trending b:N25W 40E.

7.12. Pine Tree Canyon

- Data points in Pine Tree Canyon indicate gate locations. The bottom of Pine Tree Canyon is relatively flat and underlain by alluvium. The alluvium generally consists of silty fine to coarse sand. Larger gravel, cobble, and boulder size clasts were observed at the surface of the alluvium and are likely to be encountered at depth.

8. CONCLUSIONS

Based on our review of published geologic maps and aerial photographs, and our site reconnaissance, no active faults or landslides have been mapped, or were observed within the study area. Several major faults are present in the region south and southeast of the site, the nearest of which is the Garlock fault, located approximately 5 miles southwest of the site. Accordingly, the site has a moderate potential for strong ground motions due to earthquakes on nearby active faults.

As discussed previously, fill soils are present along many of the existing roadways across the site and may also be present elsewhere. The condition of these fill soils is not known and, if improperly placed, they may be subject to settlement. Remedial earthwork may be needed if future structures are to be constructed on existing fills.

We recommend that a comprehensive geotechnical evaluation, including development-specific subsurface exploration and laboratory testing, be conducted prior to design and construction of any structures or improvements. The purpose of the subsurface evaluation would be to further evaluate the subsurface conditions in the area of the proposed structures or improvements and to provide information pertaining to the engineering characteristics of earth materials at the project site. From these data, recommendations for grading/earthwork, blasting, surface and subsurface drainage, foundations, pavement structural sections, sedimentation mitigation, and other pertinent geotechnical design considerations may be formulated.

8.1. Geologic and Geotechnical Conditions and Possible Mitigation Measures

In our opinion, the following geotechnical factors should be considered in the planning and implementation of the project:

- As discussed previously, the active Garlock Fault has been mapped approximately 5 miles to the southeast of the site. The active Southern Sierra Nevada fault zone and the White Wolf fault zone are also relatively close to the site. Accordingly, the site has a potential for moderate ground motions due to an earthquake on these active faults. To mitigate this hazard, the potential for moderate seismic accelerations will need to be considered in the design of proposed structures or improvements.

- Liquefaction of loose alluvial soils in Jawbone Canyon and Little Jawbone Canyon is possible during seismic events on nearby active faults. No structures are currently planned in these alluvial areas but roadways, laydown areas, and power lines will be constructed. Due to the temporary nature of the laydown areas, no mitigation is needed. For roadways, mitigation may include removal of loose alluvium and replacement with compacted fill. Alternatively, any damage caused to the unpaved roads by liquefaction of underlying alluvium could be repaired after the event. For the power line planed for Pine Tree Canyon, mitigation may include densifying the soil in place with vibroreplacement (stone columns), compaction grouting, or the use of deeper than normal foundations. Alternatively, any damage caused to the power lines by liquefaction of underlying alluvium could be repaired after the event.

- Flooding is likely within Jawbone Canyon, Little Jawbone Canyon, and Pine Tree Canyon during a 100 year storm. No structures are currently planned in these alluvial areas but roadways and laydown areas will be constructed. Due to the temporary nature of the laydown areas, no mitigation is needed. For roadways, mitigation may include designing the roadways outside of the 100 year flood plain or designing the roadways to survive flooding through the use of concrete fords and riprap or other engineering measures. Alternatively, any damage caused to the unpaved roads by flooding could be repaired after the event.

- Due to the variable topography at the subject site, many of the proposed roads and tower pads cross, or are adjacent to slopes with inclinations steeper than 2:1. In addition, construction of roads and pads may create cut and fill slopes with inclinations steeper than 2:1. Slopes steeper than 2:1 may be subject to landslides, debris flows, and rock falls. To mitigate these hazards, geotechnical evaluations should be performed to evaluate slope stability and provide recommendations for placement of facilities, types of foundations, and remediation of unsuitable ground. Mitigation measures for unstable slopes may include retaining walls, soil nails, buttress fills, or geofabric stabilized earth. Mitigation measures for debris flows and rock falls may include wire retention devices, diversion berms, or construction of benches on cut slopes.

- The granular nature of the majority of the site soils makes them susceptible to erosion. The graded wind turbine generator pads and numerous access roads required to construct and maintain the wind turbine generators and transmission lines tend to focus surface runoff after rains. The access roads focus overland flow and as such contribute to erosion of the soil. To mitigate erosion during construction and the life of the project, turbine generator pads and roads should be graded to divert flow away from natural slopes toward permanent culverts and swales leading to natural drainage courses. Depending on the slope, energy dissipaters may be needed at the end of the culverts or swales. Pads, roads, culverts, and swales should be consistently maintained for the life of the project. Where roads cross streams, the crossing should be made at right angles to the stream and engineered measures such as concrete fords or bridges should be used to minimize erosion, particularly during storm flows. During construction, best management practices should be utilized including straw bales, silt fences, energy dissipaters, and detention basins to minimize erosion and sedimentation. Areas disturbed by construction should be revegetated as soon as practical after construction and traffic should be limited as much as possible.

- The presence of some non-rippable to marginally rippable materials on the site makes it likely that blasting may be needed for certain excavations, such as for tower foundations, tower pads, roadways, cut slopes and other excavations in formational (bedrock) areas. Actual areas requiring blasting shall be identified in the geotechnical investigation report for design of the project. Blasting impacts due to flyrock, air blast or over pressure, and ground vibration were identified. Due to the remote location of the planned facilities and the lack of existing buildings and structures on and adjacent to the site, the potential impacts due to blasting are anticipated to be relatively minor and of short duration during the construction phase. Potential impacts due to blasting can be mitigated by proper design of the blasting program and monitoring of blasting operations during construction.

9. LIMITATIONS

The field reconnaissance and geotechnical analysis presented in this report have been conducted in accordance with current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No other warranty, implied or expressed, is made regarding the conclusions, recommendations, and professional opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered. Our preliminary conclusions and recommendations are based on an analysis of the observed conditions and the referenced background information.

The purpose of this study was to evaluate geotechnical conditions within the project site and to provide a geotechnical reconnaissance report to assist in the preparation of environmental impact documents for the project. The report is not intended for any design purposes. A comprehensive geotechnical evaluation, including subsurface exploration and laboratory testing, should be performed prior to design and construction of structural improvements.

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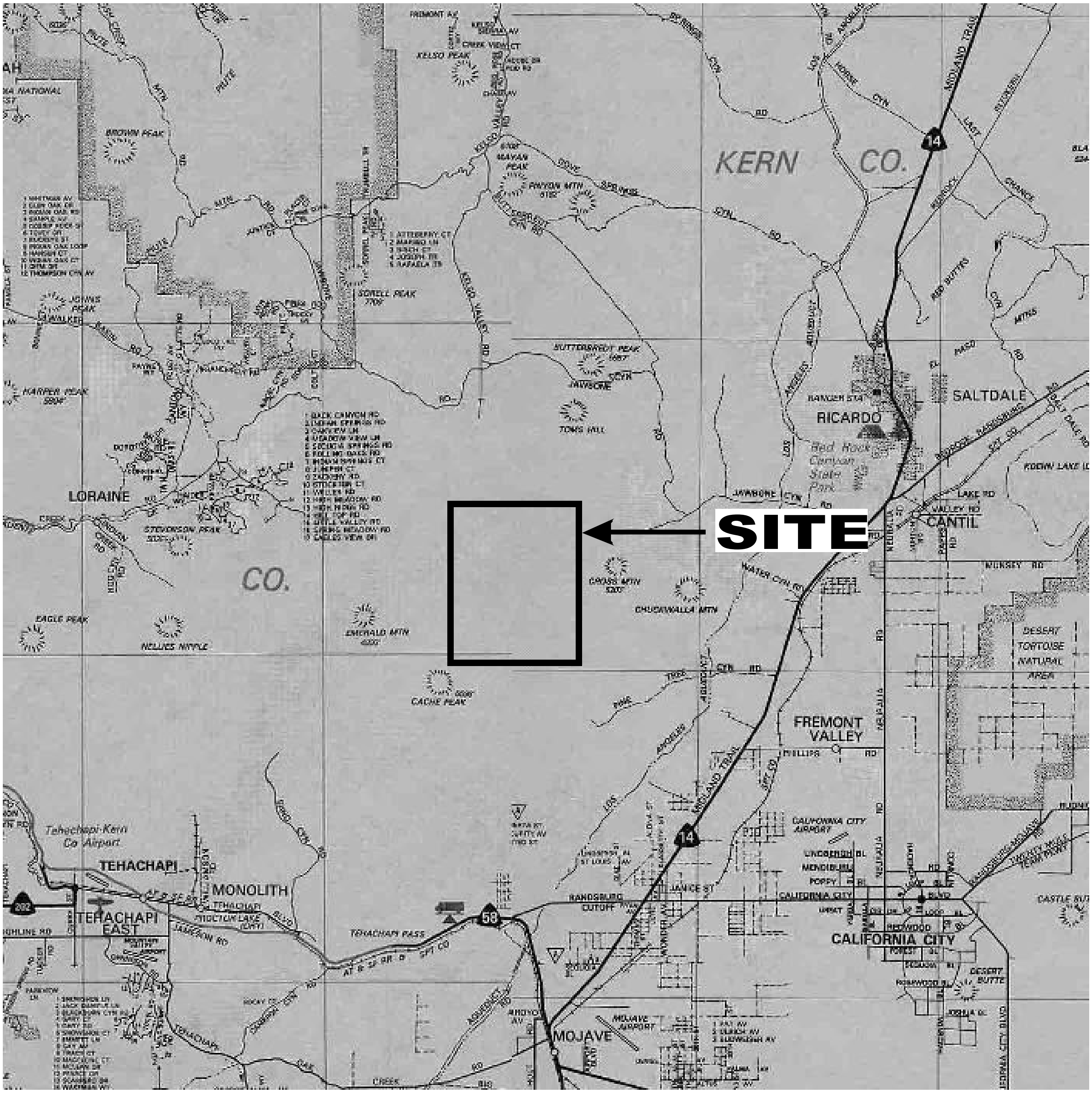

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ApproximateScaleinMiles

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REFERENCE:2004THOMASGUIDEFORCALIFORNIA,ROADATLASANDDRIVER'SGUIDE.

105284001 F SLM Fig 1

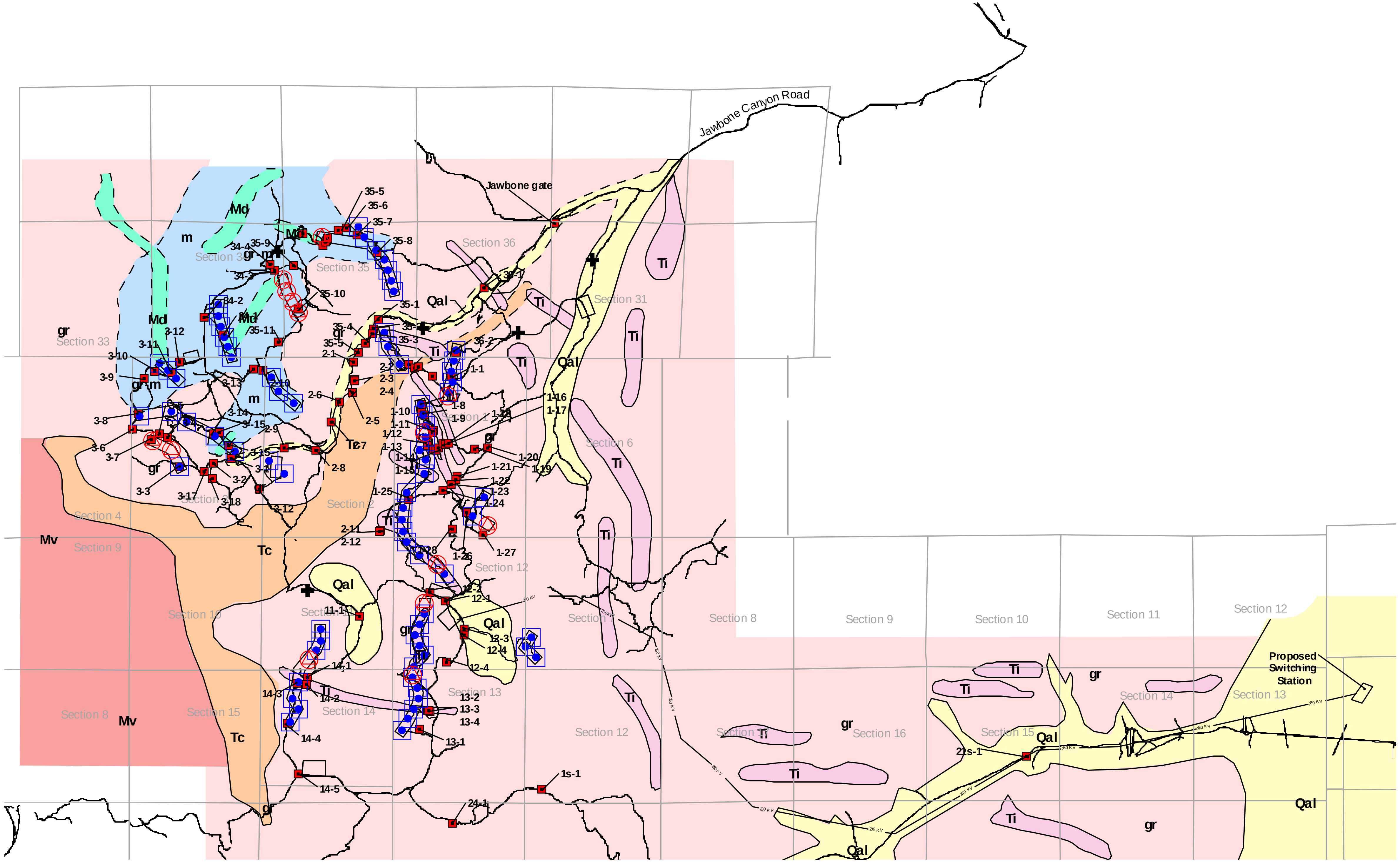
Ninyo & Moore

SITE LOCATION MAP

PINE TREE WIND PROJECT
KERNCOUNTY, CALIFORNIA

PROJECTNO.	DATE
105284001	9/04

FIGURE
1



LEGEND

- Wind Turbine location
- Alternative windmill location
- Turn out
- 36-1 Geologic Data location
- 230 KV Proposed 230 KV T-line

Geologic units:

- Qal Alluvium/stream channel deposits
- Mv Miocene volcanic rock
- Tc Tertiary nonmarine
- Tertiary intrusive (hypabyssal) rocks
- Mesozoic granite rocks
- m Pre-Cretaceous metamorphic rocks
- Pre-Cretaceous dolomite

Geologic contact, dashed where approximately located, gradational or inferred

N

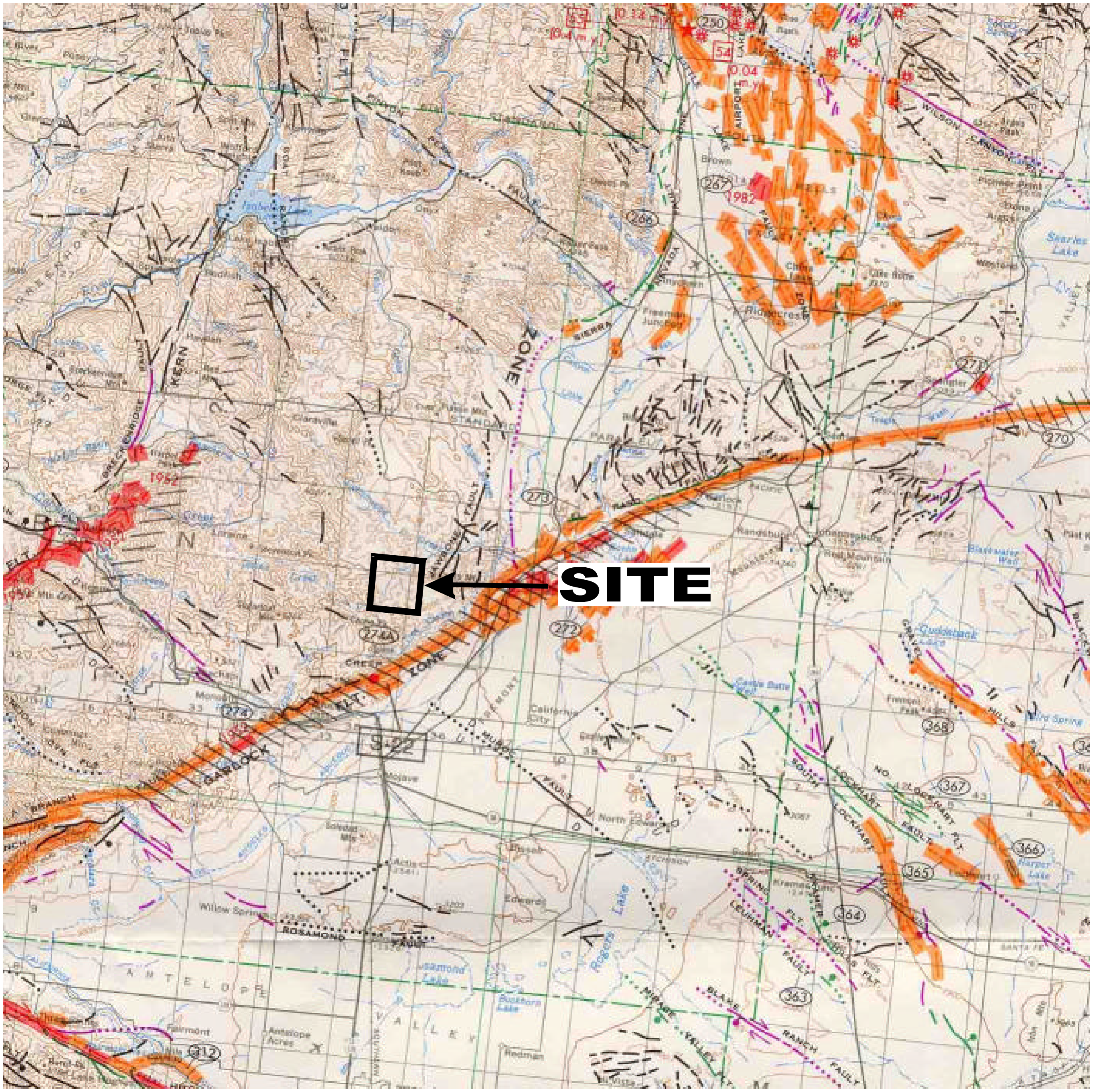
4500 0 4500 Feet

Ninyo & Moore

GEOLOGIC MAP

PINE TREE WIND PROJECT
KERN COUNTY, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105284001	9/04	2



0 12 24

Approximate Scale in Miles

N

REFERENCE: FAULT ACTIVITY MAP OF CALIFORNIA AND ADJACENT AREAS. DATED 1994.

Ninyo & Moore

FAULT LOCATION MAP

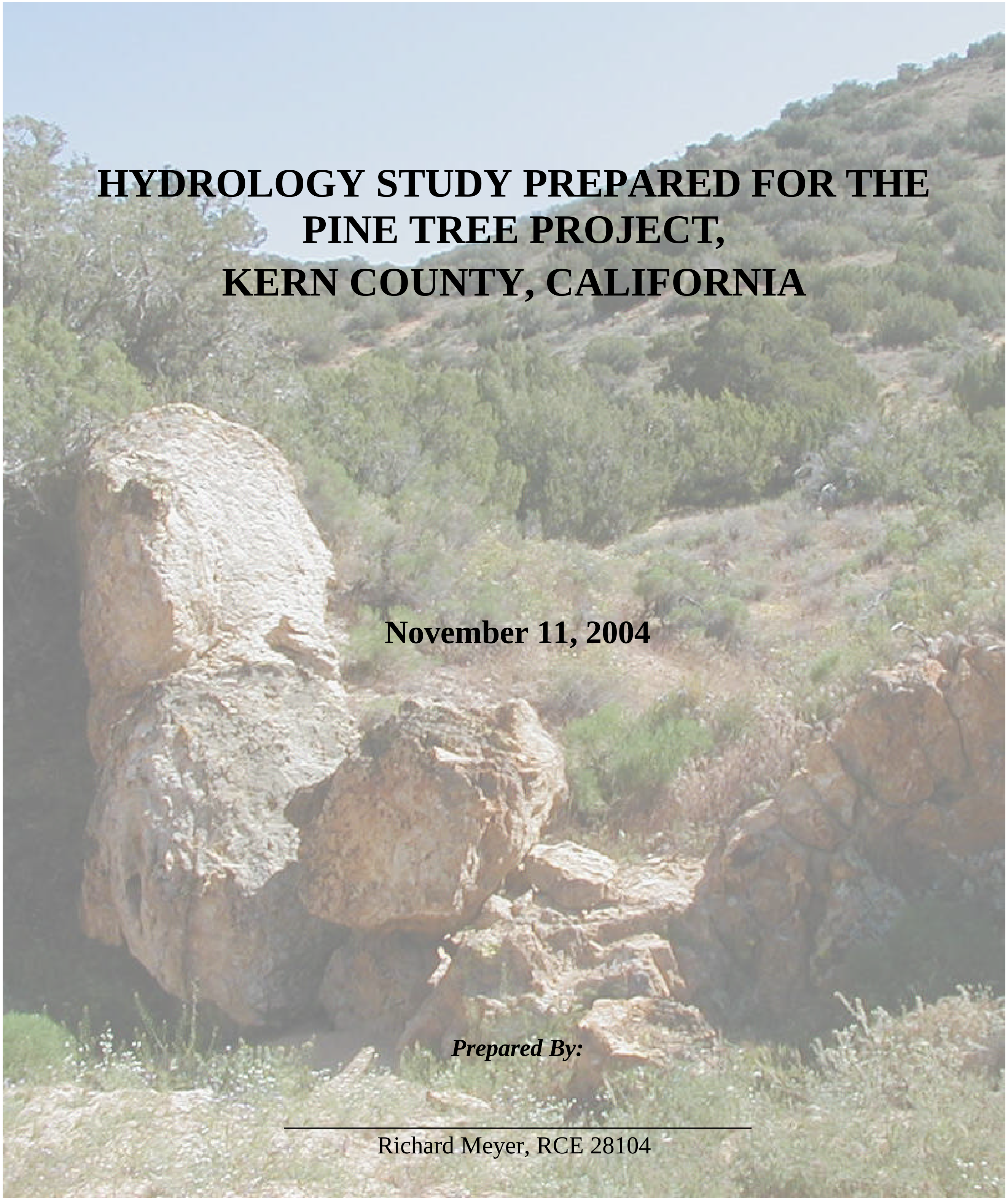
PINE TREE WIND PROJECT
KERN COUNTY, CALIFORNIA

PROJECT NO.	DATE	FIGURE
105284001	9/04	3

105284001 Fault Fig 3

Appendix C

Hydrology Study
Meyer Civil Engineering
November 11, 2004



HYDROLOGY STUDY PREPARED FOR THE PINE TREE PROJECT, KERN COUNTY, CALIFORNIA

November 11, 2004

Prepared By:

Richard Meyer, RCE 28104

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Water Resource Engineering Drainage Studies and Design Sewer Design Pump Station Design FEMA Studies Plan and Map Checking Services Municipal Consulting

INDEX

HYDROLOGY STUDY PREPARED FOR THE PINE TREE PROJECT,
KERN COUNTY, CALIFORNIA

EXISTING CONDITIONS

The project lies within two major watershed areas: 1) Jaw Bone Canyon and 2) Pine Tree Canyon. Pine Tree Canyon is located to the south of the project limits and Jaw Bone Canyon is located on the north portion of the project.

These watersheds have designated flood zones by FEMA. Flood Insurance Rate Maps (FIRMs) have been prepared by FEMA, which graphically map out designated flood zones of "A" within the defined channel ways. Community panel numbers 060075 1375B and 1125B dated September 29, 1986 identify these areas having a one-percent chance of flows being equaled or exceeded in any given year. Inquiries of FEMA were made requesting detailed file studies, but none were available.

Compliance with two federal Executive Orders will be required. Executive Order 11988 – Floodplain Management requires federal agencies to prepare a floodplain assessment for actions located within or affecting floodplains. Similarly, Executive Order 11990 - Protection of Wetlands requires federal government agencies to support a policy of minimizing "the destruction, loss, or degradation of wetlands." The intent of these Executive Orders is to minimize impacts on floodplains and wetlands.

The Executive Orders seek to prevent development in floodplains and wetlands unless it is absolutely necessary and other alternatives are not available. For this project, placing wind turbines, transmission towers or other project elements in wetlands and floodplains shall be avoided unless no alternative site is available.

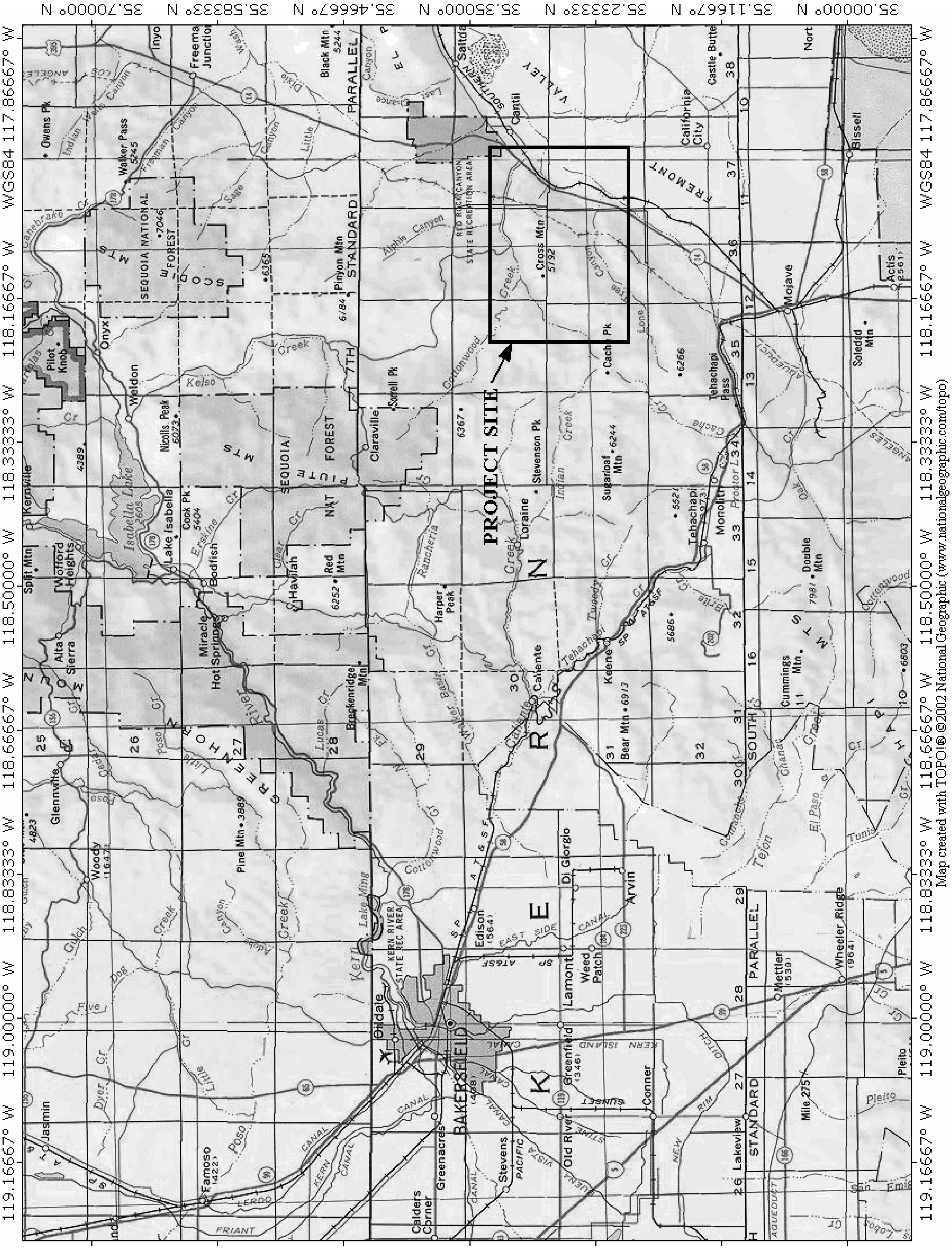
Pine Tree Canyon covers an area of approximately 32 square miles upstream of the last proposed crossing and falls approximately 3260 feet over the 12 mile long watercourse. The floodplain channel on the east side of the project limits is approximately 600 feet wide and 38 feet deep.

Jaw Bone Canyon covers an area of approximately 175 square miles upstream of the last proposed crossing and falls approximately 4030 feet over the 24 mile long watercourse. The floodplain channel on the east side of the project limits is approximately 1450 feet wide and 38 feet deep.

Hydrologic cover over the watershed can be classified as moderate to good condition. Native grasses and brush cover well over 75% of the ground surface and provide good stabilization of the soils. Existing washes in the upper tributaries are stable and show little sign of erosion. The lower confluence channel has the typical distinction of a desert watercourse, that is, loose granular channel bottoms and eroded steep banks. Lower flow meandering courses are evident within the main floodway. Relatively steep channel slopes will dictate aggressive flow velocities for major rainfall events. Erosion and sediment transportation are natural characteristics of this major watercourse.

The primary source of information for soils within the project area was obtained from the Natural Resources Conservation Service (NRCS, formerly the Soil Conservation Service) of the U.S. Department of Agriculture (USDA). Published soil surveys were available for the project site. The soil surveys applicable to the project study area include the following: "Soil Survey of Kern County, Southeastern Part, California (NRCS 1981)".

PROJECT LOCATION MAP



The NRCS has mapped and delineated soils within the project area into soil series and soil map units. According to the NRCS, the objective of soil mapping is not to delineate pure taxonomic classes but to separate the landscape into segments with similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, on-site investigations may be needed to precisely define and locate the soils and miscellaneous areas.

NRCS classification of soils over the Pine Tree Canyon tributary area are 104 Arizo in the lower channels, 204 Whitewolf at the mid channel levels, 206 Xeric Torriorthents and 148 Jawbone in the upper areas. Except for the outcrops of rock, these soils are moderate to highly permeable and non cohesive. Soil particles are typically transportable.

NRCS classification of soils over the Jaw Bone Canyon tributary area are 116 Cajon in the lower and mid level channels, 185 Torriorthents, 206 Xeric Torriorthents and 170 Rock outcrop in the upper areas. Except for the outcrops of rock, these soils are also moderate to highly permeable and non cohesive. Soil particles are typically transportable.

The following table shows ranges of infiltration rates for each soil type which in turn attribute to relatively low rainfall to runoff ratios.

Soil Number and Name	USDA Texture	Hydrologic Group	Permeability, Inches per hour
104 Arizo	Gravely loamy sand	A	>6.0
116 Cajon	Gravely loamy sand	A	6.0 -20
170 Rock Outcrop	N/A	N/A	N/A
185 Torriorthents	N/A	N/A	N/A
204 Whitewolf	Loamy Sand	A	6.0 -20
206 Xeric Torriorthents	N/A	N/A	N/A

DRAINAGE COURSES

Numerous watercourses within the project limits are to be crossed by construction and maintenance roads. These crossings will come under the jurisdiction of the California Department of Fish and Game (DFG), the Bureau of Land Management (BLM) (for drainage courses located within their properties) and the County of Kern for review of grading and road design.

The DFG has authority to review and regulate all proposed alteration of streambeds under the Fish and Game Code Sections 1600 through 1607. Section 1600 states that “except as provided in this section, general plans sufficient to indicate the nature of a project for construction by, or on behalf of, any state or local governmental agency or any public utility shall be submitted to the department if the project will (1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake designated by the department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit, (2) use material from the streambeds designated by the department, or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake designated by the department." Procedural reviews are provided within this regulation.

The BLM is responsible for maintaining roads under its control at standards set forth in BLM 9100 Series Manuals, ROD/RMP and the BMPs contained in the ROD/RMP. Maintenance provides for resource protection, accommodation of users, and protection of the government's investment. Road maintenance is divided into five levels in accordance with the BLM manual 9113. The levels provide a progressive system of maintenance with even the lowest level ensuring resource protection by controlling surface erosion and sedimentation. The BLM will review project proposals in light of the above for project components located within or adjacent to BLM lands.

WATER QUALITY

General water quality is protected under the federal Clean Water Act. As federal law, it applies to all parts and locations of the project. Project construction would require securing a National Pollutant Discharge Elimination System (NPDES) permit pursuant to 40 CFR, Parts 122-124. The NPDES permit would be supported by the preparation of a Storm Water Pollution Prevention Plan (SWPPP) for construction of the facilities. The SWPPP would be comprised of Best Management Practices (BMPs) for construction of the facilities. NPDES permitting is accomplished by the State NPDES General Construction Permit under the authority of the Regional Water Quality Control Board. The project falls within the defined boundary for "The Water Quality Control Plan for the Lahontan Region – North and South Basins". While "Upper Cottonwood Creek", a tributary to Jawbone Canyon and a portion of the Fremont Hydrologic Unit, is listed in Table 2-1 "Beneficial Uses…" no specific water quality objectives are listed. Under recent introduction of new state regulations, a Report of Waste Discharge (ROWD) will need to be filed with the Regional Water Quality Control Board.

Compliance with the federal Clean Water Act also would be required if the project would result in alteration of or discharges into watercourses and water bodies (Waters of the United States) and wetlands. The U.S. Army Corps of Engineers (USACE) and EPA regulate the placement of fill into waters of the United States under Section 404 of the act. Waters of the United States include lakes, rivers, streams and their tributaries, and wetlands. Wetlands are defined for regulatory purposes as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted to grow in saturated soil (33 CFR 328.3, 40 CFR 230.3). For a wetland to qualify as jurisdictional by the USACE and therefore be subject to Section 404 regulation, the site must support a prevalence of hydrophytic vegetation, hydric soils, and wetland hydrology. Evidence of historic presence of wetlands that have since become degraded also may result in a Section 404 compliance requirement. Waters of the United States in the project area include perennial and intermittent drainages that drain to navigable waters, such as flowing rivers, streams, and other drainage features with defined channel characteristics. The Ventura Office of the USACE has made the determination that the USACE does not have jurisdiction under Section 404. As a result of this determination the project is not subject to Section 401 as well. The USACE may consult with the Federal Emergency Management Agency (FEMA) regarding flood hazards associated with proposed facility sites in hazard zones. A specific permit is not required with regard to minimizing flood hazards; however, avoidance of undue hazard is the prudent course of action.

GROUNDWATER

Groundwater information was obtained from the Kern County Water Agency (KCWA). Not a lot of specific information is available for the project area as development of such has been on a very limited basis. The State Department of Water Resources' Bulletin 118-80 contains some very general information on the area as having water-bearing materials. The report states: "There are many wel1s 1ocated within the foothills of the Sierras and elsewhere in the State outside the identified ground water basins shown in this report. Ground water is available in most of these areas on a limited basis and has been used extensively for the development of permanent and recreational home sites and some agricultural development. The rapid increase of population in such areas has in some cases resulted in a number of wells that may interfere with each other's water levels and that together would pump more water than the local ground water in rock fractures can provide.

Specific conclusions about ground water availability in such areas are not possible because the open fractures are not always interconnected, and water does not move rapidly from one area to another. In such areas, fractures are not continuous and also become smaller with depth. Even though these areas are not identified as ground water basins in this report, the problem can be a significant one locally."

More specific information about ground water in the Fremont Valley located to the immediate east of the project is available in a report entitled "Hydrogeologic Assessment of Fremont Valley", October 21, 1977 and is on file with the KCWA. Generally, wells located on this agricultural development harvest water from aquifers being fed by the Pine Tree Canyon accent alluvials. Drainage waters collected in the watershed flow briefly over the waterway and eventually permeate into the coarse permeable soils of the channels and flow subsurface to aquifers in the valley. The report estimates that approximately 4,000 to 10,000 acre-feet of water per year is recharged from the western subsurface flows. The irrigation wells in the Fremont Valley are reported to have good quality water and yield high rates of flow.

POSSIBLE IMPACTS

The project proposes new construction and improvement of existing roads along with wind turbine and transmission tower sites. Though relatively small in scale, these construction improvements have the potential to cause erosion and sedimentation that would not otherwise occur. Unmitigated, these changes in the natural terrain could result in long-term detrimental impacts to the local ecology. Uncontrolled erosion can cause caving of side slopes, landslides, and redirection of natural watercourses, downstream siltation and pollution of surface waters. Two phases of the project need to be addressed: 1) the construction phase and 2) the long-term normal life of the project. Good engineering planning will be necessary to minimize the effect of man-made changes in the terrain in both phases.

The State Water Resources Control Board requires the proper filing of a Notice of Intent prior to any construction. A SWPPP is required under NPDES as described in the foregoing text to assure that erosion and sedimentation is contained during the construction phase. The construction phase has the greatest potential for pollution of ground water and surface waters, as large fueled vehicles such as trucks, cranes and earth moving equipment will be present on the project site. The SWPPP should include consideration of entrapment of fuel and lubricant spills in equipment service locations. Temporary facilities maintain during the course of construction will be used to mitigate these potential problems.

Goals of the design are to include eliminating or minimizing drainage course changes and incorporation of erosion and sedimentation control devices such as rock rip rap, detention basins for turbine sites and replanting of disturbed slopes. In every case, drainage waters are to be returned to their original courses and in the same magnitude as that prior to the project. Eventual final disturbance of the surface is to only those areas that are in actual use for the ongoing purpose of proper maintenance and use. Maintenance of roads is to be purposed to the re-establishment of the original design intent, that is to minimize erosion and siltation to what would naturally occur. The final improvement of access and maintenance roads will present extremely small changes to disturbed surface. No impervious surface is proposed for the project. This means that, with proper collection and returning to original courses, increased flows due to increased imperviousness or disturbed are so small that they cannot be accounted for. The turbine sites have potential to divert flows and concentrate flows. The employment of detention basins are planned to mitigate this potential problem.

"Brown-line" and "blue-line" streams as designated on the USGS Quadrangle Sheet are to come under the jurisdiction of the California Department of Fish and Game. Design of crossing these facilities will be in direct cooperation with the DFG. Disturbance of wildlife in actual wet waterways can be kept to a minimum with the use of closed culverts. This allows vehicles to cross the waterway without driving through it and thus stirring up silt and possibly washing oils and lubricants off the vehicle if exposed to water. Providing rock and coble inverts could naturalize closed culverts after their construction for extended-term wet crossings.

MITIGATION MEASURES

Mitigation of Surface Hydrology and Ground Water impacts will be accomplished under the control of three primary agencies: The Bureau of Land Management will review and provide design and construction requirements for changes and improvements made on their properties in accordance with their Best Management Practices or BMPs. The California Department of Fish and Game will review and provide design and construction requirements for the stream crossings deemed under their jurisdiction. The Kern County Planning Department will review and approve all proposed grading improvements along with review and processing of the SWPPP. While the LADWP is owner of the project, their input as to actual requirements for the project will be advisory only.

Hydrology calculations will be in accordance with the Kern County Subdivision Standards and Hydrology Manual. Local roadway crossings of drainage ways are to be designed to the 10-year event (10% chance) known as the intermediate storm design discharge (ISDD). Arterial roadways owned and operated by the County of Kern are to be designed to the 100-year event (1% chance) known as the capital storm design discharge (CSDD). These design events are in accordance with the County of Kern

Standards. Most runoff calculations for the purpose of sizing culverts and road crossings will be performed using an accepted regional analysis. Formulas used to estimate the 10 year and 100 year events were taken from "Magnitude and Frequency of Floods in California" by the U.S. Geological Survey Water Resources Investigations Bulletin No. 77-21. The formulas for the South Lahontan-Colorado Desert Region are applicable to the project site and are as follows:

$$Q_{10}=150xA^{0.53}$$
$$Q_{100}=1080xA^{0.71}$$

Where Q_{10} is the 10 year peak discharge expressed in cubic feet per second, Q_{100} is the 100 year peak discharge expressed in cubic feet per second and A is the area of the watershed in square miles.

Storm water runoff calculations are to be hydrograph based per the Kern County Hydrology Manual for runoff areas that are to be studied for peak reduction. Rational methods may be utilized when drainage areas are small and detention basin routing is not needed. Wind turbine sites are to include detention basin design to reduce any peak discharge rates to pre-project values and to provide siltation capture. Incidental roadway drainage intercepted from side-slope cuts is to be returned to natural courses at frequent intervals to reduce concentration. Grading of roadways will be performed in such a fashion as to distribute drainage back to its original courses. The use of berming and rock riprap will be necessary to minimize erosion. Rock riprap should be placed to the extent of the points of return to the natural channel slope and grade on both the upstream and downstream portions of the drainage crossings. Natural angular rock from native excavations during project construction will be best. Rock should be sound, dense and varying in size. In all cases, after proper mitigation, no measurable increase of flows will occur over the project area or to the project's neighboring property owners.

Drainage crossings will be of four basic types: 1) Minor At-Grade Crossings, 2) Major At-Grade Crossings, 3) Over-side Drains, and 4) Pipe Culvert Crossings.

Minor At-Grade Crossings will be utilized in locations where drainage ways are poorly defined and at nearly the same grade as the roadway. This crossing may also be required at the direction of the DFG. Upstream and downstream rock riprap is to be utilized along with roadway base rock to stabilize when flows occur. Downstream construction of a stilling basin will also be necessary.

Major At-Grade Crossings will be utilized for the major canyon crossings. This crossing will consist of a roadway set at the channel bed level with rock riprap stabilization. A downstream apron and energy dissipation basin will be required to minimize channel bed degradation across the roadbed.

The Over-side Drains along with berming will be utilized to minimize drainage concentration along road alignments. Collection of drainage from cut banks and these localized drainages will better manage erosion and siltation. Rock riprap at the over-side drain outlets will return drainage waters to their courses at the points of their original natural fall. These structures will be implemented with the purpose of preventing the collection and concentration of flows to anything but their originating courses. These structures will fall within the normal limits of the cut and fill banks.

Pipe Culvert Crossings will be utilized for most of the drainage crossings. These will be considered when roadway grades occur well above the channel inverts. Riprap will be used to return flows back to original line and grade.

At-Grade Crossings in Restricted Areas will be utilized in the United States and the Rudnick Estates properties. In these locations right-of way procurement is very difficult outside of the existing disturbed areas. The purpose of this crossing is to establish a stable road bed in an existing drainage way. Grade is to adapt to the existing ground in the drainage way with virtually no change to the existing drainage.

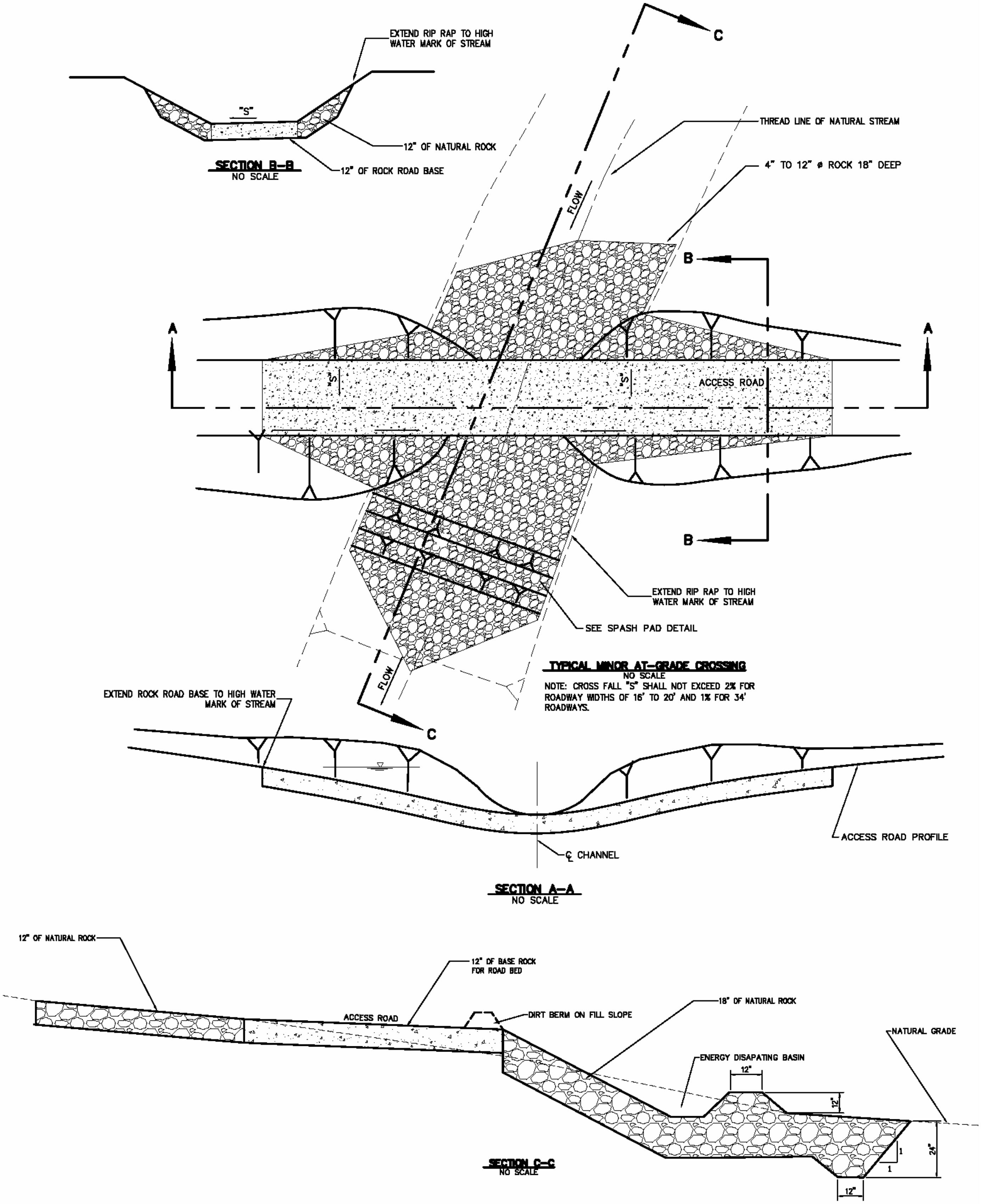
Grading of roadways and turbine sites are to follow the following design concepts:

1. Rerouting of drainage to another discharge point in a different water course is to be avoided.
2. Regular use of over-side drains should be implemented to avoid longitudinal concentration of drainage along the roadways.
3. Exiting points of culverts and over-side drains are to be protected with rock riprap.
4. Minor stilling basins are to be created by elevating grated inlets above flowline grade so as to minimize silt transport and detain drainage waters.
5. Detention basins for peak flow reduction are to be used at the turbine sites when drainage has the potential to increase to any one watershed.
6. Whenever possible, grading to be designed to evenly distribute runoff rather than concentrate it.

Areas of disturbance to the natural ground cover for side-slopes and unused graded portions of the project are to be replanted with native covers. Covers are to be re-established to like kind prior to the construction disturbance.

PROPOSED DRAINAGE CROSSINGS

The following conceptual drawings and sketches illustrate the proposed drainage structures.



9-10-04

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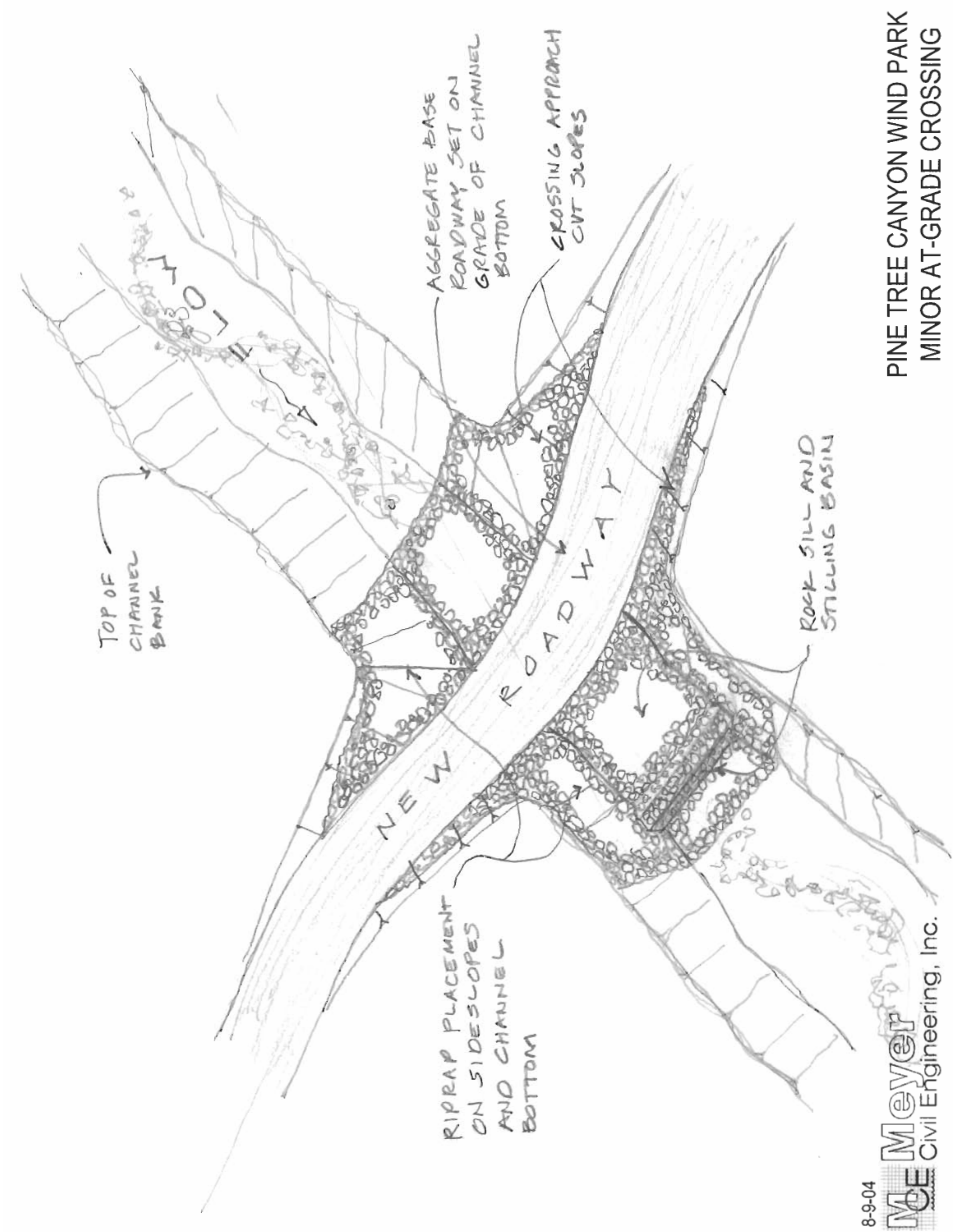
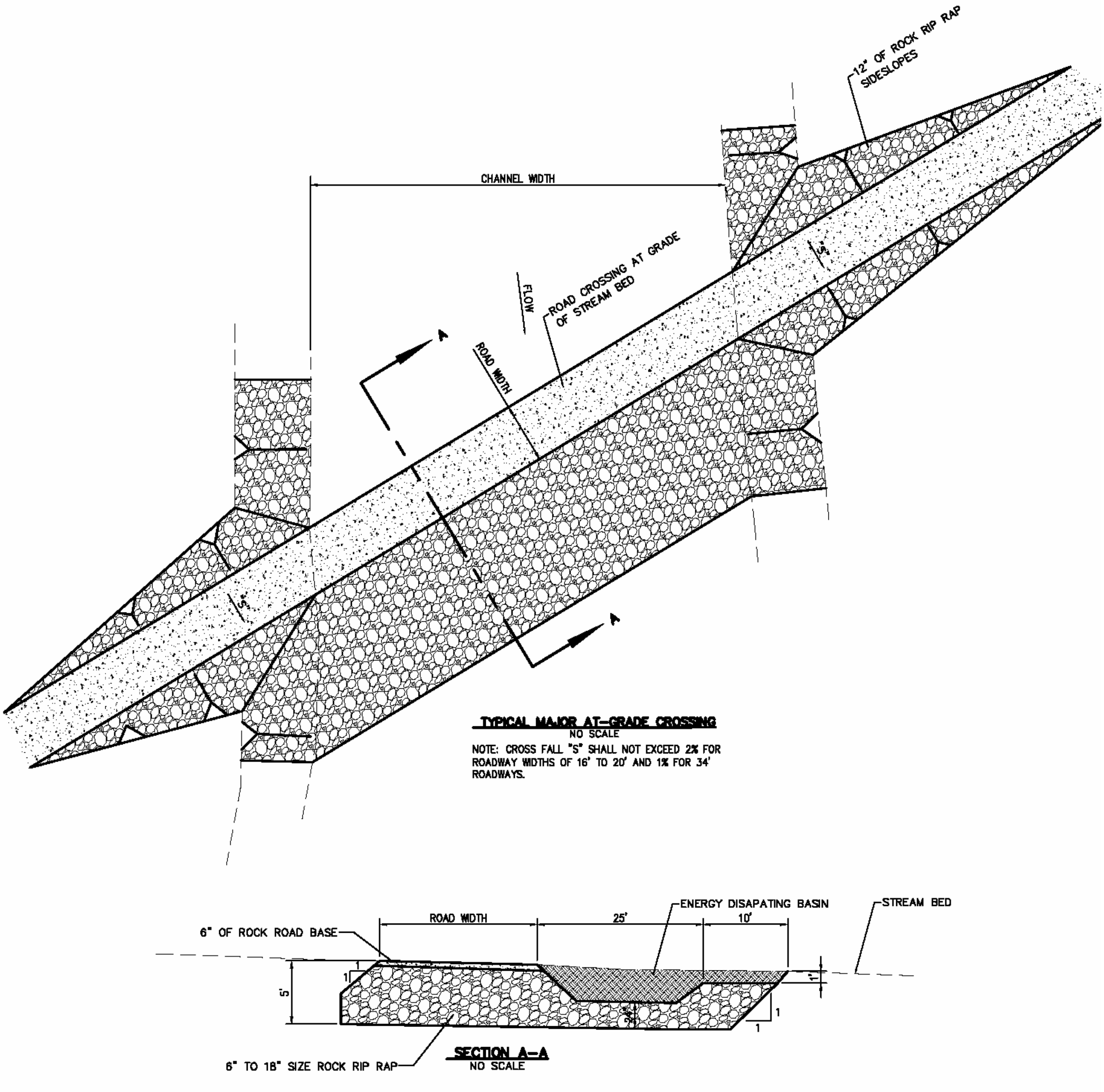
PINE TREE CANYON WIND PARK
MINOR AT-GRADE CROSSING

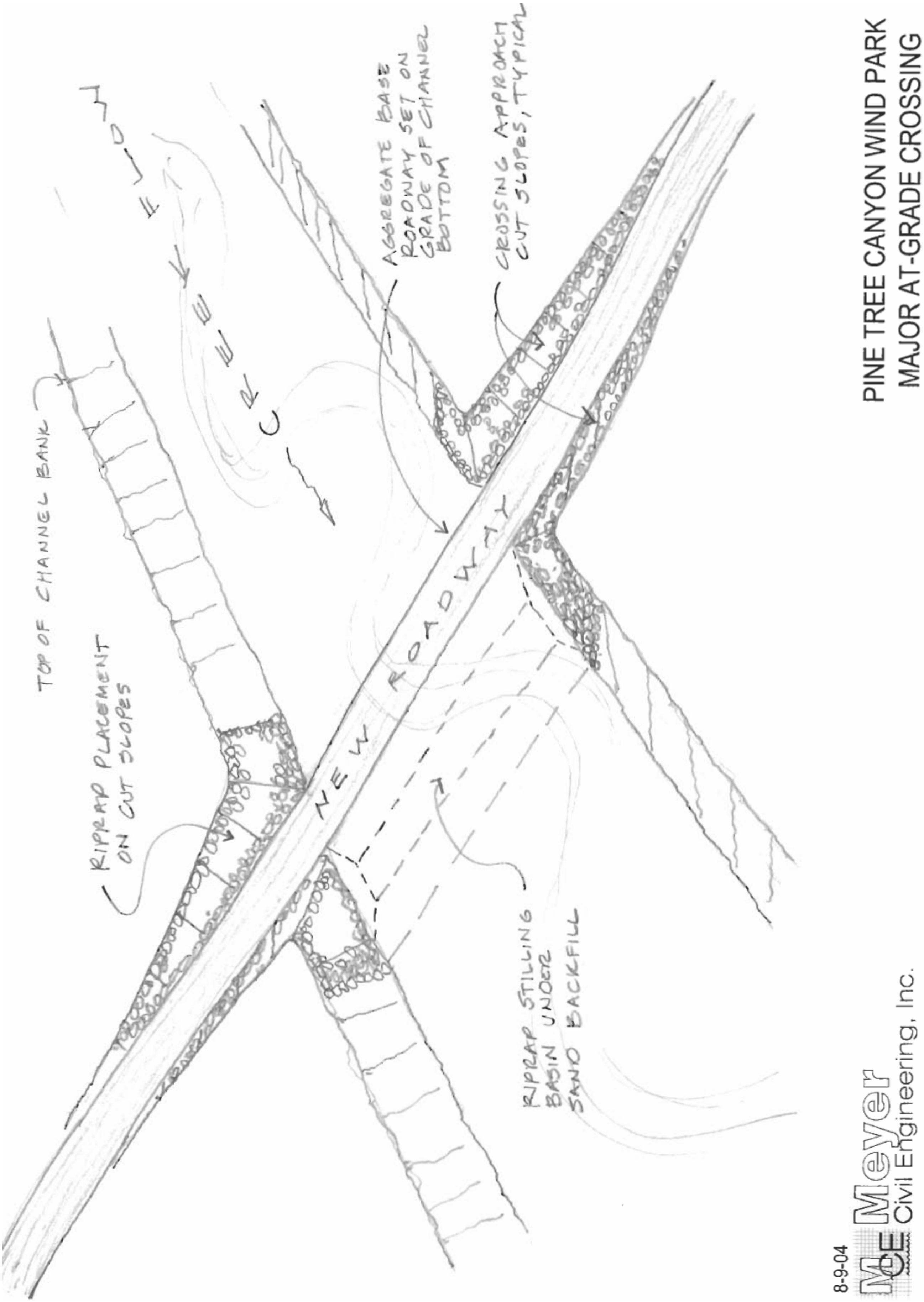

PINE TREE CANYON WIND PARK
MINOR AT-GRADE CROSSING
AGGREGATE BASE ROADWAY SET ON GRADE OF CHANNEL BOTTOM
CROSSING APPROACH CUT SLOPES
TOP OF CHANNEL BANK
FLOW
NEW ROADWAY
ROCK SILL AND STILLING BASIN
RIPRAP PLACEMENT ON SIDESLOPES AND CHANNEL BOTTOM
8-9-04
Meyer Civil Engineering, Inc.

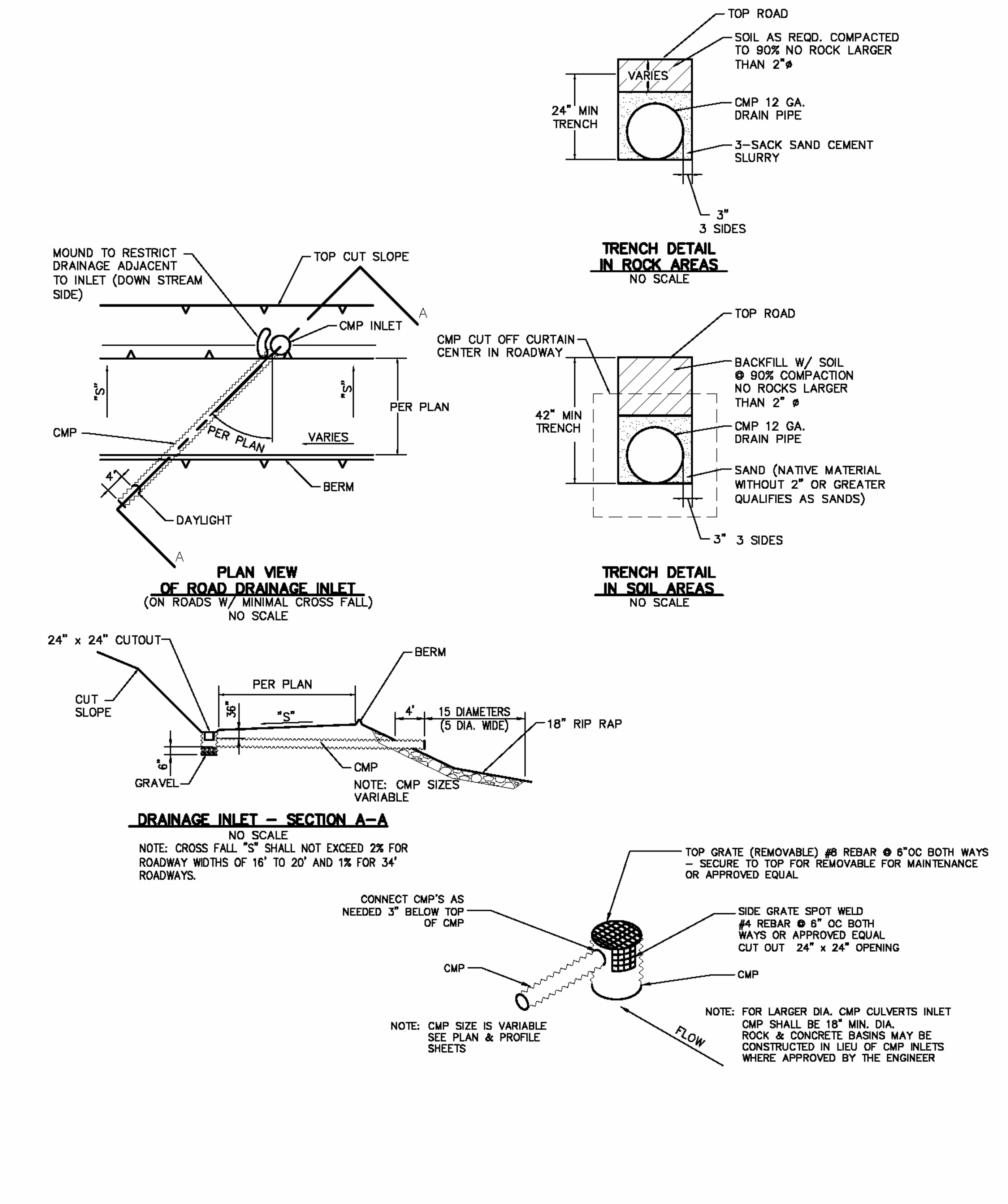


9-10-04

Meyer Civil Engineering, Inc.

PINE TREE CANYON WIND PARK
MAJOR AT-GRADE CROSSING

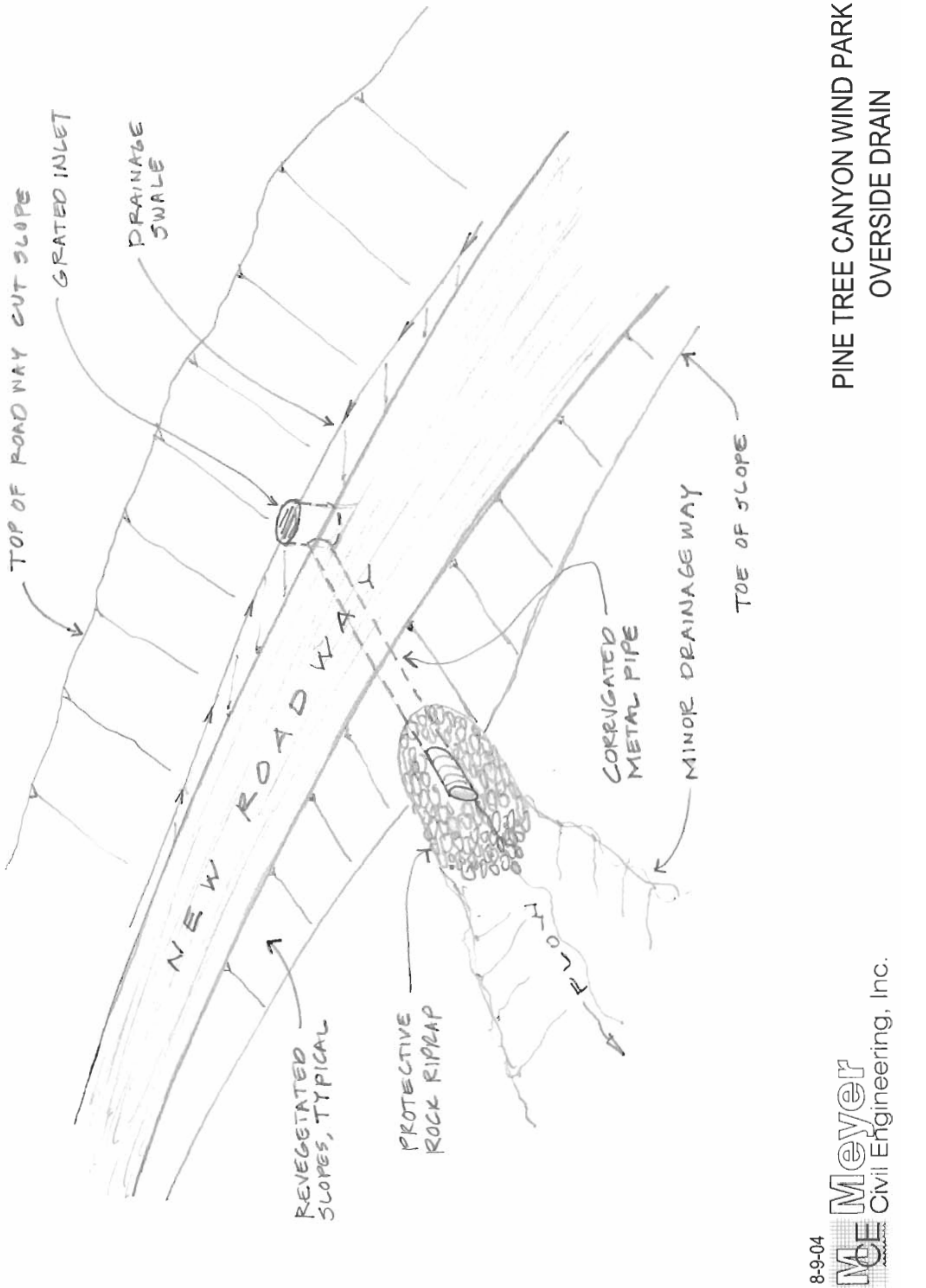

TOP OF CHANNEL BANK
RIPRAP PLACEMENT ON CUT SLOPES
CREEK FLOW
NEW ROADWAY
AGGREGATE BASE ROADWAY SET ON GRADE OF CHANNEL BOTTOM
CROSSING APPROACH CUT SLOPES, TYPICAL
RIPRAP STILLING BASIN UNDER SAND BACKFILL
PINE TREE CANYON WIND PARK
MAJOR AT-GRADE CROSSING
8-9-04
Meyer Civil Engineering, Inc.

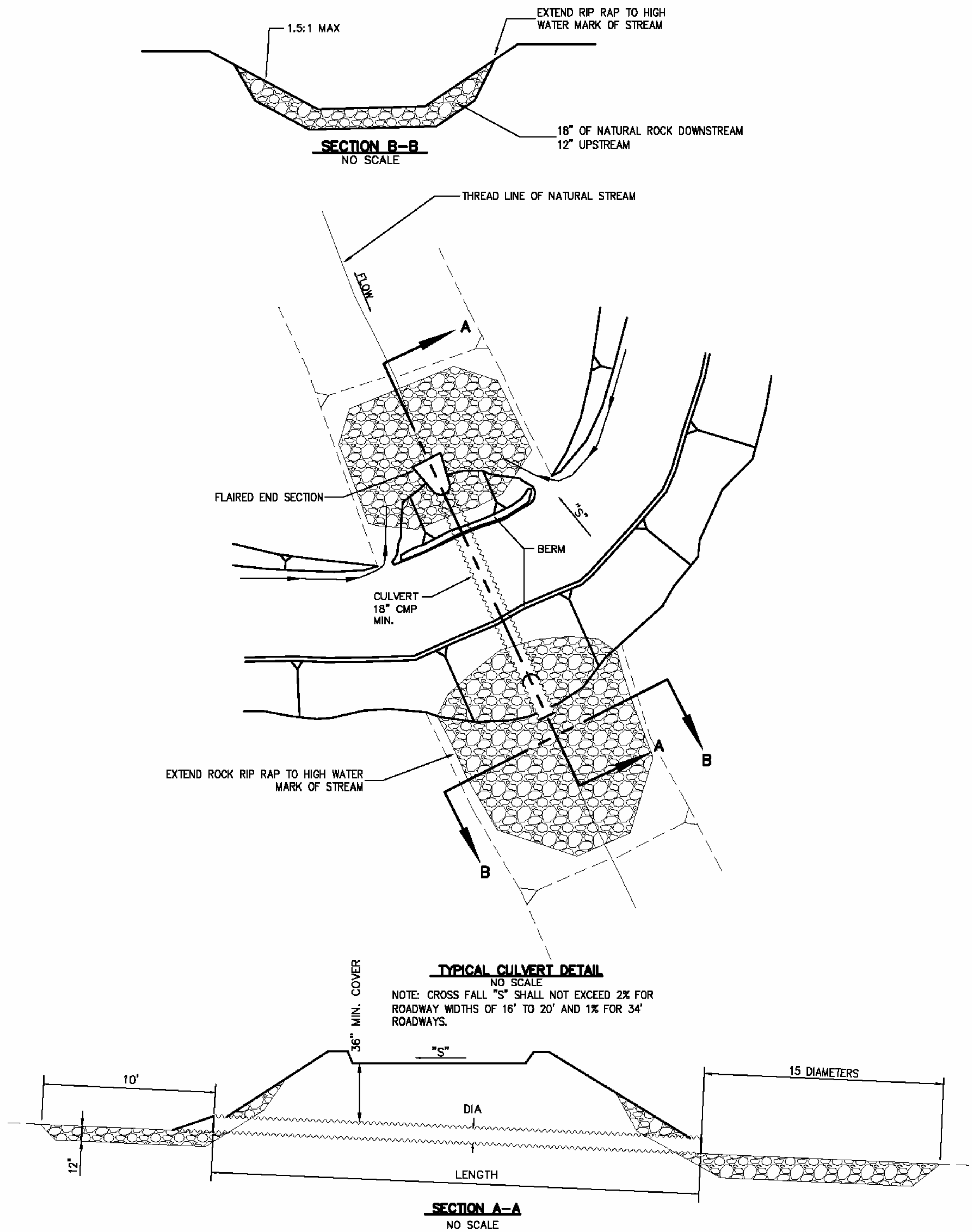


9-10-04

Meyer Civil Engineering, Inc.

PINE TREE CANYON WIND PARK
OVERSIDE DRAIN

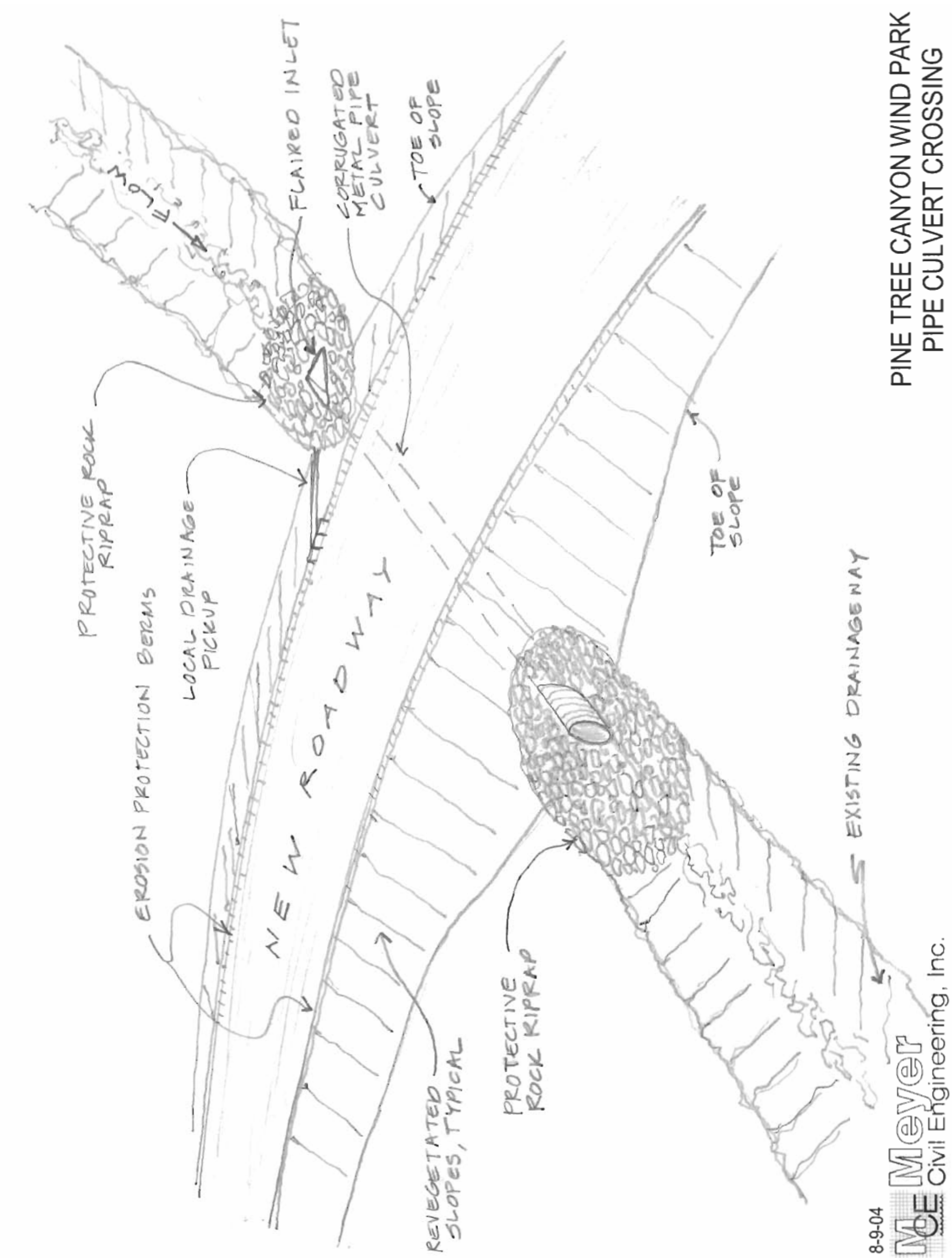

TOP OF ROADWAY CUT SLOPE
GRATED INLET
DRAINAGE SWALE
NEW ROADWAY
CORRUGATED METAL PIPE
MINOR DRAINAGEWAY
TOE OF SLOPE
REVEGETATED SLOPES, TYPICAL
PROTECTIVE ROCK RIPRAP
FLOW
PINE TREE CANYON WIND PARK
OVERSIDE DRAIN
8-9-04
Meyer
Civil Engineering, Inc.

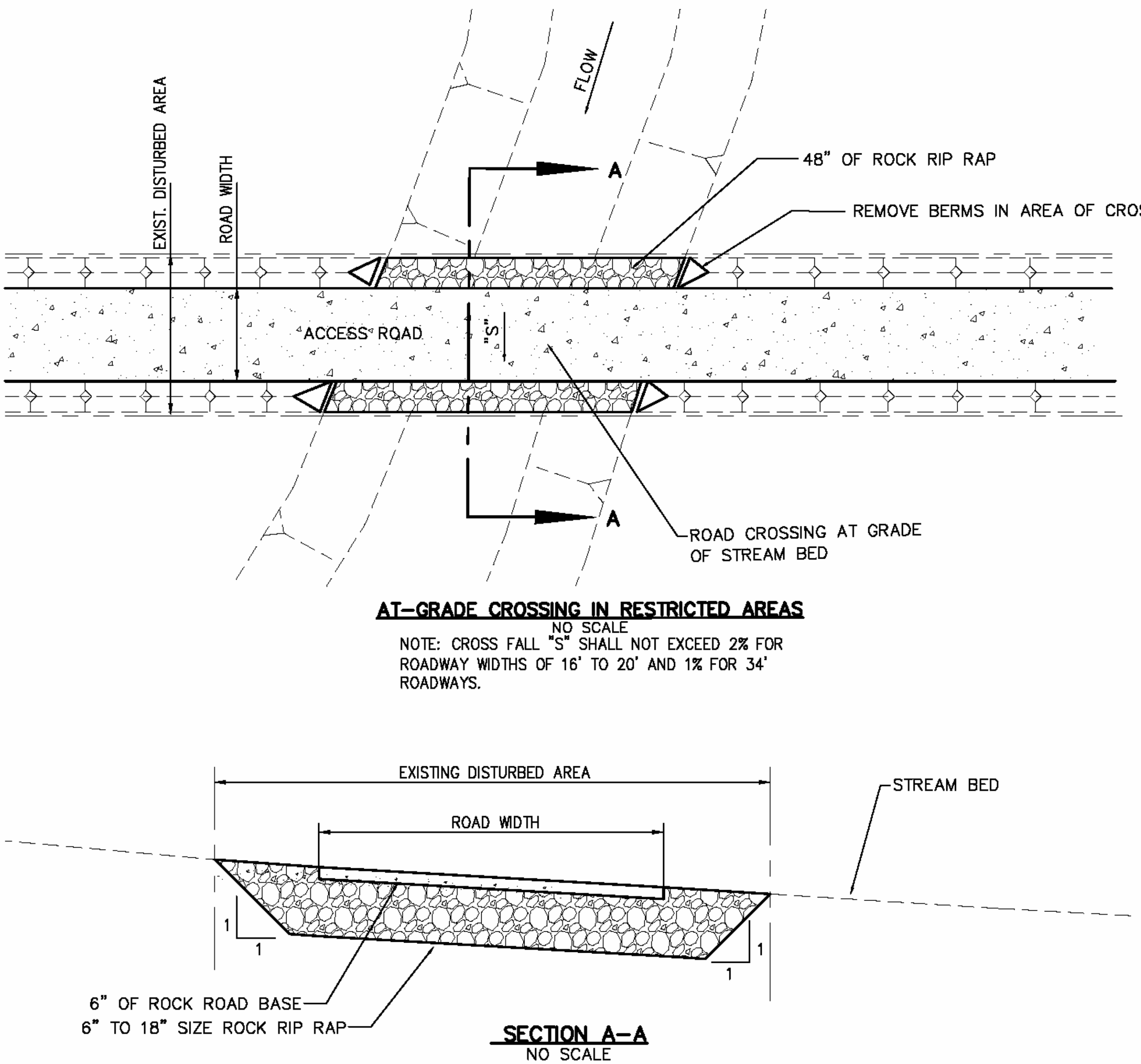


9-10-04

Meyer Civil Engineering, Inc.

PINE TREE CANYON WIND PARK
PIPE CULVERT CROSSING

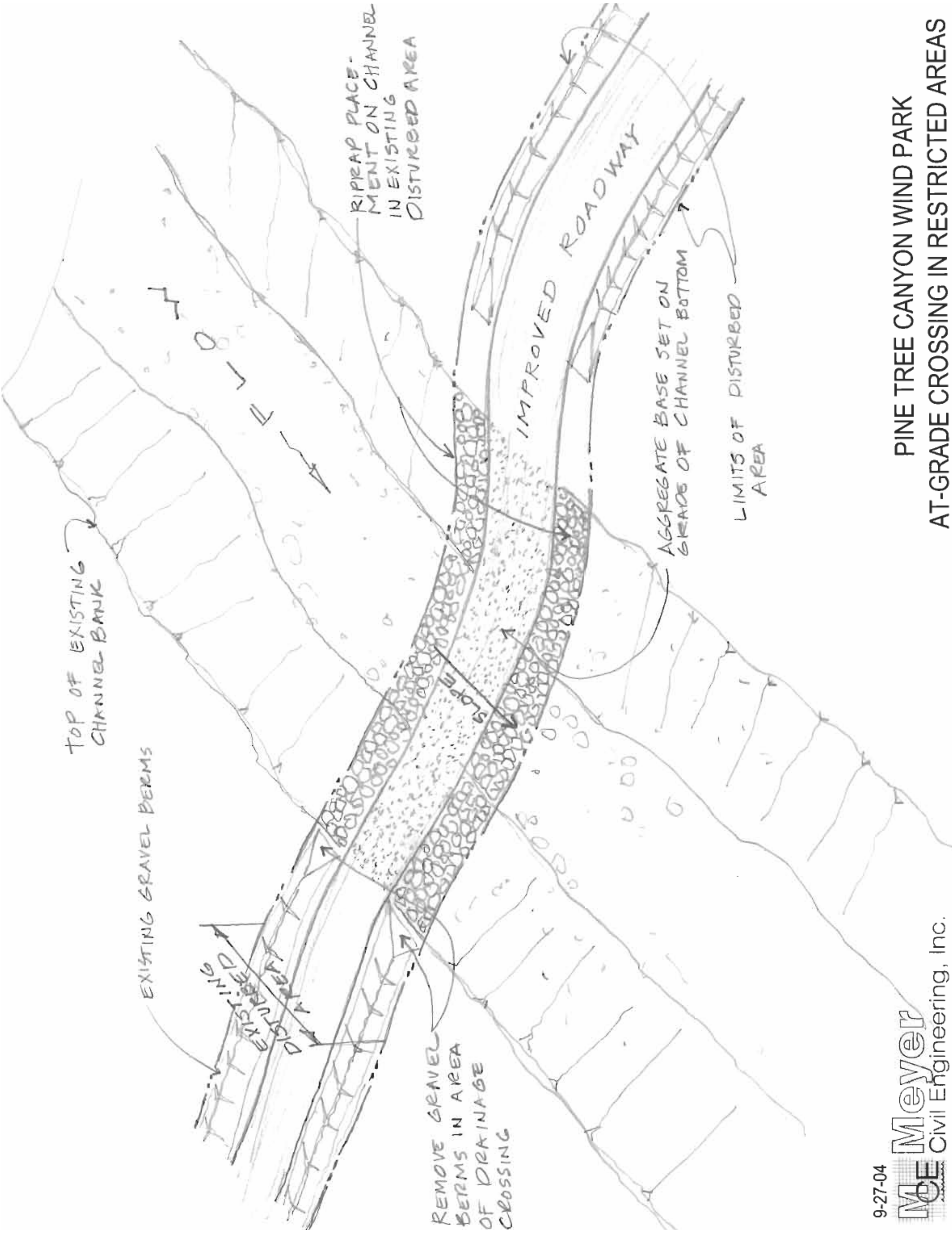

PINE TREE CANYON WIND PARK
PIPE CULVERT CROSSING
FLAIRED INLET
CORRUGATED METAL PIPE CULVERT
TOE OF SLOPE
FLOW
PROTECTIVE ROCK RIPRAP
LOCAL DRAINAGE PICKUP
EROSION PROTECTION BERMS
NEW ROADWAY
TOE OF SLOPE
EXISTING DRAINAGEWAY
REVEGETATED SLOPES, TYPICAL
PROTECTIVE ROCK RIPRAP
8-9-04
Meyer Civil Engineering, Inc.



9-27-04

Meyer Civil Engineering, Inc.

PINE TREE CANYON WIND PARK
AT-GRADE CROSSING IN RESTRICTED AREAS


TOP OF EXISTING CHANNEL BANK
EXISTING GRAVEL BERMS
EXISTING DISTURBED AREA
REMOVE GRAVEL BERMS IN AREA OF DRAINAGE CROSSING
RIPRAP PLACEMENT ON CHANNEL IN EXISTING DISTURBED AREA
IMPROVED ROADWAY
FLOW
AGGREGATE BASE SET ON GRADE OF CHANNEL BOTTOM
LIMITS OF DISTURBED AREA
PINE TREE CANYON WIND PARK
AT-GRADE CROSSING IN RESTRICTED AREAS
9-27-04
Meyer Civil Engineering, Inc.

PURPOSE

The purpose of this study is to determine locations, crossing classifications, discharge magnitudes, approximate sizes of pipes, and resultant disturbed area of drainage crossings for the project. The information developed in this study may further be used for the processing of permits through the regulatory agencies. This is a preliminary study. The final results of this study may be adjusted to conform to the final design of the roads and turbine sites. Runoff calculations for the turbine sites and any associated drainage design will be determined at the time of final design.

APPROACH

After consulting with Clark Farr of County of Kern Flood Plain Management, it was determined that the regional analysis as developed and outlined by the U.S. Geological Survey Water Resources Investigations Bulletin No. 77-21 was appropriate.

Drainage courses and their associated tributary areas were then defined utilizing USGS Quadrangle sheet and project aerial topography. Since the South Lahontan-Colorado Desert Region formulas are related only to area, the flows were calculated directly and applied to the sizing of crossings and pipes.

The regional analysis is indirectly related to rainfall as empirical studies determine anticipated runoff from measured streams. Nonetheless it is helpful to know the expected volume for the design events:

10 Year 24 Hour Rainfall:	3.94 Inches
100 Year 24 Hour Rainfall:	6.00 Inches

These values were determined in accordance with the Kern County Hydrology Manual.

STUDY RESULTS

The following table summarizes the results of the calculations performed. There are 106 crossings proposed.

TABLE OF PROPOSED DRAINAGE CROSSINGS **PINE TREE PROJECT**								
(1) CROSSING OR POINT OF CONCENTRATION	**CROSSING TYPE**	**DRAINAGE ADD AREA, ACRES**	**DRAINAGE TOTAL AREA, ACRES**	**DRAINAGE AREA SQUARE MILES**	**(2) 10 YEAR DISCHARGE, CFS**	**(3) CULVERT SIZE & NUMBER**	**(4) ADDITIONAL DISTURBED AREA, ACRES**	**100 YEAR DISCHARGE, CFS**
Jaw Bone Canyon Tributary								
200	Minor At-Grade	27	27	0.042	28		NIP	
201	Minor At-Grade	108	108	0.169	58		NIP	
202	Culvert	256	256	0.400	92	3x48"	0.00	563
203	Minor At-Grade	49	49	0.077	38		NIP	
204	Minor At-Grade	151	151	0.236	70		NIP	
205	Minor At-Grade	135	135	0.211	66		NIP	
206	Minor At-Grade	125	125	0.195	63		NIP	
207	Minor At-Grade	1460	1460	2.281	232		NIP	
208	Minor At-Grade	228	228	0.356	87		NIP	
209	Minor At-Grade	85	85	0.133	51		NIP	
210	Minor At-Grade	31	31	0.048	30		NIP	
211	Minor At-Grade	45	45	0.070	37		NIP	
212	Minor At-Grade	113	113	0.177	60		NIP	
213	Restricted At-Grade	819	819	1.280	171		NIP	
214	Restricted At-Grade	88613	103502	161.722	2222		NIP	39962
215	Restricted At-Grade	379	379	0.592	114		0.00	
216	Restricted At-Grade	745	745	1.164	163		0.00	
217	Restricted At-Grade	153	153	0.239	70		NIP	
218	Restricted At-Grade	59	59	0.092	42		NIP	
219	Restricted At-Grade	69	69	0.108	46		NIP	
220	Restricted At-Grade	1129	1129	1.764	203		0.00	
221	Restricted At-Grade	87	87	0.136	52		0.00	
222	Restricted At-Grade	3	3	0.005	9		0.00	

(1) CROSSING OR POINT OF CONCENTRATION	CROSSING TYPE	DRAINAGE ADD AREA, ACRES	DRAINAGE TOTAL AREA, ACRES	DRAINAGE AREA SQUARE MILES	(2) 10 YEAR DISCHARGE, CFS	(3) CULVERT SIZE & NUMBER	(4) ADDITIONAL DISTURBED AREA, ACRES	100 YEAR DISCHARGE, CFS
223	Restricted At-Grade	3332	3332	5.206	360		0.00	
223a	Restricted At-Grade	553	553	0.864	139		NIP	
223b	Restricted At-Grade	53	53	0.083	40		NIP	
224	Restricted At-Grade	205	205	0.320	82		0.00	
224a	Restricted At-Grade	42	42	0.066	35		NIP	
225	Restricted At-Grade	275	275	0.430	96		0.00	
225a	Restricted At-Grade	228	228	0.356	87		0.00	
225b	Restricted At-Grade	52	52	0.081	40		NIP	
226	Restricted At-Grade	2203	14889	23.264	795		0.00	10087
226a	Restricted At-Grade	58	58	0.091	42		0.00	
226b	Restricted At-Grade	98	98	0.153	55		NIP	
227	Restricted At-Grade	61	61	0.095	43		0.00	
228	Restricted At-Grade	171	171	0.267	75		0.00	
228a	Over-side Drain					1x12"	0.08	
229	Culvert	565	565	0.883	140	2x42"	0.22	
229a	Over-side Drain					1x12"	0.08	
229b	Over-side Drain					1x12"	1.08	
230	Culvert	406	406	0.634	118	2x36"	0.18	
231	Major At-Grade	2581	9443	14.755	625		0.65	7301
232	Culvert	45	45	0.070	37	1x30"	0.17	
232a	Over-side Drain					1x12"	0.08	
233	Culvert	35	35	0.055	32	1x30"	0.17	
234	Culvert	90	90	0.141	53	2x24"	0.12	

(1) CROSSING OR POINT OF CONCENTRATION	CROSSING TYPE	DRAINAGE ADD AREA, ACRES	DRAINAGE TOTAL AREA, ACRES	DRAINAGE AREA SQUARE MILES	(2) 10 YEAR DISCHARGE, CFS	(3) CULVERT SIZE & NUMBER	(4) ADDITIONAL DISTURBED AREA, ACRES	100 YEAR DISCHARGE, CFS
234a	Over-side Drain					1x12"	0.08	
235	Restricted At-Grade	121	121	0.189	62		0.00	
236	Culvert	13	13	0.020	19	1x24"	0.11	
237	Culvert	162	162	0.253	72	1x42"	0.20	
238	Major At-Grade	3243	12686	19.822	730		0.65	9003
069	Culvert	48	48	0.075	38	1x30"	0.17	
068	Culvert	36	84	0.131	51	2x24"	0.12	
067	Culvert	94	178	0.278	76	1x42"	0.20	
066	Culvert	24	202	0.316	81	1x42"	0.20	
065	Culvert	34	236	0.369	88	1x48"	0.25	
070	Culvert	15	15	0.023	21	1x24"	0.11	
070-1	Over-side Drain	7	7	0.011	14	1x18"	0.10	
070-2	Over-side Drain	20	20	0.031	24	1x24"	0.11	
070-3	Over-side Drain	13	13	0.020	19	1x24"	0.11	
070-4	Over-side Drain	11	11	0.017	17	1x24"	0.11	
070-5	Culvert	136	136	0.213	66	1x42"	0.20	
070-6	Over-side Drain	22	22	0.034	25	1x24"	0.11	
070a	Temporary	6	7464	11.663	551		NIP	
071	Temporary	267	7458	11.653	551		NIP	
072	Temporary	91	7191	11.236	541		NIP	
073	Culvert	121	121	0.189	62	1x42"	0.20	
073a	Over-side Drain					1x12"	0.08	
075	Over-side Drain	8	8	0.013	15	1x18"	0.10	
076	Culvert	109	109	0.170	59	1x36"	0.17	
076a	Major At-Grade	6862	6862	10.722	527		0.65	5820
076b	Culvert	90	90	0.141	53	2x24"	0.12	
076c	Culvert	258	2516	3.931	310	2x60"	0.35	
076cc	Over-side Drain	25	25	0.039	27	1x24"	0.11	
076d	Culvert	1951	2258	3.528	293	2x60"	0.35	
076e	Culvert	0	2258	3.528	293	2x60"	0.35	
319	Culvert	61	61	0.095	43	2x24"	0.12	
318	Culvert	80	80	0.125	50	2x24"	0.12	
317	Culvert	99	99	0.155	56	2x24"	0.12	
316	Culvert	34	34	0.053	32	1x30"	0.17	
315	Culvert	89	89	0.139	53	2x24"	0.12	

(1) CROSSING OR POINT OF CONCENTRATION	CROSSING TYPE	DRAINAGE ADD AREA, ACRES	DRAINAGE TOTAL AREA, ACRES	DRAINAGE AREA SQUARE MILES	(2) 10 YEAR DISCHARGE, CFS	(3) CULVERT SIZE & NUMBER	(4) ADDITIONAL DISTURBED AREA, ACRES	100 YEAR DISCHARGE, CFS
314	Culvert	68	187	0.292	78	1x42"	0.20	
314a	Over-side Drain	9	9	0.014	16	1x18"	0.10	
313	Culvert	55	55	0.086	41	1x30"	0.17	
312	Over-side Drain	20	20	0.031	24	1x24"	0.00	
311	Culvert	122	122	0.191	62	1x42"	0.20	
310	Over-side Drain	14	14	0.022	20	1x24"	0.11	
088	Culvert	33	33	0.052	31	1x30"	0.17	
087	Culvert	86	86	0.134	52	2x24"	0.12	
086	Culvert	45	287	0.448	98	1x48"	0.25	
086a	Over-side Drain					1x12"	0.08	
089	Culvert	355	355	0.555	110	1x48"	0.25	
090	Culvert	280	280	0.438	97	1x48"	0.25	
091	Culvert	31	31	0.048	30	1x30"	0.17	
092	Over-side Drain	12	12	0.019	18	1x24"	0.11	
093	Over-side Drain	12	12	0.019	18	1x24"	0.11	
085	Culvert	2172	2172	3.394	287	2x60"	0.35	
084	Over-side Drain	11	11	0.017	17	1x24"	0.11	
083	Culvert	230	3077	4.808	345	2x60"	0.35	
082	Culvert	3	3080	4.813	345	2x60"	0.35	
081	Over-side Drain	8	8	0.013	15	1x18"	0.10	
081a	Over-side Drain	8	8	0.013	15	1x18"	0.10	
080a	Culvert	239	239	0.373	89	1x48"	0.25	
054	Over-side Drain	7	7	0.011	14	1x18"	0.10	
055	Culvert	59	59	0.092	42	1x30"	0.17	
034	Over-side Drain	6	6	0.009	13	1x18"	0.10	
033	Over-side Drain	9	9	0.014	16	1x18"	0.10	
032	Culvert	574	574	0.897	142	2x42"	0.22	
032a	Culvert	46	46	0.072	37	1x30"	0.17	
032b	Culvert	15	30	0.047	30	1x30"	0.17	
038	Culvert	66	66	0.103	45	2x24"	0.12	
037	Culvert	30	30	0.047	30	1x30"	0.17	
036	Culvert	49	49	0.077	38	1x30"	0.17	
035	Culvert	26	75	0.117	48	2x24"	0.12	
026	Over-side Drain	14	14	0.022	20	1x24"	0.11	
025	Culvert	75	75	0.117	48	2x24"	0.12	

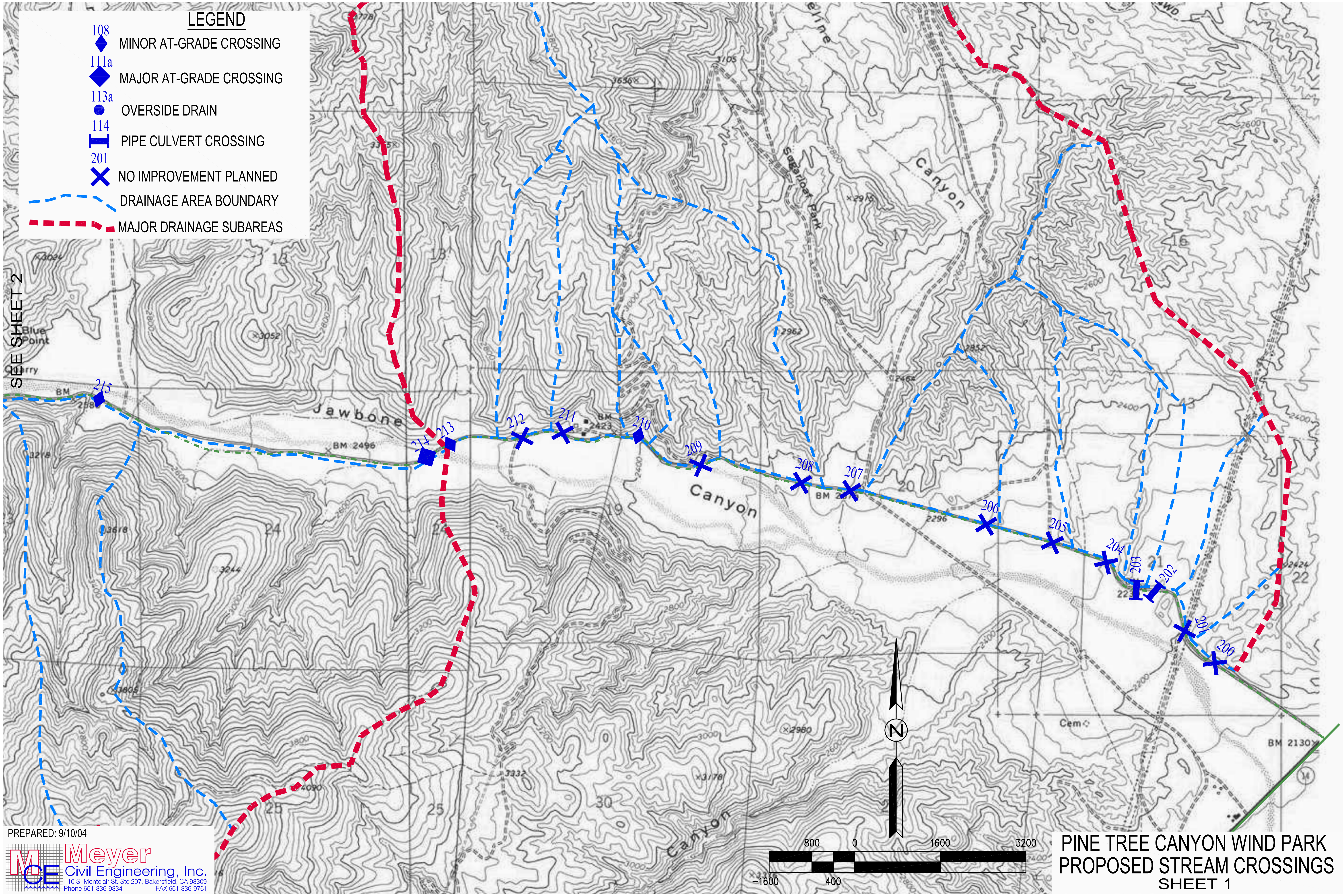
(1) CROSSING OR POINT OF CONCENTRATION	CROSSING TYPE	DRAINAGE ADD AREA, ACRES	DRAINAGE TOTAL AREA, ACRES	DRAINAGE AREA SQUARE MILES	(2) 10 YEAR DISCHARGE, CFS	(3) CULVERT SIZE & NUMBER	(4) ADDITIONAL DISTURBED AREA, ACRES	100 YEAR DISCHARGE, CFS
Pine Tree Canyon Tributary								
002	Minor At-Grade	360	360	0.563	111		0.33	
004	Major At-Grade	21289	21289	33.264	961		1.10	13002
005	Minor At-Grade	300	300	0.469	100		0.33	
005a	Over-side Drain	78	78	0.122	49	2x24"	0.12	
005aa	Minor At-Grade	21	21	0.033	25		0.33	
007	Minor At-Grade	108	108	0.169	58		0.33	
007a	Culvert	59	59	0.092	42	1x30"	0.17	
007aa	Minor At-Grade	53	53	0.083	40	1x30"	0.17	
007aaa	Minor At-Grade	15	15	0.023	21	1x24"	0.11	
008	Culvert	282	282	0.441	97	1x48"	0.25	
008a	Minor At-Grade	221	221	0.345	85		0.33	
008aa	Culvert	69	69	0.108	46	2x24"	0.12	
025	Culvert	234	234	0.366	88	1x48"	0.25	
026	Over-side Drain	14	14	0.022	20	1x24"	0.11	
038	Culvert	66	66	0.103	45	2x24"	0.12	

(1) Refer to the stream crossing location maps.
(2) Discharge is expressed in cubic feet per second or CFS.
(3) Culverts are planned to be galvanized corrugated metal pipe.
(4) This is the area that will be disturbed by the construction of the crossing beyond the right of way or currently disturbed area. NIP means “No Improvement Planned”.

CONCLUSIONS AND RECOMMENDATIONS

Calculations and investigations performed for this study show that the planned facilities for mitigation of the projects impacts to surface and ground water hydrology are effective, practical and reasonable. Sizing and design of the facilities within this report, properly implemented in the construction drawings along with the proper filing and implementation of the SWPPP, will provide a stable and extended life project compatible with surrounding land uses.

PROPOSED STREAM CROSSINGS MAPS


LEGEND
108 MINOR AT-GRADE CROSSING
111a MAJOR AT-GRADE CROSSING
113a OVERSIDE DRAIN
114 PIPE CULVERT CROSSING
201 NO IMPROVEMENT PLANNED
DRAINAGE AREA BOUNDARY
MAJOR DRAINAGE SUBAREAS
SEE SHEET 2
Jawbone
Canyon
Canyon
Sugarloaf Park
Canyon
Blue Point
BM 2496
BM 2130
Cem
215
214
213
212
211
210
209
208
207
206
205
204
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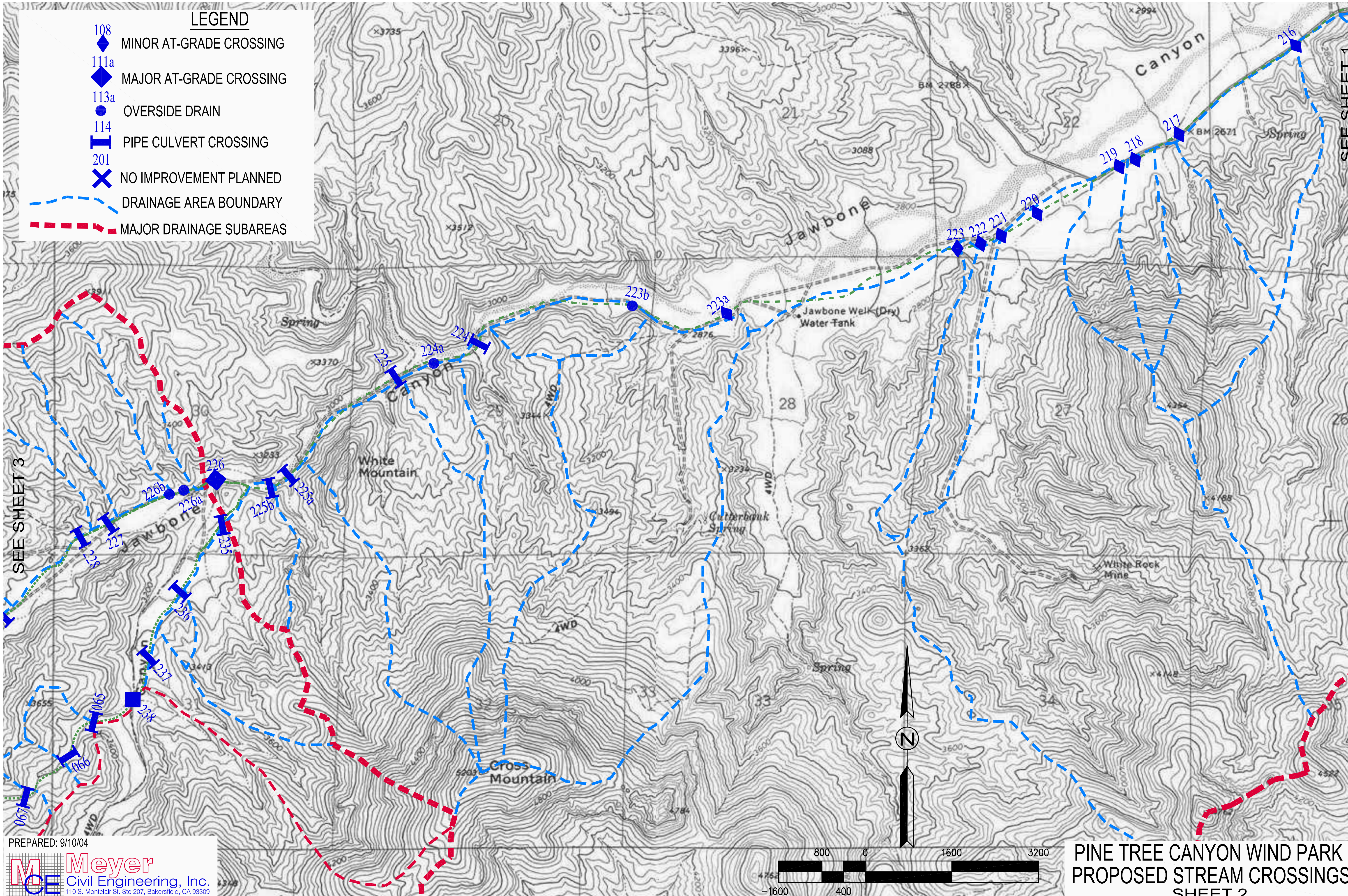
1600
400
PREPARED: 9/10/04
Meyer Civil Engineering, Inc.
110 S. Montclair St. Ste 207, Bakersfield, CA 93309
Phone 661-836-9834
FAX 661-836-9761
PINE TREE CANYON WIND PARK
PROPOSED STREAM CROSSINGS
SHEET 1



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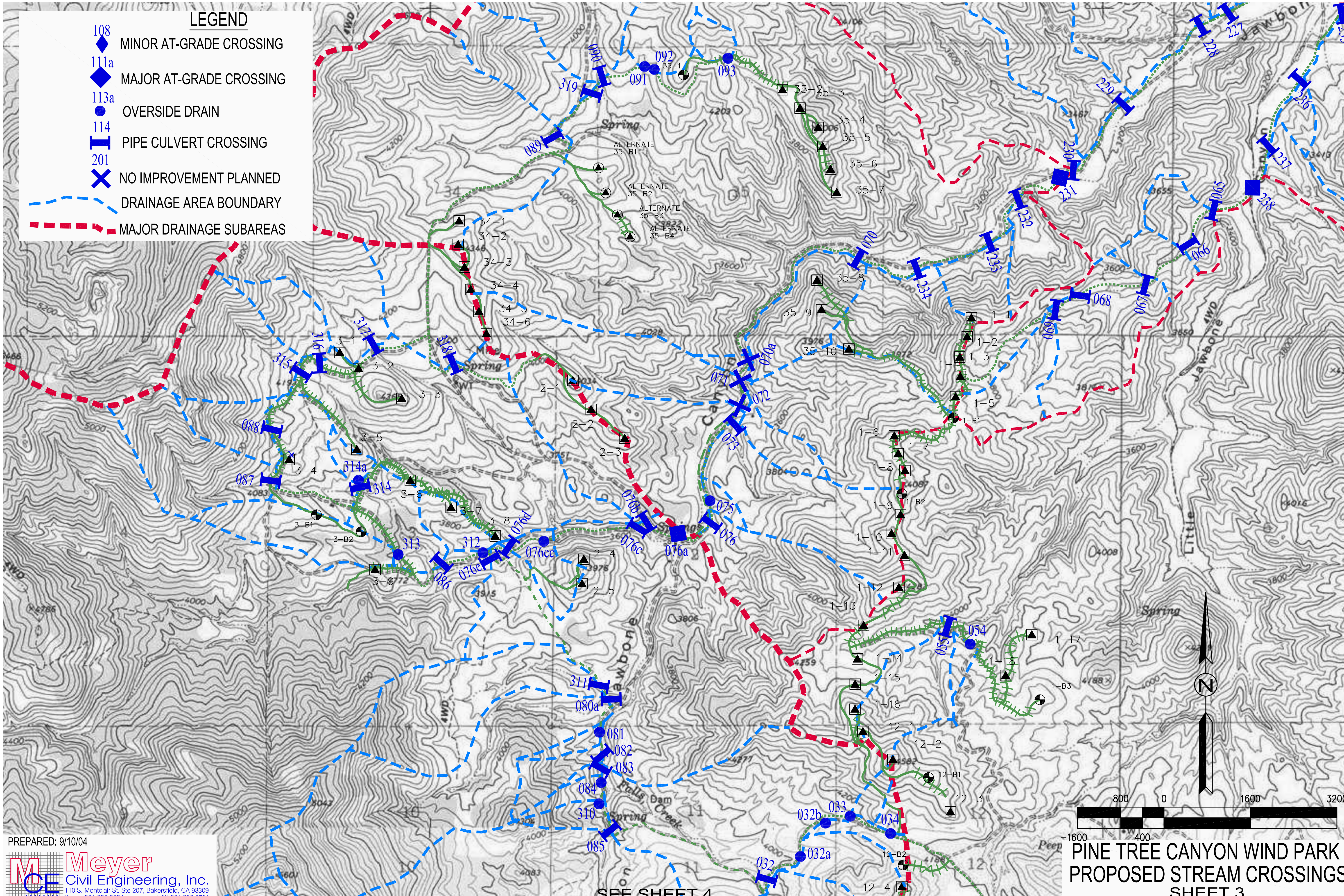
PINE TREE CANYON WIND PARK
PROPOSED STREAM CROSSINGS
SHEET 2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111a MAJOR AT-GRADE CROSSING
113a OVERSIDE DRAIN
114 PIPE CULVERT CROSSING
201 NO IMPROVEMENT PLANNED
DRAINAGE AREA BOUNDARY
MAJOR DRAINAGE SUBAREAS
SEE SHEET 2
SEE SHEET 4
PREPARED: 9/10/04
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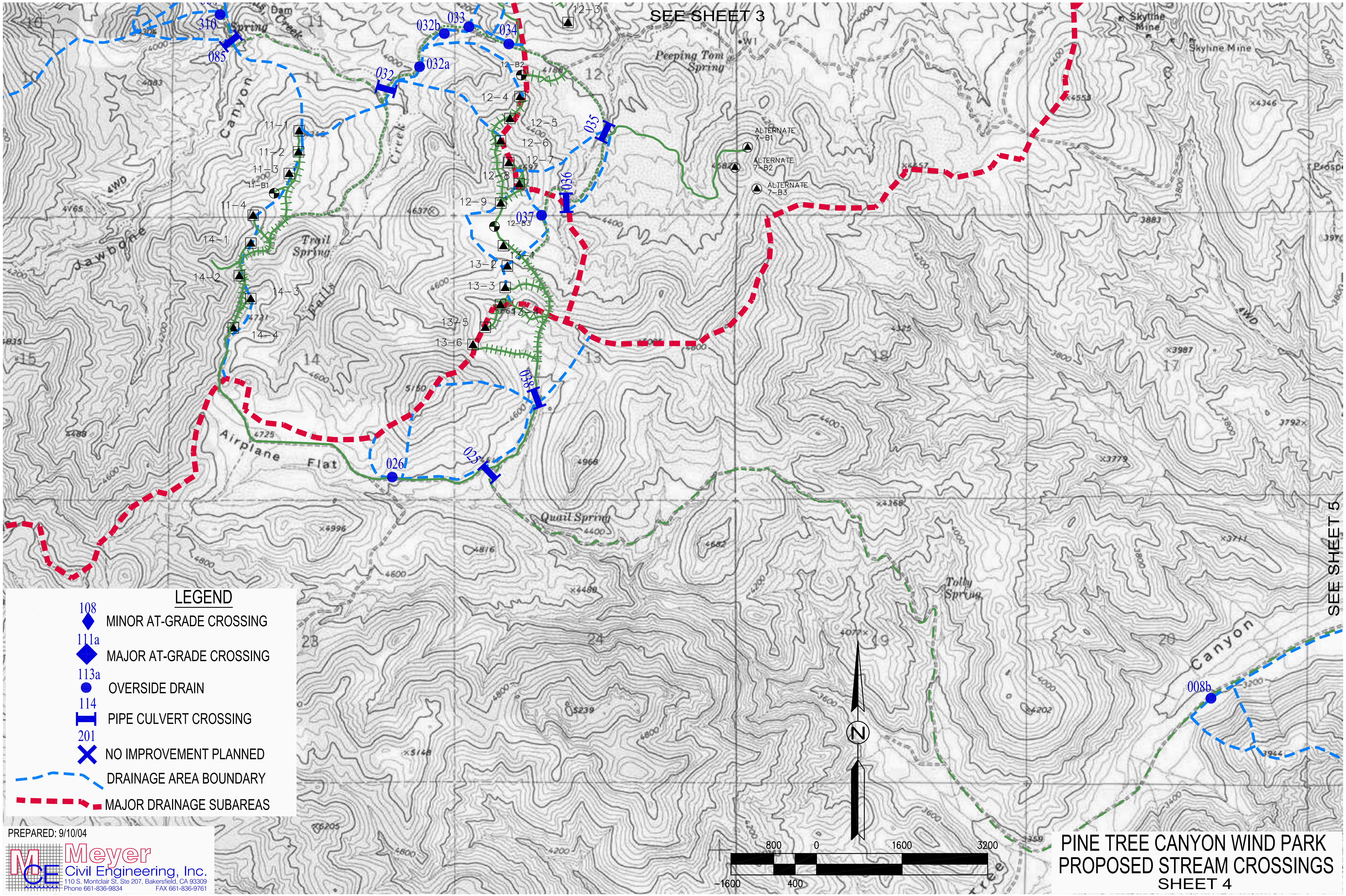
PINE TREE CANYON WIND PARK
PROPOSED STREAM CROSSINGS
SHEET 3
-1600 400 800 0 1600 3200



PINE TREE CANYON WIND PARK
PROPOSED STREAM CROSSINGS
SHEET 4

PREPARED: 9/10/04

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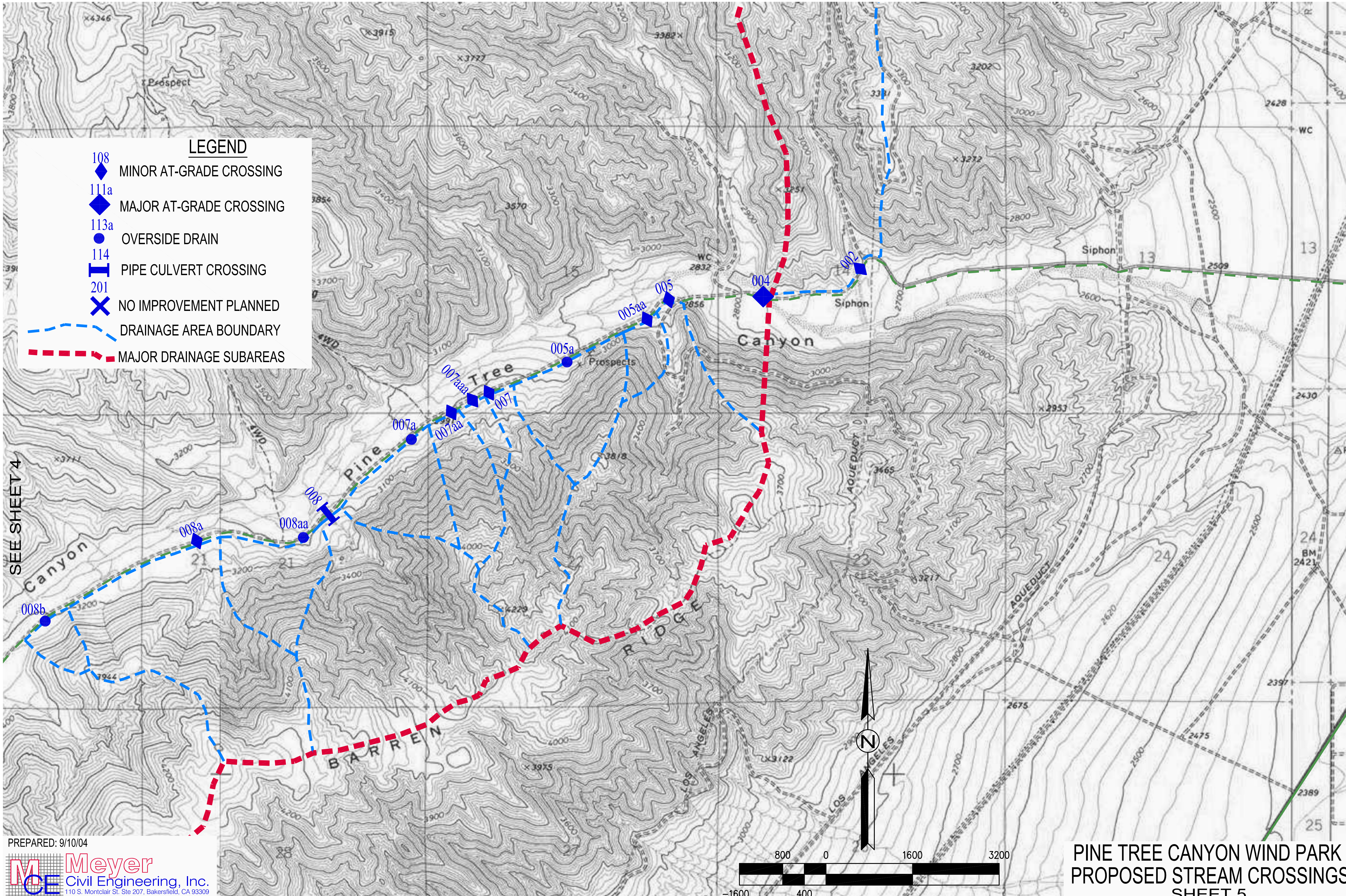
LEGEND
108 MINOR AT-GRADE CROSSING
111a MAJOR AT-GRADE CROSSING
113a OVERSIDE DRAIN
114 PIPE CULVERT CROSSING
201 NO IMPROVEMENT PLANNED
DRAINAGE AREA BOUNDARY
MAJOR DRAINAGE SUBAREAS
SEE SHEET 4
002
004
005
005aa
005a
007aaa
007
007aa
007a
008
008aa
008a
008b
Pine Tree Canyon
BARREN RIDGE
Siphon
Prospects
Prospect
AQUEDUCT
LOS ANGELES
N
800 0 1600 3200
-1600 400
PREPARED: 9/10/04
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PINE TREE CANYON WIND PARK
PROPOSED STREAM CROSSINGS
SHEET 5

Appendix D

Biological Technical Report/Biological Assessment
EDAW Inc.
November 17, 2004

BIOLOGICAL TECHNICAL REPORT/BIOLOGICAL ASSESSMENT FOR THE PINE TREE WIND DEVELOPMENT PROJECT KERN COUNTY, CALIFORNIA

Prepared for:

Los Angeles Department of Water and Power
Environmental Services
111 North Hope Street
Los Angeles, California 90012-2694
Contact: Chuck Holloway

Prepared by:

EDAW, Inc.
2737 Campus Drive
Irvine, California 92612
Contact: Thom Ryan

November 17, 2004

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APPENDICES

LIST OF FIGURES

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CHAPTER 1.0
INTRODUCTION

The Los Angeles Department of Water and Power (LADWP) proposed a wind energy generation project in the southern Sierra Nevada of Kern County, California. At the request of LADWP, EDAW, Inc. (EDAW) and its subcontractors have conducted general as well as various species-specific and protocol biological surveys for the project area. The purpose of the surveys was to inventory and evaluate the biological resources on the site, including the sensitivity status of the existing resources, and to determine the presence of, or the potential for sensitive resources known for the site vicinity, but not detected on-site. In addition, a wetland assessment was conducted to determine the presence of jurisdictional wetland or water resources within the project area. The results of these surveys are presented in this Biological Technical Report. Among the biological resources of concern for the project area, are several federally listed and state-listed species. The analyses provided herein for all listed species, and the habitats they depend on, are intended to satisfy the assessments required under the federal and state endangered species acts. As such, this Biological Technical Report also serves as the federal Biological Assessment and documentation for the State's endangered species act process.

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CHAPTER 2.0
OVERVIEW OF THE PROJECT

LADWP proposes a wind energy generation project consisting of eighty, 1.5-megawatt (MW) wind turbine generators. The project would also include several meteorological towers, an underground and overhead electrical collection system, a substation, an operations and maintenance (O&M) facility and yard, and access roads. LADWP is working with Wind Turbine Prometheus, LLC (WTP), a wind energy development company, to develop and construct the proposed project. LADWP would also construct and operate approximately 8 miles of 230-kilovolt (kV) transmission line, which would connect the proposed project substation to an existing LADWP 230-kV transmission line. The goal of the proposed project is to reduce air pollutant emissions and dependence on fossil fuels related to the generation of electrical energy by LADWP.

2.1 PROJECT LOCATION

The proposed project property is located in the southern Sierra Nevada in Kern County, California. The property is approximately 6 miles west of California State Highway 14 and about 12 miles north of the town of Mojave and 15 miles northeast of the city of Tehachapi (Figure 1). The primary access to the project property is from Highway 14 via Jawbone Canyon Road, which enters the property at its northeastern corner (Figure 2).

2.2 GENERAL SETTING OF PROJECT SITE AND SURROUNDINGS

The proposed wind turbines would be located along selected ridgelines on privately owned land consisting of approximately 8,000 acres (approximately 12.5 square miles) (Figure 3). This land is composed of holdings of the Hansen Ranch (owned by the Hansen Family Limited Trust) and GE Wind Energy, LLC. The property included in the project would be leased from these owners under a long-term agreement.

The property consists of moderately steep terrain ranging from about 3,000 feet above mean sea level (MSL) in elevation in the northeastern corner to about 5,000 feet above MSL in the southwestern corner. A number of small intermittent streams are also located on the site, all of which ultimately drain into either Jawbone Canyon, along the north side of the property, or Pine

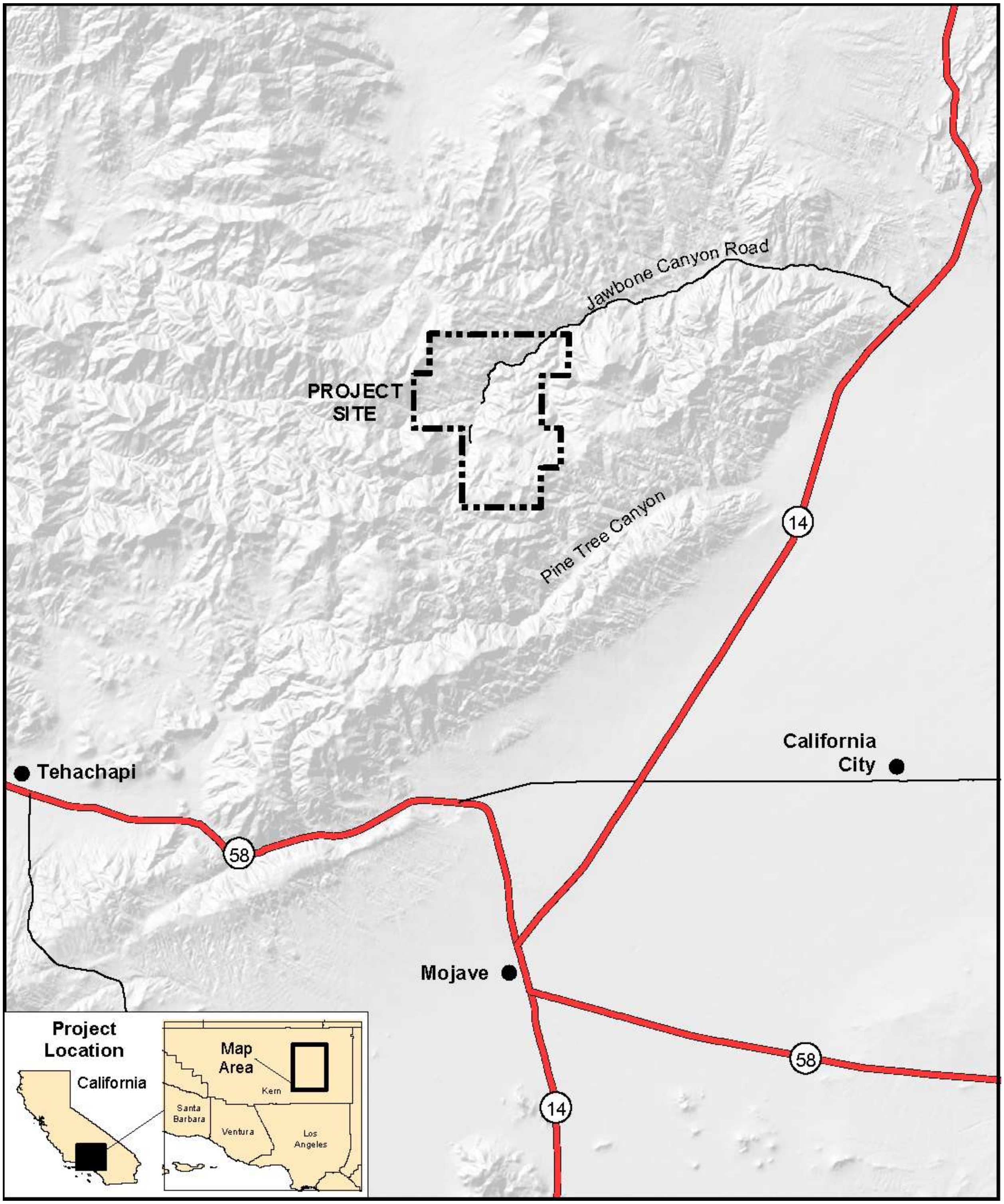

Figure 1
Project Region

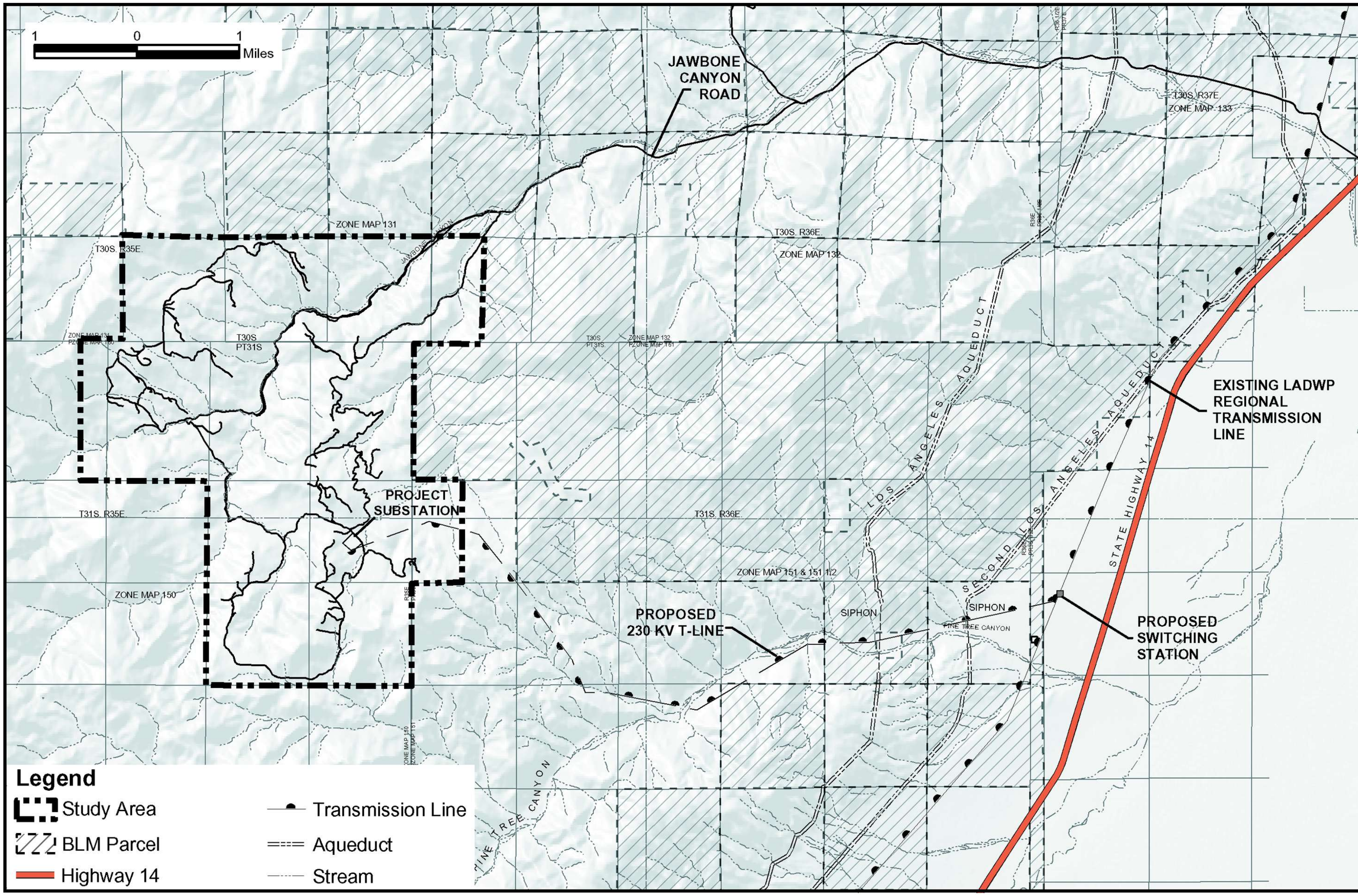

Figure 2
Project Location

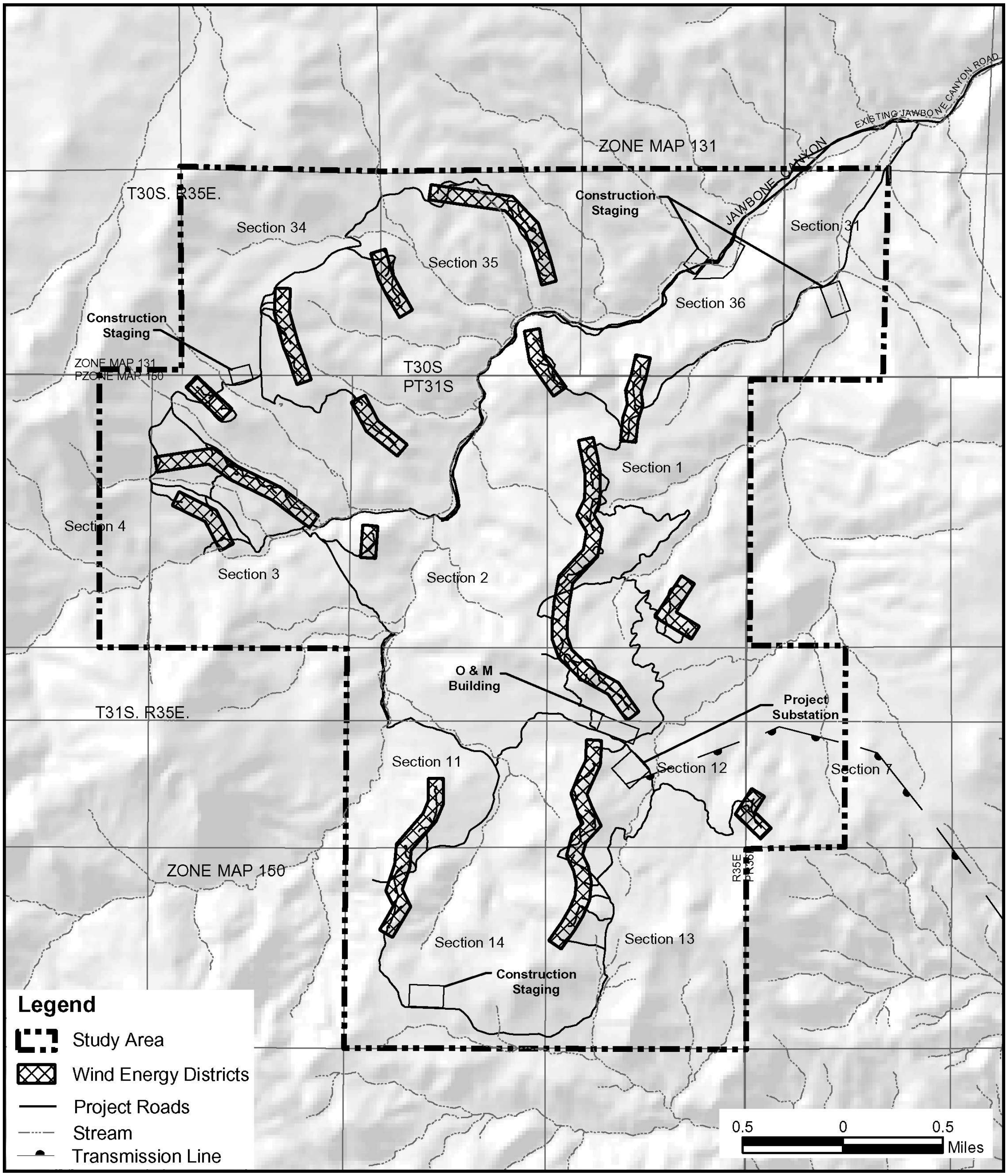

Figure 3
Project Site Plan

Tree Canyon, to the south side of the property. Both Jawbone and Pine Tree canyons drain into the Fremont Valley, to the east of the project property. The proposed project site has excellent wind resource characteristics. Average wind speeds at the site are approximately 14 to 18 miles per hour.

The property is essentially undeveloped, but it is currently and has historically been used for cattle grazing. Because of the relatively small footprint of the wind turbines and other project elements, this grazing use would be essentially unaffected and could continue after project implementation.

The area surrounding the proposed project property is also essentially undeveloped. The project property is bounded primarily by privately owned land except along a portion of its eastern boundary and a portion of its northern boundary, which adjoin federally owned land administered by the U.S. Department of Interior, Bureau of Land Management (BLM). The north eastern corner of the project property is located south of the Jawbone-Butterbredt Area of Critical Environmental Concern (ACEC) as designated in the California Desert Conservation Area Plan (BLM 1980). Approximately 3.5 miles of the ACEC are located west of the Jawbone Open Area and approximately 2.2 miles of the ACEC are within the Open Area. The location of the ACEC boundary in the area of the project site is not shown correctly on the BLM 1998 Surface Management Status Desert Access Guide, Tehachapi map.

This ACEC, which consists of both public and private property, has been designated by BLM because of its cultural and wildlife values found within this area. The ACEC is also designated as the "Sierra Mojave-Tehachapi Ecotone Wildlife Habitat Management Area (CA_06-WHA-20)." CDFG shares management responsibility in the ACEC with BLM. Portions of Jawbone Canyon Road, the main access road into the project site, pass through the Jawbone-Butterbredt ACEC, including the Jawbone Canyon Open Area (a designated off-road vehicle use area).

The Sky River Ranch wind turbine development, owned by Florida Power & Light, is located on private property along Sweet Ridge, which rises above 5,000 feet in elevation and runs in a north-south direction approximately 1 mile west of the project property. Sweet Ridge is generally the tallest ridgeline in the vicinity of the project property, and it separates the local watershed east and west. The Sky River Ranch wind development consists of 342 approximately 150-foot-tall turbines, which are visible from various locations within the project property.

Highway 14 is a four-lane, divided highway located east of the proposed project. Along with U.S. Highway 395, which it intersects north of the project site, Highway 14 provides a north-south thoroughfare along the eastern side of the Sierra Nevada. Two existing LADWP high-voltage transmission lines run roughly parallel to and approximately 0.5 to 1 mile west of Highway 14 in the vicinity of the project property. One of these existing lines would provide an interconnection point for the proposed project to the main power transmission grid.

2.3 CHARACTERISTICS OF THE PROPOSED PROJECT/ACTION

2.3.1 State and Local Actions

The proposed project/action must be approved by several local and California state agencies. As a component of the City of Los Angeles' electrical power generation system, the project initially would be approved by LADWP. LADWP would also be the Lead Agency for complying with the California Environmental Quality Act (CEQA). Kern County is a key responsible local agency with authority over land use.

The anticipated local and state actions pertaining to biological resources are as follows:

Los Angeles Department of Water and Power (CEQA Lead Agency)
- CEQA compliance

California Department of Fish and Game (CDFG)
- Streambed Alteration Agreement, CFG Code Section 1602;
- California Endangered Species Act (California ESA), CFG Code Section 2081 (formal consultation on potential effects on state listed species)

2.3.2 Federal Actions

BLM would issue a right-of-way grant for the use of federal lands and is the federal Lead Agency for complying with the National Environmental Policy Act (NEPA). A right-of-way grant is needed to cross approximately 1.1 mile of BLM-administered land along Pine Tree Canyon Road for the proposed project transmission line. To provide access to the project property for both construction activities and long-term project O&M, a right-of-way grant would also be required from BLM to cross approximately 4.7 miles of BLM-administered land along Jawbone Canyon Road.

The anticipated federal actions pertaining to biological resources include the following:

Bureau of Land Management (NEPA Lead Agency)
- NEPA compliance
- Right-of-way Grant

U.S. Fish and Wildlife Service (USFWS)
- Federal Endangered Species Act (Federal ESA), Section 7 (formal consultation on potential effects to federal listed species)

2.3.3 Alternatives Development

Introduction

Previous planning analysis for the siting of the proposed wind turbines considered a broader study area of over 21,500 acres and considered more than 130 individual turbine sites. Due to constraints imposed by such factors as terrain and Military Training Routes (MTRs), and in an effort to minimize potential impacts to existing sensitive biological resources (e.g., important raptor nesting habitat), the boundaries of the project property were narrowed to their present configuration, encompassing approximately 8,000 acres. Within these narrowed boundaries, the objective of the project is to optimize wind energy production based on a cost-benefit analysis that balances construction, operations, and maintenance considerations with the anticipated output of each turbine. A primary factor in this analysis is the quality of the wind resource at a particular site within the property.

Turbine Siting Alternatives

Based on the feasibility analyses, 80 turbines would be sited along selected ridgelines within the project property (Figure 3). The turbines would be grouped along separate ridges in “strings” ranging in size from 2 to 16 towers. The spacing between individual turbine towers within a string would be a minimum of 1.4 times the diameter of the rotor blades (approximately 353 feet), but towers within a string would otherwise be located based on existing environmental and engineering considerations to minimize impacts and facilitate construction. Seven alternate turbine sites are included in the plan in the event one or more turbine locations become impractical to construct.

Site Access Alternatives

Jawbone Canyon Road and Pine Tree Canyon were evaluated as potential construction and operations access roads for the wind turbines and transmission lines. Jawbone Canyon and Jawbone Canyon Road are the proposed construction and maintenance access to the wind turbine site. Pine Tree Canyon would provide construction access for the transmission line but would not be used for access to the wind turbine site. However, Pine Tree Canyon is considered as an alternative site access. Pine Tree Canyon and Jawbone Canyon represent the only two practical alternatives for access to the site.

Transmission Line Alternatives

An overhead 230-kV transmission line would connect the substation on the wind turbine sites to an existing regional LADWP transmission line located west of and generally paralleling Highway 14. It is proposed by LADWP to locate the transmission line in Pine Tree Canyon. However, Jawbone Canyon represents an alternative transmission line route.

CHAPTER 3.0
METHODS

A biological habitat assessment was conducted in December 2002 throughout an approximately 33-square-mile project area to delineate existing vegetation communities, assess possible sensitive plant and wildlife associations within those communities, and search for sign of sensitive plant and wildlife species on-site. A dirt access road with an associated power line right-of-way from Highway 14 into Pine Tree Canyon was also included in the habitat assessment. The information gathered during the assessment was used to formulate opinions on whether additional focused surveys would be required during a more appropriate time of the year (i.e., spring and summer for plants). The surveys subsequently conducted during 2003 covered, as needed, the 33-square-mile project area, plus access along Pine Tree and Jawbone canyons. Based on preliminary findings from the 2002 and 2003 surveys, however, project design modifications were made which reduced the wind turbine project area to 12.5 square miles, thereby avoiding more sensitive resources to the south. The 2004 biological surveys described below were conducted within the 12.5-square-mile project area, including access roads within both Pine Tree and Jawbone Canyons. Throughout this document, reference to the project area refers to the current 12.5-square-mile wind turbine area; reference to the study area includes all areas surveyed since December 2002.

Prior to initiating fieldwork, a list of sensitive plant and wildlife species with the potential to occur within the vicinity of the project was generated using the California Natural Diversity Database (CNDDB; CDFG 2004) and California Native Plant Society Checklist (CNPS 2002). In addition, USFWS recommended evaluation of the on-site status of several sensitive species (see Chapter 4 for a list of these species) in a letter dated April 24, 2003 (Appendix A). Several existing environmental documents (e.g., Gould 1998; Sapphos Environmental, Inc. 2000) and the Draft West Mojave Plan (WMP) (BLM 2003) were also reviewed for relevant information regarding the potential for sensitive species to occur on-site.

Based on the results of the December 2002 habitat assessment, the list of sensitive species with the potential to occur within the project area, and the literature review, focused surveys were conducted in the spring and summer of 2003 and 2004 and included surveys for rare plants, in particular the Hoover's woolly-star (*Eriastrum hooveri*), Kelso Creek monkeyflower (*Mimulus shevockii*), Mojave tarplant (*Deinandra mohavensis*), and Red Rock tarplant (*Deinandra arida*); and desert tortoise (*Gopherus agassazii*). The timing and focus of all surveys are provided in

Table 1. Site survey methodologies associated with each survey type are further described below. Focused surveys were not conducted for any other sensitive species recommended for evaluation within the USFWS letter based on lack of appropriate habitat or unsuitable conditions (e.g., elevation) on-site, or in the case of Mohave ground squirrel (*Spermophilus mohavensis*), the assumption that suitable habitat in the project area was occupied by this species concluded that focused surveys were not required.

Table 1
Schedule of Surveys

Date	Type of Survey	Surveyors	Weather Conditions
December 5-12, 2002	Habitat Assessment and Vegetation Community Mapping	Marc Doalson, Bonnie Hendricks, Erik LaCoste, Kim Myers, Erin Riley, Bob Solecki, Danielle Tannourji, Petra Unger, Melissa Wilson	Clear skies, mild temperatures, light winds
December 5-12, 2002	Winter Raptor Survey	Erik LaCoste, Erin Riley, Bob Solecki, Melissa Wilson	Clear skies, mild temperatures, high winds
December 5-12, 2002	General Wildlife Surveys	Erik LaCoste, Lyndon Quon, Erin Riley, Melissa Wilson	Clear skies, mild temperatures, light winds
April 19-20, 2003	Rare Plant Surveys	Marc Doalson, Erik LaCoste, Erin Riley, Melissa Wilson	Clear skies, mild temperatures, high winds
April 6-7, 2003	Raptor Surveys	Erik LaCoste, Lyndon Quon, Erin Riley, Melissa Wilson	Clear skies, mild temperatures, high winds
April 7, 2003	Tehachapi Slender Salamander Surveys	Erik LaCoste, Erin Riley	Clear skies, mild temperatures, high winds
May 13-15, 2003	Desert Tortoise Surveys	Erik LaCoste, Lyndon Quon, Melissa Wilson	Clear skies, mild temperatures, high winds
May 28-30, 2003	CDFG Jurisdictional Wetland Determination Surveys	Marc Doalson, Mark Tucker	Clear skies, mild temperatures, high winds
June 11-13, 2003	Rare Plant Surveys	Elizabeth Candela, Marc Doalson, Erin Riley	Clear skies, mild temperatures, high winds
March 15-17, 2004	General Wildlife Surveys	Lyndon Quon, Melissa Wilson	Clear skies, mild temperatures, high winds
March 16-17, 2004	Raptor and Bat Habitat Assessment Surveys	Michael Morrison	Clear skies, mild temperatures, high winds
April 4-5, 13-14, 28, 2004	Avian Surveys	Michael Morrison	Clear skies, mild temperatures, high winds
April 13-15, 2004	Rare Pant Surveys	Marc Doalson, John Messina	Clear skies, mild temperatures, high winds
May 30, 2004	Raptor Nest Survey	Michael Morrison	Mostly clear, mild temperatures, high winds
June 8-10, 2004	Rare Plant Surveys	Shawn Johnston, Danielle Tannourji	Cloudy skies, mild temperatures, high wind
June 8-10, 2004	CDFG Jurisdictional Wetland Determination Surveys	Paula Jacks, Shawn Johnston, Danielle Tannourji, Melissa Wilson	Cloudy skies, mild temperatures, high winds

3.1 VEGETATION COMMUNITY AND HABITAT ASSESSMENT

As the majority of the survey area is composed of very steep and rugged terrain, four-wheel drive vehicles were required to access the site. Vehicles, however, were used only where dirt roads or jeep trails already existed. Biologists then conducted a more detailed habitat assessment on foot throughout the proposed area. Vegetation communities encountered in the field were identified and plotted onto 1"=500' scale aerial photographic maps of the survey area. A list of plant species detected on-site is included as Appendix B.

3.2 GENERAL WILDLIFE SURVEYS

General wildlife surveys were conducted concurrently with vegetation community mapping surveys during December 2002 and again during March 2004. During these surveys, all wildlife sign was identified to species and, when appropriate, mapped along with the vegetation communities. While the assessment covered the entire site, particular attention was given to the potential wind turbine locations and access roads. Additional informal wildlife surveys were conducted during all subsequent surveys by EDAW biologists in the project area. In addition, focused raptor and bat habitat assessment surveys were conducted during March 2004 by Dr. Michael L. Morrison and during those surveys, general wildlife detected were also noted. A list of the wildlife species detected during all surveys is provided in Appendix C.

3.3 JURISDICTIONAL WETLAND DETERMINATION

Based on an analysis of the project area, all wetlands and waters onsite are isolated and would not be considered jurisdictional by the U.S. Army Corps of Engineers; however, most of these resources would be considered jurisdictional by the CDFG. Therefore, a CDFG jurisdictional wetland determination survey was conducted by EDAW on May 28-30, 2003, in all wetland areas of potential impact within the project area. All areas that would qualify as CDFG jurisdictional wetlands or waters that would be impacted by improved or new roads were mapped on a 1:1,750-scale aerial photographic map of the project area for this effort. Subsequently, project engineers completed analysis of where road improvements would be required at stream crossings along all access roads throughout the project area.

These locations were identified with Global Positioning System (GPS) equipment and photographs of the stream or drainage were taken. During June 8-10, 2004, EDAW biologists reviewed the majority of the locations where road improvements were proposed to confirm the jurisdictional status of the drainage in these areas.

During both the 2003 and 2004 assessments conducted by EDAW, site-specific information included the width of stream or drainage, the width of riparian vegetation cover, if present, and other notes.

3.4 RARE PLANTS

Rare plant surveys were conducted along all roads scheduled for improvement and new road alignments, proposed wind turbine sites with an appropriate buffer, and all other areas that would be impacted from project construction. Focused surveys were not conducted throughout the entire 12.5-square-mile project boundary, only in areas of potential impact. Surveys were conducted in three phases in 2003: early April, late April, and early June, to accommodate different blooming periods for the majority of plant species with the potential to occur on-site. In 2004, surveys for rare plants were conducted during April and June. The focus of the 2004 surveys was to search for sensitive plants in the newly proposed areas of the project site and return to high-potential areas previously surveyed in 2003.

In addition, isolated stands of Joshua trees were also mapped during the 2003 and 2004 surveys to calculate impacts to individual trees observed in proposed action areas. Quantitative estimations were also conducted by counting individual trees that occurred within a 50-foot and in some areas 100-foot buffer zone of proposed action areas and access roads.

3.5 RAPTORS

Several areas suitable for raptor nesting, breeding, and foraging were identified during the general habitat assessment and wildlife surveys in December 2002. Because several raptor species were noted during this survey, these areas were subsequently surveyed for nests and raptor occurrences in April 2003. Areas included in the survey were steep rocky cliffs, riparian corridors with mature trees, and all potential turbine string locations that coincided with vegetation communities capable of supporting raptor nests.

In addition to the general wildlife surveys and focused raptor nesting survey conducted by EDAW between 2002 and 2004, focused avian surveys with an emphasis on raptors were conducted in April 2004 by Dr. Michael L. Morrison. After a reconnaissance survey in early March 2004, Dr. Morrison conducted a series of five point count surveys within the proposed project area to quantify general bird activity and passage near proposed turbine strings. The data were used to assess the potential impacts of the proposed project on avian wildlife species.

During these surveys, Dr. Morrison noted not only the bird species that were observed during the point counts but also those identified through incidental observations.

3.6 TEHACHAPI SLENDER SALAMANDER

Habitat assessments conducted in December 2002 identified several locations within the project area that have the potential to support salamander species based on the presence of water and adequate cover sites (i.e., rocks and leaf litter). Areas included in the habitat assessment coincided with areas of potential impact from the proposed project (i.e., improved roads that cross a stream channel). Each of these areas was surveyed during the focused Tehachapi slender salamander surveys in April 2003. In addition, several other locations that did not have water during the December 2002 surveys, but held water during the April 2003 surveys, were also surveyed.

3.7 DESERT TORTOISE

During habitat assessments in December 2002, the project area was evaluated for desert tortoise habitat and the potential for desert tortoise to occur on-site. Suitable desert tortoise habitat was identified in both Pine Tree and Jawbone canyons. EDAW biologists determined that the large, alluvial fan at the entrance to Pine Tree Canyon has the potential to support the desert tortoise because it consists of creosote bush scrub, the preferred habitat of desert tortoise. Multiple signs of desert tortoise (burrows, scat, eggshells) were observed within Pine Tree Canyon during habitat assessment surveys. Thus presence of desert tortoise was assumed in all suitable habitat throughout Pine Tree Canyon and focused surveys were not conducted in this area. However, focused desert tortoise surveys were conducted in appropriate habitat in Jawbone Canyon in May 2003, excluding the off-highway vehicle recreation area along Jawbone Canyon Road because this area was not a part of the project area at the time of the survey.

3.8 MOHAVE GROUND SQUIRREL

During habitat assessments in December 2002, the project area was evaluated for Mohave ground squirrel habitat and the potential for this species to occur on-site. Suitable Mohave ground squirrel habitat was identified in both Pine Tree and Jawbone canyons. The project area is within the species' distributional range and individuals have been captured in Jawbone Canyon and several locations surrounding the project area (CDFG 2004a). Thus the presence of Mohave ground squirrel was assumed in all suitable habitat throughout the project area and focused surveys were not conducted.

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CHAPTER 4.0
EXISTING CONDITIONS

The following descriptions of existing biological conditions in the study area are based on the results of the surveys and database searches described above, and available documentation for the project study area.

4.1 VEGETATION COMMUNITIES AND COVER TYPES

Vegetation communities are assemblages of typically native plant species that coexist in the same area and exhibit similar physiognomic characters (i.e., forests are comprised of trees). These communities are subdivided based on dominant species within each community. Cover types are areas where land has been essentially stripped of its natural vegetation and has been replaced with buildings, roadways, or agricultural crops. A total of 32 vegetation communities and cover types were identified during the habitat assessments (Table 2 and Figure 4). Vegetation communities were classified based on Twisselmann (1967), Holland (1986), and Sawyer and Keeler-Wolf (1995). When applicable, vegetation community names were used directly from one of the three previously mentioned works, or independent community names were assigned based on characteristics observed in the field that did not readily fit into the existing nomenclature.

Six generalized vegetation groupings and cover types are being employed in this report to characterize and discuss the vegetation communities and land cover observed during the habitat assessments: scrubs and chaparral, wetlands, grasslands and fields, woodlands, ecotones, and disturbed and developed. Ecotones are ecological gradients that occur between distinct vegetation communities where plant species common to both communities intergrade. Ecotones are also areas where wildlife species may intergrade due to structural variations in the canopy and food sources, among other factors.

The vegetation communities delineated within the project boundary are described below.

Table 2
Vegetation Communities and Cover Types for the Pine Tree Wind Development Project

Vegetation Communities and Cover Types
Scrubs and Chaparrals
Blackbush scrub
Brittlebush Scrub
Rabbitbrush scrub
Disturbed rabbitbrush scrub
Big sagebrush scrub
Mojave mixed woody scrub
Mojave creosote bush scrub
Semi-desert chaparral
Wetlands
Mojave desert wash scrub*
Mojave riparian forest*
Southern riparian scrub*
Grasslands and Fields
Perennial grassland*
Annual grassland
Wildflower field
Woodlands
Mojavean juniper woodland and scrub
Open foothill pine woodland
Blue oak woodland
Foothill pine-oak woodland
Oak-pinyon woodland
Oak-pinyon-juniper woodland
Mojavean pinyon woodland
Juniper-oak woodland
Foothill pine-pinyon-oak woodland
Foothill pine-pinyon-juniper-oak woodland
Oak-foothill pine-juniper woodland
Pinyon-juniper woodland
Joshua tree woodland*
Desert peach woodland
Ecotones
Ecotonal Mojavean juniper woodland/Mojave mixed woody scrub
Ecotonal Mojavean juniper woodland/blackbush scrub
Developed and Disturbed
Developed
Disturbed habitat

* Sensitive vegetation community

4.1.1 Scrubs and Chaparrals

Blackbush Scrub

This scrub community is characterized by low shrubs of blackbush (*Coleogyne ramosissima*) with a sparse understory, typically composed of annual species. This community is typically found on well-drained slopes and flats of calcareous soils throughout the project site. Blackbush scrub ranges from the Owens Valley to the Mojave Desert. Common plant associates include rabbitbrush (*Chrysothamnus teretifolius*) and Mormon tea (*Ephedra nevadensis*) (Holland 1986). On site, blackbush scrub is found mainly in the northwest corner of the project area.

Brittlebush Scrub

Brittlebush scrub community is dominated by brittlebush (*Encelia farinosa*). Brittlebush scrub is a drought-deciduous plant species that can form pure stands or associations with other low-lying shrub species such as rubber rabbitbrush (*Chrysothamnus nauseosus*), white bursage (*ambrosia dumosa*), and blackbush (*Coleogyne ramosissima*). This vegetation community can be found on the south slopes of Jawbone Canyon.

Rabbitbrush Scrub

Rabbitbrush scrub consists of areas dominated by rubber rabbitbrush. It occurs throughout the Great Basin region and the western edges of the Mojave Desert. It is a disturbance-maintained community and can be found on alluvial fans, slopes, and valleys in well-drained soils (Holland 1986). It is found throughout the project area, and rubber rabbitbrush is also associated with other scrub communities.

Disturbed Rabbitbrush Scrub

This community is similar to rabbitbrush scrub but has been disturbed within the project area, primarily by cattle grazing. Disturbed rabbitbrush scrub has less total vegetated cover of rubber rabbitbrush and a higher percent cover of grasses and annual herbs. This scrub community occurs in the northwest region of the project area.

Big Sagebrush Scrub

This shrub community consists of mostly big sagebrush (*Artemisia tridentata*), a soft woody shrub with few understory annual plant species. It can be found on a wide variety of soils east of the Cascade-Sierra Nevada crest and into the Mojave and Sonoran deserts (Holland 1986). Big sagebrush scrub is found in a single location near the center of the study area, adjacent to a small drainage.

Mojave Mixed Woody Scrub

Mojave mixed woody scrub consists of a complex mosaic of plant species typically characterized by very shallow, overdrained soils. Plant species associated with this community include Joshua tree (*Yucca brevifolia*), rabbitbrush, blackbush, California buckwheat (*Eriogonum fasciculatum*), saltbush (*Atriplex polycarpa*), antelope bush (*Purshia tridentata* var. *glandulosa*), and Our Lord's candle (*Yucca whipplei* ssp. *caespitosa*). This habitat ranges from the eastern base of the Sierra Nevada southward along the Tehachapi, San Bernardino, San Jacinto, and Peninsular ranges to northern Baja California (Holland 1986). On site, the Mojave mixed woody scrub community is located in large swathes in Pine Tree Canyon, Jawbone Canyon, and various other locations throughout the study area.

Mojave Creosote Bush Scrub

Mojave creosote bush scrub is dominated by widely spaced creosote bush (*Larrea tridentata*) with a sparse understory of annual species. Typically found on alluvial fans, dry slopes, and valleys with well-drained soils, this community is common in the Mojave Desert and extends into northwestern Arizona and southern Nevada. Common associates found in the project area are brittlebush and Mormon tea (Holland 1986). Mojave creosote brush scrub is located primarily in the Pine Tree Canyon drainage.

Semi-Desert Chaparral

Semi-desert chaparral consists of open, 4- to 12-foot-tall shrubs such as California juniper (*Juniperus californica*), California buckwheat, chamise (*Adenostoma fasciculatum*), and various species of manzanita (*Arctostaphylos* spp.). Found on dry, rocky, steep slopes at elevations between 2,000 to 5,000 feet above MSL, this community is widely distributed throughout the inner south coast ranges of San Benito County to the Transverse and Peninsular ranges of Kern

County, bordering the Mojave and Colorado deserts (Holland 1986). On site, this community is located in a single location near the center of the project area.

4.1.2 Wetlands

Mojave Desert Wash Scrub

Mojave desert wash scrub has been described as an open shrubby community with scattered microphyllous trees and shrubs on well-drained sandy soils and is found in most washes, arroyos, and canyons of intermittent streams throughout the Mojave Desert. Common dominant plant species found within the project area include saltbush, scale-broom (*Lepidospartum squamatum*), and cheesebush (*Hymenoclea salsola*). This community is considered "rare" by CDFG and "worthy of consideration" by CNDDB (CDFG 2003). This community occurs in the Jawbone and Pine Tree Canyon washes.

Mojave Riparian Forest

This open wetland plant community is characterized by broadleaved, winter-deciduous cottonwoods (*Populus fremontii*) and willows (*Salix laevigata*) and is typically found along large desert rivers and moist washes. Understory associates include saltbush (*Atriplex* spp.) and rubber rabbitbrush. This community is considered "rare" by CDFG and "worthy of consideration" by CNDDB (CDFG 2003). CDFG (2000) notes that there are fewer than six known locations and/or fewer than 2,000 acres of this habitat remaining in southern California. This riparian community occurs in flat, fine-grained alluvium along river channels and tributaries found in Jawbone Canyon.

Southern Riparian Scrub

Southern riparian scrub is an inclusive term used to describe a mixed riparian habitat consisting of communities such as southern willow scrub, mule fat scrub, and rabbitbrush scrub, which are highly intermixed in dominance in a relatively small area (Sawyer and Keeler-Wolf 1995). These riparian communities are classified by the species, such as willows (*Salix* spp.), mule fat (*Baccharis salicifolia*), and rabbitbrush. These communities are considered "rare" by CDFG and "worthy of consideration" by CNDDB (CDFG 2003). Generally, these communities occur along river channels and tributaries throughout the project site where there are relatively fine-grained soils and moist conditions.

4.1.3 Grasslands and Fields

Perennial Grassland

Perennial grassland is characterized by perennial bunchgrass (*Nassella pulchra*) and sparsely covered by shrub species and associated weedy annual species (*Bromus* spp., *Avena* spp., and *Erodium* spp.). Perennial grasslands can also support herbaceous annual and perennial geophytic species. Native grassland communities are considered sensitive by CDFG (2003). This habitat is only found in one location in the northwestern portion of the project area (Figure 4).

Annual Grassland

Annual grassland is a community characterized by dense to sparse cover of annual grasses on fine-textured clay soils. As described by Holland (1986), these are typically introduced nonnative grasses, which occur throughout California's foothills and valleys. All grass species encountered in these areas were of mediterranean origin and are considered exotic. Annual grasslands are located in the northwest sections of the study area.

Wildflower Field

A dense cover of annual wildflowers characterizes this community. The species composition of this community varies in dominance from site to site throughout California's foothills and valleys (Holland 1986). Wildflower fields are located in the northwest sections of the study area.

4.1.4 Woodlands

Mojavean Juniper Woodland and Scrub

Mojavean juniper woodland and scrub is an open woodland community dominated by California juniper. The understory is typically diverse and may include rabbitbrush, blackbush, and California buckwheat. Elevation range for this community is 4,000 to 6,000 feet above MSL in the southern range, and slightly higher and expanded in the northern range (Holland 1986). This is one of the most widespread vegetation communities on-site and is found throughout the project area.

Open Foothill Pine Woodland

Open foothill pine woodland is a community characterized by an open spacing of foothill pine (*Pinus sabiniana*) with an understory of various woody shrubs such as ceanothus (*Ceanothus* spp.) and rabbitbrush. Various oak (*Quercus* spp.) species are known to also occur scattered throughout this community. In the study area, open foothill pine woodland is located in several locations near the center of the site.

Blue Oak Woodland

The blue oak woodland within the project site is characteristic of the upper elevation community described by both Holland (1986) and Twisselmann (1967). This community is dominated by blue oak (*Quercus douglasii*), but usually co-occurs with several other species of oak and pine. This community is typically found on well-drained soils below 3,000 to 4,000 feet. Blue oak woodland is found in several locations in the study area, particularly at higher elevations to the west.

Foothill Pine-Oak Woodland

Foothill pine-oak woodland is a community where the dominant species are foothill pine and blue oak, generally in equal numbers and distribution. Each of these woodland species and its associated woodland community are described above in detail. Foothill pines generally tower above the blue oaks in this community. The understory for this community typically consists of introduced annual species. This vegetation community is found at several locations, particularly at the middle elevation range for the site.

Oak-Pinyon Woodland

Oak-pinyon woodland is a community where the dominant species are single-leaf pinyon pine (*Pinus monophylla*), and blue oak. This woodland community is widespread throughout the site, particularly in the higher elevation steep slopes at the western edge of the project area. As expected in woodlands such as this, the understory is typically scattered and consists of annual species.

Oak-Pinyon-Juniper Woodland

Oak-pinyon-juniper woodland is a community where the dominant species are single-leaf pinyon pine, California juniper, and blue oak. Each of these species and its associated community are described in separate sections above. This community is generally found on steep and rocky slopes near the center of the project area.

Mojavean Pinyon Woodland

Mojavean pinyon woodland is an open woodland community dominated by single-leaf pinyon pine with an understory that is typically diverse in shrub species that outnumber the pines in the area (Holland 1986). Dominant shrub species include big sagebrush, California sage (*Artemisia californica*), and mahogany (*Cercocarpus* sp.). This community is typically better developed on steep slopes between 4,000 and 8,000 feet above MSL. On site, the community occurs in a single locale in the western part of the project area.

Juniper-Oak Woodland

Juniper-oak woodland is a community where the dominant species are California juniper and blue oak. This woodland community is typically found on rocky sites with xeric soils or severe drainage and can often be found on rocky outcrops (Holland 1986). Juniper-oak woodland is found in several locations in the center of the project area.

Foothill Pine-Pinyon-Oak Woodland

Foothill pine-pinyon-oak woodland is a community where the dominant species are foothill pine (*Pinus sabiniana*), single-leaf pinyon pine, and blue oak. This woodland community occurs in a single locale on the steep slopes and high elevations at the western edge of the project area.

Foothill Pine-Pinyon-Juniper-Oak Woodland

This woodland community occurs where foothill pine, single-leaf pinyon pine, California juniper, and blue oak are equally dominant. Understory is generally bare, with few annual species scattered throughout. Foothill pine-pinyon-juniper-oak woodland occurs as a single occurrence in the southwest corner of the project area.

Oak-Foothill Pine-Juniper Woodland

Oak-foothill pine-juniper woodland is a community where the dominant species are blue oak, foothill pine, and California juniper. This woodland community occurs in a single locale near the center of the project area.

Pinyon-Juniper Woodland

Pinyon-juniper woodland is a community where the dominant species are single-leaf pinyon pine and California juniper. Understory consists of shrub species that are typically found in adjacent nonforested stands of shrub communities. Species typically include big sagebrush and mahogany). This woodland community dominates the landscape at the western edge of the project area.

Joshua Tree Woodland

Joshua tree woodland is an open woodland community dominated by Joshua tree and numerous shrubby species (Holland 1986). Understory is generally nonexistent during most of the year, with annuals blooming in the spring after late fall and winter rains. The main growing season is spring, as winter and summer represent limiting factors in growth. Joshua tree woodland is typically found on well-drained sandy, gravelly, or loamy soils. This community is not common within the project area, yet it occurs in Pine Tree Canyon and near the center of the project area. This community is considered "rare" by CDFG and "worthy of consideration" as a sensitive vegetation community by CNDDB (CDFG 2003).

Desert Peach Woodland

Desert peach woodland is characterized as a dense thicket of desert peach (*Prunus andersonii*), which has only one occurrence near the center of the project area.

4.1.5 Ecotones

Ecotonal Mojavean Juniper Woodland/Mojave Mixed Woody Scrub

This community functions as an ecotone between Mojavean juniper woodland and Mojave mixed woody scrub. See individual descriptions for each of these vegetation communities presented above. This community occurs in several locations scattered throughout the project area.

Ecotonal Mojavean Juniper Woodland/Blackbush Scrub

This community functions as an ecotone between Mojavean juniper woodland and blackbush scrub. See individual descriptions for each of these vegetation communities presented above. This community occurs in several locations scattered throughout the project area.

4.1.6 Developed and Disturbed

Developed

Developed areas are typically areas that support no native vegetation and may be additionally characterized by the presence of man-made structures such as buildings or paved roads. Developed areas within the project are generally restricted to western portions of the project area, where the existing Florida Power & Light wind farm is situated. Also, several ranch structures are scattered throughout the project area, and are classified as developed areas, although these areas are surrounded by vegetation.

Disturbed Habitat

Disturbed habitat is described as lands that are permanently altered by previous human activity including grading, repeated clearing, intensive agriculture, vehicular damage, or dirt roads. Disturbed land is typically characterized by more than 50 percent bare ground and an absence of remnant native vegetation. The disturbed habitat observed onsite, excluding dirt roads which were not mapped during the field surveys, occurs near the main gate to Jawbone Canyon where a laydown area is proposed. This area has been cleared without subsequent development or revegetation (Figure 4) and the surrounding areas are currently used for cattle grazing.

4.2 WILDLIFE SPECIES

Given the size of the project area (approximately 12.5 square miles), the diverse assortment of vegetation communities, the variation in topographic relief (from approximately 2,500 to 5,400 feet above MSL), and the fact that the habitat is primarily undeveloped, a diverse array of wildlife species would be expected in the project area. A total of 114 wildlife species were identified during the various wildlife surveys conducted for the proposed project (Appendix C).

Bird, mammal, reptile, amphibian, and insect species were widely distributed. Notable bird species observed in the project area include northern harrier (*Circus cyaneus*), golden eagle (*Aquila chrysaetos*), red-tail hawk (*Buteo jamaicensis*), mountain quail (*Oreortyx pictus*), California quail (*Callipepla californica*), chukar (*Alectoris chukar*), scrub jay (*Aphelocoma californica*), black-throated sparrow (*Amphispiza bilineata*), and sage sparrow (*Amphispiza belli*). A single golden eagle was observed soaring above Pine Tree Canyon during the December 2002 surveys. During surveys in spring 2003, a golden eagle pair was observed gliding above Jawbone Canyon. A single golden eagle was later observed that same day in the same area.

Mammal species were detected by direct observation and by sign (e.g., scat, tracks, burrows). Tracks were the most observed sign, followed by scat, burrows, and, occasionally, kill sites. Some of the more notable mammal species observed include American black bear (*Ursus americanus*), bobcat (*Canis familiaris*), and Tule elk (*Cervus elaphus nannodes*). A black bear was observed in May 2003 at dusk near the far western edge of the project boundary. Bear sign was detected throughout the study area, even in sparsely vegetated areas of Pine Tree Canyon. Bobcat tracks were observed on numerous occasions throughout the study area, and on a single occasion in December 2002, a bobcat was observed just west of Little Jawbone Canyon running on a dirt road. Tule elk were first detected during the December 2002 habitat assessments. At that time, elk tracks were observed leading in a westerly direction near Peeping Tom Springs in Section 12 of the project area; scat was also observed at this time. More tracks were observed a few days later in Sections 13, 17, and 18 of the project area, also leading in a westerly direction. In April 2003, five Tule elk (a single male and four females) were observed in Section 18 of the project area. Mule deer (*Odocoileus hemionus*) were observed and detected during every survey period and appear to be very abundant throughout the site. However, there were limited observations of small mammals during general surveys, which suggests that this area is not a major source of prey for local raptors.

Throughout the project study area, reptile and amphibian species were varied with several species relatively abundant. Sandy washes and drainages were typical areas for reptiles, particularly the washes in Jawbone and Pine Tree canyons. Notable reptile species include desert horned lizard (*Phrynosoma platyrhinos*), great basin whiptail (*Cnemidophorus tigris tigris*), and long-nosed leopard lizard (*Gambelia wislizenii*). Of particular importance, a live desert tortoise (*Gopherus agassizii*) along with several tortoise burrows, scat, and eggshells was observed during habitat assessments in April 2003 east of the Second Los Angeles Aqueduct in Pine Tree Canyon adjacent to the dirt access road from Highway 14 in alluvial areas that support creosote bush scrub. Also, during tortoise surveys through Jawbone Canyon in May 2003, a desert tortoise was observed on the paved road from Highway 14, approximately 0.5-mile west of the BLM office (located at Highway 14). A single amphibian species, California toad (*Bufo boreas halophilus*), was located during the May 2003 salamander surveys, in Falls Creek in Section 11.

Insects and butterfly species were numerous throughout the project area. Species encountered were noted during all surveys conducted for the project. Notable species include great purple hairstreak (*Atlides halesus*), sagebrush checkerspot (*Chlosyne acastus*), California tortoiseshell (*Nymphalis californica*), striated queen (*Danaus gilippus strigosus*), and red admiral (*Vanessa atalana*). A sphinx moth (*Hiles lineata*) was observed on a single occasion.

4.3 SENSITIVE VEGETATION COMMUNITIES

Sensitive vegetation communities are those that are considered rare in the region, support sensitive plant or animal species, or receive regulatory protection (e.g., wetlands as defined by the U.S. Army Corps of Engineers [Corps] and CDFG). In addition, vegetation communities listed on the CNDDB as having the highest inventory priorities are considered sensitive (CDFG 2004).

The Corps regulates wetlands that meet all three wetland criteria as defined under Section 404 of the Clean Water Act (i.e., hydrophytic vegetation, wetland hydrology, and hydric soils). Corps jurisdiction over wetlands, however, is also dependent on a hydrological connection or adjacency to navigable water bodies (i.e., "waters of the U.S."). The project area drains to the east into the Fremont Valley, which is an enclosed basin that lacks a surface drainage connection to other jurisdictional waters that ultimately flow into the ocean. While the majority of the drainages in the project area are ephemeral washes, there are approximately four intermittent stretches along Jawbone Creek. Drainages within the project area flow into two large washes (Jawbone Canyon and Pine Tree Canyon), then east into the Fremont Valley (Mojave Desert) and ultimately into Koehn Lake. Koehn Lake is an inland lake approximately 12 miles north of California City, northeast of the project area. Koehn Lake has no distributary or other outlet. There are no docks or marinas in Koehn Lake, and neither Koehn Lake nor any of its tributaries are navigable under current conditions. Several salt evaporation ponds exist at the lake. While the salt harvesting ponds may represent a potential interstate commerce nexus, the lack of navigability of the receiving waterbody (i.e., Koehn Lake) means that the drainages in the project area are isolated. Therefore, the Corps does not have jurisdiction (see Appendix D, Army Corps of Engineers Correspondence) over the wetlands and waters within the project area.

CDFG regulates wetlands associated with lakes, rivers, or streams pursuant to Section 1600 of the Fish and Game Code. As part of the project, several existing dirt roads would be improved and several dirt roads created that would impact approximately 135 ephemeral drainages in the project area. All of the drainages and washes within the project area are regulated by CDFG.

As such, the Mojave desert wash scrub, Mojave riparian forest, and riparian scrub habitats are considered to be under the jurisdiction of CDFG pursuant to Section 1600 of the Fish and Game Code.

Five vegetation communities (Joshua tree woodland, Mojave desert wash scrub, Mojave riparian forest, southern riparian scrub, and native perennial grassland) on the site are considered to be of high priority for inventory in the CNDDB. *The List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (CDFG 2003) identifies series or associations considered rare and worthy of consideration by the CNDDB. In addition, the CDCA Plan identifies Unique Plant Assemblages (UPAs) for emphasis in the environmental review process and for special monitoring attention. All riparian systems in the CDCA are classified as UPA. On the project site, this would include all Mohave riparian forest, Mojave desert wash scrub, and southern riparian scrub vegetation communities.

4.4 SENSITIVE PLANT AND WILDLIFE SPECIES

Sensitive plant and wildlife species are species that are either legally protected under the federal and state ESAs or other regulations, or species considered by the scientific community to be sufficiently rare to qualify for such listing. Sensitive species include species listed or proposed for listing as threatened or endangered under the federal ESA, the California ESA, or the California Native Plant Protection Act. Also included in this list are species that are of special concern to CDFG, are fully protected in California, are covered under the Migratory Bird Treaty Act, are covered under the Bald Eagle Protection Act, are considered sensitive by BLM, or are covered under the Draft WMP. Furthermore, it is mandatory that CNPS list 1A, 1B, and 2 species be fully considered during surveys as they meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 (California ESA) during the preparation of environmental documents relating to CEQA (CNPS 2001).

Based on a letter dated April 24, 2003 (Appendix A), the federally listed, or proposed for listing, species that USFWS determined should be evaluated for the project include the following:

- Hoover's woolly-star (*Eriastrum hooveri*)

- Kelso Creek monkey flower (*Mimulus shevockii*)
- desert tortoise (*Gopherus agassazii*)
- California condor (*Gymnogyps californianus*)
- mountain plover (*Charadrius montanus*)
- western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)
- southwestern willow flycatcher (*Empidonax traillii extimus*)
- least Bell's vireo (*Vireo bellii pusillus*)

The CNDDB search revealed additional sensitive species known from the project vicinity. The species from the USFWS letter and the CNDDB are included in Tables 3 and 4, along with their sensitivity status and comments on their potential for occurrence within the project area. The sensitive plant and animal species that have been previously recorded in the project vicinity, or that were detected during project surveys, are depicted in Figure 5.

4.4.1 Plants

Federally Listed Plant Species

The two plant species included on the USFWS letter (April 2003) are discussed below. These two species were not detected, and after evaluating the conditions at the site, affinities of the two species, and their historic ranges, both are considered to have a low probability of occurring within the project area.

<u>Hoover's Woolly-Star</u>

Hoover's woolly-star (*Eriastrum hooveri*) was listed as a threatened species by USFWS in July of 1990 but was later delisted in October of 2003. The delisting was approved because the species was found to be more widespread and abundant than previously thought, due to the additional findings of several significant populations discovered on adequately protected BLM land holdings.

Hoover's woolly-star is a native annual species restricted to the San Joaquin Valley. Habitat for this species is characterized by stabilized silty to sandy soils, a low cover of competing herbaceous vegetation, and the presence of cryptogamic crust. However, it has also been found on loamy soils, in areas of dense vegetation, and in areas lacking cryptogamic crusts. Reported elevations for this species range from 164 feet to 3,002 feet.

Table 3
Potentially Occurring Sensitive Plant Species Relevant to the Pine Tree Wind Development Project

Common Name Scientific Name	Sensitivity Status[1]	General Habitat Description (CNPS 2001)	Flowering Period	Probability of Occurrence
Spanish needle onion *Allium shevockii*	CNPS: 1B	Pinyon and juniper woodland, upper montane coniferous forest. Grows at elevations of 4,806-8,202 feet.	Geophyte that flowers in June.	Moderate potential of occurrence on-site due to suitable habitat and range in elevation. This species is known from three occurrences at Spanish Needle and Sand Canyon in Kern County. One recent occurrence was detected only 1 mile east of the project site (Harris, pers. comm. 2004). However, no populations were detected on-site during focused surveys, which were conducted within the appropriate blooming period (June).
Palmer's mariposa lily *Calochortus palmeri* var. *palmeri*	CNPS: 1B	Chaparral, lower montane coniferous forest, meadows and seeps, in mesic soils. Grows at elevations of 3,280-7218 feet.	Geophyte that flowers May-July.	Moderate potential of occurrence within the project boundary due to potential habitat. However, no populations found in the proposed project area during the focused survey period (June), which falls within the appropriate flowering period of this species. No known populations occur near the project region (CDFG 2004a).
Alkali mariposa lily *Calochortus striatus*	CNPS: 1B WMP: Covered	Chaparral, cheopod scrub, Mojavean desert scrub, meadows and seeps in alkaline, mesic soils. Grows at elevations of 230-4,940 feet.	Geophyte that flowers April-June.	Low potential of occurrence on-site due to the lack of potential soils. Known populations in Kern County are threatened by development and grazing. No populations found on-site during the focused surveys, which were conducted during the appropriate flowering period of this species. A small population occurs in Red Rock Canyon State Park east of the project area (BLM 2003).
Pygmy poppy *Canbya candida*	CNPS: 4	Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland, granitic soils.	Annual herb that flowers March-June.	Moderate potential of occurrence within the project boundary due to potential habitat. However, no populations found in the proposed project area during the focused survey period (June), which falls within the appropriate flowering period of this species. No known populations occur near the project region (CDFG 2004a).
Piute cypress *Cupressus arizonica* ssp. *nevadensis*	CNPS: 1B	Closed-cone coniferous forest, chaparral, cismontane forest, pinyon and juniper woodland. Grows at elevations of 2,362-6,003 feet.	Tree (not applicable)	Moderate potential of occurrence on-site due to suitable habitat. Known populations in Kern County are in decline and no known populations occur close to the project vicinity. No individuals of this conspicuous species were identified on-site during the focused surveys.

Common Name Scientific Name	Sensitivity Status[1]	General Habitat Description (CNPS 2001)	Flowering Period	Probability of Occurrence
Red Rock tarplant *Deinandra arida*	CDFG: Rare CNPS: 1B WMP: Covered	Mojavean desert scrub in clay, volcanic tuff. Grows at elevations of 984-3,117 feet.	Annual that blooms April-November.	Low potential of occurrence due to unsuitable soils and high elevations on-site. Less than 10 occurrences are known from the Red Rock Canyon State Park and Last Chance Canyon in Kern County, approximately 8.5 miles northeast of the project site (CDFG 2004a). No populations observed on-site during the focused survey periods, which coincided with the appropriate flowering period of this species.
Mojave tarplant *Deinandra mohavensis*	CDFG: Endangered CNPS: 1B WMP: Covered	Chaparral (mesic), riparian scrub. Grows at elevations of 2,790-5,250 feet.	Annual that blooms July-October.	Low potential of occurrence on-site due to unsuitable habitat and high elevation. Four known populations occur in natural springs northeast of the project boundary characterized by mesic conditions and suitable elevations (CDFG 2004a). During focused survey periods, this species was not detected in any of the natural springs or riparian habitats on-site, which occur at elevations between 4,000-5,000 feet.
Hoover's woolly star *Eriastrum hooveri*	CNPS: 4	Chenopod scrub, pinyon and juniper woodland, valley and foothill grassland. Grows at elevations ranging from 164-3,001 feet.	Annual that flowers March-July.	Low potential of occurrence on-site due to appropriate habitat. However, there are no known locations of this species from the Piute mountains or the project vicinity (CDFG 2004a). No individuals were observed in the potential habitats on-site during focused survey periods, which coincided with the blooming period of this species.
Breedlove's buckwheat *Eriogonum breedlovei* var. *breedlovei*	CNPS:1B	Pinyon and juniper woodland, upper montane coniferous forest often in carbonate soil. Grows at elevations of 6,200-8,497 feet.	Perennial herb that flowers June-August.	Moderate potential of occurrence on-site due to suitable habitat and range in elevation. Less than 20 occurrences known from the Piute Mountains in Kern County. None of these known populations occur near the project vicinity (CDFG 2004a). During the focused survey periods, which coincided with the appropriate flowering period of this species, no populations were identified on-site.
Reveal's buckwheat *Eriogonum contiguum*	CNPS: 2 WMP: Covered	Mojave mixed woody scrub in sandy soils. Grows at elevations of 100-3,300 feet.	Annual herb that flowers February-June.	Moderate potential of occurrence on-site. One population was recently reported from Jawbone-Butterbredt ACEC adjacent to the project area (BLM 2003). However, no populations were observed within the proposed project area during the spring focused survey periods, which coincided with the appropriate flowering period of this species.
Kern buckwheat *Eriogonum kennedyi* var. *pinicola*	CNPS: 1B WMP: Covered	Chaparral, pinyon and juniper woodland in clay soils. Grows at elevations of 4,396-6,398 feet.	Perennial herb that flowers May-June.	Species observed on-site within project study area but outside the proposed impact area for the project.

Common Name Scientific Name	Sensitivity Status[1]	General Habitat Description (CNPS 2001)	Flowering Period	Probability of Occurrence
Round-leaved filaree *Erodium macrophyllum*	CNPS: 2	Cismontane woodland, valley and foothill grassland in clay soils. Grows at elevations of 49-3,937 feet.	Annual that blooms March-May.	Moderate potential of occurrence due potential habitat present on-site. However, collections to date are historical and current distribution is in question (CNPS 2001). Moreover, no populations were detected on-site during the focused survey periods, which coincided with the appropriate flowering period of this species.
Red Rock poppy *Eschscholzia minutiflora* ssp. *twisselmannii*	CNPS: 1B WMP: Covered	Mojavean desert scrub in volcanic tuff. Grows at elevations of 2,230-4,035 feet.	Annual that flowers March-May.	Low potential of occurrence on-site due to the lack of potential soils. Known populations are located from the Rand and El Paso mountains in Kern County. However, one recent population was located approximately 5.8 miles east of the project site (CDFG 2004a). During the focused survey periods, which coincided with the appropriate flowering period of this species, no individuals were observed on-site.
Greenhorn fritillary *Fritillaria brandegei*	CNPS: 1B	Lower montane coniferous forest in granitic soils. Grows at elevations of 4,921-6,890 feet.	Geophyte that flowers April-June.	Low potential of occurrence on-site due limited suitable habitat. No known reference population occurs within the project region (CDFG 2004a). No populations located on-site during the focused survey periods, which coincided with the appropriate flowering period of this species.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	CNPS: 1B	Marshes and swamps (coastal salt), playas, and vernal pools. Grows at elevations of 3-4,002 feet.	Annual that blooms February-June.	Low potential of occurrence with the project boundary due to lack of appropriate habitat. No populations were located within proposed project area during the focused survey periods, which coincided with the appropriate flowering period of this species. In addition, no known populations occur near the project vicinity (CDFG 2004a).
Pale-yellow layia *Layia heterotricha*	CNPS: 1B	Cismontane woodland, pinyon and juniper woodland, valley and foothill grassland in alkaline or clay soils. Grows at elevations of from 984-5,244 feet.	Annual that flowers March- June.	Moderate potential of occurrence on-site due to suitable habitat and substrate on-site. No reported locations of this species within the project region. Also, no populations were identified on-site during the focused survey periods, which coincided with the appropriate flowering period of this species.
Creamy blazing star *Mentzelia tridentata*	CNPS: 1B	Mojavean desert scrub. Grows at elevations of from 2,297-3,806 feet.	Annual that flowers March-May.	Moderate potential of occurrence on-site due to suitable habitat and range in elevation on-site. No known reference population close to the vicinity of the project area (CDFG 2004a). No populations were located on-site during the focused survey periods, which coincided with the appropriate flowering period of this species.

Common Name Scientific Name	Sensitivity Status[1]	General Habitat Description (CNPS 2001)	Flowering Period	Probability of Occurrence
Calico monkeyflower *Mimulus pictus*	CNPS: 1B	Broadleaved upland forest, cismontane woodland in granitic soils. Grows at elevations of 328-4,265 feet.	Annual that blooms March-May.	Moderate potential of occurrence within the project boundary due to potential habitat. However, no known local populations occur near the proposed project region (CDFG 2004a). Moreover, during the focused survey periods, which coincided with the appropriate flowering period of this species, no populations were detected.
Kelso Creek monkey flower *Mimulus shevockii*	CNPS:1B WMP: Covered	Joshua tree woodland, pinyon and juniper woodland. Grows at elevations of 2,706-4,396 feet.	Annual that flowers March- May.	Low potential of occurrence within the project boundary due to potential habitat and range in elevation. This species is known to occur north of the project region in Kelso Creek (CDFG 2004a). However, there are only seven other known occurrences in Kern County. No populations were observed in the project area during the spring focused survey periods, which coincided with the appropriate flowering period of this species.
Baja navarretia *Navarretia peninsularis*	CNPS: 1B	Chaparral openings, lower montane coniferous forest, in mesic soils. Grows at elevations of 4,921- 7,546 feet.	Annual that flowers June-August.	Low potential of occurrence on-site due to lack of suitable habitat. No known reference populations within the project region (CDFG 2004a). No populations observed on-site during the late spring focused survey period (June), which coincided with the appropriate flowering period of this species.
Piute mountains navarretia *Navarretia setiloba*	CNPS: 1B	Cismontane woodland, pinyon and juniper woodland, valley and foothill grassland in clay or gravelly loam. Grows at elevations of 1,000-6,890 feet.	Annual	Moderate potential of occurrence within the project boundary due to potential habitat and range of elevation on-site. This species is only known from less than 10 occurrences in the Piute mountains of Kern County. However, no known populations occur near the project region (CDFG 2004a). Moreover, no populations were found within the project boundaries during the spring focused survey periods, which coincided with the appropriate flowering period of this species.
Charlotte's phacelia *Phacelia nashiana*	CNPS: 1B WMP: Covered	Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland. Grows at elevations of 1,969- 7,218 feet.	Annual that blooms March-June.	High potential of occurrence on-site. Known populations occur northeast of the project site in suitable habitat along Jawbone Canyon Road (CDFG 2004a). Several populations also occur south of the project boundaries approximately 2.5 miles away. However, no populations were observed on-site during the spring focused survey periods, which coincided with appropriate flowering period of this species.

Common Name Scientific Name	Sensitivity Status[1]	General Habitat Description (CNPS 2001)	Flowering Period	Probability of Occurrence
Aromatic canyon gooseberry *Ribes menszesii* var. *ixoderme*	CNPS: 1B	Chaparral and cismontane woodland. Grows at elevations of 2,001- 3806 feet.	Deciduous shrub that flowers in June.	Low potential of occurrence on-site due to lack of suitable habitat. No known reference population within project region (CDFG 2004a). No populations found on-site during the spring focused survey period, which coincided with the appropriate flowering period of this conspicuous species.
Piute mountains jewel-flower *Streptanthus cordatus* var. *piutensis*	CNPS: 1B	Broadleaved upland forest, closed-cone coniferous forest, pinyon and juniper woodland in clay or metamorphic soils. Grows at elevations of 3,592-5,692 feet.	Perennial herb that flowers May- July.	High potential of occurrence within the project boundary due to potential habitat and range in elevation. A known population occurs approximately 2.3 miles southwest of the project site (CDFG 2004A). However, no populations were observed within the proposed project area during the spring focused survey periods, which coincided with the appropriate flowering period of this species.
Golden violet *Viola aurea*	CNPS: 2	Great Basin scrub, pinyon and juniper woodland in sandy soils. Grows at elevations of 3,280-5,905 feet.	Perennial herb that blooms April-June.	Moderate potential of occurrence within the project boundary due to potential habitat and range in elevation. However, no known populations occur close to the project region (CDFG 2004A). In addition, no populations were found within the proposed project area during the spring focused survey periods, which coincided with the appropriate flowering period of this species.

[1]**Sensitivity Status Key**

State — California Department of Fish and Game (CDFG)

Other — California Native Plant Society (CNPS)

1B: Considered rare, threatened, or endangered in California and elsewhere.

2: Considered rare, threatened, or endangered in California, but more common elsewhere.

4: Limited distribution or infrequent throughout a broader area in California.

Draft West Mojave Plan (WMP)

Covered: Species that are covered by the Draft WMP (BLM 2003)

Table 4
Potentially Occurring Sensitive Wildlife Species Relevant to the Pine Tree Wind Development Project

Common Name Scientific Name	Sensitivity Status[1]	Habitat Requirements	Probability of Occurring On-site
Amphibians			
Yellow-blotched salamander *Ensatina eschscholtzii croceator*	CDFG: Special Concern Species BLM: Sensitive	Coniferous and deciduous forests, oak woodland, coastal sage scrub, and chaparral under logs, bark, moss, leaf litter, and talus.	Moderate. Species not observed during surveys in the project area. However, species is known from areas to the west within 25 miles in similar habitat to that found on-site (CDFG 2004a).
Tehachapi slender salamander *Batrachoseps stebbinsi*	CDFG: Threatened BLM: Sensitive	Valley foothill riparian habitats, forest areas with leaf litter and rotting wood, and other moist areas between 1,800 and 4,700 feet.	Low. Species not located during focused surveys and suitable habitat on-site is limited.
Reptiles			
Southwestern pond turtle *Clemmys marmorata pallida*	CDFG: Special Concern Species BLM: Sensitive WMP: Covered	Inhabits permanent or nearly permanent bodies of water and requires basking sites such as partially submerged logs, vegetation mats, or open mud banks.	Not expected. Habitat does not occur on-site and site is outside of the distributional range (Stebbins 1985).
Desert tortoise *Gopherus agassizii*	USFWS: Threatened CDFG: Threatened WMP: Covered	Mojave desert scrub and desert washes up to 4,000 feet. Dry, gravelly soils.	Detected. Sign of desert tortoise was observed in December 2002 at the mouth of Pine Tree Canyon, and two individuals were observed adjacent to Pine Tree Canyon Road near State Route 14.
Northern sagebrush lizard *Sceloporus graciosus graciosus*	BLM: Sensitive	Prefers sagebrush, manzanita and ceanothus brushland, pinon-juniper woodland, pine and fir forests, and river bottoms. Requires good light, open ground, and scattered low bushes.	Not expected. Outside of species distributional range.
San Diego horned lizard *Phrynosoma coronatum blainvillei*	CDFG: Special Concern Species WMP: Covered	Prefers friable, rocky, or shallow sandy soils in coastal sage scrub and chaparral in arid and semiarid climates.	Moderate. Limited suitable habitat occurs on-site. Species observed approximately 6 miles southwest of the project area.

Common Name Scientific Name	Sensitivity Status[1]	Habitat Requirements	Probability of Occurring On-site
California horned lizard *Phrynosoma coronatum frontale*	CDFG: Special Concern Species BLM: Sensitive	Similar to the habitat requirements of the San Diego horned lizard.	Moderate. Limited suitable habitat occurs on-site. Species observed approximately 25 miles west of the project area, near Breckenridge.
Birds			
California condor *Gymnogyps californianus*	USFWS: Endangered CDFG: Endangered, Fully Protected	Mountainous country at low to moderate elevations, especially in rocky and brushy areas with cliffs available for nest sites. Forages in grasslands, oak savanna, mountain plateaus, ridges, and canyons.	Not expected. Species not previously observed in the project area. Appropriate habitat does not occur on-site. Global population number remains very low in the wild.
Bald eagle *Haliaeetus leucocephalus*	USFWS: Threatened CDFG: Endangered, Fully Protected	Coniferous woodland or forest areas near water. Rocky cliffs.	Not expected. Habitat necessary to support bald eagles does not occur on-site. Site lacks sufficient water bodies.
Northern harrier *Circus cyaneus*	CDFG: Special Concern Species	Occurs in grasslands and agricultural fields during migration and in winter.	Detected. Species was observed in the project area during habitat assessments in December 2002.
Sharp-shinned hawk *Accipiter stiatus*	CDFG: Special Concern Species	Visitor to woodlands, parks, and residential areas.	Moderate. Project area is within the distributional range of this species. Suitable habitat occurs on-site, particularly at higher elevations. Potentially insufficient prey sources present on-site.
Cooper's hawk *Accipiter cooperii*	CDFG: Special Concern Species	Mature forests, open woodlands, riparian forests, and parks.	Detected. Species was observed in the project area during April 2004 avian surveys.
Swainson's hawk *Buteo swainsoni*	CDFG: Threatened	Savanna, open pine-oak woodland, and cultivated lands with scattered trees.	Not Expected. Project area is outside of distributional range of this species. Suitable habitat occurs on-site, particularly at higher elevations. Potentially insufficient prey sources present on-site.
Ferruginous hawk *Buteo regalis*	CDFG: Special Concern Species WMP: Covered	Typically occurs in arid or dry grassland habitats.	Low. Limited suitable habitat occurs on-site. Potentially insufficient prey sources present on-site.
Golden eagle *Aquila chrysaetos*	CDFG: Special Concern Species, Fully Protected WMP: Covered	Uncommon resident that forages over grassland and broken chaparral or sage scrub. Nests on high cliffs.	Detected. Golden eagle was observed on-site in December 2002 and April 2003. Nesting activity was not observed during either occurrence. Nesting pair has been observed in the past just west of the project area (CDFG 2004a).

Common Name Scientific Name	Sensitivity Status[1]	Habitat Requirements	Probability of Occurring On-site
American peregrine falcon *Falco peregrinus anatum*	CDFG: Endangered, Fully Protected	Open habitats from tundra, moorlands, steppe, and seacoasts to mountains, and open forested regions, especially where there are suitable nesting cliffs.	Moderate. Suitable habitat occurs on-site. Potentially insufficient prey sources present on-site.
Prairie falcon *Falco mexicanus*	CDFG: Special Concern Species WMP: Covered	Forages in open grasslands, agricultural fields, and desert scrub. Prefers ledges on rocky cliffs for nesting.	High. Though not observed during surveys, project area could support prairie falcon. Several nest sites have been reported in the project area in the past (CDFG 2004a).
Mountain plover (*Charadrius montanus*)	CDFG: Special Concern Species	Prefers short-grass plains and fields, plowed fields and sandy deserts and commercial sod farms. Nests on high plains, shortgrass prairie, and desert tablelands.	Moderate. Distributional range is within project area during the winter. Suitable habitat exists on-site.
Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	USFWS: Candidate for Listing CDFG: Endangered WMP: Covered	Prefers mature willow and alder streamside riparian areas, open woods, and orchards.	Not expected. Habitat on-site is too open and not extensive enough to support this species.
Southwestern willow flycatcher *Empidonax traillii extimus*	USFWS: Endangered WMP: Covered	Dense willow, cottonwood, and tamarisk thickets and woodland along streams and rivers.	Not expected. Habitat on-site is too open and not extensive enough to support this species.
California horned lark *Eremophila alpestris actia*	CDFG: Special Concern Species	Often occurs in fields, grasslands, shores, and tundra habitats.	High. Though not observed during surveys, project area could support California horned lark. Several observations have been reported in and around the project area in the past (CDFG 2004a).
San Joaquin Le Conte's thrasher *Toxostoma lecontei macmillanorum*	CDFG: Special Concern Species WMP: Covered	Inhabits areas with sparse desert scrub and uses cholla cactus for nesting.	Detected. Species was observed in the project area during April 2004 avian surveys.
Loggerhead shrike *Lanius ludovicianus*	CDFG: Special Concern Species	Occurs in semiopen country with utility posts, wires, and trees to perch on.	Detected. Loggerhead shrike was observed during surveys in April 2003 in Jawbone Canyon.
Least Bell's vireo *Vireo bellii pusillus*	USFWS: Endangered CDFG: Endangered	Riparian woodlands, scrub, and thickets.	Not expected. Suitable habitat is not present on-site. Site is located at higher elevations than this species is typically observed.

Common Name Scientific Name	Sensitivity Status[1]	Habitat Requirements	Probability of Occurring On-site
Yellow-breasted chat *Icteria virens*	CDFG: Special Concern Species	An uncommon and localized summer resident. The breeding population is confined to riparian woodlands. Can be found up to 6,561 feet in elevation in desert riparian habitats.	Moderate. Species not observed during surveys in April 2003. Suitable habitat may occur within the project area at higher elevations.
California gray-headed junco *Junco hyemalis caniceps*	CDFG: Special Concern Species	Typically found in montane coniferous forests.	Low. Suitable habitat occurs on-site. However, range for this species is closer to the California/ Nevada border with occasional strays noted from locations near the California coast (Sibley 2000).
Tricolored blackbird *Agelaius tricolor*	CDFG: Special Concern Species BLM: Sensitive	Localized residents nest in large, dense colonies in freshwater marsh with open water. Species forages in agricultural areas, lakeshores, and damp lawns.	Not expected. Tricolored blackbird was not observed during surveys and supporting habitat does not occur on-site.
Mammals			
Pallid bat *Antrozous pallidus*	CDFG: Special Concern Species BLM: Sensitive WMP: Covered	Found in arid desert and grasslands in rocky, mountainous environments with water. Usually roosts in rock crevices or buildings.	Low. Project site is within the distributional range for this species. Some suitable habitat occurs on-site. No water sources readily available on-site.
Pale big-eared bat *Corynorhinus townsendii pallescens*	CDFG: Special Concern Species BLM: Sensitive	Occurs in a variety of habitats from desert shrub to pinon-juniper and coniferous forests at a wide range of elevations.	Moderate. Project site is within the distributional range for this species. Suitable habitat occurs on-site.
Spotted bat *Euderma maculatum*	CDFG: Special Concern Species BLM: Sensitive WMP: Covered	Found in mountainous regions including arid pine forests and marshlands.	Low. Project site is within the distributional range for this species. Some suitable habitat occurs on-site.
Small-footed myotis *Myotis ciliolabrum*	BLM: Sensitive	Found in desert and semidesert mountainous areas and shortgrass prairie regions.	Moderate. Project site is within the distributional range for this species. Some suitable habitat occurs on-site.
Long-eared myotis *Myotis evotis*	BLM: Sensitive	Found predominantly in coniferous forests at elevations of between 7,000 and 8,500 feet. Also found in sage habitats.	Low. Project site is within the distributional range for this species. Some suitable habitat occurs on-site.

Common Name Scientific Name	Sensitivity Status[1]	Habitat Requirements	Probability of Occurring On-site
Fringed myotis *Myotis thysanodes*	BLM: Sensitive	Occurs in oak, pinyon pine, and juniper woodlands above 5,000 feet.	Low. Project site is within the distributional range for this species. Limited suitable habitat occurs on-site.
Long-legged myotis *Myotis volans*	WMP: Covered	Occurs in oak, pinyon pine, and juniper woodlands above 4,000 feet.	Moderate. Project site is within the distributional range for this species. Suitable habitat occurs on-site.
Yuma myotis *Myotis yumanensis*	BLM: Sensitive	Wide range of habitats includes desert scrub, coniferous forests, and chaparral. Must have a water source.	Low. Project site is within the distributional range for this species. Minimal water sources exist on-site. Otherwise, suitable habitat occurs on-site.
Greater western mastiff bat *Eumops perotis californicus*	CDFG: Special Concern Species BLM: Sensitive WMP: Covered	Found in pinyon pine, juniper, and other coniferous forest environments with rocky cliff and canyon areas.	Moderate. Project site is within the distributional range for this species. Suitable habitat occurs on-site.
Mohave ground squirrel *Spermophilus mohavensis*	CDFG: Threatened WMP: Covered	Mojave desert scrub, alkali scrub, and Joshua tree woodland between 1,800 and 5,000 feet. Sandy to gravelly soils.	High. Though focused surveys have not been conducted for the Mohave ground squirrel, appropriate habitat occurs in both Pine Tree and Jawbone canyons. The project area is within the species distributional range. Individuals have been captured in Jawbone Canyon and several other locations around the project site (CDFG 2004a): Cache Creek, Dove Springs Canyon, Fremont Valley.
Tehachapi pocket mouse *Perognathus alticola inexpectatus*	CDFG: Special Concern Species	Occurs in native and nonnative grasslands, Joshua tree woodland, pinyon, and juniper woodlands. Also known from coastal sage scrub and chaparral habitats.	Low. Suitable habitat occurs on-site. However, project site is outside the species distributional range. Known species occurrences are from south of the Tehachapi Pass (CDFG 2004a).
San Joaquin pocket mouse *Perognathus inornatus inornatus*	BLM: Sensitive	Occurs in dry, open grasslands and desert scrub habitats between 1,100 and 2,000 feet.	Low. Project site may be outside the species distributional range. Chance of occurrence is limited by high elevation of project site (Laudenslayer 1991).
Yellow-eared pocket mouse *Perognathus parvus xanthonotus*	BLM: Sensitive WMP: Covered	Typically found in sandy soils with sparse vegetation. Known from grasslands, desert scrub, Joshua tree woodland, pinyon, and juniper woodland.	Moderate. The yellow-eared pocket mouse habitat occurs on-site and the species is known from Kelso Valley approximately 5 miles to the north of the project area.

Common Name Scientific Name	Sensitivity Status[1]	Habitat Requirements	Probability of Occurring On-site
Southern grasshopper mouse *Onychomys torridus ramona*	CDFG: Special Concern Species	Occurs in arid regions in a variety of habitats, including desert scrub, wash, and riparian habitats.	Moderate. Suitable habitat occurs on-site. Project area is within the species' distributional range.
Tulare grasshopper mouse *Onychomys torridus tularensis*	CDFG: Special Concern Species BLM: Sensitive	Habitat requirements are similar to the southern grasshopper mouse. Occurs in environments in a variety of habitats.	Moderate. Suitable habitat occurs on-site. Project area is within the species' distributional range.
Pacific fisher *Martes pennanti pacifica*	CDFG: Special Concern Species BLM: Sensitive	Habitat requirements are generally undisturbed late-successional forest.	Not expected. No suitable habitat occurs on-site.
California bighorn sheep *Ovis canadensis californiana*	USFWS: Endangered CDFG: Endangered, Fully Protected WMP: Covered	Typically occurs in steep-walled canyons and ridges bisected by rocky or sandy washes with available water.	Not expected. Population numbers in California are extremely low. Suitable habitat on-site is limited.
Tule elk *Cervus elaphus nonnodes*	CDFG: Harvest species	Occurs in wooded, shrubby, grassland, and riparian habitats.	Detected. Tule elk was observed in Sections 12, 13, 17, and 18 of the project area during the December 2002 and April 2003 general wildlife surveys.
Mule Deer *Odocoileus hemionus fuliginata*	CDFG: Game Species	Occurs in large, undisturbed tracts of coastal sage scrub, chaparral, mixed grassland/scrub vegetation, riparian and oak woodlands, and coniferous forest.	Detected. Sign of mule deer was observed in the December 2002 and April 2004 general surveys throughout the project site.
Mountain Lion *Felis concolor*	CDFG: Game Species	Occurs in coastal sage scrub, chaparral, riparian and oak woodlands, and coniferous forest.	Detected. Sign of mountain lion was observed in the December 2002 and April 2004 general surveys in the northern portion of the project site.

[1]**Sensitivity Status Key**

Federal U.S. Fish and Wildlife Service (USFWS)
State California Department of Fish and Game (CDFG)
Other Bureau of Land Management (BLM)
Draft West Mojave Plan (WMP)
Covered: Species that are covered by the Draft WMP (BLM 2003)

Hoover's woolly-star typically blooms between March and July. This species was not found on the project site during the 2003 and 2004 focused spring and summer surveys. The majority of the site is not suitable habitat for this species and is on the fringe of the elevation range for which this species is reported. Lower Jawbone Canyon and Pine Tree Canyon have habitat slightly more suitable to this species, but these areas are still expected to have a very limited probability of holding the species due to the geographical isolation of these canyons to the San Joaquin Valley.

Kelso Creek Monkeyflower

Kelso Creek monkeyflower (*Mimulus shevockii*) was proposed to be listed as an endangered species by USFWS in October of 1994 but was never listed due to the existence of several large populations that are considered adequately protected on BLM-managed lands. Although this species is no longer proposed for Federal status, it is covered by the Draft WMP (BLM 2003).

Kelso Creek monkeyflower predominantly occurs in loamy, coarse sands of alluvial fans, dry streamlets, and deposits of granitic origin that are found in the Joshua tree woodlands, pinyon-juniper woodlands, or their transition in the southern Sierra Nevada in the Kelso Creek drainage within the Kern River drainage (Heckard and Bacigalupi 1986).

Kelso Creek monkeyflower was not found on the project site during the 2003 and 2004 spring and summer focus surveys. Although suitable habitat for the Kelso Creek monkeyflower exists within the project site, the limited distribution and historic range of this species indicates a low probability for occurrence on the project site.

State-Listed Plant Species

There are two state-listed plant species with a low potential to occur within the project area. These two species were not detected, and after evaluating the conditions at the site, affinities of the two species, and their historic ranges, both are considered to have a low probability of occurring within the project boundaries.

Mojave Tarplant

Mojave tarplant (*Deinandra mohavensis*) was listed as an endangered species in 1998 by CDFG. The CNPS lists the species as List 1A, presumably extinct, but with the discovery of several populations its status will likely be altered to a List 1B ranking in the future. In addition, this species is covered under the Draft WMP (BLM 2003).

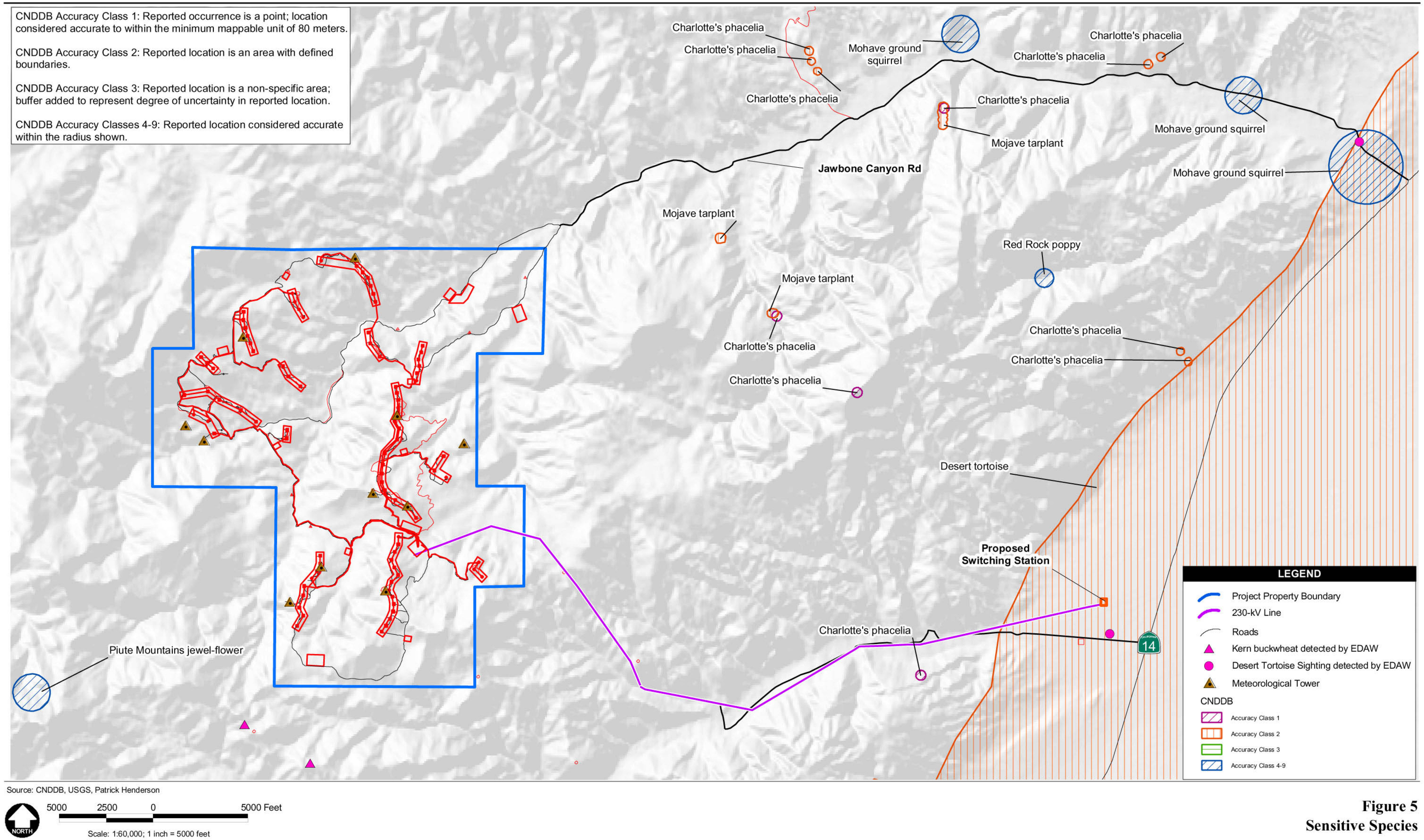

Figure 5
Sensitive Species

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Known sites of Mojave tarplant occur mostly within the belt of desert chaparral and arid coastal facing in clay or silty loams that are saturated with water in the winter and spring (Sanders et al. 1997). All known populations occur within an elevation range of 2,800 and 5,220 feet, but most are located between 3,000 and 4,000 feet.

A small population of Mojave tarplant occurs in Jawbone Canyon near Cutterback Spring just outside the project area (Figure 5); however, the species is expected to have a low potential to occur where project activities are proposed. The majority of the project site is located on the extreme elevation range for the species, and the arid slopes and hilltops of the project site where turbine strings will be sited do not provide suitable habitat conditions. Moreover, no occurrences of Mojave tarplant were found within the project footprint during the spring 2003 and 2004 focused surveys, which were conducted along drainages and springs within the project site.

Red Rock Tarplant

Red Rock tarplant (*Deinandra arida)* was listed by CDFG as rare in 1972. The plant species has no federal listings but is recognized as list 1B by the CNPS (2001) and is covered by the Draft WMP (BLM 2003). Red Rock tarplant, an annual plant species growing to approximately 7 to 40 inches tall, is a severely restricted endemic species known only from the western half of the El Paso Mountains of Kern County. It is known from only 10 small occurrences within the boundaries of Red Rock Canyon State Park (Faull 2004) and is associated with mesic conditions, usually occurring in clay soil washes.

Red Rock tarplant was not detected on-site and has a very low potential to occur within the project area because of its restricted endemism to the geologic substrates of Red Rock Canyon State Park. The project site is located approximately 8.5 miles from Red Rock Canyon but is geographically isolated from the canyon by formations known as Butterbredt Peak and Sugarloaf Mountain. Furthermore, the project site lacks the preferred clay soil washes that the plant inhabits.

BLM Sensitive Plant Species (and Other Non-listed Species)

Based on focused surveys conducted within the project footprint during the spring and summer of 2003 and 2004, only one sensitive plant species occurs within the project boundaries. The Kern buckwheat (*Eriogonum kennedyi* var. *pinicola*), a CNPS list 1B species and a WMP covered species, was detected in two locations (Figure 5). However, both of these locations are outside of the current project footprint and would not be directly or indirectly impacted by the project design.

In addition to the Kern buckwheat and the state-listed plant species described above, another 17 CNPS list 1B species had some potential to occur within the project site but were not detected. Of the 17 species, 2 were considered to have a high potential, 8 have a moderate potential, and 7 have a low potential to occur (Table 3).

Those CNPS List 1B species considered to have a high potential to occur include both Charlotte's phacelia (*Phacelia nashiana*) and Piute mountains jewel-flower (*Streptanthus cordatus* var. *piutensis*). Both of these sensitive species are known from local occurrences adjacent to the project area (CNDDB 2004). Charlotte's phacelia was identified 2.5 miles northeast of the project site in desert scrub habitat adjacent to Jawbone Canyon Road (Figure 5). In addition, the Piute mountains jewel-flower is known to occur only 2.3 miles southwest of the project site in pinyon juniper woodland (Figure 5). Although both of these species occur close to the project study area, they were not detected on-site during the focused plant surveys of 2003 and 2004, which coincided with the appropriate blooming periods for these species. Moreover, the 2003 survey year coincided with one of the best flowering seasons for the region in years.

Finally, three plant species included on the CNPS list 2, plus two plant species included on the CNPS list 4, were all considered to have a moderate or lower potential to occur on the site but were not detected during the focused plant surveys of 2003 and 2004. Of the sensitive plant species noted in Table 3, a total of eight are listed as Covered Species in the Draft WMP (BLM 2003), but none were detected within the current project footprint during the focused plant surveys.

Other Sensitive Plants

Although not listed by USFWS, CDFG, or CNPS, the Joshua tree is a plant species that is categorized as a special status species recognized by CDFG and BLM that requires protection. Joshua trees provide important biological factors that support wildlife diversity in its range of distribution. These factors include shade, perching sites, foraging habitat, and nesting sites for desert wildlife.

In a few locations surveyed the Joshua trees grow in relatively dense stands; these areas were mapped as Joshua tree woodland (Figure 4). In addition, while conducting the rare plant surveys, three areas of scattered Joshua tree stands were noted in Mojave mixed woody scrub and Mojavean juniper woodland scrub habitats (Figure 3). One location is in Little Jawbone Canyon in a proposed laydown area where approximately 80 individual Joshua trees were observed. The other two locations are along segments of dirt roads that may be widened or upgraded during construction. Approximately 35 individuals occur within 50 feet of the roadside at each location.

4.4.2 <u>Wildlife</u>

Based on the USFWS letter dated April 24, 2003 (Appendix A), the CNDDB list of sensitive species, a review of the Draft WMP, and bird lists provided by local groups (i.e., Sierra Club), there are several sensitive wildlife species with a potential to occur within and adjacent to the proposed project site (Table 4). Federally and state-listed species, along with all other sensitive wildlife species either detected or with a potential to occur on-site, are discussed further below.

Federally Listed Wildlife Species

The six federally listed wildlife species identified in the USFWS letter as having the potential to occur on-site include the following:

- desert tortoise (*Gopherus agassazii*)
- California condor (*Gymnogyps californianus*)
- mountain plover (*Charadrius montanus*)
- western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)
- least Bell's vireo (*Vireo bellii pusillus*)
- southwestern willow flycatcher (*Empidonax traillii extimus*)

In addition, the CNDDB records of sensitive species identified within the project vicinity include the following two federally listed species:

- bald eagle (*Haliaeetus leucocephalus*)
- California bighorn sheep (*Ovis canadensis californiana*)

Of these eight species, five – the western yellow-billed cuckoo, southwestern willow flycatcher, least Bell's vireo, California condor, and California bighorn sheep – are not expected to occur on-site. Of the remaining three species, the bald eagle has a low potential to occur on-site; the mountain plover has a moderate potential to occur on-site; and the desert tortoise is known to occupy portions of both Pine Tree and Jawbone canyons within the project study area. Detailed accounts for all eight of these species are included in Appendix E, and brief discussions for each species are provided below.

Desert Tortoise

The desert tortoise was listed by the USFWS as threatened on August 20, 1980, and by the CDFG as threatened on August 3, 1989. This federally and state-listed species is also covered under the Draft WMP. In the Mojave Desert, desert tortoise occurs primarily in creosote bush scrub, creosote bursage, shadscale scrub, and mixed blackbush scrub between 3,500 and 5,000 feet above MSL. Most often, these habitats are associated with well-drained, sandy soils in plains and alluvial fans. Suitable desert tortoise habitat occurs in both Pine Tree and Jawbone canyons (Figure 6) where creosote bush scrub provides high quality habitat and Mojave wash scrub provides marginal habitat for the species. The Draft WMP designates portions of Pine Tree Canyon and Jawbone Canyon as Category III Desert Tortoise Habitat (BLM 2003), which identifies suitable but marginal habitat within the desert tortoise range. However, a live tortoise along with several tortoise burrows, scat, and eggshells were observed at the outlet of Pine Tree Canyon in alluvial areas that support creosote bush scrub during habitat assessments in April 2003. In addition, a live desert tortoise was observed on the existing paved access road on the Second Los Angeles Aqueduct, approximately 0.75 mile west of Highway 14 during the May 2003 focused desert tortoise surveys in Jawbone Canyon. During the June 2004 surveys, BLM staff also notified EDAW biologists that six adult desert tortoises have been reported within the Jawbone Canyon OHV area so far in 2004. Based on these data, tortoises are known to occur within the proposed project area in both Pine Tree and Jawbone canyons.

California Condor

The California condor was listed by the USFWS as endangered on March 11, 1967, and by the CDFG as endangered on June 27, 1971. The California condor is also listed as fully protected by CDFG. It inhabits rocky and brushy areas with cliffs for nesting and grasslands, oak savanna, ridges, and canyons for foraging. Although this species was once widespread, the California condor was considered rare and declining even in the late 1800s. By 1982, the population

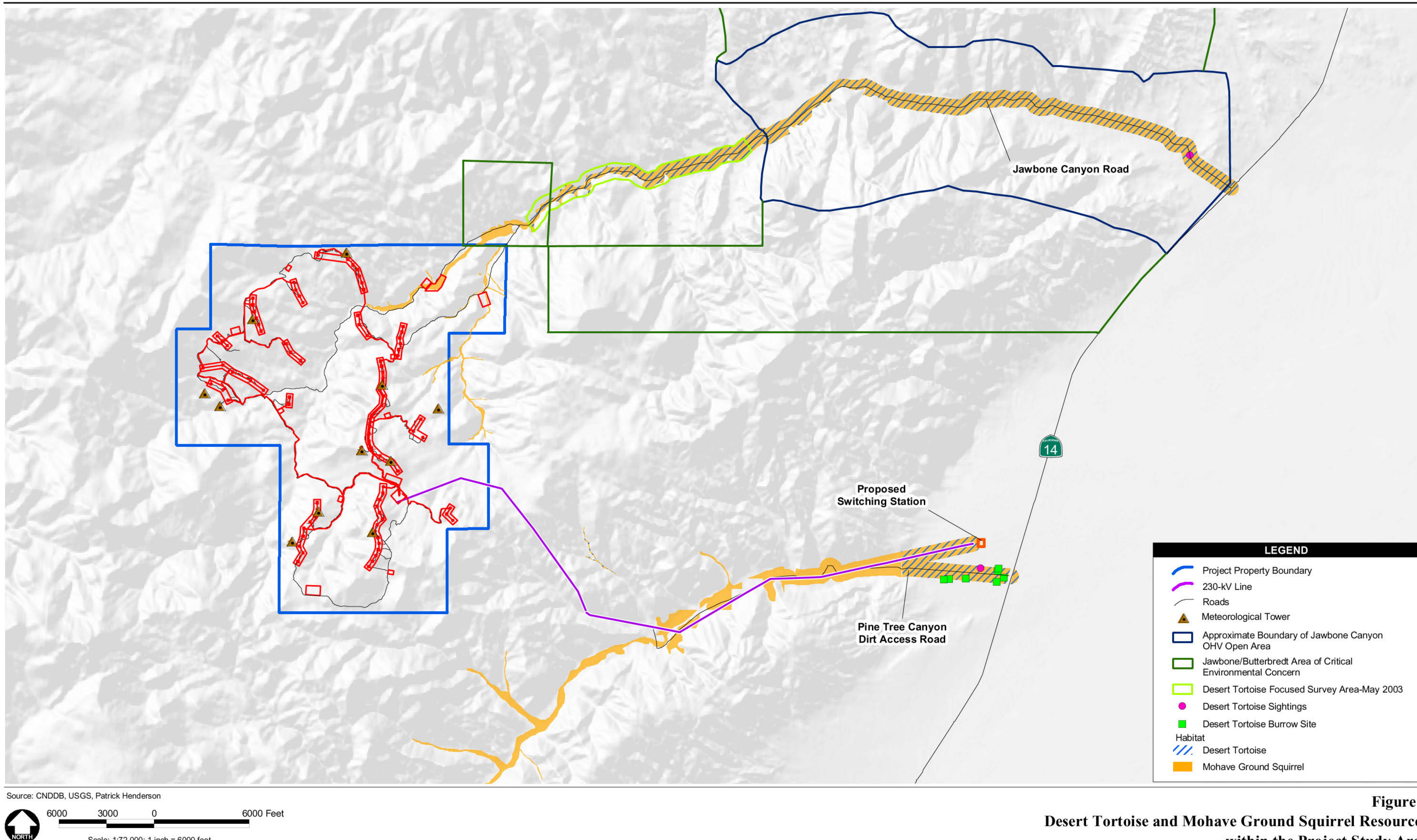

Figure 6
Desert Tortoise and Mohave Ground Squirrel Resources within the Project Study Area

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numbers had dropped to only 22 individuals. Thus, a captive breeding program was initiated and has been extremely successful. By April 2000, total population numbers had risen to 155 individuals, 95 in captivity and 60 successfully introduced back into the wild. Despite the success of this breeding program, this species has not been recorded in the project vicinity in over 20 years (Curry and Kerlinger 2000). An avian study conducted immediately north of the project area in an area with similar topography and vegetation communities concluded that condor-nesting suitability was marginal and that the nearest known nest location was approximately 30 miles away (Curry and Kerlinger 2000).

In February 2003, a man from Tehachapi, California shot and killed a California condor while participating in a pig hunt on the privately owned Tejon Ranch. The Tejon Ranch is located approximately 25 miles southwest of the proposed project site and is roughly bordered to the west by Interstate 5, to the northwest by Highway 223, to the north by Highway 58, to the east by the Tehachapi Mountains, and to the south by Highway 138. Although condors are known to fly up to 150 miles or more per day, they tend to stay within their smaller-sized home ranges. Based on discussions with CDFG, California condors have been observed on the west slope of the Tehachapi Mountains (adjacent to the eastern border of the Tejon Ranch); however, they are not known to cross over to the east slope, most likely due to preference of wind currents. Additionally, habitat on the east slope of the Tehachapi Mountains is considered less suitable to condors. Based on the low wild population numbers for this species, existing distribution data, and lack of detection during the numerous project surveys, the California condor is not expected to occur within the proposed project area.

Mountain Plover

The mountain plover was listed as proposed threatened on February 16, 1999, and was included in the USFWS April 24, 2003, letter as a federally listed species with the potential to occur within the proposed project area. However, on September 9, 2003, USFWS withdrew the threatened status proposal for this species. Thus, the mountain plover currently has no federal status but is considered a California state species of special concern.

The mountain plover inhabits short-grass plains and fields, plowed fields, sandy deserts, and heavily grazed rangelands. This species typically winters in southern California but migrates to the central plains for the summer. Habitat for the mountain plover occurs on-site in the lower elevations in the eastern portion of the project area. Although this species was not observed during project wildlife surveys, there is a moderate potential for the mountain plover to occur within the project area during the winter.

Western Yellow-Billed Cuckoo

The western yellow-billed cuckoo is a federal candidate species that was proposed for listing by USFWS on July 18, 2001. This species was also listed by CDFG as endangered on March 26, 1998 and is covered under the Draft WMP. It generally occurs in thick, well-developed riparian habitat consisting of willow, cottonwood, and sycamore trees. This species ranges within the western and southwestern portions of the United States, including Oregon, California, Nevada, Arizona, and New Mexico. Although the riparian habitat on-site is well developed, it is generally too open and not extensive enough to support this bird. In addition, there are no records of nesting areas within the Draft WMP Planning Area (BLM 2003). Thus, the western yellow-billed cuckoo is not expected to occur within the proposed project area.

Least Bell's Vireo

The least Bell's vireo was listed as endangered by the USFWS on May 2, 1986. It was also listed by the CDFG as endangered on October 2, 1980. It inhabits semi-open willow-mule fat-dominated riparian woodlands with dense shrub understory in southern California and northern Baja California, Mexico. Within the proposed project area, habitat suitable for the least Bell's vireo is not present, and most of the project area is at a higher elevation than the species is generally found. Thus, this species is not expected to occur within the proposed project area.

Southwestern Willow Flycatcher

The southwestern willow flycatcher was listed as endangered by the USFWS on February 27, 1995. It is also covered under the Draft WMP. This species is restricted to willow-dominated riparian habitats, usually in proximity to water. In the southwestern United States, the southwestern willow flycatcher range is limited to a few major river drainages, with the largest population in southern California located on the south fork of the Kern River in Kern County. Within the Draft WMP Planning Area, this species is known from only two sites on the Western Mojave Desert, at Big Morongo Canyon Preserve and along the Mojave River. Although the riparian habitat on-site is well developed, it is generally too open and not extensive enough to support this bird. In addition to EDAW's project surveys, a CDFG biologist and a BLM biologist examined potential flycatcher habitat in Jawbone Canyon and concluded that it was not consistent with typical flycatcher habitat. Based on this lack of suitable habitat, the southwestern willow flycatcher is not expected to occur within the proposed project area.

Bald Eagle

The bald eagle was listed as threatened by the USFWS on March 11, 1967. It was also listed as endangered and fully protected by the State on October 2, 1980. It inhabits lakes, rivers, marshes, and seacoasts. This species breeds from Alaska east across Canada and south to California and winters along coasts and large rivers in much of the United States. The bald eagle is not expected to occur on-site because suitable habitat (i.e., waterbodies) does not exist within the proposed project area.

California Bighorn Sheep

The California bighorn sheep was listed by the USFWS as endangered on April 20, 1999. It was also listed as endangered and fully protected by CDFG on August 27, 1999 and is covered under the Draft WMP. This species prefers open areas of low-growing vegetation with proximity to steep-walled canyons, ridges, and an adequate source of water. The California bighorn sheep is uncommon in California, with only about 100 individuals known to exist in the wild. Within the Draft WMP Planning Area, the majority of the bighorn sheep populations are located on military bases with additional populations found in the Rodman and Ord mountains, Newberry Mountains, and on the north slope of the San Bernardino Mountains (BLM 2003). Thus, because suitable habitat (i.e., adequate water sources) on-site is limited and because of low population numbers in California, this species is not expected to occur within the proposed project area.

State-Listed Wildlife Species

Four of the federally listed wildlife species discussed above – the desert tortoise, California condor, western yellow-billed cuckoo, and least Bell's vireo – are also state-listed endangered species. In addition to these species, a search of the CNDDB indicates that another four state-listed species have the potential to occur within the project vicinity. These species include:

- Tehachapi slender salamander (*Batrachoseps stebbinsi*)
- Swainson's hawk (*Buteo swaiinsoni*)
- American peregrine falcon (*Falco peregrinus anatum*)
- Mohave ground squirrel (*Spermophilus mohavensis*)

Of these four species, the Tehachapi slender salamander and the Swainson's hawk have a low potential to occur on-site; the American peregrine falcon has a moderate potential to occur on-site; and the Mohave ground squirrel has a high potential to occur on-site. Detailed accounts for all four of these species are included in Appendix E, and brief discussions for these four state-listed species are provided below.

Tehachapi Slender Salamander

The Tehachapi slender salamander was listed by the state as threatened in 1971. It inhabits foothill coniferous forests and riparian forests in the Tehachapi Mountains where it seeks refuge under bark, wood, and especially rock talus (Brame and Murray 1968). It is most active nocturnally during moist periods, typically November to May, when it forages through leaf litter, under debris, and possibly in termite and earthworm holes (Cunningham 1960; Adams 1668). During dry periods throughout its distribution, it retreats to moist underground niches or seepage areas. Habitat assessments of the project area in December 2002 showed that a few locations in the project area had the potential to support salamanders. These locations coincided with areas of potential impact from the project (i.e., improved roads that cross a stream channel). Focused surveys for the Tehachapi slender salamander were conducted in April 2003, and none were detected on-site. Based on these survey results and the limited availability of suitable habitat on-site, there is a low potential for this species to occur within the project area.

Swainson's Hawk

The Swainson's hawk was listed as a threatened species by the state on April 17, 1983. It typically inhabits savanna, open pine-oak woodland, and cultivated lands with scattered trees and is known to build nests along wetlands, drainages, savannas, and farmsteads. This species is a common inhabitant of the Great Plains and other relatively arid areas of western North America, extending less commonly to interior Alaska; northern Mexico; and western Minnesota, Illinois, Missouri, and Texas. Although suitable habitat occurs on-site in areas of higher elevation, the Swainson's hawk is not expected to occur because the project area is outside of its distributional range and because there are insufficient prey sources.

American Peregrine Falcon

The American peregrine falcon was listed as endangered and fully protected by CDFG on June 27, 1971. It is often found along or near the coast, especially around mudflats, shores, or ponds where large numbers of water birds congregate. This species is also occasionally seen farther inland near reservoirs or on the coastal slopes. The American peregrine falcon ranges throughout North, Central, and South America; Africa; and Australia. Although this species was once widely distributed in North America, pesticide poisoning has led to its extirpation from the eastern United States and southeastern Canada. Its current North American range extends from Alaska southeast into Canada and south to Baja California and northern Mexico. Although suitable habitat for the American peregrine falcon occurs on-site, there is only a moderate potential for this species to occur within the project area based on the limited availability of prey species.

Mohave Ground Squirrel

The Mohave ground squirrel was listed as threatened by the state in 1998. It is also covered under the Draft WMP. It inhabits alluvial fans with deep sandy or gravelly friable soils with an abundance of herbaceous vegetation. This species is typically associated with a variety of habitats e.g., desert scrub, alkali scrub, and Joshua tree woodland. A review of the Draft WMP shows that the project area occurs within the range of the Mohave ground squirrel. Two habitat assessments of the study area – one in December 2002 and one in April 2003 – determined that Mohave ground squirrel habitat occurs in several areas within Pine Tree and Jawbone canyons. Within the higher elevations of the project area, however, patches of Joshua tree woodland are considered too isolated and small to support viable populations of Mohave ground squirrel. To date, focused protocol-level surveys for this species have not been conducted within the project area; however, several individuals have been captured in Jawbone Canyon and other locations surrounding the project area (CDFG 2004a). This species has a high potential to occur on-site because suitable habitat is present onsite, the site lies within the distributional range for this species, and because several individuals have been captured adjacent to the project site.

BLM Sensitive Wildlife Species (and Other Non-listed Species)

In addition to the federally and state-listed species discussed above, a CNDDB search indicated 36 additional non-listed, sensitive wildlife species with the potential to occur within the project area. These wildlife species are either classified as California state species of special concern, game and harvest species, are considered sensitive by BLM, and/or are covered under the Draft WMP. Of these 36 species, 4 are not expected to occur on-site; 9 have a low potential for occurrence; 13 have a moderate potential for occurrence; 2 have a high potential for occurrence; and 8 have been detected on-site. Each of these species is included in Table 4 and has been considered in the general discussion below.

Tule Elk

The Tule elk is protected by the Tule Elk Protection Act of 1976 and is considered a "Harvest Species" by the California Department of Fish and Game (CDFG). Habitat types suitable to support elk species include wooded, shrubby, grassland, and riparian areas, all of which are found on site. An area near the project site formerly was used by CDFG to raise tule elk as part of plan to reintroduce the species to the Owens Valley. However, the stock pens were washed out by a storm and the animals escaped to the wild. Observations of Tule elk individuals or signs were made in Sections 12, 13, 17, and 18 of the project area during December 2002 and April 2003 general surveys. Discussions with the Bureau of Land Management and CDFG also indicated that a small Tule elk population has been observed in Jawbone Canyon and the surrounding area since 1977. Thus, the upper elevations of the project area should be considered wintering grounds for the species, with the greatest use occurring between September and May. This influx of Tule elk during the winter months is expected from the surrounding mountains to the north and west. The Tule elk population present within the project area is most likely small in size and does not use the proposed project area as primary calving grounds, which are further north and west.

Large mammals, including mule deer and mountain lion, can be affected if rows of turbines are placed along migration paths between winter and summer ranges; however, no distinct migration routes have been identified within the project area. Therefore, no large-scale displacement of large mammals is expected to occur. Direct observations of large mammals in proximity to existing turbines near the project site indicate that small-scale displacement has not occurred in the project vicinity. Similar observations of large mammals at Foote Creek Rim in Wyoming also showed that small-scale displacement did not occur in that area (National Wind Coordinating Committee, 2002).

Raptors

Raptors (and songbirds) are protected under the Migratory Bird Treaty Act (MBTA) of 1918. The MBTA makes it illegal to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird…" Bald eagles and golden eagles are also afforded protection under the Bald Eagle Protection Act (BEPA). Similar to the MBTA, this act prohibits the taking of, possession of, or commerce in bald eagles and golden eagles or their parts. In addition to this federal coverage, CDFG considers impacts to raptors and their breeding, nesting, and foraging activities to be significant.

Raptor nests are typically located on steep cliff ledges or high in trees, particularly in or near riparian vegetation and open grasslands where they forage. During project surveys in 2002 and 2003, EDAW biologists located several areas with the potential to support both raptor nesting and raptor foraging activities. The most suitable raptor habitat in the project vicinity is located to the south of the current project area. Because of recent project design modifications, the current project footprint no longer includes turbine strings or other facilities adjacent to this prime habitat. Within the current project footprint, there is limited suitable raptor nesting and foraging.

Focused avian surveys with an emphasis on raptors were conducted in April 2004 by Dr. Michael L. Morrison. Four raptor species were observed during the avian surveys: eight American kestrels, seven red-tailed hawks, seven turkey vultures, and one golden eagle. Additionally, Dr. Morrison determined that only one golden eagle and two red-tailed hawks were potentially nesting on-site. A focused nesting survey conducted by Dr. Morrison on May 30, 2004, determined that no raptor nests of any kind or of any age were located within the project area. A copy of Dr. Morrison's report is included as Appendix F.

Within the proposed project area, an additional nine sensitive raptor species have the potential to occur: three federally and state-listed species and six species that are considered California state species of special concern and/or are classified as sensitive by BLM (Table 4). Of the sensitive raptor species with the potential to occur on-site, the Cooper's hawk, golden eagle, and northern harrier have been detected within the project area. Other sensitive raptor species with a potential to occur on-site include the sharp-shinned hawk, ferruginous hawk, and prairie falcon.

<u>Bats</u>

Of the nine bat species with the potential to occur on-site, four are considered sensitive by both CDFG and BLM while the remaining five are considered sensitive only by BLM. In addition, four of these species are covered under the Draft WMP. Of these nine species, four have a moderate potential and five have a low potential to occur on-site. Bat species typically use natural caves and mine adits as breeding and roosting locations. They require water sources like streams, rivers, and lakes for foraging activities. Based on observations by EDAW biologists during general wildlife surveys between 2002 and 2004, little suitable habitat exists within the project area to support resident bat species. However, the project area may be temporarily utilized by these species during annual migration.

Because wind resource areas have been known to have negative impacts not only on avian species but also on bat species, Dr. Morrison conducted a focused bat habitat assessment in conjunction with the raptor habitat assessment discussed above in the raptor section. Dr. Morrison noted that the scattered riparian vegetation in the valley bottoms provides little foraging habitat for bats. In addition, Dr. Morrison noted that a few natural water sources occur on-site; however, these are seasonally ephemeral. Thus, although bats may be attracted to the stock ponds and water troughs provided for the cattle that graze on-site, Dr. Morrison concludes that it is unlikely that substantial populations of bats occur within the project areas (see Appendix F for Dr. Morrison's complete report).

CHAPTER 5.0
IMPACT ANALYSIS

In this section, project-related impacts to vegetation communities and sensitive plant and animal species are analyzed. Biological resources may be either directly or indirectly impacted by a project. Direct and indirect impacts may furthermore be either permanent or temporary in nature. These impact categories are defined below.

- Direct: Any alteration, disturbance, or destruction of biological resources that would result from project-related activities is considered a direct impact. Examples include clearing vegetation, encroaching into wetlands, diverting natural surface water flows, and the loss of individual species and/or their habitats.
- Indirect: As a result of project-related activities, biological resources may also be affected in a manner that is not direct. Examples include elevated noise and dust levels, soil compaction, increased human activity, decreased water quality, and the introduction of invasive wildlife (domestic cats and dogs) and plants.
- Permanent: All impacts that result in the irreversible removal of biological resources are considered permanent. Examples include constructing a building or permanent road on an area containing biological resources.
- Temporary: Any impacts considered to have reversible effects on biological resources can be viewed as temporary. Examples include the generation of fugitive dust during construction; or removing vegetation for underground pipeline trenching activities and either allowing the natural vegetation to recolonize or actively revegetating the impact area.

Significance criteria are defined in the general context of CEQA and NEPA. Significant impacts to biological resources include, but are not restricted to, the following:

- Substantial impact to plant species considered by the CNPS to be rare, threatened, or endangered in California (CNPS 2001) or with strict habitat requirements and narrow distributions; substantial impact to a sensitive natural community (i.e., community that is especially diverse, regionally uncommon, or of special concern to local, state, and federal agencies).

- Any impact to wildlife species that are federally or state listed or proposed to be listed; substantial impact to wildlife species of special concern to CDFG (2002b), candidates for state listing, or animals fully protected in California.
- Substantial impact to habitats that serve as breeding, foraging, nesting, or migrating grounds and are limited in availability, or that serve as core habitats for regional plant and wildlife populations.
- Any impact to important riparian habitats or wetlands and any other "waters of the U.S."

A detailed description of the project components and construction are included in Appendix G.

5.1 VEGETATION COMMUNITIES

Assumptions employed for the calculation of impacts to vegetation communities are described below.

5.1.1 Direct Impacts

Wind Turbines

The impact at each wind turbine site includes a level pad of approximately 50 feet by 50 feet wherein the turbine foundation would be constructed; an adjacent cleared and level area approximately 35 feet by 60 feet to accommodate the crane required to install the turbine; and an 8- foot by 8-foot concrete pad for a transformer. Proposed (80) and alternative (7) wind turbine locations are included in the calculations.

Onsite Access Roads

A total of approximately 31.7 miles of roads would be necessary for the project. The specific types of roads required are noted below. All of these roads would be unpaved.

- Approximately 1.8 miles of existing 16-foot-wide road would be upgraded (not widened) to be used during construction only.
- Approximately 1.8 miles of existing 20-foot wide road would be upgraded and used for project construction and operations.

- Approximately 12.4 miles of existing 16-foot-wide roads would be improved and widened to 20 feet for construction and operations.
- Approximately 5 miles of existing 16-foot-wide road would be widened to 34 feet for both construction and operations.
- About 0.5 mile of new 20-foot-wide road for construction and operations would be constructed.
- About 9 miles of new 34-foot-wide road for construction and operations would be constructed.
- Segments of the above noted access roads, where turns are tight or the slope is steep, would impact an area of up to 200 feet to accommodate the larger construction vehicles.
- About 1.2 mile of new temporary construction road (34 feet wide) would be required.

Electrical Collection System

Underground cables would interconnect all of the turbines electrically; this network of cables (approximately 22 miles total) would terminate at the project substation. The underground cables would be installed in a trench that would generally run at the edge of project roads and would typically be 3 to 4 feet deep. Where this is possible (approximately 68% of the cable network), no additional impact beyond that calculated for roads was included. Due to terrain or to avoid excessively long runs, the collection cables would occasionally become overhead lines for relatively short distances or run overland. Overhead lines also would not lead to ground-disturbing activities. However, in some locations (7 miles total), a trench would be dug to run between the turbines. In these locations, an impact corridor 20 feet wide was assumed to account for the approximately 3 to 5-foot-wide trench and the equipment required to dig the trench and install the cable.

Alignment

The proposed transmission line would be approximately 8 miles in length and is shown on Figure 4 in the Biological Assessment as a purple and dark blue line. Originating at the Pine Tree switch yard (substation) located in Section 12, T31S, R35E in the south-central part of the project property, it would be routed eastward through privately owned land until it intersects the existing dirt road in Pine Tree Canyon. The line would then generally parallel Pine Tree Canyon

Road eastward to a point near the Los Aqueduct, where it would traverse northeasterly away from the road toward the existing LADWP regional transmission line. This proposed transmission line route would cross two parcels of Bureau Land Management land for a total length of approximately 1.1 miles. LADWP intends to secure an easement for the transmission line alignment that is 150 feet wide and this easement would not be fenced.

Transmission Line Tower Structures

Three conductor wires would be needed to transmit the power from the site to the regional line. The conductor wires would be suspended on tubular steel monopole towers or tapered spun cast concrete pole towers for the length of the alignment with the exception of certain critical angle points that may require use of a freestanding steel lattice tower. At present, it is anticipated that one of these angle points would be located where the line crosses Pine Tree Canyon wash.

The typical height of towers would be 120 feet. The approximate diameter of the tower would be about 5 feet at the base, narrowing toward the top end. A round concrete footing (approximately 5 feet in diameter) would anchor the tower structure. The footings for the tower structure would be drilled shaft and cast-in-place. Using 120-foot tall towers, the average span length between towers would be roughly 500 to 600 feet, or approximately 10 structures per mile.

The portion of the transmission alignment in Sections 7, 8, 17, and 18 (above Pine Tree Canyon) are near an established military flight-training corridor. Tower heights in these sections may be limited to 100 feet resulting in the need for approximately 12 structures per mile.

The three conductor wires would be strung on Horizontal Vee hardware assemblies on each tower. Two conductor wire assemblies would be placed on one side of the pole with one conductor wire assembly on the opposite side. The Horizontal Vee assembly angles downward from the pole at a 45-degree angle to a strut insulator supporting the conductor wire. The strut insulator would be attached horizontally between the conductor wire and pole to keep the conductor wire a minimum of 6 feet from the tower. A 13-foot vertical distance would be maintained between the two conductor wires on the same side of the pole. The lowest conductor wire would be a minimum of 30 feet from the ground at its low-point between towers. The fiberglass Horizontal Vee assemblies are angled downward such that perching by birds would be difficult. The insulators, though horizontal, are made of silicon and grooved to discourage perching.

Switching Station

Barren Ridge Switching Station (BRSS) would be constructed within the existing Inyo-Rinaldi 230kV line easement, approximately 1,500 feet north of where this regional line crosses the existing Pine Tree Canyon dirt road. The station would be constructed between the 230kV towers on the east side of right-of-away.

The Inyo-Rinaldi 230kV line will be cut and looped through BRSS along with 230kV line coming from Pine Tree Switch Yard. The interconnect will be through a ring bus design that will consist of three circuit breakers, eight disconnect switches and total of nine coupling capacitive voltage transformers, CCVT, on all incoming and outgoing lines. In addition to the rack, there will be a masonry block structure for control room and communication room within the station.

The switching station yard will be 500 feet, parallel to Inyo-Rinaldi line, by 250 feet, or 125,000 square feet (about 2.9 acres). Within the yard, there will be a control room and/or communication room(s). The control room plan includes space for equipment, distribution panels and relay panels, exposed cable tray and open cable trench extending to the rack area. It also includes space for batteries, storage and a rest room. The control room will be 30 feet by 35 feet, or 1,050 square feet. An additional communication room (assume same size as control room) may be required. The BRSS will not be manned on a daily basis.

Equipment piers and foundations and the cable trench will be reinforced concrete. A 25-foot-wide compacted roadway will be built around station equipment and the remainder will have crushed rock to a depth of 6 inches.

Access

General vehicular access to the transmission line segment would be taken from either Pine Tree Canyon or Jawbone Canyon. It is anticipated that a maintenance road would be constructed along portions of the alignment (from tower to tower), except where topography is too steep or the existing road is adjacent to the towers. In some cases, short spur roads would be constructed from the existing Pine Tree Canyon Road to tower sites. In general, spur roads would be 14 feet wide and maintenance/patrol roads would be 24 feet wide. The following assumptions relative to access roads govern the analysis of biological impacts.

Barren Ridge Switching Station (BRSS) – Access to the BRSS is achieved via Highway 14 to Pine Tree Canyon Road, and then to the existing dirt maintenance/patrol road running parallel to the regional line. Pine Tree Canyon Road is a wide dirt road (greater than 24 feet) from Highway 14 to where it crosses under the Los Angeles Aqueduct. The regional transmission line maintenance/patrol road is a 24-foot-wide road paralleling the alignment. No widening or improvement of either of these existing roads would be required.

BRSS to Second LA Aqueduct – The transmission line segment from BRSS to the Second L.A. Aqueduct (Sections 18 [mouth of Pine Tree], 13, and 14) extends approximately 9,500 feet. A new 24-foot-wide maintenance/patrol road would extend within the right-of-way parallel to the line in this reach.

Second L.A. Aqueduct to Section 15 Angle Point – In this reach of 3,500 feet, the transmission towers would be adjacent to the existing main Pine Tree Canyon Road and no new road construction or spurs roads would be needed. This road is assumed to range in width from 16 feet to 24 feet.

Section 15 Angle Point to Section 21 Angle Point – This 6,700-foot-long segment is parallel to but upland from the existing main road in Pine Tree Canyon. A new spur road would be constructed from the main road to each of the tower sites. Spur roads would be 14 feet wide with a total length of approximately 1,750 feet. No improvements to the main Pine Tree Canyon Road are necessary.

Section 21 Angle Point to Section 20 Angle Point – This 5,800-foot-long segment crosses over Pine Tree Canyon Wash and begins to climb out of Pine Tree Canyon. It is possible that the angle point in Section 21 would have a lattice tower due to the tension loads that would be placed on this structure. It is anticipated that an existing dirt road crossing Pine Tree Canyon Wash east of the transmission alignment would be used to access the north side of the wash, and then a new or modified 24-foot wide maintenance/patrol road would be constructed along the alignment.

Section 20 Angle Point to Pine Tree Substation – The remaining segment of the transmission line is approximately 16,000 feet long and traverses moderately steep topography in a northeasterly and easterly direction to reach the Pine Tree Substation (as shown on Figure 4). A new or modified 24-foot-wide maintenance/patrol road would be constructed along the alignment, following the alignment of existing roads and trails to the extent possible. Spur roads to the individual towers would be constructed. For purposes of estimating the necessary road construction, it is assumed that the maintenance/patrol road would be 20,000 feet long and that out of 30 transmission towers, spur roads 300-feet long would be needed for 25 of the towers.

Construction (Temporary) Disturbance Areas

In addition to roads, a number of other areas associated with project construction and operations must be cleared and graded. During the construction of the transmission line, tower site work areas, crane pads, pull/tensioning sites and other areas would be required. Temporary disturbance areas are listed below, total acres of disturbance are estimated.

Tower Site Work Areas: 86 x 100 feet x 100 feet = 860,000 square feet, 19.7 acres
Crane Pads: 86 x 25 feet x 30 feet = 64,500 square feet, 1.5 acres
Pull and Tensioning Sites: 7 x 150 feet x 200 feet = 210,000 square feet, 4.8 acres
Splicing Sites: 5 x 50 feet x 50 feet = 12,500 square feet, 0.3 acres
Guard Structures: 2 guard structures, 10 feet x 30 feet = 300 square feet, 0.01 acres

It is estimated that project construction could last five months and result in regular daily travel on access roads in the project area, with peak daily travel associated with the first three months of construction activity.

Maintenance Activities

Routine maintenance of the transmission towers would include annual inspections and equipment repair if needed. Inspections would be done by helicopter. Minimal travel on access roads, on the order of a few trips per month, is assumed.

Other Project Components

- Equipment and materials laydown and staging areas would be required; these areas total approximately 45 acres.
- Several relatively small temporary material stockpile and turnout areas would also be located throughout the project property during construction.
- A small concrete batch plant would also be located at one of the laydown and staging areas.
- A total of approximately 21 acres would be cleared and graded as a site for the substation and O&M facility.

The project components map provided by WTP (March 17, 2004) was used to calculate the number of acres impacted by the project in each vegetation community (Table 5). The source of the impact and the area affected temporarily by construction activities, or permanently by project components or ongoing operations, are noted in Table 5. Of the 237.88 acres of impact summarized in Table 5, only the permanent and temporary impacts to habitats considered sensitive by CDFG (2003) have the potential to be considered significant.

Sensitive vegetation communities that would be impacted from project construction include the three wetland habitats on-site (Mojave riparian forest, southern riparian scrub, and Mojave desert wash scrub), perennial grassland, and Joshua tree woodland (CDFG 2003). All project impacts to wetland habitats are considered significant by CDFG (17.37 acres of temporary impacts and 1.96 acres of permanent impacts). All of the wetlands that will be affected by project development are associated with the many stream channels that traverse the project site. Of the 206 ephemeral drainage courses identified in the study, approximately 135 ephemeral drainages will be affected by road improvements, in particular, constructed stream crossings that will be required to accommodate the large vehicles that will be used during the construction phase of the project. Impacts to ephemeral drainages, and the wetlands they can support, are regulated by the CDFG pursuant to Section 1600 of the Fish and Game Code. Impacts to ephemeral drainages are considered significant.

Joshua tree woodland is considered rare by CDFG, and individual Joshua trees are considered a species that requires protection, therefore, the impact to Joshua tree woodland would also be considered significant (1.11 acres of permanent impacts). However, the perennial grassland that would be affected by permanent road widening would not be considered significant due to the relatively small area affected (1.23 acres), and the fact that comparable areas of perennial grassland are expected to occur elsewhere within the approximately 8,000-acre project area and would not be affected by project activities.

5.1.2 Indirect Impacts

All potential indirect impacts to the vegetation communities on-site, including ephemeral drainages, would occur as a result of project grading activities. Potential permanent, indirect impacts include habitat fragmentation and exotic species introductions. Habitat fragmentation could affect pollinator activity, rates of fertilization, and seed dispersal. All temporary ground-disturbing activities could adversely affect vegetation communities by altering vegetation

Table 5
Vegetation Impacts for the Pine Tree Wind Development Project

Vegetation Communities	Temporary Direct Impacts (acres) [1]	Permanent Direct Impact (acres)				Total Permanent Direct Impacts (acres)	Total Temporary and Permanent Direct Impacts (acres)
		Wind Turbines[2]	Roads	230 kV Transmission Line	Substation/ O&M Building		
Scrubs and Chaparral							
Blackbush scrub	0.19	0.10	0.54			0.64	0.83
Rabbitbrush scrub	1.51	0.49	10.80	0.20		11.49	13.00
Disturbed rabbitbrush scrub		0.05	0.56			0.61	0.61
Mojave mixed woody scrub	34.43	0.95	15.73	3.39	6.95	27.02	61.45
Mojave creosote bush scrub	12.23			5.28		5.28	17.51
Total	**48.36**	**1.59**	**27.63**	**8.87**	**6.95**	**47.04**	**93.40**
Wetlands							
Mojave desert wash scrub*	14.76		1.51	0.17		1.68	16.44
Mojave riparian forest*	2.59		0.28			0.28	2.87
Southern riparian scrub*	0.02						0.02
Total	**17.37**		**1.79**	**0.17**		**1.96**	**19.33**
Grasslands and Fields							
Perennial grassland*			1.23			1.23	1.23
Annual grassland	11.50	0.33	9.05			9.38	20.88
Wildflower field							
Total	**11.50**	**0.33**	**10.28**			**10.61**	**22.11**
Woodlands							
Mojavean juniper woodland and scrub	21.35	2.28	36.09	2.18	14.20	54.75	76.10
Open foothill pine woodland	0.19	0.10	0.80			0.90	1.09
Foothill pine-oak woodland	1.14	0.28	8.51			8.51	9.65
Oak-pinyon woodland			0.18			0.46	0.46
Foothill pine-pinyon-oak woodland	0.01		0.12			0.12	0.13

Vegetation Communities	Temporary Direct Impacts (acres) [1]	Permanent Direct Impact (acres) Wind Turbines[2]	Roads	230 kV Transmission Line	Substation/ O&M Building	Total Permanent Direct Impacts (acres)	Total Temporary and Permanent Direct Impacts (acres)
Oak-foothill pine-juniper woodland			0.64			0.64	0.64
Joshua tree woodland*			1.11			1.11	1.11
Total	**22.69**	**2.66**	**47.45**	**2.18**	**14.20**	**66.49**	**89.18**
Ecotones							
Ecotonal Mojavean juniper woodland/Mojave mixed woody scrub	3.04	0.28	5.02			5.30	8.34
Ecotonal Mojavean juniper woodland/blackbush scrub	2.64	0.18	2.25			2.43	5.07
Total	**5.68**	**0.46**	**7.27**			**7.73**	**13.41**
Developed and Disturbed							
Disturbed habitat[3]			0.45			0.45	0.45
Total of Vegetation Impacts	**105.60**	**5.04**	**94.87**	**11.22**	**21.15**	**132.28**	**237.88**

* Sensitive vegetation (CDFG 2003)

1 Temporary impacts include the temporary construction road in Section 2, electrical collection systems, spoil areas, and laydown areas.

2 Included in this impact analysis is approximately 0.76 acre of impacts derived from seven alternative wind turbine locations.

3 This category does not include approximately 30 acres of existing graded roads that will be used and/or modified to accommodate construction and operations.

boundaries and creating disturbed areas that are more conducive to invasion of exotic species. The introduction and invasion of exotic species could potentially reduce native population growth, dispersal, and recruitment.

Potential temporary, indirect impacts resulting from grading are sedimentation, erosion, and alteration of drainage patterns. These indirect impacts are not anticipated to be significant due to the overall small and discontinuous area of direct impacts to all vegetation communities affected by project development. The relatively small degree of impacts (237.88 acres) compared to the area left unaffected (7,762.12 acres) is not expected to result in substantial habitat fragmentation. Of the 237.88 acres impacted by the project, 65.60 acres is attributed to temporary impacts from construction activities. If these areas of temporary impact are left bare after project construction, there is a potential for adverse indirect impacts from exotic species introduction and invasion. This potential indirect impact could be significant.

Additional potential indirect impact could occur after project development within the 15 turbine strings. Each of the 400-foot-wide turbine strings will be zoned as Wind Energy (WE) Combining Districts as part of the project, as such, there will be 15 WE Districts within the project area. The 15 WE Districts total 425 acres in area. The project features within the turbine strings (e.g., turbine towers, access roads, electrical collection system) total 44.83 acres; therefore, 380.17 acres among the 15 turbine strings will not be affected under the project design analyzed herein. The WE District designation, however, could allow additional impacts within the 380.17 acres in the futures due to construction of additional access roads, appurtenant or ancillary facilities, wind turbines, or collection lines in the WE zones. If future impacts were to affect state-jurisdictional wetlands or Joshua trees, these impacts would be considered significant.

5.3 PLANT SPECIES

The project’s affect on listed and other sensitive plant species is discussed below.

5.3.1 Direct Impacts

Potential permanent, direct impacts to sensitive plant species, if present, may arise from implementation of the proposed project including proposed and alternative wind turbine locations, substation locations, staging areas, and proposed road improvements.

Federally Listed Plant Species

No federally listed plants have the potential to occur within the project study area; therefore, no direct impacts to federally listed plants would result from either construction or operation of the project. Because no federally listed plant species would be affected by the proposed project, no avoidance, minimization, or compensatory mitigation measures would be required for such species.

State-Listed Plant Species

The state-listed Mojave tarplant was detected in Cutterback Spring within 2,640 feet of the Jawbone Canyon access road. This location would not be affected by the proposed project. Despite its known proximity to the project site, Mojave tarplant does not have a high potential to occur on-site due to unsuitable habitat and elevations that are generally outside of the range for this species in the majority of the site.

No state-listed plant species were detected within the project area; therefore, no direct impacts to state-listed plants would result from either construction or operation of the proposed project. Because no state-listed plant species would be affected by the proposed project, no avoidance, minimization, or compensatory mitigation measures would be required for such species.

BLM Sensitive Plant Species (and Other Non-listed Species)

The two individuals of Kern buckwheat do not occur within the 2004 project area and would not be directly impacted by project construction or operation. Because Kern buckwheat would not be affected by the proposed project, no avoidance, minimization, or compensatory mitigation measures would be required for this species.

Approximately 150 individual Joshua trees would be impacted by proposed construction activities. Such activities include a proposed laydown area in Little Jawbone Canyon, where approximately 80 Joshua trees occur. In addition, the proposed road-widening activities throughout the project site would impact two areas where Joshua trees are scattered along and adjacent to the roads. It is estimated that approximately 70 Joshua trees would be directly impacted in these two areas (Figure 4). Based on state regulations, this impact would be considered significant and would require mitigation.

Due to the occurrences of Charlotte's phacelia and Piute mountains jewel-flower less than 3 miles from the project site, both are considered to have a high potential to occur within the proposed project area. However, neither was observed during project surveys and therefore direct impacts are not expected to occur during project implementation. As such, no avoidance, minimization, or compensatory mitigation measures would be required for this species.

For all of the 17 CNPS list 1B plants, 3 list 2 plants, and 2 list 4 plants that have a potential to occur on the project site, but were not detected during two survey seasons, no impacts are expected to occur from project construction or operation. Potential impacts to these species, if they were to be detected, would not be considered significant due to the low numbers of individuals that would be expected to occur, the relatively low sensitivity status (for the list 4 species), and the fact that the majority of the habitat for these species would not be affected by the proposed project. For all of the plant species that are covered in the Draft WMP, adverse project impacts are not expected to occur to individuals or to the habitats that support them within the project study area. The proposed project impacts are compatible with the Draft WMP.

5.3.2 Indirect Impacts

Potential permanent, indirect impacts to sensitive plant species, if present, may arise from population fragmentation and introduction of nonnative weeds. Population fragmentation could affect pollinator activity and hence gene flow. Introduction and establishment of invasive weeds within, or adjacent to, sensitive plant populations can adversely affect native species by reducing growth and recruitment.

Potential temporary, indirect impacts could arise from runoff and sedimentation, erosion, fugitive dust, and unauthorized access by construction workers. Runoff, sedimentation, and erosion can adversely affect plant populations by damaging individuals or by altering site conditions sufficiently to favor other species that could competitively displace the listed species. Construction-generated fugitive dust can adversely affect plants by reducing the rates of metabolic processes such as photosynthesis and respiration. Unauthorized access by construction workers and their vehicles can trample and destroy individuals outside of, but immediately adjacent to, the proposed construction area.

Federally Listed Plant Species

No federally listed plants have the potential to occur within the project study area; therefore, no indirect impacts to federally listed plants would result from either construction or operation of the project. Because no federally listed plant species would be indirectly affected by the proposed project, no avoidance, minimization, or compensatory mitigation measures would be required for such species.

State-Listed Plant Species

No state-listed plant species were detected within the project area; therefore, no indirect impacts to state-listed plants would result from either construction or operation of the proposed project. Because no state-listed plant species would be indirectly affected by project construction or operation, no avoidance, minimization, or compensatory mitigation measures would be required for such species.

BLM Sensitive Plant Species (and Other Non-listed Species)

No rare plants were detected within the project boundaries; therefore, no indirect impacts to rare plants would result from either construction or operation of the proposed project. Because no rare plant species would be indirectly affected by project construction or operation, no avoidance, minimization, or compensatory mitigation measures would be required for such species.

5.4 WILDLIFE SPECIES

5.4.1 Direct Impacts

The proposed project could potentially result in direct impacts to sensitive wildlife species. Direct impacts could result from mortality to birds and bats colliding with wind turbines or transmission line wires during flight, mortality by electrocution of large birds that attempt to perch on wires of the 230-kV transmission line or to smaller species inhabiting the substation area. Furthermore, direct impacts could result from mortality of wildlife by crushing or vehicle collisions during construction and subsequent maintenance activities.

Federally Listed Wildlife Species

The proposed project would not directly affect California condor, western yellow-billed cuckoo, southwestern willow flycatcher, least Bell's vireo, or California bighorn sheep, because these species are not expected to occur on within the project study area. The proposed project would not directly affect bald eagle because suitable habitat (i.e., waterbodies) does not occur within the project study area. Because these federally listed animal species would not be directly affected by the proposed project, no avoidance, minimization, or compensatory mitigation measures would be required for these species. Finally, the proposed project would not affect mountain plover, a species once proposed for listing as threatened by USFWS (proposal subsequently withdrawn), because this species was not detected within the project study area.

The federally and state-listed endangered desert tortoise was observed within the project area in both Pine Tree and Jawbone canyons. Based on these observations, tortoises are presumed present on-site in areas within suitable tortoise habitat. Direct permanent impacts to the desert tortoise could potentially occur as a result of road-widening activities within suitable habitat within the project area (Figure 6), the installation of the 230-kV transmission line in Pine Tree Canyon, and the establishment of laydown areas on-site. Based on habitat assessments, 8.55 acres of suitable desert tortoise habitat will be permanently impacted by the project transmission line within Pine Tree Canyon. Direct temporary impacts to the desert tortoise could potentially result from habitat disturbance associated with transmission line construction in Pine Tree Canyon. Based on habitat assessments, 5.89 acres of desert tortoise habitat will be temporarily impacted by the project (Table 6).

These impacts to desert tortoise have the potential to be significant; however, with implementation of the impact avoidance, minimization, and mitigation measures outlined in Chapter 6.0, the project's effect on desert tortoise would be reduced to a level of insignificance. With the successful implementation of the measures discussed in Chapter 6.0, the desert tortoise population on-site is not expected to be adversely affected by the project.

State-Listed Wildlife Species

Direct impacts to the Tehachapi slender salamander, American peregrine falcon, and Mohave ground squirrel could potentially occur as a result of road-widening activities within the project area, the installation of the 230-kV transmission line in Pine Tree Canyon, and the establishment of laydown areas on-site.

Direct impacts to the state-listed threatened Tehachapi slender salamander could result from construction and subsequent maintenance activities if the salamander is crushed by project-related vehicle traffic. However, because construction and maintenance activities would occur outside of suitable habitat for this species and because there is a low probability for this species to occur on-site, no significant direct impacts to the Tehachapi slender salamander are expected as a result of construction and maintenance activities associated with the proposed project.

Direct impacts to raptors, such as the American peregrine falcon, could potentially result from collision with wind turbines and electrocution while attempting to perch on wires associated with the transmission line. Based on the low mortality rate of 0.04 kills per turbine per year estimated for the project by Dr. Michael Morrison, it is estimated that 80 turbines planned for the project could potentially kill approximately 4 raptors per year (see Appendix F). However, no significant direct impacts are expected to the American peregrine falcon from collision with the wind turbines. In addition, because the transmission line will be designed to avoid or minimize the potential for avian electrocutions (i.e., incorporation of perch guards, appropriate separation of wires, use of line insulators, and monopole towers), no significant impacts to state-listed species is expected to occur as a result of electrocution associated with the transmission line.

Although focused surveys were not conducted for the Mohave ground squirrel, appropriate ground squirrel habitat exists in both Pine Tree and Jawbone canyons, and there is a high potential for this species to occur on-site. Direct permanent impacts to the Mohave ground squirrel could potentially result from road-widening activities within the project area, the installation of the 230-kV transmission line in Pine Tree Canyon, and the establishment of laydown areas on-site. Based on habitat assessments, 9.55 acres of suitable Mohave ground squirrel habitat will be permanently impacted by the project (Table 6). Direct temporary impacts to the Mohave ground squirrel could potentially result from habitat disturbance associated with transmission line construction in Pine Tree Canyon. Based on habitat assessments, 12.60 acres of suitable Mohave ground squirrel habitat will be temporarily impacted by the project (Table 6). Any direct impacts to the Mohave ground squirrel and its habitat would be considered significant by CDFG and would require mitigation. The impacts to Mohave ground squirrel have the potential to be significant; however, with implementation of the impact avoidance, minimization, and mitigation measures outlined in Chapter 6.0, the project's effect on Mohave ground squirrel would be reduced to a level of insignificance. With the successful implementation of the measures discussed in Chapter 6.0, the Mohave ground squirrel population is not expected to be adversely affected by the project.

BLM Sensitive Wildlife Species (and Other Non-listed Species)

Direct impacts to BLM sensitive wildlife species or other non-listed sensitive wildlife species could result from collision with wind turbines, and electrocution while attempting to perch on wires associated with the transmission line, road-widening activities within the project area, the installation of the 230-kV transmission line in Pine Tree Canyon, and the establishment of laydown areas on-site. Direct impacts to birds listed under the MBTA or BEPA would be

Table 6
Anticipated Permanent and Temporary Impacts to Habitats for Listed Wildlife Species in the Pine Tree Wind Development Project Area

Listed Species	Total Permanent Impact Acreage [1]	Total Temporary Impact Acreage [1]
Desert Tortoise and Mohave Ground Squirrel	8.55	5.89
Mohave Ground Squirrel Only	1.00	6.71
Total	9.55	12.60

[1] The temporary and permanent impacts noted above are exclusive of each other.

considered by the USFWS to be a violation of these federal acts; therefore, appropriate mitigation measures to avoid or minimize adverse effects to these species would be required. However, because avian mortality associated with project related construction, maintenance, and operation activities would be an unintended or incidental occurrence, it is unlikely that this would be considered a "take" under either the MBTA or BEPA.

Direct impacts to sensitive raptors could result from collisions with rotating turbine blades. Many factors contribute to avifauna strikes in areas with power-generating turbine towers, including turbine spacing (the closer each turbine is to another the greater the chance of a bird strike); height of turbine blades from the ground (the shorter the turbine height the greater the chance of a bird strike); and abundance of prey species in the wind-generating areas (lower prey species mean lower number of raptors in an area) (California Energy Commission 2002). Installing approximately 80 power-generating wind turbines could directly impact non-listed avian populations in the immediate area of the project by increasing the chance of collision. However, based on Dr. Michael Morrison's risk assessment report (Appendix F) and other recent studies (Curry and Kerlinger 2000), the proposed development is not expected to have any adverse effects on the local raptor population. In his report, Dr. Morrison calculated that there is a potential loss of 4 raptors per year, most likely to be red-tailed hawks (Appendix F). Given the wide distribution range of the red-tailed hawk in the region, this is not considered a biologically significant impact to the species. These data, combined with the low number of turbines proposed and the small land area to be occupied by the development indicate that the project related construction and maintenance activities will not have a significant impact to non-listed raptor species.

Direct impacts to raptors could also result from the installation of electrical power transmission and distribution lines in areas where raptors nest or forage. The presence of distribution lines [69 kV or less] represents more of a danger to raptors than transmission lines (greater than 69 kV), because the spacing between elements in distribution lines is much less than that of transmission lines. This increases the chance of phase-to-phase or phase-to-ground contact because the conductors are closer together than the wingspan of many raptor species, thus allowing the bird species to contact both elements at once causing electrocution (Avian Power Line Interaction Committee 1996). Increasing the potential for electrocution associated with the installation of distribution and transmission lines in the project area is a potential significant direct impact to raptors.

Based on Dr. Morrison's analysis of the proposed project site, no direct impacts to sensitive bat species are expected to occur as a result of project-related activities. No natural caves were located on site and the few mine adits present did not harbor bats. Additionally, the few natural water sources for bats that exist on site are limited to ephemeral creeks, water troughs, and a few ponds. Foraging habitat for bats is limited to scattered locations of riparian vegetation within some of the valley bottoms. Thus there is no indication that substantial populations of bats occur within the project area and thus no significant impacts to sensitive bat species are expected to occur at the population level.

Aside from the desert tortoise and Mohave ground squirrel described above, for all other animal species that are covered in the Draft WMP, significant adverse impacts are not expected to occur to individuals or to the habitats that support them within the project study area. The proposed project impacts are compatible with the Draft WMP.

5.4.2 Indirect Impacts

The proposed project could potentially result in temporary and permanent indirect impacts to sensitive wildlife species. Temporary indirect impacts could result from dust accumulation on surrounding vegetation, increased ambient noise levels in adjacent plant communities, and use of unnatural lighting during dawn, dusk, or nighttime construction. Dust accumulation on surrounding vegetation and increased ambient noise levels adjacent to construction areas could potentially lead to temporary, indirect impacts to sensitive avian species that may nest in the adjacent plant communities by disrupting their natural breeding patterns. In addition, should construction activities be conducted at night, the use of unnatural lighting could also temporarily indirectly impact sensitive wildlife species adjacent to construction areas by increasing possible detection by predators.

Permanent indirect impacts to sensitive wildlife species resulting from the proposed project could also include (1) habitat fragmentation, where removal of habitat elements result in separation of formerly connected habitat patches, and (2) increased raptor predation on reptiles, songbirds, and small mammals resulting from an increase in perch sites provided by support structures such as transmission line towers. Indirect impacts from habitat fragmentation are not expected to occur due to the relatively small and discontinuous areas of habitat that would be affected by the project. The effect of potentially increased raptor predation on small animals is discussed further below.

Federally Listed Wildlife Species

The proposed project would not indirectly affect California condor, western yellow-billed cuckoo, southwestern willow flycatcher, least Bell's vireo, or California bighorn sheep, because these species are not expected to occur on within the project study area. The proposed project would not indirectly affect bald eagle because suitable habitat (i.e., waterbodies) does not occur within the project study area. Because these federally listed animal species would not be indirectly affected by the proposed project, no avoidance, minimization, or compensatory mitigation measures would be required for these species. Finally, the proposed project would not indirectly affect mountain plover, a species once proposed for listing as threatened by USFWS (proposal subsequently withdrawn), because this species was not detected within the project study area.

Indirect impacts to the desert tortoise could occur as a result of the creation of new roads and modification to existing roads within the upper, steeper sections of Pine Tree and Jawbone canyons and their tributaries and through the creation of laydown areas in both canyons. Indirect impacts to the desert tortoise would be associated with the sediment load deposited into the wash during heavy rain events along the lower, more gently sloped sections of Pine Tree and Jawbone canyons. The increased deposition could impact desert tortoise habitat by covering existing desert tortoise burrows. However, indirect impacts associated with deposition events are likely insignificant as deposition undoubtedly occurs regardless of the increase of new and improved dirt roads. Additional indirect impacts to the desert tortoise could result from vehicle strikes while tortoise are attempting to cross roads. Creating and widening dirt roads could also result in indirect impacts to the desert tortoise through habitat fragmentation. The indirect impacts to desert tortoise have the potential to be significant; however, with implementation of the impact avoidance, minimization, and mitigation measures outlined in Chapter 6.0, the projects indirect affect on desert tortoise would be reduced to a level of insignificance. With the successful implementation of the measures discussed in Chapter 6.0, desert tortoise is not expected to be indirectly adversely affected by the project.

State-Listed Wildlife Species

Indirect impacts to the Mohave ground squirrel could occur as a result of the creation of new roads and modification to existing roads within the upper, steeper sections of Pine Tree and Jawbone canyons and their tributaries and through the creation of laydown areas in both canyons. Indirect impacts to the Mohave ground squirrel would be associated with sediment load deposited into the wash during heavy rain events along the lower, more gently sloped sections of Pine Tree and Jawbone canyons. The increased deposition could impact Mohave ground squirrel habitat by covering existing ground squirrel burrows. However, indirect impacts associated with deposition events are likely insignificant as deposition undoubtedly occurs regardless of the increase of new and improved dirt roads. Additional indirect impacts to the Mohave ground squirrel could result from vehicle strikes while squirrels are attempting to cross roads. Creating and widening dirt roads could also result in significant indirect impacts to the Mohave ground squirrel through habitat fragmentation. The indirect impacts to Mohave ground squirrel have the potential to be significant; however, with the implementation of the impact avoidance, minimization, and mitigation measures outlined in Chapter 6.0, the projects indirect affect would be reduced to a level of insignificance. Additional nonsignificant indirect impacts to the Mohave ground squirrel could occur from increased raptor predation associated with the installation of additional raptor perching sites, including the wind turbines, the 230-kV line, and additional support structures. With the successful implementation of the measures discussed in Chapter 6.0, Mohave ground squirrel is not expected to be indirectly adversely affected by the project.

BLM Sensitive Wildlife Species (and Other Non-listed Species)

No indirect impacts are expected to BLM sensitive wildlife species or other non-listed species. Because Mr. Morrison computed the overall intensity of raptor use within the project area to be low (Appendix F), he concluded that raptors are scarce within the project area, possibly because rodents and other prey do not occur in high abundance onsite. Thus, although the transmission line towers will provide additional perch sites along the transmission route, this is not expected to significantly adversely affect small prey in the area because alternative natural perch sites occur in the area and the increase in new perch sites is not substantial.

CHAPTER 6.0
AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Because the project will affect state-jurisdictional wetlands and waters, a Streambed Alteration Agreement will need to be approved by CDFG before project implementation.

Because the proposed project may affect both federally and state-listed desert tortoise, and the state-listed Mohave ground squirrel, incidental take permits will need to be secured from USFWS and CDFG before construction of the project.

Under the federal ESA, *take* (defined as hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill) of listed species is prohibited unless authorized by USFWS. Although the project design would minimize impacts to listed species, the project has the potential to affect a listed species, desert tortoise. Therefore, it is suggested by EDAW that LADWP consult with USFWS through BLM, pursuant to Section 7 of the ESA to determine if the project would jeopardize the continued existence of the species.

The California ESA parallels the federal ESA. CDFG has regulatory authority over state-listed threatened or endangered species. The state legislature encourages cooperative and simultaneous findings between state and federal agencies. Further, the general counsel for CDFG has issued a memorandum to CDFG regional managers and division chiefs clarifying the consultation process under the state ESA. Specifically, the memorandum states that if a federal Biological Opinion (BO) is issued by USFWS for the take of a sensitive species, CDFG must use the BO in lieu of its own findings unless it is inconsistent with the state ESA. If the BO were determined to be inconsistent with the state's ESA then the state would issue a take permit under Section 2081 of the California Fish and Game Code.

6.1 IMPACT AVOIDANCE AND MINIMIZATION

The following is a list of general impact avoidance and minimization measures that would apply to all construction-related activities during the construction phase of the project. These measures are standard practices designed to prevent environmental degradation during this period. LADWP will ensure implementation of these measures in order to avoid and minimize impacts to the greatest extent feasible.

- The construction crew and any contractor(s) should be informed about the biological constraints of the project. All construction personnel who work on the project site should attend a contractor education program, presented by a project biologist. The construction crews and contractor(s) should be responsible for unauthorized impacts from construction activities to sensitive biological resources that are outside the areas ultimately approved for impacts by the County of Kern and the resource agencies.

- Construction crews and contractors should be responsible for working around all shrubs and trees within the construction zone to the extent feasible. Particular avoidance should be applied to Joshua trees and riparian trees (i.e., cottonwoods and willows). Shrubs and trees should be flagged to indicate top priority for avoidance.

- The anticipated impact zones, including staging areas, equipment access, and disposal or temporary placement of spoils, should be delineated with stakes and flagging prior to construction to avoid natural resources where possible. Construction-related activities outside of the impact zone should be avoided.

- New and existing roads that are planned for either construction or widening should not extend beyond the planned impact area. All vehicles passing or turning around should do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads or the construction zone, the route should be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.

- Spoils should be stockpiled in disturbed areas or other designated areas. Stockpile areas should be marked to define the limits where stockpiling can occur. Top soil shall be segregated from the other stockpiled material on federals and shall be applied as the top soil layer to assist revegetation.

- Best Management Practices (BMPs) should be employed to prevent further loss of habitat due to erosion caused by project-related impacts (i.e., grading or clearing for new roads). All detected erosion should be remedied within 2 days of discovery.

- Fueling of equipment should take place within existing paved roads, and not within or adjacent to drainages or native desert habitats. Contractor equipment should be checked for leaks prior to operation and repaired as necessary.

6.2 PROJECT-SPECIFIC MITIGATION

6.2.1 Sensitive Vegetation Communities

Mitigation for permanent wetland impacts generally ranges between 1:1 to 3:1, with 1:1 often required for impacts to herbaceous-dominated wetlands, 2:1 required for impacts to wetlands dominated by shrubs, and 3:1 required for impacts to forested wetlands or woodlands. Mitigation for permanent wetland impacts is generally met by a combination of wetland creation, restoration or enhancement, and preservation at a suitable area near the impact area. Based on the ratios noted above, anticipated mitigation for the project's permanent impacts to wetlands is provided in Table 7.

Table 7
Anticipated Mitigation for Permanent Impacts to Sensitive Wetland Vegetation Communities in the Pine Tree Wind Development Project Area

Sensitive Vegetation	Total Permanent Impact Acreage	Mitigation Ratio	Total Mitigation Acreage
Mojave desert wash scrub	1.68	--[1]	--[2]
Southern riparian scrub	0	--[1]	--[2]
Mojave riparian forest	0.28	--[1]	--[2]
Total	**1.96**		

[1] These ratios will be determined in consultation with CDFG.
[2] These acreages will be determined in consultation with CDFG.

Mitigation for a project's temporary impacts to wetlands is generally met by restoring the wetland habitats in-place.

A total of 17.37 acres of wetlands would be temporarily affected during project construction (Table 5). A portion of this impact (2.61 acres) would occur along the temporary construction road that will be needed in Jawbone Canyon in Section 2 within the project area (Figure 4). The remainder of the temporary impact (14.37 acres) would occur at the two laydown areas in Jawbone Canyon (Section 36) and at Pine Tree Canyon where the 230 kV transmission line is proposed (0.39 acre) (Section 21).

Mitigation for impacts to wetland and riparian vegetation communities and state-jurisdictional waters would be finalized as part of the Streambed Alteration Agreement. A detailed wetland mitigation plan will be prepared for submittal with the Streambed Alteration Agreement package. This plan will describe the on-site restoration that will be required along the construction access road in Section 2, at the two laydown areas in Jawbone Canyon, and at the proposed 230 kV transmission line in Pine Tree Canyon. In addition, wetland creation, enhancement or restoration, and preservation within a 4.20-acre area at a location approved by the CDFG will also be described. Funding for the long-term management of the land preserved will also be required. The location of the preserved land and the management program would be negotiated between the resource agencies and LADWP.

Mitigation for impacts to the sensitive Joshua tree woodland vegetation community (1.11 acres) would be through either preservation, salvage, or restoration of existing habitat. Mitigation for impacts to individual Joshua trees is 5:1 or at a replacement or salvage ratio determined through consultation with CDFG. CDFG would also need to approve where the mitigation is to occur and whether preservation, salvage, or restoration is the preferred method to mitigate for project impacts.

Of the project's 105.60 acres of temporary impacts to vegetation, 17.37 acres is comprised of wetland habitats for which mitigation was addressed above. For the remaining 88.23 acres of temporary impacts to native scrubs and chaparral, grasslands, woodlands, and ecotones, potential indirect impacts from exotic species introductions can be minimized by application of an approved native seed mix in the bare areas after construction is complete. This measure would increase the rate of native regeneration and decrease the potential for the invasion of exotic weeds. This combined benefit would decrease the degree of potential impact to below the level of significance. The native seed mix should be approved by the CDFG and BLM, and dispersed in the fall, prior to winter rains.

Mitigation for the potentially significant indirect impacts that could occur within the 15 WE Districts if state-jurisdictional wetlands or Joshua trees are affected would include additional mitigation as described above for these sensitive resources.

6.2.2 Sensitive Plants

Because no state or federally listed plant species would be affected by the project, no avoidance, minimization, or compensatory mitigation measures would be required for such species for the proposed project.

No direct or indirect impacts to special status plants are expected to occur from project construction or operation; therefore, no mitigation measures are required. However, Joshua trees are considered a species that should be protected by CDFG, thus mitigation at a 5:1 ratio or at a replacement or salvage ratio determined through consultation with CDFG is required for each individual impacted by the project.

6.2.3 Sensitive Wildlife

Anticipated mitigation requirements for the project's permanent impacts to habitats occupied, or presumed occupied for listed wildlife species (desert tortoise and Mohave ground squirrel) are outlined in Table 8. Mitigation for permanent impacts to these species is generally met by conservation of in-kind habitat of equal or greater value than impacted.

Table 8
Anticipated Mitigation for Permanent Impacts to Habitats for Listed Wildlife Species in the Pine Tree Wind Development Project Area

Listed Species	Total Permanent Impact Acreage[1]	Mitigation Ratio	Total Mitigation Acreage
Desert Tortoise and Mohave Ground Squirrel	8.55	--[2]	--[2]
Mohave Ground Squirrel Only	1.00	--[3]	--[3]
Total	9.55		

[1] The temporary and permanent impacts noted above are exclusive of each other.
[2] These ratios and acreages will be determined in consultation with CDFG and USFWS.
[3] These ratios and acreages will be determined in consultation with CDFG.

Mitigation for a project's temporary impacts to habitat for listed wildlife is generally met by restoring the habitat in-place and through on-site monitoring of construction activities in all areas with the potential to support the species.

Additional discussion of the mitigation required for desert tortoise and Mohave ground squirrel, as well as mitigation for other sensitive wildlife is presented below.

Desert Tortoise

Mitigation for impacts to the desert tortoise and its habitat would include a two-phased approach. First, to avoid or minimize impacts to the desert tortoise within suitable desert tortoise habitat, on-site monitoring of construction activities in all areas with the potential to support the desert tortoise would be required. Generally, a qualified biologist with extensive knowledge and experience with desert tortoise is required to monitor construction activities. Resource agencies would require the monitoring biologist to have a handling permit that allows for desert tortoise relocation and burrow construction, if required. Because active tortoise burrows would be avoided to the extent feasible through project design features, the monitoring biologist would only handle a desert tortoise if a tortoise or an active burrow were discovered within the impact area. In this situation, the tortoise would be removed from the burrow and placed into an existing burrow outside of the area of impact. If no existing burrows are located, the monitoring biologist would construct a new burrow and place the tortoise inside. To summarize, the monitoring biologist's duties would include:

- Preconstruction tortoise clearance surveys within the impact area
- Implementation of a preconstruction contractor education program
- Relocation of any desert tortoise located within the impact area to a location within 100 feet from the impact area and monitor the individual daily for one week.
- Burrow construction, if needed
- Preparation of construction monitoring and desert tortoise relocation reports provided to USFWS, CDFG, and other applicable resource agencies

In addition to the measures discussed above, mitigation for direct permanent impacts to 8.55 acres of potential desert tortoise habitat would include conservation of habitat with the potential to support desert tortoise, such as creosote bush scrub and rabbitbrush scrub, at a 3:1 ratio (Table 8). Based on the BLM/FWS MOU, disturbance of more than 2 acres of desert tortoise habitat requires consultation under Section 7 of the Endangered Species Act. As the project impacts are above the 2-acre threshold for disturbance, consultation for this project will be required. Habitat conservation generally consists of the off-site purchase of in-kind habitat of equal or greater value than that impacted. Funding for the long-term management of the land preserved will also be required. The location of the preserved land and the management program would be negotiated between the resource agencies and LADWP.

Mitigation requirements for temporary direct impacts of approximately 5.89 acres to desert tortoise habitat are generally met by restoring the habitat in-place and through on-site monitoring of construction activities in all areas with the potential to support the species. Temporary direct impacts to desert tortoise habitat, such as creosote bush scrub, would be minimized to a level of insignificance by application of a native seed mix approved by the resource agencies in the disturbed areas after construction is complete.

Also, indirect impacts from vehicle strikes are minimized by employee education on the proper procedures upon encountering desert tortoises on roads, by maintaining safe speed limits on access/patrol roads, and by prohibiting travel off the established roadways.

Mohave Ground Squirrel

As noted above, impacts to potential Mojave ground squirrel habitat would require mitigation. To compensate for the potential direct permanent loss of 16.82 acres of Mohave ground squirrel habitat, preservation of land at a specified ratio (3:1 presumed) would be required at a location approved by CDFG and LADWP. Funding for the long-term management of the land preserved would also be required (on a per-acre of impact basis).

Secondly, as with desert tortoise, to help avoid and minimize impacts to the species, a biological monitor should be on-site during all construction activities in potential Mohave ground squirrel habitat. The biological monitor should conduct a Mohave ground squirrel education program for all persons working on the project. Trash and food items should be removed from the project site daily and disposed of properly to avoid attracting ravens, a common predator of the Mohave ground squirrel. During construction activities, monthly and final compliance reports should be provided to CDFG and other applicable resource agencies documenting the effectiveness of mitigation measures and the level of take associated with this project.

Mitigation requirements for temporary direct impacts to Mohave ground squirrel habitat are generally met by restoring the habitat in-place and through on-site monitoring of construction activities in all areas with the potential to support the species. A total of 12.60 acres of Mohave ground squirrel habitat is proposed for temporary impacts, 5.89 acres of which is also desert tortoise habitat and will be mitigated for accordingly as described above. The remaining 6.71 acres of temporary impacts occur in habitat designated specifically for Mohave ground squirrel and will be mitigated by in-place habitat restoration. The in-place habitat restoration would consist of applying a native seed mix approved by CDFG and BLM of the specified habitat type in the disturbed areas after construction is complete.

Also, indirect impacts from vehicle strikes are minimized by employee education on the proper procedures for operating vehicles on the site, including using proper vigilance to avoid wildlife, maintaining safe speed limits on access/patrol roads, and by prohibiting travel off the established roadways.

Raptors

Raptors, including several sensitive raptor species, have the potential to occur within the project area. Potential direct impacts to raptor species could occur as a result of collisions with turbine blades or from electrocution from the transmission lines. Based on the data presented in Dr. Michael Morrison's avian risk assessment report (Appendix F), approximately 0.04 raptors would be killed per turbine per year as a result of collisions with the rotating turbine blades. Because this impact is not considered significant, no additional avoidance, minimization, or mitigation measures would be required for impacts associated with avian mortality associated with turbine collisions.

However, because raptors like to perch and, in some cases, nest on transmission lines and power poles, potential direct impacts from electrocution could occur. Mitigation measures to minimize impacts to raptor species, such as perch guards, separation of wires, line insulators, and monopole towers would be incorporated into project design features associated with the overhead electrical power lines and other transmission facilities.

Also, if lighting is used for aircraft safety purposes, lights should be placed where practicable on meteorological towers, or lights should be placed on towers with the least potential to attract birds, but consistent with FAA lighting requirements.

CHAPTER 7.0
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CHAPTER 8.0
LIST OF PREPARERS

Thom Ryan	Project Manager
Paula Jacks	Biology Task Manager
Erik LaCoste	Wildlife Biologist
Marc Doalson	Botanist
Danielle Tannourji	Botanist
Melissa Wilson	Wildlife Biologist
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John Messina	Botanist
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Mark Tucker	Wetland Specialist
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Therese Tempereau	Technical Editor
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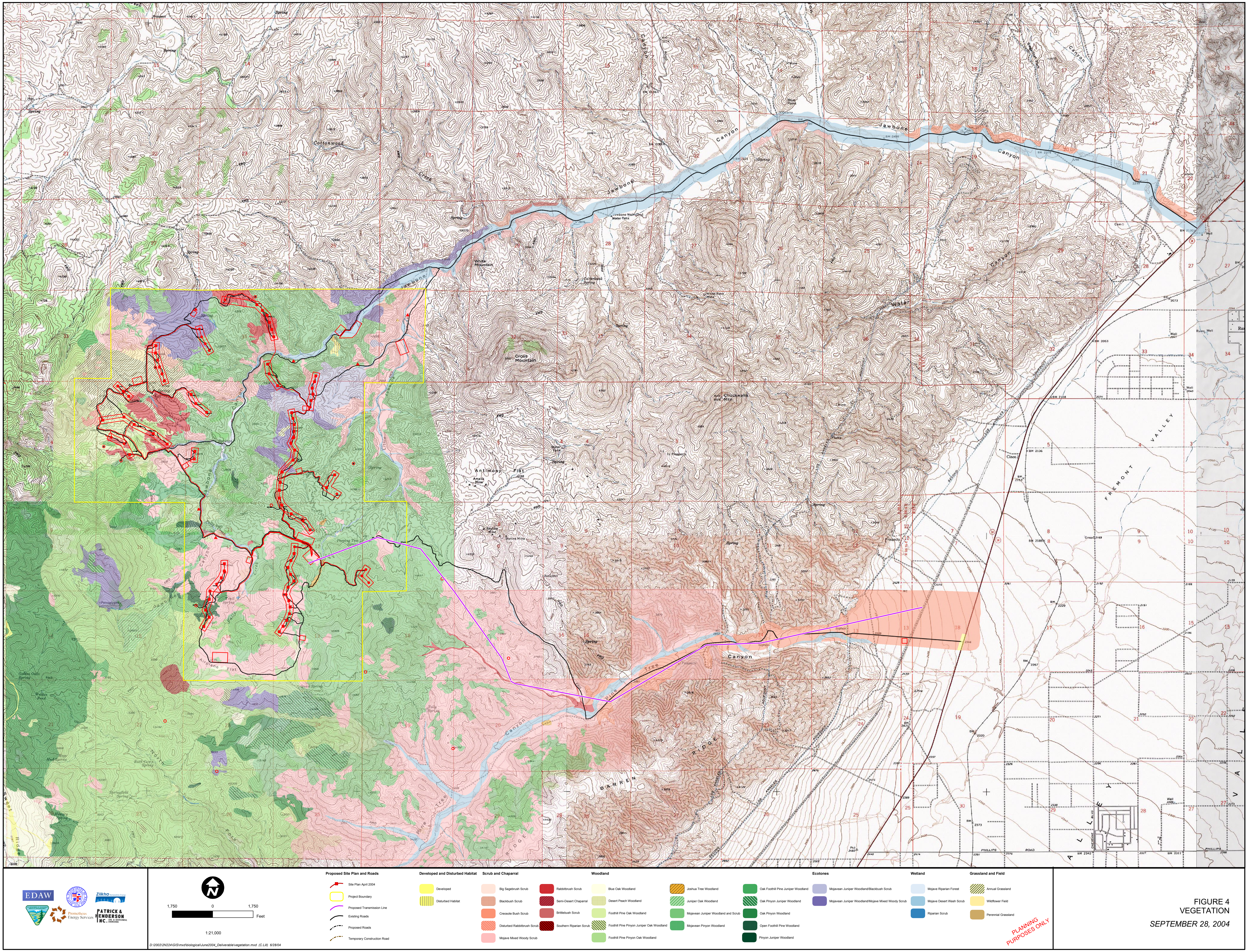

FIGURE 4
VEGETATION

SEPTEMBER 28, 2004

APPENDIX A
USFWS LETTER – APRIL 24, 2003

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

In Reply, Refer to: 358.379.448

April 24, 2003

Thomas C. Ryan
Senior Project Manager
EDAW Inc.
2737 Campus Drive
Irvine, California 92612

Subject: Species List for Pine Tree Wind Development, U.S. Geological Survey Quadrangles: Cinco, Cross Mountain, Mojave NE, and Cache Peak, Kern County, California

Dear Mr. Ryan:

This letter is in response to your request, dated March 31, 2003, and received by us on April 2, 2003, for information on federally listed, proposed, or candidate species which may be present in or around the following 7.5-minute U.S. Geological Survey quadrangle maps: Cinco, Cross Mountain, Mojave NE, and Cache Peak, Kern County, California.

Wind Turbine Prometheus, LLC (WTP) and Los Angeles Department of Water and Power (LADWP) are proposing to develop a wind energy project and related facilities in the vicinity of Pine Tree and Jaw Bone Canyons, approximately 12 miles north of Mojave, California. The project would entail the construction of approximately 80 wind turbines capable of generating a total of 120 megawatts of power, new and upgraded access roads, collector lines, and a 230 kV transmission line. There would also be construction staging areas, electrical substations, and appurtenant facilities. The Bureau of Land Management (BLM) would be the lead federal agency for this project, and would assume responsibility under section 7 of the Endangered Species Act of 1973, as amended (Act).

The enclosed list of species fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Act. The BLM, as the lead agency for the project, has the responsibility to review its proposed activities and determine whether any listed species may be affected. If the project is a construction project[1/] which may require an environmental impact

1/ "Construction project" means any major Federal action which significantly affects the quality of the human environment designed primarily to result in the building of structures such as dams, buildings, roads, pipelines, and channels. This includes Federal actions such as permits, grants, licenses, or other forms of Federal authorizations or approval which may result in construction.

statement, the BLM has the responsibility to prepare a biological assessment to make a determination of the effects of the action on the listed species or critical habitat. If the BLM determines that a listed species or critical habitat is likely to be adversely affected, it should request, in writing through our office, formal consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to threatened or endangered species or their critical habitat prior to a written request for formal consultation. During this review process, the BLM may engage in planning efforts but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act.

Federal agencies are required to confer with the Service, pursuant to section 7(a)(4) of the Act, when an agency action is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 CFR 402.10(a)). A request for formal conference must be in writing and should include the same information that would be provided for a request for formal consultation. Conferences can also include discussions between the Service and the Federal agency to identify and resolve potential conflicts between an action and proposed species or proposed critical habitat early in the decision-making process. The Service recommends ways to minimize or avoid adverse effects of the action. These recommendations are advisory because the jeopardy prohibition of section 7(a)(2) of the Act does not apply until the species is listed or the proposed critical habitat is designated. The conference process fulfills the need to inform Federal agencies of possible steps that an agency might take at an early stage to adjust its actions to avoid jeopardizing a proposed species.

The Migratory Bird Treaty Act (16 U.S.C. 703-712) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the Act has no provision for allowing unauthorized take, it must be recognized that some birds may be killed at structures such as communications towers even if all reasonable measures to avoid it are implemented. The Service's Division of Law Enforcement carries out its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals and industries that proactively seek to eliminate their impacts on migratory birds. While it is not possible under the Act to absolve individuals or companies from liability if they follow these recommended guidelines, the Division of Law Enforcement and Department of Justice have used enforcement and prosecutorial discretion in the past regarding individuals or companies who have made good faith efforts to avoid the take of migratory birds.

Candidate species are those species presently under review by the Service for consideration for federal listing. Candidate species should be considered in the planning process because they may become listed or proposed for listing prior to project completion. Preparation of a biological assessment, as described in section 7(c) of the Act, is not required for candidate species. If early evaluation of your project indicates that it is likely to affect a candidate species, you may wish to request technical assistance from this office.

The take of candidate species is not prohibited by the Act, however, we encourage you to consider their conservation in your planning process in the event they are listed prior to project completion. For information on other species of concern that may occur in the project area, the Service recommends that you review information in the California Department of Fish and Game's (CDFG) Natural Diversity Database and that you contact CDFG at (916)324-3812.

If you have any questions, please contact Robert McMorran of my staff at (805) 644-1766.

Sincerely,

Judy Holman

Judy Holman
Division Chief
Mojave/Great Basin Desert

cc: Robert Parker, BLM, Ridgecrest
Larry Farrington, FWS, Torrance

Enclosure

ENDANGERED, THREATENED, AND PROPOSED SPECIES THAT MAY OCCUR IN OR AROUND CINCO, CROSS MOUNTAIN, MOJAVE NE, AND CACHE PEAK QUADRANGLES KERN COUNTY, CALIFORNIA

Birds		
Yellow billed cuckoo	*Coccyzus americanus*	C
Southwestern willow flycatcher	*Empidonax traillii extimus*	E
California condor	*Gymnogyps californianus*	E
Least Bell's vireo	*Vireo bellii pusillus*	E
Mountain plover	*Charadrius montanus*	PT
Reptile		
Desert tortoise	*Gopherus agassizii*	T
Plants		
Hoover's wooly-star	*Eriastrum hooveri*	T
Kelso Creek monkeyflower	*Mimulus shevockii*	PE

Key:

E Endangered
T Threatened
PT Taxa proposed for listing as threatened
PE Taxa proposed for listing as endangered
C Candidate species for which the Fish and Wildlife Service has on file sufficient information on the biological vulnerability and threats to support proposals to list as endangered or threatened.

APPENDIX B
GENERAL PLANT SPECIES LIST
FOR THE
PINE TREE WIND DEVELOPMENT PROJECT STUDY AREA

APPENDIX B
General Plant Species List for the Pine Tree Wind Development Project Study Area

Scientific Name	Common Name
Dicotyledoneae	
Anacardiaceae - Sumac Family	
Rhus trilobata	squaw bush
Apiaceae - Carrot Family	
Lomatium mohavense	desert parsley
Asclepiadaceae - Milkweed Family	
Asclepias fascicularis	narrow-leaved milkweed
Asteraceae - Sunflower family	
Artemisia tridentata	Great Basin sage
Baccharis salicifolia	mule fat
Baccharis sergiloides	desert baccharis
Chaenactis glabriuscula	yellow pincushion
Chrysothamnus nauseosus ssp. *Mohavensis*	rubber rabbitbush
Coreopsis bigelovii	tickseed
Coreopsis californica	California coreopsis
Ericameria cooperi	cooper goldenbush
Ericameria linearifolia	linear-leafed goldenbush
Eriophyllum confertiflorum	golden yarrow
Eriophyllum pringlei	woolly eriophyllum
Eriophyllum wallacei	Wallace's eriophyllum
Gutierrezia microcephala	desert matchweed
Lepidospartum squamatum	scale broom
Tetradymia sp.	horsebrush
Senecio flaccidus	groundsel
Uropappus lindleyi	silver puff
Xylorhiza tortifolia	desert-aster
Boraginaceae - Borage Family	
Amsinckia tessellate	fiddleneck
Cryptantha pterocarya	forget-me-not
Brassicaceae - Mustard Family	
Arabis pulchra	rock cress
Caulanthus cooperi	jewel flower
Erysimum capitatum	western wallflower
Lepidium fremontii	desert alyssum
Stanleya pinnata	prince's plume
Cactaceae - Cactus Family	
Opuntia basilaris	beavertail cactus
Opuntia echinocarpa	silver cholla
Capparaceae - Caper Family	
Isomeris arborea	bladder pod
Chenopodiaceae - Goosefoot Family	
Grayia spinosa	hop sage
Cuscutaceae – Dodder Family	
Cuscuta sp.	dodder
Ericaceae - Heath Family	
Arctostaphylos glauca	bigberry manzanita
Euphorbiaceae - Spurge Family	
Chamaesyce albomarginata	rattlesnake weed
Fabaceae - Legume Family	
Astragalus lentiginosus	Loco weed
Lupinus excubitus	adonis lupine

Scientific Name	Common Name
Psorothamnus arborescens var. *minutifolius*	indigo bush
Fagaceae - Oak Family	
Quercus douglasii	blue oak
Quercus dumosa	Nuttall's scrub oak
Quercus wislizeni	interior live oak
Hydrophyllaceae - Waterleaf Family	
Emmenanthe penduliflora	whispering bells
Phacelia cryptantha	lacy phacelia
Phacelia fremontii	Fermont's phacelia
Lamiaceae - Mint Family	
Salazaria mexicana	paper bag bush
Salvia columbariae	chia
Salvia dorrii	blue sage
Loasaceae - Loasa Family	
Mentzelia albicaulis	comet blazing star
Malvaceae - Mallow Family	
Sphaeralcea ambigua	apricot mallow
Nyctaginaceae - Four o'clock Family	
Mirabilis sp.	four o'clock
Oleaceae	
Fraxinus dipetala	California Ash
Onagraceae - Evening Primrose Family	
Camissonia californica	mustard-like primrose
Camissonia claviformis	brown-eyed primrose
Camissonia palmeri	desert sun cups
Camissonia boothii	woody bottlewasher
Epilobium canum	California fuchsia
Orobanchaceae - Broom Rape Family	
Orobanche sp.	broom rape
Papaveraceae - Poppy Family	
Argemone corymbosa	prickly poppy
Eschscholzia californica	California poppy
Eschscholzia minutiflora	little gold poppy
Platystemon californicus	cream cups
Polemoniaceae - Phlox Family	
Gilia capitata ssp. *abrotanifolia*	globe gilia
Gilia latiflora ssp. *davyi*	Davy's gilia
Linanthus dichotomus	evening snow
Linanthus parryae	parry gilia
Loeseliastrum matthewsii	desert calico
Polygonaceae - Milkwort Family	
Centrostegia thurberi	Thurber's spineflower
Eriogonum deflexum	skeleton weed
Eriogonum fasciculatum ssp. *polifolium*	California buckwheat
Eriogonum inflatum	desert trumpet
Eriogonum kennedyi var. *pinicola*	Kern buckwheat
Eriogonum nudum	naked buckwheat
Eriogonum pusillum	yellow turban
Portulaceae - Purslane Family	
Calyptridium monandrum	sand cress
Claytonia perfoliata	miner's lettuce
Lewisia sp.	Lewisia

Scientific Name	Common Name
Ranunculaceae - Buttercup Family	
Delphinium parishii	Parish's larkspur
Rhamnaceae - Buckthorn Family	
Rhamnus ilicifolia	holly-leaf redberry
Rosaceae - Rose Family	
Cercocarpus sp.	mountain mahogany
Coleogyne ramosissima	blackbush
Prunus andersonii	desert peach
Purshia tridentata	antelope bush
Rubiaceae - Madder Family	
Galium stellatum	bedstraw
Salicaceae - Willow Family	
Populus fremontii ssp. *fremontii*	western cottonwood
Scrophulariaceae - Figwort Family	
Castilleja foliolosa	woolly paintbrush
Mimulus guttatus	monkeyflower
Penstemon centranthifolius	scarlet burglar
Viscaceae - Mistletoe Family	
Phoradendron sp.	mistletoe
Zygophyllaceae - Caltrop Family	
Larrea tridentata	creosote bush
Gymnosperm	
Cupressaceae - Cypress Family	
Juniperus californica	California juniper
Ephedraceae - Ephedra Family	
Ephedra nevadensis	mormon tea
Pinaceae - Pine Family	
Pinus sabiniana	foothill pine
Pinus monophylla	single leaf pinyon pine
Monocotyledoneae	
Liliaceae - Lily Family	
Allium burlewii	Berlew's onion
Allium campanulatum	sierra onion
Allium fimbriatum var. *fimbriatum*	fringed onion
Bloomeria crocea	golden stars
Calochortus kennedyi	desert mariposa
Calochortus venustus	white mariposa
Dichelostemma capitatum	blue dicks
Muilla coronata	crowned muilla
Yucca brevifolia	Joshua tree
Yucca schidigera	Mojave yucca
Yucca whipplei	Our Lord's candle
Poaceae - Grass Family	
Bromus madritensis ssp. *rubens*	foxtail chess
Nasella pulchra	purple-needle grass

*Indicates a nonnative species

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APPENDIX C
GENERAL WILDLIFE SPECIES LIST
FOR THE
PINE TREE WIND DEVELOPMENT PROJECT STUDY AREA

APPENDIX C
General Wildlife Species List for the Pine Tree Wind Development Project Study Area

Scientific Names	Common Names
Insects	
Order Coleoptera	Beetles
Family Tenebrionidae	
Eleodes dentipes	Dentate stink beetle
Order Hymenoptera	Ants, bees, wasps
Family Formidae	
Pogonomyrmex californicus	Harvester ant
Order Lepidoptera	Butterflies
Family Deinaidae	
Danaus gilippus strigosus	Striated queen
Family Hesperioidea	
Erynnis funeralis	Funereal duskywing
Family Lycaenidae	
Atlides halesus	Great purple hairstreak
Brephidium exile	Pygmy blue
Family Nymphalidae	
Chlosyne acastus neumoegenii	Sagebrush checkerspot
Limenitis lorquini	Lorquin's admiral
Nymphalis californica	California tortoiseshell
Vanessa cardui	Painted lady
Family Pieridae	
Anthocharis centhura	Felder's orangetip
Pontia protodice	Common white
Family Sphingidae	
Hyles lineata	Sphinx moth
Birds	
Order Apodiformes	Swifts and Hummingbirds
Family Apodidae	
Aeronautes saxatalis	White-throated swift
Order Charadriiformes	Shorebirds and Relatives
Family Charidriidae	
Charadrious vociferous	Killdeer
Family Scolopacidae	
Numenius phaeopus	Whimbrel
Order Ciconiiformes	New World Vultures
Family Cathartidae	
Cathartes aura	Turkey vulture
Order Columbiformes	Doves and Pigeons
Family Columbridae	
Zenaida macroura	Mourning dove
Order Cuculiformes	Cuckoos, Roadrunners, and Anis
Family Cuculidae	
Geococcyx californianus	Greater roadrunner
Order Falconiformes	Hawks and Allies
Family Acciptridae	
*Aquila chrysaetos**	Golden eagle*
Buteo jamaicensis	Red-tailed hawk
Family Falconidae	
Falco sparverius	American kestrel
*Circus cyaneus**	Northern harrier*

Scientific Names	Common Names
Order Galiformes	Fowls and Relatives
Family Odontophoridae	
Callipepla californica	California quail
Oreortyx pictus	Mountain quail
Family Cracidae	
Alectoris chukar	Chukar
Order Passeriformes	Perching Birds
Family Aegithalidae	
Psaltriparus minimus	Bushtit
Family Corvidae	
Aphelocoma californica	Scrub jay
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
Cyanocitta stelleri	Steller’s jay
Gymnorhinus cyanocephalus	Pinyon jay
Family Emberzidae	
Amphispiza belli	Sage sparrow
Amphispiza bilineata	Black throated sparrow
Chondestes grammacus	Lark sparrow
Junco hyemalis	Dark-eyed junco
Melospizq melodia	Song sparrow
Pipilo crissalis	California towhee
Pipilo maculatus	Spotted towhee
Zonotrichia leucophrys	White-crowned sparrow
Zonotrichia atricapilla	Golden-crowned sparrow
Family Fringillidae	
Carduelis lawrenci	Lawrence’s goldfinch
Carpodacus mexicanus	House finch
Family Hirundinidae	
Petrochelidon pyrrhonota	Cliff swallow
Tachycineta thalassina	Violet green swallow
Family Icteridae	
Agelaius phoeniceus	Red-winged blackbird
Eremophila alpestris actia	California horned lark
Euphagus cyanocephalus	Brewer’s blackbird
Icterus bullockii	Bullock’s oriole
Icterus parisorum	Scott’s oriole
Molothrus ater	Brown-headed cowbird
Sturnella neglecta	Western meadowlark
Family Laniidae	
*Lanius ludovicianus**	Loggerhead shrike*
Family Mimidae	
Mimus polyglottos	Northern mockingbird
Toxostoma lecontei	Le Conte’s thrasher
Family Paridae	
Parus inornatus	Oak titmouse
Poecile gambeli	Mountain chickadee
Family Parulidae	
Dendroica coronata	Yellow-rumped warbler
Dendroica occidentalis	Hermit warbler
Dendroica nigrescens	Black-throated gray warbler
Oporornis tolmiei	MacGillivray’s warbler
Vermivora celata	Orange-crowned warbler
Wilsonia pusilla	Wilson’s warbler

Scientific Names	Common Names
Family Ptilogonatidae	
Phainopepla nitens	Phainopepla
Family Regulidae	
Regulus calendula	Ruby-crowned kinglet
Family Sittidae	
Sitta carolinensis	White-breasted nuthatch
Family Sturnidae	
Sturnus vulgaris	European starling
Family Sylviidae	
Polioptila caerulea	Blue gray gnatcatcher
Family Troglodytidae	
Catherpes mexicanus	Canyon wren
Salpinctes obsoletus	Rock wren
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	House wren
Family Turididae	
Sialia currucoides	Mountain bluebird
Sialia mexicana	Western bluebird
Turdus migratorius	American robin
Family Tyrannidae	
Myiarchus cinerascens	Ash-throated flycatcher
Sayornis nigricans	Black phoebe
Tyrannus verticalis	Western Kingbird
Order Picformes	Woodpeckers and Allies
Family Picidae	
Colaptes auratus	Northern flicker
Melanerpes formicivorus	Acorn woodpecker
Picoides scalaris	Ladder-backed woodpecker
Order Strigiformes	Owls
Family Strigidae	
Asio flammeus	Short-eared owl
Reptiles	
Order Chelonia	Turtles and Tortoises
Family Testudinidae	
*Gopherus agassizii**	Desert tortoise*
Order Squamata	Lizards and Snakes
Family Colubridae	
Diadophus punctuatis	Ringneck snake
Lampropeltis getulus	Common kingsnake
Masticophis bilineatus	Sonoran whipsnake
Masticophis flagellum piceus	Red coachwhip
Pituophis melanoleucus deserticola	Great basin gopher snake
Thamnophis elegans	Western terrestrial garter snake
Family Iguanidae	
Callisaurus draconoides	Zebra-tailed lizard
Gambelia wislizenii	Long-nosed leopard lizard
Phrynosoma platyrhinos	Desert horned lizard
Sauromalus obesus	Chuckwalla
Sceloporus occidentalis	Western fence lizard
Uta stanburiana	Side-blotched lizard
Family Teiidae	
Cnemidophorus tigris multiscutatus	Coastal western whiptail
Cnemidophorus tigris tigris	Great basin whiptail

Scientific Names	Common Names
Amphibians	
Order Anura	Frogs and Toads
Family Bufonidae	
Bufo boreas	Western toad
Family Hylidae	
Pseudacris triseriata	Chorus frog
Mammals	
Order Artiodactyla	Even-toed Ungulates
Family Bovidae	
Bos taurus	Domestic cow
Family Cervidae	
Cervus elaphus nannodes	Tule elk
Odocoileus hemionus	Mule deer
Order Carnivora	Carnivores
Family Canidae	
Canis familiaris	Domestic dog
Canis latrans	Coyote
Family Felidae	
Felis concolor	Mountain lion
Lynx rufus	Bobcat
Family Ursidae	
Ursus americanus	American black bear
Order Insectivora	Insectivores
Family Soricidae	
Scapanus latimanus	Broad-footed mole
Order Lagomorpha	Rabbits, Hares, and Pikas
Family Leporidae	
Lepus californicus	Black-tailed jackrabbit
Sylvilagus audubonii	Desert cottontail
Order Rodentia	
Family Geomydiae	
Thomomys bottae	Botta’s pocket gopher
Family Sciuridae	
Ammospermophilus leucurus	White-tailed antelope squirrel
Spermophilus beecheyi	California ground squirrel
Family Muridae	
Neotoma sp.	Woodrat species (nest)

* Indicates sensitive wildlife species

APPENDIX D
ARMY CORPS OF ENGINEERS CORRESPONDENCE LETTER

EDAW

EDAW INC

1420 KETTNER BLVD

SUITE 620

SAN DIEGO CALIFORNIA

92101

TEL 619 233 1454

FAX 619 233 0952

www.edaw.com

June 25, 2003

Aaron Allen, Ph.D.
U.S. Army Corps of Engineers
Los Angeles District
911 Wilshire Boulevard
Los Angeles, California 90017

Re: Army Corps of Engineers Jurisdiction for the Pine Tree Wind Development Project, Kern County, California

Dr. Allen:

The purpose of this letter is to summarize the facts and present our conclusions regarding the jurisdictional status of the drainages within Pine Tree Wind Development Project footprint.

The Los Angeles Department of Water and Power (LADWP) is planning to construct a wind power generation project in eastern Kern County, California. Situated on private and Bureau of Land Management (BLM) land in the Southern Sierra foothills just north of the town of Tehachapi, the project footprint occupies portions of 32 sections (see attached figure). The general terrain of the project area consists of moderate to steep, hilly topography ranging from approximately 2,500-feet to 5,600-feet.

Several predominantly ephemeral drainages within the project footprint would be impacted by the discharge of dredge and fill material. While the majority of the drainages are ephemeral washes, there are approximately 4 intermittent stretches along Jawbone Creek. Drainages within the project area flow into 2 large washes (Jawbone Canyon and Pine Tree Canyon), then east into the Mojave Desert and ultimately into Koehn Lake. Koehn Lake is an inland lake approximately 12 miles north of California City (see attached Figure). Koehn Lake has no distributary or other outlet. There are no docks or marinas in Koehn Lake and neither Koehn Lake nor any of its tributaries are navigable under current conditions. Several salt evaporation ponds exist at the lake. While the salt harvesting ponds may represent a potential interstate commerce nexus, we contend that the lack of navigability of the receiving waterbody (i.e., Koehn Lake) means that the drainages in the project area are isolated and therefore the ACOE does not have jurisdiction.

We are requesting a jurisdictional determination letter from the Corps concurring with our findings. If you have need for additional information, feel free to call me at (619) 233-1454.

Sincerely,

Mark Tucker
Senior Wetland Ecologist

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
VENTURA FIELD OFFICE
2151 ALESSANDRO DRIVE, SUITE 110
VENTURA, CALIFORNIA 93001

July 22, 2003

REPLY TO
ATTENTION OF:

Office of the Chief
Regulatory Branch

City of Los Angeles
Department of Water and Power
c/o EDAW
Attention: Mark Tucker
2737 Campus Drive
Irvine, California 92612

Dear Mr. Tucker:

Reference is made to your letter (No. 2003-01320-AOA) dated July 10, 2003 for a Department of the Army Permit to construct a wind power generation project, including approximately 80 wind turbines and associated access roads, in several unnamed tributaries to Koehn Dry Lake near the community of Garlock, Kern County, California.

Based on the information furnished in your letter and the Corps independent analysis of the project area, we have determined that Koehn Dry Lake does support active salt ponds, but does not exhibit any evidence of navigation. Using the criteria at 33 CFR Part 328.3, the Corps has determined that Koenig Dry Lake exhibits insufficient evidence of interstate commerce to meet the requirements of 33 CFR Part 328.3(a)(3)(iii) and clearly does not meet the requirements for navigability at 33 CFR Part 328.3(a)(1). Based on the above information and the recent Solid Waste Agency of Northern Cook County Supreme Court decision (No. 99-1178), your proposed project does not discharge dredged or fill material into a water of the United States or an adjacent wetland. Therefore, the project is not subject to our jurisdiction under Section 404 of the Clean Water Act and a Section 404 permit is not required from our office.

Please be aware that our determination does not preclude the need to comply with Section 13260 of the California Water Code (Porter/Cologne) and we recommend that you contact the California Regional Water Quality Control Board to insure compliance with the above regulations. Furthermore, our determination does not obviate the need to obtain other Federal, state, or local authorizations required by law.

I am forwarding copies of this letter to: California State Water Resources Control Board, 1001 I Street, Sacramento, California 95814, Attention: Mr. Oscar Balaguer, Chief, Water Quality Certification. California Regional Water Quality Control Board, Region 6, Lahontan Region, Attention: Mr. Harold J. Singer, 2501 Lake Tahoe Blvd., South Lake Tahoe, California 96150.

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JUL 2 8 2003
EDAW, INC., IRVINE, CA

If you have any questions, please contact Dr. Aaron O. Allen of my staff at (805) 585-2148.

Sincerely,

David J. Castanon

David J. Castanon
Chief, North Coast Section
Regulatory Branch

APPENDIX E
Species Accounts for Federally and State Listed Wildlife Species Relevant to the Project Vicinity

Amphibians

<u>Tehachapi slender salamander</u> – *Batrachoseps stebbinsi*

USFWS Status:	None
CDFG Status:	Threatened
Listing Data:	The Tehachapi slender salamander was State listed as threatened in 1971. In 1999, its status was reported to be unknown by the California Department of Fish and Game.
Distribution:	This species is uncommon in suitable habitat in a small number of isolated localities in the Piute and Tehachapi Mts. of Kern Co., and perhaps in Los Angeles and Ventura cos. Elevation 760 to 1500 m (2500 to 5000 ft).
Habitat:	Preferred habitats include cismontane woodland, valley foothill hardwood-conifer and valley-foothill riparian. This species appears to prefer north-facing talus slopes in valley-foothill hardwood-conifer and valley-foothill riparian habitats
Natural History:	A semifossorial species able to enter termite tunnels, earthworm burrows and other small openings not available to other more robust salamanders. May compete for food resources with juvenile salamanders of other species where their ranges overlap. Primary predators are probably small snakes such as the ringneck snake. Adults and juveniles may also be taken by beetle larvae and other predatory arthropods, diurnal birds (especially those that search through leaf litter) and small mammals.
Comments:	Nocturnal surface activity during moist periods (November to May). Retreats underground or to moist seepages during drier periods. Retreats to subterranean refugia during dry periods.
Status on Site:	Tehachapi salamander was not detected during focused surveys. However, suitable habitat does exist onsite. It may exist in areas not surveyed or outside of the project area.

Reptiles

<u>Mojave desert tortoise</u> **-** *Gopherus agassizii*

USFWS Status:	Threatened
CDFG Status:	Threatened
BLM Status:	Federal Sensitive Species
Listing Data:	The Mojave desert tortoise was listed by the USFWS, with a critical habitat determination, on August 20, 1980 (Federal Register 45 FR 55654). This listing status applies to the entire population of the desert tortoise, except in Arizona south and east of the Colorado River, and in Mexico. A recovery plan for the species has been published (USFWS 1994), along with a revised critical habitat determination (Federal Register

	59 FR 5820). The state listed this species as threatened on August 3, 1989.
Distribution:	The species is widely distributed in the deserts of California, southern Nevada, extreme southwestern Utah, western and southern Arizona, and throughout most of Sonora, Mexico.
Habitat:	Habitat consists of firm but not hard ground, usually soft sandy loams and loamy sands to allow for burrow construction (Karl 1983, Weinstein et al 1986). They have also been found on rocky slopes (Karl 1988). In the Mojave Desert, the tortoise is most often found in association with creosote bush, Joshua tree woodland, and saltbush scrub vegetation communities. They are not found in areas of very cobbly soil, soil too soft to construct a burrow in or in dry lakes (Karl 1983, 1988). The species generally occurs below 4000 feet elevation (Karl 1983, Stebbins 1985).
Natural History:	Desert tortoises are usually most active early March through early June and again between September and early November (Marlow 1979). The species is herbivorous and is most active when plants are available for forage or when pooled water is available for drinking. They typically have home ranges from 11-53ha (1ha=10,000 square meters) and these figures probably underestimate the actual area familiar to the tortoise (Berry 1986). Individuals commonly traverse 450-800m/day within their home range and males have been recorded to travel 1km within their home range. Mojave desert tortoises are also known to disperse extended distances such as 3.1km in 16 days and 7.2km in 15 months (Berry 1986). A desert tortoise matures at approximately 15-18 years of age (Turner et al 1987), and can live 50 to 100 years.
Comments:	This widespread and once common taxon is rapidly declining in numbers due to various factors including the spread of a fatal respiratory disease, increases in raven populations that prey on juvenile tortoises, habitat destruction in the form of off-road vehicle use and development.
Status on Site:	Present onsite. Two individuals were observed within the project area.

Birds

American peregrine falcon **-** *Falco peregrinus anatum*

USFWS Status:	De-listed from Endangered, August 25, 1999
CDFG Status:	Endangered, Fully Protected
Listing Data:	The state listed the subspecies as endangered on June 27, 1971.
Distribution:	American peregrine falcon is distributed throughout North America, South America, Africa, and Australia. This sub-species was eliminated as a breeding resident from much of continental United States during the 1950s but is currently being reintroduced into its historic range (Johnsgard 1988). In San Diego County, this falcon is a rare winter visitor and breeding resident, most commonly observed from October through May (Unitt 1984). During winter peregrine falcons have been observed at the Tijuana River Valley, San Diego Bay, San Diego River Valley, Mission Bay Park, Batiquitos Lagoon, Lake Hodges, San Pasqual Valley,

	San Vicente Reservoir, Mount Israel area, and Sweetwater Reservoir (Ogden 1995). Two pairs of peregrine falcon have recently nested at San Diego Bay (Ogden 1994, Pavelka 1991, Ogden unpublished data).
Habitat:	American peregrines are primarily found near large bodies of water where they feed on waterbirds.
Natural History:	The American peregrine falcon exhibits a strong fidelity for breeding site locations, and will mate for life (Brown and Amadon 1968). Nest sites are usually located on rock ledges, escarpments, or bluffs.
Comments:	American peregrine falcon populations have declined due to pesticide contamination which caused declines in reproductive success because of egg shell thinning (Johnsgard 1988). This species continues to be threatened by pesticide poisoning on wintering grounds, low breeding densities and reproductive isolation, lack of gene flow between populations, and reduced availability of foraging habitats and avian prey (Finch 1992).
Status on Site:	American peregrine falcon was not detected during focused surveys. However, there is a moderate probability due to suitable habitat being present onsite.

<u>Bald eagle</u> **-** *Haliaeetus leucocephalus*

USFWS Status:	Threatened
CDFG Status:	Endangered, Fully Protected.
Listing Data:	The state first listed the species as endangered on June 27, 1971, and revised the listing on October 2, 1980.
Distribution:	The bald eagle breeds from Alaska east across Canada and south to California. Winters are spent along coasts and large rivers in much of the United States. The bald eagle occurs in southern California as a sparse winter visitor, being an occasional visitor at local lakes. Bald eagle occurs in San Diego County as a sparse winter visitor, being most frequent at Lake Henshaw and occasional at other lakes.
Habitat:	The bald eagle inhabits lakes, rivers, marshes and seacoasts.
Natural History:	This bird is primarily a fish eater but also eats carrion and crippled waterfowl.
Comments:	The bald eagle population was severely impacted by hunting, poaching, loss of habitat due to development pressures, as well as the bioaccumulation of pesticides from contaminated prey items.
Status on Site:	Not detected. Bald eagle is not expected to occur onsite due to lack of suitable habitat.

<u>California condor</u> – *Gymnogyps californianus*

USFWS Status:	Endangered
CDFG Status:	Endangered, Fully Protected
Listing Data:	The USFWS listed the California condor as Endangered on March 11, 1967. It was listed as Endangered by the State on June 27, 1971.
Distribution:	Captive-bred condors have been released into the wild in southern California since 1992 - about 18 birds are currently living in the wild

	there. Another population has been started at a sandstone cliff near the Grand Canyon in Arizona. More condors will be released in the west in the future. As of June 1997, there were about 135 California condors- 31 in the wild and over 100 in captive breeding programs. Eighteen of the captive condors are young birds that hatched in 1997 - most will be released when they are old enough to fly.
Habitat:	California condors are found in the arid foothills and mountain ranges of southern and central California. They roost in rocky cliffs or in trees, from the late afternoon until the next mid-morning. As the temperature rises they take flight and catch thermals (updrafts of heated air), which carry them over foothills, grasslands and oak woodlands in search of food.
Natural History:	California condors once ranged along the entire Pacific coast from British Columbia to Baja California. 10,000 year old fossils place them in Texas, Arizona, New Mexico, Florida, and New York. By 1983, there were only 20 condors left in the wild, limited to a few remote areas in Kern, Los Angeles, Santa Barbara, San Luis Obispo, Tulare, and Ventura counties. By 1985, when only 9 wild birds still survived, the remaining birds had to be captured to protect them and try to breed them.
Comments:	The condors decline is most likely primarily a result of human activities. As people settled in the west they often shot, poisoned, captured, and disturbed the condors, collected their eggs, and reduced their food supply of antelope, elk, and other wild animals. Eventually condors could no longer survive in most areas. The remaining condors lived only in the more remote, mountainous areas of southern California, where they fed on dead cattle, sheep, and deer.
Status on Site:	Not detected. California condor is not expected to occur onsite due to lack of appropriate habitat and low population numbers in the wild.

Least Bell's Vireo**-** *Vireo bellii pusillus*

USFWS Status:	Endangered
CDFG Status:	Endangered
Listing Data:	The least Bell’s vireo was listed by the USFWS on May 2, 1986 (Federal Register 51 FR 16482), with a critical habitat listing. This listing status applies to the entire population of least Bell’s vireo. A draft recovery plan has been written by the USFWS and was recently circulated for review. The state listed this subspecies as endangered on October 2, 1980.
Distribution:	Historically this subspecies was a common summer visitor to riparian habitat throughout much of California. Currently, least Bell's vireo is found only in riparian woodlands in southern California, with the majority of breeding pairs in San Diego, Santa Barbara, and Riverside Counties. Substantial vireo populations are currently found on five rivers in SanDiego County: Tijuana, Sweetwater, San Diego, San Luis Rey, and Santa Margarita, with smaller populations on other drainages. Over 460 breeding pairs or territorial males were recorded in San Diego County in 1991 (Salata, pers. comm.).

Habitat: Least Bell's vireo is restricted to riparian woodland and is most frequent in areas that combine an understory of dense young willows or mulefat with a canopy of tall willows. Since the vireos build their nests in dense shrubbery 3 to 4 feet above the ground (Salata 1984), they require young successional riparian habitat or older habitat with a dense understory. Therefore, riparian plant succession is an important factor maintaining vireo habitat. Nests are also often placed along internal or external edges of riparian thickets (USFWS 1986).

Natural History: The least Bell's vireo arrives in San Diego County in late March and early April and leaves for its wintering ground in September.

Comments: The vireo's decline was attributed to loss, degradation, and fragmentation of riparian habitat combined with nest parasitism by the brown-headed cowbird. Due to concerted programs focused on preserving, enhancing, and creating suitable nesting habitat, the vireo population has steadily increased in population size along several of its breeding drainages in southern California. Significant increases in breeding populations have occurred along the Santa Ana River at Prado Basin, and on the Santa Margarita River on U.S. Marine Corps Base Camp Pendleton, as well as at several other sites throughout the region.

Status on Site: Not detected. Least Bell's vireo has a low potential to exist onsite due to limited habitat and high elevation of project area.

<u>Mountain plover</u> **-** *Charadrius montanus*

USFWS Status: None

CDFG Status: Species of Special Concern

Listing Data: The mountain plover was proposed by the USFWS for threatened status on February 16, 1999 (Federal Register 64 FR 7587). However, on September 9, 2003 the USFWS withdrew the threatened status proposal for this species.

Distribution: Mountain plover breeds throughout the Rocky Mountain states from Canada to Baja California. In the winter, the majority of the population resides in California, with the greatest densities in the Central Valley south of Sacramento and west of Highway 99, and in the Imperial Valley in southern California.

Habitat: The species is strongly associated with low-growing, or grazed grasslands, agricultural fields, and bare ground throughout both its breeding and wintering ranges.

Natural History: Mountain plovers feed on a variety of invertebrates, including weevils and earwigs. Nesting occurs between March and June. From June through mid-August, mountain plovers flock on their breeding grounds in preparation for their winter migration. The flocks leave for their wintering grounds between August and October. Typically, the mountain plover begins to arrive in California by September, with numbers peaking by November.

Comments: Current theories on the decline of the species suggest that it is the result of reduced productivity of foraging habitat associated with breeding sites.

	This decrease in productivity appears to be tied to an increase of tillage of agricultural fields.
Status on Site:	Not detected. However, mountain plover has a moderate potential to exist onsite due to the project being within this species' distributional range and availability of appropriate habitat.

Southwestern willow flycatcher - *Empidonax traillii extimus*

USFWS Status:	Endangered
CDFG Status:	None
Listing Data:	The southwestern willow flycatcher was listed by the USFWS on February 27, 1995 (Federal Register 60 FR 10715). This listing applies to the entire population of *E. t. extimus*. Critical habitat for the species was determined by the USFWS on July 16, 1997 (Federal Register 62 FR 39129), and corrected on August 20, 1997 (Federal Register 62 FR 44228) regarding critical habitat on MCB Camp Pendleton. No approved recovery plan has been adopted for the southwestern willow flycatcher. The state listed the species as endangered on January 2, 1991.
Distribution:	This subspecies of willow flycatcher is a summer breeding resident in riparian habitats in southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and northwestern Mexico (USFWS 1995). In San Diego County only two substantial breeding populations are known to remain along the Santa Margarita River and the upper San Luis Rey River.
Habitat:	It is restricted to dense riparian woodlands of willow, cottonwood, and other deciduous shrubs and trees. In general, the riparian habitat of this species tends to be rare, isolated, small and/or in linear patches, separated by vast expanses of arid lands.
Natural History:	Spring migration of the endangered subspecies is relatively late, beginning in early May and extending through June (Unitt 1984). Another subspecies which breeds to the north in the northern Sierra Nevada Mountains and the Cascade Range *(E. t. brewsteri)* migrates through San Diego between mid May and mid June. There is a period of overlapping occurrence in San Diego County riparian habitats for these two very similar looking subspecies during spring and fall migration. Fall migration of both subspecies occurs rather early, from August through mid October. Egg laying by the endangered southwestern willow flycatcher occurs in San Diego County from the end of May through the end of June. Dense willow thickets are required for nesting, and nests are often near standing water (CDFG 1990). Willow flycatchers hunt for insects from low exposed perches, flying out to catch the insects in mid-air.
Comments:	The southwestern willow flycatcher was listed as endangered by the USFWS in February 1995 because of "extensive loss of riparian breeding habitat, brood parasitism by the brown-headed cowbird *(Molothrus ater)*, and lack of adequate protective regulations" (USFWS 1995a). This subspecies was previously listed as endangered by the CDFG in December 1990. The population of southwestern willow flycatcher in southern

	California was estimated to be less than 80 pairs in the early 1980's (Unitt 1984).
Status on Site:	Not detected. There is a low potential for this species to exist onsite due to limited suitable habitat within the project area.

Swainson's Hawk - *Buteo swainsoni*

USFWS Status:	None
CDFG:	Threatened
Listing Data:	The state listed the Swainson's hawk as a threatened species on April 17, 1983.
Distribution:	Breeds primarily in the great Plains and arid regions of western United States, extending less commonly to interior Alaska, northern Mexico, and western Minnesota, Illinois, Missouri, and south-central Texas. Winters mainly in Argentina, although winter range has become less concentrated owing to control of migratory locusts (major food source) there. A small group, primarily immatures, are known to have wintered in southern Florida since about 1950 (Farrand 1989). The Swainson's hawk is an uncommon spring migrant and a very rare fall migrant. In San Diego, the Swainson's hawk was formerly a very common spring migrant, and a fairly common summer resident; however, the local breeding population is now completely extirpated (Unitt 1984). The species may still occur in the Santa Maria Valley but only as a migrant during spring and fall when migrating between North and South America.
Habitat:	Swainson's hawk is a common inhabitant of the great plains and relatively arid areas of western North America. It builds rather flimsy nests in shrubs and trees along wetlands and drainages and in windbreaks in fields and around farmsteads.
Natural History:	The Swainson's hawk is a lanky, small-footed buteo that preys on small mammals, birds, large insects, reptiles, and amphibians, hunting primarily from perches such as fence posts and low trees, or from vantage points on the ground; in winter, it is apparently much more insectivorous. During both winter and summer, Swainson's tends to be less sedentary that other buteos, moving about in response to locally high concentrations of prey (Farrand 1989).
Comments:	The loss of habitat has been a driving force behind the species' ongoing decline (Bloom 1994).
Status On Site:	Not detected. There is a low potential for Swainson's hawk to be present onsite due to the project area being outside of its distributional range and the probability of insufficient prey resources.

Western yellow-billed cuckoo **-** *Coccyzus americanus occidentalis*

USFWS Status:	Proposed Listed
CDFG Status:	Endangered
Listing Data:	The western yellow-billed cuckoo is a federal candidate species that was proposed for listing by USFWS on July 18, 2001. In addition, this species was listed by the CDFG as a threatened species on June 27, 1971 and later

	was upgraded by the state to endangered status on March 26, 1998. Although a final determination has not been made, on February 17, 2000, the USFWS initiated a status review of the subspecies to determine if listing was warranted.
Distribution:	Western yellow-billed cuckoo is an uncommon to rare summer resident in California and western Arizona (CDFG 1990). The largest populations of breeding cuckoos in California occur along the Colorado River and along the south fork of the Kern River. This subspecies was formerly a rare summer resident in San Diego County and is now thought to be extirpated except as an occasional migrant (Unitt 1984). Since 1950, the western yellow-billed cuckoo has only been reported 2 times from San Diego County (Unitt 1984). In the late 1970's several cuckoos were observed together less than a mile from the San Luis Rey River. According to Unitt (1974), the number of birds suggested a possible family group and indicated that in the late 1970's there may have been a few breeding pairs in remnant woodlands of northern San Diego County.
Habitat:	Cuckoos are restricted to dense, tall cottonwood and willow riparian woodlands of the valley foothill and desert.
Natural History:	Cuckoos primarily feed by gleaning for insects in foliage, and occasionally prey on frogs and lizards, or feed on fruit (Bent 1940).
Comments:	This species was formerly much more common and widespread throughout lowland California but has decreased drastically in abundance due to riparian habitat loss.
Status on Site:	Not detected. There is a low potential for this project to be present onsite due to the limited availability of suitable habitat.

Mammals

<u>California bighorn sheep</u> **-** *Ovis canadensis californiana*

USFWS Status:	Endangered
CDFG Status:	Endangered
Listing Data:	The state originally listed the subspecies as threatened on June 27, 1971. However, the status was upgraded to endangered on August 27, 1999. On April 20, 1999, the Bighorn sheep was designated as Endangered by the USFWS.
Distribution:	Mostly uncommon in California. Up to 1979, California bighorns consisted of 2 native herds in the southern Sierra Nevada (Mt. Baxter and Mt. Williamson herds). Subsequently, Mt. Baxter herd has been used as a source for reintroductions, into Inyo Co., and into the South Warner Wilderness (Modoc Co.)
Habitat:	Habitats used include alpine dwarf-shrub, low sage, sagebrush, bitterbrush, pinyon-juniper, palm oasis, desert riparian, desert succulent shrub, desert scrub, subalpine conifer, perennial grassland, montane chaparral, and montane riparian (DeForge 1980, Monson and Sumner 1980, Wehausen 1980).

Natural History:	Active yearlong; mostly diurnal activity. Move to bedding areas at night. Bad weather may restrict activity. Desert sheep are least active during the hot midday, when they remain near water (Lawson and Johnson 1982). Migrate between winter and summer ranges. Montane populations spend the summer in alpine habitats, moving downslope into canyons in winter.
Comments:	Extremely sensitive to disease. A herd at Lava Beds National Monument was lost to pneumonia in 1980. Diseases, particularly those of livestock, may be the major factor in decline and loss of populations. Feral ungulates and livestock compete with desert bighorns for water, and may compete for forage. Predation may be an important loss in very small populations, such as recent transplants. Loss of any critical habitat (e.g., lambing and feeding areas, escape terrain, water sources, travel routes) also may result in serious decline or loss of populations (Hicks and Elder 1979, Jessup 1981, Seegmiller and Ohmart 1981, DeForge et al. 1982, DeForge and Scott 1982, Dunn and Douglas 1982, Ginnett and Douglas 1982, Wehausen 1983, Shackleton 1985).
Status on Site:	Not detected. There is a low potential for this species to exist onsite due to low availability of suitable habitat.

<u>Mohave ground squirrel</u> – *Spermophilis mohavensis*

USFWS Status:	None
CDFG Status:	Endangered
Listing Data:	The Mohave ground squirrel was given State threatened status listing in 1998.
Distribution:	Restricted to the Mojave Desert in San Bernardino, Los Angeles, Kern, and Inyo cos. This species is rare throughout its range. Populations in southwestern San Bernardino Co. appear to be extirpated.
Habitat:	Optimal habitats are open desert scrub, alkali desert scrub, and Joshua tree. Also feeds in annual grasslands. This speices has been found from 1800-5000 ft (505-1525 m) elevation.
Natural History:	This diurnal ground squirrel is active above ground in the spring and early summer. Emergence dates vary from March to June, depending on elevation. Squirrels begin aestivation in July or August. Stored body fat is the principal source of energy for aestivation, although food is stored, and captive individuals eat during intermittent periods of wakefulness (Bartholomew and Hudson 1960,1961).
Comments:	Occurs sympatrically with the white-tailed antelope squirrel. The Mohave ground squirrel is competitively superior to the white-tailed antelope squirrel, but it lacks adaptations that allow the antelope squirrel to continue activity at higher temperatures (Bartholomew and Hudson 1961). Predators include badgers, foxes, coyotes, hawks, and eagles (Whitaker 1980). The squirrel is threatened by loss and degradation of its habitat due to clearing for agriculture and military activities and for urban, suburban, and rural development, livestock grazing, and OHVs.

Status on Site: Not detected. However, potential for existence onsite is high due to the project area being within the species' distributional range and the availability of appropriate habitat onsite.

APPENDIX F
AVIAN AND BAT SURVEY REPORT FOR PINE TREE WIND DEVELOPMENT BY MICHAEL MORRISON

PROPOSED PINE TREE WIND DEVELOPMENT PROJECT:

A Review of Potential Avian Wildlife-Wind Development Impacts

Prepared by
Michael L. Morrison, Ph.D

Prepared for
EDAW, Inc.

22 June 2004

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A Review of Potential Avian Wildlife-Wind Development Impacts

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Draft
22 June 2004

SUMMARY OF FINDINGS

This report (1) reviews results of a study of the impacts of the Tehachapi Pass Wind Resource Area (WRA) on birds, (2) presents findings from site surveys of the proposed Pine Tree Wind Development Project, and (3) develops an avian risk assessment for the proposed Pine Tree Wind Development Project.

Most wind developments in North America and Europe have not been shown to cause substantial negative impacts to wildlife, including birds and bats. Although relatively large numbers of birds have been killed at a few locations, especially the Altamont Pass WRA in central California, bird and bat fatalities at other developments have been below that thought to influence overall population size. Nevertheless, wind developers are striving to reduce fatalities through modification in turbine design, placement and operation of turbines, and management of wildlife habitat.

A recent study of the Tehachapi Pass WRA, in combination with bird surveys in the Pine Tree Wind Development Project, was used to make projections of the potential fatality rate of birds in the proposed Pine Tree Wind Development Project. Based on habitat conditions, the number of turbines proposed, and results of the Tehachapi Pass WRA study, I conclude that the proposed Pine Tree Wind Development Project would not have a substantial impact on avian wildlife. The primary raptor species likely to be killed is the red-tailed hawk. Although the death of any individual should not be discounted, this species is widely distributed in the region. The Pine Tree Wind Development Project will continue to provide foraging, resting, breeding, and passage habitat following development.

There is no indication that substantial concentrations of bats occur in the Pine Tree development area (only 1 bat kill was located during the Tehachapi Pass WRA study). Thus, no specific management steps are indicated for bats.

INTRODUCTION

The first wind energy developments were planned, permitted, constructed, and operated with little knowledge that birds could be killed by flying into rotating blades (Anderson et al. 1999). The discovery of a substantial number of dead raptors at the Altamont Pass WRA (Anderson and Estep 1988, Estep 1989, Orloff and Flannery 1992) raised concern about possible large-scale impacts to birds from wind energy development by regulatory agencies, environmental and conservation groups, and the wind and electric utility industries. Many organizations, including the Department of Energy's National Renewable Energy Laboratory and California Energy Commission, sponsored meetings and funded studies to address interactions between birds and wind developments. Additionally, the National Wind Coordinating Committee (NWCC) was formed to bring together all parties interested in this issue. Thus, a substantial effort, especially since the early 1990s, has been devoted to trying to understand the magnitude of the issue and develop remedies that allowed wind development to continue while minimizing negative impacts to wildlife.

Bird fatality rates observed at most wind projects are not currently considered significant to individual bird species populations. Although many bird species are affected, raptors have received the most attention (see reviews by Anderson et al. 1999, Erickson et al. 2001). Bats also have been killed at wind energy facilities (Williams 2003), and concern has been raised in some locations over potential impacts to endangered bat species (e.g., Williams 2004a, b, c). At least 250 bats of several species died in fall 2003 at the Mountaineer Wind Farm in West Virginia (Williams 2003). Overall, wildlife fatalities due to wind generation facilities is substantially lower in magnitude than estimates of bird fatalities from other human made obstacles including communication towers, power lines, buildings and windows, and vehicles (Erickson et al. 2001). However, fatalities must be evaluated relative to the overall population status of the species of concern, and the cumulative effects of all fatalities should be included in risk assessments.

This report was developed to provide information on the potential for impacts to birds and bats in the proposed Pine Tree Wind Development Project. The proposed development is located in the Tehachapi Mountains of southern California (Kern County), adjacent to an existing commercial wind development (Tehachapi Pass WRA). Specifically, this report (1) reviews results of a study of the impacts of the Tehachapi Pass Wind Resource Area (WRA) on birds, (2) presents findings from site surveys of the proposed Pine Tree Wind Development Project, and (3) develops an avian risk assessment for the proposed Pine Tree Wind Development Project.

WILDLIFE AND WIND DEVELOPMENTS IN THE TEHACHAPI WIND RESOURCE AREA

A study of bird interactions with wind turbines was conducted at the Tehachapi Pass Wind Resource Area (WRA); a report of this study has been drafted (Anderson et al., in press). The primary objective of that study was to estimate and compare bird utilization, fatality and collision risk rates among factors such as bird taxonomic groups, turbine types, and turbine locations within the operating wind plant in the Tehachapi Pass WRA, between October 1996 and May 1998. This study is especially relevant because portions of the Tehachapi Pass WRA are immediately adjacent to the proposed Pine Tree Wind Development Project. The Tehachapi Pass WRA, however, contains >3000 operating wind turbines, which is order of magnitude larger than the development proposed for the Pine Tree site. In this section I briefly summarize the methods, results, and conclusions of this study that are relevant to this risk assessment report for Pine Tree Wind Development area.

There were approximately 3300 operational wind turbines within the WRA during the study. Anderson et al. conducted a total of 3,318 five-minute bird utilization counts, during which 47 unique species were documented. Additionally, they conducted 829 carcass searches from 2 October 1996 to 27 May 1998.

Twenty-five species were observed during spring (1 March - 15 April), 28 species were observed during summer (16 April - 30 September), 25 species were observed during fall (1 October - 15 December), and 20 species were observed during winter (16 December - 28/29 February). Avian use (mean number of individuals per survey) was highest in the spring (1.61), followed by fall (1.55), winter (1.20) and summer (0.93). Avian richness (mean number of species per survey) was highest in the spring (1.26), followed by fall (1.25), summer (1.20), and winter (1.16). Raptor (birds of prey, including hawks and owls) use was generally higher during fall and winter and slightly lower during spring and summer. Corvid (primarily ravens) abundance was highest during spring and lowest during summer and fall. Passerine (primarily small songbirds) abundance was highest during fall and lowest during summer with similar values for spring and winter.

Red-tailed hawk was the most commonly observed raptor species, comprising over 60% of the observations, followed by American kestrel (15%). Other raptor species observed included golden eagle (3 detections), northern harrier (2), sharp-shinned hawk (2), ferruginous hawk (2) and prairie falcon (1).

One hundred and twenty seven bird fatalities representing 27 species were identified during the study period in the Tehachapi Pass WRA. In addition, one long-eared bat (*Myotis evotis*) with a fresh wound to the body was found dead. Forty-four of the fatalities (34.6%) were raptors. Raptor species with the most fatalities were the red-tailed hawk (14), great horned owl (13), and American kestrel (9). Other raptor fatalities consisted of the common barn owl (2) and one each of the ferruginous hawk, prairie falcon, long-eared owl, and flammulated owl, unidentified buteo, and an unidentified raptor. Only two corvid species suffered fatalities, the common raven (8) and scrub jay (2), representing 7.9% of the total. Twenty-seven of the fatalities (21.3%) were passerines. Passerine species with the most fatalities were the Western meadowlark (6), horned lark (3), European starling (3), white-crowned sparrow (2), and dark-eyed junco (2). Other passerine fatalities consisted of one each of the chipping sparrow, Brewer's blackbird, hermit thrush, rock wren, yellow-rumped warbler, loggerhead shrike and unidentified sparrow in addition to four unidentified passerine fatalities. Other birds comprised 46 (36.3%) of the fatalities. Other bird species with fatalities included the rock dove (11), mourning dove (6), red-shafted flicker (3), greater roadrunner (2), chukar (2), and California quail (2). Twenty fatalities remained unidentified to taxonomic group and were grouped in the other bird category. These were typically feather spots.

Fatalities were observed at 54 (27%) of the 201 sites monitored. The largest number of fatalities observed at any one site was four, with three fatalities observed each at two sites, two fatalities at nine sites, 1 fatality at 39 sites, and no fatalities at the remaining sites. Based on the 75 fatalities observed at these sites, Anderson et al. concluded that approximately 28% of the sites would have at least one fatality under a random distribution. This pattern of no distinctive clustering of fatality locations at a particular turbine suggests there appears to be no single turbine or site sampled that has a very high mortality rate compared to the other turbines sampled.

PROJECTED FATALITIES IN THE PROPOSED PINE TREE WIND DEVELOPMENT PROJECT

A standard method of presenting and comparing fatalities in wind developments is number of fatalities per turbine per unit of time, with unit of time usually being per year (Erickson et al. 2001). As stated by Anderson et al. (page 22), "This study was not specifically designed to provide standardized estimates of avian fatalities and the wide interval between searches (90 days) leads to a high level of uncertainty in the fatality estimates. The unknown impact scavenging has on the fatality estimates could greatly impact the fatality estimates. With these obvious caveats in mind, the unadjusted estimate of raptor fatalities for the wind resource area is 0.047 per turbine per year."

Raptor carcasses are known to remain for long (>90 day) periods of time, whereas smaller birds (e.g., passerines) will sometimes disappear within a few days depending on the local environmental conditions (Morrison 2002). Thus, estimates of raptor fatalities are Tehachapi are likely more reliable than those for other bird groups. Because Anderson et al. did not think it was appropriate to calculate fatality rates for non-raptors; I did not do so for this analysis (i.e., using data presented in Anderson et al.). Based on the estimate of 0.047 raptors killed per year per turbine in the Tehachapi WRA, we can estimate that the 80 turbines planned for Pine Tree could kill an estimated 4 raptors per year.

Note, however, that any projection and extrapolation is only an approximation and should not be taken as a statement of fact or absolute prediction. In North America, several wind developments have apparently killed no or very few animals (birds or bats; Erickson et al. 2001). Overall, fatality rates in North America indicate an average of 2.19 avian fatalities per turbine per year for all species combined and 0.033 raptor fatalities per turbine per year. Thus, raptor fatality rate at Tehachapi Pass WRA was somewhat higher than that seen across North America. The relatively small size of the proposed Pine Tree Wind Development Project indicates that few birds will be killed overall. The few number of turbines and small area occupied by the proposed development can be considered as mitigation for raptor fatalities.

RESULTS OF FIELD RECONNAISSANCE

March 2004

I visited the proposed Pine Tree Wind Development Project on 16-17 March 2004. On 16 March I was accompanied by EDAW biologists so I could gain familiarity with the proposed turbine locations.

The Pine Tree Wind Development Project is similar to the eastern side of the existing Tehachapi Pass WRA. Pine Tree is, however, generally lower in elevation and supports a predominately desert-influenced plant and animal community. There appears to be a general decline in bird abundance, including raptors, as we move from west to east in this geographic area. My basic observations of the proposed Pine Tree Wind Development Project with regard to wildlife habitat and potential wildlife occurrence are given below.

A. Distribution and abundance of raptor prey

1. Most of the ground area is covered with brush and small trees (PHOTO: 101-0161_IMG). There are thus few relatively flat, open grassland areas. Hence, no extensive area of habitat for burrowing animals exists on the site. Indeed, I noted only scattered evidence of burrowing animals such as gophers and ground squirrels; no evidence of widespread distribution in the recent past was noted. The primary squirrel species was the white-tailed antelope ground squirrel (PHOTO: 101-0148_IMG)
2. Small, scattered areas of grassland do exist along the bottom of valleys and in scattered locations in the surrounding hills. Some evidence of gopher activity was noted, and scattered burrows of ground squirrels and gophers were seen (PHOTO: 101-0171_IMG).

B. Distribution of bat habitat

1. Little foraging habitat for bats was noted during my survey. Scattered locations of riparian vegetation existed in some of the valley bottoms (PHOTO: 101-0169_IMG).
2. Few natural water sources existed on the site, and those that do exist (i.e., creeks) are seasonally ephemeral. The primary water sources are provided by stock (cattle) water troughs (PHOTO: 101-0170_IMG) and a few ponds (PHOTO: 101-0168_IMG). It is likely that bats use these water sources, although no surveys were conducted.
3. From my observations and discussions with EDAW biologists, there appear to be no natural caves, and few mine adits, on the proposed development site (PHOTO: 101-0165_IMG). Thus, it is unlikely that turbines would be located on flight paths between a major roosting or breeding location (cave or adit) and a water source.

C. Raptor abundance and distribution

1. EDAW biologists indicated that they seldom observed raptors anywhere on the project site. Indeed, during my 2-day visit I only observed a few individual American kestrels; no large hawks or eagles were observed during 12 hours in the field over 2 days of ideal weather conditions.
2. Potential nesting locations for larger raptors (Buteos and eagles) appeared limited to cliffs; trees (primarily juniper) were smaller than usually used by these species. Some non-cliff nest sites for American kestrels were available in the form of tree cavities and other structures.

May 2004

I also visited the Pine Tree Wind Development Project on 30 May 2004 between 06:00 and 13:00 to search for a possible red-tailed hawk nest site in the vicinity of proposed turbine site 13-2, south to 13-6. This search was conducted because of repeated observations of red-tailed hawks in this vicinity during the spring 2004 avian surveys (see below). I searched the area on foot, scanning trees and rock faces for potential nests. No raptor nests of any kind or of any age and condition were located during this visit, and no observations of red-tailed hawks or other raptors were made (common ravens were in the vicinity).

Based on these observations it appears that the red-tailed hawks previously observed did not breed in this vicinity. The previous, repeated observations of red-tailed hawks in this area does indicate, however, that the birds might concentrate foraging activities in this area in early spring.

Pine Tree Canyon Transmission Line Route

I drove and hiked the proposed route for the transmission line in Pine Tree Canyon on 2 site visits in April 2004. I did not observe any potential habitats or locations that might offer risk to wildlife. The route of the transmission line does not appear to bisect any natural passage corridor for birds.

RESULTS OF SPRING FIELD SURVEYS

Spring wildlife surveys were conducted to assist with preparation of a risk assessment for the proposed Pine Tree Wind Development Project. Although these surveys concentrated on birds, other animal species were also recorded including a habitat assessment for bats. The avian protocol developed for this project is responsive to the level of effort recommended in the National Wind Coordinating Committee (NWCC) Guidance Document (Anderson et al. 1999) and the recently released United States Fish and Wildlife Service (USFWS) Interim Guidelines. The goal of this work is to survey site conditions relative to avian use. Bird surveys at the Tehachapi Pass WRA found the highest overall bird activity to be during spring.

The NWCC Guidelines call for an initial reconnaissance survey. The goal is to identify sites early on in the planning process that have a high probability of substantial bird fatalities. Reconnaissance surveys are composed of several site visits, a literature survey, analysis of unpublished data, interviews with local experts, and other information that might be available. Assuming no significant biological issues are raised following the reconnaissance survey, a Level 1 Survey is initiated. The Level 1 Survey is designed to quantify the numbers, species, and activity of birds in the project area. Available avian mortality data indicates that individual turbines are often responsible for the majority of fatalities in a development because they are located in locations that attract birds, such as near gullies or concentrations of prey. Pre-construction surveys are designed to site turbines such that minimal or no mitigation is required during facility operation. Level 2 Surveys, which include detailed assessment of population effects due to avian fatalities, are seldom needed, especially if reconnaissance and Level 1 Surveys were implemented properly. Only the high kill rate of golden eagles at the Altamont Pass Wind Resource Area (WRA) have resulted in a Level 2 Study to date.

Methods

The spring avian survey followed a protocol that is responsive to the NWCC and USFWS guidelines and follows general procedures used by the National Renewable Energy Lab (NREL) to analyze bird-wind energy studies. The protocol developed for NREL by Morrison (1998), including modifications used in other wind-energy developments, was used to develop the survey protocol for the Pine Tree avian survey. As indicated above, this protocol is designed to assess not only bird fauna, but also provide recommendations, if necessary, for micro-siting and operation strategies that will maximize the energy generation output of the facility while minimizing or eliminating potential negative impacts on birds.

Observation Points

Reconnaissance of the project area was conducted on 16-17 March to determine the most suitable locations for avian observation points. During the reconnaissance, existing topographic features and habitat were surveyed, and avian observation points were selected based on general locations of wind turbines. A total of 10 observation points were established throughout the project area based on the proposed spacing of turbines and visibility between observation points. Points were positioned so that observers could view one or more proposed turbine strings during an observation period. The approximate location of each point is marked on Map 1, and Universal Transverse Mercator (UTM) coordinates of each point are in Table 1. Global Positioning System (GPS) recordings were made with a Magellan SporTrak.

Habitat Assessment

A habitat assessment was conducted along the ridgeline during the avian survey to supplement the observation point data, search for raptor nests, and to identify the presence of other animal species (e.g., concentrations of prey). A visual assessment of the specific vegetation type(s) surrounding the observation points, and any habitat features deemed to be likely nesting or foraging sites, were noted. Vegetative types followed those presented in Preliminary Draft Biological Technical Report, Pine Tree Wind Development Project, Kern County, California (EDAW, Inc., Irvine, California, August 2003).

The project area was visually surveyed to assess potential bat habitat, including caves, mines, foraging areas, buildings, and watering locations. These locations were evaluated with respect to potential passage near proposed wind turbines.

Sampling Frequency and Intensity

The spring survey is designed to quantify general bird activity and passage near proposed turbine strings, and concentrates on birds of prey (raptors). Well-established sampling protocols for avian point counts (e.g., Bibby et al. 1992) concluded that 3 counts are adequate to sample birds within an area of interest. This sampling intensity was increased for this study, with each observation point visited 5 times across a 4-week period. This sampling intensity and frequency ensures that repeated visits are made during the breeding season. Surveys were conducted between 4 and 28 April; 2 different observers participated in the surveys. Each observation point was visited once during each one-day survey, and observations were recorded for 30 minutes at each observation point. Although point counts are usually conducted for 10 minutes, the period was increased for this study to enhance the opportunity to observe the intensity of use of the area by birds (see metric description below), especially raptors. Data recorded were bird species observed, activity, flight height and direction, and distance from the observation point. Because the specific location of each turbine and turbine string has not been finalized, this sampling strategy gave an assessment of the overall use of the project area by birds, as well as details on the specific locations of birds relative to topographic features and proposed turbines. Environmental conditions (cloud cover, ceiling, temperature, precipitation, and wind speed) were recorded at each observation point. Observation points were visited throughout the day to evaluate within-day temporal variation in bird activity and abundance in the proposed project area. The data recording form and key is presented in Appendix 1.

The number of birds counted were summarized by observation point and count date. Results were summarized into tables and evaluated visually because statistical treatments such as regression analysis were not needed for this short-term data set. An "intensity of use" metric was calculated by multiplying the number of birds present during a single count by the amount of time they were present during that count. For example, 1 bird that was present for 1, 30 second observation would total 1 unit of activity; whereas, 1 bird present for 3, 30 second observations would total 3 units of activity. Likewise, two birds present for three, 30-second observations would total six units of activity. Units of intensity of use were used to indicate how much time a species was spending under observation, which can be related to the potential risk a species has for encountering a wind turbine.

Bird flight heights and distance from the observation point were summarized by percent of observations to quantify the location of birds in the project area relative to the proposed turbines. Birds and other animals observed while on the project area but not during a 30-minute observation session were recorded as incidental observations. These data were used to supplement the 30-minute observation periods. Common ravens were included with many of the analyses of raptors, as is becoming commonplace in most studies of birds in wind-energy developments.

RESULTS

Habitat Assessment

The UTM coordinates of each observation point are given in Table 1. Vegetation surrounding the observation points was typical of that occurring throughout the project area, and was predominated by Mojavean juniper woodland with varying understories of shrubs and grasses (Table 1). Pinyon pine and foothill pine became predominant in the higher elevation, southern portions of the project site.

Birds

Species Observed

A total of 30 species of birds was observed during the 10-minute observation period (Table 2); 29 of these species were also observed "incidentally" (not during the 10-minute observation periods; Appendix 2). A total of 54 animal and birds species were observed incidentally (Appendix 2). The only raptor observed incidentally and not on the counts was the Cooper's hawk.

Abundance and Distribution

The predominate bird species observed during the observation periods was the common raven, which accounted for 36.2% of all birds counted (Table 2). The raven was the only species that averaged >1 bird per count. The scrub jay, violet-green swallow, and white-crowned sparrow were the only other species to total >5% of the total count. The American kestrel totaled 2.3% of the birds counted and the red-tailed hawk totaled 2% of the birds counted. Although the turkey vulture totaled 2% of the count, all birds counted (7) occurred in a single flock. The golden eagle totaled only 0.3% of the birds counted.

American kestrels were observed consistently at 3 observation points (2A, 11A, 34A), and averaged only 0.16 birds per point per count (Table 3). Red-tailed hawks were observed consistently at only points 13A and 34A, with an overall average of 0.14 birds per point per count (Table 4). A single golden eagle was observed during the counts at point 35A (but see comments below under incidental observations). Common ravens were observed at all observation points, although they were in relatively lower abundance at points 13A, 14A, and 35A (Table 5). Overall, ravens averaged 2.58 birds per point per count, with a range between 0.8 and 10.0 birds per count. The high value (10.0) was due to several flocks of migrating birds observed on 13 April at 13A. Removing these birds from the calculations lowers the average number of birds per point per count to about 1.8 (removing migrants from calculations is not meant to imply a lack of relevance of these data, but rather is done to separate the influence of migrants from the remaining data set for purposes of interpretation).

Intensity of Use

Overall, an average of 2.96 units of raptor activity per point per count was calculated, with a range of 0.4 to 20.0 units (Table 6). The relatively high intensity of raptor use observed at point 13A was due to a red-tailed hawk that was perched (and apparently nesting). The only golden eagle observed during the counts was a single bird seen from point 35A.

Heights

The majority of raptor observations were of birds occurring <100 m above the ground (includes perching)(Table 7). The flocks of migrating ravens observed on 13 April were responsible for the concentration of perching activity for this species at <25 m; removing the migrants lowered the <25 m percentage to about 46%.

Distance from Observation Points

The concentration of results seen for red-tailed hawks was due to a bird perched along the proposed turbine string near point 13A; this bird was apparently nesting in this location (Table 8). Again, the concentration of data for ravens was influenced heavily by the 13 April migrants. Removing the migrant data lowered the <50 m results to about 38%.

Incidental Observations

Incidental observations (i.e., observations made outside the 30-minute observation periods) identified golden eagle activity within the project area between observation points 35A and 1A (an eagle was also observed during the observation periods from point 35A). More specifically, this activity was in the area bounded by proposed turbines 1-1, 35-8, and 35-7. An eagle was also observed incidentally to the area east of observation points 12A and 13A.

Observations made during the counts and incidentally indicated that a red-tailed hawk was nesting along the ridge proposed for placement of turbines 13-3 to 13-5. A pair of birds was observed in this area, and a single bird was regularly observed perched in foothill pine in this location. Additionally, red-tailed hawks were observed in the area around point 35A both during counts and incidentally.

Riparian vegetation was widely scattered throughout Jawbone Canyon. The primary area of concentration of riparian vegetation was located near the center of the project area near observation point 2A. A variety of passerine species, both resident and migrant, were observed incidentally in this location; some of these species were also reflected in the counts for observation point 2A. Passerines were observed in small numbers.

Other Animals

Mammals and herpetofauna observed incidentally during surveys were typical of species expected in the region (Appendix 2). The primary, diurnally active rodent species noted were the white-tailed antelope ground squirrel and California ground squirrel. These 2 species occurred as scattered individuals throughout the northern half of the project area, but did not occur in high abundance. Gopher mounds were observed in small concentrations, again scattered throughout the project area. Cottontails and jackrabbits were observed throughout the project area in low numbers (based on visual observations of animals, tracks, and scat).

Three mine adits were indicated on topographic maps of the project area, and no additional adits were observed during driving surveys. Of the 3 adits visited, only 2 were open (the entrance to the third was completely closed from a dirt slide). The 2 adits were entered and no bats or evidence of bats was observed (Appendix 2).

Discussion

These analyses indicated that raptors were scarce within the project site during spring 2004. An evaluation of formal counts and incidental observations indicated that only one golden eagle and two red-tailed hawks were potentially nesting within the project area. American kestrels were likewise scarce, with only 3-4 potential nesting pairs identified. The project site was predominated by a widespread occurrence of common ravens and other passerines birds typical of the Mojavean juniper wood and pinyon pine-foothill pine forest. As detailed in Results, potentially nesting raptors were located in only several locations. Common ravens were, however, relatively common and widespread throughout the project area.

Little riparian vegetation occurred in the project area. The primary area of concentrated riparian vegetation, located near observation point 2A, occupied only several hectares. No large number of passerines was observed in this location, although individuals were observed foraging in the trees present that were certainly migrating through the area (e.g., hermit warbler, black-throated gray warbler, yellow-rumped warbler, ruby-crowned kinglet).

Rodents and leporids, which serve as prey for raptors, did not occur in high abundance overall or in concentrated abundance in any location within the project area. The distribution and abundance of smaller rodents (mice, voles) was not assessed during this study, but can be assumed to vary both spatially and temporally.

No natural caves were located on the site and the few mine adits present did not harbor bats. Thus, it is unlikely that any large concentrations of bats occur within the project area at any time of the year. During summer, many bat species use rock crevasses, space under bark, buildings, and other structures for roosting; a few bats were observed at several water sources at dusk. Foraging would likely be concentrated over riparian areas, and water troughs and ponds established for cattle would be used for drinking. Based on the lack of locations of concentrated roosting, however, there is no reason to conclude that large numbers of bats would use specific routes to move between roosts and foraging and watering sites. Since there is no indication that substantial concentrations of bats occur in the project area, the spring wildlife survey did not include a formal assessment of bats (via acoustic surveys or observations of potential migratory routes)

In conclusion, during spring 2004 the project area harbored animal species characteristic of the Tehachapi Mountains within the occurring vegetation types. No concentration of animals of any species, or potential prey species, were located. Several incidences of raptors occurring and likely nesting in close proximity to proposed wind turbines were identified. These data, in combination with other data and literature available, can be used to help evaluate the overall potential impact of the proposed wind development to animals.

CONCLUSIONS

Potential Impacts

I conclude that the proposed Pine Tree Wind Development Project would have no substantial impact on avian wildlife. The primary raptor species likely to be killed is the red-tailed hawk. Although the death of any individual should not be discounted, this species is widely distributed in the region. There has been much recent debate over what constitutes a “biologically significant” level of mortality in wind developments, and no conclusions have been reached (Williams 2004c). The potential loss of 4 raptors per year (based on the Tehachapi Pass WRA data), the few number of turbines proposed, and the small land area to be occupied by the development, all indicate that the proposed development is unlikely to have any negative impact on the local raptor populations. Red-tailed hawks are widely distributed and abundant throughout their range, indicating that any kills in the Pine Tree Wind Development would not impact at the population level. Additionally, the project area will continue to provide foraging, resting, breeding, and passage habitat following development.

There is no indication that substantial concentrations of bats occur in the Pine Tree development area. As summarized above, only 1 bat kill was located during the Tehachapi Pass WRA study. Thus, no specific management steps are indicated for bats. However, if post-construction fatality surveys identify a substantial kill of bats, or if a significant bat location is found (i.e., roost or breeding site), then mitigation steps can be considered.

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PHOTO CAPTIONS

The following digital photographs were taken by the author during the 16-17 March 2004 site visit to the proposed Pine Tree Wind Development Project.

101-0146_IMG: Grazed grassland.

101-0148_IMG: Burrow of a white-tailed antelope ground squirrel.


101-0158_IMG: A patch of grassland located within the hills; this patch is below a meteorological tower (see also 101-0163_IMG).


101-0161_IMG: Tree and brush covered hillside typical of the project area.

101-0163_IMG: A patch of grassland with evidence of burrowing mammals (primarily gophers) below a meteorological tower (see also 101-0158_IMG).

101-0165_IMG: A small mine adit (this adit extended only ~5 m into the hillside)

101-0168_IMG: A small stock pond.

101-0169_IMG: Potential bat foraging habitat (deciduous trees) in a creek bottom.

101-0170_IMG: A cattle water trough.

101-0171_IMG: Gopher activity on grazed grassland.

Table 1. UTM coordinates, elevation, and vegetation associations for Observation (count) points, spring 2004, Pine Tree.

Point No.	UTM Coordinates (E; N)	Elevation (m)	Vegetation Types[a]
1A	3 92 660; 39 03 476	1310	A, B, C
1B	3 92 068; 39 01 954	1425	A
2A	3 91 372; 39 03 143	1150	A, E
3A	3 89 110; 39 03 285	1330	I, J
11A	3 91 385; 39 00 741	1390	A, D
12A	3 92 609; 39 00 633	1510	A
13A	3 92 678; 38 99 891	1560	A, D
14A	3 90 980; 38 99 740	1510	F
34A	3 90 227; 39 04 489	1390	G, H
35A	3 92 065; 39 05 560	1275	A, J

[a]Vegetation type codes (predominant vegetation within 500 m of observation point:
A—Mojavean juniper woodland and scrub
B—Mojavean juniper woodland/blackbush scrub
C—Mojavean juniper woodland/Mojave mixed woody scrub
D—Mojavean mixed woody scrub
E—Mojavean riparian forest
F—Foothill pine pinyon oak woodland
G—Annual grassland
H—Blackbush scrub
I—Foothill pine oak woodland
J—Rabbitbrush scrub

Table 2. Total count (n = 5 counts/point) of species recorded at observation points, spring 2004, Pine Tree (Index = birds/point/count). Index for individual point = no. birds/5.

Species	11A	12A	13A	14A	1A	1B	2A	34A	35A	3A	TOTAL	PERCENT	INDEX
Common raven	7	9	4	5	8	10	14	14	6	50	129	36.2	2.58
Scrub jay	0	2	5	3	3	1	3	1	6	5	29	8.2	0.58
Violet-green swallow	0	0	0	0	5	0	2	20	0	0	27	7.6	0.54
White-crowned sparrow	0	0	1	4	0	0	1	4	4	6	20	5.6	0.40
Yellow-rumped warbler	0	0	2	0	0	0	0	0	2	11	15	4.2	0.30
Lark sparrow	0	1	0	0	0	0	0	2	8	0	14	3.9	0.28
Mourning dove	3	2	0	0	0	2	2	0	2	2	13	3.7	0.26
Lawrence's goldfinch	0	0	0	0	0	3	5	0	4	1	13	3.7	0.26
Western bluebird	0	0	0	0	0	1	1	0	10	5	12	3.4	0.24
Brown-headed cowbird	0	0	0	0	0	0	0	0	11	1	12	3.4	0.24
Western meadowlark	2	0	0	0	0	1	2	3	0	0	8	2.3	0.16
American kestrel	3	0	0	0	0	0	2	3	0	0	8	2.3	0.16
Red-tailed hawk	0	0	4	1	0	0	0	0	2	0	7	2.0	0.14
House finch	0	0	1	0	0	3	2	0	0	1	7	2.0	0.14
Turkey vulture	0	0	0	0	7	0	0	0	0	0	7	2.0	0.14
European starling	0	0	0	0	0	0	7	0	0	0	7	2.0	0.14
Western kingbird	0	0	0	0	2	0	4	0	0	0	6	1.7	0.12
White-throated swift	3	0	1	0	0	0	0	0	0	0	4	1.1	0.08
Spotted towhee	0	0	1	0	1	0	1	0	0	0	3	1.1	0.06
Golden-crowned sparrow	0	0	0	0	0	0	0	0	0	3	3	1.1	0.06
Oak titmouse	0	2	0	0	0	0	0	0	0	0	2	0.6	0.04
Brewer's blackbird	0	0	0	0	0	0	2	0	0	0	2	0.6	0.04
Greater roadrunner	0	0	0	0	0	0	1	0	0	0	1	0.3	0.02
Ladder-backed woodpecker	0	0	0	0	0	0	1	0	0	0	1	0.3	0.02
LeConte's thrasher	0	0	0	0	0	0	1	0	0	0	1	0.3	0.02
Loggerhead shrike	0	0	0	0	0	0	0	1	0	0	1	0.3	0.02
Golden eagle	0	0	0	0	0	0	0	0	1	0	1	0.3	0.02
Dard-eyed junco	0	0	0	0	0	0	1	0	0	0	1	0.3	0.02
Acorn woodpecker	0	0	0	0	0	0	0	0	0	1	1	0.3	0.02
Northern flicker	0	0	0	0	0	0	0	0	0	1	1	0.3	0.02

Table 3. Number of American kestrels observed at Pine Tree, spring 2004.

Point	4 Apr	5 Apr	13 Apr	14 Apr	28 Apr	Raw total	No./count
1A							
1B							
2A			1	1		2	0.4
3A							
11A	1	1			1	3	0.6
12A							
13A							
14A							
34A	1	1	1			3	0.6
35A							
Raw total	2	2	2	1	1	8	
No./point	0.2	0.2	0.2	0.1	0.1		

Mean = 0.16 birds per point per count.

Table 4. Number of red-tailed hawks observed at Pine Tree, spring 2004.

Point	4 Apr	5 Apr	13 Apr	14 Apr	28 Apr	Raw total	No./count
1A							
1B							
2A							
3A							
11A							
12A							
13A	1	1		1	1	4	0.8
14A		1				1	0.2
34A			1		1	2	0.4
35A							
Raw total	1	2	1	1	2	7	
No./point	0.1	0.2	0.1	0.1	0.2		

Mean = 0.14 birds per point per count.

Table 5. Number of common ravens observed at Pine Tree, spring 2004.

Point	4 Apr	5 Apr	13 Apr	14 Apr	28 Apr	Raw total	No./count
1A	1	3	2		2	8	1.6
1B		4	3	1	2	10	2.0
2A		1	9	2	1	14	2.8
3A	2	3	43	1	1	50	10.0
11A	2	1	2		2	7	1.4
12A	2	2	2	1	2	9	1.8
13A	2	2				4	0.8
14A		2			2	5	1.0
34A	2	4	4	5	2	16	3.2
35A	3	3				6	1.2
Raw total	14	26	65	10	14	129	
No./point	1.4	2.6	6.5	1.0	1.4		

Mean = 2.58 birds per point per count.

Table 6. Intensity of use of points by raptors seen during counts at Pine Tree, spring 2004.

Point	4 Apr	5 Apr	13 Apr	14 Apr	28 Apr	Raw total	Units/count
1A							
1B							
2A			1	2		3	0.6
3A							
11A	10	7			2	19	3.8
12A							
13A	60	11		27	2	100	20
14A		2				2	0.4
34A	2	3	13		2	20	4.0
35A	4					4	0.8
Raw total	76	23	14	29	6	148	
Units/point	7.6	2.3	1.4	2.9	0.6		

Overall mean = 2.96 units per point per count.

Table 7. Height of raptors as a percentage of total observations, Pine Tree, spring 2004.

	Height (%)			
Species	**<25 m**	**26-100 m**	**101-150 m**	**>150 m**
American kestrel	93	7		
Common raven	88	10	3	<1
Golden eagle				100
Red-tailed hawk	23	54	16	7
Turkey vulture			100	

Values rounded.

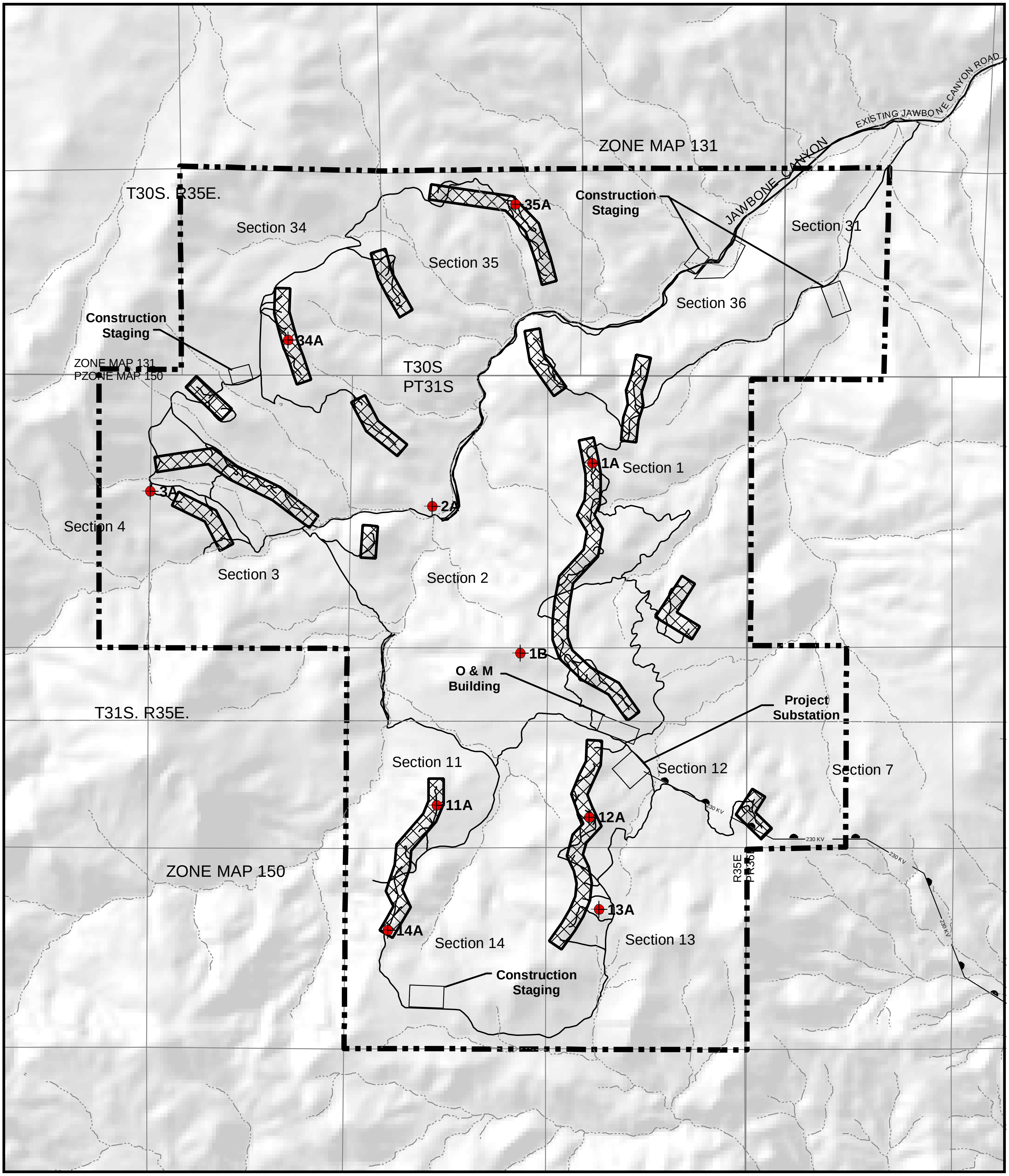
Common raven include for comparison.

Table 8. Flight distance of raptors from observation point as a percentage of total observations, Pine Tree, spring 2004.

	Distance (%)				
Species	**<50 m**	**51-100 m**	**101-300 m**	**301-500 m**	**>500 m**
American kestrel	4	18	68	7	4
Common raven	84	8	2	3	3
Golden eagle					100
Red-tailed hawk	75	6	11	4	4
Turkey vulture			33	33	33

Values rounded.

Common raven include for comparison.



Legend

Study Area
Wind Energy Districts
Observation Points
Stream
Transmission Line
Project Roads

0.5 0 0.5 Miles

APPENDIX 1

Field Data Form

Page ____ of ____

Pine Tree Wind Resource Area Avian Survey

Location: ____________________ **Survey Point:** ____________________ **Date:** ____________

Observer: ____________________ **Start Time:** ____________________ **End Time:** ____________

Environmental Conditions:

Ceiling:_____ (**UL**=Unlimited, **HI**=>200 m, **MID**=>100 m, **LO**=<50 m)

Cloud Cover:____ (**0**=about 25%, **1**=26-50%, **2**=51-75%, **3=**76-100%) **Temperature:**_______

Precipitation:____Rain____ Fog____Other____ (**0**=None, **L**=light, **M**=Moderate, **H**=Heavy, Other= Hail, Snow)

Wind:_____ **0**=<1 mph, **1**=1-3 mph (leaves barely move), **2**=3-7 mph (leaves rustle, small twigs move),
3=8-12 mph (sm. Twigs move), **4**=13-18 mph (sm. Branches move) **5**=12-24 mph (lg. Branches move trees sway)

Observation Number	Individual	Species	Direction	Flight Direction	Distance	Flight Behavior	Flight Height

Observation Number: Record a numeric identifing the observation period. 60 observation periods for 30 min. survey.

Individual: Record a numeric to indicate same bird for each 30 second observation (e.g. 1,1,1 for three observations for same bird, next bird would be 2). **Species:** 4 letter species code (e.g. RTHA - redtail hawk)

Direction Seen: N=north, **NW**=northwest, **NE**=northeast, **W**=west, **SW**=southwest, **S**=south, **SE**=southeast, **E**=east)

Flight Direction: Use direction codes above to record general flight direction.

Distance from turbine string: 1=<50m, **2**=51-100m, **3**=101-300m, **4**=301-500m, **5**=>500m

Flight Behavior: SO=soaring, **HO**=hovering, **PE**=perching, **FL**=flight through area

Flight Height: 1=<25m, **2**=26-100m, **3**=101-150m, **4**=>150m

Check here if notes on back of data form: _______

APPENDIX 2

List of Species Observed

APPENDIX 2
Summary of incidental observations, Pine Tree, spring 2004
Birds
Acorn woodpecker
American kestrel
American robin
Bewick's wren
Black phoebe
Black-throated gray warbler
Brewer's blackbird
Brown-headed cowbird
California quail
California towhee
Chukar
Common raven
Cooper's hawk
Dark-eyed junco
European starling
Golden eagle
Golden-crowned sparrow
Greater roadrunner
Hermit warbler
Horned lark
House finch
House wren
Killdeer
Ladder-backed woodpecker
Lark sparrow
Lawrence's goldfinch
LeConte's thrasher
Loggerhead shrike
Mountain quail
Mourning dove
Northern flicker
Northern oriole
Oak titmouse
Orange-crowned warbler
Phainopepla
Red-tailed hawk
Rock wren
Ruby-crowned kinglet
Sage sparrow
Scott's oriole
Scrub jay
Solitary vireo
Song sparrow

Spotted towhee
Violet-green swallow
Western bluebird
Western kingbird
Western meadowlark
Whimbrel
White-breasted nuthatch
White-crowned sparrow
White-throated swift
Yellow-rumped warbler

Mammals
Mule deer
California ground squirrel
White-tailed antelope ground squirrels
Desert cottontail
Pocket gopher
Coyote
Black-tailed jackrabbit

Herpetofauna
Gopher snake
Kingsnake
Chorus frog
Chuckwalla
Horned lizard
Sonoran whipsnake
Western fence lizard
Gopher snake
Mojave rattlesnake
Ringneck snake
Whiptail

APPENDIX G
PROJECT COMPONENTS AND CONSTRUCTION

APPENDIX G
Project Components and Construction

Wind Turbines

Turbine Description - The proposed turbines have a horizontal axis with a three-bladed rotor. The turbines would be mounted on tubular steel towers with internal maintenance access ladders. The total height of the tower to the hub of the rotor blades is 65 meters (213 feet). The diameter of the rotor is 77 meters (253 feet). The total height of the turbine at the highest point of the rotor blade's rotation is 103.5 meters (340 feet). The ground clearance for the rotor blades at their lowest point of rotation is 26.5 meters (87 feet). The base of the tower is approximately 15 feet in diameter. The towers and turbines would be neutral in color and would have a non-reflective finish.

Turbine Construction - Each turbine tower would require a level pad of approximately 50 feet by 50 feet. The turbine foundation would be constructed within this area. In order to accomplish the erection and assembly of the turbines, a large truck- or track-mounted crane would be required to hoist the extremely heavy components as high as the hub height of 213 feet. A cleared and level area approximately 35 feet by 60 feet would be required adjacent to each tower site to accommodate the crane. Each turbine would require an 8- foot by 8-foot concrete pad for a transformer.

On-site Access Roads

To operate and maintain the turbines, the proposed project would require a network of service roads to provide access to the turbine sites, the substation, and the O&M facility. A total of approximately 35.5 miles of roads would be necessary for the project, including about 23.5 miles of existing roads (upgraded or widened) for construction and operations; 2 miles of existing roads for construction only; 9.5 miles of new roads for construction and operations; and 0.5 mile of new roads for construction only. All these roads would be unpaved.

The specific types of roads required are as follows:

- Approximately 2 miles of existing 16-foot-wide road would be upgraded (not widened) to be used during construction only.
- Approximately 15.5 miles of existing 16-foot-wide roads would be improved and widened to 20 feet for construction and operations.
- Approximately 6 miles of existing 16-foot-wide road would be widened to 34 feet for both construction and operations.
- About 0.5 mile of new 20-foot-wide road for construction and operations would be constructed.
- About 9 miles of new 34-foot-wide road for construction and operations would be constructed.
- About 0.5 mile of new temporary construction road (34-feet wide) would be required.
- Approximately 0.4 mile of 16-foot wide access road to meteorological towers.

- Portions of the Jawbone Canyon access road northeast of the project property may also require widening or other improvements.

Electrical Collection System

Electrical power generated by the wind turbines would be transformed and collected through a network of cables that would terminate at the project substation. Power from the turbines would be fed through a breaker panel located at the turbine base inside the tower and connected to a pad-mounted step-up transformer. The transformers would be connected to underground cables that would interconnect all of the turbines electrically. The underground cables would be installed in a trench that would generally run at the edge of project roads and would typically be 3 to 4 feet deep. Due to terrain or to avoid excessively long runs, the collection cables would occasionally become overhead lines for relatively short distances. The collection cables would connect to larger feeder lines that would run to the main substation. At the substation, the electrical power from the turbines would be stepped up to transmission level at 230 kV. In locations where two or more sets of underground lines converge, underground vaults and/or pad-mounted switch panels would be used to tie the lines together into one or more sets of larger feeder conductors. The project will require a total of approximately 20 miles of underground and 1 mile of overhead lines to collect all of the power from the turbines and route it to the substation.

Alignment

The proposed transmission line would be approximately 7.9 miles in length and is shown on Figure 4 in the Biological Assessment as a purple and dark blue line. Originating at the Pine Tree switch yard (substation) located in Section 12, T31S, R35E in the south-central part of the project property, it would be routed eastward through privately owned land until it intersects the existing dirt road in Pine Tree Canyon. The line would then generally parallel Pine Tree Canyon Road eastward to a point near the Los Aqueduct, where it would traverse northeasterly away from the road toward the existing LADWP regional transmission line. This proposed transmission line route would cross two parcels of Bureau Land Management land for a total length of approximately 1.1 miles. LADWP intends to secure an easement for the transmission line alignment that is 150 feet wide and this easement would not be fenced.

Transmission Line Tower Structures

Three conductor wires would be needed to transmit the power from the site to the regional line. The conductor wires would be suspended on tubular steel monopole towers or tapered spun cast concrete pole towers for the length of the alignment with the exception of certain critical angle points that may require use of a freestanding steel lattice tower. At present, it is anticipated that one of these angle points would be located where the line crosses Pine Tree Canyon wash.

The typical height of towers would be 120 feet. The approximate diameter of the tower would be about 5 feet at the base, narrowing toward the top end. A round concrete footing (approximately 5 feet in diameter) would anchor the tower structure. The footings for the tower structure would be drilled shaft and cast-in-place. Using 120-foot tall towers, the average span length between towers would be roughly 500 to 600 feet, or approximately 10 structures per mile.

The portion of the transmission alignment in Sections 7, 8, 17, and 18 (above Pine Tree Canyon) are under an established military flight-training corridor.

Tower heights in these sections would be limited to 100 feet resulting in the need for approximately 12 structures per mile.

The three conductor wires will be strung on Horizontal Vee hardware assemblies on each tower. Two conductor wire assemblies will be placed on one side of the pole with one conductor wire assembly on the opposite side. The Horizontal Vee assembly angles downward from the pole at a 45-degree angle to a strut insulator supporting the conductor wire. The strut insulator will be attached horizontally between the conductor wire and pole to keep the conductor wire a minimum of 6 feet from the tower. A 13-foot vertical distance will be maintained between the two conductor wires on the same side of the pole. The lowest conductor wire will be a minimum of 30 feet from the ground at its low-point between towers. The fiberglass Horizontal Vee assemblies are angled downward such that perching by birds would be difficult. The insulators, though horizontal, are made of silicon and grooved to discourage perching.

Switching Station

Barren Ridge Switching Station (BRSS) would be constructed within the existing Inyo-Rinaldi 230kV line easement, approximately 1,300 feet north of where this regional line crosses the existing Pine Tree Canyon dirt road. The station would be constructed between the 230kV towers on the east side of right-of-away.

The Inyo-Rinaldi 230kV line will be cut and looped through BRSS along with 230kV line coming from Pine Tree Switch Yard. The interconnect will be through a ring bus design that will consist of three circuit breakers, eight disconnect switches and total of nine coupling capacitive voltage transformers, CCVT, on all incoming and outgoing lines. In addition to the rack, there will be a masonry block structure for control room and communication room within the station.

The switching station yard will be 450 feet, parallel to Inyo-Rinaldi line, by 440 feet, or 198,000 square feet (about 4.5 acres). Within the yard, there will be a control room and/or communication room(s). The control room plan includes space for equipment, distribution panels and relay panels, exposed cable tray and open cable trench extending to the rack area. It also includes space for batteries, storage and a rest room. The control room will be 30 feet by 35 feet, or 1,050 square feet. An additional communication room (assume same size as control room) may be required. The BRSS will not be manned on a daily basis.

Equipment piers and foundations and the cable trench will be reinforced concrete. A 25-foot-wide compacted roadway will be built around station equipment and the remainder will have Number 3 rock to a depth of 6 inches.

Access

General vehicular access to the transmission line segment would be taken from either Pine Tree Canyon or Jawbone Canyon. It is anticipated that a maintenance road would be constructed along portions of the alignment (from tower to tower), except where topography is too steep or the existing road is adjacent to the towers. In some cases, short spur roads would be constructed from the existing Pine Tree Canyon Road to tower sites. In general, spur roads would be 14 feet wide and maintenance/patrol roads would be 24 feet wide. The following assumptions relative to access roads govern the analysis of biological impacts.

Barren Ridge Switching Station (BRSS) – Access to the BRSS is achieved via Highway 14 to Pine Tree Canyon Road, and then to the existing dirt maintenance/patrol road running parallel to the regional line. Pine Tree Canyon Road is a wide dirt road (greater than 24 feet) from Highway 14 to where it crosses under the Los Angeles Aqueduct. The regional transmission line maintenance/patrol road is a 24-foot-wide road paralleling the alignment. No widening or improvement of either of these existing roads would be required.

BRSS to Second LA Aqueduct – The transmission line segment from BRSS to the Second L.A. Aqueduct (Sections 18 [mouth of Pine Tree], 13, and 14) extends approximately 9,500 feet. A new 24-foot-wide maintenance/patrol road would extend within the right-of-way parallel to the line in this reach.

Second L.A. Aqueduct to Section 15 Angle Point – In this reach of 3,500 feet, the transmission towers would be adjacent to the existing main Pine Tree Canyon Road and no new road construction or spurs roads would be needed. This road is assumed to range in width from 16 feet to 24 feet.

Section 15 Angle Point to Section 21 Angle Point – This 6,700-foot-long segment is parallel to but upland from the existing main road in Pine Tree Canyon. A new spur road would be constructed from the main road to each of the tower sites. Spur roads would be 14 feet wide with a total length of approximately 1,750 feet. No improvements to the main Pine Tree Canyon Road are necessary.

Section 21 Angle Point to Section 20 Angle Point – This 5,800-foot-long segment crosses over Pine Tree Canyon Wash and begins to climb out of Pine Tree Canyon. It is possible that the angle point in Section 21 would have a lattice tower due to the tension loads that would be placed on this structure. It is anticipated that an existing dirt road crossing Pine Tree Canyon Wash east of the transmission alignment would be used to access the north side of the wash, and then a new or modified 24-foot wide maintenance/patrol road would be constructed along the alignment.

Section 20 Angle Point to Pine Tree Substation – The remaining segment of the transmission line is approximately 16,000 feet long and traverses moderately steep topography in a northeasterly and easterly direction to reach the Pine Tree Substation (as shown on Figure 4). A new or modified 24-foot-wide maintenance/patrol road would be constructed along the alignment, following the alignment of existing roads and trails to the extent possible. Spur roads to the individual towers would be constructed. For purposes of estimating the necessary road construction, it is assumed that the maintenance/patrol road would be 20,000 feet long and that out of 30 transmission towers, spur roads 300-feet long would be needed for 25 of the towers.

Construction (Temporary) Disturbance Areas

In addition to roads, a number of other areas associated with project construction and operations must be cleared and graded. During the construction of the transmission line, tower site work areas, crane pads, pull/tensioning sites and other areas would be required. Temporary disturbance areas are listed below, total acres of disturbance are estimated.

Tower Site Work Areas: 86 x 100 feet x 100 feet = 860,000 square feet, 19.7 acres
Crane Pads: 86 x 25 feet x 30 feet = 64,500 square feet, 1.5 acres
Pull and Tensioning Sites: 7 x 150 feet x 200 feet = 210,000 square feet, 4.8 acres
Splicing Sites: 5 x 50 feet x 50 feet = 12,500 square feet, 0.3 acres
Guard Structures: 2 guard structures, 10 feet x 30 feet = 300 square feet, 0.01 acres

It is estimated that project construction could last five months and result in regular daily travel on access roads in the project area, with peak daily travel associated with the first three months of construction activity.

Maintenance Activities

Routine maintenance of the transmission towers would include annual inspections and equipment repair if needed. Inspections would be done by helicopter. Minimal travel on access roads, on the order of a few trips per month, is assumed.

Other Project Components

In addition to roads, a number of other areas associated with project construction and operations must be cleared and graded. During the construction phase, equipment and materials laydown and staging areas would be required. These areas, totaling approximately 45 acres, would be located in the northeastern, northwestern, and southern portions of the project property. They would provide for the offloading of all major components and construction equipment from flatbed trucks for temporary storage and restaging for delivery to individual wind turbine sites or the substation/O&M facility site. Several relatively small temporary material stockpile and turnout areas would also be located throughout the project property during construction. A small concrete batch plant would also be located at one of the laydown and staging areas to provide concrete for the turbine, substation, and O&M building foundations.

A total of approximately 21 acres would be cleared and graded as a site for the substation/O&M facility. These facilities would be located on relatively level terrain in the south-central portion of the property to minimize the length of the electrical collection system.

Grading Requirements

Initial grading requirements for construction of the project have been estimated at approximately 522,200 cubic yards of cut and 407,200 cubic yards of fill, leaving approximately 115,000 cubic yards of excess material. Excess material will be disposed of at approved sites. Some blasting may be required to assist excavation of rock formations.

Blasting Requirements

<<To be provided>>

Jawbone Canyon Operations and Maintenance (O&M) Traffic

With completion of construction, approximately 10 to 12 employees would operate and maintain the project on a permanent basis. The estimate of the post-construction, round-trip project traffic on Jawbone Canyon Road includes 2,280 trips per year. Averaged over six days per week, the use rate would be 7 to 8 round-trips per day. The majority of the traffic, 2,184 trips, would be generated primarily from O&M personnel using pickup trucks. Another 60 trips would be other light duty trucks, while 36 trips would consist of heavy-duty delivery trucks or road maintenance equipment.

Pine Tree Canyon O&M travel would be limited to a few trips per month at most. The BRSS is not regularly staffed and standard line inspections would be conducted by helicopter.

Decommissioning

The estimated life of the project depends primarily on the demand for power, which is expected to continue growing. However, the project is expected to have a life of a minimum of 20 years.

Upon decommissioning, site reclamation would be based on site-specific requirements and techniques commonly employed at the time the area is reclaimed. As necessary, this could include regrading, spot replacement of topsoil, and revegetation of project-disturbed areas. Foundations would be removed to a depth of 2 feet, or less if bedrock is encountered.

See Section 2.0 of the EIR/EA.

Appendix E

Air Quality Data
EDAW, Inc.
September 2004

URBEMIS 2002 For Windows 7.5.0

File Name: C:\Program Files\URBEMIS 2002 For Windows\Projects2k2\Pine Tree Wind\Pine Tree Grading.urb
Project Name: Pine Tree Grading and Roads
Project Location: Mountain Counties and Rural Counties
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Tons/Year)

CONSTRUCTION EMISSION ESTIMATES

*** 2005 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (tpy, unmitigated)	4.08	27.76	33.48	0.00	18.80	1.20	17.60
TOTALS (tpy, mitigated)	4.08	23.90	33.48	0.00	6.83	0.44	6.39

*** 2006 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (tpy, unmitigated)	0.51	3.35	4.25	0.00	2.34	0.14	2.20
TOTALS (tpy, mitigated)	0.51	2.88	4.25	0.00	0.85	0.05	0.80

URBEMIS 2002 For Windows 7.5.0

File Name: C:\Program Files\URBEMIS 2002 For Windows\Projects2k2\Pine Tree Wind\Pine Tree Grading.urb
Project Name: Pine Tree Grading and Roads
Project Location: Mountain Counties and Rural Counties
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Tons/Year)

Construction Start Month and Year: May, 2005
Construction Duration: 9
Total Land Use Area to be Developed: 200 acres
Maximum Acreage Disturbed Per Day: 20 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 1000

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (tons/year)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2005***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	17.60	-	17.60
Off-Road Diesel	4.00	27.60	31.84	-	1.20	1.20	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.08	0.16	1.64	0.00	0.00	0.00	0.00
Total tons/year	4.08	27.76	33.48	0.00	18.80	1.20	17.60
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total all phases tons/yr	4.08	27.76	33.48	0.00	18.80	1.20	17.60
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	2.20	-	2.20
Off-Road Diesel	0.50	3.33	4.04	-	0.14	0.14	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.01	0.02	0.21	0.00	0.00	0.00	0.00
Total tons/year	0.51	3.35	4.25	0.00	2.34	0.14	2.20
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total all phases tons/yr	0.51	3.35	4.25	0.00	2.34	0.14	2.20

Phase 3 - Building Construction Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: May '05
Phase 2 Duration: 9 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Bore/Drill Rigs	218	0.750	4.0
4	Crawler Tractors	143	0.575	8.0
2	Excavators	180	0.580	8.0
2	Graders	174	0.575	8.0
8	Off Highway Trucks	417	0.490	4.0
2	Scrapers	313	0.660	8.0
8	Tractor/Loaders/Backhoes	79	0.465	8.0
4	Trenchers	82	0.695	8.0

CONSTRUCTION EMISSION ESTIMATES MITIGATED (tons/year)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2005***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	6.39	-	6.39
Off-Road Diesel	4.00	23.74	31.84	-	0.44	0.44	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.08	0.16	1.64	0.00	0.00	0.00	0.00
Total tons/year	4.08	23.90	33.48	0.00	6.83	0.44	6.39
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total all phases tons/yr	4.08	23.90	33.48	0.00	6.83	0.44	6.39
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.80	-	0.80
Off-Road Diesel	0.50	2.86	4.04	-	0.05	0.05	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.01	0.02	0.21	0.00	0.00	0.00	0.00
Total tons/year	0.51	2.88	4.25	0.00	0.85	0.05	0.80
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total all phases tons/yr	0.51	2.88	4.25	0.00	0.85	0.05	0.80

Construction-Related Mitigation Measures

Phase 2: Soil Disturbance: Water exposed surfaces - 2x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 34.0%)
Phase 2: Off-Road Diesel Exhaust: Use aqueous diesel fuel
Percent Reduction(ROG 0.0% NOx 14.0% CO 0.0% SO2 0.0% PM10 63.0%)
Phase 2: Unpaved Roads: Water all haul roads 3x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 45.0%)
Phase 3 - Building Construction Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: May '05
Phase 2 Duration: 9 months
On-Road Truck Travel (VMT): 0
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Bore/Drill Rigs	218	0.750	4.0
4	Crawler Tractors	143	0.575	8.0
2	Excavators	180	0.580	8.0
2	Graders	174	0.575	8.0
8	Off Highway Trucks	417	0.490	4.0
2	Scrapers	313	0.660	8.0
8	Tractor/Loaders/Backhoes	79	0.465	8.0
4	Trenchers	82	0.695	8.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

Phase 2 mitigation measure Soil Disturbance: Water exposed surfaces - 2x daily
has been changed from off to on.
Phase 2 mitigation measure Off-Road Diesel Exhaust: Use aqueous diesel fuel
has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 3x daily
has been changed from off to on.

URBEMIS 2002 For Windows 7.5.0

File Name: C:\Program Files\URBEMIS 2002 For Windows\Projects2k2\Pine Tree Wind\Pine Tree Erection.urb
Project Name: Pine Tree Erection
Project Location: Mountain Counties and Rural Counties
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Tons/Year)

CONSTRUCTION EMISSION ESTIMATES

*** 2005 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (tpy, unmitigated)	6.36	40.80	53.58	0.00	1.80	1.80	0.00
TOTALS (tpy, mitigated)	6.36	35.09	53.58	0.00	0.67	0.67	0.00

*** 2006 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (tpy, unmitigated)	3.18	20.01	26.82	0.00	0.84	0.84	0.00
TOTALS (tpy, mitigated)	3.18	17.21	26.82	0.00	0.31	0.31	0.00

URBEMIS 2002 For Windows 7.5.0

File Name: C:\Program Files\URBEMIS 2002 For Windows\Projects2k2\Pine Tree Wind\Pine Tree Erection.urb
Project Name: Pine Tree Erection
Project Location: Mountain Counties and Rural Counties
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Tons/Year)

Construction Start Month and Year: July, 2005
Construction Duration: 9
Total Land Use Area to be Developed: 0 acres
Maximum Acreage Disturbed Per Day: 0 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 1000

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (tons/year)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2005***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	6.36	40.80	53.58	-	1.80	1.80	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	6.36	40.80	53.58	0.00	1.80	1.80	0.00
Total all phases tons/yr	6.36	40.80	53.58	0.00	1.80	1.80	0.00
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	3.18	20.01	26.82	-	0.84	0.84	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	3.18	20.01	26.82	0.00	0.84	0.84	0.00
Total all phases tons/yr	3.18	20.01	26.82	0.00	0.84	0.84	0.00

Phase 2 - Site Grading Assumptions: Phase Turned OFF

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Jul '05
Phase 3 Duration: 9 months
Start Month/Year for SubPhase Building: Jul '05
SubPhase Building Duration: 9 months
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
4	Cranes	190	0.430	8.0
2	Crushing/Processing Equip	154	0.780	8.0
22	Off Highway Trucks	417	0.490	8.0
9	Rough Terrain Forklifts	94	0.475	8.0

SubPhase Architectural Coatings Turned OFF
SubPhase Asphalt Turned OFF

CONSTRUCTION EMISSION ESTIMATES MITIGATED (tons/year)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2005***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	6.36	35.09	53.58	-	0.67	0.67	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	6.36	35.09	53.58	0.00	0.67	0.67	0.00
Total all phases tons/yr	6.36	35.09	53.58	0.00	0.67	0.67	0.00
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	3.18	17.21	26.82	-	0.31	0.31	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	3.18	17.21	26.82	0.00	0.31	0.31	0.00
Total all phases tons/yr	3.18	17.21	26.82	0.00	0.31	0.31	0.00

Construction-Related Mitigation Measures

Phase 2 - Site Grading Assumptions: Phase Turned OFF

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Jul '05
Phase 3 Duration: 9 months
Start Month/Year for SubPhase Building: Jul '05
SubPhase Building Duration: 9 months
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
4	Cranes	190	0.430	8.0
2	Crushing/Processing Equip	154	0.780	8.0
22	Off Highway Trucks	417	0.490	8.0
9	Rough Terrain Forklifts	94	0.475	8.0

SubPhase Architectural Coatings Turned OFF
SubPhase Asphalt Turned OFF

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 3 mitigation measure Off-Road Diesel Exhaust: Use aqueous diesel fuel
has been changed from off to on.

Pine Tree Wind Farm - Emissions Summary

data in tons, except where indicated as pounds per day

	ROG	NOX	CO	PM10
Grading - URBEMIS				
2005 unmitigated	4.08	27.76	33.48	18.8
2006 unmitigated	0.51	3.35	4.25	2.34
total unmitigated	4.59	31.11	37.73	21.14
pounds per day (182 days)	*50*	*342*		
2005 mitigated	4.08	23.9	33.48	6.83
2006 mitigated	0.51	2.88	4.25	0.85
total mitigated	4.59	26.78	37.73	7.68
Erection - URBEMIS				
2005 unmitigated	6.36	40.8	53.58	1.8
2006 unmitigated	3.18	20.01	26.82	0.84
total unmitigated	9.54	60.81	80.4	2.64
pounds per day (208 days)	*92*	*585*		
2005 mitigated	6.36	35.09	53.58	0.67
2006 mitigated	3.18	17.21	26.82	0.31
total mitigated	9.54	52.3	80.4	0.98
On-Road - Spreadsheet				
unmitigated	0.77	3.47	14.88	136.62
pounds per day (260 days)	*6*	*27*		
mitigated	0.77	3.47	14.88	65.91
TOTALS				
unmitigated - tons	14.9	95.4	133.0	160.4
pounds per day (overlap only)	*148*	*953*		
mitigated- tons	14.9	82.6	133.0	74.6

Pine Tree Wind Farm - On-Road Emissions

	trips	one way miles-av	vmt	av speed	**NOX** EF-gm/mi	tons	**ROC** EF-gm/mi	tons	**CO** EF-gm/mi	tons	**PM10** Total	PM10 EF-gm/mi	tons	PM10 Road EF pounds/vmt	tons
heavy trucks															
highway	2102	36	75672	55	18.43	1.54	0.92	0.08	12.2	1.02	0.02	0.186	0.02		
Jawbone +	2102	10	21020	20	15.19	0.35	2.38	0.06	21.7	0.50	0.01	0.403	0.01		
Worker trips															
highway	27360	36	984960	55	1.13	1.23	0.39	0.42	8.90	9.65	0.02	0.015	0.02		
Jawbone +	27360	10	273600	20	1.19	0.36	0.74	0.22	12.30	3.71	0.01	0.032	0.01		
Total - tons (per project)						3.47		0.77		14.88	136.62		0.05		
Average pounds/day (260 days)						27		6		114	1051		0		
Fugitive dust															
Paved	29462	41	1207942										unmit	0.031	19
Unpaved access	29462	5	147310										unmit	1.6	118
													unpaved m	0.6	47

trips - from transportation matrix
EF - emission factors - from EMFAC 2002

KERN COUNTY AIR POLLUTION CONTROL DISTRICT

RULE 402 - FUGITIVE DUST
(Adopted 11/29/93, Amended 3/07/94, 9/7/95)

I. **Purpose**

The purpose of this Rule is to reduce the amount of respirable particulate matter (PM_{10}) emitted from significant man-made fugitive dust sources in the Indian Wells Valley portion of Kern County and in an amount sufficient to attain National Ambient Air Quality Standards. Rule 419 shall still be used to prevent/correct specific public nuisances and health hazards.

II. **Applicability**

The provisions of this Rule shall apply to specified bulk storage, earthmoving, construction and demolition, man-made conditions resulting in wind erosion, and unpaved roadways located in the Kern County portion of the "Searles Valley Planning Area" shown on Page 402-11.

III. **Definitions**

A. Active Operation - activity capable of generating fugitive dust, including any open storage pile, earth-moving activity, construction/demolition activity, disturbed surface area, and non-emergency movement of motor vehicles on unpaved roadways and any parking lot served by an unpaved road subject to this Rule.

B. Bulk Material - sand, gravel, soil, aggregate, and any other organic or inorganic solid matter capable of releasing dust.

C. Calendar Quarter - consecutive three month period and each consecutive three-month period thereafter, beginning on the first day of the calendar month in which an activity qualifies as a large operation.

D. Construction and Demolition Activity - any on-site mechanical activity preparatory to or related to building, alteration, rehabilitation, demolition or improvement of property, including the following activities: grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.

E. Contractor - any person or company, or licensed construction contractor having a contractual arrangement to conduct an active operation subject to this Rule for another person.

F. Contingency Measure - additional PM_{10} control requirements automatically triggered in the event of lack of Reasonable Further Progress to attain or failure to attain or maintain the National Ambient Air Quality Standards for PM_{10}.

G. Disturbed Surface Area - portion of the earth's surface having been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural condition, thereby increasing the potential for emission of fugitive dust. Disturbed surface area does not include areas restored to a natural state with vegetative ground cover and soil characteristics similar to adjacent or nearby natural conditions.

H. Dust Suppressant - water, hygroscopic materials, or non-toxic chemical stabilizers used as treatment to reduce fugitive dust emissions. A suppressant shall not be used if prohibited by the Regional Water Quality Control Board, the California Air Resources Board, the Environmental Protection Agency, or any other applicable law, rule or regulation. All suppressants shall meet all specifications, criteria, or tests required by any federal, state, or local water agency. The use of dust suppressants shall be of sufficient concentration and application frequency to maintain a stabilized surface.

I. Earth-Moving Activity - grading, earth cutting and filling, loading or unloading of dirt or bulk material, adding to or removing from open storage piles of bulk material, landfilling, or soil mulching.

J. Fugitive Dust - any particulate matter becoming airborne, other than being emitted from an exhaust stack, directly or indirectly as a result of human activity.

K. Inactive Disturbed Surface Area - any disturbed surface area upon which an active operation has not occurred for a period of at least ten consecutive days.

L. Large Operation - any active operation, excluding vehicle movement on roadways, on property involving in excess of 100 acres of disturbed surface area, or any earth-moving activity exceeding a daily volume of 7,700 cubic meters (10,000 cubic yards) three times during the most recent 365-day period.

M. Motor vehicle - any engine-powered device used to convey people, or freight and registered for use on public highways.

N. Non-Routine - non-periodic active operation occurring no more than three times per year, lasting less than 30 cumulative days per year, and scheduled less than 30 days in advance.

O. Open Storage Pile - any accumulation of bulk material with 5 percent or greater silt content not fully enclosed, covered or chemically stabilized, and attaining a height of three feet or more and a total surface area of 500 or more square feet. Silt content level shall be assumed to be 5 percent or greater unless a person shows, by sampling and analysis in accordance with ASTM Method C-136, the silt content is less. Results of ASTM Method C-136 are valid for 60 days from the date the sample was taken.

P. Particulate Matter - any solid material, existing in finely divided form.

Q. PM10 - particulate matter with an aerodynamic diameter smaller than or equal to 10 microns as measured by California Air Resources Board Test Method 501.

R. Prevailing Wind Direction - from Southwest to Northeast or as specified by the Control Officer as being more representative of local conditions.

S. Property Line - boundaries of an area in which either a person causing fugitive dust emissions or a person allowing fugitive dust emissions has ownership or legal right to use the property.

T. Reasonably Available Control Measure (RACM) - any technique or procedure used to prevent or reduce the emission and airborne transport of fugitive dust. RACM's include, but are not limited to, application of dust suppressants, use of coverings or enclosures, paving, enshrouding, planting, control of vehicle speeds, and any other measure recognized by the Control Officer as providing equivalent dust control. Table I (Page 402-4) and U.S. EPA's reference document "Control of Open Fugitive Dust Sources", Midwest Research Institute, September 1988 shall be used for guidance.

U. Simultaneous Sampling - operation of two PM_{10} samplers such that one sampler is started within five minutes of the other, and each sampler is operated for a consecutive period of not less than 290 minutes and not more than 310 minutes.

V. Stabilized surface - previously disturbed surface area showing visual or other evidence of surface particle conglomeration after application of a dust suppressant.

W. Unpaved Road - any straight or curved length of well-defined travel way for motor vehicles not covered by one or the following: concrete, asphaltic concrete, or asphalt.

X. Wind Gust - maximum instantaneous wind speed, as measured by an anemometer or as provided by the nearest local meteorological station.

TABLE I

SUGGESTED

FUGITIVE DUST REASONABLY AVAILABLE CONTROL MEASURES

Source Category	**Control Method**
Unpaved Road	Improve Road Surface Control Vehicular Traffic Speed Apply Dust Suppressants

Construction/Demolition Activity	Use Wind Breaks Apply Dust Suppressants
Earth-moving/Open Storage Pile	Use Wind Screens Use Enclosures Around Storage Piles Apply Dust Suppressants
Disturbed Surface Area	Use Fences/Barriers Vegetate Apply Dust Suppressants Compact Surface

NOTE: If water is selected as a dust suppressant, use of non-potable water is encouraged.

IV. **Exemptions**

A. Provisions of this Rule shall not apply to:

1. Agricultural operations;

2. Actions required by federal or state endangered species legislation;

3. Any disturbed surface area less than three acres on residential property;

4. Active operations conducted during emergency life-threatening situations, or in conjunction with any officially-declared disaster or state of emergency;

5. Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions;

6. Unpaved roads, provided such roads:

   a. are less than 75 (50, if contingency measure triggered) feet long or,

   b. have a motor vehicle traffic volume less than 25 (15, if contingency measure triggered) vehicle-trips per day, or

c. have a motor vehicle traffic volume of 25 (15, if contingency measure triggered) vehicle-trips per day or more, not more than six times per year, or

d. provide access to not more than 10 residences;

Contingency measure is triggered if U.S. EPA publishes a finding in the Federal Register that KCAPCD's portion of the Searles Valley Planning Area (see Page 402-11) has failed to make reasonable further progress to attain or has failed to attain or maintain National Ambient Air Quality Standards for PM_{10}.

7. Restorative grading of unpaved shoulders of paved roads;

8. Non-routine or emergency maintenance of flood control channels and water spreading basins;

9. Weed and dried vegetation removal required by a fire prevention/control agency;

10. Active operations conducted during freezing weather if applicable RACM involves application of water;

11. County sanitary landfill disposal sites provided such sites conform to California Code of Regulations Sections 17659 and 17706;

12. Blasting operations permitted by the California Division of Industrial Safety;

13. Motion picture, television, and video production activities when dust emissions are required for visual effects. This exemption shall be obtained from the Control Officer;

14. Officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and County regional parks;

15. Any contractor subsequent to a contract termination date, provided such contractor implemented Reasonably Available Control Measures during the contractual period; and

16. Any grading contractor, for a phase of active operations conducted after his completion of earth-moving activities, provided such contractor implemented Reasonably Available Control Measures during the entire phase of earth-moving activities and until the final grading inspection.

B. Provisions of Subsection V.A. (visible emissions limit) shall not apply when wind gusts exceed 25 miles per hour, provided:

1. Table I (Page 402-4) Reasonably Available Control Measures are implemented for each applicable fugitive dust source type, or;

2. A person has on file with the District an approved "High Wind Fugitive Dust Control Plan" indicating technical reasons why any Reasonably Available Control Measure cannot be implemented. Such Plan shall provide an alternative measure of fugitive dust control, if technically feasible, and shall be subject to the same approval conditions as specified in Section V.

C. If applicable, provisions of Subsection V.D.2. (large operation PM_{10} monitoring) shall not apply for a period of:

a. One calendar quarter for each new large operation,

b. Fourteen calendar days after approval or conditional approval of a fugitive dust emission control plan.

V. **Requirements**

A. A person shall not cause or allow emissions of fugitive dust from any active operation to remain visible in the atmosphere beyond the property line of the emission source. This Subsection shall not apply to unpaved roadways.

B. A person shall utilize one or more Reasonably Available Control Measures to minimize fugitive dust emissions from each fugitive dust source type which is part of any active operation subject to this Rule, including unpaved roadways.

C. For any large operation, except those satisfying Subsection V.D.3. (implementation of RACM's), a person shall not cause or allow downwind PM_{10} ambient concentrations to increase more than 50 micrograms per cubic meter above upwind concentrations as determined by simultaneous upwind and downwind sampling. High-volume particulate matter samplers, or other EPA-approved equivalent method(s) for PM_{10} monitoring shall be used. Samplers shall be:

a. Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate EPA-published documents for EPA-approved equivalent methods(s) for PM_{10} sampling;

b. Reasonably placed upwind and downwind of the large operation based on prevailing wind direction and as close to the property line as feasible, such that other sources of fugitive dust between the sampler and the property line are minimized; and

c. Operated during active operations.

D. Special Requirements for Large Operations

1. No person shall conduct or authorize conducting a large operation subject to requirements of this Rule without either: 1) conducting on-site PM_{10} air quality monitoring and associated recordkeeping, or 2) filing for and obtaining an approved fugitive dust emissions control plan pursuant to Subsection V.D.3.

2. Any person subject to Subsection V.D.1. electing to conduct on-site PM_{10} monitoring and recordkeeping shall take the following actions:

   a. Notify the Control Officer of intent to monitor PM_{10} at least seven days prior to initiating such monitoring. Notification shall contain, at a minimum, the person's name, address, telephone number, brief description and location of the operation(s), and anticipated first date of sampling.

   b. Be responsible for acquisition, calibration and operation of PM_{10} samplers.

   c. Collect samples on four separate days during each calendar quarter. Sampling shall be conducted during typical operations, and during prevailing wind direction conditions. All other provisions of this Rule shall continue to be applicable on days when monitoring is not conducted.

   d. Collect samples on four additional days during one calendar quarter if requested by the Control Officer based on receipt of complaints from the public, visible dust emissions, or other determinations by District personnel indicating violations of conditions specified in Subsection V. C. may be occurring. Each sampling day shall be conducted during typical operations, and during prevailing wind direction conditions.

   e. Conduct laboratory analyses in accordance with 40 CFR, Part 50, Appendix J, for all samples collected as required by Subsections V.D.2.c and V.D.2.d.

   f. Compile and submit records to the District on a quarterly basis, not later than 30 days after the end of each calendar quarter. Such records shall include:

      1. Brief description and location of the operation(s);

      2. Hours of active operations on days when particulate sampling occurred;

      3. Location, vendor, model, and serial number of PM_{10} samplers used on each sampling day;

      4. Date, start and end times of all PM_{10} sampling;

      5. Laboratory results (measured ambient concentrations) of all PM_{10} samples;

6. List of consultants, laboratories, and other groups of individuals responsible for collection, analysis, evaluation and validation of each PM_{10} sample; and

7. Documentation of any maintenance and calibration actions performed on each PM_{10} sampler conducted in accordance with 40 CFR, Part 50, Appendix J.

3. Any person subject to Subsection V.D.1. electing to obtain an approved fugitive dust emissions control plan shall take the following actions:

   a. At least 45 calendar days prior to a calendar quarter during which air monitoring would be conducted in accordance with Subsection V.D.2. submit to the Control Officer a fugitive dust emissions control plan, including at least:

   1. Name(s), address(es), and phone number(s) of person(s) responsible for the preparation, submission, and implementation of the plan;

   2. Description and location of operation(s);

   3. Listing of all fugitive dust emissions sources within property lines;

   4. Description of Reasonably Available Control Measures to be applied to each source identified in Subsection V.D.3.a.3). Such description must be sufficiently detailed to demonstrate Reasonably Available Control Measures will be utilized and/or installed during all periods of active operations.

   b. If there are special technical, e.g. non-economic, circumstances preventing use of Reasonably Available Control Measures for any source identified in Subsection V.D.3.a.3), justification shall be provided in lieu of the description required in Subsection V.D.3.a.4). A justification statement shall explain reason(s) why Reasonably Available Control Measures cannot be implemented.

4. The Control Officer shall either approve, conditionally approve, or disapprove the plan, in writing, within 30 calendar days of receipt of the plan. For a plan to be approved or conditionally approved, three conditions shall be satisfied:

   a. All sources of fugitive dust emissions shall be identified, e.g. earth-moving, storage piles, vehicular traffic on unpaved roads, etc.;

   b. For each source identified, at least one Reasonably Available Control Measure shall be implemented; and

   c. If, after implementation of control measures, visible dust emissions cross property line(s), standby control measures, e.g., increased watering, shall be specified for immediate implementation.

5. If a plan can be conditionally approved with actions not specified in the plan, the applicant shall be notified in writing. Such modifications shall be incorporated into the plan within 30 days of receipt of the notice of conditional approval, or the plan shall be disapproved. A letter to the Control Officer stating such modifications will be incorporated into the plan shall be used as a basis to approve the plan.

6. Any plan disapproved by the Control Officer shall require air monitoring and recordkeeping in accordance with Subsection V.D.2.

7. Failure to comply with any provisions in an approved or conditionally approved plan shall result in a violation of Subsection V.D.1.

8. An approved plan for a specific project shall be valid for a period of one year from date of approval or conditional approval. Plans shall be resubmitted, annually, at least 60 days prior to expiration date, or the plan shall be disapproved as of the expiration date. If all fugitive dust sources and corresponding Reasonably Available Control Measures or special circumstances remain identical to those identified in the previously approved plan, the resubmittal may contain a simple statement of "no-change". Otherwise a resubmittal shall contain all items specified in Subsections V.D.3.a.and V.D.3.b.

9. A contractor may have on file with the District a pre-approved plan or plans for one or more types of large projects subject to Subsection V.D.3. Prior to initiation of any project, one or more applicable pre-approved plans may be specified by the contractor in lieu of filing a new plan or plans.

10. Any person subject to requirements of Subsection V.D.1. making changes to an active operation resulting in it not fitting the definition for a large operation for a period of at least one year, may request reclassification as a non-large operation. To obtain this reclassification, a person shall submit a request in writing to the Control Officer specifying actions having taken place to reduce disturbed surface area and/or earth-moving process rate to levels below criteria for large operations. A person shall also indicate criteria for a large operation will not to be exceeded during the subsequent 12-month period. The Control Officer shall either approve or disapprove reclassification within 60 days from receipt of a reclassification request. The Control Officer shall disapprove the request if indicated changes cannot be verified. If approved, a person shall be relieved of all requirements under Subsections V.D.1, V.D.2, and V.D.3. Any person so reclassified shall again be subject to requirements of Subsection V.D.1. if, at any time subsequent to reclassification, criteria for large operations are met.

Appendix F

Cultural Resources Inventory Report
URS Corporation
November 18, 2004

DRAFT

VOLUME I: TECHNICAL REPORT

CULTURAL RESOURCES INVENTORY REPORT FOR THE PINE TREE WIND DEVELOPMENT PROJECT, KERN COUNTY, CALIFORNIA

Prepared by:

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Prepared for:

Los Angeles Department of Water and Power
Los Angeles, California

URS Corporation
Portland, Oregon

November 18, 2004

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EXECUTIVE SUMMARY

The Los Angeles Department of Water and Power (LADWP), in association with Wind Turbine Prometheus LLP (WTP), propose to construct a wind development project on privately owned land located 12 miles north of Mojave, California, and 15 miles northeast of Tehachapi. When completed, the facility, which will include 80 wind turbines, will produce up to 120 megawatts of electricity and will be the largest municipally owned wind plant in the United States. Access to the facility will require crossing lands managed by the United States Department of the Interior, Bureau of Land Management (BLM). Following construction, the facility will be owned and operated by LADWP.

In compliance with Federal cultural resources laws and regulations, an archaeological inventory was conducted of all proposed project facilities. The cultural resources investigation resulted in the identification of 101 archaeological sites, including 43 previously recorded and 58 newly identified properties. Of these, 90 sites are within the Project Area. Nineteen sites have the potential to be affected by project activities, depending upon which components (e.g., access roads, 230kV transmission line, laydown areas) are selected for use or construction. The remaining 71 sites do not occur within or immediately adjacent to proposed project components. Of the 19 sites with potential project impacts, only seven (PT-3, PT-12, PT-30, PT-31, PT-32, PT-34, WF-18) are considered NRHP-eligible properties, the remainders not qualifying due to lack of integrity and/or lack of research potential.

Evaluation procedures, discussed below, were conducted at the majority of sites that are situated within areas that might be affected by project activities. Where necessary, limited shovel probing was conducted at these sites to test for the presence of buried deposits, thereby providing preliminary information regarding their data potential and National Register of Historic Places (NRHP) eligibility. Seven of the potentially affected sites are recommended as eligible for nomination to the NRHP and current project plans indicate these seven sites cannot feasibly be avoided.

Current project plans indicate that six of the 7 sites recommended as eligible cannot feasibly be avoided, including PT-3, PT-12, and PT-30, each of which will be impacted by installation of an underground electrical system within an access road passing through the site. Sites PT-31, PT-32, and PT-34 are crossed by access roads. Two of these sites, PT-32 and PT-34, contain both historic and prehistoric components. Because the historic components will not be affected, mitigation measures presented in Appendix A focus on prehistoric components only. Three sites will be avoided by a minimum distance of 20 feet or more, including PT-24, PT-31, and WF-15. Consequently, mitigation measures proposed for these sites should not be necessary. An additional site, WF-18, will be impacted if the alternative turbine proposed for this location is constructed. If the alternative is selected, an access road to that location will pass through site WF-18 and mitigation will be necessary. Consequently, mitigation measures for this site are also included in Appendix A. Six sites lie within the proposed transmission line corridor, including PT-7, PT-8, WF-2, WF-19, WF-20, and CA-Ker-2983. Because feasibility of avoidance of these sites has not yet been evaluated, mitigation measures are provided in Appendix A. If avoidance is determined feasible, these measures should not be necessary.

CHAPTER 1 – INTRODUCTION

PROJECT DESCRIPTION

The Los Angeles Department of Water and Power (LADWP), in association with Wind Turbine Prometheus LLP (WTP), propose to construct a wind development project on privately owned land located 12 miles north of Mojave, California, and 15 miles northeast of Tehachapi. When completed, the facility, which will include 80 wind turbines, will produce up to 120 megawatts of electricity, and will be the largest municipally owned wind plant in the United States. Access to the facility, from State Highway 14, will require crossing lands managed by the United States Department of the Interior, Bureau of Land Management (BLM). Following construction, the facility will be owned and operated by LADWP.

The Pine Tree Wind Development Project is located near upper Pine Tree and Jawbone canyons in the Piute Mountains of Kern County, northwest of Mojave, California (see Figure 1-1). The Piute Mountains are part of the Sierra Nevada Range and meet the extension of the Transverse Ranges that curve east and northeast at the southern end of the Central Valley. The Project Area and its general environs are essentially undeveloped, but are currently, and have been historically, used as grazing land for cattle. Because of the relatively small footprint of the wind turbines and other project elements, this grazing use would be essentially unaffected and could continue after project implementation. Given the historical use of the site area, there is a relatively extensive system of existing unpaved roads throughout the property. A small ranch headquarters building, which is located in the central portion of the project, is the only occupied structure within the property, but it receives only intermittent use. Several older, abandoned buildings and ranch facilities are also located within the property. The project property is bounded primarily by privately owned land except along a portion of its eastern boundary and a portion of its northern boundary, which adjoin lands administered by the BLM. The Pine Tree Canyon Road transmission line passes through approximately 1 mile of BLM-administered land east of the project property and a total of approximately 9 miles of private land.

Project elements will include wind turbine generators, foundations, meteorological towers, an electrical collection system of underground and overhead electrical lines, a substation, grid interconnect facilities, an operations and maintenance facility, and access roads. As part of the proposed project, LADWP will design, construct, and operate approximately 10 miles of 230,000 volts (kV) transmission line connecting the project substation to the existing LADWP 230-kV transmission line located near and running parallel to State Highway 14. During the construction phase of the Project, temporary facilities will be required for assembly and erection of the wind turbines, including areas for component lay down and temporary concrete batch plants. These temporary areas will be rehabilitated upon the completion of the construction phase of the project. To the extent feasible, the Project will take advantage of the many existing roads that have been in place within the private lands for many years.

The proposed wind turbines will be located along selected mountain ridgelines, on privately owned land, which collectively encompass about 8,000 acres (approximately 12.5 square miles). The turbine areas will consist of approximately 12, 400-foot-wide strips of land within which the facilities will be located. Additional acreage will be dedicated to operations and maintenance (O&M) support facilities. The O&M support facilities will consist of an approximate 35-foot high, 60-x-100-foot building containing offices for operation and maintenance personnel, workshop area, spare parts storage, control and relay room, restrooms, and training and lunchroom areas. The remaining area will consist of a fenced yard area containing the 34.5-kV to 230-kV step-up transformer, substation, and related electrical control equipment.

The proposed 10-mile, 230-kV transmission line between the project substation and the existing LADWP transmission line runs approximately west and east following an existing road through Pine Tree Canyon. Most of this proposed line is on private property. Approximately 1.0 mile of the proposed transmission line, located at the mouth of Pine Tree Canyon, crosses public land managed by the BLM. Two access roads for construction, and operations and maintenance, are under consideration and will be evaluated during the environmental process. Proposed access roads include the existing road in Pine Tree Canyon and the existing road in Jawbone Canyon, which both traverse through private property and BLM-administered land. The Jawbone Canyon route uses an existing road under the jurisdiction of the Kern County Roads Department. Some Public Land Sections in the Jawbone alternative cross the Jawbone Canyon Open Area, an area heavily disturbed by longstanding off-road vehicle use.

REGULATORY SETTING

Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance. Numerous laws, regulations, and statutes, on both the Federal and State levels, seek to protect and target the management of cultural resources. These include the Antiquities Act of 1906; Historic Sites Act of 1935; Reservoir Salvage Act of 1960; National Historic Preservation Act of 1966, as amended; National Environmental Policy Act of 1969; Executive Order 11593 (Protection and Enhancement of the Cultural Environment); Archaeological and Historical Preservation Act of 1974; American Indian Religious Freedom Joint Resolution of 1978; Archaeological Resources Protection Act of 1979; the Native American Graves Protection and Repatriation Act of 1990; and the California Environmental Quality Act. Collectively, these regulations and guidelines establish a comprehensive program for the identification, evaluation, and treatment of cultural resources on both the Federal and State levels.

EDAW, Inc. (EDAW) has been retained by LADWP to conduct necessary environmental permitting studies for the Project. LADWP is the lead agency under the California Environmental Quality Act (CEQA), while the BLM is the lead agency for the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA). The cultural resources surveys described herein were designed to provide these agencies an inventory of cultural resources, inclusive of archaeological and historical resources and traditional cultural properties, which might be affected by the project, consistent with relevant standards and guidelines developed under CEQA, NEPA, and Section 106 of NHPA. To assist in meeting these goals, a cultural resources inventory was initiated in 2002 by EDAW. Additional surveys and site evaluations were conducted in 2003 and 2004 by URS Corporation. This document addresses these investigations and documents previous research conducted within the Project Area and the results of the recent investigations. Potential impacts from the project are also identified, followed by recommendations for mitigation. Appendix A presents the Historic Properties Treatment Plan developed for Project sites.

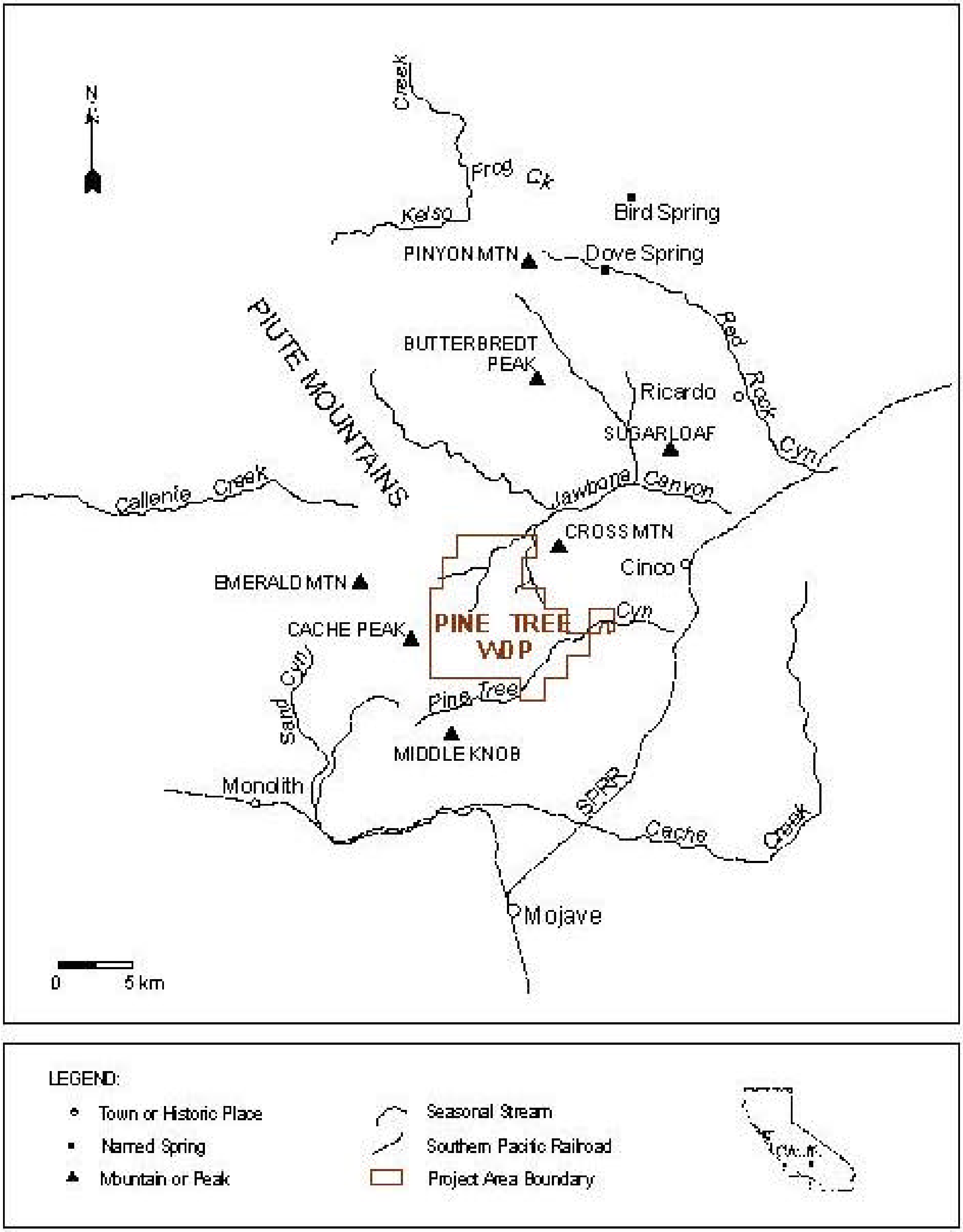

Figure 1-1. **Project Vicinity Map**.

CHAPTER 2 – ENVIRONMENTAL AND CULTURAL SETTING

ENVIRONMENTAL SETTING

Introduction

The Pine Tree Wind Development Project is located near upper Pine Tree and Jawbone canyons in the southeastern Piute Mountains of Kern County, northwest of Mojave, California (Figure 2-1). It is situated at the contact between the western Mojave Desert and the southern Sierra Nevada Mountains. The Mojave Desert forms part of the larger Basin and Range physiographic province (Hunt 1967), which extends south to include the Sonoran and Chihuahuan deserts of Arizona and Mexico. The Basin and Range province is characterized by hundreds of long, narrow, and roughly parallel mountain ranges separated by deep valleys, while the Sierra Nevada Mountains are characterized by rugged topography, with jagged crests, steep slopes and many deep stream channels and valleys.

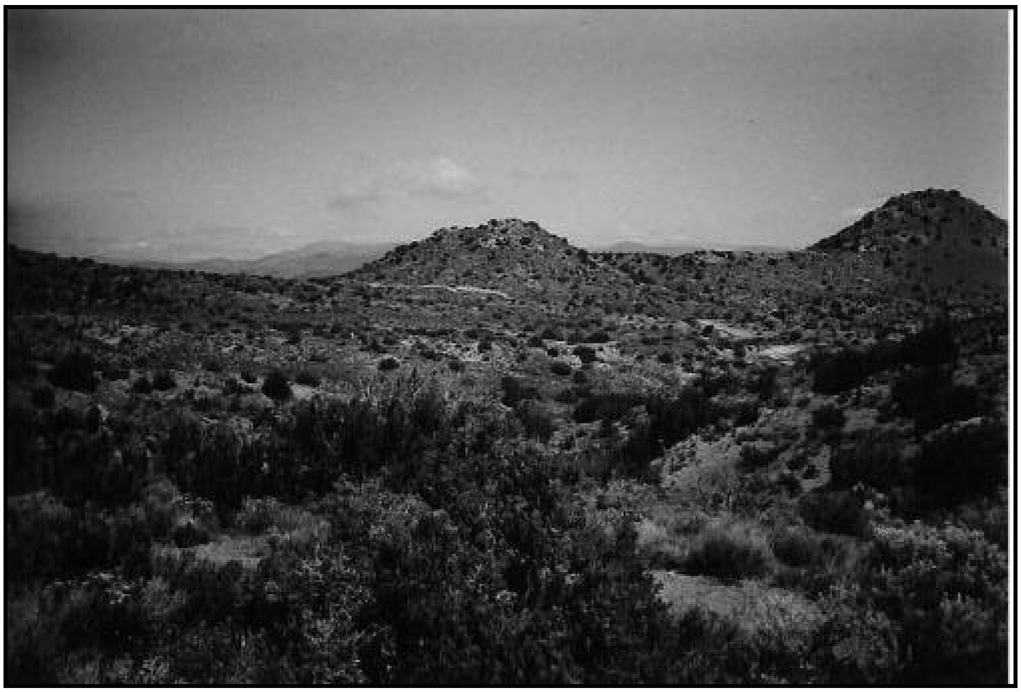

Figure 2-1. Overview of the Pine Tree Wind Project Area.

Mojave Desert

The Mojave Desert covers much of southeastern California and extends into portions of Arizona and Nevada. It is bounded on the west by the Sierra Nevada mountains, on the south by the Transverse and Peninsular ranges, on the southeast and east by the Yuma and Colorado deserts, and on the north by the Great Basin. The dividing line between the Mojave Desert and Great Basin may be arbitrarily defined by climate and the distribution of vegetation (Sutton 1996:222-223). The U.S. Geological Survey defines the northern Mojave Desert as including Owens Lake, the adjacent Coso Mountains and Panamint Range, Death Valley, Amargosa Range, Pahrump Valley, Spring Mountains, Las Vegas Valley, Dry Lake Valley, and Moapa Valley.

Within the Mojave Desert, the oldest identified rock formations consist of various metamorphosed sedimentary rocks, including gneiss, marble, quartzite, mica schist, gabbro, and conglomerates of pre-Cambrian age. Rock types of the Paleozoic era (230 to 620 million years old) include scattered sedimentary and carbonate rock, chert, limestone, sandstone, gypsum, and dolomite. Such materials typically formed at the bottom of an ocean, yield fossils ranging from Cambrian to Permian in age. These materials are not abundant within the Mojave block of the western Mojave Desert, although thick sections of Paleozoic rock occur within the El Paso Mountains (Hewett 1954:9-13).

Sandstone and limestone of the Mesozoic era (70 to 230 million years ago) also occur within the El Paso Mountains area and near Barstow. The limited distribution of thick masses of Paleozoic and Mesozoic formations within the Mojave block, south of the Garlock Fault, together with an absence of late Mesozoic and early Cenozoic rock older than the Miocene Period, provide evidence that this area rose 15,000 to 20,000 feet during the late Mesozoic and early Cenozoic (ca. 70 million years ago). This resulted in vigorous erosion of the pre-Miocene Tertiary rock formations with external drainage (Hewett 1954:14-15). Few areas of Eocene fossils have been noted in the El Paso Mountains and in the Palmdale area to the south. Pliocene age vertebrate fossils have been identified in the El Paso Mountains and Red Rock Canyon area, found within sediments designated the "Ricardo" formation. During the Oligocene and Miocene epochs (23 to 5 million years ago), volcanism dominated the landscape, with volcanic activity occurring near Ridgecrest and Red Rock Canyon. Volcanic material from this time may be found atop the Ricardo formation (Monastero 1996:164). Basalt and rhyolite flows also formed north of Indian Wells Valley and into the Coso Mountains about two to three million years ago.

Following the late middle Pliocene (about three million years ago), the Mojave region was subjected to great erosion (Hewett 1954:18). This was followed by the extrusion of Red Mountain andesite in the Randsburg area of the western Mojave. During the subsequent Pleistocene or glacial period, beginning about 1.64 million years ago, erosion helped form the long southward-trending valleys including Owens, Searles, Panamint, and Death Valleys. Streams flowing from these valleys, including the Owens River, likely flowed south across the Mojave block, successively filling Owens Lake, China Lake, Searles Lake, Panamint Lake, and Death Valley. Water then likely followed the Leach trough (Garlock Fault) and flowed southward to Silver Lake, Soda Lake, and Bristol Lake. Beyond this point, the water joined the Colorado River estuary (Hewett 1954:18). Finally, a number of basalt flows occurred during the Pleistocene and Holocene epochs. Such recent lava flows may be found extending from the Little Lake area to the Coso Mountains, and include the cinder cone known as Red Hill. At present, erosion of the Sierra Nevada and other surrounding mountains is actively filling the valleys with sediments, with such material as deep as 7,000 feet in Indian Wells Valley (Monastero 1996:166).

Presently, the Mojave is a warm-temperature desert situated between the subtropical Sonoran Desert to the south and the cold-temperature Great Basin to the north. The arid Mojave Desert is characterized by sparse rainfall, generally ranging from 5 to 25 cm (2 to 10 in.) per year. Some areas receive as little as 2.5 cm (1 in.) of annual precipitation, while others receive more than 25 cm (10 in.) (Warren 1984:342).

The Joshua tree (*Yucca brevifolia*) is often used as the common vegetative marker of the Mojave Desert (Sutton 1996:223), although much of the Project Area within the Mojave is marked by creosotebush (*Larrea tridentata*), the dominant plant of both the Mojave and Colorado deserts (Warren 1984:342). Open, Desert Scrub habitats such as this typically contain scattered assemblages of broad-leaved evergreen or deciduous microphyll shrubs that are usually between 0.5 and 2 m (1.5 and 6.5 ft) in height. Bare ground is common between plants (Laudenslayer and Boggs 1988:114). Overall, Desert Scrub habitats are characterized by low species diversity. While the lower elevations are dominated by creosotebush, higher elevations give way to yuccas and agaves and then to piñon-juniper habitats. Plant communities localized around springs, marshes, and streambeds produce tules, cattail, and various grasses (Warren 1984:343). Other riparian vegetation includes various types of cottonwood (*Populus* spp.) and willow (*Salix* spp.).

Large game animals are rare in the Mojave Desert, as evidenced by deer (*Odocoileus hemionus*) and black bear (*Ursus americanus*), which make infrequent treks from the nearby Sierra Nevada slopes. More common to the desert floor are various rodents and reptiles. Primary resident species may include Couch's spadefoot toad (*Scaphiopus couchii*), desert tortoise (*Xerobates [Gopherus] agassizii*), desert iguana (*Dipsosaurus dorsalis*), chuckwalla (*Sauromalus obesus*), leopard lizard (*Crotaphytus wislizenii*), horned lizard *(Prynosoma platyrhinos*), banded gecko (*Coleonyx variegatus*), western whiptail (*Cnemidophorus tigris*), common kingsnake (*Lampropeltis getulus*), Mojave rattlesnake (*Crotalus scutulatus*), sidewinder (*C. cerastes*), gopher snake (*Pituophis melanoleucus*), various pocket mice (*Perognathus* spp.), whitetail antelope squirrel (*Ammospermophilus leucurus*), and kangaroo rats (*Dipodomys* spp.). Other species found in the Mojave include blacktail jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), kit fox (*Vulpes macrotis*), coyote (*Canis latrans*), and bobcat (*Lynx rufus*) (Laudenslayer and Boggs 1988:114; Martyn and Moore 1996).

More than 300 species of birds are found in the northern Mojave Desert. Common to the open desert of Indian Wells Valley are the prairie falcon (*Falco mexicanus*), burrowing owl (*Athene cunicularia*), lesser nighhawk (*Chordeiles acutipennis*), horned lark (*Eremophila alpestris*), roadrunner (*Geococcyx californianus*), cactus wren (*Campylorhynchus brunneicapillus*), Say's phoebe (*Sayornis saya*), Le Conte's Thrasher (*Toxostoma lecontei*), and black-throated sparrow (*Amphispiza bilineata*) (Moore 1996:117). Within canyons are found chukar (*Alectoris chukar*), California quail (*Lophortyx californicus*), great horned owl (*Bubo virginianus*), rock wren (*Salpinctes obsoletus*), mountain bluebird (*Sialia currucoides*), and others. Marshes and lakes in the Mojave Desert area may contain the long-billed marsh wren (*Cistothorus palustris*), snow goose (*Chen caerulescens*), Canada goose (*Branta canadensis*), red-winged blackbird (*Agelaius phoeniceus*), eared grebe (*Podiceps nigricollis*), white pelican (*Pelecanus erythrorhynchos*), mallard (*Anas platyrhynchos*), ruddy duck (*Oxyura jamaicensis*), California gull (*Larus californicus*), and many other species (Moore 1996:117-118). Canada geese, pelicans, ruddy ducks, and pintails (A. acuta) are known to frequent Little Lake during the spring and fall migrations.

Sierra Nevada Mountains

The Sierra Nevada Mountains extend some 360 miles from a point near Mt. Lassen at the north to Walker Pass at the south. It ranges from 60 to 80 miles in width and trends roughly from northwest to southeast. It consists primarily of a massive granite block that is tilted, forming a gradual western slope and an abrupt eastern slope. The eastern escarpment rises some 2,000 to 3,000 feet in elevation at the north end of the range, while at the south end, it rises some 7,000 feet or more from the valleys bordering its base. Summits found in the southern Sierra Nevada near Owens Valley rise to as high as 14,000 feet above sea level. The crest of the Sierra Nevada is cut apart by numerous passes, natural travel corridors used by Indians and early pioneers. The southernmost route is Walker Pass, situated at 5,250 feet (Storer and Usinger 1963:3-8).

Among the oldest rock formations in the Sierra Nevada are marbles, slates, and greenstones derived from rocks more than 200 million years old, dating to the late Paleozoic Era. During the Paleozoic, there were six major continental landmasses; each of these consisted of different parts of the modern continents. For instance, at the beginning of the Paleozoic, today's western coast of North America ran east-west along the equator. Rocks of this time found within the Sierra Nevada indicate that a flat surface was formed by erosion, and this surface then became covered by the sea (Storer and Usinger 1963:17). A thick sequence of volcanic and sedimentary materials was then deposited during the Mesozoic Era, within the Triassic and Jurassic periods. The Mesozoic was a time of great change in terrestrial vegetation, as well as the time of the dinosaurs. Within the Sierra Nevada region, marine beds of this time formed into rock and were folded into parallel, northwest-trending mountain ridges and valleys, with streams flowing in northwesterly or southeasterly directions. During the Middle Cretaceous period, at about 100 million years ago, large amounts of molten granite were injected into and under the overlying, folded strata. Such granite was exposed by erosion during the Late Cretaceous, and deep clay soils were formed. During this time, the sea reached inland to the eastern border of what is now the Great Valley. The breakup of the world-continent Pangaea continued during the Mesozoic Era, resulting in regional diversity of flora and fauna by the Cretaceous period.

During the early Cenozoic Era, at about 70 to 60 million years ago, the Coast Ranges were folded up, and the ancestral Sierra Nevada Mountains tilted, forming a slope toward the west. Streams then began to flow westward, removing the deep clay deposits. During the Oligocene and Miocene epochs, volcanic mud flows appeared throughout the Sierra Nevada, burying valleys and low ridges along the western slopes, primarily in the northern Sierra. About 12 million years ago, the Sierras uplifted several thousand feet, and this uplift continued into the Pliocene epoch, bringing the Sierra to about its present height (Storer and Usinger 1963:17). The Pliocene was a time of global cooling, during which vast grasslands spread across most continents, favoring the diversification of grazing animals. In addition, the Panamanian land-bridge between North and South America appeared during the Pliocene, allowing migrations of plants and animals into new habitats. Of even greater impact was the accumulation of ice at the poles, which would lead to the extinction of most species living there, as well as the advance of glaciers and ice ages of the Late Pliocene and the following Pleistocene.

It was throughout the Pleistocene, dating from 1.8 million years to 10,000 years ago, that the most recent episodes of global cooling, or ice ages, took place. Much of the world's temperate zones were alternately covered by glaciers during cool periods and uncovered during the warmer interglacial periods when the glaciers retreated. Within the Sierra Nevada region, glaciers accumulated within the high country, and such masses began moving slowly down slope, carving out U-shaped valleys and scouring the land surface. Glaciers and ice fields of the Sierra Nevada were generally discontinuous, and there is evidence of at least three lengthy glacial stages, each separated by warm, interglacial intervals. From Donner Pass south to the upper Kern River Canyon, there were individual ice fields of a few to many square miles, and from each of these there were trunk glaciers that flowed down valleys toward both the east and west (Storer and Usinger 1963:20). Many of the scenic features and biological environments of the Sierra Nevada that exist today were formed during the Pleistocene epoch. It was also during the Pleistocene that the evolution and expansion of modern humans took place, including the intrusion of humans into North America.

Given the high elevation of the Sierra Nevada range, and the pattern of prevailing storms from the Pacific Ocean, the mountains present a barrier to the movement of moisture to the east. For most of the Sierra Nevada range, the western slope is characterized by a Mediterranean climate, with cool, moist winters and warm, dry summers. Thunderstorms are infrequent in late summer, while winter snow occurs in areas above 3,500 feet, and varies greatly from year-to-year. Normal precipitation for the lower slopes is between 7-12 inches per year. Areas east of the Sierra Nevada are drier due to the “rain shadow” effect of the mountains. This picture of contemporary climate is probably generally characteristic of the western Sierra Nevada; however, significant changes in climate and environment in this area during the 10,000 years have been documented for the larger Sierra Nevada area (Moratto and Davis 1988).

Lower elevations of the far southern Sierra Nevada are characterized by creosotebush, with intermediate slopes supporting Joshua tree scrub and juniper-piñon woodland. Higher wilderness slopes to the west are marked by chaparral, blue oak-digger pine, and Jeffrey pine forest. As mentioned in the Mojave Desert section above, creosotebush is a hallmark of the Desert Scrub habitat, the most widespread habitat in California deserts. Desert Scrub is found throughout the Mojave Desert, as well as on the lower, western slopes of the southern Sierra Nevada near Walker Pass. Creosotebush and Desert Scrub occurs on lower elevations, below 4,000 feet, and have a low species diversity in terms of both plants and animals. Other plants common to the Desert Scrub include rubber rabbitbrush, cholla, beavertail cactus, barrel cactus, white bursage, and desert agave. Animals include primarily rodents and reptiles, including a variety of snakes and lizards, the desert tortoise, kangaroo rats, and pocket mice. The kit fox, coyote, and bobcat may also be found in the Desert Scrub habitat (Laudenslayer and Boggs 1988:114-115).

Joshua Tree habitats typically occur along the periphery of the Mojave Desert above creosotebush, at elevations ranging from 750 to 2,500 feet (Laudenslayer 1988:93). Joshua trees are typically found on well drained, deep soils and alluvial slopes within areas characterized by cool, moist winters and dry, hot summers. Joshua trees intergrade with Desert Scrub at lower elevations, and interface with Juniper-piñon Woodland at higher elevations. Such trees are generally widely scattered, and often occur with creosote, sagebrush, Mormon tea, California buckwheat, Cooper goldenbush, and bladdersage. Grasses include red brome and desert needlegrass (Laudenslayer 1988:92-93).

The Juniper-Piñon woodland occurs on the desert-facing slopes of the Sierra Nevada from 4,000 to 9,000 feet in elevation, and is dominated by California juniper (*Juniperus californica*) and singleleaf piñon (*Pinus monophylla*). Juniper-Piñon habitats thrive on dry, well drained, rocky slopes that face east. Such trees require hot summers and intense sunlight with low relative humidity (Laudenslayer and Boggs 1988:62-63). In favorable areas, juniper and piñon may form dense stands, while such trees become scattered in drier, low elevation sites. The Juniper-Piñon association is especially prominent along the Kern-Tulare County line in the Lamont Peak region, extending south to Walker Pass. South of Walker Pass, on the summits of Gold, Dove, and Butterbredt Peaks, the Juniper-Piñon woodland is poorly developed (Schiffman and Garfinkel 1981).

Blue Oak-Digger Pine woodland occurs on scattered slopes of the southern Sierra Nevada in Kern County, particularly within the Kern River area. This habitat type is found between 500 and 3,000 ft in elevation, common to areas that receive from 20-40 inches of precipitation during the year. At higher elevations, the Blue Oak-Digger Pine woodland may be found mixed with chaparral. The overstory is dominated by blue oak and digger pine (gray pine), while a mix of other hardwoods and shrubs may occur. Tree species associated with this habitat include interior live oak and California buckeye. Shrub species may include *Ceanothus*, manzanita (*Arctostaphylos* spp.), redberry, California coffeeberry, poison oak, blue elder, redbud, and yerba santa. Also common to the Blue Oak-Digger Pine woodland are open patches of annual grass (Verner 1988).

The chaparral country is dominated by manzanita (*Arctostaphylos* spp.) and *Ceanothus* shrubs. The Mixed Chaparral habitat occurs below 5,000 feet in elevation, found on the western slope of the Sierra Nevada. While it occurs on all aspects, it is more often found on north-facing slopes, in areas that receive from 15-25 inches of precipitation per year (England 1988:104-105). Mixed Chaparral habitats are commonly characterized by dense, nearly impenetrable thickets of brush, and may contain chamise, mountain mahogany, shrub live oak, yerba santa, poison oak, and buckeye.

The highest elevations of the Project Area are characterized by yellow pine, namely a Jeffrey Pine woodland. Within the Project Area, this habitat type occurs at elevations above 5,500 ft, and often occurs on soils formed from decomposing granite and lava. It is found above the Blue Oak-Digger Pine and Juniper-Piñon woodlands, within areas that receive from 14-20 inches of precipitation per year, mainly in the form of snow (Schiffman and Garfinkel 1981). While the overstory is dominated by Jeffrey pine with lesser amounts of Ponderosa pine, white fir, and incense cedar, a lower, secondary tree layer of deciduous hardwoods may occur, including black oak (*Quercus kelloggii*), juniper, and piñon pine. Shrubs typical of the Jeffrey Pine habitat in southern California include scrub oak, Ceanothus, Sierra chinquapin, and manzanita (McBride 1988).

Paleoenvironment

Understanding prehistoric human occupation of the Project area requires knowledge of its past environmental context, particularly any changes that occurred during the Holocene epoch, or the past 10,000 years. Evidence for paleoenvironmental change has been well documented for the Great Basin, Mojave Desert, and Sierra Nevada region (Anderson 1990; Anderson et al. 1985; Grayson 1993; Mehringer 1977, 1986; Scuderi 1987, 1993; Spaulding 1985, 1990; Stine 1990, 1995; Weide 1982). Through these studies and others, a general picture of environmental change for the past 10,000 years has emerged.

Human occupation of the Project vicinity likely began some time at or near the end of the Pleistocene or Glacial Epoch, some 12,000 to 10,000 years ago. This was at the end of the Wisconsin glacial age, a period of increasing temperature and changing circulation patterns from 14,000 to 10,000 years ago. The postglacial or Recent Epoch, referred to as the Holocene, may be divided into three periods. The early Holocene dates roughly from 10,000 to 7,500 years ago, while the middle Holocene dates from 7,500 to 4,000 years ago. That period from 4,000 years ago to the present is referred to as the late Holocene. Together, the Pleistocene and Holocene comprise the Quaternary Period, representing the past 1.6 million years.

The glacial climate of the Pleistocene within the Mojave Desert and Great Basin was cooler that at present, with wetter conditions supporting several major lake systems, smaller lakes, and associated lacustrine zones (Sutton 1996:224; Weide 1982). Such lakes are referred to as “pluvial,” reflecting their creation during prolonged periods of wet climate. Pollen records from Searles Lake and the Panamint Mountains indicate that present woodland vegetation (pine, juniper, and sage) was up to 1,200 m (3,900 ft) lower than at present before 10,000 years ago (Weide 1982:12). Pluvial Lake Searles included both the China and Searles lake basins, and was once part of a larger, interconnected lake system that included Owens and

Death valleys (Grayson 1993:100). At its maximum level during the Pleistocene, water likely overflowed from Mono Lake to Owens Lake by way of Owens River, then to China and Searles Lake. Fossil Falls within Rose Valley provides evidence of the water flow between Owens and China lakes. Sediments of Searles Lake show evidence of several periods of increase and high water during the late Pleistocene, between 16,000 and 10,000 years ago (Grayson 1993:101-102). After 13,000 years ago, a general desiccation of pluvial lakes in the Mojave region began, perhaps marked by climatic conditions more similar to those of today (Weide 1982:17).

Evidence from the central Mojave Desert indicates that during late Pleistocene and early Holocene times, between 11,400 and 8,700 years ago, water routinely traveled the entire course of the Mojave River, forming a series of shallow lakes within the area of Lake Mojave. Although shallow lakes formed there after 8,700 years ago, none were of the magnitude of those before that time (Grayson 1993:195). From about 10,000 to 7,000 years ago, many, now-dry Great Basin valleys appear to have supported a series of substantial lakes and marches. Such features would have provided resources such as waterfowl, fish, cattail, bulrush, and other plants associated with mesic conditions. As conditions became more arid during the early Holocene, lakes retreated and woodlands began to withdraw to higher elevations, being replaced by the desert scrub common within the Project Area today. In many areas of the Mojave Desert, such as Death Valley and Lucerne Valley, juniper all but disappeared between 10,000 and 7,800 years ago, being replaced by creosotebush (Grayson 1993:199).

Within the middle Holocene, both China Lake and Searles Lake attained their last lacustural stage at about 6,000 years ago. It was at this time that the last spilling of Owens Lake likely occurred (Los Angeles Department of Water and Power n.d.). Pollen cores from Little Lake indicate that, by 7,000 years ago, the climate of the northern Mojave Desert was similar to that of the present, and was definitely more arid than at any time during the preceding 13,000 years (Weide 1982:15). Packrat middens from the Alabama Hills reveal that after the retreat of juniper (ca. 8,000 years B.P.), few changes occurred in the plant composition of the Owens Valley area (Koehler and Anderson 1995). Analysis of packrat middens in the eastern Mojave Desert south of Las Vegas suggests that the middle Holocene was warm and dry, with conditions between ca. 6,800 and 5,060 years ago being more arid than today (Grayson 1993:215). In fact, evidence throughout much of the Great Basin points to a period of high temperatures and low precipitation during the middle Holocene.

In general, the late Holocene is characterized by conditions cooler and moister than the middle Holocene, but not as cool and moist as the early Holocene. The arid conditions of the middle Holocene gave way to greater effective moisture by about 5,500 to 4,500 years ago. Detailed records from the Great Basin provide evidence of environmental variability, including periods of climatic change during the past 3,500 years. An example is Mono Lake, which has witnessed a series of at least six significant high, and intervening low, stands during the late Holocene (Grayson 1993:223). Mono Lake was at a high stand ca. 3,500 years ago, similar to modern times, and reached its lowest levels of the past 3,500 years between 2,000 and 1,800 years ago. Stine (1994) suggests that at least two periods of major drought have occurred within the Sierra Nevada Mountains, at ca. A.D. 892 to A.D. 1112 and ca. A.D. 1209 to A.D. 1350. Such droughts would have had a direct impact on Owens Valley and the western Mojave Desert, since these areas receive significant water flow from the Sierra Nevada. Cleland and Spaulding (1992:4) suggest that a period of cooler and wetter conditions occurred between 600 and 150 years ago, while dendrochronological data provide evidence of a major drought between A.D. 1760 and A.D. 1820, with a minor Sierran neoglacial advance after A.D. 1850 or A.D. 1860 (Delacorte 1999:7).

ETHNOGRAPHIC OVERVIEW

Kawaiisu

The ethnographic Kawaiisu people occupied the forest, desert, and grassland environments at the southern end of the Sierra Nevada, and in the Paiute and Tehachapi mountains (Figure 2-2). Although their core habitation area was limited to 2,500 square miles in the mountains, seasonal trips were made eastward into Indian Wells Valley, Granite Mountains, and the Mojave Desert to exploit various resources. In this way, their sphere of influence expanded to include nearly 13,000 square miles. The Kawaiisu have been described as representing a blend of California and Great Basin cultures (Zigmond 1986).

Neighboring California groups included the Tubatulabal to the north, the Southern Yokuts to the west, and the Kitanemuk and Serrano groups to the south. Neighboring Great Basin groups included the Western Shoshone to the northeast and Southern Paiute to the east. The notion of distinct cultural boundaries was foreign to the Kawaiisu, and overlapping of groups was commonplace. This was especially prevalent during seasonal expeditions, and during the trade of acorns for obsidian, salt, or pottery (Cappannari 1960; Zigmond 1986). Intertribal relations were peaceful and cooperative; each year, several local tribes coalesced into one hunting party for the annual antelope drive (Voegelin 1938).

The Kawaiisu language is a member of the Southern Numic division of the Uto-Aztecan language family (Miller 1986; Zigmond 1986). The Kawaiisu referred to themselves as *niwi*, meaning “person,” or *niwiwi*, for “people” (Kroeber 1925; Zigmond 1986). Linguistic reconstructions have deemed the Kawaiisu language separate from the other Southern Numic dialects (Goss 1966), with the Kawaiisu area identified as the original location of the Proto-Numic and Southern Numic (Fowler 1972). If true, at the time of historic contact, the Kawaiisu would have been at their location for over 2,000 years (Zigmond 1986).

Kawaiisu subsistence practices focused on hunting and gathering of local plant and animal resources. Zigmond (1981) compiled a list of 233 plant species used by the Kawaiisu for food and beverage, medicine, spirituality, or other uses. Acorns served as a principal food resource, and were used to trade for exotic obsidian and salt. Although deer was the favored meat, other animals were also eaten, including large and small game, rodents, birds, and insects (Zigmond 1986). Fish were a minor dietary item, owing to the few fish-bearing streams within the region.

The primary winter settlement was the *tomokahni*, a circular, aboveground structure constructed of willow for winter use. The *havakahni* was a flat-roofed, summer, house with an open exposure. Sweathouses, referred to as *tivikahni*, were earth-covered structures, usually built near water resources. Small windbreaks, short-term camps, and granaries were other common types of structures (Zigmond 1986).

Social organization was focused on the family group, but because there was rarely violent conflict, there was no need for a single authority or leader. Instead, several male leaders were accepted at any given time. It was their responsibility to provide lavish celebratory feasts rather than leadership during war (Zigmond 1986).

Material cultures included the juniper wood bow and the arrow, as well as elaborate basketry for use as plant gathering baskets and hats. The Kawaiisu used two basic basketry weaves – twined and coiled – but developed a distinctive variant of the coiled, which is easily recognized for its design and decorative qualities, even in utilitarian items (Zigmond 1986:401). Willow was used to form the baskets, while Joshua tree roots and quail crests were used in designs. It is believed that pottery, such as Owens Valley Brown ware, was obtained through trade with neighboring Great Basin groups rather than manufactured by the Kawaiisu (Zigmond 1986:401).

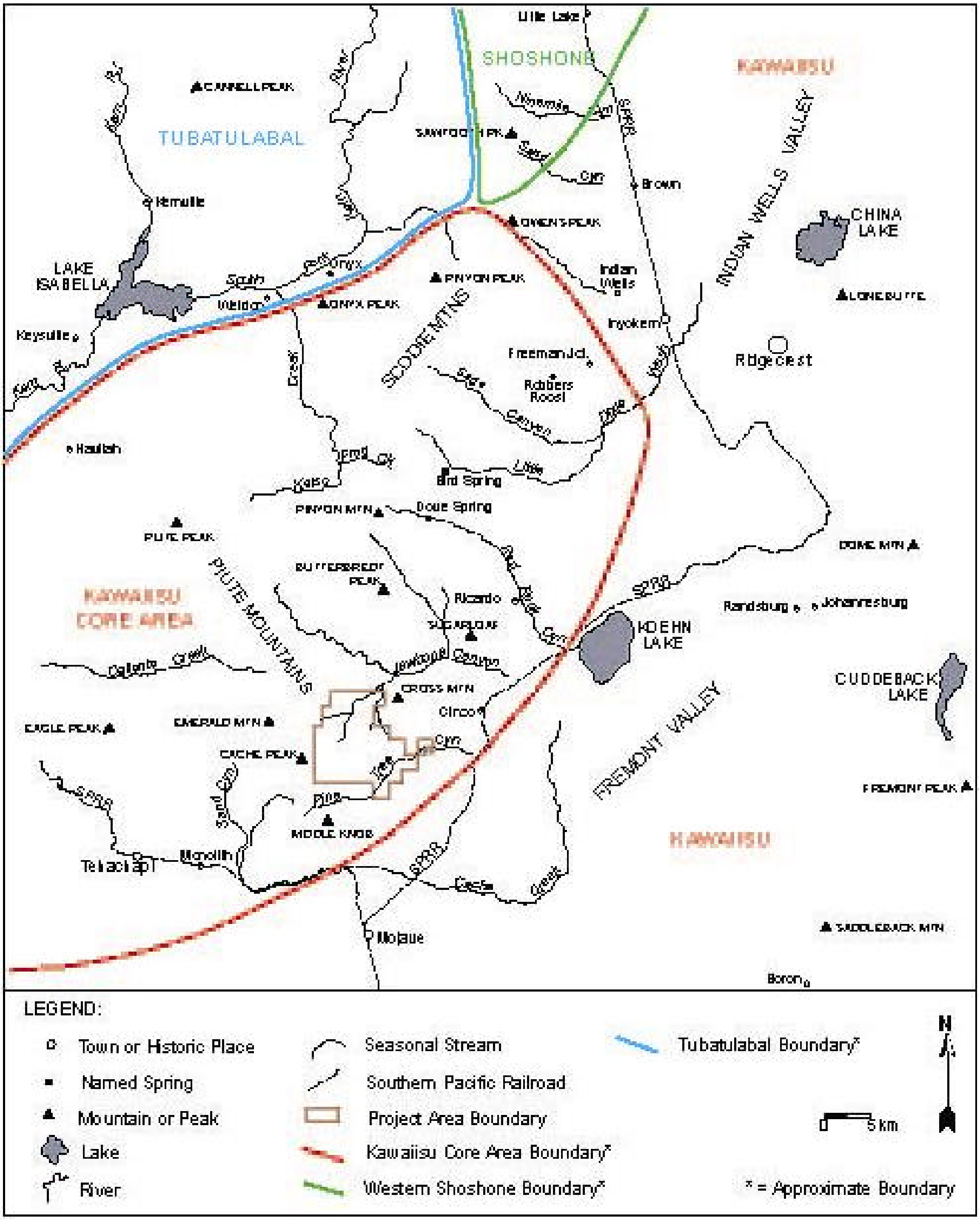

Figure 2-1. Ethnographic Territories Map. (Sources: Smith 1978; Steward 1938; Zigmond 1986)

The earliest documented contact between Kawaiisu and non-indigenous cultures may have occurred as early as 1776 by missionary priest Francisco Garcés, who encountered a very peaceful and receptive group of women and children in the Kawaiisu area during his travels (Coues 1900). In 1844, John C. Frémont crossed Oak Creek Pass, southeast of Tehachapi, likely encountering the Kawaiisu. Subsequently, prospectors descended upon region during the 1850s Gold Rush era, adding to the existing non-native population of trappers, stockmen, and farmers. The result was an inevitable clash of cultures. Escalating conflicts led to the Massacre of 1863, which was spearheaded by Captain Moses McLaughlin, after it was reported that a group of Indians was amassing near Keysville (Zigmond 1986).

The Kawaiisu Indians were relocated by the federal government onto the Tejon reservation, years after the signing of the 1851 treaty by local Tejon Indians. When Fort Tejon was built, to control the Tejon Indians, the Kawaiisu were forced to relocate to the reduced 25,000 acre Tejon reservation. Like most Native American groups, the Kawaiisu population was significantly reduced after contact. Population estimates place the Kawaiisu at 500 before Euroamericans entered the region, and only 150 by 1910. By 1984, only 30 remained, scattered in towns across southern California. Today, a number of contemporary Kawaiisu descendants are actively involved in preserving their language and interpreting their past, as evidenced by the establishment of Tomo-Kahni State Park in 1996. The Park, which encompasses a Kawaiisu winter village, is dedicated to archaeology and the preservation of Native American culture.

ARCHAEOLOGICAL BACKGROUND

Prehistory of the Southern Sierra Nevada

The southern Sierra Nevada region encompasses the upper San Joaquin, Kings, Kaweah, Tule, and Kern River systems, an area of varied topography that embraces low, rolling foothills, ridge and canyon systems, high meadows, and rugged mountain peaks. Kawaiisu homeland straddled the southern end of the southern Sierra Nevada area, including a portion of the Kern River system, the Scodie and Piute mountains, and extending south to the Tehachapi Pass and Double Mountain. East of the mountains, peripheral use areas extended well into to the Mojave Desert, reaching northeast to the Amargosa River and southeast to the Mojave River (Zigmond 1986: Figure 1).

Archaeological investigations within the far southern Sierra Nevada region have focused on numerous compliance-related surveys and some excavations, the latter producing data for the development of a local chronological sequence. Excavations have included studies near Delonegha Springs in the Kern River Canyon by California State University, Fresno (unpublished); near Bodfish, below Isabella Dam (Voegelin 1938); in the Philips Ranch area (Sutton 1982), and in the Tule River country (Jones 1969; Jones and King 1970). The most intensive work, however, has been the systematic survey and testing of sites along the Pacific Crest Trail, in high country of eastern Kern and Tulare counties (McGuire and Garfinkel 1980). Employing data from these investigations, McGuire and Garfinkel (1980) defined a four-phase chronological sequence for the southern high Sierra Nevada that includes the Lamont Phase (4000 – 1200 B.C.), Canebrake Phase (1200 B.C. – A.D. 600), Sawtooth Phase (A.D. 600-1300), and Chimney Phase (A.D. 1300 – historic period).

Prehistory of the Mojave Desert Region

The chronological sequence for the northeastern Mojave Desert proposed by Warren (1980, 1984) and Warren and Crabtree (1986), divides the prehistoric era into five periods: Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Shoshonean. The latter includes the ethnographic era, while the four previous periods encompass the Archaic of the Great Basin and, in the Saratoga Springs period, Formative influences from the Southwest (Lyneis 1982). Claims have been made for archaeological assemblages dating to periods earlier than Lake Mojave, but as Warren and Crabtree (1986) note, all are controversial and, even if valid, have little or no relationship to later cultural developments in the region.

The northeastern Mojave Desert sequence has been recently expanded by Sutton (1996) to include elements more closely aligned to the prehistoric periods described above for the Owens Valley area. Similar to

Warren and Crabtree (1986), Sutton (1996) notes little evidence of a "Pre-Projectile Point" Pleistocene occupation of the Mojave Desert. In contrast to the earlier sequence, pre -Holocene era occupation is identified and termed the Paleoindian period. Other elements of Sutton's (1996) Mojave Desert chronology include the Lake Mojave period, Pinto period, Gypsum period, Rose Spring period, and Late Prehistoric period, as described below.

Paleoindian Period (ca. 12,000 – 10,000 B.P.)

The earliest, clear evidence for human occupation of the Mojave Desert begins at about 12,000 years ago, while claims for earlier, pre-Holocene era occupations such as those made for Tule Springs (Harrington and Simpson 1961), Lake China (Davis 1978), and Lake Manix (Simpson 1958, 1960, 1961) remain unsubstantiated. The Paleoindian period experienced profound environmental changes, as cool, moist conditions of the terminal Wisconsin glacial age gave way to a warmer, drier climate of the Holocene (Spaulding 1990).

Paleoindian period sites are characterized by fluted Clovis projectile points and related materials, commonly viewed as representing a Big Game Hunting Tradition focused on the exploitation of Pleistocene megafauna (Moratto 1984:79). Although a lack of milling equipment is evident during this period, it is likely that a variety of plant resources and small game were also exploited (Sutton 1996:227). Fluted point finds are widely distributed across the Mojave Desert, with only a single Clovis occupation site identified at Lake China (Davis 1978; Davis and Panlaqui 1978a, 1978b, 1978c). Such Clovis finds have consistently been dated based on their typological similarity with dated specimens from the Great Plains region (Sutton 1996:228).

Lake Mojave Period (ca. 10,000 - 7000 B.P.)

Cultural materials dating to this time have been assigned to the Playa and Malpais cultures (Rogers 1939), the San Dieguito Complex (Warren 1967), and the Lake Mojave Complex (Warren and Crabtree 1986). This phase is considered ancestral to the Early Archaic cultures of the Pinto period, and represents a shift toward a more diversified and generalized economy (Sutton 1996:228). Lake Mojave assemblages, first identified at Lake Mojave (Campbell et al. 1937), include Lake Mojave series projectile points (leaf-shaped, long stemmed points with narrow shoulders) and Silver Lake points (short bladed, stemmed point with distinct shoulders). Other diagnostic items include flaked stone crescents; abundant bifaces; and a variety of large, well-made scrapers, gravers, perforators, and heavy core tools.

Millingstones are generally absent in the archaeological record of this time. In the Mojave Desert and southern Great Basin, this assemblage is typically (but not exclusively) found around the margins of ancient lakes, although the role of the lakes in the overall adaptation remains unclear. According to Sutton (1996:229), Lake Mojave period sites occur more commonly in the eastern and central Mojave Desert, while rare occurrences have been noted within the western Mojave in the Lake China and Coso areas.

Pinto Period (ca. 7000 - 4000 B.P.)

The Pinto period is marked by the appearance of Pinto series projectile points, characterized as thick, shouldered, expanding stem points with concave bases. Such points were typically produced by percussion reduction, with limited pressure retouch. Named for the Pinto Basin Site (Campbell and Campbell 1935), the points were presumably used on atlatl darts. As mentioned in the Owens Valley and Rose Valley discussion above, large numbers of such artifacts were also recovered from the Stahl Site near Little Lake (Harrington 1957).

The transition from big game hunting to a more broadly based economy likely continued into the Pinto Period (Sutton 1996:231). The period between about 7,500 and 5,000 years ago appears to have been more arid across the Mojave region (Hall 1985; Spaulding 1991). It is during this time that woodland attained its approximate modern elevation range, and the modernization of desert scrub communities was completed with the immigration of such plant species as creosote bush into the area. Warren (1984) sees this period as marking the beginnings of cultural adaptation to the desert, as materials characteristic of the Pinto period gradually replace those of the preceding Lake Mojave period. Sites associated with this era are usually found in open settings, in relatively well-watered locales representing isolated oases of high productivity.

Major technological shifts include the appearance of Pinto points, domed scrapers, and a significant increase in the use of millingstones (Warren and Crabtree 1986). Warren (1990) attributes the latter development to the exploitation of hard seeds, which is seen as part of a process of subsistence diversification brought on by increased aridity and reduced ecosystem carrying capacity. Big game hunting probably continued as an important focus during this time, but the economic return of this activity likely decreased as artiodactyl populations declined in response to increased aridity (Warren and Crabtree 1986). In fact, faunal remains from recorded Pinto period sites are dominated by lagomorph, followed by artiodactyl remains. The remains of rodents, some reptiles, and freshwater mussel have also been recovered from Pinto period contexts. The exploitation of piñon is also suggested by the recovery of hulls from hearth features at Surprise Spring (Sutton 1996:232).

Gypsum Period (ca. 4000 - 1500 B.P.)

Gradual amelioration of the climate began by around 5,000 years ago, culminating in the Neo-glaciation at about 3,600 years ago, and a period of greater effective moisture dating to the latter part of the Middle Holocene (Spaulding 1995). At this time, barren pans in the Mojave Sink episodically held perennial water, although it is not known if this was the case for other closed basins in the region. An increase in moisture would have presumably resulted in favorable conditions in the desert, and may have influenced changes in cultural adaptations, including increasing population, trade, and social complexity (Sutton 1996:232).

Culturally, the Gypsum period is marked by population increases and broadening economic activities as technological adaptation to the desert environment evolved. Hunting continued to be an important subsistence focus, but the processing of plant foods took on greater importance as evidenced by an increase in the frequency and diversity of ground stone artifacts. Later, the bow and arrow were introduced, increasing hunting efficiency. Perhaps due to these new adaptive mechanisms, the increase in aridity during the late Gypsum period (after ca. 2,500 years ago) seems to have had relatively little consequence on the distribution and increase in human populations (Warren 1984; Warren and Crabtree 1986). In addition to open sites, the use of rockshelters appears to have increased at this time. Base camps with extensive midden development are a prominent site type in well-watered valleys and near concentrated subsistence resources (Warren and Crabtree 1986). Additionally, several types of special purpose sites in upland settings begin to appear.

Considerable evidence exists indicating increased contact with the California coast and the Southwest during the Late Archaic, and the presence of split-twig figurines and zoomorphic petroglyphs suggest that a rich ritual life was present. Much of the Coso Range rock art may date to Gypsum times (Grant et al. 1968). Gypsum period sites are characterized by medium to large stemmed and notched projectile points, including Elko series, Humboldt Concave Base, and Gypsum. In addition, rectangular-based knives, flake scrapers, occasional large scraper planes, choppers and hammerstones; handstones and milling tools become relatively commonplace and the mortar and pestle appear for the first time.

Gypsum period faunal assemblages within the Fort Irwin area contain greater amounts of artiodactyl remains than do later components, which contain larger numbers of small animal remains. This suggests a shift in subsistence orientation and mobility near the end of the Gypsum period, with decreased residential mobility (Basgall et al. 1988; Sutton 1996:234). Rock art suggests that the hunting of mountain sheep was important during the Gypsum period (Grant et al. 1968), while artiodactyl, lagomorph, rodent, and tortoise remains are reported from Gypsum period sites in the central Mojave Desert (Hall and Basgall 1994). Evidence from the western Mojave Desert suggests that there was a major population increase about 3,000 to 2,300 years ago (Gilreath and Hildebrandt 1991; Sutton 1988).

Rose Spring Period (ca. 1500 – 1000 B.P.)

Sometime between 2,000 and 1,500 years ago, small projectile points (Eastgate and Rose Spring series) began to dominate assemblages in the Mojave Desert and southern Great Basin. Such points appear to mark the introduction of a bow and arrow technology and the decline of the atlatl and spear weaponry (Sutton 1996:235). These points fall within Warren and Crabtree's (1986) Saratoga Springs period, a time of marked regional differentiation throughout the region. This period saw the rise of Basketmaker III and Anasazi cultures in southern Nevada and portions of adjoining southern California, the influence of which, as evidenced by painted ceramics, extended a good distance to the west. Such influence near the Project Area appears to have been marginal, however, and sites of this period seem to exhibit general continuity with the Gypsum pattern. Change is most apparent in the reduced size of projectile points (Warren and Crabtree 1986).

Sutton (1996:235) notes that Rose Spring period sites are common in the Mojave Desert. Such sites often contain well-developed middens and abundant cultural materials, including milling equipment, hunting implements, and marine shell artifacts. Obsidian use was widespread, with Coso obsidian the most common source within the western and central Mojave Desert. Investigations have occurred at a number of Rose Spring period sites in the western Mojave, including Rose Spring (Lanning 1963; Yohe 1992), Coso Junction Ranch (Whitley et al. 1988), various sites in the Coso Range (Hillebrand 1972; Gilreath and Hildebrandt 1991), the El Paso Mountains (McGuire et al. 1982), Cantil (Sutton 1991), Koehn Lake (Sutton 1986b, 1990; Sutton and Hansen 1986), and Cottonwood Creek (Sutton 1988a).

Subsistence practices during the Rose Spring period appears to have shifted to the exploitation of medium and small game, including lagomorphs and rodents, with a decreased emphasis on large game. In addition, the milling of plant foods was an important activity, as suggested by milling slabs, handstones, pestles, mortars, and bedrock milling features. At Rose Spring, numerous bedrock milling features, including mortar cups and slicks, are associated with rich midden deposits. Within the eastern Mojave Desert, agriculture was being practiced during the Rose Spring period and into the subsequent Late Prehistoric period. This included the Anasazi populations of the Muddy and Virgin river areas (Sutton 1996:237).

Late Prehistoric Period (1000 B.P. - Contact)

Between 1,000 and 750 years ago, ethnic and linguistic patterns within the Mojave Desert increases in complexity. Late in prehistory (approximately A.D. 1000), it appears that Numic speakers expanded into southern Nevada and adjacent Arizona from the west or southwest. To the south of the Project Area, Hakatayan, and later, Yuman speaking groups occupied a broad area extending to the Gulf of California (Schroeder 1979). It is likely that groups representing both of these traditions interacted in some fashion with the Anasazi, but the exact nature of these contacts remains unclear (Lyneis 1982b).

One of the most important regional developments during the Late Prehistoric period was the apparent expansion of Numic-speakers (or Shoshonean groups) throughout most of the Great Basin. Many (but by no means all) researchers accept the proposition that sometime around A.D. 1000 the Numa spread eastward from a homeland in the southwestern Great Basin, possibly from Death Valley (Lamb 1958) or Owens Valley (Bettinger and Baumhoff 1982). While there is little dispute that the Numic spread occurred, there is much disagreement over its mechanics and timing (see Madsen and Rhode 1995). It is apparent, however, that the ethnographic Southern Paiute represents the entry of Numic speakers into southern Nevada sometime during this period. Characteristic artifacts of this period include Desert series projectile points (Desert Side-notched and Cottonwood Triangular), Brownware ceramics, Lower Colorado Buff Ware, unshaped handstones and millingstones, incised stones, mortars, pestles, and shell beads (Warren and Crabtree 1986).

Investigations within the western Mojave Desert point to an increased effective moisture beginning just after 2,000 years ago, as evidenced by a shoreline bench feature at Koehn Lake (Sutton 1996:238; Sutton and Hansen 1986). The Koehn Lake site appears to have been abandoned by 1,000 years ago, at the time Koehn Lake dried up during a major "medieval drought." Such a drought in the western portion of the

Mojave may have had an influence in the movement of people from this area north and east across the Great Basin (Sutton 1996:239).

HISTORY

Euroamericans arrived on the California coast in 1542 (Holliday 1999), but the first documented entry by non-indigenous people into the Southern Owens Valley and Mojave Desert did not occur until much later. During the eighteenth century, a handful of Spanish, Mexican, and American explorers, including Garces in 1776 and John Charles Fremont in 1844, traveled through the region during exploratory trips or missions (Coues 1900; Holliday 1999). Joseph Walker, for whom Walker Pass is named, traveled from the Mojave to the San Joaquin Valley in 1833. The Death Valley forty-niners, led by William Lewis Manly, reportedly traveled through the Project Area along Indian's Big Trail (Underwood 2000).

With the discovery of gold and silver in northern and western Nevada came a massive influx of prospectors into the West, and later into the deserts of California. Small mining towns and ranching operations mushroomed during the latter decades of the nineteenth century, including the new town of Mojave, established in 1876 (Pracchia 1994; Underwood 2000). By the late 1890s, other mining camps were established in the areas of Jawbone Canyon, Randsburg, and Johannesburg.

The Mojave and Owens Valley regions could not, by themselves, support large quantities of people; the hot, arid environment was considered unfriendly, and the need developed for transportation of goods, people, livestock, food, and mined ore, between there and Los Angeles. A number of trails and stage coach lines were introduced during the 1870s that utilized some existing trails known to Native Americans in the area. Indian's Big Trail, also called Owens River Road (Warren and Roske 1981), the Midland Trail, and the Bullion Road (Pracchia 1994), all connected the northern Mojave and Owens Valley area with Los Angeles, via connections with the Tehachapi Pass road and the Walker Pass road. Several of these old roads are known to have passed near or though the current Project Area; a road from Panamint City constructed by Remi Nadeau in the 1870s connected with the Bullion Road at Freeman Junction, just northeast of the current Project Area (Underwood 2000).

Every few miles, or as a convenience at the intersection of two or more roads, a rest was needed. Some of these temporary camps were later developed by entrepreneurs into stage stops. Indian Wells Station, located along present State Highway 14, was the start of an eastern road towards Searles Lake and Trona. Panamint Station, in operation from the 1870s to 1882, was located between Indian Wells and Coyote Holes/Freeman, adjacent to the First Los Angeles Aqueduct, and is still visible today (Pracchia 1994; Underwood 2000). Coyote Holes, also referred to as Freeman Stage Station, was located just west of the First Los Angeles Aqueduct near its crossing over Freeman Canyon. With the introduction of the motor vehicle came the decreasing need for stage lines and stops. Many of the old stage routes were eventually paved over for modern traffic (Underwood 2000).

The growing ranching and agricultural industries in the desert around the turn of the twentieth century required a larger supply of water than the landscape could easily support. During the early 1900s, farmers began to construct irrigation ditches and canals in an attempt to divert water into their fields. The population boom in Los Angeles created a similar problem, however, and soon plans were developed to construct the First Los Angeles Aqueduct to tap the water supplies of the Sierra Nevada Range and the Owens Valley.

Construction of the First Los Angeles Aqueduct began around 1908, resulting in new roads, ditches, dams, reservoirs, and camps along the route (Bevill et al. 2003). Railroads were improved, and local economies received a well-needed boost. Thousands of workers and animals were employed during the five-year effort that finally delivered water via gravity flow to Los Angeles in 1913 (LADWP 1996). Subsequent expansions of the First Los Angeles Aqueduct in 1940 extended the system 105 miles north to the Mono Basin. The Second Los Angeles Aqueduct, which further expanded the system's capacity, was completed in 1970 (LADWP 1996).

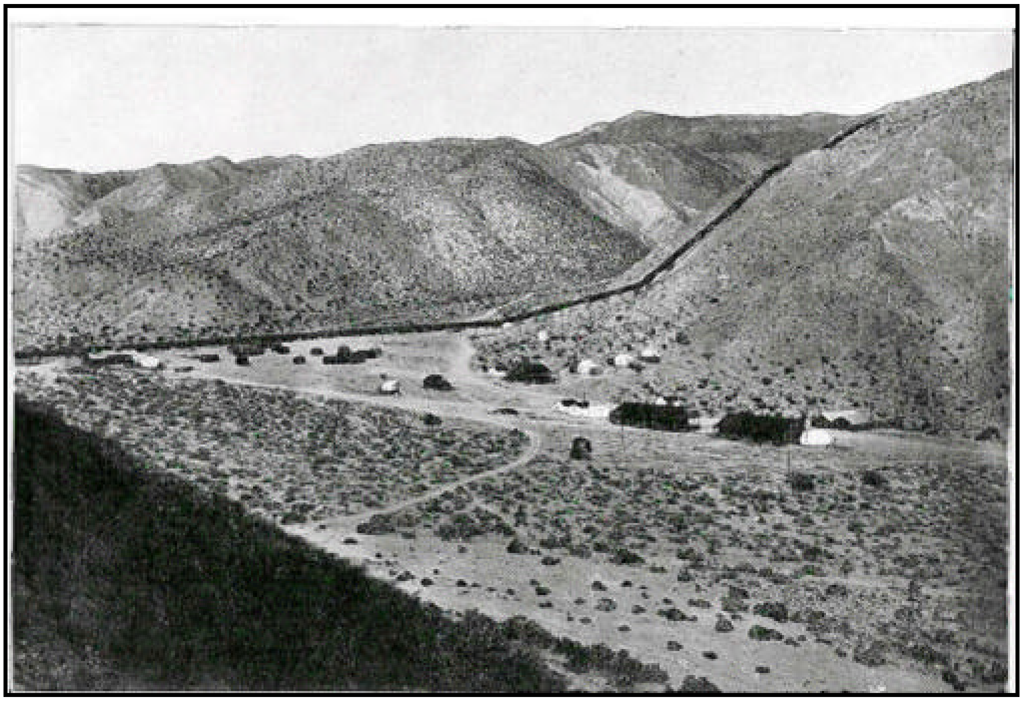

Figure 2-3. Pine Tree Canyon Labor Camp, First Los Angeles Aqueduct (LADWP photo).

During the planning process for the First Los Angeles Aqueduct, the City of Los Angeles recognized the potential of water for generating and, in 1906, commissioned Ezra Scattergood to develop a hydroelectric power system. The first power plant was constructed in the Owens Valley at Division Creek and, by 1916, the first power pole was erected in Los Angeles (LADWP 1996).

In 1996, 75 percent of Los Angeles' water supply originated in the eastern Sierra Nevada mountains, with the remainder provided by wells in the San Fernando Valley, local ground-water basins, and purchases from the Metropolitan Water District of Southern California (LADWP 1996).

CHAPTER 3 – METHODS

PREFIELD RESEARCH

A record search of the Project Area was conducted at the Southern San Joaquin Valley Information Center at the California State University, Bakersfield, on December 4, 2002. Digital 7.5' U. S. Geological Survey quadrangle maps were prepared by the geographic information systems (GIS) department at EDAW and printed on light paper to facilitate copying of survey and site information obtained during the records search. Once all survey and site information had been transferred to the maps, the site records and pertinent reports were copied for later analysis. The records search encompassed the Project Area as defined by the proponent. This included 33.4 square miles (21,375 acres) located in portions of T30S/R35E, T31S/R35E, T30S/R36E, and T31S/R36E.

The records search revealed 41 previously recorded archaeological sites within or immediately adjacent to the defined area. A supplemental records search for three sections along Pine Tree Canyon Road, on the Mojave NE quadrangle, was conducted at the end of January 2003 and revealed two additional resources, for a total of 43. The sites are dominated by prehistoric resources, comprised of lithic scatters; rock shelters, some with pictographs; milling stations; and several sites designated by their recorders as temporary camps. Only two historic sites were identified: the First Los Angeles Aqueduct and an area of foundations with an associated trash scatter. The results of the records search are summarized in Table 3-1. State of California site records for the previously recorded sites are provided in Appendix D.

Table 3-1. Summary of Previously Recorded Cultural Resources.

Site P-15-	Township	Range	Section	Site Type	Area in m²	Condition	Comment
001115*				Temporary Camp	2500	Fair	1000's of flakes
001116				Lithic Scatter	30	Poor	10 flakes
001117				Lithic Scatter	>10	Fair	2 cores, 2 scrapers
001118				Lithic Scatter	~150	Fair	10 flakes, 1 core, 1 scraper
001119*				Temporary Camp	7500	Fair	Hearth, scraper, flakes
001120*				Lithic Scatter	7500	Fair	1000's of flakes
001715*							
001718*							
002142				Historic	64200	Fair	Foundations, can & glass scatter
002541*				Lithic Scatter	1120	Fair	Points, cores, flakes
002542*				Temporary Camp	5625	Poor	Mortar, pictograph, flakes
002555*				Lithic Scatter	300	Good	24 flakes
002556*				Rock Shelter	1125	Poor	Pictographs, lithic scatter
002830				Lithic Scatter	600	Poor	~12 flakes
002831				Lithic Scatter	11250	Good	Flakes
002832*				Lithic Scatter	34500	Fair	Flakes, 1 biface
002833				Lithic Scatter	3750	Good	Flakes, 1 core
002834				Lithic Scatter	5625	Good	Flakes
002835				Temporary Camp	90	Fair	Metates, burnt bone, flakes
002836				Quarry/Workshop	135000	Good	Outcrops, flakes
002981				Pictograph		Poor	Pictograph, mortar
002982				Rock Shelter	160	Good	Pictographs, lithics
002983				Milling Station	64	Fair	Bedrock mortars, flakes
003042*				Lithic Scatter	20000	Good	Flakes, mano fragment
003452*							
003549				Historic		Good	First Los Angeles Aqueduct
005133				Habitation Site	15000	Good	Burials, mortars, hearths
005435				Habitation Site	84	Good	Points, scrapers

Site P-15-	Township Range Section	Site Type	Area in m²	Condition	Comment
007195		Lithic Scatter	167	Good	Points, knives, scrapers
007196		Lithic Scatter		Good	Points, scrapers
007197		Milling Station		Good	Manos
007198		Milling/Workshop	84	Good	Bedrock mortars, points
007199		Lithic Scatter	84	Good	Points
007200		Lithic Scatter	84	Good	Points, scrapers
007201		Lithic Scatter	84	Good	Points, scrapers
007202		Lithic Scatter	84	Good	Points, scrapers
007203		Lithic Scatter	84	Good	Points, scrapers
007204		Lithic Scatter	84	Good	Points, scrapers
007205		Rock Shelter		Poor	Pictographs, ceramic, point
007207		Rock Shelter		Good	Ceramic, bone, vegetal
007381		Rock Art		Good	Pictograph
007382		Rock Art		Good	Pictograph
Petroglyph		Petroglyph			

* = denotes sites outside, but immediately adjacent to the defined Project Area
m² = square meter

These 43 resources were recorded with varying degrees of accuracy. For example, sites recorded by W.S. Bacon in 1961 (P-15-007195 through P-15-007207) have only approximate locations based on a minimal description and a single page site record. Pictograph sites, P-15-007381 and P-15-007382, were located and photographed in 1991, but no formal primary or archaeological site record form was completed. Conversely, sites in the extreme southwestern section of the Project Area (e.g., P-15-002830 through P-15-002836) were well recorded, having been more recently identified.

NATIVE AMERICAN ISSUES

To initiate the Native American consultation process, in February 2003, a letter was sent to the Native American Heritage Commission (NAHC) requesting information on sacred lands, traditional cultural properties, or other concerns within the Project Area. At that time, the NAHC files did not reveal any specific site information. Also requested was a list of Native American individuals and organizations that might have knowledge of cultural resources within the Project Area. A list was provided and supplemented with information obtained by ZRE. Individuals on this list were contacted via letter and telephone by ZRE staff with requests for information about the Project Area or other concerns. At that time, initial steps were also taken to set up meetings and field trips to the Project Area.

Subsequent to these initial contacts, three field trips were conducted in March and May 2003. These trips were designed to allow representatives of the Kawaiisu Tribe an opportunity to tour the area, review the results of the inventory effort, and share information on traditional uses of the area and traditional cultural places that may be present, as well as to voice any concerns about project impacts or potential mitigation measures. While no specific concerns have yet been voiced, the consultation process is still underway, under the direction of the BLM.

FIELD METHODS

The cultural resources inventory conducted by EDAW and URS focused on the examination of specific project elements within the larger Project Area, such as proposed turbine locations, access roads, lay down yards, and sections of proposed underground transmission lines linking turbine locations (Appendix B). The inventory was undertaken between December 2002 and May 2004, during which several redesigns were examined. The survey resulted in the identification of 58 new archaeological sites, 38 during the

EDAW survey and 20 during the URS survey. Appendix C presents confidential site location maps, while Appendix D provides State of California site record forms for the previously recorded and newly identified sites.

EDAW Survey

The cultural resources inventory of the Project Area was initiated by EDAW in December 2002. Survey locations were based on maps provided to EDAW by the proponent. Linear facilities, such as roads and proposed transmission lines, were surveyed by a two-person crew spaced at 15 m (50 foot) intervals, thus covering 100-foot corridors. Proposed turbine locations were surveyed at a radius of approximately 30 m in 15 m intervals. Practically, all of the flat to gently sloping areas on the tops of ridges where the turbines are to be located were surveyed. Lay down yards were surveyed at 10 to 15 m intervals until the entire area, including a 50-foot buffer had been walked.

Archaeological sites and isolated finds were recorded on Department of Parks and Recreation (DPR) 523 forms. Site locations were recorded using either Garmin or Magellan 310 handheld Global Positioning System (GPS) units. Photographs also were taken. EDAW field crews identified 38 new archaeological sites (see Chapter 4).

A small portion of the area to be surveyed, consisting of an existing access road along Pine Tree Canyon Road, is administered by the BLM and a fieldwork authorization was obtained from the Ridgecrest Field Office. As specified in the permit, the road corridor was surveyed using 10-m wide transect intervals.

The EDAW survey was conducted using two-person crews under the supervision of Richard Deis and Jackson Underwood. Additional crew-persons included Sherrie Gadreault, Brendan Fitzsimons, Laura Dreibelbis, Chris Shaver, Julie Toenjes, Steve Diaz, Mark Carrel, and Joe Fayer.

URS Survey

Subsequent inventory of the Project Area was conducted by URS in April 2003, continuing periodically through July 2003. Following partial redesign of the project, additional inventory was conducted in April and May, 2004. URS field methods largely followed those employed by EDAW and included inventory of 100-foot corridors along proposed access roads and 200-foot corridors along turbine strings and proposed and alternate transmission line corridors. All survey was conducted utilizing 10 to 15 m transect intervals. Archaeological sites and isolated finds were recorded on Department of Parks and Recreation (DPR) 523 forms. Site locations were recorded using Garmin handheld Global Positioning System (GPS) units. URS field crews identified 20 new archaeological sites (see Chapter 4).

To assist in site evaluation, impact assessment, and avoidance, URS conducted limited shovel probing at sites that might be affected by project activities, including both previously recorded and newly identified properties (Table 3-2). Shovel probes measured 50-x-50-cm and were excavated to determine the presence or absence of subsurface materials. Depths of the probes varied depending upon the nature of sediments encountered, but averaged 30-60 cm. Sediments removed from probes were screened through one-eighth-inch hardware cloth screening. Cultural materials encountered during probing were not collected but were tallied and returned to units before backfilling.

Several sections of existing access roads through Jawbone and Little Jawbone Canyons surveyed by URS are on lands administered by the BLM. Before survey of these roads, a fieldwork authorization was obtained from the Ridgecrest Field Office.

The URS survey and limited shovel probing was conducted using two- and four-person crews. Field supervision was provided by URS archaeologists Michael S. Kelly, Mark Hale, and Elena Nilsson. Field staff included Oliver Patsch, Suzan Rose, Sarah McDaniel, Jerry Doty, Noah Arnold, Mike Avina, and Leroy Laurie.

Table 3-2. Summary of Shovel Probe Units for Sites within the Project Area.

Site	Number of Probes	Maximum Depth of Recovered Artifacts	Unit Depth	Comments
Ker-2983/4733	1	30 cm	70 cm	Depth extends beyond 70 cm
PT1/27	1	---	40 cm	Sterile
PT-2	1	40 cm	40 cm	1 flake
PT-3	1	40 cm	40 cm	3 flakes
PT-7	1	40 cm	40 cm	1 flake
PT-8	1	40 cm	40 cm	3 flakes
PT-9	1	---	40 cm	Sterile
PT-11	1	20 cm	40 cm	1 flake
PT-12	1	40 cm	40 cm	3 flakes
PT-13	1	---	40 cm	Sterile
PT-14	1	---	40 cm	Sterile
PT-15	1	---	40 cm	Sterile
PT-16	1	---	40 cm	Sterile
PT-21	1	20 cm	40 cm	Flakes
PT-22	1	---	40 cm	Sterile
PT-23	1	---	40 cm	Sterile
PT-24	1	20 cm	40 cm	2 flakes
PT-25	1	---	40 cm	Sterile
PT-26	1	---	40 cm	Sterile
PT-28	1	40 cm	60 cm	11 flakes
PT-29	1	---	40 cm	Sterile
PT-30	1	60 cm	60 cm	14 flakes; depth extends beyond 60 cm
PT-31	1	60 cm	60 cm	17 flakes; depth extends beyond 60 cm
PT-34	1	43 cm	43 cm	22 flakes, 1 biface; bedrock at 43 cm
PT-CS-01/CS-02	1	---	40 cm	Sterile
WF-2	1	---	20 cm	Sterile
WF-3	2	---	20 cm	Sterile
WF-5	1	30 cm	30 cm	64 flakes, 15 bone; depth beyond 30 cm
WF-6	1	30 cm	30 m	7 flakes
WF-7	1	30 cm	30 cm	15 flakes
WF-8	1	30 cm	30 cm	1 flake
WF-9	1	---	30 cm	Sterile
WF-10	1	30 cm	30 cm	17 flakes
WF-13	1	10 cm	20 cm	3 flakes
WF-14	2	---	20 cm	Sterile
WF-15	2	30 cm	30 cm	20 flakes; depth extends beyond 30 cm
WF-16	1	20 cm	20 cm	5 flakes
WF-17	2	---	30 cm	Sterile

CHAPTER 4 – SURVEY RESULTS

INTRODUCTION

The cultural resources inventory and records search conducted for the Pine Tree Wind Development Project Area resulted in the identification of 101 archaeological sites, including 43 previously recorded and 58 newly identified properties (38 EDAW and 20 URS). The majority are prehistoric resources, defined by flaked and ground stone artifact scatters, some with bedrock milling features or cultural middens. While most prehistoric sites are open-air deposits, six rock shelters are present, five of which contain an array of pictographs. Six multiple component sites occur in the Project Area, defined by prehistoric and historic artifact scatters. Seven sites exhibit only historic-era materials, inclusive of trash scatters, the Upside-Down Mine, a rock house "The Ship," and features associated with the Pine Tree Canyon labor camp and construction of the First Los Angeles Aqueduct (1908-1913).

PREVIOUSLY RECORDED SITES

The records search identified 43 previously recorded sites, including 31 within the defined Project Area and 12 outside and/or adjacent to project boundaries, defined by an asterisk (*) after the site number (see Table 3-1). Summary descriptions of all 43 previously recorded sites are presented below, and State of California site record forms appear in Appendix D.

CA-Ker-1115*

This prehistoric site consists of a large artifact scatter located in a pass between Fox Canyon and Jawbone Canyon. Cultural remains include over 1,000 cryptocrystalline silicate (CCS) flake; two projectile points, including a Desert Side-notched type; one CCS scraper; and one chopper. An area of darkened soil, possibly indicative of a midden deposit is present. Impacts include cattle grazing and construction and maintenance of a jeep road.

CA-Ker-1116

This prehistoric site consists of a sparse artifact scatter located on an east-facing ridgeline adjacent to a firebreak. Cultural remains include approximately 10 CCS flakes. The site has been highly disturbed by construction of the firebreak.

CA-Ker-1117

This prehistoric site consists of a sparse artifact scatter located on a south-facing slope near the road to Golden Oaks Spring. Cultural remains include one white chert scraper, one brown chert scraper, one large core fragment, and one large chert flake, possibly washed down from a saddle area located 10 m north. No disturbances were noted at the time of recordation.

CA-Ker-1118

This prehistoric site consists of a sparse artifact scatter located on a level terrace of Sweet Ridge. Artifacts include chert flakes and a quartz scraper. No disturbances were noted at the time of recordation.

CA-Ker-1119*

This prehistoric site consists of a moderate density lithic scatter, formed tools, and a small hearth that surrounds a dry meadow on Sweet Ridge. Lithic materials are entirely CCS tool stone. A dirt road traverses longitudinally across the site.

CA-Ker-1120*

This prehistoric site is a lithic scatter of 50-100 CCS flakes situated in a dry meadow near Sweet Ridge. Lithic materials are entirely CCS tool stone. A dirt road passes along the eastern edge of the site.

CA-Ker-1715*

Pending

CA-Ker-1718*

This prehistoric site consists of an extensive lithic scatter situated in a valley between two ridges. Noted remains include hundreds of CCS flakes, a core, and an obsidian point. A dirt road traverse through the site.

CA-Ker-2142/H

This multiple component site consists of a prehistoric campsite and historic foundations and debris situated on a low hill surrounded by a gently sloping alluvial fan. The historic component is defined by five features and a scatter of rusted cans and glass sherds. Feature 1 is a large historic refuse concentration along the top of a ridge in the central portion of the site. Feature 2 is a privy foundation, while Feature 3 is a post and beam structure. Feature 4 is a modern hearth made of foundation rip-rap removed from Feature 3. Feature 5 consists of two posts, apparently the remains of a post and beam structure.

The prehistoric component includes three features and a lithic scatter comprised of obsidian and volcanic flakes, one calcined bone, two projectile point fragments and a biface fragment. Features 6, 7 and 8 are deflated prehistoric hearths, all three covering approximately 3 m^2 and consisting of 10-20 cobbles each. No disturbances were noted, although several dirt tracks traverse the site.

CA-Ker-2541*

This prehistoric site consists of an artifact scatter with five triangular concave based projectile points; crude biface fragments; cores; large, early-stage reduction flakes; and portable milling equipment. Disturbances include a well-defined road that cuts through the site north to south, an extensively disturbed campground at the south end of the site, motorcycle damage, and illegal artifact collection. During recordation in 1989, six 50-x-50-cm shovel probe units were excavated at various locations within the site. These units, dug to a maximum depth of 50 cm, yielded artifacts to 30 cm. Artifacts included CCS and obsidian debitage; burnt bone, a biface fragment, core, and pieces of clear glass.

CA-Ker-2542*

Pending

CA-Ker-2555*

This prehistoric site consists of a sparse lithic scatter located in a small clearing atop Sweet Ridge. Cultural remains consist of about 25 CCS flakes. A dirt road borders the site to the west.

CA-Ker-2556*

This prehistoric site consists of a rockshelter with pictographs and a sparse artifact scatter located on a broad, northwest/southwest trending ridge and on an east-facing cliff face cut in the ridge by an adjacent seasonal drainage channel. Cultural remains include about 25 metasedimentary flakes, one jasper flake, one chalcedony flake, three metasedimentary cores, three metates, two manos, one "metate-like" millingstone with a single cupule, one carved stick broken at one end and whittled to a rounded shape at the other end, as well as the rock shelter and pictographs.

The red pictographs are located on the wall of the rockshelter and include sunbursts, combs, and other indistinct linear designs. Most are badly deteriorated from exfoliation of the rock. A pile of juniper "firewood" is stacked against the back of the shelter. No disturbances were noted at the time of recordation.

CA-Ker-2830

This prehistoric site consists of a sparse artifact scatter located immediately south of a graded hilltop on the eastern side of Sweet Ridge, overlooking Hungry Spring to the north/northeast. Cultural constituents include about 12 chalcedony and jasper secondary flakes. Disturbances include a dirt road located to the north and west of the site.

CA-Ker-2831

This prehistoric site consists of an extensive artifact scatter located on a slight saddle on the eastern side of Sweet Ridge immediately above a small ephemeral drainage leading to Hungry Spring. Cultural remains include chalcedony and jasper secondary flakes and one jasper core. Disturbances include construction and maintenance of two jeep trails that traverse the site and the Pacific Crest Trail that marks the site's western boundary.

CA-Ker-2832*

This prehistoric site consists of a low-density artifact scatter located on a small flat overlooking an unnamed drainage on the eastern edge of Sweet Ridge. Cultural remains include chalcedony, jasper and obsidian secondary and primary reduction flakes and one Stage I biface. Disturbances include grading of the central portion of the site.

CA-Ker-2833

This prehistoric site consists of an artifact scatter situated on a small flat on the eastern side of Sweet Ridge approximately 100 feet above the Pacific Crest Trail, and overlooking Hungry Spring to the northeast. Cultural remains include a jasper core and primary and secondary reduction flakes of chalcedony and jasper. No disturbances were noted at the time of recordation.

CA-Ker-2834

This prehistoric site consists of an artifact scatter situated on a large flat lying on the east side of Sweet Ridge. Cultural remains include chalcedony and jasper reduction flakes, some heat-treated, a small quantity of obsidian flakes, one jasper core, and a large chert uniface. No disturbances were noted at the time of recordation.

CA-Ker-2835

This prehistoric site consists of a midden deposit located on a small saddle on the east side of Sweet Ride, overlooking Hungry Spring to the southeast. Cultural remains include the midden deposit, three flat slab metates, three manos, chalcedony and jasper reduction flakes, and burnt bone. Disturbances include construction and maintenance of the Pacific Crest Trial, which bisects the site.

CA-Ker-2836

This prehistoric site consists of an artifact scatter and quarry/workshop located along the spine of a northeast ridgeline of Sweet Ride, southeast of Cache Peak. Cultural remains include primary flakes, quarry assay, and float and outcrops of a low-quality, reddish chert found in very low density along the spine of the ridgeline. No disturbances were noted at the time of recordation.

CA-Ker-2981

This prehistoric site consists of a pictograph and a bedrock mortar located in a canyon between Quail Spring Canyon and North Fork Canyon. The pictograph is a faded painting on a pink colored rock, with the single mortar cup situated on an adjacent boulder. Disturbances include flash floods that have frequently inundated the pictograph.

CA-Ker-2982

This prehistoric site consists of pictographs on the west end of Jawbone Canyon on the edge of a south-facing ridge above an ephemeral drainage. The pictographs are located on a large prominent rock overhang, and are painted with red, white, and black pigment. Bedrock mortars are located in the streambed approximately 100 m to the north, with a broken pestle also noted. Modern camping under the overhang has resulted in smoke damage to some of the pictographs.

CA-Ker-2983/Ker-4733 (P-15-005435) (Quail Springs Site)

This multi-component resource consists of an extensive prehistoric habitation site and an historic livestock corral situated adjacent to Quail Springs, on a series of low ridges bordered by ephemeral drainages that converge near the spring (Figure 4-1). The site, which encompasses an area measuring 300-m north/south by 180 m east/west, is restricted by steep hillsides to the south/southwest and north/northeast, and narrow rock canyon walls below Quail Springs. The northwest edge of the site terminates at an open and exposed plain.

Cultural remains include a well-developed midden with abundant flaked stone and ground stone tools, as well as six bedrock milling features. Flaked stone artifacts include hundreds of cryptocrystalline silicate (CCS) and obsidian flakes reflecting a full range of reduction techniques, including core reduction, biface reduction, and pressure flaking. Formed tools consist of four biface fragments, four cores, one edge-modified flake, three Rosegate series points, one hammerstone, nine millingstone fragments, two pestles, one piece of unspecified groundstone, one bowl mortar fragment, and six handstone fragments. Artifacts are concentrated within the midden deposit, which is primarily situated in the southeast portion of the site, close to Quail Springs and surrounding the corral. From here, midden sediments extend northwest along the dirt road for about 200 m, lessening in both intensity and artifact count.

The six bedrock-milling features are variously distributed across the site. Two (Feature 1 and Feature 2) occur adjacent to Quail Spring, on (Feature 1) or near (Feature 2) a rocky island formed by a bifurcated stream channel. Feature 1 contains two mortar cups, while Feature 2 exhibits four mortar cups. Feature 3 is about 60 m northwest of Feature 2, within the principal drainage leading to Quail Spring. The feature contains one cup-shaped and one oval-shaped mortar cup. Feature 4 is located along the eastern margin of the site about 120 m northwest of Feature 3. It is defined by two oval-shaped mortar cups and two milling slicks. Feature 5 is situated at the far northern end of the site, west of the dirt road. It is characterized by two conical-shaped mortar cups. Feature 6 is situated about 50 m northwest of Feature 2, within an ephemeral drainage that joins the principal drainage leading to Quail Spring. This milling station includes two oval-shaped mortars.

Figure 4-1. Overview of CA-Ker-2983/4733, Quail Springs Site.

A dirt road traverses longitudinally (NW/SE) through the site for a distance of about 400 m. To construct the road, at least 40 cm of the midden deposit was removed near the corral, creating a cut bank that contains eroding artifacts. Other disturbances include off-road vehicle use (midden area), as well as construction and use of the livestock corral and loading ramp (midden area). An abandoned freezer truck is located just west of the corral, adjacent to the dirt road.

URS excavated one 50-x-50-cm shovel probe unit within the roadbed in the midden deposit. This unit, dug to 30 cm, yielded abundant artifacts and midden sediment throughout. A posthole was dug in the probe unit to 70 cm, revealing a dark gray, ashy midden to that depth. The 0-10 cm level of the probe unit yielded 27 CCS and 15 obsidian flakes, the 10-20 cm produced 25 CCS and 8 obsidian flakes, and the 20-30 cm level had 24 CCS and 20 obsidian flakes. Sediment data suggest that the midden deposit extends at least 110 cm below the natural surface: 40 cm removed to create the road, excavation of 30 cm probe in the roadbed, and another 40 cm in the probe unit posthole.

CA-Ker-3042*

This prehistoric site is a low-density lithic scatter located at the southernmost end of Sweet Ridge. Artifacts include primary and second CCS flakes, an obsidian point, and a mano fragment. The only disturbance is a dirt road that traverses through the site.

CA-Ker-3452*

Pending

CA-Ker-3549H

The site consists of the water conveyance systems and related features of the First Los Angeles Aqueduct. Built between 1908 and 1913 to provide water to the City of Los Angeles. The Aqueduct is noted on the 1915 edition of the Mojave (1:125,000) USGS map, which is based on survey data obtained in 1912 and 1913. The portion of the site recorded in detail includes the Alabama Gates in Inyo County, extending south for approximately 1 mile. This section consists of three features, Feature 1 the Alabama Gates and Spillway, Feature 2 the dynamited location and wash-out channel from the May 12, 1926 bombing, and Feature 3 the concrete-lined open canal. Feature 1 includes water gates and operating mechanisms, the housing that covers the gates, and the spillway that carries water back to the Owens River. There are five valves built into the gate housing, and when closed contain the water within the aqueduct, and when open allow the water to flow down the spillway.

Feature 2 is located along the portion of the Los Angeles Aqueduct that was dynamited on May 16, 1926. The repair of this section is noticeable today as a distinctive soil discoloration. The resulting wash-out from the bombing remains as an eroded channel, which an old country road crosses. Rocks on the eastern side of the road may have been placed as a retaining wall during the repair job. The channel is currently eroded along its sides.

Feature 3 is a concrete-lined, open section of the Los Angeles Aqueduct that begins at the north end of the Alabama Hills and extends south to the Haiwee Powerhouse. The channel is "U" shaped with concrete sides measuring 34 feet wide, and 18 feet deep. The uphill side of the aqueduct has been cut into the rock of the Alabama Hills, while the downhill side is supported by large earthen berms. Concrete bridges allow for the passage of runoff from seasonal drainages. URS is currently updating recordation of the remainder of this system.

CA-Ker-4619 (P-15-005133)

This prehistoric resource consists of a habitation site and cemetery located along an ephemeral drainage and on a slope north of Peeping Tom Spring. The remains of a minimum of nine individuals were noted at the site, having been exposed by alluvial activities. The slope above the drainage contains a midden deposit that also contains human remains, along with burial goods, ceramics, Desert series and Rose Spring projectile points, incised green slate, debitage, manos, metates, pestles, as well as faunal and floral remains. Features include an unspecified amount of bedrock mortars and hearths. No disturbances beside alluvial activities were noted.

P-15-7195

This prehistoric site consists of a lithic scatter/workshop situated on a south-facing slope on either side of the road to Weldon Pond. Cultural remains include projectile points, knives, and scrapers. Disturbances include road construction and maintenance, vegetation, and wind erosion.

P-15-7196

This prehistoric site consists of a lithic scatter/workshop situated on a ridge between two ephemeral drainages. Cultural remains include projectile points and scrapers. Disturbances include wind erosion.

P-15-7197

This prehistoric site consists of an artifact scatter situated above an ephemeral drainage at the end of an east/west trending finger ridge. Cultural remains include bedrock mortars and manos, which had been disturbed by overgrown vegetation.

P-15-7198

This prehistoric site consists of a bedrock milling station and an artifact scatter/workshop situated on a south-facing slope above an ephemeral drainage. Cultural remains include bedrock mortars, projectile points, and scrapers. Disturbance is restricted to wind erosion.

P-15-7199

This prehistoric site consists of an artifact scatter/workshop situated along the road from Airplane Flat to Hungry Spring, between two ridges. The site was described as only containing projectile points. Disturbance is restricted to wind erosion.

P-15-7200

This prehistoric site consists of an artifact scatter/workshop situated along the road from Airplane Flat to Hungry Spring, between two ridges. The site was described cultural constituents as consisting of projectile points and scrapers. Disturbance is restricted to wind erosion.

P-15-7201

This prehistoric site consists of an artifact scatter/workshop situated on a ridge near Peeping Tom Spring. The site was described as consisting of projectile points and scrapers. Disturbance is restricted to wind erosion.

P-15-7202

This prehistoric site consists of an artifact scatter/workshop situated on a southwest to southeast trending ridge above an ephemeral drainage. The site was described as consisting of projectile points and scrapers. Disturbance is restricted to wind erosion.

P-15-7203

This prehistoric site consists of an artifact scatter/workshop situated on the road to Airport Flat on a south-facing slope, above an ephemeral drainage. The site was described as consisting of projectile points and scrapers, which had been disturbed by wind erosion. This site could not be relocated during subsequent field visits. According to the site record for P-15-7203, the plotted site location is "approximate."

P-15-7204

This prehistoric site consists of an artifact scatter/workshop situated along a dirt road on a northeast-facing slope in Little Jawbone Canyon. The site was described as consisting of projectile points and scrapers, which had been disturbed by wind erosion. As with P-15-7203, the plotted location of this site is "approximate." Based on the limited location information included on the 1961 site record, it appears that P-15-7204 is likely represented by recently identified site WF-6 (see below).

P-15-7205

This prehistoric site consists of a rock shelter and pictographs located on the northeast-facing slope of a finger ridge on the south side of Jawbone Canyon. Cultural remains include pottery, bone, asphaltum, pigment, vegetal remains, European artifacts, food remains, projectile points and scrapers. Bacon, who noted that initial excavations at the site by an unknown individual revealed a deep deposit with two occupation levels and evidence of stratigraphy, recorded the site in 1961. Bacon and Rhodehammel, who found cultural remains to a depth of 3 feet despite the surface being badly disturbed, excavated a test trench.

P-15-7206

This prehistoric site consists of an artifact scatter/workshop situated in a narrow canyon running south off Jawbone Canyon. The site was described as consisting of projectile points and scrapers, which had been disturbed by construction activity.

P-15-7207

This prehistoric site consists of a small rock shelter situated on a north-facing slope on the south side of Jawbone Canyon. The site was described as consisting of pottery, bone, and vegetal remains, which have been disturbed by vandalism.

CA-Ker-PRO-008/P-15-7381

See PT-35, below.

CA-Ker-PRO-009/P-15-007382

This prehistoric site consists of pictographs located under a granite overhang situated on a southwest-facing slope above an ephemeral drainage. No formal recordation has occurred at this site, and only photographs were submitted to the Southern San Joaquin Valley Information Center.

Petroglyph (no site number provided)

Pending

EDAW SURVEY SITES

PT-1/27

This prehistoric site consists of a lithic scatter situated on the south-facing slope of a southeast to northwest trending ridge. The site has two main concentrations of materials consisting of chert, obsidian, quartzite, and volcanic and metavolcanic flakes. Exhausted cores were also noted within each concentration. Disturbances include minor erosion and road graded. Limited shovel probing conducted within the vicinity of Locus A failed to identify a subsurface deposit.

PT-2

This prehistoric site consists of a sparse lithic scatter situated in a flat area on a saddle along an east/west trending ridge. Cultural constituents include one CCS projectile point, one CCS unidirectional core, seven CCS flakes, and one siltstone metate. Site disturbances include road grading.

A single shovel probe placed in the northern site area recovered a single CCS flake from the 20-40 cm level. Given that no other cultural material was identified within the probe, the single flake may represent surface material that was inadvertently mixed with the soils extracted from the 20 to 40 cm level.

PT-3

This prehistoric site consists of a sparse lithic scatter situated in a flat are between two graded roads on the southern side of a saddle along an east to west trending ridge. Cultural remains include about 20 CCS and quartzite flakes, one obsidian flake, one chalcedony biface fragment, and one chalcedony unidirectional core. Site disturbances include road grading.

One shovel probe placed along the eastern edge of the site indicates the presence of a minor subsurface deposit. The recovered materials, comprised of two CCS and one basalt flake, were found in the 20-40 cm level.

PT-5

This prehistoric site consists of a very sparse lithic scatter situated on a south-facing saddle between north to south trending ridges. Cultural constituents include two interior quartzite flakes and interior CCS flake. No disturbances were noted at the time of recordation.

PT-6

This prehistoric resource consists of a habitation site situated on an alluvial terrace of Pine Tree Canyon that is open to the east and west. Cultural remains include five disc beads; two portable basalt grinding slabs, one of which shows obvious percussion shaping; one, exhausted, unifacial chert core; and over 50 CCS, vesicular basalt, and obsidian flakes. The southern boundary of the site is eroding from the seasonal wash that flows through the canyon.

PT-7

This prehistoric site consists of a very sparse lithic scatter situated on an alluvial terrace along Pine Tree Canyon that is open to the east and west. Cultural remains include nine CCS flakes, two of which exhibit use wear. Disturbances include Pine Tree Canyon Road, which has been graded through the southern portion of the site.

One shovel probe placed within the central portion of the site area immediately north of Pine Tree Canyon Road produced three pieces of debitage. From within the 0-20 cm level two CCS flakes were identified, while in the subsequent 20-40 cm level a single CCS flake was observed.

PT-8

This prehistoric site consists of a sparse lithic scatter situated on an alluvial terrace along Pine Tree Canyon that is open to the east and west. Cultural constituents include 25 CCS flakes and 2 multidirectional cores. Disturbances include Pine Tree Canyon Road, which has been graded through the northern portion of the site. One shovel probe unit was excavated to a depth of 40 cm, resulting in the recovery of three debitage specimens.

PT-9

This prehistoric site consists of a sparse lithic scatter situated on an alluvial terrace on either side of an ephemeral drainage located at the base of two hills east of Jawbone Canyon. Cultural remains include 10 CCS interior flakes and 2 CCS secondary flakes. It is possible that the artifacts were redeposited by sheet wash from the adjacent hills. No other disturbances were noted, although an access road is adjacent to the southern site boundary.

Limited shovel probing, conducted within the southern part of the site, adjacent to Project access road, failed to identify a subsurface deposit.

PT-11

This prehistoric site consists of a sparse lithic scatter situated on a terrace of a north-facing slope, along an east trending seasonal drainage. Cultural materials include 12 interior CCS flakes and 1 obsidian biface thinning flake. The southwestern edge of the site has been disturbed by road grading activities, with vehicle disturbance noted across the center of the site, northeast of the road. One shovel probe unit was excavated at the site, resulting in the recovery of one piece of debitage from the 0-20 cm level.

PT-12

This prehistoric site consists of a sparse lithic scatter situated on a terrace of a north-facing slope along an east trending drainage. Cultural constituents include a CCS biface fragment, a CCS expended core, 8 CCS flakes, and 1 obsidian flake. A dirt road has been graded through the southern portion of the site with a drainage ditch across a portion of the southeastern section of the site, northeast of the road. Three pieces of debitage were recovered from a shovel probe unit placed within the central site area, extending to a depth of 40 cm.

PT-13

This prehistoric site consists of a sparse lithic scatter situated on a terrace of a south-facing slope along an east trending seasonal drainage. Cultural constituents include six CCS flakes, two obsidian flakes, and one volcanic flake. Disturbances consist of a dirt road that has been graded through the southeast portion of the site, and erosion. Limited shovel probing was conducted within the southern extent of the site adjacent to an ephemeral road that may be graded for project use. This effort failed to identify a subsurface deposit.

PT-14

This prehistoric site consists of a single bedrock milling feature situated on a terrace on the east bank of a canyon along a northeast trending seasonal drainage. The milling feature contains three conical mortar cups, and one saucer mortar located on a granitic boulder measuring 2.6-m north/south x 2-m east/west. Disturbances include a dirt road that has been graded through the slope adjacent to the site, which may have affected additional constituents. No subsurface deposit was identified within a single shovel probe placed within this site.

PT-15

This prehistoric site consists of a single bedrock milling feature located on a southwest-facing slope west of the drainage that runs through Jawbone Canyon. The milling feature contains two conical mortar cups, and one saucer mortar located on a granite boulder measuring 1.25-m north/south x 1.1-m east/west. A single obsidian flake was observed at the western edge of site. Dirt roads have been graded I east and south of the site and may have affected additional constituents. One shovel probe was placed adjacent to the bedrock milling feature situated in the site. No subsurface deposit was identified during the completion of this effort.

PT-16

This prehistoric site consists of a sparse lithic scatter situated just south of a road on an east-west trending ridge. Cultural constituents include one unifacial mano, one CCS core, and one interior CCS flake. Disturbances include a bladed road just north of the site. One shovel probe was excavated, but yielded no artifacts.

PT-17

This prehistoric site consists of a sparse lithic scatter situated on the south-facing slope of a southwest trending ridge. Cultural remains include four CCS flakes and one CCS biface. Disturbances include a bladed road that runs northeast to southwest through the center of the site.

PT-18

This prehistoric site consists of a lithic scatter situated on a terrace and a small knoll north and south of Springfield Spring. Artifacts occur within two distinct loci. Locus 1 includes over 1,000 flakes constituted primarily by CCS, with a small amount of obsidian, over 10 bifaces or biface fragments and approximately 10 cores. Locus 2 is a sparse scatter of two CCS flakes and one CCS core. Disturbances include slope wash, erosion, and road construction.

PT-19

This prehistoric site consists of a lithic scatter situated on a saddle south of Springfield Spring. Cultural remains include over 1,000 CCS and obsidian flakes, expended cores and biface fragments, and a cluster of metates and manos. Two portable metates were noted in a contemporary fire ring located 25m east of the site datum. Disturbances include slope wash, erosion, and road construction.

PT-20

This prehistoric site consists of a lithic scatter situated on a small east to west trending ridge 300 m south of Springfield Spring. Cultural constituents include over 10 interior CCS flakes, three expended cores, and one unshaped portable metate. No disturbances were noted at the time of recordation.

PT-21

This prehistoric site consists of a lithic scatter situated on a southwest to northeast trending ridge. Cultural materials include over 100 flakes, one unidirectional CCS core, one granitic bifacial mano, the medial section of a CCS biface, the proximal end of a CCS biface, one CCS distal biface fragment, one obsidian projectile point with one corner missing, one CCS distal biface fragment, and one granitic hammerstone. Excavation of a single shovel probe indicates the presence of a light density subsurface deposit to a depth of 20 cm. Disturbances include a dirt road, which has been graded though the middle of the site, as well as and other vehicular activity.

PT-22

This prehistoric site consists of a bedrock milling feature situated on a ridge above Airplane Flat. The milling feature contains two conical mortar cups located on a granitic boulder measuring 2-m north/south by 1.5-m east/west. Cultural constituents include two granitic cobble pestles, one quartzite unifacial mano, one granitic unifacial mano fragment, and one CCS biface fragment. No disturbances were noted at the time of recordation. Limited shovel probing was conducted within the southern extent of the site. This effort, however, failed to identify a subsurface deposit.

PT-23

This prehistoric site consists of a very sparse lithic scatter situated in a level area of Airplane Flat. Cultural remains include two CCS and one obsidian interior flake. Extensive cattle grazing has occurred within the site area. No subsurface deposit was identified within a single shovel probe placed in this site.

PT-24

This prehistoric site consists of a sparse lithic scatter situated in a level area of Airplane Flat. Cultural constituents include seven CCS and two volcanic interior flakes, one CCS core fragment, and one CCS bifacially worked flake. Extensive cattle grazing has occurred in the area. A shovel probe, placed within the eastern portion of the site, recovered two CCS flakes to a depth of 20 cm.

PT-25

This prehistoric site consists of a sparse lithic scatter situated on a flat at the base of an east-west trending ridge. Cultural constituents include seven CCS interior flakes and seven CCS and one quartzite secondary flake. No disturbances were noted at the time of recordation, although two berms are located 2 m from the site's northern boundary. A shovel probe was placed immediately adjacent to the road that passes just beyond the northern edge of this site. No subsurface cultural remains were observed within this probe.

PT-26

This prehistoric site consists of a bedrock milling feature situated on a small saddle of a north/south trending ridge west that descends into Falls Creek. The feature contains three milling slicks located on a granitic boulder measuring 15-m north/south by 4.0-m east/west. Cultural remains include two mano fragments and one CCS and one rhyolite flake. No disturbances were noted at the time of recordation. One shovel probe was placed adjacent to the milling feature, but did not yield cultural items.

PT-28

This site consists of a prehistoric occupation area situated within a small valley between two northwest/ southeast trending ridgelines. An expanse of exposed bedrock a top the terminus of the southern ridgeline contains four bedrock mortars. A road has been graded through the western half of the site, where flakes of several varieties are exposed. Cultural remains include bedrock milling features, flaked and ground stone tools, and a scatter of obsidian, CCS, and quartzite debitage. A shovel probe placed adjacent to the road resulted in the recovery of six obsidian and two CCS flakes within the 0-20 cm level, and two obsidian and one CCS flake within the 20-40 cm level. No cultural material was observed below a depth of 40 cm.

PT-29

This prehistoric site consists of a sparse lithic scatter located on the slope of a northwest/southeast trending ridge, south of a dirt road. Cultural materials include CCS flakes and one ground stone fragment. The site has been disturbed by the construction and maintenance of the dirt road. A shovel probe was placed adjacent to the road that bisects the center of this site. No subsurface artifacts were observed within this probe.

PT-30 (Wilderness Ranch)

This multiple component site consists of a prehistoric lithic scatter and a historic ranching complex situated on a gently sloping terrace along the southern edge of an unnamed seasonal drainage. The prehistoric component includes a light scatter of obsidian, CCS, and quartzite tools underlying the historic structures. A complex for the handling of livestock associated with the Wilderness Ranch (ca. 1960s) has been constructed on the site. This complex includes corrals, hay shed, fences, and a network of graded roads. The main house of the ranch lies 80 m west of the site boundary.

One shovel probe placed within the northern portion of the site, adjacent to an access road, produced cultural materials to a depth of at least 60 cm. Specifically, in the 0-20 cm level two obsidian and three CCS flakes were observed in the 0-20 cm level; three obsidian and two CCS flakes were identified in the 20-40 cm level; and one obsidian and three CCS specimens were recovered in the 40-60 cm level.

PT-31

This prehistoric site consists of a bedrock milling feature and a dense scatter of obsidian, CCS, and quartzite tools and debitage. The site is situated primarily on a terrace that is bordered by a seasonal creek to the south/southwest. Cultural materials were also noted in surrounding arroyos and on minor ridges that occur within the vicinity. The site may be associated with PT-32 (described below), being separated primarily by dense vegetation along the creek, as well as by differences in elevation. Three inter-connecting roads have been graded through site area.

One shovel probe placed along the southern edge of one road yielded cultural materials to a depth of at least 60 cm. Four obsidian and five CCS flakes were recovered in the 0-20 cm level; four obsidian and two CCS flakes were found in the 20-40 cm level; and two CCS flakes were observed in the 40-60 cm level.

PT-32 (Sky River Ranch)

This multiple component site consists of a prehistoric artifact scatter and a complex of 1940-1950s era historic structures located on a flat at the junction of two small creeks within upper Jawbone Canyon. The flat is open to the north and east, backed by a steep ridge to the west. The prehistoric component underlies the historic complex and consists of a midden deposit, obsidian and chert flakes, and a large groundstone bowl fragment.

The historic ranching complex is defined by eight cultural features, comprised of seven standing structures and one foundation. Feature 1 is a seven-room "longhouse" made of mortared stone and a concrete foundation (Figure 4-2). The building has a flat tin roof with an open porch at the south end. The main room has an adjoining kitchen and a fireplace, along with three bedrooms and a bath. Feature 2 is a three-room adobe house with a mortared stone addition, and a gabled corrugated tin roof. Feature 3 is a two-room bunkhouse made of mortared stone on a concrete slab, with a pitched gable roof with tarpaper and asphalt shingles. A wood stove is located within the structure. Feature 4 is a single room outbuilding with an enclosed front porch. The structure is made of mortared stone wall toped with vertical board and batten with a low-pitched gable roof with asphalt shingles. Feature 5 is a stone and mortar foundation surrounding a sunken interior concrete foundation. Feature 6 is a stone and concrete outbuilding with a single room and a concrete slab floor, with a flat shed roof with aluminum sheeting. Feature 7 is a barn with mortared stone half walls on the north and west sides, a corrugated tin, and a wood pole wall to the south that includes a storage area. Stalls and a feed trough re located on the south side of the structure, with a large sliding door on the north wall. The roof is a low pitch gable covered by corrugated tin, with pole supports. Feature 8 is a small concrete outbuilding with a gabled wood slat roof.

The Sky Ranch historic buildings were constructed by Homer Hansen Jr. and his brother Albert, who built the principal ranch house (Feature 2) in the late 1940s/early 1950s (source: Susan Hansen, personal communication 2003). The ranch house was used until the 1970s, when a new one was built about two miles away.

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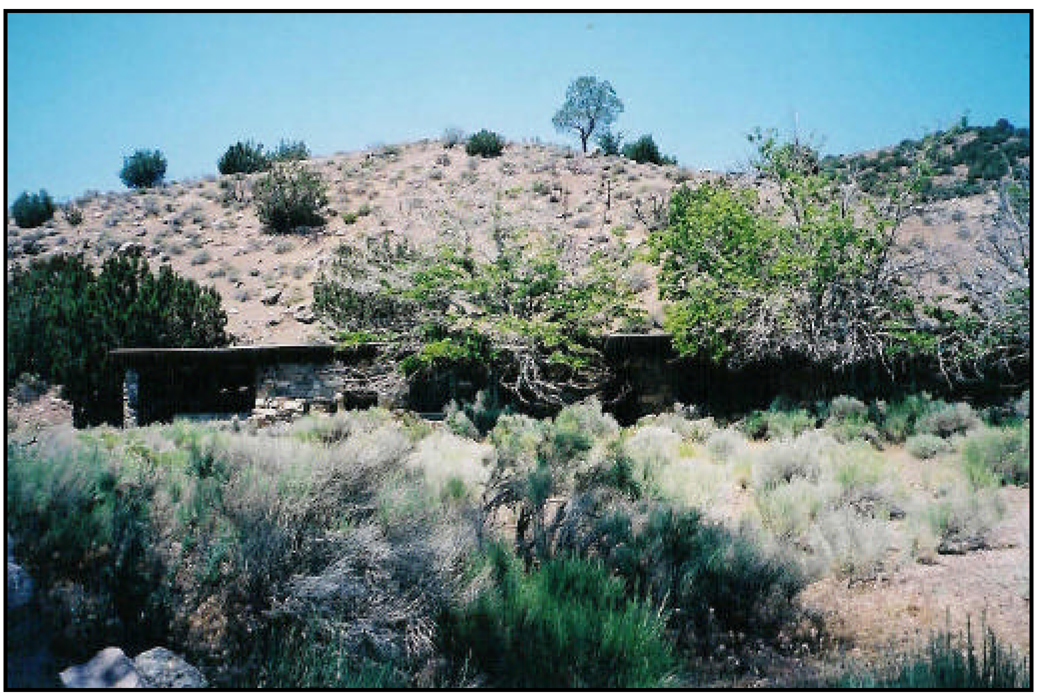

Figure 4-2. Site PT-32, Feature 1 Longhouse.

PT-33

This prehistoric site consists of a sparse lithic scatter situated on a south-facing slope of a southwest trending ridge. Cultural remains include flaked stone artifacts. No disturbances were noted at the time of recordation

PT-34 (Elmer Lundquist House)

This multiple component site consists of a prehistoric lithic scatter and the remains of the 1950s era Elmer Lundquist home site situated on a flat area along a drainage in Jawbone Canyon. The prehistoric component includes a bedrock milling feature, a scatter of obsidian and CCS debitage, and groundstone artifacts.

The historic component is defined by a stucco house with a gabled roof, a road, two concrete tanks, a well with tank, storage shed (now collapsed), a 55-gallon drum apparently utilized as an incinerator, and a concrete pad of unknown use. A rock and mortar wall, about 3 feet tall, encircles much of the complex.

One shovel probe was excavated in the area across the road from the house to test for the presence of buried prehistoric artifacts. The probe produced a relatively dense deposit of lithic debris to a depth of 43 cm. Within the initial 0-20 cm level, 11 CCS and 5 obsidian flakes were identified. In addition to the debitage, a CCS biface fragment was also recovered from this level. From in the 20-40 cm level, four CCS and one obsidian flake were found, while the a single CCS flake was found in the subsequent level, which was terminated at 43 cm due to bedrock.

PT-35

This multiple component site consists of a prehistoric rock shelter with a pictograph and a historic campsite situated at the mouth of a northeast to southwest trending canyon. The prehistoric component includes a pictograph (Feature 3) composed of five elements, three abstract, one abstract anthromorph, and one horse and rider. The roof and back of the shelter are smoke stained, and the soil is dark, suggesting the presence of a cultural midden. No prehistoric artifacts were identified.

The historic component includes two rock walls (Features 1 and 2), one at the northwest end of the rock shelter and one east of the pictograph. Barbed wire surrounds the entrance to the shelter, suggesting that it was previously used as a livestock pen. Historic artifacts include a church key opened can, a tobacco tin, a paint can handle, a solder top can, a ham can, a key opened tin, a paint can, milled lumber, a car sear, corrugated steel sheets, steel stove pipe, and half a canteen.

PT-CS-1/PT-CS-2

This multiple component site consists of a prehistoric lithic scatter and a historic debris scatter bisected by three drainages in a valley adjacent to a north to south trending ridge. The site contains two loci, separated by a dirt road. Cultural remains within Locus A include a prehistoric unidirectional jasper core, two tobacco tins, one round meat tin, two meat tins, four sanitary cans, four sardine cans, and two hole-in-top cans. Locus B contains only prehistoric artifacts, including eight obsidian flakes, four biface thinning, three tertiary, one angular shatter; one CCS tertiary flake; two utilized obsidian flakes; one obsidian projectile point base; two fire affected unifacial mano fragments; one obsidian corner-notched projectile point base; and one obsidian bifacial blade. Disturbances include a north/south trending dirt road that traverses through the center of the site. One shovel probe placed in Locus B, adjacent to the road, did not contain any subsurface cultural material.

PT-JU-1

This prehistoric site consists of a bedrock milling station located on the east slope of Jawbone Canyon at the edge of a creek. This granite feature contains five conical mortar cups and one basin/slick. No disturbances were noted at the time of recordation.

PT-JU-2

This prehistoric site consists of a single bedrock milling station located in a ravine 45 m south of Jawbone Canyon. The feature contains three conical mortar cups and five basin milling slicks situated on a granitic boulder. No disturbances were noted at the time of recordation.

PT-WF-1H

This historic site consists of a refuse deposit situated on an alluvial terrace in Jawbone Canyon. Cultural remains include meat tins, porcelain fragments, hole-in-top cans, yellow stoneware, clear glass, sanitary cans, church-key opened beer cans, light bulb fragments, a porcelain covered steel pan handle, brown glass, burnt wood fragments, green glazed stoneware, a California license plate fragment, and tobacco tins. Disturbances include vandalism and off road vehicle use.

PT-WF-2H

This historic site consists of the remains of the labor camp associated with construction of the First Los Angeles Aqueduct (1908-1913). Three features are present, including a concrete walled structure (Feature 1) and two refuse dumps (Features 2 and 3). Artifacts associated with Feature 2 include clear glass, milk glass, hole-in-top cans, church-key opened sanitary cans, green glazed glass stoneware, milk glass Mason jar inset, household screen material, metal fragments, corrugated-sided metal container, cone-topped beer cans, and church-key opened oil cans. Feature 3 contains over 100 glass fragments, including clear, brown, and green pieces; glass insulators; Coca-Cola bottle fragments; a copper flashlight handle; batteries; blue glaze stoneware plate fragments; a Mason jar lid; hole-in-top cans; sanitary cans; and an M1Garand ammunition clip. Disturbances include vandalism, target practice, and off road vehicle use.

PT-WF-3H

This historic site consists of the remains of the labor camp associated with construction of the First Los Angeles Aqueduct (1908-1913). The site is a series of concrete pads, basins, footings, and foundations located on a leveled terrace. Many pads or footings are flush or partially covered by the surrounding soil. In some areas, wooden footings are still visible. Wooden planks are still protruding from the bluff above the foundations, on the north side. Immediately above these wooden planks is another cut and leveled terrace. Disturbances include looting and off-road-vehicle use.

URS SURVEY SITES

WF-1

This site consists of a small, sparse, prehistoric lithic scatter situated on a south trending ridge bounded on the east and west by ephemeral drainages. Surface artifacts are restricted to 11 CCS, obsidian, and felsite percussion reduced flakes. No disturbances were noted. A dirt road is present about 15 m south of the site, but is isolated from it by a steep slope.

WF-2

This site is a sparse, dispersed, prehistoric lithic scatter situated on a southeast facing slope of a small valley formed by the lower alluvial slopes of a broken ridge system. Chipping debris includes 32 CCS flakes, three obsidian flakes, and two quartzite flakes, all of which reflect percussion reduction. Formed tools consist of two, granite handstones; one, felsite, Pinto series projectile point; one, felsite biface tip; one, obsidian edge-modified flake; and one, shale milling slab fragment. A dirt road traverses through the southeast portion of the site; no other disturbances were noted. Two shovel probe units were excavated at the site. Dug to a depth of 20 cm, neither unit produced cultural remains.

WF-3

This site consists of a sparse, dispersed, prehistoric lithic scatter and a single bedrock milling feature located on two low ridges separated by an ephemeral wash that joins a larger drainage channel about 40 m west of the site (Figure 4-3). Artifacts include 22 obsidian and five CCS flakes; one piece of quartzite shatter; and one, complete, granite handstone. The obsidian flakes reflect both percussion and pressure reduction, while the CCS flakes are restricted to percussion specimens. Feature 1 is a bedrock milling station with one, oval-shaped, mortar cup and two possible cups located at the northern end of the site. A dirt road is situated about 15 m south of the site. No site disturbances were noted. Two shovel probe units were excavated at the site. Dug to a depth of 20 cm, neither unit produced cultural remains.

Figure 4-3. Site WF-03, Feature 1.

WF-4 – "The Ship"

This historic site, known as the "The Ship," consists of a boat-shaped rock house situated on a stream terrace on the south side of Jawbone Creek (Figure 4-4). The structure was built in about 1948 by Dave Cory, a one-armed sailor who worked intermittently for Dr. Homer Hansen Sr., the owner of the property (source: Susan Hansen, personal communication 2003). The house contains two rooms and a fireplace. The walls are constructed of cement and locally quarried rock. It has two exterior and one interior wood framed doorways; five, wood framed window openings; and seven, portal-shaped windows. The floor is padded soil. The roof is comprised of corrugated sheet metal laid upon railroad ties, which are set perpendicular upon 16 telephone poles that serve as beams. The structure is the only feature at the site; no artifacts are present. Mr. Cory briefly lived in the house (perhaps until 1950), and then moved elsewhere in the desert (source: Susan Hansen, personal communication 2003).

Figure 4-4. Site WF-4, "The Ship."

<u>WF-5</u>

This site is a prehistoric artifact scatter and midden deposit located on two, north-trending finger ridges bounded by ephemeral drainages. Chipping debris includes hundreds of CCS and obsidian flakes representing late stages of biface reduction. Formed tools consist of three projectile points, including one Rosegate Corner-notched and one Elko Corner-notched; four handstone fragments; four milling stone fragments; one, unspecified ground stone fragment; one core; one bowl mortar fragment; and one scraper. A dense artifact concentration is present, and includes two ground stone fragments, one point tip, and at least 100 flakes. A dirt road bisects the site.

One 50-x-50-cm shovel probe unit was excavated to test for subsurface remains. This unit, placed within an area of discolored sediments (midden), was excavated to 30 cm, and yielded CCS and obsidian flakes and bone fragments to this depth. The 0-10 cm level produced 23 CCS flakes, four obsidian flakes, and five bone fragments; the 10-20 cm level yielded eight CCS flakes, 16 obsidian flakes, and eight bone fragments; and the 20-30 cm level contained six CCS flakes, seven obsidian flakes, and two bone fragments.

<u>WF-6</u>

This site is a sparse, prehistoric lithic scatter located on a gently sloping finger ridge bounded by a small ephemeral drainage to the north and a major wash to the south. About 40 flakes were noted, dominated by white CCS with smaller amounts of obsidian, all reflecting biface reduction activities. Formed tools consist of one CCS, unifacial scraper; one core/hammerstone; and one handstone fragment. A dirt road bisects the site. Based on the limited location information included on the 1961 site record for P-15-7204, it is quite possible that P-15-7204 and WF-6 represent a single site.

One shovel probe unit was excavated within the northeast portion of the site to test for the presence of subsurface remains. Dug to a depth of 30 cm, this unit yielded six flakes (three CCS, two obsidian, one basalt) in the upper 10 cm and one CCS flake in the 10-20 cm level.

WF-7

This site is a sparse, prehistoric lithic scatter located on two, northeast trending ridges cut by ephemeral drainages. Chipping debris includes at least 100 CCS, obsidian, and basalt biface reduction and pressure flakes. A concentration of obsidian flakes (10/m²) occurs at the western edge of the site. Formed tools consist of three bifaces; two CCS scrapers; one, basalt, contracting stem projectile point; and one handstone fragment. A dirt road traverses near the southern site boundary.

One shovel probe unit was excavated in the southern part of the site, near the dirt road. Dug to a depth of 30 cm, this unit produced seven CCS flakes and one obsidian flake in the 0-10 cm level, and three CCS and four obsidian flakes in the 10-20 cm level.

WF-8

This site is a low density, prehistoric lithic scatter situated on the north facing downslope of an east-west trending ridgeline, above an ephemeral drainage. About 50 flakes are present, including 15 CCS, 25 obsidian, and 10 quartzite specimens. Obsidian reduction strategies include both percussion and pressure flaking, while CCS and quartzite reflect percussion reduction. Formed tools include one obsidian biface fragment; one obsidian side-notched point; and one core tool of volcanic rock. Two graded dirt roads and several motorcycle trails traverse the site. One shovel probe unit was excavated within the northern part of the site. This unit was dug to a depth of 30 cm, producing a single obsidian flake in the 0-10 cm level.

WF-9

This site consists of a sparse, prehistoric lithic scatter located in a high valley surrounded by mountains. It is bounded to the north and east by ephemeral drainages that converge about 100 m northeast of the site. Artifacts include about 20 CCS percussion flakes and one CCS scraper. Two dirt roads traverse the site, one along its northern end and the other along its western boundary. A modern rock ring (hearth) is located at the southern end of the site. One shovel probe unit was excavated at the site. This unit was dug to a depth of 30 cm, producing no artifacts.

WF-10

This site is a prehistoric artifact scatter located on a small ridgeline bounded by two, north/south trending ephemeral drainages. A 20-x-10-m concentration of about 25 CCS flakes and 4 CCS biface fragments occurs at the northwest edge of the site. Elsewhere, flake density is low (1 flake/m²). Most flakes consist of white/cream-colored CCS biface reduction specimens; only two obsidian flakes are present. Formed tools include the four CCS biface fragments in the concentration and one bifacial milling stone fragment. A dirt road traverses across the southern portion of the site.

One 50-x-50-cm shovel probe unit was excavated within the lithic concentration. Dug to a depth of 30 cm, this unit produced eight CCS flakes in the 0-10 cm level, five CCS flakes in the 10-20 cm level, and four CCS flakes in the 20-30 cm level.

WF-11

This historic site consists of a refuse deposit located between two ridges and west of an ephemeral drainage. Two dense artifact concentrations are present, and are separated by a dirt road, which traverses northeast/southwest across the site. Concentration #1, located within the southern part of the site, measures 5-x-3-yards and contains about 100 knife-opened tins, including hole-in-top cans, cone top cans, sanitary cans, a hinged-lid pocket tobacco tin (post 1911), and one white, china fragment. Concentration #2 occurs within the central part of the site, encompassing a 10-x-5-yard area. This concentration contains 27 cans, including 15 hole-in-top, one score-strip opened can (sardines), and nine sanitary cans. Embossed tins include one “Ovaltine” lid and one sanitary can with “Triton.”

WF-12

This site is a historic mining complex consisting of six features located along an east/west trending ridge. The features include two foundations (Feature 1, Feature 6), two structures (Feature 3, Feature 5), one water tank (Feature 2), and the mine entrance (Feature 4). Feature 1 is a small, collapsed structure at the western edge of the site that measures 7-x-15-feet. It is defined by a linear rock alignment, a wooden plank floor, and collapsed walls of green, corrugated sheet metal. Feature 2 is a corrugated metal water tank, 6-feet high and 4.5 feet in diameter located in the center of the site. It is set on a wooden platform and adhered by stabilizing metal wires. Feature 3 is a wood-framed structure, possibly a loading ramp, with a sheet metal exterior and a rock retaining wall. It is highly deteriorated, with most of the framing from the roof and walls occurring on the ground. Feature 4 is a mine adit situated at the northern edge of the site. The opening measures about 5 feet wide and 4 feet high. Feature 5 is a rectangular, wood-framed structure with corrugated sheet metal, possibly used as a garage (Figure 4-5). Feature 6 is a collapsed wooden structure on a level dirt pad, which is supported by a rock retaining wall on two sides. Remains of the wood floor and other lumber are present in the pad area. Artifacts include segments of sheet metal, water pipes, stovepipe, nails, mortar, and glass and can fragments.

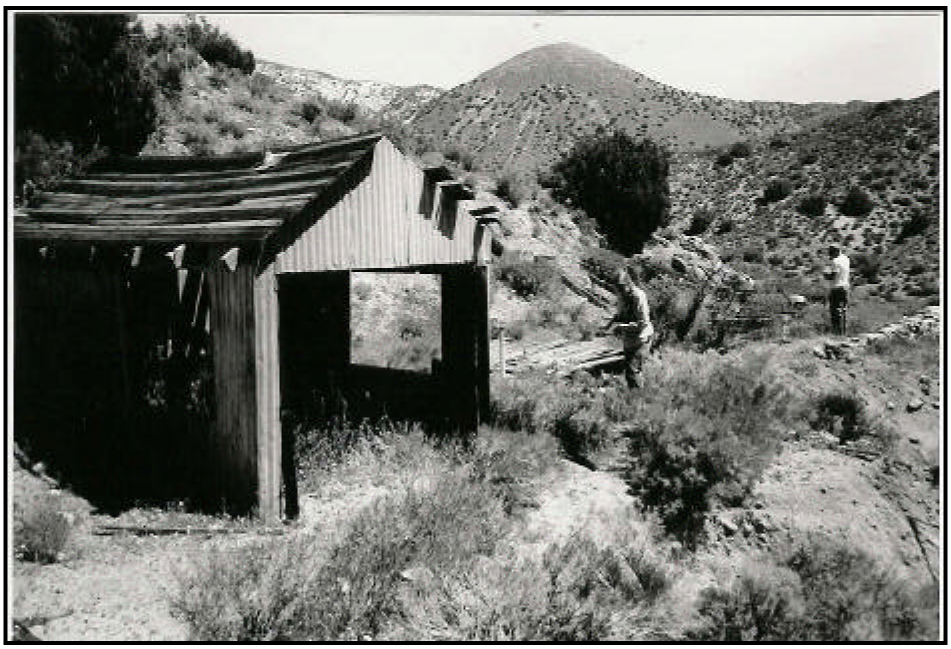

Figure 4-5. Site WF-12, Feature 5.

WF-13

This prehistoric site is an artifact scatter encompassing the slopes of two small hills and an intervening saddle located on the north side of an ephemeral drainage. About 100 flakes are present, dominated by obsidian, biface reduction debris, but also including three CCS biface thinning flakes. Formed tools include one granite handstone and one obsidian edge-modified flake. The intersection of three dirt roads occurs within the southwest portion of the site, with one road continuing to the north, and one to the southeast, within site boundaries.

One shovel probe unit was excavated within the southeast corner of the site. Dug to a depth of 20 cm, this unit yielded three obsidian flakes within the 0-10 cm level.

WF-14

This site consists of a low density, prehistoric artifact scatter situated on a gentle, northeast trending ridge situated between two ephemeral drainages. About 20 flakes are present, comprised of both rhyolite and CCS pieces that reflect percussion reduction activities. A small lithic concentration occurs in the southwest portion of the site. Five formed tools are present, consisting of one Type 5, Coso obsidian biface midsection; one, rhyolite, multiple platform core; one, CCS thumbnail scraper; one, CCS edge-modified flake; and one, quartzite mano fragment. Site disturbances include two dirt roads and natural erosion. Three tools (mano, scraper, biface) are situated atop the berm of a dirt road, suggesting that they have been moved from their original location.

One 50-x-50-cm shovel probe unit was placed within the lithic concentration. Excavated to 20 cm, the unit produced no artifacts. A second unit (30-x-30-cm) was dug in the central part of the site, near a tool concentration. Dug to 20 cm, this unit also yielded no artifacts.

WF-15

This prehistoric site consists of a large artifact scatter situated on a southwest trending ridge bounded by ephemeral drainages. Cultural remains consist of flaked and ground stone artifacts and include both debitage and formed tools. At least 100 waste flakes were noted, most within a lithic concentration that encompasses the central portion of the site. Flakes are dominated by CCS and obsidian specimens, but also include quartzite and rhyolite pieces. A range of reduction technologies is evident, including general percussion, biface thinning, and pressure flaking. Seven flaked stone tools were identified, including one, rhyolite, edge modified chopper tool; one CCS edge-modified flake; one, obsidian biface tip fragment; one, obsidian biface fragment; one, obsidian, Humboldt series projectile point; one, CCS edge-modified flake; and one CCS thumbnail scraper. Ground stone tools consist of one, slate, unifacial tabular metate in two fragments; one, sandstone, unifacial metate fragment; six mano fragments, two of quartzite, one sandstone, and three granite; and a near-complete, conical-shaped, flat bottomed, granite bowl mortar (Figure 4-6).

Figure 4-6. Bowl mortar at site WF-15.

Three features are present, comprised of a midden deposit, lithic concentration, and a modern rock ring. The midden is most visible within the road cut, and appears as a gray-colored, ashy deposit. A lithic concentration (100-x-20-m) occurs along the top of an alluvial ridge east of the dirt road. At least 100 flakes are present, as are 13 formed tools. The modern fire ring is located in the northern part of the site, and is constructed of local cobbles.

Site disturbances are limited to a dirt road, which traverses northwest/southeast across the western site boundary. The road has been excavated at least 30 cm into the midden area. The deepest cut (5 feet) is between the midden area and the southernmost ephemeral drainage.

Two shovel probe units were excavated at the site. Unit 1 was placed with the midden area, in the roadbed. Dug to 25 cm, this unit revealed gray midden sediment to 22 cm. The unit is within a portion of the roadbed that has been cut 30 cm below the ground surface, suggesting that the midden was once at least 50 cm deep. Two obsidian flakes and one piece of fire-affected rock were noted in the upper 15 cm.

Unit 2 was placed within the lithic concentration. Dug to 30 cm, it produced flakes throughout the excavated deposit. The 0-10 cm level yielded 12 flakes, the 10-20 cm had five flakes, and the 20-30 cm revealed three flakes.

WF-16

The site, generally located on a north to south-trending ridge bisected by ephemeral drainages, consists of a moderate density lithic scatter of primarily CCS flakes and a few formed tools. An unnamed seasonal drainage flows north and forms the eastern boundary of the site. Denser concentrations of cultural materials are located proximal to the drainage, but sparsely scattered artifacts are found throughout an approximately 60-x-80-m area. Tools observed at the site include a possible Pinto series projectile point fragment; three, non-diagnostic, CCS bifaces; and one quartzite cobble spall tool. Approximately 50 flakes are present, primarily CCS materials, with lesser amounts of obsidian and rhyolite. The flake types indicate various stages of reduction. Site disturbances are minimal. One 50-x-50-cm shovel probe unit was placed within the site and excavated to 20 cm, at which point bedrock was encountered. Five flakes were identified within this probe.

WF-17

The prehistoric site consists of an extensive but sparse scatter of flaked stone artifacts that extend along a gradually sloping ridgeline between two drainages. Approximately 200 flakes and two biface fragments are present, primarily CCS with lesser quantities of obsidian, rhyolite, and quartzite. Some unmodified CCS also occurs, suggesting that such materials may have been collected on-site. Artifact density averages less than one flake per 5m², but occasionally exceeds one per 1m². Debitage consists primarily of primary and secondary reduction and biface thinning flakes. The two biface fragments are large, rectangular, CCS Stage 3 types. Two shovel probes excavated at the site to a depth of 30 cm failed to disclose any evidence of subsurface cultural materials.

WF-18

This prehistoric site consists of a sparse scatter of obsidian and CCS debitage on the crest and slope of a low knoll overlooking upper Jawbone Canyon. Debitage consists of 100 to 200 items, primarily obsidian reduction and bifacial thinning flakes. CCS flakes are also present, as is naturally-occurring CCS. One small obsidian biface fragment (midsection) was also observed. Artifact density is low, averaging less than one flake per 10m², but occasionally exceeds one per 1m². Two small (25 to 50 cm diameter) concentrations of buried fire-affected rock are present within the graded road along the central astern portion of the site boundary, indicating the presence of buried cultural features.

WF-19

The site consists of a moderately dense prehistoric deposit of CCS, obsidian, basalt, and quartzite flakes situated on top of narrow ridgeline between two steep drainages, one of which encloses Peeping Tom Spring. The ridgeline drops from southwest to northeast with small terraces along its spine and is dotted with small junipers, artemesia, various forbes, and grasses. A few yuccas and small Joshua trees are found in the surrounding area. The site extends from one terrace and drops down onto a saddle to the northeast. Approximately 250 flakes, consisting primarily of CCS and obsidian, with lesser amounts of basalt and quartzite, are present. Flakes have eroded downslope along either side of the ridgeline as evidenced by flakes located on steep slopes to the southeast and northwest.

WF-20

The site consists of a sparse to moderately dense deposit of CCS and obsidian debitage situated on a large, flat terrace incised by small, shallow arroyos. On either side of the terrace, which generally trends north to south, are two large drainages with the one to the east being particularly deep. Joshua trees, juniper, artemesia, and various forbes and grasses occur across the terrace. Approximately 750 to 1,000 CCS and obsidian flakes, a multi-faceted handstone, and the neck and body fragment from a dark green glass bottle are also present. The lip of the bottle is applied, the neck exhibits stretch marks associated with a not fully molded bottle, and the body fragment exhibits horizontal striations associated with turn molding. Dark gray, ashy soil is present throughout much of the site, indicative of a subsurface prehistoric midden deposit.

CHAPTER 5 – NATIONAL REGISTER EVALUATION AND RECOMMENDATIONS

INTRODUCTION

The cultural resources inventory of the Pine Tree Wind Development Project was conducted to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (1999). Section 106 requires federal agencies, before any action, to identify cultural resources that may qualify as eligible for inclusion in the National Register of Historic Places (National Register). If significant (i.e., National Register eligible) resources are identified, then federal agencies are directed to take prudent and feasible measures to avoid or reduce adverse impacts.

The National Register serves as the official list of historic properties, including districts, sites, buildings, structures, and objects, significant in American history, architecture, archeology, engineering, and culture. A historic property may be of national, state, or local significance, and is defined as the place or places where the remnants of a past culture survive in a physical context that allows for the interpretation of those remains.

The significance of a property is best judged and explained when it is evaluated within its historic context – those patterns or trends by which a specific occurrence, property, or site is understood, and its meaning and significance within history or prehistory is made clear (National Register Bulletin 1987:7). It serves as the framework within which National Register criteria are applied to specific properties. A key principle of historic contexts is that resources, properties, or events do not occur in isolation, but rather are part of larger developments, associations, or patterns.

Four criteria of evaluation are considered to assess significance. These criteria serve as the standards by which every property nominated to the National Register is judged. The criteria are written broadly to recognize the Nation's wide variety of historic properties, and to identify the range of resources and kinds of significance that qualify properties for National Register listing. The criteria recognize associative, design, and information values, as listed in the *Code of Federal Regulations* (CFR), Title 36, Part 60:

> The quality of significance in American history, architecture, archeology, engineering and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association, and
>
> A. That are associated with events that have made significant contributions to the broad pattern of our history; or
>
> B. That are associated with the lives of persons significant in our past; or
>
> C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D. That have yielded, or may be likely to yield, information important in prehistory or history.

To be listed in the National Register, a property must not only be shown to be significant under one or more criteria, but it also must have integrity. Within the concept of integrity, the National Register recognizes seven aspects or qualities that, in various combinations, define integrity (National Register Bulletin 1998:44). The seven aspects of integrity are location, design, setting, materials, workmanship, feeling, and association.
It is recognized that all properties change over time, and it is not necessary for one to retain all historic physical characteristics or features. It must, however, retain essential physical features that enable it to convey

its historic identity that define why it is significant and when it was significant (National Register Bulletin 1998:46).

If a resource is determined eligible to the National Register, Section 106 of the NHPA (80 Stat. 915; 16 U.S.C. 470) and its implementing regulations (36 CFR 800) require that effects of a proposed project to that resource be determined. If National Register-eligible properties are identified and will be adversely affected by the project implementation, then prudent and feasible measures to avoid or reduce adverse impacts must be taken. In addition, the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation Officer (SHPO) must be provided an opportunity to review and comment on these measures. The ACHP has adopted regulations (36 CFR 800) that implement this commenting authority.

A critical factor in evaluating a particular resource is a determination of what information that property may contain that is "important" to an understanding of prehistory or history. It is a truism that any site may contain information that some archeologist may consider important (ACHP 1980:10), yet this does not imply that the public interest would be well served to attempt to preserve all sites. By establishing guidelines, the agencies have clearly set the precedent that not all information is important; hence, not all sites are important (cf. ACHP 1980:9-10). Federal guidelines encourage the use of a set of research questions that generally are recognized as important research goals to evaluate significance. If a site contains information that is demonstrably useful in answering such questions, such as those presented above, then it can be considered an important site.

Determination of site significance is most often based on the integrity of resources, as well as the demonstrated contribution of site information to research domains and/or potential to provide additional data in such categories. For the current investigation, National Register evaluation is derived through examination of archaeological materials observed at sites, presence or absence of subsurface deposits, degree of impacts, and discussions of research potential.

The cultural resources inventory and records search of the Project Area resulted in the identification of 101 archaeological sites, including 43 previously recorded and 58 newly identified properties (see Chapters 4 and 5). Of these, 90 sites are within the Project Area. Nineteen sites (21%) have the potential to be affected by project activities, depending upon which components (e.g., access roads, 230kV transmission line, laydown areas) are selected for use or construction (Table 5-1). The remaining 71 sites (79%) do not occur within or immediately adjacent to proposed project components. Of the 19 sites with potential project impacts, only seven (PT-3, PT-12, PT-30, PT-31, PT-32, PT-34, WF-18) are considered NRHP-eligible properties, the remainder not qualifying due to lack of integrity and/or lack of research potential. Appendix A presents the Historic Properties Treatment Plan developed for the seven NRHP-eligible sites.

EVALUATED SITES

Thirty-eight archaeological sites exhibiting prehistoric components were subjected to limited shovel probing by URS (Table 5-2). This effort was conducted to test for the presence of buried deposits, thereby providing preliminary information regarding data potential and National Register eligibility. These sites included: PT-1/27, PT-2, PT-3, PT-7, PT-8, PT-9, PT-11, PT-12, PT-13, PT-14, PT-15, PT-16, PT-21, PT-22, PT-23, PT-24, PT-25, PT-26, PT-28, PT-29, PT-30, PT-31, PT-34, PT-CS-1/PT-CS-2, WF-2, WF-3, WF-5, WF-6, WF-7, WF-8, WF-9, WF-10, WF-13, WF-14, WF-15, WF-16, WF-17, and CA-Ker-2983/4733.

Subsurface deposits (artifacts and/or cultural midden) were identified at 18 sites PT-3, PT-7, PT-8, PT-12, PT-21, PT-24, PT-28, PT-30, PT-31, PT-32, PT-34, WF-5, WF-6, WF-7, WF-8, WF-10, WF-13, WF-15, WF-16, and CA-Ker-2983/4733 (Quail Springs site), resulting in a recommendation of National Register eligibility based on their potential to contribute information important in prehistory (36 CFR 60.4 Criterion D) (Table 5-2). Probing at sites CA-Ker-2983/4733 and WF-15 revealed a deep, artifact-rich, midden deposit that minimally extends 70-100 cm below the ground surface. Other sites containing artifact-rich deposits, but appearing to lack developed midden soils, include PT-28, PT-30, PT-31, and PT-34. The remaining sites exhibited subsurface deposits but with slightly lower yields of artifacts within the completed probes.

Three sites, WF-2, WF-14, and PT-CS-1/PT-CS-2 lacked subsurface artifacts in the probe units, but exhibit a diversified surface artifact assemblage which suggests that buried deposits may occur elsewhere within their expansive site area. Thus, these sites are recommended as eligible until further evaluation proves differently.

Fifteen sites, WF-3, WF-9, PT-1/27, PT-2, PT-9, PT-11, PT-13, PT-14, PT-15, PT-16, PT-22, PT-23, PT-25, PT-26, and PT-29 contain sparse surface remains with no or questionable subsurface deposits (a single flake within an upper level may represent the inadvertent mixing of surface material with soils extracted during shovel probing efforts). These sites are recommended as ineligible to the National Register based on their lack of potential to contribute information important in prehistory.

Three sites, WF-18, WF-19, and WF-20, were not probed, but exhibit sufficient cultural remains (density and variety of artifacts and features) and integrity to recommend them as eligible for the National Register based on surface observations alone.

UNEVALUATED SITES

Nine sites that might be subject to project actions, depending on selected elements, remain as unevaluated properties. These sites include one property with a late 1940s structure, WF-4 (The Ship), which would require an architectural evaluation if it cannot be avoided by project activities; site WF-11, a historic artifact scatter; and site WF-12, a historic mining complex (Upside-Down Mine) with collapsed structures and extant mining features. If necessary, evaluation of this property should consider archival research and subsurface testing of features that would be affected by project activities.

Two unevaluated sites, PT-WF-2 and PT-WF-3, are associated with construction of the First Los Angeles Aqueduct (1908-1913), representing elements of the Pine Tree Canyon labor camp. If needed, evaluation of these sites should be considered within the framework of contributing or non-contributing elements to the First Los Angeles Aqueduct historic district (Bevill et al. 2003).

The remaining unevaluated site, P-15-7203, is a previously noted prehistoric site that could not be relocated by either EDAW or URS. The site location map attached to the original 1961 site record indicates that the plotted site location is "approximate." Given the unsuccessful attempts to relocate this site, it is assumed that its recorded location is in error. No further consideration of this site is necessary.

Table 5-1. Potential Impacts and Recommendations for Previously Recorded, EDAW, and URS Sites within the Project Area.

State Trinomial	Primary (P-) or Temporary Number	Site Type	Date Recorded	Site Condition	Distance to Project Component (m)	Potential Impact	Recommendation
CA-Ker-1116	P-15-1116	Prehistoric lithic scatter	1979	Poor	1450 m to access road	None	No further consideration
CA-Ker-1117	P-15-1117	Prehistoric lithic scatter	1961, 1979	Fair	1550 m to access road	None	No further consideration
CA-Ker-1118	P-15-1118	Prehistoric lithic scatter	1979	Fair	1800 m to access road	None	No further consideration
CA-Ker-2142/H	P-15-2142	Prehistoric lithic scatter; historic artifact scatter	1986	Fair	50 m to access road	None	No further consideration
CA-Ker-2541	P-15-2541	Prehistoric lithic scatter, milling stones	1989	Fair	550 m to access road	None	No further consideration
CA-Ker-2556	P-15-2556	Prehistoric rock shelter, pictographs, lithic scatter, milling stone	1990	Good	1850 m to access road	None	No further consideration
CA-Ker-2830	P-15-2830	Prehistoric lithic scatter	1990	Poor	1200 m to access road	None	No further consideration
CA-Ker-2831	P-15-2831	Prehistoric lithic scatter	1990	Good	1350 m to access road	None	No further consideration
CA-Ker-2832	P-15-2832	Prehistoric lithic scatter	1990	Fair	1300 m to access road	None	No further consideration
CA-Ker-2833	P-15-2833	Prehistoric lithic scatter	1990	Good	1350 m to access road	None	No further consideration
CA-Ker-2834	P-15-2834	Prehistoric lithic scatter	1990	Good	1400 m to access road	None	No further consideration
CA-Ker-2835	P-15-2835	Prehistoric lithic scatter, ground stone, small midden, bone	1990	Fair	1250 m to access road	None	No further consideration
CA-Ker-2836	P-15-2836	Prehistoric lithic scatter; quarry, workshop	1990	Good	900 m to access road	None	No further consideration
CA-Ker-2981	P-15-2981	Prehistoric pictograph, bedrock mortar	1990	Poor	400 m to access road	None	No further consideration
CA-Ker-2982	P-15-2982	Rock shelter, pictographs, flaked stone, bedrock mortars	1961, 1990	Good	1850 m to access road	None	No further consideration

State Trinomial	Primary (P-) or Temporary Number	Site Type	Date Recorded	Site Condition	Distance to Project Component (m)	Potential Impact	Recommendation
CA-Ker-2983/4733 (Quail Springs)	P-15-2983 P-5435	Habitation site, bedrock mortars	1961, 1983, 1990, 1996 URS 2003	Fair	Component dropped	None	Site was probed; depth identified to 70 cm. Elements exist for National Register eligibility. No further consideration due to lack of impacts
CA-Ker-3549H	P-15-3549	First and Second Los Angeles Aqueduct	1992, 2000	Good	Pine Tree Canyon Road crosses aqueduct	None	No further consideration
CA-Ker-4619	P-15-5133	Habitation site, cemetery, bedrock mortars, burial goods, ceramics, ground stone, flaked stone	1961, 1996	Good	150 m to tower alternate	None	No further consideration
	P-15-7195	Prehistoric workshop, lithic scatter	1961	Wind-eroded	200 m to access road	None	No further consideration
	P-15-7196	Prehistoric lithic scatter, workshop	1961	Wind-eroded	700 m to access road	None	No further consideration
	P-15-7197	Prehistoric bedrock mortars, ground stone	1961	Overgrown	650 m to access road	None	No further consideration
	P-15-7198	Prehistoric lithic scatter, bedrock mortars	1961	Wind-eroded	100 m to access road	None	No further consideration
	P-15-7199/ WF-15?	Prehistoric lithic scatter	1961	Wind-eroded	Component dropped	None	No further consideration
	P-15-7200	Prehistoric lithic scatter	1961	Wind-eroded	200 m to access road	None	No further consideration
	P-15-7201	Prehistoric lithic scatter	1961	Wind-eroded	200 m to access road	None	No further consideration
	P-15-7202	Prehistoric lithic scatter	1961	Wind-eroded	30 m to access road	None	No further consideration
	P-15-7203	Prehistoric lithic scatter	1961	Wind-eroded	Access road bisects site	None	Site could not be relocated. No further consideration
	P-15-7204/ WF-6?	Prehistoric lithic scatter	1961	Wind-eroded	Component dropped	None	No further consideration
	P-15-7205	Prehistoric rock shelter, pictographs, lithic scatter, pottery, bone	1961 EDAW 2003	Poor, rockshelter collapsed	100 m to access road	None	No further consideration
	P-15-7207	Prehistoric rock shelter, pottery, bone, mats, throwing stick	1961	Vandalized	60 m to access road	None	No further consideration
CA-Ker-Pro-008	P-15-7381	Prehistoric pictographs	1991	Unknown	400 m to access road	None	No further consideration

State Trinomial	Primary (P-) or Temporary Number	Site Type	Date Recorded	Site Condition	Distance to Project Component (m)	Potential Impact	Recommendation
CA-Ker-Pro-009	P-15-7382	Prehistoric rock overhang, pictographs, bedrock mortar	1991	Unknown	350 m to access road	None	No further consideration
	PT-1/27	Prehistoric lithic scatter	EDAW 2002	Good	5 m to access road	Access road	Site probed, no depth identified. Site recommended as ineligible to National Register due to lack of data potential. No further consideration
	PT-2	Prehistoric lithic scatter; ground stone	EDAW 2002	Poor	Access road bisects site	Access Road	Site probed, depth to 40 cm. Site recommended as ineligible to National Register due to lack of integrity and data potential. No further consideration.
	PT-3	Prehistoric lithic scatter	EDAW 2002	Fair	Underground electrical system will bisect site	Access road and electrical system	Site probed, depth to 40 cm identified. Elements exist for National Register eligibility. If access road is selected as part of project component and site cannot be avoided, site will require data recovery investigations
	PT-5	Prehistoric lithic scatter	EDAW 2002	Good	Component dropped	None	No further consideration
	PT-6	Prehistoric habitation site; flaked stone; ground stone; shell beads	EDAW 2002	Poor	Component dropped	None	No further consideration
	PT-7	Prehistoric lithic scatter	EDAW 2002	Fair	Component dropped	None	Site probed, depth to 40 cm identified. Elements exist for National Register eligibility. No further consideration due to lack of impacts.
	PT-8	Prehistoric lithic scatter	EDAW 2002	Fair	Component dropped	None	Site probed, depth to 40 cm identified. Elements exist for National Register eligibility. No further consideration due to lack of impacts.
	PT-9	Prehistoric lithic scatter	EDAW 2002	Fair	Component dropped	None	Site probed, no depth identified. Site recommended as ineligible to National Register due to lack of data potential. No further consideration.
	PT-11	Prehistoric lithic scatter	EDAW 2002	Fair	On access road	Access road	Site probed, no depth identified. Site recommended as ineligible to National Register due to lack of data potential.

State Trinomial	Primary (P-) or Temporary Number	Site Type	Date Recorded	Site Condition	Distance to Project Component (m)	Potential Impact	Recommendation
							No further consideration.
	PT-12	Prehistoric lithic scatter	EDAW 2002	Fair	Underground electrical system will bisect site	Access road and electrical system	Site probed, depth to 40 cm identified. Elements exist for National Register eligibility. If access road is selected as part of project component and site cannot be avoided, site will require data recovery investigations
	PT-13	Prehistoric lithic scatter	EDAW 2002	Fair	Access road at south edge of site	Access road	Site probed, no depth identified. Site recommended as ineligible to National Register due to lack of data potential. No further consideration.
	PT-14	Prehistoric bedrock milling feature	EDAW 2002	Fair	2 m west of access road	Access road	Site probed, no depth identified. Site recommended as ineligible to National Register due to lack of data potential. No further consideration.
	PT-15	Prehistoric bedrock milling feature; lithic flake	EDAW 2002	Fair	10m southwest of access road	Access road	Site probed, no depth identified. Site recommended as ineligible to the National Register due to lack of data potential. No further consideration.
	PT-16	Prehistoric lithic scatter	EDAW 2003	Fair	Component dropped	None	No further consideration
	PT-17	Prehistoric lithic scatter	EDAW 2003	Good	Component dropped	None	No further consideration
	PT-18	Prehistoric lithic scatter	EDAW 2003	Fair	Component dropped	None	No further consideration
	PT-19	Prehistoric lithic scatter; ground stone	EDAW 2003 EDAW 2003	Fair	Component dropped	None	No further consideration
	PT-20	Prehistoric lithic scatter; ground stone	EDAW 2003	Good	Component dropped	None	No further consideration.
	PT-21	Prehistoric lithic scatter; ground stone	EDAW 2003	Poor	Component dropped	None	No further consideration.
	PT-22	Prehistoric bedrock milling feature; lithic scatter	EDAW 2003	Good	Proposed access road bisects site	Proposed access road	Site probed, no depth identified. Site recommended as ineligible to the National Register due to lack of data potential. No further consideration.
	PT-23	Prehistoric lithic scatter	EDAW 2002	Poor	Site is within proposed laydown area	Proposed laydown area	Site probed, no depth identified. Site recommended as ineligible to the National Register due to lack of integrity and data potential. No further consideration.

State Trinomial	Primary (P-) or Temporary Number	Site Type	Date Recorded	Site Condition	Distance to Project Component (m)	Potential Impact	Recommendation
	PT-24	Prehistoric lithic scatter	EDAW 2002	Fair	Adjacent to proposed laydown area	None; site can be avoided	Site probed, depth to 20 cm identified. Site is recommended as eligible to the National Register. No further consideration due to lack of impacts.
	PT-25	Prehistoric lithic scatter	EDAW 2002	Good	Component dropped	None	No further consideration
	PT-26	Prehistoric bedrock milling feature; lithic scatter	EDAW 2002	Fair	Proposed access road	Proposed access road	Site probed, no depth identified. Site recommended as ineligible to the National Register due to lack of data potential. No further consideration
	PT-28	Prehistoric bedrock milling features; flaked and ground stone artifact scatter.	EDAW 2002	Fair	Component dropped	None	No further consideration
	PT-29	Prehistoric lithic scatter	EDAW 2002	Fair	Access road bisects site	Access Road	Site probed, no depth identified. Site recommended as ineligible to the National Register due to lack of data potential. No further consideration.
	PT-30	Prehistoric flaked and ground stone artifact scatter	EDAW 2003	Fair	Underground electrical system will bisect site	Access Road and electrical system	Site probed, depth to 60 cm identified. Elements exist for National Register eligibility. If access road is selected as part of project component and site cannot be avoided, site will require data recovery investigations
	PT-31	Prehistoric bedrock milling feature, flaked and ground stone artifact scatter	EDAW 2002	Fair	Access road bisects site	Access Road	Site probed, depth to 60 cm identified. Elements exist for National Register eligibility. If access road is selected as part of project component and site cannot be avoided, site will require data recovery investigations

State Trinomial	Primary (P-) or Temporary Number	Site Type	Date Recorded	Site Condition	Distance to Project Component (m)	Potential Impact	Recommendation
	PT-32; Sky River Ranch	Prehistoric – flaked and ground stone artifact scatter; Historic – Sky River Ranch	URS 2003	Good	Access road along eastern and northern site boundaries	Access Road	No probing conducted. Elements exist for National Register eligibility. If access road is selected as part of project component and site cannot be avoided, site will require data recovery investigations. If historic structures cannot be avoided, architectural evaluation and possibly mitigation would be required.
	PT-33	Prehistoric lithic scatter	EDAW 2002	Undetermined	Component dropped	None	No further consideration.
	PT-34, Elmer Lunquist House	Prehistoric bedrock milling feature, flaked and groundstone artifact scatter; historic homestead	EDAW 2003	Good	Access road bisects site	Access Road	Site probed, depth to 60 cm identified. Elements exist for National Register eligibility. If access road is selected as part of project component and site cannot be avoided, site will require data recovery investigations If historic structure cannot be avoided, architectural evaluation and possibly mitigation would be required.
	PT-35	Prehistoric rockshelter with pictographs; historic corral and camp	EDAW 2003	Good	150 m to access road	None	No further consideration
	PT-CS-1/2	Prehistoric lithic scatter; historic can scatter	EDAW 2003	Good	Component dropped	None	Site probed, no depth identified. Recommended as eligible to the National Register due to presence of multiple artifact classes. No further consideration due to lack of impacts.
	PT-JU-1	Prehistoric bedrock milling feature	EDAW 2003	Good	17 m west of access road	None	No further consideration
	PT-JU-2	Prehistoric bedrock milling feature	EDAW 2003	Good	"Up small drainage"; location uncertain	None	No further consideration
	PT-WF-1	Historic trash scatter	EDAW 2003	Fair	25 m east to Pine Tree Canyon access road	None	No further consideration

State Trinomial	Primary (P-) or Temporary Number	Site Type	Date Recorded	Site Condition	Distance to Project Component (m)	Potential Impact	Recommendation
	PT-WF-2	Historic trash scatter and foundation (Los Angeles Aqueduct related)	EDAW 2003	Fair	Pine Tree Canyon Access road bisects site; proposed 240kV line bisects site	None; site can be avoided	Site is unevaluated. No further consideration due to lack of impacts.
	PT-WF-3	Historic foundations; likely Los Angeles Aqueduct Pine Tree Canyon Labor Camp	EDAW 2003	Fair	50 m north of Pine Tree Canyon access road; proposed 230kV line may cross northern edge of site	None	Site is unevaluated. No further consideration due to lack of impacts.
	WF-1	Prehistoric lithic scatter	URS 2003	Good	45 m north of Pine Tree Canyon access road	None	No further consideration
	WF-2	Prehistoric lithic scatter, groundstone	URS 2003	Good	Component dropped	None	Site probed, no depth identified. Recommended as eligible to the National Register due to presence of multiple artifact classes. No further consideration due to lack of impacts.
	WF-3	Prehistoric lithic scatter, ground stone, bedrock milling feature	URS 2003	Good	Component dropped	None	No further consideration
	WF-4	Historic structure "The Ship"	URS 2003	Fair	Component dropped	None	Site is unevaluated. No further consideration due to lack of impacts.
	WF-5	Prehistoric lithic scatter, ground stone, midden	URS 2003	Good	Component dropped	None	No further consideration
	WF-6/ PT-15-7204?	Prehistoric lithic scatter, ground stone	URS 2003	Good	Component dropped	None	No further consideration
	WF-7	Prehistoric flaked and ground stone artifact scatter	URS 2003	Good	Component dropped	None	No further consideration
	WF-8	Prehistoric lithic scatter	URS 2003	Good	Component dropped	None	No further consideration
	WF-9	Prehistoric lithic scatter	URS 2003	Good	Access roads, O&M building	Access Roads and O&M building	Site probed to 20 cm. No depth identified. Site recommended as ineligible to National Register due to lack of data potential. No further consideration.
	WF-10	Prehistoric flaked and ground stone artifact scatter	URS 2003	Good	Component dropped	None	No further consideration.

State Trinomial	Primary (P-) or Temporary Number	Site Type	Date Recorded	Site Condition	Distance to Project Component (m)	Potential Impact	Recommendation
	WF-11	Historic trash scatter	URS 2003	Good	Access road bisects site	Access Road	No research potential beyond recordation; no further consideration
	WF-12	Historic mining complex	URS 2003	Fair	Access road is 20 m south	None	Site is unevaluated. No further consideration due to lack of impacts.
	WF-13	Prehistoric flaked and ground stone artifact scatter	URS 2003	Good	Component dropped	None	No further consideration
	WF-14	Prehistoric flaked and ground stone artifact scatter	URS 2003	Good	Component dropped	None	Site probed, no depth identified. Recommended as eligible to the National Register due to presence of multiple artifact classes. No further consideration due to lack of impacts.
	WF-15/ P-15-7199?	Prehistoric flaked and ground stone artifact scatter, midden	URS 2003	Good	Access road 10 m to north	Site can be avoided	Site probed, depth to 50 cm identified. Elements exist for National Register eligibility. No further consideration due to lack of impacts.
	WF-16	Prehistoric flaked stone artifact scatter	URS 2003	Good	Alternative 230kV line crosses the site	Site can be avoided	Site probed, depth to 30 cm identified. Elements exist for National Register eligibility. No further consideration due to lack of impacts.
	WF-17	Prehistoric lithic scatter	URS 2004	Good	Access road crosses the site	None	Site probed, no depth identified. Site recommended as ineligible to the National Register due to lack of data potential. No further consideration.
	WF-18	Prehistoric lithic scatter	URS 2004	Good	Access road crosses the site	Access road	Elements exist for National Register eligibility. If access road is selected as part of project component and site cannot be avoided, site will require data recovery investigations
	WF-19	Prehistoric lithic scatter	URS 2004	Good	230kv transmission line crosses the site	Site can be avoided	Elements exist for National Register eligibility. No further consideration due to lack of impacts.
	WF-20	Prehistoric flaked stone and ground stone scatter; one historic artifact	URS 2004	Good	230kV transmission line	Site can be avoided	Elements exist for National Register eligibility. No further consideration due to lack of impacts.

Table 5-2. Summary of Site Constituents, NRHP Evaluation, and Potential Impacts for Evaluated Archaeological Sites within Potential Impact Areas.

Site No.	Site Type	Assemblage Type	Surface Artifacts and Features	Probe Results	Site Condition	NRHP Recommendation	Potential Impact	Data Recovery Recommended	Contribution to Research Theme (see Appendix A)
PT-1/27	Prehistoric	SAS	F, C	No artifacts	Good	Ineligible	Access Road	No	None; lack of research potential
PT-2	Prehistoric	IAS	F, C, PPT, MS	Artifacts to 40 cm	Poor	Ineligible	Access Road	No	None; lack of integrity and research potential
PT-3	Prehistoric	SAS	F, BIF, CO	Artifacts to 40 cm	Fair	**Eligible** (Criterion d)	Access Road/ Elec. System	Yes	AC, CC, SP, EP
PT-7	Prehistoric	SAS	F	Artifacts to 40 cm	Fair	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
PT-8	Prehistoric	SAS	F, C	Artifacts to 40 cm	Fair	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
PT-9	Prehistoric	SAS	F	No artifacts	Fair	Ineligible	None	No	None; lack of research potential
PT-11	Prehistoric	SAS	F	Artifacts to 20 cm	Fair	Ineligible	Access Road	No	AC, CC, SP, EP
PT-12	Prehistoric	SAS	F, BIF, CO	Artifacts to 40 cm	Fair	**Eligible** (Criterion d)	Access Road/ Elec. System	Yes	AC, CC, SP, EP
PT-13	Prehistoric	SAS	F	No artifacts	Fair	Ineligible	Access Road	No	None; lack of research potential
PT-14	Prehistoric	SAS	BRM	No artifacts	Fair	Ineligible	Access Road	No	None; lack of research potential
PT-15	Prehistoric	SAS	BRM	No artifacts	Fair	Ineligible	Access Road	No	None; lack of research potential
PT-16	Prehistoric	IAS	F, CO, HS	No artifacts	Fair	Ineligible	None	No	None; lack of research potential
PT-21	Prehistoric	IAS	F, CO, HS, BIF, PPT, HST	Artifacts to 20 cm	Good	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
PT-22	Prehistoric	IAS	PS, HS, BIF, BRM	No artifacts	Good	Ineligible	Access Road	No	None; lack of research potential
PT-23	Prehistoric	SAS	F	No artifacts	Poor	Ineligible	Laydown Area	No	None; lack of research potential
PT-24	Prehistoric	SAS	F, CO	Artifacts to 20 cm	Fair	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
PT-25	Prehistoric	SAS	F	No artifacts	Good	Ineligible	None	No	None; lack of research potential
PT-26	Prehistoric	IAS	F, BRM	No artifacts	Fair	Ineligible	Access Road	No	None; lack of research potential
PT-28	Prehistoric	IAS	F, BRMs	Artifacts to 40 cm	Fair	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
PT-29	Prehistoric	IAS	F. GS	No artifacts	Fair	Ineligible	Access Road	No	None; lack of research potential
PT-30	Multiple	SAS; Historic Homestead	F	Artifacts to 60 cm	Fair	**Eligible** (Criterion d)	Access Road/ Elec. System	Yes	AC, CC, SP, EP; Historic component not evaluated
PT-31	Prehistoric	IAS	F, BRM	Artifacts to 60 cm	Fair	**Eligible** (Criterion d)	Access Road	Yes	AC, CC, SP, EP
PT-32	Multiple	CAS; Historic Homestead	F, GS, M	Not probed; visible depth	Good	**Eligible** (Criterion d)	Access Road	Yes	AC, CC, SP, EP; Historic component not evaluated
PT-34	Multiple	IAS; Historic Homestead	F, BIF, GS, BRM	Artifacts to 43 cm	Good	**Eligible** (Criterion d)	Access Road	Yes	AC, CC, SP, EP; Historic component not evaluated
PT-CS1/2	Multiple	IAS; Historic Trash Scatter	F, EMF, PPT, HS	No artifacts	Good	**Eligible*** (Criterion d)	None	No	AC, CC, SP, EP; Historic component not evaluated
WF-2	Prehistoric	IAS	F, PPT, BIF, EMF, MS, HS	No artifacts	Good	**Eligible*** (Criterion d)	None	No	AC, CC, SP, EP

Site No.	Site Type	Assemblage Type	Surface Artifacts and Features	Probe Results	Site Condition	NRHP Recommendation	Potential Impact	Data Recovery Recommended	Contribution to Research Theme (see Appendix A)
WF-3	Prehistoric	IAS	F, HS, BRM	No artifacts	Good	Ineligible	None	No	None; lack of research potential
WF-5	Prehistoric	CAS	F, PPT, C, HS, MS, GS, BM, FA, M	Artifacts to 30 cm	Good	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
WF-6	Prehistoric	IAS	F, SCR, C, HS	Artifacts to 20 cm	Good	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
WF-7	Prehistoric	IAS	F, BIF, SCR, PPT, HS	Artifacts to 20 cm	Good	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
WF-8	Prehistoric	SAS	F, BIF, PPT, CT	Artifacts to 10 cm	Good	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
WF-9	Prehistoric	SAS	F, SCR	No artifacts	Good	Ineligible	Access Roads O&M Building	No	None; lack of research potential
WF-10	Prehistoric	IAS	F, BIF, MS	Artifacts to 30 cm	Good	**Eligible (**Criterion d)	None	No	AC, CC, SP, EP
WF-13	Prehistoric	IAS	F, HS, EMF	Artifacts to 10 cm	Good	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
WF-14	Prehistoric	IAS	F, BIF, C, EMF, HS	No artifacts	Good	**Eligible*** (Criterion d)	None	No	AC, CC, SP, EP
WF-15	Prehistoric	CAS	F, CT, EMF, BIF, PPT, SCR, MS, HS, BM	Artifacts to 50 cm	Good	**Eligible** (Criterion d)	Can be avoided	No	AC, CC, SP, EP
WF-16	Prehistoric	IAS	F, BIF, EMF	Artifacts to 30 cm	Good	**Eligible** (Criterion d)	Can be avoided	No	AC, CC, SP, EP
WF-17	Prehistoric	SAS	F	No artifacts	Good	Ineligible	None	No	None; lack of research potential
WF-18	Prehistoric	SAS	F	Not probed; visible depth	Good	**Eligible** (Criterion d)	Access Road	Yes	AC, CC, SP, EP
WF-19	Prehistoric	SAS	F	Not probed; visible depth	Good	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
WF-20	Prehistoric	IAS	F, HS, M	Not probed; visible depth	Good	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP
CA-Ker-2983/4733	Multi-component	CAS; Ranching	F, BIF, C, EMF, PPT, HST, HS, MS, PS, BM, M	Artifacts to 70 cm	Good/Fair	**Eligible** (Criterion d)	None	No	AC, CC, SP, EP; Historic component not evaluated

Key:

F	Flakes	PPT	Projectile Point	BRM	Bedrock Milling Station	CC	Cultural Chronology
BIF	Biface	HST	Hammerstone	M	Midden	SP	Subsistence Patterns
C	Core	HS	Handstone	SAS	Simple Assemblage Site	EP	Economic Patterns and Technology
EMF	Edge-modified Flake	MS	Millingstone	IAS	Intermediate Assemblage Site		
CT	Core Tool	PS	Pestle	CAS	Complex Assemblage Site		
SCR	Scraper	BM	Bowl Mortar	AC	Assemblage Composition		

Eligible * - Although no subsurface artifacts were found during limited probing, the presence of a diversified surface assemblage suggests potential for buried deposits.

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APPENDIX A

HISTORIC PROPERTIES TREATMENT PLAN FOR SITES PT-3, PT-12, PT-30, PT-31, PT-32, PT-34, AND WF-18, PINE TREE WIND DEVELOPMENT PROJECT, KERN COUNTY, CALIFORNIA

PINE TREE CANYON WIND DEVELOPMENT PROJECT: HISTORIC PROPERTIES TREATMENT PLAN

INTRODUCTION

The Los Angeles Department of Water and Power (LADWP), in association with Wind Turbine Prometheus, LLP, (WTP), is proposing to construct a wind development project near upper Pine Tree and Jawbone canyons in the Piute Mountains of Kern County, northwest of Mojave, California. Following construction, the facility will be owned and operated by LADWP. When completed, the Pine Tree project will produce up to 120 megawatts of electricity and will be the largest municipally owned wind plant in the United States. The facility, consisting of 80 wind turbines, will be constructed on privately owned land located 12 miles north of Mojave, California, and 15 miles northeast of Tehachapi. Access to the facility, from State Highway 14, will require crossing lands administered by the USDI Bureau of Land Management (BLM).

This Historic Properties Treatment Plan (HPTP) is prepared based on provisional National Register eligibility recommendations provided in the Cultural Resources Inventory Report for the Pine Tree Wind Development Project (URS 2004). In this report, 90 archaeological sites were identified within the Project Area, including 34 previously recorded and 56 newly identified properties, two of which (WF-15, WF-6) likely share their location with a previously recorded site (P-15-7199 and P-15-7204, respectively) that could not be relocated. Eliminating these two sites, the remaining 88 resources include 69 sites that required no further management consideration, as planned project activities could avoid these resources. Any changes to current plans, however, will require reassessment of potential impacts to these resources.

Nineteen sites (21%) have the potential to be affected by project activities, depending upon which components (e.g., access roads, 230kV transmission line, laydown areas) are selected for use or construction (Nilsson and Kelly 2004: Table 5-1). The remaining 71 sites (79%) do not occur within or immediately adjacent to proposed project components. Of the 19 sites with potential project impacts, seven (PT-3, PT-12, PT-30, PT-31, PT-32, PT-34, WF-18) are considered NRJP-eligible properties, the remainder not qualifying due to lack of integrity and/or lack of research potential. Current project plans indicate these seven sites cannot feasibly be avoided.

Three sites, including PT-3, PT-12, and PT-30, will be impacted by installation of an underground electrical system within an access road passing through the site. Sites PT-31, PT-32, and PT-34 will be crossed by access roads. Two of these sites, PT-32 and PT-34, contain both historic and prehistoric components (Table 1-1). Because the historic components will not be affected, mitigation measures presented below focus on prehistoric components only. An additional site, WF-18, will be impacted if the alternative turbine proposed for this location is constructed. If this alternative is selected, an access road to that location will pass through site WF-18 and mitigation will be necessary. Consequently, mitigation measures for this site are also included.

Table 1-1. Evaluated Archaeological Sites within Potential Impact Areas							
Site No.	Site Type	Assemblage Type	Surface Artifacts and Features	Probe Results	Site Condition	NRHP Recommendation	Potential Impact
PT-3	Prehistoric	SAS	F, BIF, CO	Artifacts to 40 cm	Fair	Eligible	Access Road/Electrical System
PT-12	Prehistoric	SAS	F, BIF, CO	Artifacts to 40 cm	Fair	Eligible	Access Road/Electrical System
PT-30	Multiple	SAS; Historic Homestead	F	Artifacts to 60 cm	Fair	Eligible	Access Road/Electrical System
PT-31	Prehistoric	IAS	F, BRM	Artifacts to 60 cm	Fair	Eligible	Access Road
PT-32	Multiple	CAS; Historic Homestead	F, GS, M	Not probed; visible depth	Good	Eligible	Access Road
PT-34	Multiple	IAS; Historic Homestead	F, BIF, GS, BRM	Artifacts to 43 cm	Good	Eligible	Access Road
WF-18	Prehistoric	SAS	F, FAR	Not probed; visible depth	Good	Eligible	Access Road

Key:
F Flakes
BIF Biface
CO Core
GS Groundstone
BRM Bedrock Milling Station
M Midden
FAR Fire-affected Rock
SAS Simple Assemblage Site
IAS Intermediate Assemblage Site
CAS Complex Assemblage Site

RESEARCH DESIGN

INTRODUCTION

It has long been recognized that management goals necessary for achieving compliance with cultural resource legislation cannot be achieved in a theoretical vacuum: establishing the data values of a site, assessing project-related impacts to those values, and developing recommendations for data recovery all require reference to what is "important" in archaeological research. In other words, it is necessary to establish why the data should be saved. Establishing and recovering important or significant data can be accomplished through reference to a problem-oriented research design that links the research goals of the social sciences and humanities to the resources that may be found in a project area (ACHP 1980; Raab and Klinger 1977). To accomplish such a linkage, the research design presented below is devoted to the discussion of research problems and how they will be addressed using data recovered during mitigation of sites in the Pine Tree project area.

RESEARCH QUESTIONS

Realizing that survey level data are typically limited to surface observations, the range of research issues that can be addressed is also restricted. Survey data generated from the Pine Tree project will likely be able to address basic questions regarding site distribution, density, content, and integrity viewed, while preliminary questions regarding cultural chronology, subsistence patterns, technology and exchange systems may also be approached depending upon site assemblages.

Prehistoric Archaeology

Site Distribution

The spatial distribution of sites across a given landscape often reflects the choices past people made in stationing themselves to best exploit available resources. In this regard, patterns of site density can contribute to understanding intensity of occupation, the concentration and availability of resources, or the level of mobility of past groups. Questions regarding site distribution of settlement pattern include:

(SD-1) What is the overall site density within the survey area? Do densities vary by elevation, vegetation patterns, landform, or disturbance zones?

(SD-2) How does site distribution compare to the “sensitivity” zones identified in the survey sampling strategy (discussed below)?

(SD-3) Are prehistoric sites clustered around particular resources such as water, piñon pine, or lithic raw material?

Cultural Constituents

Basic to any archaeological study is the identification of the types of cultural materials present within a site or region. Knowledge of the kinds of tools present in an archaeological assemblage may aid in the identification of the organization of settlement systems, including issues of mobility and subsistence. In addition, knowledge of the relative condition of preservation of archaeological materials is useful for addressing research questions, and for assessment of site integrity. Basic questions regarding cultural constituents include:

(CC-1) What range of cultural materials is found in prehistoric sites within the Pine Tree project area?

(CC-2) What activities are represented by the types of tools present at each site? Is there evidence of past subsistence activities?

(CC-3) Are intact features present among the project sites? What do these features reveal about their use and function?

Cultural Chronology

Chronology is concerned with the temporal ordering of archaeological data in terms of absolute or relative time, as well as in the refinement of local and regional cultural historical sequences. As such, chronological issues are an essential prerequisite to the investigation of higher order research questions involving diachronic changes in human behavior.

Moratto (1984:388) writes that no local cultural chronological sequence has been established for the western Mojave Desert south of Owens Valley, although surface surveys and limited test excavations have provided some basic data. Survey and excavation projects conducted in the Antelope Valley area and reported by W.S. Glennan (1971) and M.Q. Sutton (1980) reveal evidence of a Pinto age occupation (ca. 4000-2000 B.C.) and a late prehistoric period occupation (ca. 250 B.C.-A.D. 1650).

Investigations that are more substantial have taken place within the northwestern Mojave Desert and Owens Valley area, and have revealed a complex prehistory spanning a period of approximately 12,000 years. Several excavation projects have been conducted at the Rose Spring site (CA-INY-372/H) and are reported by Lanning (1963) and Yohe (1992). Lanning (1963) identified four cultural units for this site, including Early Rose Spring (1500-500 B.C.), Middle Rose Spring (500 B.C.-A.D. 500), Late Rose Spring (A.D. 500-1300), and Early Cottonwood (A.D. 1300-1840). Lanning correlated this sequence with other data and added earlier phases: the Lake Mojave Phase (pre-3000 B.C) and Little Lake Phase (3000-1500 B.C.). In addition, Lanning (1963) included the Late Cottonwood Phase (A.D. 1840-1900). Later work by Yohe (1992) confirmed the sequence proposed by Lanning (1963).

Warren and Crabtree (1986) correlated the Lanning (1963) sequence with data from Death Valley and the southwestern Great Basin and identified five broad periods of prehistory that may apply to the Jawbone ACEC project area. These include: Lake Mojave (ca. 12,000-7000 B.P.), Pinto (ca. 7000-4000 B.P.), Gypsum (ca. 4000-1500 B.P.), Saratoga Springs (ca. 1500-750 B.P.), and Shoshonean (750 B.P.-Contact). The latter includes the ethnographic era, while the four remaining periods encompass the Archaic of the Great Basin and, in the Saratoga Springs period, Formative influences from the Southwest (Lyneis 1982). Claims have been made for archaeological assemblages dating to periods earlier than Lake Mojave, but as Warren and Crabtree (1986) note, all are controversial and, even if valid, have little or no relationship to later cultural developments in the region.

Questions specific to the realm of cultural chronology include:

(CH-1) What types of time-sensitive artifacts occur among the project sites? What is the range of dates suggested by such materials? How do these data correlation with site distribution patterns?

(CH-2) Do temporal data support the sequences proposed by Lanning (1963) or Warren and Crabtree (1986) for the western Mojave region? Can project data be used to offer any refinements to either sequence?

Subsistence Patterns

The permanent springs and seasonal streams within the project area were likely important attractions for the prehistoric inhabitants of the region. Likewise, being located within a mountainous region, with forested slopes in the nearby wilderness areas, this area likely offered a variety of flora and fauna during much of the year. Faunal remains, floral remains, and milling tools may provide valuable data for the examination of past subsistence practices at sites recorded within the project area. Questions that may be addressed with survey level data include:

(SP-1) What subsistence activities are represented by the artifact assemblages and features noted within the Pine Tree project area?

(SP-2) What types of ground stone tools or milling features are present? How do such tools or features compare with similar phenomena in the surrounding regions? Can such tools or features be dated?

(SP-3) Are floral and/or faunal remains present at sites within the Pine Tree project area? If so, what types of subsistence items are evident?

Technology and Exchange

Flaked stone artifacts comprise one of the most durable and ubiquitous types of cultural material recovered from most archaeological sites in California. Due to their manufacture from non-perishable, lithic materials, these artifacts typically represent the most numerous and, in some cases, the only cultural specimens present at sites. Having formed an integral and indispensable role in the daily lifeways of Native peoples, these artifacts offer a glimpse of past lifeways that reveal patterns of technology and economy. Basic questions regarding flaked stone and other non-perishable items include:

(TE-1) What is the range of flaked stone raw material within the project area? Is obsidian present, and if so, what sources are represented?

(TE-2) What range of flaked stone reduction activities are represented by debitage in the Jawbone ACEC project area? Are reduction technologies different for different types of lithic raw material?

(TE-3) What other types of exchange goods are present within the sites? Are items such as shell beads and pottery present? If so, can such items be dated, or can the source of such items be determined?

<u>Historic Archaeology</u>

Previous survey and a review of maps and available literature suggest that most historic era sites located within the Pine Tree area are related to past mining and ranching activities, or with the construction of the Los Angeles Aqueducts.

Basic questions regarding historic era sites in the project area include:

(HA-1) What range of historic sites is present within the study area? To what dates do these sites belong?

(HA-2) What activities occurred at each historic site?

TREATMENT MEASURES

GENERAL TREATMENT MEASURES

Hunter-gather land-use patterns are extremely dynamic, often producing complex accumulations of materials that reflect multiple occupations of different lengths and functions. Although the ultimate goal of the evaluation program is to determine the significance of entire sites and mitigate impacts by investigating significant portions of the affected deposit, the approach taken herein focuses on identifying and testing discrete loci or artifact concentrations. These areas tend to reflect relatively discrete temporal or functional events of particular value for addressing the research issues. With this in mind, the treatment strategy developed for data recovery investigations at the 22 project sites incorporates a flexible program of surface reconnaissance, surface collection, surface transect units, controlled excavation, and laboratory studies to ensure the recovery of sufficient data before the site is affected by project activities. Field studies are designed to provide determinations of effect, as well as to determine if the impact area contains portions of the site that contribute to its NRHP-eligibility. Revisions to these methods, based on in-field decisions, may be necessary as fieldwork progresses. Table 2 summarizes the level of data recovery investigations proposed for the study sites.

Surface Reconnaissance

To initiate fieldwork at a site, the entire surface will be intensively surveyed at regularly spaced transect intervals averaging 5-10-m depending upon the size of the site. All cultural materials and features observed during the reconnaissance will be pin-flagged, with tools and debitage marked in different colors. This will provide detailed characterization of the site, including re-establishing site boundaries and identifying loci or concentrations to assist in the placement of subsurface units.

Surface Collection

Following initial surface reconnaissance all temporally diagnostic artifacts and other finished tools identified on the surface will be collected. Artifact location will be recorded from a primary or secondary datum with an EDM instrument during site mapping activities. For documentation, collected items will be recorded on field specimen sheets. Inside designated loci, all formed tools except very large milling slabs will be collected; larger pieces of milling equipment will be plotted, analyzed in the field, but not collected. Outside loci, diagnostic artifacts and other finished tools will be collected.

Surface Transect Units

Following surface reconnaissance and identification of loci, concentrations, and other surface manifestations, shovel testing will be conducted as the preliminary subsurface investigation. This will consist of the excavation of a series of surface transect units (STUs), each of which will measure 1-x-0.5-m, excavated in 10 cm levels with a minimum of two levels. Units will be located at 10 m intervals along alternating sides of the access roads that will be widened through the site. All sediments removed from the STUs will be passed through one-eighth-inch mesh hardware screening. All artifactual materials identified in the screens will be collected and placed in plastic bags, and then in paper bags, labeled with the appropriate provenience information. Flotation, radiocarbon, and other special samples will be collected from features or other contexts and handled in the appropriate manner. In general, if a level in a STU contains less than 10 flakes and no tools, the STU will be terminated after two levels. If it contains more than 10 flakes, or any tools, excavation will continue. For STUs, as well as other unit types, the southwest corner will be used for provenience recordation. All STUs, as well as other types of subsurface units, will be backfilled and restored to their original condition to the extent possible.

Controlled Excavation Units

Controlled excavation units (EUs) will provide a larger sample of cultural materials from site areas determined through surface reconnaissance, surface collection, and STUs to exhibit the greatest potential for subsurface archaeological materials. Although models of site formation (see Jackson et al. 1994, White 1988) suggest that such concentrations may, in fact, reflect multiple episodes of use and, thus, have the greatest potential for mixing of components, these zones often provide the greatest abundance and diversity of materials. Therefore, such samples are often crucial to sufficiently characterize the cultural deposit. Incorporation of surface reconnaissance data (see above) is a necessary complement to EU results, and may indicate discrete occupation areas for the sites.

Based on the results of STUs, controlled excavation units will be dug at the sites. The actual number and placement of EUs will be dependent upon a number of factors, including site size and complexity, the nature of subsurface features or deposits, definition of overall site structure, and recovery of a representative and statistically meaningful sample of archaeological materials at each site or locus. Additional units or expanded block exposures may be needed to expose buried features or other finds beyond the expected scope of the investigation.

At each site, 1-2 EUs will be excavated within the impact areas depending upon results obtained from STUs. These EUs will measure 1-x-2-m and will be screened through one-eighth-inch mesh. Additional 1-x-1-m EUs will be used to examine midden areas or artifact concentrations located outside of the direct impact areas, as appropriate. Sediments from these units will also be screened through one-eighth-inch mesh. All EUs will excavated in 10 cm levels, with a minimum of two levels each.

At the termination of unit excavation, one sidewall profile will be photographed and drawn to document sediment characteristics and the unit will be backfilled. The bottom of each EU will be marked by a layer of black plastic before backfilling. Soil columns will be extracted from selected unit walls as 10-x-10-x-10 cm blocks.

Mapping

A planimetric contour map of each excavated site will be prepared using a laser electronic distance machine (EDM) instrument. This map, drawn to 1.0 m contour intervals, will depict major site features, including boundaries, areas of subsurface disturbance, natural depressions and landmarks, contour changes; and the location of milling features, surface collected artifacts and subsurface test units (STUs and EUs). To assist in the assessment of site integrity and recognition of the extent of previous impacts to sites, observable surface disturbances will also mapped. Distance and bearings to these cultural points and features will be recorded from a permanent datum established at each site.

ADDITIONAL TASKS

All sites will be documented using color slide and black-and-white photography, with attention to site overviews, features, and work in progress.

Table 4-1. Proposed Level of Effort for Data Recovery Investigations by Site

Site No.	Site Type	Site Size (m^2)	Impact Type	Area of Potential Impact (m^2) (length x width of road widening)	Shovel Transect Units (1-x-0.5-m)		Excavation Units (1-x-2-m/1-x-1-m)		Total Excavation Volume
					No.	Est. Volume (m^3)	No.	Est. Volume (m^3)	
PT-3	SAS	632	Access Road	120 m^2 (60 x 2)	6	0.9	1 / 0	0.8 (40 cm)	1.7
PT-12	SAS	217	Access Road	20 m^2 (10 x 2)	2	0.3	1 / 0	0.8 (40 cm)	1.1
PT-30	SAS-H	16,956	Access Road	640 m^2 (320 x 2)	32	4.8	4 / 0	4.8 (60 cm)	9.6
PT-31	IAS	20,724	Access Road	600 m^2(300 x2)	30	4.5	2 / 1	3.0 (60 cm)	7.5
PT-32	CAS-H	10,598	Access Road	350 m^2 (175 x 2)	17	2.5	1 / 1	1.8 (60 cm)	4.3
PT-34	IAS-H	5,102	Access Road	100 m^2 (50 x 2)	6	1.2*	2 / 1	3.0 (60 cm)	4.2
WF-18	SAS	3,500	Access Road	100 m^2 (50 x 2)	4	0.4	2 / 1	1.8 (60 cm)	2.2
TOTALS					97	14.6	13/4	16.0	30.6

SAS = Simple Assemblage Site; IAS = Intermediate Assemblage Sites; CAS = Complex Assemblage Site; H – Historic Component
* STU depth estimated at 40 cm average

SITE SPECIFIC TREATMENT MEASURES

Site PT-3

This prehistoric site consists of a sparse lithic scatter situated in a flat area between two graded roads on the southern side of a saddle along an east to west trending ridge. Cultural remains include about 20 CCS and quartzite flakes, 1 obsidian flake, 1 chalcedony biface fragment, and 1 chalcedony unidirectional core. Site disturbances include road grading.

One shovel probe placed along the eastern edge of the site indicates the presence of a minor subsurface deposit. The recovered materials, comprised of two CCS and one basalt flake, were found in the 20-40 cm level.

Potential Impacts

The site is situated within a triangle area formed by the intersection of two dirt roads. These roads will be widened by 1 m at the southern end and the western edge of the site side, for a distance of about 60 m. This action will affect about 60 m² of the site surface, or 9.5 percent of the total site area (632 m²).

Treatment

Treatment of this simple assemblage site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. Six STUs will be excavated to an estimated depth of 30 cm, four along the western edge of the north/south access road and two along the northern edge of the northwest/southeast access road, to identify subsurface cultural deposits and/or features within the impact area. As needed, one EU will also be dug, to an estimated depth of 40 cm, to explore surface features or loci and/or subsurface cultural deposits identified within the STUs. It is estimated that at least 1.7 m³ of site deposit will be excavated.

Site PT-7

This prehistoric site consists of a very sparse lithic scatter situated on an alluvial terrace along Pine Tree Canyon that is open to the east and west. Cultural remains include nine CCS flakes, two of which exhibit use wear. Disturbances include Pine Tree Canyon Road, which has been graded through the southern portion of the site.

One shovel probe placed within the central portion of the site area immediately north of Pine Tree Canyon Road produced three pieces of debitage. From within the 0-20 cm level two CCS flakes were identified, while in the subsequent 20-40 cm level a single CCS flake was observed.

Potential Impacts

Pine Tree Canyon road may be used for project maintenance activities and, if so, may require improvement and regular maintenance. If necessary, the road, which bisects the site, may be widened by 1 m on either side for a distance of about 10 m. This action will affect about 20 m² of the site surface, or 16 percent of the total site area (122 m²).

Treatment

Treatment of this simple assemblage site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. Two STUs will be excavated to an estimated depth of 30 cm, one along the northern edge, and one along the southern edge of the access road, to identify subsurface cultural deposits and/or features within the impact area. As needed, one EU will also be dug, to an estimated depth of 40 cm, to explore surface features or loci and/or subsurface cultural deposits identified within the STUs. It is estimated that at least 1.1 m^3 of site deposit will be excavated.

Site PT-8

This prehistoric site consists of a sparse lithic scatter situated on an alluvial terrace along Pine Tree Canyon that is open to the east and west. Cultural constituents include 25 CCS flakes and 2 multidirectional cores. Disturbances include Pine Tree Canyon Road, which has been graded through the northern portion of the site.

One shovel probe unit was excavated to a depth of 40 cm, resulting in the recovery of three debitage specimens.

Potential Impacts

Pine Tree Canyon road may be used for project maintenance activities and, if so, may require improvement and regular maintenance. If necessary, the road, which bisects the site, will be widened by 1 m on either side for a distance of about 20 m. This action will affect about 40 m^2 of the site surface, or 3.3 percent of the total site area (1,205 m^2).

Treatment

Treatment of this simple assemblage site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. Two STUs will be excavated to an estimated depth of 30 cm, one along the northern edge, and one along the southern edge of the access road, to identify subsurface cultural deposits and/or features within the impact area. As needed, one EU will also be dug, to an estimated depth of 40 cm, to explore surface features or loci and/or subsurface cultural deposits identified within the STUs. It is estimated that at least 1.1 m^3 of site deposit will be excavated.

Site PT-12

This prehistoric site consists of a sparse lithic scatter situated on a terrace of a north-facing slope along an east trending drainage. Cultural constituents include a CCS biface fragment, a CCS expended core, 8 CCS flakes, and 1 obsidian flake. A dirt road has been graded through the southern portion of the site with a drainage ditch across a portion of the southeastern section of the site, northeast of the road. Three pieces of debitage were recovered from a shovel probe placed within the central site area, extending to a depth of 40 cm.

One shovel probe was placed adjacent to the bedrock milling feature situated in the site. No subsurface deposit was identified during the completion of this effort.

Potential Impacts

The dirt road that bisects the site may be widened by 1 m on either side for a distance of about 10 m. This action will affect about 20 m^2 of the site surface, or roughly 9 percent of the total site area (217 m^2).

Treatment

Treatment of this simple assemblage site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. Two STUs will be excavated to an estimated depth of 30 cm, one along the northern edge, and one along the southern edge of the access road, to identify subsurface cultural deposits and/or features within the impact area. As needed, one EU will also be dug, to an estimated depth of 40 cm, to explore surface features or loci and/or subsurface cultural deposits identified within the STUs. It is estimated that at least 1.1 m^3 of site deposit will be excavated.

Site PT-24

This prehistoric site consists of a sparse lithic scatter situated in a level area of Airplane Flat. Cultural constituents include seven CCS and two volcanic interior flakes, one CCS core fragment, and one CCS bifacially worked flake. Extensive cattle grazing have occurred in the area. A shovel probe, placed within the eastern portion of the site, recovered two CCS flakes to a depth of 20 cm.

Potential Impacts

The site is located within a proposed equipment laydown area. Project actions that may occur include grading, removal of vegetation, stockpiling of sediments, and other surface impacts.

Treatment

Treatment of this simple assemblage site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. Seven STUs will be excavated to an estimated depth of 30 cm, with six arrayed east/west across the center of the site and one in the southern site area. As needed, up to two EUs will also be dug, to an estimated depth of 40 cm, to explore surface features or loci and/or subsurface cultural deposits identified within the STUs. It is estimated that at least 2.6 m^3 of site deposit will be excavated.

Site PT-30 (Wilderness Ranch)

This multiple component site consists of a prehistoric lithic scatter and a historic ranching complex situated on a gently sloping terrace along the southern edge of an unnamed seasonal drainage. The prehistoric component includes a light scatter of obsidian, CCS, and quartzite tools underlying the historic structures. A complex for the handling of livestock associated with the Wilderness Ranch (ca. 1960s) has been constructed on the site. This complex includes corrals, hay shed, fences, and a network of graded roads. The main house of the ranch lies 80 m west of the site boundary.

One shovel probe placed within the northern portion of the site, adjacent to an access road, produced cultural materials to a depth of at least 60 cm. Specifically, in the 0-20 cm level, two obsidian and three CCS flakes were observed in the 0-20 cm level; three obsidian and two CCS flakes were identified in the 20-40 cm level; and one obsidian and three CCS specimens were recovered in the 40-60 cm level.

Potential Impacts

A series of three intersecting dirt roads cross the site, one traversing roughly north/south and two others trending northwest/southeast. Collectively, about 320 m of these roads will be widened by 1 m on either side. This action will affect about 640 $m^2$of the site surface, or roughly 3.7 percent of the total site area (16,956 m^2).

Treatment

Investigation of this site will focus on the prehistoric component, since the structures associated with the Wilderness Ranch will not be affected by project activities. Treatment will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. A series of 32 STUs will be excavated to an estimated depth of 30 cm, these alternating along either side of the three dirt access roads. As needed, up to four 1-x-2-m EUs will also be dug, to an estimated depth of 60 cm, to explore subsurface cultural deposits identified within or near the STUs and the lithic concentration identified within the northern portion of the site. Overall, it is estimated that at least 9.6 m^3 of site deposit will be excavated.

<u>Site PT-31</u>

This prehistoric site consists of a bedrock milling feature and a dense scatter of obsidian, CCS, and quartzite tools and debitage. The site is situated primarily on a terrace that is bordered by a seasonal creek to the south/southwest. Cultural materials were also noted in surrounding arroyos and on minor ridges that occur within the vicinity. The site may be associated with PT-32 (described below), being separated primarily by dense vegetation along the creek, as well as by differences in elevation. Three inter-connecting roads have been graded through site area.

One shovel probe placed along the southern edge of one road yielded cultural materials to a depth of at least 60 cm. Four obsidian and five CCS flakes were recovered in the 0-20 cm level; four obsidian and two CCS flakes were found in the 20-40 cm level; and two CCS flakes were observed in the 40-60 cm level.

Potential Impacts

Three dirt roads cross the site area, one through its central portion, one along its southwestern edge, and one parallel to its southern boundary. Depending upon which road or roads are selected for use, up to 300 m of these roads will be widened by 1 m on either side. This action will affect about 600 m² of the site surface, or roughly 3.0 percent of the total site area (20,724 m²).

Treatment

Data recovery at this intermediate assemblage site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. A series of 30 STUs will be excavated to an estimated depth of 30 cm, these alternating between the western and eastern sides of the access roads, to identify subsurface cultural deposits and/or features within the impact area. As needed, up to two 1-x-2-m EUs will also be dug, to an estimated depth of 60 cm, to explore subsurface cultural deposits identified within or near the STUs. In addition, one 1-x-1 m will be placed in the northwest portion of the site, where a concentration of formed tools occurs. Overall, it is estimated that at least 7.5 m³ of site deposit will be excavated. If only portions of roads are selected for use, mitigation measures will be scaled back as appropriate.

<u>Site PT-32 (Sky River Ranch)</u>

This multiple component site consists of a prehistoric artifact scatter and a complex of 1940-1950s era historic structures located on a flat at the junction of two small creeks within upper Jawbone Canyon. The flat is open to the north and east, backed by a steep ridge to the west. The prehistoric component underlies the historic complex and consists of a midden deposit, obsidian and chert flakes, and a large ground stone bowl fragment.

The historic ranching complex is defined by eight cultural features, comprised of seven standing structures and one foundation. Feature 1 is a seven-room "longhouse" made of mortared stone and a concrete foundation. The building has a flat tin roof with an open porch at the south end. The main room has an adjoining kitchen and a fireplace, along with three bedrooms and a bath. Feature 2 is a three-room adobe house with a mortared stone addition, and a gabled corrugated tin roof. Feature 3 is a two-room bunkhouse made of mortared stone on a concrete slab, with a pitched gable roof with tarpaper and asphalt shingles. A wood stove is located within the structure. Feature 4 is a single room outbuilding with an enclosed front porch. The structure is made of mortared stone wall toped with vertical board and batten with a low-pitched gable roof with asphalt shingles. Feature 5 is a stone and mortar foundation surrounding a sunken interior concrete foundation. Feature 6 is a stone and concrete outbuilding with a single room and a concrete slab floor, with a flat shed roof with aluminum sheeting. Feature 7 is a barn with mortared stone half walls on the north and west sides, a corrugated tin, and a wood pole wall to the south that includes a storage area. Stalls and a feed trough re located on the south side of the structure, with a large sliding door on the north wall. The roof is a low pitch gable covered by corrugated tin, with pole supports. Feature 8 is a small concrete outbuilding with a gabled wood slat roof.

The Sky Ranch historic buildings were constructed by Homer Hansen Jr. and his brother Albert, who built the principal ranch house (Feature 2) in the late 1940s/early 1950s (Susan Hansen, personal communication 2003). The ranch house was used until the 1970s, when a new one was built about two miles away.

Potential Impacts

Although multiple dirt roads traverse the site area, as currently designed, only the road that traverses along the northern site boundary may be enhanced. This action will focus on a 200 m long segment, which will be widened by 1 m on either side. Overall, about 400 m^2 of the site surface, or roughly 3.7 percent of the total site area (10,598 m^2) will be affected.

Treatment

Data recovery investigations will focus on the prehistoric component, since the historic structures associated with the Sky River Ranch will not be affected by project activities. Treatment will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. A series of 17 STUs will be excavated to an estimated depth of 30 cm, these alternating along either side of the eastern dirt access road. As needed, one 1-x-2-m EU will also be dug, to an estimated depth of 60 cm, to explore subsurface cultural deposits identified within or near the STUs. In addition, one 1-x-1-m EU will be placed within the midden area, located 50 m west of the access road, to obtain comparative data regarding the site's cultural deposit. Overall, it is estimated that at least 4.3 m^3 of site deposit will be excavated.

<u>Site PT-34 (Elmer Lundquist House)</u>

This multiple component site consists of a prehistoric lithic scatter and the remains of the 1950s era Elmer Lundquist home site situated on a flat area along a drainage in Jawbone Canyon. The prehistoric component includes a bedrock milling feature, a scatter of obsidian and CCS debitage, and ground stone artifacts.

The historic component is defined by a stucco house with a gabled roof, a road, two concrete tanks, a well with tank, storage shed (now collapsed), a 55-gallon drum apparently utilized as an incinerator, and a concrete pad of unknown use. A rock and mortar wall, about 3 feet tall, encircles much of the complex.

One shovel probe was excavated in the area across the road from the house to test for the presence of buried prehistoric artifacts. The probe produced a relatively dense deposit of lithic debris to a depth of 43 cm. Within the initial 0-20 cm level, 11 CCS and five obsidian flakes were identified. In addition to the debitage, a CCS biface fragment was also recovered from this level. From in the 20-40 cm level, four CCS and one obsidian flake were found, while the a single CCS flake was found in the subsequent level, which was terminated at 43 cm due to bedrock.

Potential Impacts

The dirt road that traverses the site may be widened by 1 m on either side for a distance of about 50 m. This action would affect about 100 m^2 of the site surface, or roughly 2 percent of the total site area (5,102 m^2).

Treatment

Data recovery investigations will focus on the prehistoric component, since the historic structures and features associated with the Lundquist home site will not be affected by project activities. Treatment will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. Six STUs will be excavated to an estimated depth of 40 cm, these alternating along either side of the dirt access road. As needed, two 1-x-2-m EU will also be dug, to an estimated depth of 60 cm, to explore subsurface cultural deposits identified within or near the STUs. In addition, one 1-x-1-m EU will be placed within the midden area to obtain comparative data regarding the site's cultural deposit. Overall, it is estimated that at least 4.2 m^3 of site deposit will be excavated.

Site WF-2

This site is a sparse, dispersed, prehistoric lithic scatter situated on a southeast facing slope of a small valley formed by the lower alluvial slopes of a broken ridge system. Chipping debris includes 32 CCS flakes, three obsidian flakes, and two quartzite flakes, all of which reflect percussion reduction. Formed tools consist of two, granite handstones; one, felsite, Pinto series projectile point; one, felsite biface tip; one, obsidian edge-modified flake; and one, shale milling slab fragment. A dirt road traverses through the southeast portion of the site; no other disturbances were noted. Two shovel probe units were excavated at the site. Dug to a depth of 20 cm, neither unit produced cultural remains.

Potential Impacts

Pine Tree Canyon road may be used for project maintenance activities and, if so, may require improvement and regular maintenance. If necessary, the road, which traverses the southern part of the site, may be widened by 1 m on either side for a distance of about 100 m. This action would affect about 200 m^2 of the site surface, or roughly 0.8 percent of the total site area (24,475 m^2).

Treatment

Treatment of this intermediate assemblage site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. Ten STUs will be excavated to an estimated depth of 30 cm, these alternating along either side of the dirt access road. one along dirt access road, to identify subsurface cultural deposits and/or features within the impact area. As needed, two 1-x-2-m EUs will also be dug, to an estimated depth of 40 cm, to explore surface features or loci and/or subsurface cultural deposits identified within the STUs. In addition, one 1-x-1-m EU will be placed in the northern part of the site where a number of flaked stone tools were identified. It is estimated that at least 2.7 m^3 of site deposit will be excavated.

Site WF-15

This prehistoric site consists of a large artifact scatter situated on a southwest trending ridge bounded by ephemeral drainages. Cultural remains consist of flaked and ground stone artifacts and include both debitage and formed tools. At least 100 waste flakes were noted, most within a lithic concentration that encompasses the central portion of the site. Flakes are dominated by CCS and obsidian specimens, but also include quartzite and rhyolite pieces. A range of reduction technologies is evident, including general percussion, biface thinning, and pressure flaking. Seven flaked stone tools were identified, including one, rhyolite, edge modified chopper tool; one CCE edge-modified flake; one, obsidian biface tip fragment; one, obsidian biface fragment; one, obsidian, Humboldt series projectile point; one, CCS edge-modified flake;

and one CCS thumbnail scraper. Ground stone tools consist of one, slate, unifacial tabular metate in two fragments; one, sandstone, unifacial metate fragment; six mano fragments, two of quartzite, one sandstone, and three granite; and a near-complete, conical-shaped, flat bottomed, granite bowl mortar.

Three features are present, comprised of a midden deposit, lithic concentration, and a modern rock ring. The midden is most visible within the road cut, and appears as a gray-colored, ashy deposit. A lithic concentration (100-x-20-m) occurs along the top of an alluvial ridge east of the dirt road. At least 100 flakes are present, as are 13 formed tools. The modern fire ring is located in the northern part of the site, and is constructed of local cobbles.

Site disturbances are limited to a dirt road, which traverses northwest/southeast across the western site boundary. The road has been excavated at least 30 cm into the midden area. The deepest cut (5 feet) is between the midden area and the southernmost ephemeral drainage.

Two shovel probe units were excavated at the site. Unit #1 was placed with the midden area, in the roadbed. Dug to 25 cm, this unit revealed gray midden sediment to 22cm. The unit is within a portion of the roadbed that has been cut 30 cm below the ground surface, suggesting that the midden was once at least 50 cm deep. Two obsidian flakes and one piece of fire-affected rock were noted in the upper 15 cm.

Unit #2 was placed within the lithic concentration. Dug to 30 cm, it produced flakes throughout the excavated deposit. The 0-10 cm level yielded 12 flakes, the 10-20 cm had five flakes, and the 20-30 cm revealed three flakes.

Potential Impacts

The proposed O & M dirt road that traverses across the northern portion of the site may be widened by 1 m on either side for a distance of about 150 m. This action would affect about 100 m^2 of the site surface, or roughly 1.0 percent of the total site area (9,420 m^2).

Treatment

Treatment of this complex assemblage site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. Four STUs will be excavated to an estimated depth of 40 cm, these along either side of the dirt access road, to identify subsurface cultural deposits and/or features within the impact area. One 1-x-2-m EU will be dug within the midden deposit. An additional two 1-x-1 m units will be excavated to explore surface features or loci and/or subsurface cultural deposits identified within the STUs. Overall, it is estimated that approximately 2.5 m^3 of site deposit will be excavated.

<u>Site WF-18</u>

The site consists of a sparse scatter of obsidian and CCS debitage on the crest and slope of a low knoll overlooking upper Jawbone Canyon. Debitage consists of 100 to 200 items, primarily obsidian reduction and bifacial thinning flakes. CCS flakes are also present, as is naturally-occurring CCS. One small obsidian biface fragment (midsection) was also observed. Artifact density is low, averaging less than one flake per 10m^2, but occasionally exceeds one per 1m^2. Two small (25 to 50 cm diameter) concentrations of buried fire-affected rock are present within the graded road along the central eastern portion of the site boundary, indicating the presence of buried cultural features.

Potential Impacts

The dirt road that traverses the site may be widened by 1 m on either side for a distance of about 50 m. This action would affect about 100 m^2 of the site surface, or roughly 2.8 percent of the total site area (3500 m^2).

Treatment

Data recovery at this site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. Four STUs will be excavated to an estimated depth of 40 cm, these alternating along either side of the dirt access road. As needed, two 1-x-1-m EUs will also be dug, to an estimated depth of 60 cm, to explore subsurface cultural deposits identified within or near the STUs. In addition, one 1-x-2-m EU will be placed within one of the areas containing fire-affected rock to obtain comparative data regarding the site's cultural deposit. Overall, it is estimated that at least 2.2 m^3 of site deposit will be excavated.

WF-19

The site consists of a moderately dense deposit of CCS, obsidian, basalt, and quartzite flakes situated on top of narrow ridgeline between two steep drainages, one of which encloses Peeping Tom Spring. The ridgeline drops from southwest to northeast with small terraces along its spine. The site extends from one terrace and drops down onto a saddle to the northeast. Flakes have eroded downslope along either side of the ridgeline as evidenced by flakes located on steep slopes to the southeast and northwest. Approximately 250 flakes are present.

Potential Impacts

This site is located within the proposed transmission line corridor. Given its location on the crest of a knoll within a prominent drainage, placement of a transmission tower within the site boundary might be necessary. If so, it is anticipated that 100 m^2 of the site might be impacted, approximately 2.8% of the total site area (3,500 m^2).

Treatment

Data recovery at this site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. Four STUs will be excavated to an estimated depth of 40 cm, within the proposed impact area. As needed, two 1-x-1-m EUs and one 1-x-2-m EU will also be dug, to an estimated depth of 60 cm, to explore subsurface cultural deposits identified within or near the STUs. Overall, it is estimated that at least 2.2 m^3 of site deposit will be excavated.

WF-20

The site consists of a sparse to moderately dense deposit of CCS and obsidian debitage situated on a large, flat terrace incised by small, shallow arroyos. On either side of the terrace, which generally trends north to south, are two large drainages with the one to the east being particularly deep. Approximately 750 to 1,000 CCS and obsidian flakes, a multi-faceted handstone, and a fragment of a dark green glass bottle are also present. Dark gray, ashy soil is present throughout much of the site, indicative of a subsurface midden deposit.

Potential Impacts

This site is located within the proposed transmission line corridor. Given its location on the edge of a prominent drainage, placement of a transmission tower within the site boundary might be necessary. If so, it is anticipated that a 100 m^2 of the site might be impacted, or approximately 0.7% of the total site area (14,000 m^2).

Treatment

Data recovery at this site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. Four STUs will be excavated to an estimated depth of 40 cm, within the proposed impact area. As needed, two 1-x-1-m EUs and one 1-x-2-m EU will also be dug, to an estimated depth of 60 cm, to explore subsurface cultural deposits identified within or near the STUs. Overall, it is estimated that at least 2.2 m^3 of site deposit will be excavated.

CA-KER-2983/4733 (Quail Springs Site)

This multi-component resource consists of an extensive prehistoric habitation site and an historic livestock corral situated adjacent to Quail Springs, on a series of low ridges bordered by ephemeral drainages that converge near the spring. The site, which encompasses an area measuring 300-m north/south by 180 m east/west, is restricted by steep hillsides to the south/southwest and north/northeast, and narrow rock canyon walls below Quail Springs. The northwest edge of the site terminates at an open and exposed plain.

Cultural remains include a well-developed midden with abundant flaked stone and ground stone tools, as well as six bedrock milling features. Flaked stone artifacts include hundreds of cryptocrystalline silicate (CCS) and obsidian flakes reflecting a full range of reduction techniques, including core reduction, biface reduction, and pressure flaking. Formed tools consist of four biface fragments, four cores, one edge-modified flake, three Rosegate series points, one hammerstone, nine millingstone fragments, two pestles, one piece of unspecified ground stone, one bowl mortar fragment, and six handstone fragments. Artifacts are concentrated within the midden deposit, which is primarily situated in the southeast portion of the site, close to Quail Springs and surrounding the corral. From here, midden sediments extend northwest along the dirt road for about 200 m, lessening in both intensity and artifact count.

The six bedrock milling features are variously distributed across the site. Two (Feature 1 and Feature 2) occur adjacent to Quail Spring, on (Feature 1) or near (Feature 2) a rocky island formed by a bifurcated stream channel. Feature 1 contains two mortar cups, while Feature 2 exhibits four mortar cups. Feature 3 is about 60 m northwest of Feature 2, within the principal drainage leading to Quail Spring. The feature contains one cup-shaped and one oval-shaped mortar cup. Feature 4 is located along the eastern margin of the site about 120 m northwest of Feature 3. It is defined by two oval-shaped mortar cups and two milling slicks. Feature 5 is situated at the far northern end of the site, west of the dirt road. It is characterized by two conical-shaped mortar cups. Feature 6 is situated about 50 m northwest of Feature 2, within an ephemeral drainage that joins the principal drainage leading to Quail Spring. This milling station includes two oval-shaped mortars.

A dirt road traverses longitudinally (NW/SE) through the site for a distance of about 400 m. To construct the road, at least 40 cm of the midden deposit was removed near the corral, creating a cut bank that contains eroding artifacts. Other disturbances include off-road vehicle use (midden area), as well as construction and use of the livestock corral and loading ramp (midden area). An abandoned freezer truck is located just west of the corral, adjacent to the dirt road.

URS excavated one 50-x50-cm shovel probe unit within the roadbed in the midden deposit. This unit, dug to 30 cm, yielded abundant artifacts and midden sediment throughout. A posthole was dug in the probe unit to 70 cm, revealing a dark gray, ashy midden to that depth. The 0-10 cm level of the probe unit yielded 27 CCS and 15 obsidian flakes, the 10-20 cm produced 25 CCS and 8 obsidian flakes, and the 120-130 cm level had 24 CCS and 20 obsidian flakes. Sediment data suggest that the midden deposit extends at least 110 cm below the natural surface: 40 cm removed to create the road, excavation of 30 cm probe in the roadbed, and another 40 cm in the probe unit posthole.

Potential Impacts

Pine Tree Canyon road may be used for project maintenance activities and, if so, may require improvement and regular maintenance. If necessary, the road, which traverses longitudinally across the site, may require widening of up to two feet along a 400 m long extent. This action will occur within the two discrete midden deposits identified at the site, where limited probing at one area revealed cultural depth to at least 130 cm below surface. Given that some 40 flakes were found within the probe at this terminal level (120-130 cm), it is very likely that the deposit extends far deeper, perhaps to 2 m or beyond. Road widening will also affect portions of the site where surface visible midden was not evident, but where surface artifacts did occur.

Treatment

Data recovery at this complex assemblage site will include surface reconnaissance and collection to locate diagnostic artifacts, features, and loci. To begin, a series of 28 STUs will be excavated along the access road corridor between the two midden deposits, to the northern end of the site. These STUs will be placed on opposite sides of the road, to identify subsurface cultural deposits and/or features within the non-midden impact area. Within the midden area, where subsurface depth is evident, investigations will focus on 1-x-2-m EUs situated within the impact areas. Two EUs will be excavated within the northern midden area (40-x-15-m) where the midden extends to the western edge of the access road. It is anticipated that the depth of the cultural deposit in this midden will extend to at least 100 cm.

In the larger, southern area (80-x-50-m), the access road traverses longitudinally across the entire 80 m long extent of the midden. The northern half of this midden area has been significantly affected by historic ranching activities, as a livestock corral and an abandoned truck are present. To optimize data recovery, investigations will focus in the southern half, where affects are more limited to off road vehicle use. Within this area, up to six 1-x-2-m EUs will be excavated, with at least one placed outside of the impact zone for comparative purposes. Based on the results of limited shovel testing, cultural remains are expected to extend to at least 150 cm. Employing these treatment measures, it is estimated that at least 27.6 m^3 of site deposit will be excavated.

LABORATORY METHODS

<u>Cataloging Procedures</u>

At the end of each field day, all collected materials and completed forms will be submitted to the Principal Investigator/Field Supervisor for review, tabulation, and initial appraisal of sampling potential for obsidian hydration and geochemical source samples. This step will be crucial to developing a preliminary picture of subsurface deposits. At the termination of fieldwork, all collected materials collected will then be passed on to laboratory for processing, preliminary analysis, dissemination to special analysts, and preparation for curation. An inventory will be maintained by the Laboratory Director to ensure that all forms are systematically filed by site number and that all materials are accounted for in properly labeled bags. The field specimen log recorded in the field will be used to verify all information on bags and excavation forms.

To initiate processing of the collections, artifacts will be washed and dried, as appropriate. The cleaning of particularly fragile or unstable specimens will not occur routinely; instead processing techniques will be assessed on a case-by-case basis. Cataloging will begin at the same time as washing, using the field specimen form as the initial source of data for computerization of the catalog. This approach foregoes a reiterative step of encoding provenience and constituent data on separate "catalog" forms, as the field specimen forms are structured to provide basic data for the catalog and thereby expedite final cataloging and analysis. Once input, the computerized field specimen information will be updated with more detailed, higher-order descriptors within the classification hierarchical system employed, including designation of object (e.g., tin can) and type (e.g., sanitary, evaporated milk). Likewise, upon initiation of analysis, additional tools may be revealed within debitage or faunal lots, and data for these specimens will be appended to the catalog and items will be assigned catalog numbers.

Information eventually available in the catalog database includes the catalog number, field specimen number, site number, locus, unit type, unit number, subunit, unit coordinates, feature number, unit size, upper and lower level measurements for the level, mesh size, quantity, weight, curation box number, and comments. After this information has been recorded and reviewed for accuracy, artifact numbers will be requested from the curation facility and a tag with this information will be included within the bag of each lot or individual item. These labels will be printed using the existing catalog database, minimizing additional processing time. Artifacts will then be placed into plastic bags, labeled boxes, and incorporated into a temporary boxing system ready for final curation. The boxing system will be set up by site, item, and catalog number, all of which will be recorded on a box log form. This system will allow for easy access to any artifact or group of artifacts needed for further analysis.

Database Analysis

Laboratory processing, cataloging, analysis, and specialized studies provide for the organized tracking, thorough description, and detailed interpretation necessary to adequately assess research potential and provide for replication of results. URS' experience with several major cultural resource studies has allowed us to develop a computer database system for cataloging and analysis that facilitates all phases of research and reporting.

Typical laboratory databases include the primary catalog of recovered materials that includes accession and catalog designations, provenience information, and a hierarchical, tripartite system of classification, as discussed above. This scheme provides for various levels of data retrieval and/or sorting by provenience, class, or type. Additional databases are specific to various classes or subclasses of materials. These specialized databases permit customizing data fields for particular analytical elements that vary for different classes, thereby avoiding inclusion of inappropriate fields and minimizing data input time. Likewise, important fields are linked to the catalog database, permitting relational operations and reducing data redundancy. Tables suitable for office use and/or inclusion in reports can be created directly from analytical databases, facilitating analysis and reporting. In addition, printouts can accompany specimens sent to specialists, allowing items to be tracked for shipping and receiving. Database files are generally included with archival materials for curation after the project is complete.

ANALYTICAL METHODS

The interpretation of the cultural remains recovered the Pine Tree project sites must be developed within the overall framework of research issues and questions outlined above. The primary goals of the data recovery program revolve around a program of applied research that links data from a suite of analytical studies into a cohesive interpretation of the archeological record. These collective data will contribute to the identification of a site's role in regional prehistory and history and assessment of research potential.

Radiocarbon Analysis

Radiocarbon analysis is expected to be the most accurate chronometric tool available for interpretation of site chronology and will receive high priority in application of various analytical techniques. Such data will provide for dating of features, strata, and/or sites, while also providing absolute dates of use in developing obsidian hydration rates and refining hydration sequences.

Charcoal is generally considered the most reliable substance for radiocarbon analysis, but discrete charcoal deposits are not always available in primary and/or intact contexts. Charcoal obtained from float samples can be useful in filling this void, but these samples are subject to the vagaries created by the general mixing that occurs in middens. Specifically, they do not date a single observable episode in the manner a charcoal concentration or hearth might. In addition, flotation of older deposits often yields insufficient amounts of charcoal for radiocarbon dating using conventional, economical methods. Experience has shown that multiple radiocarbon assays from the same context are often necessary to control for measurement, lab error, and post-depositional mixing.

For these reasons we propose that radiocarbon analysis focus on materials from primary contexts, particularly where temporally diagnostic artifacts and/or obsidian specimens are also available for cross-dating. Such samples may occur as individual pieces associated with a hearth, house floor, burned structural remains, or other primary context. The proposed radiocarbon analysis program provides for five radiocarbon samples from one or more contexts.

Obsidian Studies

Hydration analysis of obsidian material recovered during the data recovery program can contribute to a variety of research topics. Such data are fundamental to examination of site structure and evaluation of the integrity of cultural deposits, while site-specific chronology, regional chronology, and population reconstruction are some of the more general themes that can be addressed by hydration information. Furthermore, definition of source-specific relative hydration sequences and investigation of source-specific hydration rates are basic areas of research for the region, as is the development of the regional projectile point sequence through application of hydration data. Previous archeological investigations in the neighboring Coso region, and elsewhere in the eastern Sierras, have provided a substantial amount of source-specific obsidian hydration data that will be incorporated into the analysis to enhance interpretation of results.

As revealed through site recordation and limited testing, obsidian artifacts are not abundant within the project area. Given the limited archaeological study of the Pine Tree area, little is known regarding obsidian source and distribution patterns other than it likely arrived from sources in the Coso Mountains, or elsewhere in the eastern Sierras. This lack of data serves to underscore the importance of conducting geochemical analyses on the site collections. Obsidian source analysis will have three primary objectives: (1) to support obsidian hydration analysis; (2) to identify potential changes in obsidian procurement/exchange relationships over time; and (3) to identify potential exceptions to the expected procurement pattern.

The strategy for sampling collections for hydration and source analysis will include an array of obsidian materials suitable for addressing various research questions. This sample will include (1) a sample of debitage from various vertical and/or horizontal proveniences; and (2) obsidian recovered from radiocarbon-dated features; and (3) a sample of formed tools. Unique or exceptional museum-quality artifacts will not be submitted for obsidian hydration. Hydration analysis of obsidian debitage will serve to assess the integrity of cultural deposits and contribute to dating of the deposits. Hydration studies of obsidian debitage are necessary also because hydration rim frequencies can vary substantially among various artifact classes due to artifact re-use. Projectile points from multi-component sites, for instance, often show very different frequency profiles than debitage. Consequently, to develop a clear picture of the occupation sequence at a site, a variety of artifact classes must be considered and debitage likely provides the most accurate indications of actual site use.

Debitage Column Sampling

Obsidian hydration analysis of debitage will focus on column sampling of one EU from each project site. A five percent sample of debitage from each 10-cm level excavated will be examined.

Debitage from Radiocarbon Dated Features

To provide independent data for assessment of source-specific obsidian hydration rate profiles, analysis of obsidian debitage recovered in direct association with radiocarbon dated features will also be conducted. It is anticipated that up to five radiocarbon-dated features will be encountered among the project sites. If such contexts are found, up to 25 pieces of debitage from each will be submitted for geochemical source assignment and obsidian hydration analysis.

Formed Tools

Obsidian source and hydration analysis will also include a sample of up to 100 formed tools from the project sites. Due to their importance as time-sensitive artifacts, all diagnostic projectile points will be submitted for analysis. Other functionally diagnostic tools, tied to defined temporal components, will also be a focus of study.

Flaked Stone Analysis

Flaked stone artifacts comprise one of the most durable and ubiquitous types of cultural material recovered from archaeological sites. Due to their manufacture from non-perishable, lithic materials, these artifacts typically represent the most numerous and, in some cases, the only cultural specimens recovered from archeological sites throughout this region. Having formed an integral and indispensable role in the daily lifeways of Native peoples, these artifacts offer a glimpse of past lifeways that reveal patterns of technology, economy, subsistence, and settlement, as well as elements of site function and period of use.

The apparent diversity of site types found in this area of California suggests that comparison of the data derived from the project sites with results from other sites in higher and lower elevation zones can contribute to study of lithic procurement strategies. One principal aspect of the lithic analysis will be the identification of site-specific lithic reduction strategies to provide information regarding technology, site function, and period of use. Identification of lithic reduction sequences can provide an understanding of the criteria used in selecting certain tool stone for reduction, such as shape, size, and knapping qualities of parent raw material, and may provide data regarding procurement strategies, the system of material transport, and tool stone curation. Similarly, techniques used to reduce lithic material can reveal information regarding socioeconomic factors of a group including the form, quality, availability or abundance of the material; economizing or risk avoidance; shared technologies or traditions; stylistic norms; and intended function of the tool stone. In addition to providing information regarding reduction trajectories, an artifact's stage of manufacture may relate to logistic strategies, site function, or duration of occupation. Lastly, the final tool form produced as part of the continuum may yield information related to site function, period of use, subsistence technology, personal gear/tool kit composition, and curation.

To facilitate the description and study of the flaked stone assemblages, several analytical techniques will be employed. The assemblage from each site will be segregated into various techno-morphological categories using a hierarchical classification system. The use of a standardized system provides for general classification of the collections, intra- and intersite comparisons, and the establishment of site typologies.

The first step in this system requires the segregation of flaked stone artifacts into two primary groups: (1) debitage; and (2) tools. The debitage category includes all unmodified lithic flakes, while all modified, formed artifacts constitute tools. At the second level of classification, debitage recognized as complete or fragmentary will be quantified by frequency and weight by material type to provide a preliminary tabulation of the assemblage. Following this, detailed analyses will be undertaken on a selected sample of debitage from each site, as well as for all formed tools.

Due to the variability in the quantity of debitage recovered from a given site, a flexible, site-specific sampling strategy will employed in selecting specimens for study. For the larger, complex assemblage sites like WF-15 and Quail Springs, debitage analysis will focus on the assemblage from every second or third 10-cm level excavated from one EU. For the remaining sites, debitage analysis will include flakes from every 10-cm level of the EUs.

Debitage selected for analysis will be sorted into technological classes and stages using a method of analytic classification (Rouse 1960:313-315) based on the visual examination of selected flake attributes characteristic of different reduction techniques. Debitage will be grouped into one of eight broad classes based on reduction technique: (1) core reduction, percussion; (2) blade reduction, percussion; (3) blade reduction, pressure; (4) biface reduction, percussion; (5) biface reduction, pressure; (6) uniface reduction, percussion; (7) uniface reduction, pressure; and (8) bipolar reduction, percussion. Other attributes that will be monitored include condition (complete vs. incomplete), size (measured by grid), and presence or absence of cortex, platform preparation, and heat treatment.

Formed tools will be segregated into taxonomic classes (Rouse 1960:315-317) based upon the modes of manufacture, style, shape, and inferred function. Tool classes will be further divided into morphological, descriptive types. Finally, in the case of projectile points, temporally significant groupings will be identified relying on both comparison with existing typologies (e.g., Moratto 1972) and the use of obsidian hydration analysis (see Hull and Roper 1999). Tools will be placed into one of five general classes: (1) flake; (2) core; (3) bifacial; (4) unifacial; and (5) varia. Each tool class is subdivided into specific types, which in turn are sorted into subtypes.

Modified flakes will be further segregated into the categories of edge-modified flakes, notched flakes, and burinated flakes. Other categories will be developed as necessary. Edge-modified flakes are defined as specimens that exhibit retouch or modification confined to one or more edges; notched flakes include artifacts that possess a single notch along one edge; and burinated flakes consist of specimens from which long, thin spalls have been removed to produce a chisel-like edge.

Artifacts classified as cores include pieces of tool stone that exhibit one or more negative flake or blade scars. These scars reflect the detachment of blanks (flakes or blades) to be used unaltered, or to be subsequently fashioned into formal tools. Cores will be segregated into subtypes based on the relative position of their striking platforms (e.g., single-platform, and multiple-platform) and their method of reduction (e.g., percussion, bipolar).

The category of unifacial tools includes formally shaped artifacts that exhibit extensive retouch across one face or surface. At the second level of classification, unifacially modified specimens will be segregated into two classes: (1) scrapers; and (2) unifaces. Other classes will be added as necessary. Within each class designation, morphological subtypes will be identified when appropriate.

The bifacial tool category includes artifacts that exhibit flaking on both the ventral and dorsal face of the piece. Such implements will be subdivided into discrete tool classes based on morphological attributes, as well as apparent function. Four bifacial tool classes are initially defined for the study collection: bifaces, drills, perforators, and projectile points. Other classes will be added as necessary. Within each class designation, morphological subtypes will be identified when appropriate.

The varia category includes specimens that, due to their distinctive techno-morphological attributes, cannot be easily subsumed under any of the other artifact classes defined above.

Attribute analysis for formal tools will vary according to the tool type, but will typically monitor the following variables: condition, subtype, flaking pattern, fracture type, debitage class, location of retouch, type of retouch, shape of retouch, reworking, and size. Additional morphological attributes such as shoulder angle will also be employed for classification of projectile points (e.g., Thomas 1981), providing for identification and segregation of temporal types as well as intersite comparisons.

Data generated as part of the debitage and tool analysis will be entered into database files arranged according to artifact type (i.e., biface, projectile point, and debitage). As necessary, data will be assessed using the SPSS PC+ software program. Summary data and statistics will be generated on both a site-specific and artifact-specific level using Frequency, Crosstabs, and Descriptive procedures of SPSS PC+.

Ground Stone Analysis

Ground stone artifacts are typically associated with the processing of plant foods and fibers, but may have functioned in the grinding of minerals or small animals, as well. It is anticipated that the analysis of ground stone artifacts will contribute to questions regarding cultural chronology as well as to the study of settlement and subsistence practices. Being relatively immobile, large ground stone artifacts also contribute important information on site structure and function.

Portable ground stone artifacts will be separated into several categories, consisting of handstones, grinding slabs, pestles, mortars, and all others. Each of the general categories will be further subdivided according to overall shape and milling surface characteristics.

Handstone attributes to be recorded include rock type, plan view angle, striations, polish, beveling, and presence of pecking. Likewise, general morphology such as cross-section, number of milling surfaces, and shape will be noted. All combinations of attributes present in the collection will be determined and their distribution analyzed. The objectives of the analysis will be to discover if handstone types changed through time; to assign types to specific time periods; to determine if different functional types co-occur within strata; to correlate handstone types with projectile point types; and to correlate handstone types with specific assemblages, presumably representative of different subsistence strategies.

A similar approach will be taken for grinding slabs, each of which will be classified by the shape of the grinding surface (flat or concave), the number of milling surfaces (unifacial or bifacial), and the presence or absence of such attributes as shaping and pecking. Additional attributes to be recorded include rock type, thickness, depth of basin, striations, and polish. As with handstones, all possible combinations of these attributes will be identified. The distribution of grinding slab types will be analyzed, with particular attention applied to the co-occurrence of handstone and grinding slab types. The intent of this analysis will be much like that discussed for handstones above. In particular, we hope to be able to identify functional assemblages and change through time.

Pestles and portable mortars are not anticipated. All portable ground stone artifacts that are recovered will be measured and weighed. This information, along with all data used for classificatory purposes, will be included with the results of the analysis.

Small Finds Analysis

This class of artifacts includes prehistoric stone, shell, and bone beads and ornaments, as well as historic trade beads. Data on these items can contribute to definition of prehistoric site chronology and facilitate study of resource procurement. Shell beads, in particular, provide data relevant to such research. Because they are often abundant, amenable to refined typological analysis, and occur in well-dated contexts, California shell beads and ornaments have long been used to help define chronological sequences. Consequently, temporal changes in bead types are quite well documented. Shell beads can also be a valuable aid in assessing patterns of exchange, particularly between California and the Great Basin, and apparent diachronic patterns in use of such specimens has been documented in the Great Basin (Bennyhoff and Hughes 1987). Historic manufactured beads will also be of use in indicating latest Indian site use.

Several standard references are available for classification and analysis of such materials, including Bennyhoff and Hughes (1987), Gifford (1940, 1947), and Kidd and Kidd (1970). These materials will be used for the current project. In addition to general classification, attributes reflecting manufacturing techniques and wear patterns will be recorded.

Faunal Analysis

The archeological record can provide two means to address problems of prehistoric and historic subsistence practices, one direct and one indirect. The indirect evidence consists of tools and facilities from which inferences may be drawn. For example, grinding slabs, mortars, and pestles suggest that certain kinds of foods were prepared by pounding and grinding, such as acorns and grass seeds. Projectile points and cutting and scraping implements imply a hunting economy, although actual species hunted and processed cannot be identified. Direct evidence, on the other hand, is most often found in the form of faunal and macrobotanical remains, although organic residue analysis techniques have also been applied in some recent California studies. Macrobotanical remains can provide data on plant food use, seasonality, and gathering area exploitation. Faunal remains provide information on species hunted or used and their proportional contribution to the diet, change in subsistence practices through time, butchering techniques, seasonality, resource area exploitation, and other aspects of the prehistoric economy.

Analysis of faunal remains will be directed at acquiring as much data as possible from recovered assemblages, although it is anticipated that relatively little material will be recovered. The approach to be followed will concentrate first on identifying each specimen to the lowest possible taxonomic unit. An effort will then be made to quantify the relative abundance of the various taxa represented. At a minimum, the general size range of the faunal material at the sites (e.g., large or small mammal) will be presented for specimens not easily identifiable. In addition to taxa identification, when the faunal remains are of sufficient quality, MNI (minimum number of individuals) counts will be made, and evidence of charring and butchering marks will be recorded.

Identified unit or locus assemblages will be compared in an attempt to identify patterns of faunal exploitation and interpret these patterns in the context of the project as a whole. Particular attention will be directed toward the identification of remains representative of single components or occupations, such as might be found in features. Patterns that may be revealed by faunal data include changes or continuity in subsistence activities over time; differences associated with micro-environmental setting; differences associated with seasonality of occupation; and differences attributed to ethnic affiliation for historic material. Finally, faunal data will be interpreted in light of the availability and accessibility of the various resources represented.

Sediment Analysis and Geomorphology

The geomorphological investigation of any archeological site has, as its objective, the compilation of topographic, stratigraphic, sedimentologic, and soils data to meet three interrelated objectives: (1) determination of the age(s) of site occupation; (2) identification of processes that led to post-occupational transformations of the archeological assemblage (site formational processes); and (3) identification of geologic aspects of the site that relate to environmental conditions during occupation(s), including paleotopography. Ideally, assembly of these data begins with the assessment of the topography and overall geomorphic setting of a site and its surroundings, and the focuses on the stratigraphy, sediments, and soils (if any) exposed in excavation units and trenches. In the Yosemite Falls area, some of the sediments and soils that may provide keys in archeological interpretations include calcic horizons (either relict or active), marsh paleosols (sometimes termed "black mats"), pyroclastic sediments (volcanic ash deposits), and either primary or secondarily deposited eolian silts. Many of these reflect local or regional environmental conditions, while others (such as pyroclastic sediments) provide important time lines if their mineralogy is identified.

Geomorphic investigations are proposed for sites WF-15 and Quail Springs based on their apparent complexity given the presence of deep midden deposits. Pre-excavation geomorphic assessment may also be considered, including determining whether the site is in an aggradational, stable, or degradational (erosional) setting, providing important data for interpretation. Other relevant broad-scale site information includes whether post-occupational sedimentation likely occurred in a high- or low-energy regime. High-energy sediments (e.g., colluvium) indicate that there may be little chance of recovering *in situ* cultural materials at depth. Geomorphic assessments of drainages in proximity to a site are also important.

The stratigraphy of an archeological site frequently displays lateral variation that can potentially confound the interpretation of depositional processes and hamper archeological interpretations. This is particularly the case when the number of excavation units is limited and they are separated from one another by several to tens of meters. A uniformly applied system of classification of sediment types, discontinuities, and soils (in the strict sense) is therefore valuable in interpretation of site data. The USDA textural classification of clastic sediments will serve as an effective descriptive system, supplemented by determination of the degree of sorting, colors according to the Munsell system, and description of bedding (if any). The nature of the surface soil, as well as buried soils (paleosols) can provide important markers. Similarly, discontinuities (unconformities) provide important data whether they are accompanied by a paleosol or not, and their character is described (abrupt, wavy, conformable, etc.). These descriptive data will be assembled on standardized forms by the excavator under the direction of the Principal Investigator and Field Director to assure that standard descriptive terms are used, while additional technical observations will be made by the Field Geomorphologist.

Paleobotanical Analysis

Paleoethnobotanical data are crucial to addressing many research questions posed by archeologists, including those relating to site function and subsistence practices. These data include macrobotanical information from flotation samples and archeopalynological data from analysis of ground stone tool residue. Exploitation and processing of plant resources, and the effect that ecological changes may have had on attendant strategies and technologies, are important issues for consideration.

Beyond subsistence, an understanding of site function and seasonality can be greatly augmented by a comprehensive paleoethnobotanical database, including the results of site-specific archeopollen analyses. Research questions and hypotheses that invoke environmental change as a forcing factor in cultural change will be completely reliable only if sufficient data exist to demonstrate linkages between the cultural system and the ecosystem. Paleoethnobotanical data can be critical in establishing these linkages. With a broad paleobotanical database, the archeologist may be able to demonstrate causation rather than simple correlation.

Minimally, soil samples recovered from midden deposits at sites WF-15 and Quail Springs will be submitted for flotation analysis. These samples will be processed for the recovery of plant macro- and micro- fossils. If preserved within the site matrix, these remains may provide data concerning past botanical communities, environmental regimes, and subsistence practices.

Soil samples will be collected from cultural features such as fire hearths, as well as from column samples, as appropriate. Sediment samples taken from well-developed midden containing abundant charcoal will be collected from 20-x-20 cm columns, while any samples taken from leached midden, or midden containing small amounts of charcoal, will be taken from 30-x-30 cm columns. This strategy will ensure that a sufficient sediment sample is obtained for the recovery of organic remains. It is anticipated that up to three samples will be collected and processed at the URS Laboratory in Chico, where initial sorting of heavy and light fractions will occur. If sufficient botanical remains are present within the processed samples, these will be submitted for botanical identification.

As ground stone artifacts are expected to form a part of the recovered assemblages, the analysis of pollen residues from these implements is viewed as providing important data for assessing subsistence-related issues. Toward this end, up to 10 ground stone artifacts recovered from subsurface contexts will be selected for pollen analysis. Processed samples will be submitted to Susan Smith at Northern Arizona University Laboratory of Paleoecology for pollen identification.

REPORT PREPARATION

Results of data recovery investigations will be provided in a comprehensive technical report. The report will begin with and Introduction that provides a brief project description and summarizes findings. This will be followed by background data included in the research design including a review of the Natural and Cultural Environment, and the Research Design. Field methods will be described on an on-going basis. Using daily field notes, project staff will discuss sampling strategies, unit placement, and general results. These notes will likely contribute to initial assessment of sample selection for analytical studies, as well as forming the basis for methods sections of the report. Individual site description chapters, one for each site, will outline field methods, analytical studies, and detailed results of the data recovery investigations. The research results section of the report will be initiated at the point when technical studies applicable to a given research issue (e.g., chronology) have been completed or nearly completed. This section will serve to synthesize project data for each research domain, focusing on both site-specific and intra-site data. Regional implications of the data will also be discussed. The final chapter of the report will provide a synthesis of project data as they relate to identified research issues.

APPENDIX B

SURVEY COVERAGE MAPS

(CONFIDENTIAL)

Appendix G

Traffic Study
Katz, Okitsu & Associates
October 19, 2004

Traffic Study for the Pine Tree Wind Development Project in Kern County, California

October 19, 2004

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1. Introduction/Project Description

This document serves as the traffic and parking analysis for the proposed Pine Tree Wind Development in Kern County, California.

Overview of the Project

The Los Angeles Department of Water and Power (LADWP) propose to construct a wind energy generation project that would consist of 80, 1.5 megawatt (MW) wind turbine generators. The project would also include several meteorological towers, an underground and overhead electrical collection system, a substation, an operations and maintenance (O&M) facility and yard, and access roads. LADWP is working with Wind Turbine Prometheus, LLC (WTP), a wind energy development company, to develop and construct the proposed project. Upon completion of construction, the project would also construct and operate approximately 10 miles of 230-kilowvolt transmission line, which would connect the proposed project substation to an existing LADWP 230-kV transmission line.

Project Location

The proposed project property is located in the southern Sierra Nevada Mountains in Kern County, California. The property is approximately 6 miles west of California State Route 14 (SR-14) and about 12 miles north of the town of Mojave and 15 miles northeast of the City of Tehachapi. The primary access to the project property is from SR-14 via Jawbone Canyon Road, which enters the property at its northeastern corner. Figure 1 shows the project location.

FIGURE 1 – PROJECT LOCATION

Project Objectives

The goal of the proposed project is to reduce air pollutant emissions and dependence on fossil fuels related to the generation of electrical energy by LADWP. Specific objectives related to this goal are to:

- Provide generation capacity to help meet the electrical energy demand of Southern California region.

- Provide an increased share of electrical generation capacity with clean and renewable energy sources.

Project Components

Wind Turbines

The primary component of the proposed project is a series of 80, 1.5 MW nameplate capacity wind turbines. The proposed turbines have a horizontal access with a three-bladed rotor. The total height of the tower to the hub of the rotor blades is 65 meters (213 feet). The diameter of the rotor is 77 meters (253 feet).

Substation and O & M Facility

The substation would consist of a fenced yard area containing a transformer, substation and related electrical control equipment. The O&M facility would consist of a storage and equipment yard and an approximate 35-foot high, 60-foot by 120-foot building containing offices for O&M personnel, a control and relay room, a workshop area, spare parts storage, training rooms, restrooms and a lunch room.

Electrical Transmission Line

An overhead 230-kV transmission line would connect the project substation to an existing LADWP transmission line located west of and generally paralleling State Route 14. The proposed transmission line would be approximately 10 miles in length. It would originate at the project substation in the south-central part of the project property and travel southeastward through privately owned land until it intersected Pine Tree Canyon Road to the southeast of the project property. The line would then generally parallel Pine Tree Canyon Road eastward to the existing LADWP transmission line at State Route 14. The towers would be approximately 110 feet in height and spaced approximately 1,100 feet apart (approximately five towers per mile).

Project Construction

The following tasks will be required to construct the project:

1. Turbine Siting
2. Field Survey and Geotechnical Investigations
3. Primary Construction Activities

- Grading of roads, turbine pads and crane pads
- Grading of the substation, switching station, materials laydown and equipment staging areas

- Construction of the turbine tower foundations and transformer pads
- Installation of the electrical collection system
- Erection and assembly of the wind turbines
- Construction and installation of the substation and O&M facility including water well and septic system
- Construction of the 230-kV transmission line
- Plant commissioning and energization

4. Road Construction and Site Grading
5. Turbine Foundations and Erection
6. Electrical Collection System

Construction Traffic

Traffic generated during construction would include worker traffic; truck traffic associated with the on-site batch plant; truck traffic for transporting wind turbine components, concrete and reinforcing steel; mechanical equipment and construction consumables; water trucks; and the delivery of construction equipment such as cranes and earth-moving machines. It is anticipated that there will be approximately 30 transportation loads of components and materials per wind turbine location. As many as 2,100 truck trips may be required throughout the construction period for the erection related to the 80 turbines. The heavier loads anticipated would be the main power transformer, which weighs approximately 320,000 pounds, and the turbine nacelles, which weigh approximately 112,000 pounds. The nacelle is assembled in nearby Tehachapi, so trips on public highways would be relatively short. Trucks delivering earth-moving and other construction equipment to the project property would unload the equipment and depart the site, only to return when construction is complete. It is anticipated that approximately four large and nine small cranes would be required during construction, along with approximately 20 bulldozers, trenchers, and other earth-moving machines. Concrete trucks used in the construction of all foundations would be delivered to and remain at the project area until foundation construction was complete.

Construction Schedule and Personnel

It is anticipated that approximately 10 months would be required to construct the project. The average workforce on site would consist of approximately 150 workers. During peak periods, it is expected that about 170 personnel would be on-site at once, as multiple disciplines complete their work simultaneously. Construction activity would normally take place during single 10-hour shifts, 6 days per week, for the duration of the project construction. However, to ensure that construction activities remain on schedule and to take advantage of weather conditions, additional shifts may be employed at times during construction. The delivery of large loads on Jawbone Canyon Road would be minimized during peak periods of recreational use in the Jawbone Canyon Open Area. During peak periods, it is anticipated that, with carpooling, the daily employee trips would average about 85 trips during peak hours, in addition to a daily average of 28 trips per day for light duty delivery and construction trucks (in passenger car equivalents). The laydown and staging areas would provide sufficient space for construction crew vehicle parking and no other construction-related parking areas would need to be provided on the property.

Project Operations and Maintenance

Wind Turbine Areas

With completion of construction, approximately 10 to 12 employees would operate and maintain the project on a permanent basis. Routine maintenance of the turbines would be necessary to maximize performance and detect potential problems. Routine activities related to maintenance would consist primarily of daily travel, generally by pick-up trucks, of O&M personnel who would test and maintain the wind generation facilities. Most servicing would be performed “up-tower” (within the nacelle, without using a crane to remove the turbine from the tower). Occasionally, the use of a crane and possibly equipment transport vehicles may be necessary for cleaning, repair, adjustments, or replacements of the rotors or equipment contained in the nacelle. Additionally, all roads, pads, and trenched areas would be regularly inspected and maintained to minimize erosion.

Access to this area by maintenance personnel would be provided by Jawbone Canyon Road.

Transmission Line Segment Facilities

Ground inspection and maintenance of the transmission line and related facilities would be provided by both Jawbone Canyon Road and Pine Tree Canyon Road. Travel on these roads would likely be minimal since most inspections will be performed by helicopter.[1]

[1] LADWP Initial Study Checklist for the Pine Tree Wind Development Project

2. Area Roadway Descriptions

This section of the report documents the existing conditions on the roadways adjacent to and most likely affected by the proposed project. The data used in this section of the report was obtained from field reconnaissance conducted by EDAW and Katz, Okitsu & Associates in August 2004 and *Caltrans Traffic Volumes, 2003.* These Caltrans traffic volumes are the latest available.

State Route 14 is the principal regional access route leading to the project area. It is a two-lane and four-lane north-south state highway that, along with U.S. Highway 395, connects the City Mojave south of the project site to the Cities of Lone Pine, Big Pine, Bishop and the Mammoth Mountain Resort areas to the north. According to the Caltrans 2003 Traffic Volume publication, this section of roadway carries approximately 6,500 vehicles per day and about 680 vehicles during the peak hours.

Jawbone Canyon Road is a 25-feet wide County-maintained paved road (60-foot right-of-way) that runs west from its intersection with State Route 14. The roadway is paved at State Route 14 but becomes a dirt road west of State Route 14, as it exits the Jawbone Canyon Open Area. Jawbone Canyon Road runs all the way up into the Sequoia National Forrest (Elevation 6000'-7000'), to the northwest of the project property. It is about a 25-mile drive to get there from State Route 14. Even though it is a dirt road, most of it is well maintained. There are some very steep switchbacks heading up the mountains that a 2WD vehicle may have trouble climbing.

Traffic volumes on this roadway are generally very low. However, use increase considerably on holiday weekends and winter weekends as recreational users visit the Jawbone Canyon Open Area. The roadway and surrounding hills in the Open Area are used by all-terrain vehicles for recreation. Local recreation groups have commented that typical holiday weekends bring upwards of 4,000 people to the area.

Pine Tree Canyon Road is a dirt road located south of Jawbone Canyon Road that runs west from its intersection with State Route 14. This roadway is very lightly traveled. It is maintained by the Los Angeles Department of Water and Power (LADWP) to provide access to transmission facilities and two Los Angeles Aqueducts.

Primary access to the proposed wind turbine component would be taken from Jawbone Canyon Road at Highway 14, and access to the transmission line component would be taken from Pine Tree Canyon Road at Highway 14. These intersections as described as follows:

<u>Intersection No. 1 – State Route 14/Jawbone Canyon Road</u>

The State Route 14/Jawbone Canyon Road intersection is a “T” intersection controlled by a stop sign on Jawbone Canyon Road. At this intersection, State Route 14 is a four-lane roadway that provides a northbound left-turn lane, a southbound right-turn lane and an acceleration area northbound for eastbound left-turning traffic from Jawbone Canyon Road. Photographs 1, 2, 3 and 4 show this intersection.

Photograph 1 - Looking north from the southwest corner of the State Route 14/Jawbone Canyon Road intersection

Photograph 2 - Looking south from the northwest corner of the State Route 14/Jawbone Canyon Road intersection

Photograph 3 - Looking east along Jawbone Canyon Road toward State Route 14

Photograph 4 - Looking west across State Route 14 at Jawbone Canyon Road

Intersection No. 2 – State Route 14/Pine Tree Canyon Road Intersection

The State Route 14/Pine Tree Canyon Road intersection is controlled by stop signs on Pine Tree Canyon Road. Stops signs are located on either side of State Route 14 and in the median area separating the northbound and south bound lanes. State Route 14 is a four-lane divided highway at this location, with northbound and south-bound left-turn lanes. There is a paved shoulder on the highway but it is not striped for an acceleration lane.

Photographs 5, 6, 7 and 8 show this intersection.

Photograph 5 - Looking north along the west side of State Route 14 from Pine Tree Canyon Road

Photograph 6 - Looking south along the west side of State Route 14 from Pine Tree Canyon Road

Photograph 7 - Looking west from the State Route 14 median at Pine Tree Canyon Road

Photograph 8 - Looking west from the State Route 14 median at Pine Tree Canyon Road

3. Project Trip Generation Forecast

Project Construction Phase Trip Generation

Wind Turbine and Related Components

Employee/Worker Trips

A maximum of 170 employees would be working at the site at one time. It is anticipated that, with carpooling, the daily employee trips would average about 85 (one per every two employees) inbound trips during the AM peak hour and 85 outbound trips during the PM peak hour.

Non-employee Truck Trips

Katz, Okitsu & Associates was provided with Table 1. Table 1 shows the non-employee forecast truck traffic for the wind turbine and related components construction for the project duration.

Table 1 – Wind Turbine and Related Components Construction Trip Generation Matrix

	Trips laden	Trips unladen	Gross wtg/truck (1,000 lbs.) [1]	Load wtg (1,000 lbs.)	Overall Length [1]	Height [1]	Width [1]
Wind Turbine Assemblies							
Tower Top Section	80	80	**87**	46.2	**88' 0"**	**14' 10"**	**9' 10"**
Tower Mid Section	80	80	**110.6**	69.8	**86'0"**	11' 3"	**11' 1"**
Tower Bottom Section	80	80	**136.8**	89.6	**96'8"**	**15' 7"**	**13' 4"**
Hub Assemblies	80	80	75	34.2	**78' 0"**	**14' 8"**	**10' 5"**
Controllers	40	40	60.9	6.7/ea-3/truck	60' 0"	**14' 1"**	7' 8"
Nacelle	80	80	**197**	112.5	**111' 2"**	**15' 4"**	**11' 6"**
Blades	120	120	75	35ea-/2/truck	**133' 0"**	--	7' 8"
Loose Parts/tooling	21	21	75	34.2	60' 0"	14' 0"	**11' 0"**
BOP Equipment/Substation							
Substation	1	1	**130**	320	**123' 7"**	**23'-0"**	**20'-0"**
Building (steel/roofing/siding)	40	40	75	34.2	60' 0"	14' 0"	**11' 0"**
Mechanical Equipment	20	20	75	34.2	60' 0"	14' 0"	**11' 0"**
Electrical cable/equipment	100	100	75	34.2	60' 0"	14' 0"	**11' 0"**
Construction Materials/Equip.							
concrete/reinforcing steel	100	100	75	34.2	60' 0"	14' 0"	**11' 0"**
construction consumables/misc	100	100	26	--	--	--	--
large excavation equipment	12	n/a	**200**	115.5	**111' 2"**	**14' 2"**	**14' 0"**
small excavation Equipment	30	n/a	75	45	**78' 0"**	14' 0"	**12' 0"**
water trucks	16	n/a	26	53	25' 0"	11' 0"	8' 6"
rock crushers	4	n/a	**120**	90	65' 0"	14' 0"	**14' 0"**
Batch plants	2	n/a	**120**	80	65' 0"	14' 0"	**14' 0"**
concrete trucks	20	n/a	20	52	25' 0"	12' 0"	8' 6"
2 Large Cranes	4	4	**205.6**	132.5	**105' 6"**	12' 2"	**10' 0"**
misc. large flat bed truck	8	8	**86.3**	59.7	54' 5"	10' 3"	8' 0"
large semi trailer	20	20	75	45	60' 0"	14' 0"	**11' 0"**
5 small cranes	5	5	**120**	89.6	--	--	--
construction mobilization/demobilization	30	30	75	34.2	60' 0"	11' 0"	**11' 0"**
employee pickup trucks	13,680	13,680	4	--	--	--	--
Trip Totals	**14,773**	**14,689**					
Non-employee trips	1,093	1,009					

[1] Bold signifies that the load exceeds maximum limits and a permit is required.
Source: - Zikha Renewable Energy

To calculate the number of construction and delivery trips, Katz, Okitsu & Associates added the row title "Non-employee" trips and subtracted the employee total pick-up trips from the trip totals. The results are 2,102 trips (1,093 + 1,009). To convert these truck trips to passenger car trips, Katz, Okitsu & Associates utilized a passenger car equivalent factor[2] of 2.5. This results in 5,255 equivalent passenger car trips for the duration of the project for construction and delivery trucks.

Assuming that 80% of these trips would occur over a six-month period working six days a week, this would result in 28 passenger car equivalent truck trips per day. (0.80 x 5,255 trips/(25 working days per month x 6 months). Assuming that these trips occurred over a ten hour day would result in three passenger car equivalent truck trips in the average peak hour.

Total Average Daily Wind Turbine and Related Components Construction Trips

Assuming that there are a total of 170 employee trips per day (85 AM peak hour and 85 PM peak hour) plus 28 passenger car equivalent truck trips per day, the total daily traffic generated by the project would be approximately 198 vehicle trips (PCEs) per day.

Using the assumptions described above, the number of peak hour trips (PCEs) would be 88 trips.

Transmission Line and Related Components

Employee/Worker Trips

A maximum of 40 employees would be working at the site at one time. It is anticipated that, with carpooling, the daily employee trips would average about 20 (one per every two employees) inbound trips during the AM peak hour and 20 outbound trips during the PM peak hour.

Non-employee Truck Trips

Katz, Okitsu & Associates was provided with Table 2. Table 2 shows the non-employee forecast truck traffic for the transmission line and related components construction for the project duration.

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[2] PCE = Passenger Car Equivalents are factors that are used to convert truck, bus and RV trips to the equivalent number of car trips, which have an equal impact on congestion.

Table 2 – Transmission Line and Related Components Construction Trip Generation Matrix

	Trips laden	Trips unladen	Gross wtg/truck (1,000 lbs.) [1]	Load wtg (1,000 lbs.)	Overall Length [1]	Height [1]	Width [1]
Power Poles							
Pole Sections	90	90	**87**	46.2	**88' 0"**	**14' 10"**	**9' 10"**
Insulators	20	20	80	45	65' 0"	14' 0"	8' 6"
Tower Arm Assemblies & Hardware	20	20	80	45	65' 0"	14' 0"	8' 6"
Wire and pulling equipment	15	15	75	34.2	65' 0"	14' 0"	8' 6"
Switching Station							
Substation Circuits, CVTs	1	1	**120**	89.6	**96' 0"**	**15' 7"**	**11' 1"**
Building (steel/roofing/siding)	20	20	75	34.2	60' 0"	14' 0"	**11' 0"**
Mechanical Equipment	10	10	75	34.2	60' 0"	14' 0"	**11' 0"**
Electrical cable/equipment	50	50	75	34.2	60' 0"	14' 0"	**11' 0"**
Concrete	10	n/a	20	52	25' 0"	12' 0"	8' 6"
Gravel	50	50	75	34.2	60' 0"	14' 0"	8' 6"
Construction Materials/Equip.							
concrete/reinforcing steel	15	15	75	34.2	60' 0"	14' 0"	8' 6"
construction consumables/misc	15	15	26	--	--	--	**--**
large excavation equipment (2)	2	2	**200**	115.5	**111' 2"**	**14'2"**	**14' 0"**
small excavation equipment (3)	3	3	75	45	**78' 0"**	14' 0"	**12' 0"**
water trucks (2)	2	n/a	26	53	25' 0"	11' 0"	8' 6"
concrete trucks	10	n/a	20	52	25' 0"	12' 0"	8' 6"
Large Cranes (2)	2	2	**120**	80	65' 0"	14' 0"	**14' 0"**
construction mobilization/demobilization	25	25	20	52	25' 0"	12' 0"	8' 6"
Pickup trucks and small utility	5,000	5,000	**4**				
Trip Totals	**5,360**	**5,338**					
Non-employee trips	360	338					

[1] Bold signifies that the load exceeds maximum limits and a permit is required.
Source: LADWP, 2004

To calculate the number of construction and delivery trips, Katz, Okitsu & Associates added the row title "Non-employee" trips and subtracted the employee total pick-up trips from the trip totals. The results are 698 trips (360 + 338). To convert these truck trips to passenger car trips, Katz, Okitsu & Associates utilized a passenger car equivalent factor of 2.5. This results in 1,745 equivalent passenger car trips for the duration of the project for construction and delivery trucks.

Assuming that 80% of these trips would occur over a four-month period working six days a week, this would result in 14 passenger car equivalent truck trips per day. (0.80 x 1,745 trips/ (25 working days per month x 4 months). Assuming that these trips occurred over a ten hour day would result in two passenger car equivalent truck trips in the average peak hour.

Total Average Daily Transmission Line and Related Components Construction Trips

Assuming that there are a total of 40 employee trips per day (20 AM peak hour and 20 PM peak hour) plus 14 passenger car equivalent truck trips per day, the total daily traffic generated by the project would be approximately 54 vehicle trips (PCEs) per day.

Using the assumptions described above, the number of peak hour trips (PCEs) would be 22 trips.

Project Operational Phase

During the operational phase of the project, 10 to 12 employees would maintain the wind generating equipment. The transmission line would normally be inspected by helicopter and would generate traffic on the order of four trips per day, intermittently. Therefore, the completed project, assuming that each employee drove to and from work alone and that no more than five supporting trips would be required per day would be 36 trips per day. (12 inbound and 12 outbound employee trips, plus 5 inbound and 5 outbound delivery trips, plus 2 inbound and 2 outbound trips for the transmission line).

4. Roadway Capacity Analysis

The type of traffic analysis required for this project is based on the Caltrans traffic study guidelines since the project access points are located along State Route 14.

Trip Generation Thresholds

The proposed project may be deemed to have a significant transportation/circulation effect if it will:

a. Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e. result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ration on the roads, or congestion at intersections.
b. Result in a safety hazard to pedestrians or motorists.

In addition, Caltrans has established criteria for determining the proper level of traffic analysis for a proposed project. Based on Caltrans traffic study guidelines, the following criterion is a starting point in determining when a traffic impact study is needed. Such a study is necessary when a project:

1. Generates over 100 peak hour trips assigned to a State highway facility
2. Generates 50 to 100 peak hour trips assigned to a State highway facility – and, affected State highway facilities are experiencing noticeable delay; approaching unstable traffic flow conditions (Level of Service “C” or “D”).
3. Generates 1 to 49 peak hour trips assigned to a State highway facility and any of the following conditions exist:

    a. Affected State highway facilities experiencing significant delay; unstable or forced traffic flow conditions (Level of Service “E” or “F”).
    b. The potential risk for a traffic incident is significantly increased (i.e., congestion-related collisions, non-standard sight distance considerations, increase in traffic conflict points, etc.).
    c. Change in local circulation networks that impact a State highway facility (i.e., direct access to State highway facility, a non-standard highway geometric design, etc.).

Note: A traffic study may be as simple as providing a traffic count or as complex as a detailed simulation. The appropriate level of study is determined by the particulars of a project, the prevailing highway conditions, and the forecasted traffic.

Roadway Capacity Analysis

State Route 14 operates at a very good level of service in the project vicinity. State Route 14 in the project vicinity carries less than 7,000 daily trips. Two-lane expressways are designed to carry up to 35,000 vehicles per day.

Since no specific project construction site and since each construction phase of the project, as well as the operational phase of the project, is forecast to generate less than 100 peak hour trips and State Route 14 currently operates at a good level of service, no detailed traffic study is required based on Caltrans criteria and, as such, no capacity-related traffic impacts are anticipated.

5. Assessment of Heavy Vehicle/Over-size Load Impacts

The movement of large vehicles to delivery supplies and construction equipment can impact in several ways. The size and maneuverability can affect traffic circulation at the project access points, in this case the State Route 14/Jawbone Canyon Road intersection, and "over-size" loads, like those that will be required to delivery turbine nacelles and the substation transformer, can affect roadways from the point of origin to the point of delivery.

To comply with permit requirements, some of the oversize loads will require special escorts or pilot cars during travel on state and local highways. Transport of oversize loads in this case does not constitute a significant adverse impact, since the pilot cars are adequate warning to other motorists of the oversize condition on state highways.

This section of the report discusses the potential project impacts associated with oversize loads.

Roadway Access at the State Route 14/Jawbone Canyon Road Intersection

The intersection of State Route 14 and Jawbone Canyon Road is generally designed to accommodate vehicles that are qualified to operate without permits on the state highway system. Most of the larger vehicles would be expected to come from the Los Angeles and Bakersfield metropolitan areas to the south/west so northbound left-turn movements from State Route 14 and southbound right-turn movements from Jawbone Canyon could be accommodated (northbound left-turn pocket is available and shoulder area to accelerate southbound is available).

Roadway Access at the State Route 14/Jawbone Canyon Road Intersection

The intersection of State Route 14 and Pine Tree Canyon is similar to Jawbone with a northbound left turn lane and some room on the shoulder to merge into southbound and northbound traffic upon exit from the area.

Though light to moderate volumes are characteristic on Highway 14, turning movements from the highway onto both Pine Tree and Jawbone canyon roads by oversize loads could be difficult at times due to cross traffic and represents a potential adverse impact of the project.

Over-size Loads

Permits

Over-size loads require special traffic control and usually require that permits be obtained from potentially affected jurisdictions. Since loads will be delivered using state highways, permits will be required from Caltrans. Additional permits from and coordination with the California Highway Patrol will also be required.

Following is a list of requirements for legal, un-permitted vehicles to operate in California. (Source: Caltrans Web Site)

WIDTH - The maximum allowable vehicle width is 102 inches (some exceptions apply).
HEIGHT - The maximum allowable vehicle height is 14 feet.

LENGTH (California Legal) - The maximum allowable lengths for vehicles that can travel throughout California are as follows (some exceptions apply).

- single vehicle length is 40 feet.
- combination length is 65 feet.
- trailer length is not specified.
- KPRA (kingpin-to-rear-axle) is 40 feet maximum.
- Doubles - 75 feet for combination of vehicles consisting of a truck tractor and two trailers, provided neither trailer length exceeds 28 feet 6 inches.
- Doubles - 65 feet for combination of vehicles consisting of a truck tractor and two trailers, if one trailer length exceeds 28 feet 6 inches.

LENGTH (STAA) - The maximum allowable lengths for vehicles that are limited to the National Network and Terminal Access routes are as follows:

- combination length is unlimited.
- maximum trailer length is 53 feet.
- KPRA is unlimited if trailer is no more than 48 feet.
- KPRA is 40 feet maximum if trailer is more than 48 feet.
- Doubles - unlimited length for combination of vehicles consisting of a truck tractor and two trailers, but *neither* trailer length can exceed 28 feet 6 inches.

WEIGHT: The maximum allowable weights are as follows:

- gross combination weight is 80,000 pounds.
- single-axle weight is 20,000 pounds.
- maximum weight on a tandem axle with a four-foot spread is 34,000 pounds.

For vehicles that do not meet this qualification, permits information can be found at the following web site: http://www.dot.ca.gov/hq/traffops/permits/

Kern County criteria regarding the need for permits for oversize loads are based on the California Vehicle Code. In certain cases, an annual blanket permit may be issued.

Information regarding Kern County's oversize load permit requirements can be found on the County web site: http://www.co.kern.ca.us/roads/permits.asp

Potential for Roadbed Damage Due to Oversize Vehicle Loads

Oversize loads, and in particular overweight loads, required to transport equipment to the site during construction can physically damage roadways, which is considered an adverse impact.

While Highway 14 meets the design standard for state highways, Jawbone Canyon Road (a County road) does not appear designed for heavy loads. However, the applicant has agreed to and County road permits require that any damage done to roadways be repaired to the satisfaction of the agency with jurisdiction. With the agreement to repair any damage to state or county roadways, which is substantiated through standard permit conditions, the impacts of damage to roads would be adverse but less than significant.

<u>Potential for Conflicts between Project-Generated Traffic and Recreational Uses</u>

Jawbone Canyon Road through the Open Area is a rural road with little signage or other traffic control features. Off-road vehicle users of all ages frequent the open area. High recreation use periods include holiday weekends as well as most fall and winter weekends. As such, there is a potential for conflict between traffic generated by recreation uses of Jawbone Canyon Road and construction traffic.

6. Project Recommendations

The wind energy generation project will not result in any permanent traffic generating impacts on State Route 14. As such, permanent physical or operations improvements to either study intersection are not required. However, it is recommended that measures be implemented to reduce the potential for conflicts between construction-generated traffic and motorists traveling on State Route 14. These include the following:

1. Develop a construction schedule that identifies the number of large trucks/day that are expected.

2. Identification of the time of day large trucks are expected to arrive such as daytime or nighttime.

3. Coordinate and develop a traffic control plan with Caltrans, the California Highway Patrol and Kern County.

4. With the approval of Caltrans, install Warning Sign SW-40 Truck Crossing per State Highway Design Guidelines.

5. With the approval of Caltrans, install Warning Sign SC-5 Special Event Ahead per State Highway Design Guidelines.

6. Where appropriate, obtain the required permits for “over-size” loads.

7. To reduce the potential for conflicts between recreational users of Jawbone Canyon Road and recreational traffic, it is recommended that haul permits for oversize loads include limitations to travel on County roads that exclude travel on holidays, such as New Years, Memorial Day, Labor Day, Thanksgiving, and Christmas, and that could exclude Saturday/Sunday travel, and times of darkness. In addition, it is recommended that the applicant work with the Bureau of Land Management to consider curtailing or controlling vehicle traffic in the Open Area of Jawbone Canyon. BLM may actually require this.