Environmental Summary Report for the Proposed Lugo-Pisgah 500kV Transmission Line and Substation Upgrades

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1.0 INTRODUCTION

Note to Reader: This report is based on data and information provided by Southern California Edison (SCE) and available data at federal, county, and local departments as well as existing environmental analysis and reports that have been tiered from and referenced to provide a summary of potential environmental impacts associated with the construction, operation, maintenance, and de-commissioning of the proposed Lugu-Pisgah 500kV Transmission Line and Substation Project. It should be noted that design of the project may be modified by SCE that may have a correlated effect on potential environmental impacts. Should the design of the project change materially, subsequent environmental analysis may be required to address those changes.

This Summary Environmental Report provides a description of environmental resources and evaluates the potential environmental impacts of SCE proposed Lugo–Pisgah No. 2 500kV Transmission Line (T/L) and Substation (Lugo-Pisgah No. 2 500kV T/L, Proposed Project), and its alternatives. The Proposed Project would be located in San Bernardino County between the existing SCE Pisgah Substation and the SCE Lugo Substation (see Figure 1, Project Area Map).

Potential environmental impacts associated with construction and operation of the Proposed Project will be analyzed in detail upon Stirling Energy Systems (SES) receiving further direction from SCE, the California Energy Commission (CEC), California Public Utilities Commission (CPUC), and the Bureau of Land Management (BLM). It is recognized that a number of large scale green power producers are pursuing projects within the region and that associated upgrades to the existing electrical system will benefit these projects; however, because each of these projects are at various stages of development, completion of detailed environmental analysis in a timely manner is of critical concern.

In an effort to conduct due diligence related to the Solar One Project, SES has initiated this Environmental Summary Report that generally describes the affected environment and summarizes potential issues and areas of concern associated with these upgrades. This summary report was prepared with the understanding that more detailed environmental analysis will be completed in the future.

1.1 PROPOSED PROJECT

SCE proposes to construct the Lugo-Pisgah No. 2 500kV (single circuit) within the existing Right-of-Way (ROW) of the existing Lugo-Pisgah 220kV Transmission Line (see Figure 1 and Plat Maps 1 through 58 at the end of this document) for 57 of the approximately 67 miles of the ROW. The last 10 miles south of Victorville would be constructed within a new ROW area. There would also be two new T/L loops constructed in the vicinity of the existing Pisgah Substation.

The existing Pisgah Substation (approximately 5 acres) will be expanded to approximately 40 acres to accommodate new electrical and communication facilities. The Proposed Project would serve current and projected demand for electricity and maintain electric system reliability in this portion of the Mojave Desert where numerous renewable (solar and wind) projects are being proposed, including SES Solar One.

The Proposed Project is expected to be operational on or before 2015 (see CAISO October 2008 Interconnection Facility Study Report) to ensure that safe and reliable electric service

is available to meet existing and projected customer electrical demands. The Proposed Project is described in detail in the following sections.

1.2 PROJECT DESCRIPTION

The Proposed Project consists of the construction of a single circuit 500kV T/L on 57.1 miles of existing ROW and 9.8 miles of new ROW. The existing 220kV Lugo-Pisgah No. 2 transmission line will be replaced with 500kV single circuit structures. The completed project will result in a new single circuit transmission line built to 500 kV standards on both existing and new ROW from the Pisgah Substation to the Lugo Substation.

The Proposed Project also involves looping the existing 500kV El Dorado-Lugo single circuit T/L into the Pisgah Substation. The new 500kV line will cross over the existing 220kV Cima–El Dorado No. 1 and No. 2 circuits. The following is a summary of the major elements of the Lugo-Pisgah No. 2 transmission line project.

1.2.1 Transmission Line Facilities

500kV T/L Scope (Lugo-Pisgah No. 2): The Lugo–Pisgah No. 2 500kV T/L would begin at the new Pisgah 500 kV/220 kV Substation. The proposed line would exit the substation to the northeast, and then wrap around the south side of the substation for approximately 0.6 miles before joining the existing Lugo-Pisgah No. 2 ROW. The line would then head southwest along the existing Lugo-Pisgah No. 2 ROW for approximately 56.7 miles until it reaches the eastern edge of the Mojave River.

The proposed line would then head south on a new ROW along the east side of the river for approximately 1.6 miles before crossing to the west side of the river. The line would then continue west on new ROW for approximately 7.6 miles before rejoining the existing Lugo-Pisgah No. 2 ROW for another 0.4 miles into the existing Lugo Substation. The project would terminate at the Lugo Substation.

The existing 220kV structures on the Lugo-Pisgah No. 2 220kV T/L would be removed for the entire length of the ROW.

The new approximately 67 miles of 500kV T/L would use two-bundled nonspecular 2156 kcmil aluminum conductor steel reinforced (ACSR) “Bluebird” conductor on single-circuit lattice steel towers (Towers). It is currently estimated that approximately 220 new dulled galvanized 500kV Towers would be installed in the existing ROW and 38 new dulled galvanized 500kV Towers would be installed in the new ROW. The single-circuit Towers would range in height between 91 feet and 194 feet. Most of the structure sites would require minor to substantial grading and new or re-developed access and spur roads.

500kV T/L Scope (El Dorado-Lugo): The existing El Dorado-Lugo 500kV T/L would be looped into the new Pisgah Substation. The northern leg of the loop would turn southeast and cross over the existing 220kV Cima–El Dorado No. 1 and No. 2 circuits before turning into the new Pisgah Substation. The southern leg of the loop would exit the Pisgah Substation and turn northwest over the existing 220kV Cima–El Dorado No. 1 and No. 2 circuits before rejoining the existing ROW. The northern leg is approximately 1,220 feet in length and the southern leg is approximately 1,000 feet in length.

Two existing 500kV structures on the Lugo–El Dorado T/L would be removed.

1.2.2 General Construction Related Activities

ROW: Approximately 9.8 miles of new ROW would be required for the Lugo-Pisgah No. 2 T/L project. This includes 0.6 miles around the new Pisgah Substation and 9.2 miles from the Mojave River to the Lugo Substation. The existing ROW for the Lugo-Pisgah No. 2 220kV T/L would be used for the remaining 57.1 miles of the 500kV T/L. Approximately 0.3 miles of new ROW would be required for the El Dorado–Lugo loop into Pisgah Substation.

Access and Spur Roads: Where possible, existing access and spur roads would be re-opened and rehabilitated. At a number of structure sites, access roads, and spur roads would be extended from existing roads to access the new structure locations adjacent to the existing structures. Drainage structures would be installed where necessary to allow for control of runoff and crossing of large washes.

Structure Removal: All existing 220kV structures on the Lugo-Pisgah No. 2 220kV T/L would be removed. This would include the 57.1 miles of ROW that would contain the new 500kV T/L and the section of line that would be bypassed by the new ROW.

Two existing 500 kV structures on the Lugo–El Dorado T/L would be removed.

Pulling and Splicing Locations: Pulling and splicing locations would be determined at a later date, but would generally be located within the existing ROW area.

1.2.3 Transmission Line Structures

It is currently anticipated that Lugo-Pisgah No. 2 would utilize 500kV four-legged single-circuit towers.

It is currently estimated that approximately 258 single-circuit 500kV towers would be constructed of dulled galvanized lattice steel angle members connected by steel bolts. The single-circuit 500kV towers would range in heights between 91 feet and 194 feet.

Each four-legged lattice steel tower would be built on four drilled pier concrete footings. The dimensions of each footing are dependent on variables such as topography, tower height, span lengths, and soil properties. On average, a typical footing would have an above ground projection of approximately 3 feet.

1.2.4 Conductors

The Lugo-Pisgah No. 2 500kV T/L would be strung with two-bundled 2156 kcmil ACSR "Bluebird" conductors with nonspecular finish. Approximately 2,226,000 feet of conductor would be strung.

The El Dorado-Lugo 500kV T/L loop into Pisgah Substation would be strung with two-bundled 2156 kcmil ACSR "Bluebird" conductors with nonspecular finish. Approximately 13,000 feet of conductor would be strung.

1.2.5 Insulators

The tangent and angle 500kV insulator assemblies would consist of two strings of insulators in the form of a "V." Each leg of the "V" assembly would contain one or two one-piece gray

polymer insulators, depending on the load. On dead-end structures, the insulators would be arranged in a "barrel" configuration consisting of four polymer insulators.

1.2.6 Overhead Ground Wires

The overhead ground wires would be located on the peaks of the transmission structures. The 500kV structures would have two overhead ground wires, one approximately 0.5 inch in diameter. The other ground wire would contain optical fibers for communications and line protection and would be approximately 11/16 inch in diameter.

1.2.7 Decommissioning of the existing 220kV Line

The proposed Lugo-Pisgah No 2 500kV T/L would be constructed while the existing Lugo-Pisgah 220kV T/L is in operation. Once the 500kV line is operational, then the existing 220kV line would be de-energized and the line would be taken out of commission. To remove the line, the conductors would be removed from the line, and the conductor towers would be dismantled and removed from the ROW area. The foundations for the towers would be removed to below grade and the locations of the towers would be reclaimed per the associated ROW grant or easement permit conditions. Any access roads not required for access to the new 500kV T/L line would also be reclaimed per the associated ROW conditions.

2.0 ENVIRONMENTAL RESOURCES

The following environmental review provides a baseline condition description for the proposed Lugo–Pisgah No. 2 550kV Transmission Line route and Substation upgrades. The environmental summary was prepared by reviewing public documents that describe resource conditions in the project area and acquiring Geographic Information System (GIS) resource information. The GIS data was acquired from public internet web sites. The GIS data and environmental review information was synthesized into an environmental report that provides a summary of baseline conditions, and provides general estimates as to environmental impacts associated with the Proposed Project. For each resource, potential mitigation measures and best management practices are recommended. The environmental resource areas specified in the Application for Certification (AFC) power plant siting regulations are analyzed in this report.

It is understood that the Proposed Project would go through a public review and permitting process completed by the CEC/CPUC and the BLM. As part of the review and permitting process a more detailed environmental review and impact assessment would be completed for the project. After detailed resource evaluations and impact assessments are completed project specific conditions of approval would be specified if the Proposed Project is permitted.

2.1 AGRICULTURE AND SOILS

This section presents a discussion of potential agriculture and soils issues associated with the Proposed Project upgrades. Baseline agriculture and soils conditions are discussed, potential environmental impacts are identified, and mitigation measures are identified to minimize impacts during Project construction and operation.

2.1.1 Affected Environment

This subsection discusses baseline agriculture and soils conditions in the Project region and along the linear routes of the transmission line.

2.1.1.1 Regional Setting

The Proposed Project would be located within the Mojave River area in the southwestern part of the Mojave Desert, in San Bernardino County, California. Characteristic landforms in the Mojave Desert include broad alluvial fans, old dissected terraces, playas, the Mojave River and its flood plain, and scattered mountains.

The Mojave River originates where the West Fork of the Mojave River joins the Deep Creek River. The river flows northward and then eastward past the City of Barstow. A flood plain 0.5 to 1.0-mile wide flanks the Mojave River along most of its course.

Natural resources in the Mojave River Area include soils, scenic resources, various mineral deposits, plants, and wildlife communities. Major minerals extracted in this area include gold, silver, feldspar, uranium, copper, iron, tungsten, turquoise, zeolite, barite, and clay. Limestone, sand, and gravel for cement and aggregate used for road construction are found at several locations throughout the area.

The majority of the surface in the region is covered by Quaternary-age unconsolidated surficial deposits. These deposits are comprised primarily of alluvial, fluvial, lacustrine, and aeolian derived material (BLM 2005). Soils on the flood plains of the Mojave River are nearly level. Soils on mountainside areas are moderately steep to steep and gently sloping to moderately sloping in the valleys (USDA, 1986). Soils in the vicinity of the Proposed Project were formed from parent material of mixed alluvium and colluvium derived from a variety of rock types, primarily granite.

Land classified as grazing land comprises approximately 76 percent of the agricultural resources within the boundaries of the soil surveys of the Mojave River Area (California Department of Conservation, 2007). Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance occur in the vicinity of the project and make up approximately three percent of the land in the project area (Figure 2).

2.1.1.2 Agricultural Resources

The majority of the Lugo-Pisgah No. 2 500kV T/L project is located on areas designated as Grazing Land. Approximately three miles near the center of the transmission line passes through and adjacent to an area designated as Farmland of Statewide Importance of less than 1,000 acres. The nearest Prime Farmland and Farmland of Local Importance are approximately 1.6 miles and 1.1 miles south of the transmission line, respectively. Where the line reaches the eastern edge of the Mojave River, approximately 4.6 miles southeast of Hesperia, the transmission line passes adjacent to approximately 206 acres of an area designated as Farmland of Local Importance. The nearest Prime Farmland and Farmland of Statewide Importance are approximately 0.4 miles and 0.7 miles north, respectively.

2.1.1.3 Soils Resources

The U.S. Department of Agriculture, Natural Resource Conservation Service has published soil surveys for the San Bernardino County Mojave River Area, the West Central Mojave

Desert and Marine Corps Air Ground Combat Center Twentynine Palms located in the vicinity of the project area. Detailed reports of the soils present at the northeastern end of the Proposed Project near I-40 are not available.

Soils are grouped into mapping units that represent a unique natural landscape. Typically, a map unit consists of one or more major soils and the soils in any map unit may differ from place to place in slope, depth, drainage, and other characteristics that affect management. Because of the large project area, general map units have been grouped for broad interpretive purposes.

The western half of the LP No. 2 500kV T/L project area is located within the San Bernardino County Mojave River Area. The San Bernardino County Mojave River Area is comprised of three groups of soil types (BLM 2005).

The central part of the Lugo-Pisgah No. 2 500kV T/L project is located within the West Central Mojave Desert soil survey (USDA NRCS 2008). Two major soil groupings are identified within this area.

Approximately six miles of the eastern portion of the LP No. 2 500kV T/L project pass through the Marine Corp Ground Combat Center Twentynine Palms soil survey area. This area also contains three general types of soil groups (BLM 2005).

2.1.2 Environmental Impacts

California Environmental Quality Act (CEQA) Guidelines were used to develop significance criteria. Impacts would be considered significant if:

- project construction or operation significantly increased wind or water-induced soil erosion;
- areas adjacent to construction areas experienced significantly increased sedimentation;
- Prime Farmlands, Farmlands of Statewide Importance, or Unique Farmland was lost, or;
- construction activities occur in areas of high erosion susceptibility and the disturbed areas were not properly stabilized and left exposed.

2.1.2.1 Agricultural Resources

The transmission line passes adjacent to or through areas designated as Farmland of Statewide Importance and Farmland of Local Importance. These areas account for approximately 1,100 acres, less than 2 percent of the total acreage of the project. Thus, the project is not anticipated to contribute to conversion or curtailment of agricultural land use due to the relatively small agricultural areas that the transmission line passes through (California Dept. of Conservation, 1997).

2.1.2.2 Soils Resources

The soils along the Proposed Project route would be subject to wind and water erosion during construction activities. Impacts associated with soil erosion include increased soil

loss and increased sediment yields downstream from disturbed areas. During construction, erosion impacts could result from disturbance or stripping of soils in the area of temporary roadways. Disturbed soils along the transmission line route are subject to wind and water erosion and mitigation measures would be implemented to limit erosion and sedimentation. Erosion on natural roads and trails is expected to be moderate and erosion in the offroad and offtrail setting is expected to be slight. Wind erodibility is expected to be very low. Minimal erosion is expected post-construction because the only soil disturbance during operation would be from periodic inspection and maintenance activities when needed. Potential impacts to the project may be caused by flash floods in the existing channels.

2.2 AIR QUALITY

This section addresses the air quality impacts of construction and operation of the Proposed Project.

2.2.1 Affected Environmental

The Lugo-Pisgah No. 2 500kV transmission line falls within the Mojave Desert Air Basin (MDAB). The transmission line falls within the Mojave Desert Air Quality Management District (MDAQMD).

2.2.1.1 Air Quality Overview

The vicinity surrounding the project is designated as being in attainment of California Ambient Air Quality Standards (CAAQS) for CO, NO2, and SO2. The area is in attainment or unclassified for CO, NO2, and SO2 with regards to the National Ambient Air Quality Standards (NAAQS). The area has been classified as non-attainment areas for ozone and PM10 under the CAAQS and NAAQS. The area is in non-attainment under CAAQS for PM2.5. Designations of attainment/non-attainment under NAAQS for the new PM2.5 and 8-hour ozone will occur in the future. It is expected that the area will be non-attainment for PM2.5 when a designation is made.

PM10 is the most important air pollutant in the MDAB that can be caused by both environmental and human activities. Human activities include stack emissions, diesel exhaust, fugitive dust sources arising from construction and demolition activities, unpaved public roads, and industrial activities. PM10 emissions can have an adverse effect on human health when inhaled into the nose, throat, and/or lungs. Fugitive dust tends to produce larger particulates and is not as likely to contain toxic materials as the smaller particulates produced from combustion sources.

The U.S. Environmental Protection Agency (USEPA) classified the San Bernardino County Mojave desert area as a PM10 non-attainment area in 1994. The MDAQMD adopted federal attainment plans for ozone and PM10 under the Federal Clean Air Act (MDAQMD, 2007). Emission sources identified in the plan include construction/demolition, travel on unpaved roads, wind erosion, industrial activities, disturbed areas, and paved road entrainment. MDAQMD Rule 403.2, adopted in 1996, outlines fugitive dust control for the Mojave Desert Planning Area to ensure that the NAAQS for PM10 will not be exceeded due to anthropogenic sources of fugitive dust within the MDPA and control measures contained in federal attainment plans will be implemented (MDAQMD, 1996).

Most of the ozone pollution in the area has been transported into the area from its source by the prevailing winds. The Victorville-Barstow area and the Antelope Valley are heavily

impacted by the ozone transport. Because the NAAQS does not recognize transport as a factor in their standards, most of the area has been classified as non-attainment areas for ozone.

Proposed actions in federal non-attainment areas must conform to the State Implementation Plan (SIP) before approval as stated in Section 176(c) of the Clean Air Act (CAA), as amended (42 U.S.C. 7401 et seq.), and regulations under 40 CFR, part 93, subpart W, that "no department, agency or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an applicable implementation plan."

2.2.1.2 Regional Climate

The local climate is influenced by topography, as well as by large scale synoptic weather patterns. Intense anticyclonic circulation such as those associated with high pressure systems influences the weather patterns in the area. The Mojave Desert area is sunny and dry during the summer due to large subtropical high pressure systems off the California coast. During the winter, the strength of the Pacific High pressure area weakens and 20 to 30 frontal systems may pass through the area, some which may produce rain. Transport winds from the south and west bring ozone and other pollutants through the area from the Los Angeles Basin and the San Joaquin Valley. Pollutant transport into the MDAB is the primary reason for violations of federal and California ozone standards.

2.2.1.3 Meteorological Data

Hourly meteorological data obtained from the MDAQMD monitoring site in Victorville shows that wind blows primarily from the south or south-southwest. During the summer, the MDAB is influenced by a Pacific Subtropical High cell. High wind speeds are documented during summer afternoons, typically from the south, southwest, and west. In the fall and winter, Santa Ana wind conditions produce high wind speeds from the north, north-northeast, and northeast.

2.2.1.4 Ambient Air Quality Data

The MDAQMD operates several monitoring stations for the measurement of particulate and gaseous pollutants. The nearest monitoring stations to the Proposed Project are located in Victorville and Hesperia. Both areas are in non-attainment for the California 1-hour and 8-hour and national 8-hour ozone standards. Intense wildfires release large amounts of particulate into the air and elevate the PM10 concentrations. Air quality data taken from periods of intense wildfires can make it difficult to determine compliance with air quality standards.

2.2.2 Environmental Impacts

The implementation of the Proposed Project would not have a significant adverse impact on air quality in the area. The project would comply with federal, state, and local air quality rules and regulations. The Southeast Desert Modified Air Quality Management Area (SDMAQMA) covers the Mojave Desert, the Coachella Vally/San Jacinto region in Riverside County, and the Antelope Valley region in Los Angeles County. The MDAQMD is responsible for the Mojave Desert and developed the MDAQMD Ozone State Implementation Plan (2004) for inclusion in the 2004 Southeast Desert Modified Ozone State Implementation Plan (2004 SED SIP). This plan identifies sources of PM10 emissions and mitigation measures to reduce

these emissions. Mitigation measures would be implemented following the MDAQMD Ozone SIP to reduce the emissions generated during project construction and operation.

2.2.2.1 Construction

Direct impacts of Proposed Project would arise during construction and operation of the transmission line. On-site construction emissions would arise primarily from heavy duty vehicles and equipment exhaust and wind erosion. On-site dust emissions would be generated during site preparation and construction. Off-site emissions would occur from construction worker vehicles and material delivery trucks. Construction related emissions are expected to cause unavoidable but minor localized short-term impacts. The Lugo-Pisgah No. 2 500kV transmission line project consists of constructing 66.9 miles of a single circuit 500kV T/L. Construction includes 10.1 miles (incl. 0.3 miles of El Dorado-Lugo) of new ROW, rehabilitation and extension of existing access and spur roads, removal of existing 220kV structures and two 500kV structures, construction of approximately 258 single-circuit 500kV towers, and stringing of approximately 2,226,000 feet of conductor (+ 13,000 feet for El Dorado-Lugo). Construction-related emissions include exhaust and dust from vehicle and construction equipment and fugitive windblown dust.

2.3 BIOLOGICAL RESOURCES

2.3.1 Affected Environment

2.3.1.1 Vegetation

In 2007 and 2008, URS biologists conducted a habitat assessment to characterize the vegetation within the project area and determine potential habitats for sensitive species (Appendix A). The project area encompasses a wide range of terrain and elevation with 17 native vegetation types and three non-native or disturbance-related vegetation types observed. The vegetation at the western end of the corridor near the Lugo Substation is characterized by semi-desert scrubs and woodlands within the hilly terrain. The project area crosses the Mojave River and several ephemeral drainages that are characterized by riparian scrub or forest habitats. As the corridor moves east, the terrain opens into mid-elevation desert basins with creosote bush and other drought tolerant species near the Pisgah Substation.

The project area was surveyed by vehicle and on foot. Vegetation communities were identified by one or more indicative species. The project study area included approximately 5,830.4 acres and supports 17 vegetation communities and three altered communities. Each community was assigned a Holland vegetation code (Holland 1986). Table 1 summarizes the acreage for each vegetation type and its Holland vegetation code.

Table 1. Vegetation community types, their corresponding Holland vegetation codes and the acreage of each community type within the survey area.

Vegetation Community Name	Holland Vegetation Code	Acreage
Shrublands		
Mojave creosote scrub	34100	3,301.0
Mojave mixed woody scrub	34210	281.1
Burned Mojave mixed	34210	199.6

woody scrub		
Mojave wash scrub	34250	21.8
Big sagebrush scrub	35210	97.0
Rabbitbrush scrub	35400	44.3
Disturbed rabbitbrush scrub	35400	79.3
Desert saltbush scrub	36110	174.6
Mulefat scrub	63310	8.8
Chaparral		
Semi-desert chaparral	37400	28.1
Grasslands		
Mojave mixed steppe	34220	14.4
Native grassland	42100	4.0
Non-native grassland	42200	13.0
Disturbed non-native grassland	42200	23.3
Woodlands and Forests		
Southern cottonwood-willow riparian forest	61330	1.3
Mojave juniper woodland scrub	72220	455.6
Joshua tree woodland	73000	312.8
Disturbed Joshua tree woodland	73000	13.7
Joshua tree woodland/Mojave juniper woodland scrub	72220/73000	267.0
Altered Communities		
Developed	12000	179.7
Disturbed	11300	117.1
Orchards and vineyards	18100	24.0
Extensive agriculture	18300	47.4

Near the proposed transmission line's western end, the terrain is dominated by Antelope Valley. Vegetation characteristic of this valley includes various desert scrubs, chaparral, and arid grasslands. As the proposed transmission line moves east, it crosses the Mojave River and the Ord Mountains where Mojave and Joshua tree woodlands are found at the higher elevations. The terrain flattens east of the Ord Mountains into the lower elevations of Apple Valley where Mojave creosote scrub and other drier communities dominate. The proposed transmission line then moves into Lucerne Valley where the vegetation is typically Mojave creosote scrub and desert saltbush scrub. The proposed transmission line would travel along the southern segment of this valley that is characterized by desert saltbush with some areas of agriculture. Continuing east-northeast to the end of the corridor, the vegetation is exclusively Mojave creosote scrub on this rolling terrain.

Wildlife

URS biologists surveyed the project area for wildlife species in 2007 and 2008. Species were identified by scat, tracks, burrows, vocalizations, or direct observations with the aid of binoculars.

The project area supports a wide range of desert wildlife. Eleven species of reptiles were observed during the biological surveys including desert tortoise (*Gopherus agassizii*), Mojave fringe-toed lizard (*Uma scoparia*), common side-blotched lizard (*Uta stansburiana*), western whiptail lizard (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), Mojave black-collared lizard (*Crotaphytus bicinictores*), and desert spiny lizard (*Sceloprous magister*). Sand dunes along the banks of the Mojave River provide habitat for the Mojave fringe-toed lizard (BLM 2005).

The project area spans a wide range of vegetation types that support a diversity of mammal species. Mule deer (*Odocoileus hemionus*), coyotes (*Canis latrans*), bobcats (*Lynx rufus*), and kit fox (*Vulpes macrotis arsipus*) range over most of the project area. Smaller mammals present include kangaroo rats (*Dipodomys* spp.), pocket mice (*Dipodomys* spp.), black-tailed jackrabbits (*Lepus californicus*), and desert cottontails (*Sylvilagus audobonii*). URS biologists observed 13 mammal species while conducting their surveys including the kit fox, coyote, black-tailed jackrabbit, bobcat, American badger (*Taxidea taxus*), and white-tailed antelope squirrel (*Ammospermophilus leucurus*).

The project area lies near the Pacific flyway and serves as a stopover for a wide range of migratory birds in the spring and the fall. Other birds spend winter in the area including the white-crowned sparrow (*Zonotrichia leucophrys*), dark-eyed junco (*Junco hyemalis*), sage sparrow (*Amphispiza belli*), and cedar waxwing (*Bombycilla cedrorum*). Certain birds are residents of the area and can be observed year-round including the greater roadrunner (*Geococcyx californianus*), phainopepla (*Phainopepla nitens*), mockingbird (*Mimus polyglottos*), verdin (*Auriparus flaviceps*), cactus wren (*Campylorhynchus brunneicapillus*), and rock wren (*Salpinctes obsoletus*). URS biologists observed 36 bird species in their biological surveys including the golden eagle (*Aquila chrysaetos*), cactus wren, red-tailed hawk (*Buteo jamacenis*), and the horned lark (*Eremopihila alpestria*).

2.3.1.2 Sensitive Plant and Animal Species

Ten special status species were detected during the 2007 and 2008 surveys. The desert tortoise is federally listed as threatened (Table 2). The short-joint beavertail cactus (*Opuntia basilaris* var. *brachyclada*) and white-margined beardtongue (*Penstemon albomarginatus*) are BLM Sensitive Species (Table 3). The Mojave fringe-toed lizard, western burrowing owl (*Athene cunicularia*), golden eagle, American badger, horned lark, yellow warbler (*Dendroica petechia*), and loggerhead shrike (*Lanius ludovicianus*) are California Species of Concern with no federal status.

Table 2 lists the federally listed species for San Bernardino County, California. The desert tortoise was the only species located during surveys. No other species have potential habitat within the project area.

Table 2. Federally listed fish and wildlife species for San Bernardino County, California and their potential to occur in the project area.

SPECIES (STATUS)	HABITAT ASSOCIATION	POTENTIAL TO OCCUR
BIRDS		
Least bell's vireo	Typically inhabits structurally	Project area is outside of the

SPECIES (STATUS)	HABITAT ASSOCIATION	POTENTIAL TO OCCUR
(Endangered)	diverse woodlands along water courses including cottonwood-willow forests and mulefat scrub.	present range of the species.
Southwestern willow flycatcher (Endangered)	Breeds only in riparian woodland typically adjacent to or even over water. Only two known sites in the Mojave desert at Big Morongo Canyon Preserve and along the Mojave River near the Mojave Narrows Regional Park.	Project area is located 4.6 miles south of designated critical habitat at Mojave Narrows Regional Park.
Yellow-billed cuckoo (Candidate)	Desert oases with willows and cottonwoods could provide habitat for migrating yellow-billed cuckoos. Birds have been observed during the breeding season along the Mojave River between Victorville and Barstow.	Project area is outside of the known range of the species.
Yuma clapper rail (Endangered)	Breeds in marshes along the Colorado River and around the southeastern portion of the Salton Sea.	Project area is outside of the known range of the species.
FISHES		
Bonytail chub (Endangered)	Found in the Colorado River.	Project area is outside of the known range of the species.
Mohave tui chub (Endangered)	Endemic to the Mojave River.	Project area crosses the Mojave River where the river does not have perennial flow.
Razorback sucker (Endangered)	Found in the Colorado River.	Project area is outside of the known range of the species.
AMPHIBIAN		
Arroyo toad (Endangered)	Breed in stream channels and use stream terraces and surrounding uplands for foraging and wintering.	Project area is approximately 1.25 miles north of designated critical habitat in Summit Valley.
REPTILE		
Desert tortoise (Threatened)	Mostly found in creosote bush scrub with lower densities occurring in Joshua tree woodlands and saltbush scrub.	**Surveys in 2007 and 2008 detected desert tortoise sign and burrows throughout the project area and five live tortoises were detected within the survey corridor.**
PLANTS		
Cushenbury buckwheat (Endangered)	Restricted to limestone and dolomite substrates in the San Bernardino Mountains at the southern edge of the western Mojave Desert.	Project area is outside of the species' known range.
Cushenbury milkvetch (Endangered)	Restricted to limestone and dolomite substrates in the San Bernardino Mountains at the southern edge of the western Mojave Desert.	Project area is outside of the species' known range.

SPECIES (STATUS)	HABITAT ASSOCIATION	POTENTIAL TO OCCUR
Cushenbury oxytheca (Endangered)	Restricted to limestone and dolomite substrates in the San Bernardino Mountains at the southern edge of the western Mojave Desert.	Project area is outside of the species' known range.
Lane Mountain milkvetch (Endangered)	Found on granitic substrates with shallow soils. A very local endemic species whose entire known range is between Goldstone and Barstow in San Bernardino County.	Project area is outside of the species' known range.
Parish's daisy (Threatened)	Restricted to limestone and dolomite substrates in the San Bernardino Mountains at the southern edge of the western Mojave Desert.	Project area is outside of the species' known range.

Source: U.S. Fish and Wildlife Service, Federally listed threatened and endangered species which may occur in San Bernardino County, CA, http://www.fws.gov/ventura/speciesinfo/spplists/sl_sanbernardino_co.cfm

Table 3 lists the BLM sensitive species outlined in the West Mojave Plan (BLM 2005). The short-joint beavertail cactus and white-margined beardtongue were the only species observed during surveys. The Mojave monkeyflower (*Mimulus mohavensis*) and gray vireo (*Vireo vicinior*) have potential habitat within the project area but were not observed during field surveys. No other species have potential habitat within the project area.

Table 3. BLM Sensitive Species from the West Mojave Plan and their potential to occur in the project area.

SPECIES (STATUS)	HABITAT ASSOCIATION	POTENTIAL TO OCCUR
BIRDS		
Gray vireo	Found on arid slopes dominated by short, densely branched, stiff-twigged shrubs. Populations have been observed in the eastern San Bernardino Mountains.	Potential habitat may occur within the project area, but no individuals have been identified in previous studies of the area.
MAMMALS		
California leaf-nosed bat	Colonial cave dweller that is dependent on desert wash foraging habitat near their roosts.	Project area is outside of the species' known range.
Pallid bat	Roost mostly in rock crevices.	Project area is outside of the species' known range.
Spotted bat	Primarily cliff dwellers.	Project area is outside of the species' known range.
Townsend's big-eared bat	Colonial cave dweller that is dependent on riparian habitat within five miles of roosts.	Project area is outside of the species' known range.
Western mastiff bat	Primarily cliff dwellers.	Project area is outside of the species' known range.
Bighorn sheep	Known populations in the Ord and Rodman Mountains.	Project area does not extend into the mountain ranges.
Mojave River vole	Occupies moist habitats along	Project area crosses the

SPECIES (STATUS)	HABITAT ASSOCIATION	POTENTIAL TO OCCUR
	the middle reaches of the Mojave River including an area between Hesperia and Victorville.	Mojave River south of Hesperia outside of the species' known range.
Yellow-eared pocket mouse	Inhabits the eastern slopes of the Piute Mountains and the Sierra Nevada.	Project area is outside of the known range for the species.
REPTILE		
Panamint alligator lizard	Found most often in canyons with riparian habitat and nearby permanent springs. It has only been sited in Inyo and Mono Counties.	Project area is entirely within San Bernardino County.
PLANTS		
Barstow woolly sunflower	Found on bare areas with little soils, often containing a shallow subsurface caliche layer. Most known locations are between Kramer Junction and Harper Dry Lake.	Project area is outside of the species' known range.
Charlotte's Phacelia	Usually found on naturally disturbed or unstable habitats such as loose sand, talus, and washes. Occurs in the high Sierra Nevada.	Project area is outside of the species' known range.
Desert Cymopterus	Generally found on sandy soils. Found from California City east to the Superior Valley and from the Cuddeback Lake area south to near Kramer Junction.	Project area is outside of the species' known range.
Kern buckwheat	Found on ridge tops in poorly draining depressions in white bentonite clay soils. All known populations are in Kern County.	Project area is entirely within San Bernardino County.
Little San Bernardino Mountains gilia	Found in dry canyons and along desert washed on alluvial fans. Known populations are in the Little San Bernardino Mountains and the northeast portion of the San Bernardino Mountains.	Project area is outside of the species' known range.
Mojave monkeyflower	Found in Joshua tree and creosote bush scrub communities. All known occurrences are east of the Mojave River and south of Barstow.	**Potential habitat exists within the project area but rare plant surveys in 2008 did not observe any individuals.**
Mojave tarplant	Found in Joshua tree woodlands, creosote bush scrub, and mixed desert scrub communities. Found at the base of the southern Sierra Nevada's.	Project area is outside of the species' known range.

SPECIES (STATUS)	HABITAT ASSOCIATION	POTENTIAL TO OCCUR
Parish's popcorn flower	It is a wetland obligate. Single site at Rabbit Springs in Lucerne Valley.	Project area is outside of the species' known range.
Red rock poppy	Appears on rhyolite tuffs, granitics and similar rocks. Known locations include Red Rock Canyon State Park, Mesquite Canyon, and southeast of Searles Station.	Project area is outside of the species' known range.
Short-joint beavertail cactus	Mostly associated with Joshua tree, pinyon pine and juniper woodlands.	**These cacti were found in the rare plant surveys in the eastern portion of the project area within semi-desert chaparral vegetation.**
White-margined beardtongue	Found on loose desert sands, generally on stabilized dunes.	**This species was found during the 2008 rare plant surveys in the western portion of the project area in Mojave creosote bush scrub near Pisgah.**

Source: Bureau of Land Management. 2005. Final Environmental Impact Report and Statement for the West Mojave Plan: A Habitat Conservation Plan and California Desert Conservation Area Plan Amendment.

2.3.1.2.1 Desert Tortoise

Sign of the desert tortoise was detected throughout the project area including inactive burrows, carapace remains, and dried and fresh tortoise scat. URS biologists observed five live desert tortoises and their burrows within the survey corridor during the protocol surveys. The Proposed Project area crosses 533 acres of the U.S. Fish and Wildlife Service (FWS) designated desert tortoise critical habitat in the eastern section of the proposed transmission line near the Rodman Mountain Range (Figure 3).

Potential desert tortoise habitat was scored on the basis of suitability of soils, vegetation, and presence of tortoise sign. A total of 4,720.2 acres were determined to be suitable for desert tortoise and approximately 2,512.2 acres were classified as either good tortoise habitat or within designated critical habitat for desert tortoise.

2.3.1.2.2 Mojave Ground Squirrel

The Mojave ground squirrel (*Spermophilus mohavensis*) ranges from Palmdale to Lucerne Valley and from Coso Range to the Avawatz Mountains. Habitat is typically dominated by creosote bush and burrobush in flat to moderate terrain. Associated species include winterfat (*Krascheninnikovia lanata*) and Joshua tree. This species is a state-listed species with no federal status.

The Mojave ground squirrel was not detected during biological surveys conducted by URS in 2007 and 2008. The closest documented location of the Mojave ground squirrel is greater than five miles from the project area which precludes the requirement for protocol surveys for this species.

2.3.2 Environmental Consequences

The types of project activities that could potentially cause adverse impacts to vegetation, wildlife, sensitive species, wildlife corridors, and/or special vegetation habitats include construction at pole locations, access roads, and staging/storage areas; activities at wire handling areas and marshaling yards, topping and/or clearing of vegetation in the ROW, and maintenance of the ROW. The primary types of adverse impacts that could occur to biological resources in the project area include:

- adversely affect, either directly or through habitat modifications, any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the BLM or FWS;
- impact any riparian habitat or other sensitive natural community;
- impact any federally protected wetland as defined by Section 404 of the Clean Water Act; or
- interfere substantially with the movement of any native resident or migratory wildlife species or with established wildlife corridors.

2.3.2.1 Vegetation

Vegetation within the proposed transmission line right-of-way may need to be managed to maintain necessary ground to conductor clearances. The majority of the vegetation in the project area is a variety of desert scrub communities that do not grow to heights where trimming would be necessary. Certain areas of the cottonwood-willow riparian forests, Joshua tree woodlands, and Mojave juniper woodlands may require trimming to maintain the necessary ground clearances.

Actual removal of vegetation would occur at each pole location (approximately 0.5 acres per structure [Molburg, et. al. 2007]), where road widening and road construction is necessary, and where vegetation maintenance is required to assure a safe clearance between the vegetation canopy and the conductors and lines. Mitigation measures outlined in Section 3, Mitigation Measures, would minimize impacts to the natural vegetation and provide the opportunity for the communities to recover after construction activities.

Any project-related surface disturbance could lead to invasion of the newly disturbed area by exotic weed species. Mitigation measures discussed in Section 3, Mitigation Measures, would minimize to the extent possible the invasion of exotic weed species.

Any wetland or riparian habitats would be spanned when possible to avoid impacts. When damage to US Army Corps of Engineers (USACOE) jurisdictional wetlands is unavoidable, mitigation would be required to offset the losses. Other special vegetation communities include the sand dunes along the Mojave River which provide habitat for the Mojave fringe-toed lizard (BLM 2005).

2.3.2.2 Wildlife

Construction activities associated with the proposed transmission line would impact general wildlife species through the removal of habitat at each pole location and for road widening and road construction. These activities could also increase wildlife mortality in the short-

term. The noise and additional vehicle traffic during construction activities could impact wildlife movement and some wildlife may not use areas surrounding the utility corridor during construction activities.

Installation of the proposed transmission line is not anticipated to impede resident and migratory wildlife patterns after construction is complete. Mitigation measures outlined in Section 3, Mitigation Measures, should minimize impacts to wildlife species and their movement corridors.

Raptors and other large perching birds such as common ravens could be electrocuted by the installation of the proposed transmission line. Design and construction standards such as those outlined by the Avian Power Line Interaction Committee (APLIC 2006) would minimize the risk of bird electrocution. Electrocution of small mammals such as rodents and jackrabbits is a possibility near substations. However, such mortality would be unlikely to affect regional populations of any small mammal species in the area.

Mortality of birds by collision with the wires is also a potential impact. However, none of the lines pass areas of high bird concentrations such as large wetlands, so the potential for impacts to waterfowl is not high. The proposed transmission line crosses canyons and woodland areas where the risk of bird collision increases. For the most part, migrating birds fly at a higher elevation than the powerlines with the possible exception of some canyon crossings. Design and construction standards outlined in by the Avian Power Line Interaction Committee (APLIC 2006) would be implemented to minimize bird collisions.

2.3.2.3 Sensitive Species

During biological surveys in 2007 and 2008, URS biologists observed three species that are listed by the FWS or the BLM. Those species are the desert tortoise, short-joint beavertail cactus, and white-margined beardtongue.

2.3.2.3.1 Desert Tortoise

The desert tortoise was the only federally listed species found in the project area during biological surveys in 2007 and 2008. Five individuals were observed within the survey corridor and signs of tortoise activity were observed throughout the project area (Appendix A). The project area also crosses critical habitat for the desert tortoise (Figure 3, Desert Tortoise Critical Habitat) on the eastern end near the Rodman Mountains.

Formal consultation with the FWS under Section 7 of the Endangered Species Act would occur before construction activities begin. The FWS will review the expected impacts to the desert tortoise and recommend a plan to avoid impacts where feasible and recommend mitigation where impacts are unavoidable.

2.3.2.3.2 Short-joint beavertail cactus and white-margined beardtongue

These two species are listed as BLM Sensitive Species. The short-joint beavertail cactus was observed in the eastern portion of the project area while the white-margined beardtongue was observed near Pisgah. These populations would be avoided wherever possible and if impacts are unavoidable, relocation of the populations would occur where feasible. Mitigation measures outlines in Section 3, Mitigation Measures, should minimize impacts to these sensitive plant species.

The BLM would be consulted regarding impacts to these sensitive species before any construction activities begin.

2.4 CULTURAL RESOURCES

The affected environment section for cultural resources is provided as an overview of the cultural resources of the general project area, and a description of the potential for cultural resources sites to be present within the proposed project area.

2.4.1 Affected Environment

2.4.1.1 Cultural Resources Overview

The project area is located in the western Mojave Desert where numerous large-scale inventory projects have been conducted. In part, these projects have defined a cultural chronology for the area that spans the last 12,000 years (Sutton et al. 2007). Ethnographically, the project area is centered on the traditional lands of the Serrano, a Numic speaking group related to the Shoshone. Between these earliest and latest Native American periods is a rich cultural history. The Mojave Desert is suggested to have been the area of principal point of origin for the migration of the Numic language group, which spread northeastward into the Great Basin and eventually the northern Colorado Plateau (papers in Madsen and Rhode 1994). Many of the distinctive projectile point types described for the Great Basin and Southwest culture areas may have originated in the broad geographic area of the Mojave Desert.

Native American history begins with the Clovis culture, the earliest substantively established cultural period in the Western Hemisphere and the only "classic" Paleoindian period represented in the project area. Dated from 10,000-8,000 B.C., the Clovis period is represented by distinctive spear points with a central flute or groove on either side of the point. These points are extremely well made and have been found in association with extinct Pleistocene megafauna (Holliday 1997). Because of the emphasis Clovis people placed on their hunting technology, researchers have tended to interpret Clovis as geared specifically towards big game hunting. In recent years this assumption has been challenged with increasing evidence towards a broader spectrum subsistence strategy (Collins 2007).

The transition from the Pleistocene to the Holocene is marked by significant environmental changes that resulted in equally significant changes in human settlement and subsistence strategies. The Lake Mojave Complex follows Clovis and subsumes several other named complexes, including the Western Pluvial Lakes Tradition and the San Dieguito Complex, among others (Sutton et al. 2007). Again, the Mojave Complex is represented by a distinct projectile point that tapers to a rounded base. Dates of the complex are ca. 8000-6000 B.C. The period is associated with relatively wet conditions and periodic lake recharge in the region. Material culture for the period is dominated by a stone tool technology geared towards a forager-like subsistence strategy. Such a strategy reflects the frequently changing environmental conditions and patchy resources that would be available necessitating frequent settlement shifts.

Changing environmental conditions to more arid, present-day conditions, marks the transition to the Middle Holocene and the Pinto Complex, which overlaps slightly with the preceding Lake Mojave Complex, and persists to about 3000 B.C. (Sutton et al. 2007). There is broad similarity with the Lake Mojave Complex, especially in toolstone selection and

overall technology; however, the Pinto Complex begins the first extensive use of milling tools presumed to reflect the intensification of vegetal processing. An emphasis towards plant resources probably reflects a more predictable biotic environment. The range of settlements across the landscape also suggests more predictable subsistence resources and characterizes the complex overall as spatially extensive.

Sutton and others (2007) have recently defined a new complex based on archaeological work within the Twentynine Palms area. Although acknowledged as spatially confined for the time being, future work will undoubtedly extend the range of the Deadman Lake Complex. The associated assemblage is described with contracting stemmed or lozenge-shaped projectile points, battered cobbles and core tools, biface technology, and milling stones. Preliminary dating places the complex from 7500 to 5200 B.C.

An occupation hiatus is suggested for the period between 3000 and 2000 B.C. (Sutton et al. 2007). Population density was very low (based on known archaeological sites) and large-scale abandonment is presumed for the Mojave Desert. After 2000 B.C. is the Gypsum Complex, represented by well-known projectile point styles, including the contracting stemmed Gypsum, Elko series, and Humboldt series projectile point types. Few excavated components are known from the project area despite the wide settlement pattern represented by these distinctive projectile point styles.

Following the Gypsum Complex, by A.D. 200 the Rose Springs Complex marks the introduction of the bow and arrow technology and significant population increase (Sutton et al. 2007). Rose Spring projectile points are smaller and were presumably hafted as arrow points. Environmental conditions were wetter and cooler during this period allowing Rose Spring settlement patterns to shift back to the Mojave Desert. Material culture is diverse and extensive and is often found as well developed middens. Architecture is first recognized during this period including wickiups and pit houses. Obsidian procurement was emphasized, as well. Settlement patterns appear to have been oriented initially towards permanent streams and lake margins and by the end of the period, or about A.D. 1000, settlements shifted to more ephemeral water sources as large-body lakes began to desiccate. The persistence of the Medieval Climatic Anomaly may have stressed an already expanding population resulting in the end of the complex by A.D. 1100.

The Late Prehistoric period extends from the close of the Rose Springs Complex ca. A.D. 1100 and ends with the ethnographically described groups occupying the area at contact in the 16th century (Draft WWEC PEIS 2007). It is during this period that Ancestral Puebloan groups are known to have exploited turquoise mines and probably interacted with resident Numic speaking Paiute and Shoshone groups. Numic material culture includes Desert Side-notched and Cottonwood Triangular projectile points, buff and brown ware ceramics, ornaments, milling tools, and rock art. Although interaction spheres have been posited for the region, no clear cultural partitioning is evident so far in the archaeological record despite the linguistic divergence. Obsidian procurement was greatly reduced in the southern and eastern portion of the Mojave Desert perhaps indicating increasing regionalization during this period. It is during this period that the postulated Numic expansion took place out of the Mojave Desert northeastward into the Great Basin (papers in Madsen and Rhode 1994). A return of warm and dry conditions, coupled with linguistic evidence, suggest this expansion began sometime before A.D. 1000 (Sutton et al. 2007).

Spanish settlement of southern California did not take place until the first mission was established in 1769. At the time, California had the highest Native American population in North America speaking over 300 dialects. The Serrano, a Shoshonean group, were the

primary inhabitants of the project area. Serrano lived in large square communal houses and practiced an extensive trade network with the coast.

Secularization of the Spanish missions in 1834 led to the development of large ranchos that extended into the interior from the coast. Ranchos often forced Native American groups into a form of indentured servitude. These closed, fortified communal settlements continued after non-Mexican immigrants entered the region. Upon statehood in 1850, industrialization began with the building of railroads, including the Atchison, Topeka & Santa Fe (AT&SF), mining, and the development of military installations (Draft WWEC PEIS 2007).

2.4.1.2 Potential Cultural Resources

To date, no formal file and literature review and no intensive cultural resources inventory has taken place in the area of potential effect (APE). It is anticipated these studies will begin in December 2008/January 2009. As such, the identification of affected cultural resources is limited to broad generalities until such time that an intensive cultural resources inventory can be completed.

Based on the cultural resources overview presented above, it can be expected that a number of prehistoric cultural resources will be identified during inventory. Likely locations for prehistoric archaeological sites include the edges of intermittent drainages such as those that drain into Antelope Valley near the western end of the project area and ultimately the terraces above the Mojave River. East of the Mojave River it is expected that the number of prehistoric resources will decrease as the corridor extends across Apple and Fifteen-mile Valleys. However, the many ephemeral drainages that bisect these areas are relict stream channels that could have archaeological sites in association. The margins of both Rabbit Lake and Lucerne Lake also have the potential to contain prehistoric resources. Sites along relict stream channels and desiccated lake margins could include prehistoric campsites and resource processing localities.

Potential historic resources include both the Pisgah and Panoche/Lugo substations, if more than 45-years old, and the 220kV transmission line that is to be replaced by the new 550kV line. If these resources meet the age criteria for consideration then a qualified architectural historian must document the resources on appropriate Department of Parks and Recreation (DPR) forms and assess the significance and potential impact to these resources. Other potential historic resources include the crossing of the AT&SF Railroad (two locations) and the California Aqueduct. Numerous other transmission lines will also be crossed.

2.4.2 Environmental Impacts

Impacts to cultural resources are unknown pending a formal file and literature review and intensive inventory. Since the proposed transmission line corridor follows an existing ROW for much of its proposed length, it is possible that existing cultural resources have already been impacted. New construction has the potential to adversely affect cultural resources from ROW/access road construction, blading, equipment storage, pole placement, and line installation.

2.5 GEOLOGIC RESOURCES AND HAZARDS

This section presents a discussion of potential geologic resources and hazards associated with the Proposed Project upgrades. Baseline geologic resources and hazards are discussed, potential environmental impacts are identified, and mitigation measures are identified to minimize impacts during Project construction and operation.

2.5.1 Affected Environment

2.5.1.1 Regional Setting

The Proposed Project upgrades are within the southern portion of the Mojave Desert Geomorphic Province of California. The Mojave Desert is bounded on the north and northwest by the Tehachapi Mountains, on the west by the Garlock fault, on the east by the Colorado River, and on the south and southwest by the San Andreas Fault. The Mojave Desert Province is characterized by broad alluvial basins of Cenozoic sedimentary and volcanic materials overlying older plutonic and metamorphic rocks (Dibblee 1980). The plutonic and metamorphic rocks are exposed as eroded hills throughout the region. The alluvial basins are up to several thousand feet thick.

Structurally the transmission corridor traverses a series of large alluvial fans adjacent to metamorphosed sediments that have been intruded by masses of quartz monzonite. The alluvial deposits are classified as Younger Alluvium by Dibblee (1960) and consist of interbedded sand and gravel with lesser amounts of silt and clay. The sand and gravel deposits are generally unconsolidated to weakly consolidated sediments. The alluvium was derived from erosion of the San Gabriel and San Bernardino Mountains to the south. The Mojave River channel and associated tributaries have dissected the alluvium and continue to deposit younger alluvium in active channels.

2.5.1.2 Geologic Resources

The Proposed Project can be subdivided into three generalized geologic areas; the western, central, and northern areas. Figure 4 shows the corridor plotted against major geologic units. The western portion of the alignment in and around Hesperia can be characterized as high desert plains and foothills of the western Mojave Desert. This area is mostly alluvial plain and pediment, with relatively small areas of hills and low mountains. This subsection contains mainly Mesozoic granitic rocks and Quaternary alluvium and lacustrine deposits. Eolian sand deposits are common. There are small areas of Precambrian gneiss and schist and Miocene and Pliocene nonmarine sedimentary rocks.

This portion of the alignment is on mostly very gently to moderately sloping pediments and alluvial fans and nearly level basin floor and dry lake bed. There are a few moderately steep hills and steep slopes traversed (i.e., Fry Mountains). Pediments are quite extensive. The elevation range is mostly from about 2000 to 3000 feet. Fluvial erosion and deposition and eolian deflation and deposition are the main geomorphic processes.

The central portion of the alignment includes mountains, hills, pediments, and alluvial plain. The area of pediment and alluvial plain is greater than that of mountains and hills. The bedrock through the central portion of the alignment is mainly Mesozoic granitic rocks that are exposed at the surface in only a few areas in the vicinity of the Rodman Mountains and Lava beds Mountains. There is Precambrian metamorphic rock associated with slopes

and hills crossed and some Mesozoic mafic plutonic and Paleozoic marine sedimentary rock immediately south of the corridor. Transported Quaternary deposits, mostly alluvium that include lacustrine deposits and eolian sand are the predominant geologic mapping unit in this central portion of the alignment and along the entire alignment.

There are some steep mountains and moderately steep hills in the central and in the northern portion of the corridor. The elevation range is from about 1600 feet up to 4000 feet in the Granite Mountains and Rodman Mountains. Mass wasting, fluvial erosion and deposition, and eolian deflation and deposition are the main geomorphic processes.

The northern portion of the corridor and in the area of the Pisgah Substation is characterized by half upland terrain, including pediments, and half alluvial plain. There are many small mountain ranges and hills with many different orientation patterns. The Mesozoic plutonic rocks are mostly granitic, but include some mafic rocks. There are areas of Quaternary volcanic, Tertiary nonmarine sedimentary, Pre-Cretaceous metamorphic, Paleozoic marine sedimentary, and Precambrian metamorphic rocks, too.

The majority of the transmission alignment consists of generally flat terrain which is not prone to significant mass wasting or slope stability problems. Where the transmission alignment does traverse a hillside or slope, the parent material is predominantly granitic or volcanic thereby minimizing the risk of landslides.

2.5.1.3 Seismicity

The Proposed Project upgrades are located in seismically active Southern California, a region that has experienced numerous earthquakes in the past. The Alquist-Priolo Special Studies Zones Act specifies that an area termed an "Earthquake Fault Zone" is to be delineated if surrounding faults that are deemed "sufficiently active" or "well defined" after a review of seismic records and geological studies. Cities and counties affected by the Earthquake Fault Zones must regulate certain existing and development projects within the zones by permitting and building code enforcement.

The major faults crossed by the Proposed Project upgrades include those listed in Table 4 and shown in Figure 4, Geology and Fault Zones. Fourteen (14) major faults would be crossed by the transmission line. Most of these faults trend northwest to southeast. Movement along the faults is predominantly strike slip and/or dip slip.

Table 4. Major earthquake faults crossed by the Lugo-Pisgah 500kV Transmission Line and Substation upgrades.

FAULT NAME	NUM	AGE	ACODE	SLIPCODE	FCODE	FTYPE
Calico-Hidalgo fault zone, Calico section	121a	<1,600,000	5	3	1	Well constrained
Helendale-South Lockhart fault zone, Helendale section	110b	<15,000	2	3	2	Moderately constrained
Lenwood-lockhart fault zone, Lenwood section	111b	<130,000	3	3	1	Well constrained
North Frontal thrust system, Western section	109a	<130,000	3	3	2	Moderately constrained
Johnson Valley fault zone, Northern Johnson Valley section	115a	<15,000	2	3	2	Moderately constrained
Pisgah-Bullion fault zone, Pisgah section	122a	<15,000	2	3	2	Moderately constrained

Lavic Lake fault	351	<15,000	2	3	2	Moderately constrained
Camp Rock-Emerson-Copper Mountain fault zone, Emerson section	114b	<150	1	3	1	Well constrained
Lavic Lake fault	351	<150	1	3	1	Well constrained
Calico-Hidalgo fault zone, West Calico section	121b	<15,000	2	3	2	Moderately constrained
Helendale-South Lockhart fault zone, Helendale section	110b	<15,000	2	3	1	Well constrained
Camp Rock-Emerson-Copper Mountain fault zone, Camp Rock section	114a	<150	1	3	1	Well constrained
Lenwood-lockhart fault zone, Lenwood section	111b	<15,000	2	3	1	Well constrained
North Frontal thrust system, Western section	109a	<15,000	2	3	2	Moderately constrained

2.5.2 Environmental Impacts

Significance criteria were developed based on CEQA Guidelines and evaluated using professional judgment. The significance criteria used in evaluating potential geologic related impacts are shown below. Impacts would be considered significant if:

- Surface rupture occurred as a result of faulting or due to mass movements or settlement from seismic shaking,
- Liquefaction occurred as a result of shallow groundwater and/or seismic shaking,
- Subsidence occurred as a result of existing soil conditions or seismic shaking,
- Mass wasting occurred as a result of landsliding and soil creep, and
- Construction of the project interfered with access to mineral resources.

2.5.2.1 Construction

Construction-related impacts to the geologic environment primarily are related to terrain modification (cuts, fills, and drainage diversion measures) and dust generation. Other than the Pisgah Crater, no major unique geologic or physical features have been identified along the proposed corridor. Project construction will not require cut and fill activities on the site and grading will not require import or export of earthen materials to/from the site. Thus, significant impacts are not expected on geologic hazards or resources during construction. No evidence of ground subsidence caused by groundwater extraction has been noted at the existing substation sites or along the transmission corridor.

The Proposed Project upgrades are in the seismically active southern California region and thus are subject to ground shaking from earthquakes along faults in the region. The potential for earthquake-related impacts would begin during project construction. However, seismic impacts would be of greater concern during long-term operation rather than during the limited duration of construction.

2.5.2.2 Operations

Regional and local geologic conditions will not be altered significantly by the long-term operation of the Proposed Project upgrades. With the exception of the Pisgah Crater, no other major unique geologic or physical features would be directly affected by the transmission corridor. This potential impact however is considered minor as the proposed transmission corridor would parallel other existing transmission lines across this feature. The transmission corridor and substation sites may be underlain by deposits of sand and gravel, and these resources could not be recovered and used during the active life of the project. No other impacts to the geologic environment were identified.

The project area is subject to ground shaking from nearby and distant earthquakes. According to the California Uniform Building Code (UBC, Section 2312), the substations and transmission corridor are located in Seismic Zone 4, the zone with the highest potential for seismic ground shaking. Project structures will be designed to meet the seismic design standards appropriate for Seismic Zone 4. At least 14 faults have been identified along the proposed transmission corridor. More detailed geophysical investigations are anticipated to identify whether ground rupture potential exists along the corridor. Due to the depth to groundwater, liquefaction is not expected to occur.

To ensure that collapse potential is minimized all foundations, structures, or substation facilities will be designed in accordance with subsequent geotechnical investigations. In summary, the only identified potential geologic hazards associated with the Proposed Project upgrades are ground shaking from earthquakes and the potential for localized soil collapse. Construction of facilities in accordance with the mitigation measures identified below will ensure that earthquake-related impacts and impacts from potential soil collapse are minimized. Project impacts are considered less than significant.

2.6 HAZARDOUS MATERIALS HANDLING

2.6.1 Affected Environment

A hazardous material is generally described as any substance or mixture of substances that have properties that are capable of having an adverse effect on human health and the environment. Hazardous materials handling is regulated at the federal, state, and local level. Regulations cover the transportation, labeling, handling, storage, disposal, and accidental releases of hazardous materials. Included within these regulations are reporting requirements for hazardous materials storage and usage, worker exposure protection, and reporting and spill response requirements. Hazardous material handling also covers response to incidental discovery of buried or unknown hazardous materials present in the subsurface environment.

The proposed transmission line route would traverse a combination of developed urban lands on the west end, and relatively undeveloped or limited development areas of the Mojave Desert in the central and eastern sections. The developed areas of the project area have a higher potential to pass through areas of historic or on-going soil or groundwater contamination. The desert and rural areas of the transmission line route would generally be considered lower risk for the presence of hazardous material storage areas or subsurface uncontrolled hazardous waste disposal areas, due to the lack of commercial and industrial activities.

2.6.2 Environmental Impacts

Potential environmental impacts associated with hazardous materials handling include worker exposure to hazardous materials, public exposure to hazardous materials and impacts to the natural environment associated with spills or releases of hazardous materials.

Worker exposure impacts may include exposure to hazardous substances during normal work activities, and accidental exposure during spills or discovery of buried hazardous materials. Human intake can occur through inhalation, dermal exposure, or swallowing of hazardous material. Public exposure to hazardous materials may occur through accidental spills and releases which allow for materials to disperse to the atmosphere, or through subsurface releases which have potential to contaminate water supplies. Impacts to the natural environment may occur by release of hazardous materials into the environment. Uncontrolled releases have the potential to impact vegetation and wildlife in the general vicinity of a release site.

The Proposed Project construction activities would include the handling and use of hazardous materials associated with general construction activities such as heavy equipment operations, transmission tower construction, and transmission line conductoring and decommissioning. The following materials may be present and routinely utilized in transmission line construction activities: gasoline, diesel fuel, motor oil and hydraulic oil, solvents, grease, and paint. These materials are associated with vehicle and equipment operation and drilling activities. Transmission line construction activities are generally mobile, moving from one site to another for construction of towers, stringing of lines, and decommissioning equipment. As a mobile construction activity, there are not typically any centralized fueling or equipment maintenance areas constructed to support the transmission line construction operation. Therefore most of the hazardous materials are contained within vehicles and small volume containers. Typically vehicle fueling and maintenance activities would occur at off-site facilities.

2.7 LAND USE

This section addresses existing land uses and potential land use impacts associated with the construction and operation of the Proposed Project. Based on CEC power plant siting regulations, the land use study area encompasses lands within 0.25 mile on either side of the electrical transmission line.

2.7.1 Affected Environment

The transmission line will follow a generally southwesterly route between the SCE Pisgah Substation (near Interstate 40 [I-40]) and the SCE Lugo Substation (south of the City of Hesperia) for approximately 67 miles. The line will be built within the existing SCE ROW of the Lugo-Pisgah 220kV Transmission Line except for the last 10 miles south of Hesperia where a new ROW would be required. The existing Pisgah Substation (approximately 5 acres) would be expanded to approximately 40 acres to accommodate new electrical and communication facilities.

The Proposed Project is located primarily on BLM land within the Barstow Field Office. The area where the Project would be constructed is primarily open, undeveloped land within the Mojave Desert. Communities within proximity to the transmission line which could potentially be impacted include Hesperia, Apple Valley, and Victorville at the southwestern

end of the line, and Hector, Pisgah, Lavic, and Ludlow at the northeastern portion. See Land Ownership and Transportation Maps A and B (Figures 5 and 6).

The Project is located within the Desert Planning Region identified in the County of San Bernardino 2007 General Plan (County of San Bernardino 2007). The Desert Planning Region includes about 93 percent (18,735 square miles) of the land within San Bernardino County and much of the Mojave Desert. Approximately 81 percent of the county's total land area is controlled by federal or state agencies, with the BLM managing approximately 47 percent of the county's land base. Publicly owned lands are distributed throughout the Desert Planning Region and tend to be interspersed with privately owned lands. Approximately 4 percent of the county land area is within one of 24 incorporated communities, with the remaining 15 percent or 1.9 million acres of private land distributed throughout the unincorporated parts of the county (County of San Bernardino 2007). Any new ROWs needed for the Proposed Project would be obtained in accordance with the County of San Bernardino 2007 General Plan.

In addition to the County of San Bernardino General Plan, the southwesterly portion of the Proposed Project may fall under the jurisdiction of the City of Hesperia General Plan. Where possible, the line would be constructed within existing ROWs. Any new ROWs needed for the Proposed Project would be obtained in accordance with the City of Hesperia General Plan.

The Proposed Project falls within the jurisdiction of the West Mojave Habitat Conservation Plan (HCP). The West Mojave HCP is a habitat conservation plan and federal land use plan amendment that (1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel (MGS), and over 100 other sensitive plants and animals and the natural communities of which they are a part; and (2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts (CESA and ESA, respectively) (BLM 2005). The HCP effectively addresses over 100 species of plants and animals, designates Areas of Critical Environmental Concern (ACEC) and other special management areas specifically designed to promote species conservation, designates routes of travel on the public lands, and establishes other management prescriptions to guide grazing, mineral exploration and development, recreation, and other public land uses (BLM 2006). The HCP designates Desert Wildlife Management Areas (DWMAs), which were created to manage and protect threatened desert tortoises and other imperiled animals and plants.

The Proposed Project supports Executive Order (EO) S-14-08, signed by Governor Schwarzenegger on November 17, 2008. The intent of the EO is to streamline California's renewable energy project approval process and increase the state's Renewable Energy Standard to 33 percent renewable power by 2020 (SCOG 2008). The EO aims to utilize new areas of biologically sensitive land for the deployment of new renewable energy technologies, as well as allows for mutually compatible conservation and economic activities related to California's Natural Community Conservation Planning (NCCP) and renewable energy generation, respectively.

2.7.2 Environmental Impacts

The criteria used to determine the significance of Proposed Project-related impacts to land use are based on the criteria identified in the Guidelines for Implementation of the CEQA, Appendix G (CEQA 2007). Project-related impacts would be considered significant if they would:

- physically divide an established community;
- 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; or
- conflict with any applicable habitat conservation plan or natural community conservation plan.

The final route for the Proposed Project was not available at the time of this analysis; therefore, locations where the transmission line may cross existing land use boundaries are approximate and generally stated.

2.7.2.1 Construction and Operation Impacts

The proposed route for the Proposed Project will not physically divide an existing community. Most of the route will be along existing SCE ROW. The new ROW will be in communities with planning and zoning requirements that would likely prevent any physical divisions. The Proposed Project would be constructed in accordance with the applicable land use plans, including, but not limited to the San Bernardino County and City of Hesperia planning and zoning requirements as defined in the respective General Plans.

With regard to habitat conservation plans, the Proposed Project falls under the jurisdiction of the West Mojave HCP (see Special Designations Map, Figure 7). However, only a small portion of the anticipated route of the transmission line crosses any of the designated DWMAs, specifically, the Ord-Rodman DWMA. The Proposed Project route also borders the Rodman Mountains Wilderness Area. The existing ROW corridor crosses through the Upper Johnson Valley Yucca Rings ACEC and is presumed to be included in the ACEC management plan. The existing ROW corridor passes through the Johnson Off-Highway Vehicle Area, the largest open area for OHVs in California. The Proposed Project is unlikely to impact the recreation-user experience or management of this special recreation area. In the context of the recently-signed EO S-14-08, it is anticipated that the impact associated with crossing a relatively small portion of the DWMA and ACEC would be considered minor.

2.8 NOISE

This section presents a discussion of general noise characteristics, background noise conditions and potential noise impacts associated with the Proposed Project upgrades.

2.8.1 Affected Environment

Noise is the general term given to unwanted sound. Sound is measured in units of decibels (dB), which is a logarithmic measure of sound power. Sound measurements are corrected to provide an approximate measure of normal human hearing. The correction to sound measurement is called the A-weighted decibel (dBA) scale. This scale provides a general correlation to a human's sensing of noise under normal circumstances.

The levels of noise in a given environment are dependent on the amount of human activity and the environmental conditions present. The Proposed Project area contains a broad range of environmental conditions, ranging from the urban conditions present in Hesperia at

the west end of the project area, to very undeveloped areas such as the Ordman and Roman mountain areas in the central and eastern sections of the project area. Typical noise levels for these areas may range from 70dBA in an urban setting to 35dBA in a rural setting (CSU 2008).

Noise control is regulated for two main purposes, the first is to control public nuisance associated with excessive noise in the public environment. The second control is for worker safety associated with chronic noise exposure that may cause permanent damage to an individual's hearing.

2.8.2 Environmental Impacts

No specific noise level measurements or monitoring activities were completed for this report. Typical noise levels associated with a variety of construction equipment have been compiled by a number of agencies (CSU 2008, USDOT 2006). Typical construction equipment noise levels range from 80 to 100dBA. The level of noise associated with construction activities will decrease with distance from the source. Climatic conditions and topography will also affect noise levels at any given location.

Project construction activities may last up to 24 months, with activities generally progressing along the length of the ROW alignment. Noise levels during construction in any given area would increase above background levels. The level of increase would be dependent on the background levels present in the area and the level of activity. Noise levels would vary based on the type of activity occurring and the associated equipment in operation to perform a given task.

Noise levels during normal operation of the transmission line would generally be at the background levels. There is typically no noise associated with normal operations of a transmission line. Any potential noise generated from transmission lines may occur due to corona effect. A brief summary of the corona effect is provided in the Transmission Line Nuisance and Safety section (Section 2.13). Noise from the line is also dependent on wind conditions, which may produce a humming sound from wind passing between the transmission lines. Normal operation of the transmission line would also include routine inspection of the line and possible repair and maintenance activities. These activities would create short-term increases in noise levels, depending on the level of activity.

2.9 PALEONTOLOGICAL RESOURCES

This section describes known areas of paleontological resources in the general vicinity of the Proposed Project. Potential impacts to paleontological resources, and suggested mitigation measures are also provided. Paleontological resources are associated with specific geologic strata; therefore, this section provides a brief summary of geologic resources within the project area. Additional details on geologic resources are provided in the Geologic Resources and Hazards section (Section 2.5).

2.9.1 Affected Environment

The Proposed Project area is located in the western portion of the Mojave Desert geomorphic region. The Mojave Desert is bounded on the north and northwest by the Tehachapi Mountains, on the west by the Garlock fault, on the east by the Colorado River, and on the south and southwest by the San Andreas Fault. The Mojave Desert Province is

characterized by broad alluvial basins of Cenozoic sedimentary and volcanic materials overlying older plutonic and metamorphic rocks (Dibblee, 1980).

The Proposed Project area traverses the Mojave Desert region, beginning at the Pisgah Volcano area and terminating on the outskirts of Hesperia, California. A variety of paleontological resources have the potential to be present within the Proposed Project area.

Known areas of paleontology resources present within the general vicinity of the project area have been identified by the San Bernardino County Museum. The Victorville and Hesperia regions have Pliocene and Pleistocene fossils present (SBCM 2008). Deposits from these epochs have been identified as Irvingtonian and Blancan mammal assemblages (BLM 2005). In the vicinity of Barstow, California, the Barstow Formation is known to contain a diversity of fossil resources, including Barstow Fauna and Tick Canyon Fauna (BLM 2005).

2.9.2 Environmental Impacts

Direct impacts to paleontological resources may occur due to the physical removal or disturbance of existing resources. Ground disturbing activities for construction of the proposed transmission line would occur for access road construction or improvement, staging area clearing, tower structure foundation excavation and installation and clearing of line pulling area clearing. The decommissioning and removal of the existing transmission may also require ground clearing activities for access road improvements and construction of staging areas for dismantling the tower structures. There may also be an increase in public travel within the project area if new access roads open a previously inaccessible area. Increased public access may increase fossil removal activities within the project area.

Indirect impacts to paleontological resources may include erosion of features due to channeling of runoff or modification of drainage channels. Construction activities in the vicinity of fossil resources may also cause erosion or damage to outcrop areas, due to earth shaking activities associated with drilling activities.

2.10 PUBLIC HEALTH

2.10.1 Affected Environment

There are many potential public health concerns that could be associated with construction and operation of the Proposed Project. These include health impacts due to the emissions of air pollutants; health risks from the emissions of air contaminants and airborne pathogens; exposure to hazards from the handling of wastes, chemicals and other materials; exposure to electromagnetic fields (EMF) from power transmission; and safety concerns for workers. Most of these topics are addressed in other sections of this appendix. For example, a discussion of EMF is provided in Section 2.13, Transmission System Safety and Nuisance. Small quantities of hazardous or solid waste may be generated during the construction phase of the Proposed Project. However, the potential for public exposure is considered minimal because waste management plans will be implemented. (See sections on Hazardous Materials and Waste Management.) Releases from the project in wastewater streams to the public sewer system are discussed in the section addressing Water Resources. Programs to create a safe workplace for project employees are described in Worker Safety.

2.10.2 Environmental Impacts

The only public health issue that is not addressed elsewhere is health risks from the emissions of air contaminants. The implementation of the Proposed Project will not have a significant adverse impact on air quality in the area. The Proposed Project will comply with federal, state, and local air quality rules and regulations. A SIP was prepared for the Mohave Desert Planning Area, which identifies sources of PM10 emissions and identifies control measures to reduce these emissions. Mitigation measures would be implemented to reduce the emissions generated during project construction and operation. Therefore, public exposure to air contaminants is not expected to generate a significant public health risk.

2.11 SOCIOECONOMICS

The potential social and economic impacts associated with the Proposed Project include effects to population, housing, public services (fire protection, emergency response services, law enforcement, schools, and medical services), utilities, and government tax revenue, as well as economic benefits that will arise from the Proposed Project investment and payroll. The area that could be affected by the Proposed Project is San Bernardino County, specifically the northeast portion of the county near the cities of Barstow and Hesperia.

This preliminary analysis of socioeconomic effects for the SCE Lugo-Pisgah No. 2 line uses baseline socioeconomic data compiled for the SES Solar One AFC. Both projects have the same affected area (San Bernardino County) for socioeconomic impacts and will be constructed on similar schedules. Therefore the population, housing, employment, income, and fiscal revenue data used in the SES Solar One Project AFC are relevant to this analysis. The SES Solar One data is augmented with data for the southwestern parts of the transmission line, near Lugo Substation, particularly for the City of Hesperia.

2.11.1 Affected Environment

The transmission line would follow a generally southwesterly route between SCE Pisgah Substation (near I-40) and the SCE Lugo Substation (south of Hesperia) for approximately 67 miles. The line would be built within the existing SCE ROW of the Lugo-Pisgah 220kV Transmission Line except for the last 10 miles south of Hesperia where a new ROW would be required. The existing Pisgah Substation (approximately 5 acres) would be expanded to approximately 40 acres to accommodate new electrical and communication facilities.

The project would serve present and projected demand for electricity and maintain electric system reliability in this portion of the Mojave Desert where numerous renewable (solar and wind) projects are being proposed including SES Solar One. The Proposed Project is expected to be operational on or before 2015.

The affected area for the Project is San Bernardino County. San Bernardino County is part of the Riverside-San Bernardino-Ontario Metropolitan Statistical Area (MSA) that consists of Riverside and San Bernardino counties. The Proposed Project is located within the Desert Planning Region identified in the County of San Bernardino 2007 General Plan.

The population of San Bernardino County was about 2.1 million in 2008. (See Table 5-10.1 in the SES Solar One AFC). The population of Barstow was estimated to be about 24,000 and Hesperia was 92,000 in 2008. The population in all of these communities has been growing

rapidly since 2008, greater than 10 percent during the past eight years. Population forecasts for San Bernardino County use an average annual growth rate of 1.7 percent between 2010 and 2020; and 1.4 percent between 2020 and 2030. This would amount to more than 40,000 people per year being added to the population of San Bernardino County during the Proposed Project construction period.

Housing for project workers would include houses for rent or sale as well as temporary housing in hotels, motels, and RV parks in surrounding communities. Based on estimates developed for SES Solar One AFC (Table 5.10-3), in 2008 there was a total of about 2,400 housing units available for rent in the communities of Barstow, Victorville, Adelanto, Apple Valley, and Hesperia. There were about 2,300 housing units for sale in these same communities in 2008. There were about 3,400 hotel rooms and 11 RV Parks within one hour of driving distance of the Proposed Project in 2008 (See SES Solar One AFC Table 5.10-4).

The labor force in San Bernardino County in September 2008 was estimated to be about 900,000. In the communities surrounding the Proposed Project (Adelanto, Apple Valley, Barstow, Hesperia, and Victorville), the labor force in 2008 was estimated to be about 110,000. The unemployment rate for San Bernardino County in 2008 was estimated to be 8.5 percent. The communities surrounding the Proposed Project had higher unemployment rates ranging from 9 to 13 percent. (See SES Solar One AFC Table 5.10-6). Unemployment rates have been trending higher between 2007 and 2008. In Victorville, for example, the unemployment rate in September 2007 was 7.2 percent and in September 2008 it climbed to 10.4 percent.

The median household income in San Bernardino County in 2007 was $56,600, about 94 percent of the median household income in California (Connell and Pierson 2008). In an area within a 20-mile radius of Barstow, the median household income in 2005 was $41,600, about 80 percent of the median household income in California in that year (City of Barstow). In 2007, approximately 11.8 percent of San Bernardino County's population was living below poverty level compared to 12.4 percent statewide (Connell and Pierson 2008).

The proposed budget for 2008-09 for San Bernardino County totaled more than $3.5 billion in appropriations, an increase of 1.9 percent from the county's 2007-08 restated final budget. The 2008-09 proposed budget included $3.1 billion in revenue, with approximately 22 percent of the total from property-related revenue and other taxes. (SES Solar One AFC Table 5.10-8).

San Bernardino County has a sales and use tax rate of 7.75 percent, which consists of the 7.25 percent combined statewide rate and 0.5 percent for the San Bernardino County Transportation Authority. San Bernardino County and the City of Hesperia are the local agencies with taxing powers on the Proposed Project.

There are three school districts located in the vicinity of the Proposed Project: the Barstow Unified School District, Silver Valley Unified School District, and Hesperia Unified School District. For emergency and law enforcement services, the Proposed Project falls under the jurisdiction of the San Bernardino County Sheriff's Department. The City of Hesperia contracts with the San Bernardino County Sheriff for all police services and with the San Bernardino County Fire District (SBCFD) for all fire services. The fire stations that would likely respond to emergency calls for locations in the southwestern part of the transmission line and the Lugo Substation would be Stations 304 and 303 of the North Desert Division of the SBCFD near Hesperia. Station 46 located near the town of Harvard would serve the north end of the line and near the Pisgah Substation. Both the City of Barstow and the

County of San Bernardino have hazardous materials units that could respond to any hazardous material calls emanating from the Project. The hospitals that would serve the Project include Barstow Community Hospital, Saint Mary Desert Valley Hospital, and Victor Valley Community Hospital.

2.11.2 Environmental Impacts

The criteria used to determine the significance of project-related socioeconomic impacts are based on the criteria identified in the Guidelines for Implementation of CEQA, Appendix G (CEQA 2007). Project-related impacts would be considered significant if they would:

- induce substantial population growth,
- displace substantial numbers of people or existing housing,
- induce a substantial increase in demand for public services and utilities,
- result in substantial adverse environmental impacts associated with the increased provision of public services and utilities, and
- physically divide an existing community.

Details on the employment and investment for the Proposed Project were not available at the time of this analysis. Therefore, it is not possible to estimate the size or significance of potential socioeconomic impacts. The potential socioeconomic impacts that may occur are identified with possible mitigation measures.

2.11.2.1 Construction and Operation Impacts

One of the primary impacts associated with project construction would be the population growth caused by new workers and their families moving into the affected area permanently or temporarily during project construction. The forecasted growth rate for the affected area is approximately 40,000 people per year. Therefore, it is unlikely that the Proposed Project would have a significant impact on population growth.

Housing in the affected area, particularly in the communities surrounding the Proposed Project, is expected to be sufficient to meet project workers' needs without causing measurable displacement of existing people or housing. There are estimated to be about 5,000 housing units and more than 3,400 hotel rooms or other temporary housing available in the surrounding communities.

The influx of project workers and their families into the communities surrounding the project is not expected to cause a substantial increase in demand for social services or cause significant environmental damage to provide these services.

The route for the Proposed Project would not physically divide an existing community. Most of the route would be along existing SCE ROW. The new ROW would be in communities with planning and zoning requirements that would likely prevent any physical divisions.

2.11.2.2 Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires each federal agency to make the achievement of environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations.

Guidelines provided by the Council on Environmental Quality (CEQ) (1997) and USEPA (1998) indicate that a minority community may be defined as one where the minority population comprises more than 50 percent of the total population or comprises a meaningfully greater share than the share in the general population. In 2006, the percentage of San Bernardino County's population reporting non-White race was about 20 percent, about the same as the state of California. The percentage of San Bernardino County's population reporting Hispanic or Latino ethnicity was 46 percent compared to about 36 percent for the state in 2006. In 2007, approximately 11.8 percent of San Bernardino County's population was living below poverty level compared to 12.4 percent statewide (Connell and Pierson 2008). It is unlikely that the Proposed Project would have disproportionately adverse human health or environmental impacts on minority or low income populations in the affected area.

2.12 TRAFFIC AND TRANSPORTATION

This section assesses the potential impacts to the transportation system due to activities associated with the construction and operation of the Proposed Project.

2.12.1 Affected Environment

2.12.1.1 Regional Setting and Roadway Operating Characteristics

The proposed transmission line route would generally follow a southwest line from north of the Town of Newberry Springs, crossing I-40 east of Daggett, crossing State Highway 247 and terminating south of Hesperia at the SCE Lugo Substation. See Figures 5 and 6 for proposed routing and major highways. The major access routes for project workers would likely be I-40, Interstate 15 (I-15), and State Highway 247 as well as secondary routes such State Route 18 (SR 18).

The relevant section of I-40 for the Proposed Project is from Barstow southeast to Needles. This segment of I-40 is a fully improved freeway through Barstow at the junction with I-15. I-15 extends northeasterly from the Victorville area through Barstow and Las Vegas. It is fully improved to freeway status in the Victorville area with grade-separated interchanges at Bear Valley Road, Palmdale Road, Hook Boulevard, Mojave Drive, "D" Street, and Stockton Wells Road. State Highway 274 is classified as a minor arterial and is a two-lane highway connecting Barstow and Lucerne Valley near SR 18. SR 18 is a two-way, two-lane roadway. The intersection of U.S. 395 and SR 18 in Victorville has been improved and is controlled with traffic signals. Widening SR 18 has been proposed as part of the High Desert Corridor project improving highway access between Victorville and Palmdale to the west.

The roadway operating characteristics for these routes have been defined in several recent transportation planning documents including the Victor Valley Area Transportation Study. A map from this study identifying current Level of Service (LOS) for I-15 and SR 18 in the Victor Valley Area is included below. LOS defines roadway operating conditions as follows:

Level of Service (LOS)	Operating Conditions
A	Free flow, with no restrictions on maneuvering or operating speeds. Minimal or no delay.
B	Stable flow, with some restrictions on maneuvering or operating speeds. Nominal delays
C	Stable flow, with more restrictions on speed and maneuverability. Some delays.
D	Approaching unstable flow. Restricted speed and maneuverability. Delays encountered at intersections.
E	Unstable flow, with some stoppages. Constitutes maximum capacity by definition. Extensive delays at some locations.
F	Forced flow, with many stoppages. Low operating speeds, extensive queuing and very extensive delays.

Source: Victor Valley Area Transportation Study. Roadway Segment Level of Service Description.

2.12.2 Environmental Impacts

For purposes of this evaluation, significant traffic or transportation impacts will be identified as occurring when the Proposed Project will:

- cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system;
- reduce a roadway segment or intersection LOS below acceptable levels; for instance, the City of Victorville's target for peak hour operations is LOS E or better;
- adversely affect traffic circulation and parking conditions in neighboring areas because of inadequate on-site parking and/or inadequate on-site circulation; and
- conflict with adopted policies, plans, or programs supporting alternative transportation.

Details on employment and travel for the Proposed Project were not available at the time of this analysis. Therefore, it is not possible to estimate the size or significance of potential traffic and transportation impacts. The potential impacts that may occur are identified with possible mitigation measures.

2.12.2.1 Construction and Operating Impacts

Based on this preliminary analysis of LOS of highway segments that are likely to be used to access the Proposed Project site by workers, the major potential impact is increased traffic on SR 18 east of U.S. 395 in Hesperia by workers accessing the Lugo Substation or the southwest portion of the proposed transmission line route. This roadway segment is currently at an LOS D or E and is likely to drop below target operations levels in the next few years if roadway improvements are not implemented.

The Proposed Project is unlikely to adversely affect traffic circulation or parking conditions along any of the expected access routes. The Proposed Project would be required to comply with updated requirements in transportation plans for San Bernardino County and the cities of Victorville and Hesperia. All of the transportation plans for these communities are being changed and improvements implemented as part of the Southern California Association of Governments' Regional Transportation Improvement Plan and San Bernardino County's updated Regional Transportation Plan.

2.12.2.2 Permits and Impact Fees

Some of the potential permits and impact fees that may be applicable to the Project construction and transport of equipment or materials include:

- City of Victorville Oversize Load Permit
  - Apply at least 2 working days prior to oversize load on city roadways
- Caltrans Oversize Load Permit
  - Apply at least 7 working days prior to oversize load on state highways
- Lucerne Valley Local Area Transportation Facilities Impact Fee
  - Assessed on commercial projects and truck trips on Lucerne Valley roadways.

2.13 TRANSMISSION SYSTEM SAFETY AND NUISANCE

This section identifies the potential safety and nuisance associated with the Proposed Project.

2.13.1 Affected Environment

The Proposed Project consists of the construction of a single circuit 500kV T/L on approximately 57.1 miles of existing ROW and approximately 9.8 miles of new ROW. The existing 220kV Lugo-Pisgah No. 2 Transmission Line would be rebuilt with 500kV single circuit structures. The completed project would result in a new single circuit transmission line built to 50 kV standards on both existing and new ROW from the Pisgah Substation to the Lugo Substation. The Proposed Project also involves looping the existing 500kV El Dorado-Lugo single circuit transmission line into the Pisgah Substation. The new 500kV line would cross over the existing 220kV Cima–El Dorado No. 1 and No. 2 circuits.

The proposed T/L facilities include:

- <u>500kV T/L Scope (Lugo-Pisgah No. 2):</u> The Lugo–Pisgah No. 2 500kV T/L begins at the new Pisgah 500 kV/220 kV Substation. The line exits the substation to the northeast, and then wraps around the south side of the substation for approximately 0.6 miles before joining the existing Lugo-Pisgah No. 2 ROW. The line then heads southwest along the existing Lugo-Pisgah No. 2 ROW for approximately 56.7 miles until it reaches the eastern edge of the Mojave River. The line then heads south on new ROW along the east side of the river for approximately 1.6 miles before crossing to the west side of the river. The line then continues west on new ROW for approximately 7.6 miles before rejoining the existing Lugo-Pisgah No. 2 ROW for

another 0.4 miles into the existing Lugo Substation. This project would terminate at the Lugo Substation. The existing 220kV structures on the Lugo-Pisgah No. 2 220kV T/L would be removed.

- 500kV T/L Scope (El Dorado-Lugo): The existing El Dorado-Lugo 500kV T/L would be looped into the new Pisgah Substation. The northern leg of the loop would turn southeast and cross over the existing 220kV Cima–El Dorado No. 1 and No. 2 circuits before turning into the new Pisgah Substation. The southern leg of the loop would exit the Pisgah Substation and turn northwest over the existing 220kV Cima–El Dorado No. 1 and No. 2 circuits before rejoining the existing ROW. The northern leg is approximately 1,220 feet in length and the southern leg is approximately 1,000 feet in length. Two existing 500kV structures on the Lugo–El Dorado T/L would be removed.

- The Lugo-Pisgah No. 2 500kV T/L would be strung with two-bundled 2156 kcmil ACSR "Bluebird" with nonspecular finish. Approximately 2,226,000 feet of conductor would be strung. The El Dorado-Lugo 500kV T/L loop into Pisgah Substation would be strung with two-bundled 2156 kcmil ACSR "Bluebird" with nonspecular finish. Approximately 13,000 feet of conductor would be strung.

- The tangent and angle 500kV insulator assemblies would consist of two strings of insulators in the form of a "V." Each leg of the "V" assembly would contain one or two one-piece gray polymer insulators, depending on the load. On dead-end structures, the insulators would be arranged in a "barrel" configuration consisting of four polymer insulators.

- The overhead ground wires would be located on the peaks of the transmission structures. The 500kV structures would have two overhead ground wires, one approximately 0.5 inch in diameter. The other ground wire would contain optical fibers for communications and line protection and would be approximately 11/16 inch in diameter.

2.13.2 Environmental Impacts

The potential safety and nuisance issues associated with the Proposed Project include public health effects from EMF exposure, noise, communications interference, aviation, fire, and electric shock hazard. The proposed transmission line would be built to meet specifications by the CPUC General Order 95 (GO-95), SCE, other regulatory agencies, and local governments designed to minimize these potential nuisances and hazards. At the time of this analysis, detailed information required to estimate EMF exposure and noise level for the Proposed Project were not available. Therefore, the significance or size of potential impacts is not estimated, but potential safety and nuisance issues are identified.

2.13.2.1 Electromagnetic Field

The inherent electric and magnetic fields from high-voltage transmission lines can cause two types of electrical effects: corona effects and field effects. Corona effects are caused by high electric field strength at the surface of energized conductor and the attachment hardware that can ionize the surrounding air. Corona effects may result in radio and television reception interference, audible noise, light, and production of ozone. Field effects are the voltages and currents that may be induced in nearby conducting objects.

Electrical motors, home wiring, lighting, and all other electrical appliances produce electric and magnetic fields commonly referred to as EMF. Power lines produce EMF when they are operating. Electric fields around transmission lines are produced by electrical charges on the energized conductor. Electric field strength is directly proportional to the line's voltage; that is, increased voltage produces a stronger electric field. At a given distance from the transmission line conductor, the electric field is inversely proportional to the distance from the conductors, so that the electric field strength declines as the distance from the conductor increases.

Magnetic fields around transmission lines are produced by the level of current flow through the conductors. The magnetic field strength is also directly proportional to the current; that is, increased amperes produce a stronger magnetic field. The magnetic field is inversely proportional to the distance from the conductors, and thus, like the electric field, the magnetic field strength declines as the distance from the conductor increases.

Considerable research has been conducted over the last 30 years on the possible biological effects and human health effects from EMF. This research has produced many studies that offer no uniform conclusions about whether long-term exposure to EMF is harmful or not. In the absence of conclusive evidence, some states, California in particular, have chosen not to specify maximum acceptable levels of EMF. Instead, California mandates a program of prudent avoidance whereby EMF exposure to the public would be minimized by encouraging electric utilities to use low-cost techniques to reduce the levels of EMF.

There are several factors that would determine public exposure to EMF from the Proposed Project including operating characteristics, line design, other lines in the ROW, line loading, and distance from the line to public facilities or residences. Because the final design parameters and routing were not available at the time of this analysis, it is not possible to estimate the significance or size of potential nuisances or impacts. However, the line would be routed and designed to minimize EMF exposure and effects.

2.13.2.2 Noise and communications interference

Audible noise can be produced by a transmission line and is related to the corona which is a function of line voltage, diameter, and condition. The electric field gradient is greatest at the surface of the conductor. Large-diameter conductors have lower electric field gradients at the conductor surface and, hence, lower corona than smaller conductors, everything else being equal. Also, irregularities (such as nicks and scrapes on the conductor surface) or sharp edges on suspension hardware concentrate the electric field at these locations and, thus, increase corona at these spots. Similarly, contamination on the conductor surface, such as dust or insects, can cause irregularities that are a source for corona. Raindrops, snow, fog, and condensation are also sources of irregularities. Corona can also cause interference with radio and television reception. The Proposed Project would be designed to minimize corona noise and interference by proper selection of the conductor and associated hardware. The final design for the Proposed Project conductor was not available at the time of this analysis. However, as a 500kV line, corona and noise would be critical design concerns.

2.13.2.3 Induced electric fields

A conducting object, such as a vehicle or person in an electric field, will experience induced voltages and currents. The strength of the induced current will depend on the electric field strength, the size and shape of the conducting object, and the object-to ground resistance.

When a conducting object is isolated from the ground and a grounded person touches the object, a perceptible current or shock may occur as the current flows to the ground. Proper design standards would be implemented to prevent hazardous and nuisance shocks by ensuring that metallic objects on or near the right-of-way are grounded and that sufficient clearances are provided at roadways and parking lots to keep electric fields at these locations low enough to prevent vehicle short-circuit currents from exceeding 5 milliamperes (mA).

2.13.2.4 Electric shock hazard

Magnetic fields can also induce voltages and currents in conducting objects. Typically, this requires a long metallic object, such as a wire fence or above-ground pipeline that is grounded at only one location. A person who closes an electrical loop by grounding the object at a different location will experience a shock similar to that described above for an ungrounded object. Design standards for managing this issue dictate multiple grounds on fences or pipelines, especially those that are oriented parallel to the transmission line.

The Proposed Project would be constructed in conformance with CPUC GO-95 and Title 8 CCR 2700 requirements. These regulations require sufficient grounding to ensure that hazardous shocks do not occur. Therefore, hazardous shocks are unlikely as a result of project construction, operation, or maintenance. A shield wire would be installed as a feature of the project.

2.13.2.5 Aviation Safety

Standards for determining obstructions in navigable airspace such as a transmission line are determined by the Federal Aviation Administration (FAA). The Proposed Project would be built in conformance with FAA requirements to protect aviation safety.

2.13.2.6 Fire Hazard

The CPUC has established clearances for transmission lines from other man-made and natural structures as well as tree-trimming requirements to avoid fire hazards. SCE would maintain the transmission line corridor and immediate area in accordance with existing regulations and accepted industry practices that would include identification and abatement of any fire hazards.

2.14 VISUAL RESOURCES

The Proposed Project would run generally east to west through the Mojave Desert area of southern California. The overall landscape of the Mojave Desert is highly diverse and contains many outstanding features that are visible from many key viewing sites. The scenic qualities of the desert area include: the extraordinary topography, geology, and scenically diverse vistas.

2.14.1 Affected Environment

The transmission line construction project as proposed would be an upgrade of an existing transmission line. For approximately 57 miles the transmission line would replace an existing 220kV line, within the existing ROW area for that line. For the remaining 10 miles of the route, the proposed line would be constructed within a new ROW area. The section

of transmission line with new ROWs would be in the vicinity of Hesperia (see Figure 1, Project Area Map).

The visual environment associated with the project area is generally natural and not highly altered from predevelopment conditions; however, there are existing and proposed transmission line and other linear features in the area, including the proposed ROW area. Visual resources in the area of the Proposed Project have been affected along portions of the routes by past and present actions, including highway/roadway construction, and residential and commercial development. The Proposed Project routes pass through BLM lands and run adjacent to wilderness areas and ACECs, including the Ord-Rodman DWMA. The project area includes broad expanses of Basin and Range topography of the Mohave Desert region, and the ROWs generally traverse between alluvial valley debris flows and rugged mountain ranges. Views are generally expansive through this portion of the project area.

No specific Visual Resource Management designations have been identified for BLM lands crossed by the Proposed Project; however, based upon the minimal alterations to the existing environment, it is assumed that the lands would have a Class II or III designation with wilderness areas located along the eastern sections of the proposed ROW classified as Class I. No qualitative evaluations of the project area scenic quality were completed for this study.

2.14.2 Environmental Impacts

The project would be visible from foreground, middle ground, and distant views from sensitive viewpoints (e.g., scenic byways, residences, trail heads, wilderness areas, scenic overlooks) located along the proposed ROW. The project would be visible from travelers along I-40 and Highway 66; however, two existing 220kV transmission lines are currently located within the proposed ROW in these areas. I-40 is currently classified as an eligible state scenic highway, not officially designated (Caltrans 2008).

In the sections of the proposed ROW with existing transmission line structures in place, development of the proposed action is not expected to attract additional attention from the casual observer. In locations with no previously existing transmission line corridors, the degree of change may be more evident, particularly if poles or towers are placed in visually sensitive locations, such as near residences, against a skyline, or adjacent to highly traveled roadways. Visual resource contrast rating analysis will be required to be completed for BLM-managed lands and sensitive viewshed locations, such as wilderness areas, crossed by or lying adjacent to the project, to determine the degree of change to visual resources in those areas, particularly in areas where no transmission lines currently exist.

Upgrades to the Pisgah Substation would be noticeable from travelers along I-40, but for only short periods (e.g., less than 1 minute) [if this is an existing station, changes should not generally attract attention from the casual observer]. Upgrades to the Lugo Substation would occur within the existing footprint and are also not expected to result in significant changes to current conditions.

2.15 WASTE MANAGEMENT

2.15.1 Affected Environment

Waste management activities associated with the proposed action would include the storage, transport, recycling, or disposal of all project waste streams. Waste streams generally include solid waste and liquid waste. For the purposes of this analysis, discharges to the atmosphere are not included as a waste streams. Atmospheric discharges and air quality are described in Section 2.2. Solid waste would include office type materials (paper, cardboard, newspaper, etc.) and any other solid material that is stored or disposed of as a non hazardous waste. Liquid waste may include human septic waste, process fluid waste, and storm water runoff.

All waste streams are regulated and discharges or disposal of any waste material either requires specific permitting or disposal at a permitted facility under the conditions of the operator. Both solid and liquid waste streams can be either hazardous or non hazardous, depending on the constituents in the waste stream and the characteristics (ignitability, reactivity, toxicity, and corrosivity) of the waste. The status of the waste stream determines both the storage options for the material, and the disposal method for the material.

Solid waste disposal sites are permitted as either Class I facilities, which accept municipal solid waste, or Class III facilities which accept hazardous waste. Within San Bernardino County, there are seven existing Class III commercial solid waste disposal facilities (CIWMB 2008). The proposed transmission line route has not been reviewed to determine the location of the transmission line relative to existing and proposed solid waste disposal facilities.

Liquid waste disposal facilities include municipal waste water treatment plants and individual sewage disposal systems (ISDS). Municipal waster treatment plants are allowed to receive residential, commercial, and industrial human sewage material, and some regulated industrial liquid waste streams. Residential human sewage waste can also be disposed of in ISDS. Any liquid waste stream that is considered hazardous must be disposed of in a Class I land fill or through a combination of recycling and disposal at a permitted facility.

Uncontrolled solid waste disposal facilities may be present within the proposed transmission line ROW area. These facilities may include historic fill areas associated with urban solid waste disposal, areas of domestic solid waste present on private property, or areas of illegal solid waste disposal on public lands. These types of facilities may or may not be publicly known, mapped, and identified. Public records for these facilities would be reviewed as part of Phase 1 ESA (described in Hazardous Materials Handling, Section 2.6) completed prior to permitting of the project. Unknown areas of solid waste disposal may be encountered during project construction activities.

2.15.2 Environmental Impacts

Waste management activities have potential to impact the environment by creating a public nuisance or hazard, by the release of waste material into the environment, or by physically impacting plant and animal species and/or their habitat. Threshold criteria for solid waste impacts include: noncompliance with appropriate waste handling, storage, and disposal

regulations or creation of a waste stream that would require alteration to existing waste disposal facilities to accommodate the volume of waste.

The construction of the proposed transmission line and the long-term operation of the transmission line has the potential to generate solid waste, liquid waste, and hazardous waste. Solid waste would be in the form of spent containers and packaging material generated during construction, and solid waste associated with the worker activities at the construction site. Liquid waste generated during construction activities would consist of human waste generated at the site and any spilled liquid material that was present at the site for construction activities. Hazardous waste would be in the form of spent containers of hazardous materials and possibly material generated from spills of hazardous materials.

The total volumes of waste generated from the Proposed Project would not be sufficient to cause any of the existing permitted facilities to exceed their operating capacities.

2.16 WATER RESOURCES

2.16.1 Affected Environment

The project area is within the Mojave Desert, the driest desert in the continental United States with average annual precipitation less than eight inches. The majority of the precipitation occurs from January to March with occasional thunderstorms during the summer months. Summer temperatures are typically over 100 degrees Fahrenheit while temperatures in December and January may drop below freezing (BLM 2005).

2.16.1.1 Surface Water Resources:

Due to the arid nature of the region, surface water is very scarce in the project area. Streams originate high in the mountains ranges (Ord, Granite, Fry, Rodman, and Cady) that surround the project area and may have perennial flow at higher altitudes. As the streams descend to the valley bottoms where the majority of the proposed transmission line would be constructed, virtually no water exists in the streambeds or rivers, except locally after infrequent, heavy cloudbursts (BLM 2005). The proposed transmission line would cross numerous dry washes and ephemeral streambeds.

The proposed transmission line would cross Lucerne Lake and Rabbit Lake which are actually large playas. Depending on the year, these playas may contain water from runoff for as much as two months of the year

The proposed transmission line would cross the Mojave River south of Hesperia. The Mojave River originates in the San Bernardino and San Gabriel Mountains and has perennial flow in its upper reaches and near Victorville in the vicinity of Camp Cady and in Afton Canyon. In these places, hard rock barriers force the groundwater to the surface. However, where the proposed transmission line would cross the Mojave River, the flow is ephemeral.

No floodplains would be affected by the proposed transmission line. Surveys would be conducted to identify any wetlands or Waters of the U.S. (WUS) that would be regulated by the USACOE.

2.16.1.2 Groundwater Resources:

The proposed transmission line includes sections of the Colorado River and South Lahontan Hydrologic Regions as defined by the California Department of Water Resources (CDWR) (Figure 8). The boundary between the two hydrologic regions is a series of mountain ranges (Granite, Rodman, and Ord) that divide those watersheds draining south towards the Colorado River and those draining north (CDWR 2003).

Many of the alluvial valleys in these hydrologic regions are underlain by groundwater aquifers. In most of the smaller basins, the groundwater is found in unconfined alluvial aquifers (BLM 2005). Some of the larger basins, or near dry lakes (Lucerne Lake and Rabbit Lake), aquifers may be separated by aquitards that create confined groundwater conditions.

The basins range in depth from tens to hundreds of feed in smaller basins and up to thousands of feet in the larger basins. The aquifers range in thickness from tens to hundred of feet (CDWR 2003).

The chemical character of the groundwater in these hydrologic regions is variable, but commonly is characterized by calcium or sodium bicarbonate. Typically, the edges of the valleys contain lower total dissolved solids (TDS) than groundwater found beneath the central part of the valleys or near dry lakes. Drinking water standards are most often exceeded for TDS, fluoride, or boron content (CDWR 2003).

2.16.2 Environmental Impacts

The types of project activities that could potentially cause adverse impacts to surface water bodies, floodplains, groundwater, and wetlands include construction at pole locations, access roads, and staging/storage areas; activities at wire handling areas and marshaling yards, topping and/or clearing of vegetation in the ROW, and maintenance of the right-of-way. The primary types of adverse impacts that could occur to the water resources in the project area include:

- impaired surface water quality due to increased erosion and sedimentation from exposed, disturbed ground,
- reduced capacity of natural drainages at road crossings,
- impaired surface water quality or physical resource damage due to inadvertent placement of fill directly into waterways or wetlands from the construction of road crossings or pole placement,
- physical damage to wetland vegetation,
- altering drainage patterns causing either drainage or flooding of existing wetlands,
- altering the wetland area causing a deterioration in its function or value, or
- impaired surface or groundwater quality due to spillage or inappropriate disposal of construction materials or vehicle fluids.

It is anticipated that federal, state, and county permits for project construction would be required. The federal permits that may be required to mitigate construction impacts are:

- USACOE Section 404 individual permit and/or USACOE Section 404 Nationwide Permit, and
- National Pollutant Discharge Elimination System Permit for construction.

Any state or county permits that are required would be obtained before construction begins.

2.16.2.1 Surface Water Resources:

The proposed transmission line only has one major river crossing at the Mojave River. Depending on the alternative route that is chosen, the crossing would be between 700 and 1,300 feet. This distance would be spanned without affecting the riverbed or the riparian habitat on either side of the river. The proposed transmission line would also cross Rabbit Lake and Lucerne Lake and would span any water bodies or sensitive riparian areas. The rest of the proposed transmission line only crosses dry washes or ephemeral streambeds that would be spanned. Access roads would be designed to minimize impacts to jurisdictional wetlands and WUS. The appropriate mitigation measures from Section 3 would ensure that surface water resources are protected.

2.16.2.2 Groundwater Resources:

Groundwater resources would not be impacted because water tables are located in formations below any of the construction. The appropriate mitigation measures from Section 3 would ensure that contaminants do not enter the groundwater supply.

2.17 WORKER SAFETY

This section presents a discussion of potential worker safety issues and hazards associated with the Proposed Project upgrades.

2.17.1 Affected Environment

Worker safety is not a resource area that can be described in terms of a baseline condition (affected environment) for a general project area. The Proposed Project area would generally follow an existing transmission line which is maintained by the owner of the transmission line (SCE). The remaining sections of the transmission line route would follow a new ROW corridor which would terminate at an existing substation facility. The proposed action would also include the removal of an existing 220kV transmission line once the new line is operational.

2.17.2 Environmental Impacts

Worker safety impacts would occur if and when there are any types of accidents or near misses of accidents during the construction and operation of the proposed transmission line. The construction activities would include the pre-permitting surveying of the transmission line route, the actual construction activities, and the existing line decommissioning activities. Accidents or near misses can cause impacts to workers physical health and or their ability to complete their job requirements. Work safety impacts may occur to employees of the project owner and to contractors working on the project.

Worker safety impacts can be caused by vehicle accidents associated with operation of heavy equipment or travel accidents to and from or within the project area. For construction of the transmission line towers accidents can occur during transport of equipment and supplies to the project area, during drilling of the transmission tower foundations, during welding and construction of the tower components, and during overhead work activities on the tower structures. The conductor stringing activities also requires transport of equipment to the project area, vehicle and equipment usage, overhead work activities, and work activities in the vicinity of live high voltage electric lines. The line decommissioning activities would have similar potential for accidents, due to transport of equipment and supplies to the project area, equipment usage, vehicle travel, overhead work activities, and work activities in the vicinity of live high voltage electric lines.

3.0 MITIGATION MEASURES

3.1 AIR RESOURCES

The project would incorporate mitigation sufficient to reduce its impact to a level that is not significant and not exceed emission thresholds as outlined in the CEQA and Federal Conformity Guidelines (MDQAMD, 2007). The following mitigation measures are proposed to

control exhaust emissions from the diesel heavy equipment used during construction of the project:

- a requirement to shut down equipment when idling for more than minimum periods,
- regular preventive maintenance to prevent equipment engine emission increases due to inefficient fuel combustion,
- use of low sulfur and low aromatic fuel meeting California standards for motor vehicle diesel fuel, and
- use of low-emitting gas and diesel engines meeting state and federal emissions standards (Tiers I, II, and III) for construction equipment, including, but not limited to catalytic converter systems and particulate filter systems.

The following mitigation measures are proposed to control fugitive dust emissions during construction of the project:

- Use either water application, chemical dust suppressant application, or other suppression technique to control dust emissions from on-site unpaved road travel and unpaved parking areas.
- Use vacuum-sweep and/or water flush paved road surfaces to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets affected by construction activities) and paved parking areas.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard.
- Limit traffic speeds on all unpaved site areas to 5 miles per hour.
- Install sandbags or other erosion control measures to prevent silt runoff to roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Use wheel washers or wash off tires of all trucks exiting construction site.
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water, chemical dust suppressant, or other suppression technique.

3.2 BIOLOGICAL RESOURCES

The following mitigation measures are recommended to reduce or eliminate effects on biological resources during project construction. The applicant would implement one or more of the suggested courses of action listed below to minimize potential effects to on biological resources.

- Clearance surveys for listed and sensitive species will be conducted before each phase of project construction.

- Any listed or sensitive species observed within the construction area will be relocated to suitable habitat outside the development effect footprint as directed by the Federal Authorized Officer (FAO).

- Where practicable, ground-disturbing activities will occur outside listed and sensitive species breeding times.

- Clearance surveys for nesting birds will be conducted before each phase of project construction if the activity must be conducted during the bird breeding season.

- Off-site mitigation for the permanent loss of suitable for listed and sensitive species habitat will be provided per agreement with the BLM and CEC / CPUC.

- After project completion, a seed mix of dominant plant species will be distributed within any extensive temporarily disturbed areas as directed by the FAO.

- Erosion and sedimentation control will be implemented during project construction to retain sediment on-site and to prevent violations of water quality standards.

- Diversion ditches and/or berms will be constructed as necessary to divert runoff from off-site areas around the construction site.

3.3 CULTURAL RESOURCES

If found to meet age and significance criteria, those historic resources identified above, including the substations and the existing 220kV transmission line, would require Level 1 Historic American Engineering Records (HAER) be completed in order to mitigate adverse effects.

The crossing of the AT&SF railroad, other historic transmission lines, and the California Aqueduct would likely result in the determination of no adverse effect.

In the event of a site discovery during project implementation, all work must stop in the immediate area in order to afford time for documentation, evaluation, and consultation between the lead federal agency, the California State Historic Preservation Officer (CASHPO), and all consulting tribes if a discovery is aboriginal in origin. Consultation with the above entities would ensue regardless of whether the discovery is located on private or federal lands. If consultation determines that the discovery is eligible for the NRHP, a consideration of effects should be undertaken pursuant to 36 CFR 800.5 of the National Historic Preservation Act (NHPA, 1966, as amended). If consultation results in a determination of adverse effects to a historic property, mitigation measures must be proposed and implemented following consultation with the CASHPO, the lead federal agency, the Advisory Council on Historic Preservation (ACHP), and all consulting Tribes, if necessary. Avoidance is still the preferable mitigation measure in all instances.

3.4 GEOLOGIC RESOURCES AND HAZARDS

Geologic impacts associated with the construction and operation of the Proposed Project upgrades are expected to be less than significant. Moreover, site-specific geotechnical and seismic conditions will be appropriately addressed in the detailed engineering design and

construction of towers and facilities. The following mitigation measures are proposed to ensure that impacts are less than significant.

- Transmission structures and substation facilities will be designed in accordance with Seismic Zone 4 requirements.

- Transmission structures and substation facilities will be designed in accordance with recommendations provided in preliminary geotechnical reports and as amended by future geotechnical investigations with respect to collapsible.

3.5 HAZARDOUS MATERIALS

Prior to initiating permitting activities for the transmission line route a Phase 1 Environmental Site Assessment (Phase 1 ESA) will be prepared for the entire transmission line route. The Phase 1 ESA process includes a review of public records of known environmental contamination, a site inspection of the entire project area by an environmental professional and interviews with land owners regarding known or potential 'recognized environmental conditions' present on a given property. The process for completing a Phase 1 ESA, and the definition of recognized environmental condition are provided in the Association for Standards and Testing of Materials (ASTM) standard E 1527-05.

All project personnel should be trained on the handling, storage, disposal, and reporting requirements for hazardous materials. All training activities should be completed in compliance with appropriate regulatory requirements. All training activities should be documented and records of training activities maintained for the project for all employees and contractors. Training activities should include appropriate spill response and containment plans.

All hazardous material storage areas and disposal areas should be constructed and operated in compliance with appropriate federal, state, and local regulations. All permits for handling of hazardous materials should be acquired prior to initiation of project activities and should be maintained at the project site. Appropriate spill response and containment plans should be maintained at the project site.

3.6 LAND USE RESOURCES

As described above, operational and construction impacts on land uses associated with the Proposed Project are not expected to be significantly adverse. To minimize impacts, the route should follow existing SCE ROWs where feasible, and any new ROWs should be developed in accordance with all applicable land use plans, policies, and regulations, as well as applicable habitat conservation plans and natural community conservation plans.

According to the West Mojave HCP Record of Decision, any new authorization or use of public land within the West Mojave Desert is required to be in conformance with the West Mojave HCP and subject to site-specific analysis. Authorization and use would be subject to administrative review at the time of issuance of a final BLM decision regarding the authorization or use. This process would likely prevent significant impacts associated with the goals of the West Mojave HCP. New construction, including roads, should be located outside of DWMAs where possible.

3.7 NOISE

Typical mitigation measures for noise impacts include:

- maintenance of sound mufflers on all project equipment,
- adherence to all permit conditions, especially local land use permits, and
- timing control for all activities that are known to have high noise levels.

3.8 PALEONTOLOGICAL RESOURCES

The following mitigation measures are recommended for paleontological resources:

- Prior to initiation of project construction activities the Proposed Project area ROW and proposed and existing access roads will be surveyed by a Qualified Paleontologist.
- Based on the results of the paleontology resource survey, a paleontology resource management plan will be prepared and submitted to the CEC for review and approval.
- All project construction staff will be trained in the importance of paleontological resources and the routine identification of fossil resources.

3.9 WASTE MANAGEMENT

The following mitigation measures are recommended for waste management activities:

- preparation of a waste management plan for the project;
- utilization of portable liquid waste systems (port-a-potties) at all construction locations, including regular maintenance of the facilities;
- compliance with all applicable waste disposal regulations;
- evaluation of the project ROW area for existing solid waste or hazardous waste release sites by completing a Phase 1 ESA prior to permitting of the project; and
- disposal of all solid waste generated during construction and operation phases in a permitted solid waste disposal facility.

3.10 SOILS

This section describes applicant-committed mitigation measures that will be implemented to reduce project-related potential effects on soil resources. The following mitigation measures will be implemented to reduce potentially significant soils effects to less-than-significant levels. An acceptable level of soil erosion, as used herein, is defined as that amount of soil loss that would not affect (i.e., limit) the potential long-term beneficial uses

of the soil as a growth medium, or adversely affect water resources because of accelerated erosion and subsequent sedimentation. Following are specific mitigation measures:

- Conduct grading operations consistent with the San Bernardino County Grading Ordinance.
- Prepare and implement a detailed Erosion Control Plan before construction, which may be a component of the Storm Water Pollution Prevention Plan (SWPPP).
- Limit soil erosion/dust generation by wetting active construction areas (including roads) with water or by applying dust palliatives (soil binders).
- Stabilize disturbed areas that will not be covered with structures (e.g., buildings or collectors) or pavement following grading and/or cut-and-fill operations.
- Stabilization methods will include moisturizing and compacting and/or application of polymeric soil stabilizers.
- Minimize disturbance of soils and vegetation by reducing access and construction areas to smallest practical dimensions.
- Cut/mow vegetation when removal is necessary, clear vegetation only to the extent necessary during construction activities.
- Segregate and stockpile removed topsoil for reuse if practicable.
- Implement drainage control measures and grade project site to direct surface water into the retention basins.
- Conduct post-construction monitoring of areas that were disturbed during the construction phase.

3.11 VISUAL RESOURCES

Mitigation

The following are recommended mitigation measures for impacts to visual resources:

- Complete visual resource impact analysis on BLM lands and for other sensitive viewshed locations.
- Attempt to place lines within existing corridors.
- Use structures that have a more natural appearance and color that will blend in with the existing landscape (e.g., non-coated metal [able to rust], wooden, painted structures).
- Do not place structures against a skyline view or within drainages wherever possible.
- Avoid perpendicular or “straight-line” placement along hillsides wherever possible.

3.12 WATER RESOURCES

The following mitigation measures are recommended to reduce or eliminate effects on water resources during project construction. The applicant will implement one or more of the suggested courses of action listed below to minimize potential effects to water resources.

- Wetland delineation surveys will be conducted before each phase of project construction to identify jurisdictional wetlands and Waters of the US.
- Mitigation for the permanent loss of jurisdictional wetlands or WUS will be provided per agreement with the USACOE.
- Implement spill controls and cleanup as needed and as specified in permits and work plans. Spill-control and cleanup procedures and materials should be at hand during construction, and workers should be trained in their use.
- Excavated material or other construction materials shall not be stockpiled or deposited near or in stream banks or other watercourse perimeters.
- Access ways will be located to avoid wetlands, where practical; or if they are linear, to cross them at the least sensitive feasible point.
- Avoid working in wet conditions.
- Erosion and sedimentation control will be implemented during project construction to retain sediment on-site and to prevent violations of water quality standards.

3.13 WORKER SAFETY

General mitigation measures for worker safety include:

- adherence to appropriate OSHA safety standards;
- utilization of applicable permits for all work activities and compliance with permit conditions;
- preparation and utilization of appropriate traffic control plans;
- training for all project employees and contractors on job hazards, personnel protective equipment (PPE), and hazard reporting; and
- preparation of appropriate health and safety plans for each specific work area, monitoring of the implementation of the plan, and modification of the plan as necessary based on work conditions and safety performance.

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4.2 GIS Source Data

Name: Cities
Original Name: ci26au08.shp
Metadata link: http://www.weather.gov/geodata/catalog/national/metadata/citymeta.htm
Publisher: National Weather Service
Originator: National Weather Service
Year Created: 1998
Online Link: http://www.nws.noaa.gov/geodata/catalog/national/cities.htm
Ecosphere's Use: all maps

Name: US Highways
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Originator: California Spatial Information Library
Publisher: State of California
Year Created: 2002
Online Link: http://gis.ca.gov/casil/gis.ca.gov/tiger2k
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Ecosphere's Use: all maps

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Ecosphere's Use: Land Ownership and Transportation – A and B, Special Designations, and Farmland

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Ecosphere's Use: Geology and Fault Zones Map

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Ecosphere's Use: Geology and Fault Zones Map

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Publisher: California Division of Water Resources
Year Created: 1999
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Ecosphere's Use: Hydrologic Regions Map

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Originator: U.S. Geological Survey
Publisher: U.S. Geological Survey
Year Created: Unknown
Online Link: http://nhd.usgs.gov/
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Online Link: http://nhd.usgs.gov/
Ecosphere's Use: Hydrologic Regions Map

Name: Farmland
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Year Created: 2006
Online Link: ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/2006/
Ecosphere's Use: Farmland Map

4.3 ABBREVIATIONS AND ACRONYMS

Term	Abbreviation/Acronym
A-weighted decibel	dBA
Advisory Council on Historic Preservation	ACHP
Aluminum conductor, steel reinforced	ACSR
Application for Certification	AFC
Area of Critical Environmental Concern	ACEC
area of potential effect	APA
Association for Standards and Testing of Materials	ASTM
Atchison, Topeka & Santa Fe	AT&SF
Avian Power Line Interaction Committee	APLIC
Bureau of Land Management	BLM
California Ambient Air Quality Standards	CAAQS
California Department of Water Resources	CDWR
California Endangered Species Act	CESA
California Energy Commission	CEC
California Environmental Quality Act	CEQA
California Public Utility Commission	CPUC
California State Historic Preservation Office	CASHPO
California Uniform Building Code	UBC
Clean Air Act	CAA
Council on Environmental Quality	CEQ
decibels	dB
Department of Parks and Recreation	DPR
Desert Wildlife Management Areas	DWMAs
Electromagnetic field	EMF
Endangered Species Act	ESA
Executive Order	EO
Federal Authorized Officer	FAO
Federal Aviation Administration	FAA
Historic American Engineering Records	HAER
individual sewage disposal systems	ISDS
Interstate 15	I-15
Interstate 40	I-40
Level of Service	LOS
Metropolitan Statistical Area	MSA

milliamperes	mA
Mojave Desert Air Basin	MDAB
Mojave Desert Air Quality Management District	MDAQMD
Mojave ground squirrel	MGS
National Ambient Air Quality Standards	NAAQS
National Historic Preservation Act	NHPA
Natural Community Conservation Planning	NCCP
Personnel Protective Equipment	PPE
Phase 1 Environmental Site Assessment	Phase 1 ESA
Right of Way	ROW
San Bernadino County Fire Department	SBCFD
Single-circuit lattice steel towers	Towers
Southeast Desert Modified Air Quality Management Area	SDMAQMA
Southern California Edison Company	SCE
State Implementation Plan	SIP
State Road 18	SR 18
Storm Water Pollution Prevention Plan	SWPPP
Total dissolved solids	TDS
Transmission Line	T/L
United States Army Corps of Engineers	USACOE
U.S. Environmental Protection Agency	USEPA
Waters of the U.S.	WUS
West Mojave Habitat Conservation Plan	WMHCP

5.0 MAPS

Figure 1. Project Area Map

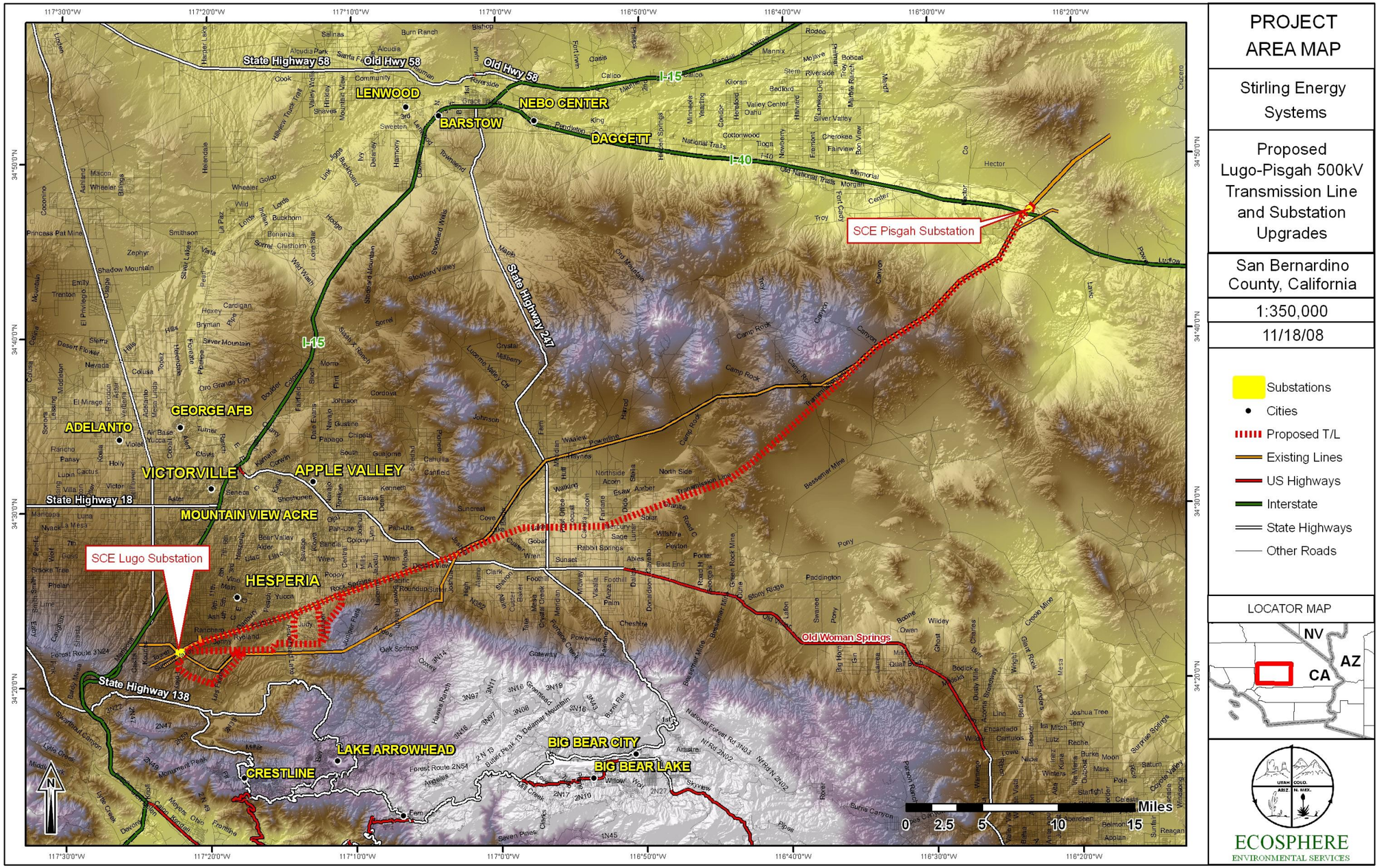


Figure 2. Farmland in Project Area.

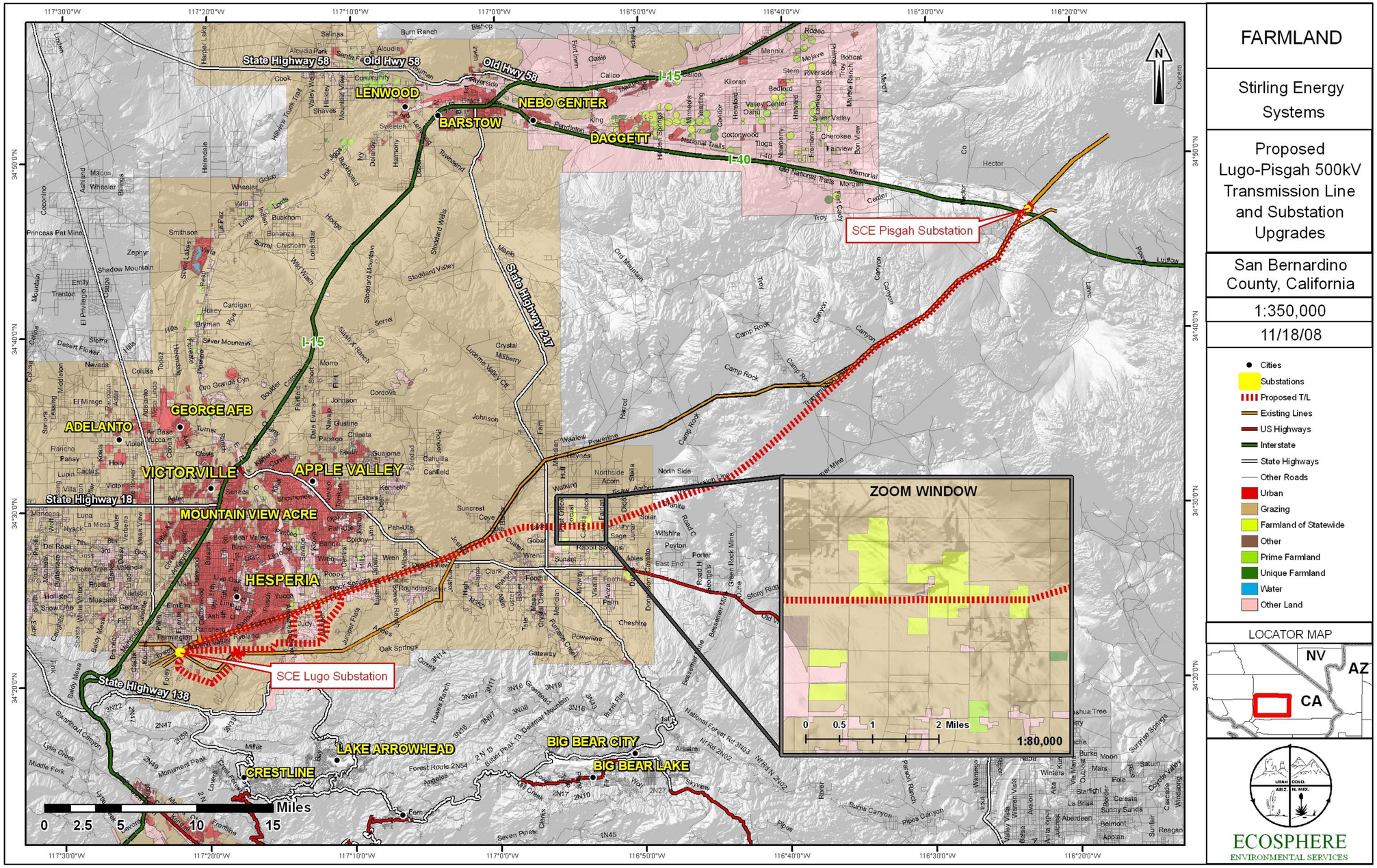


Figure 3. Desert Tortoise Critical Habitat.

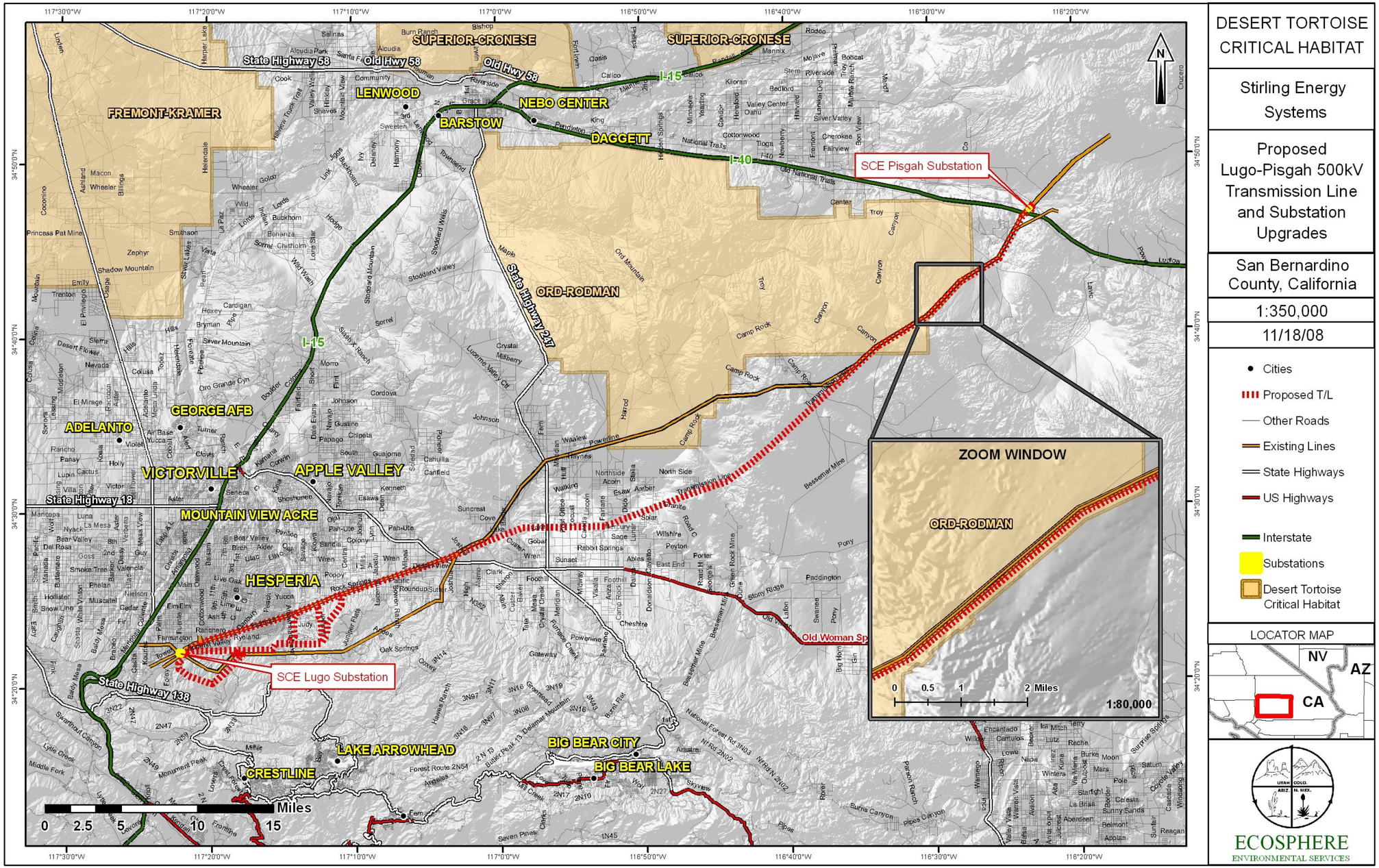


Figure 4. Geology and Fault Zones

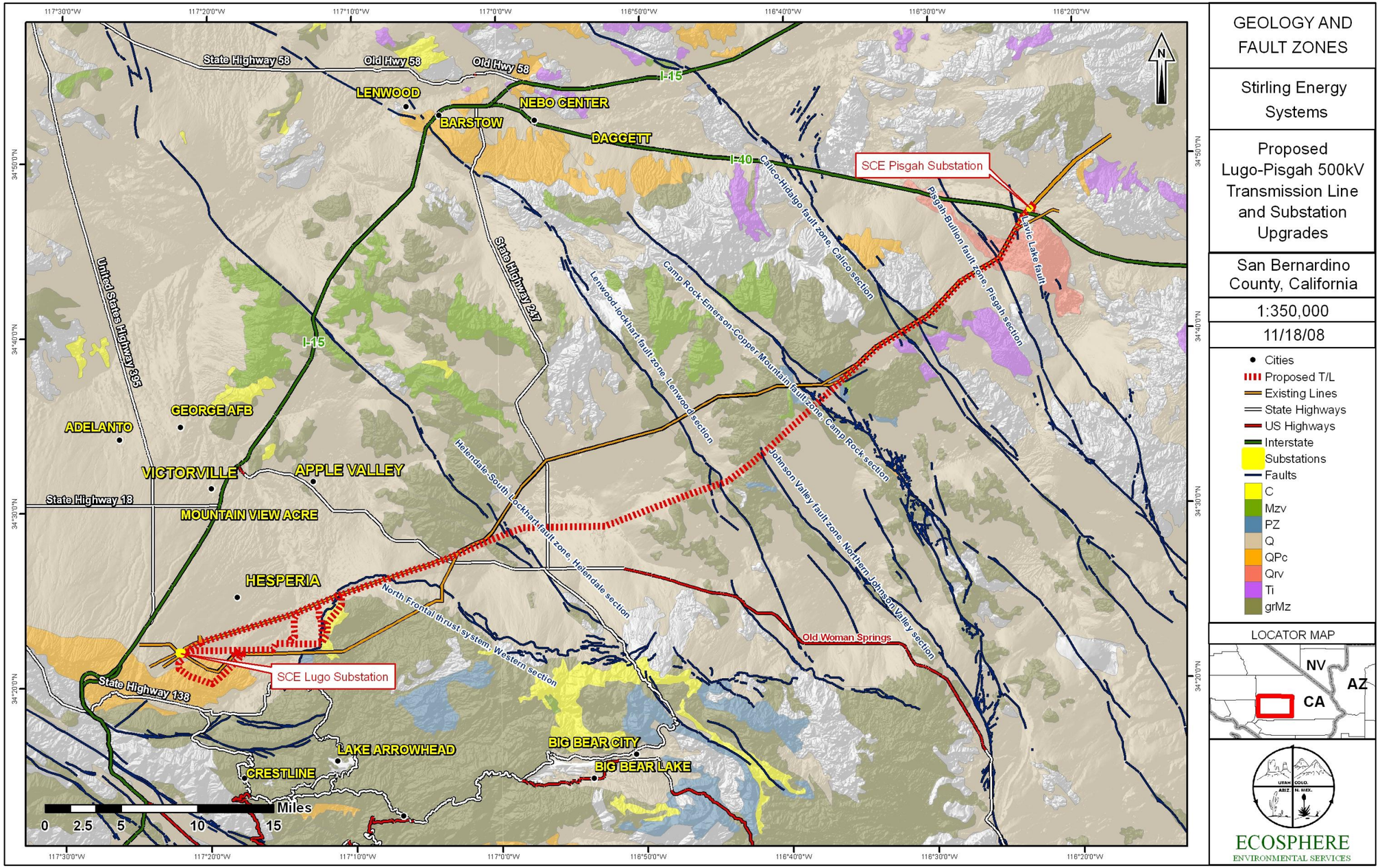
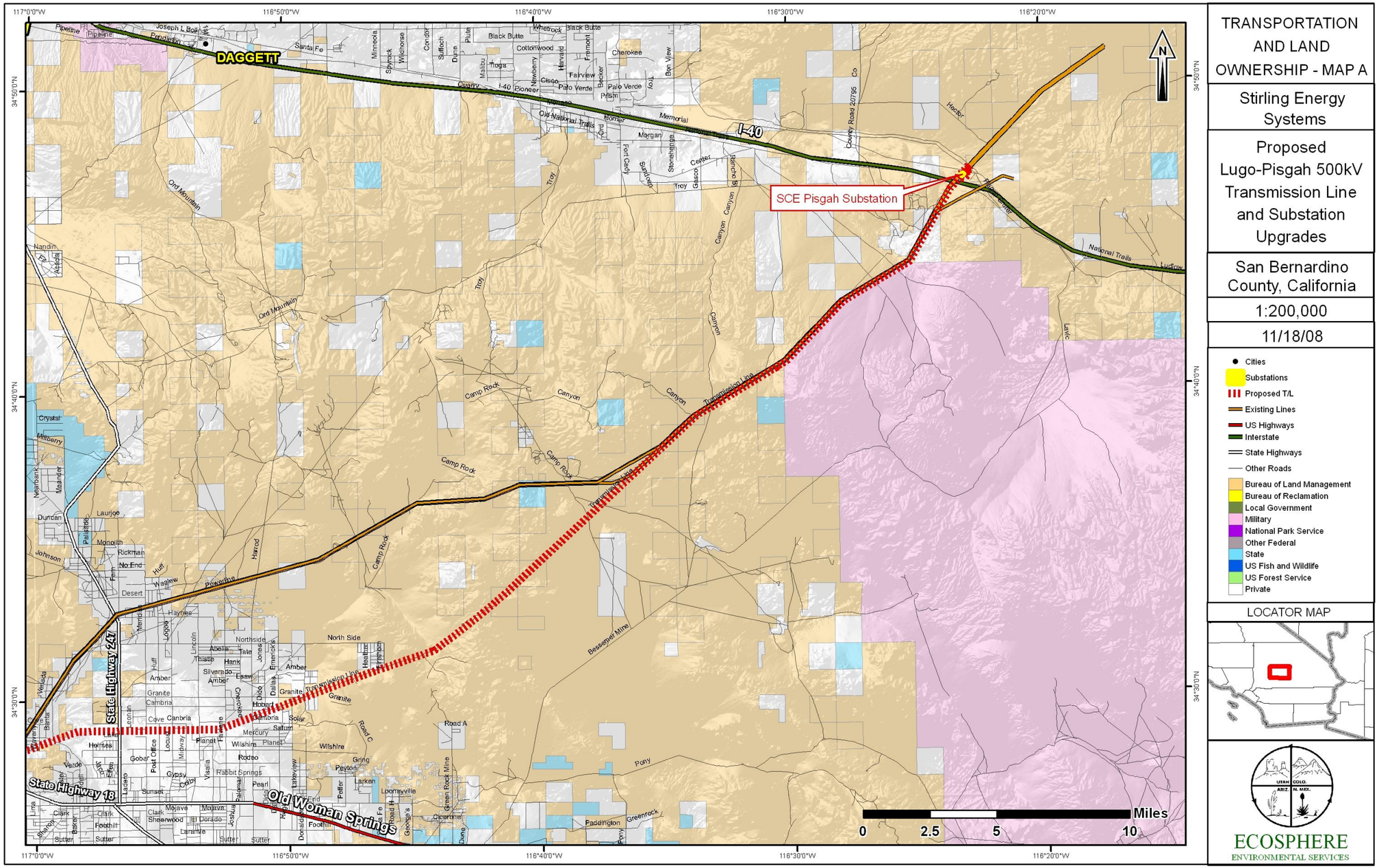


Figure 5. Transportation and Land Ownership - Map A



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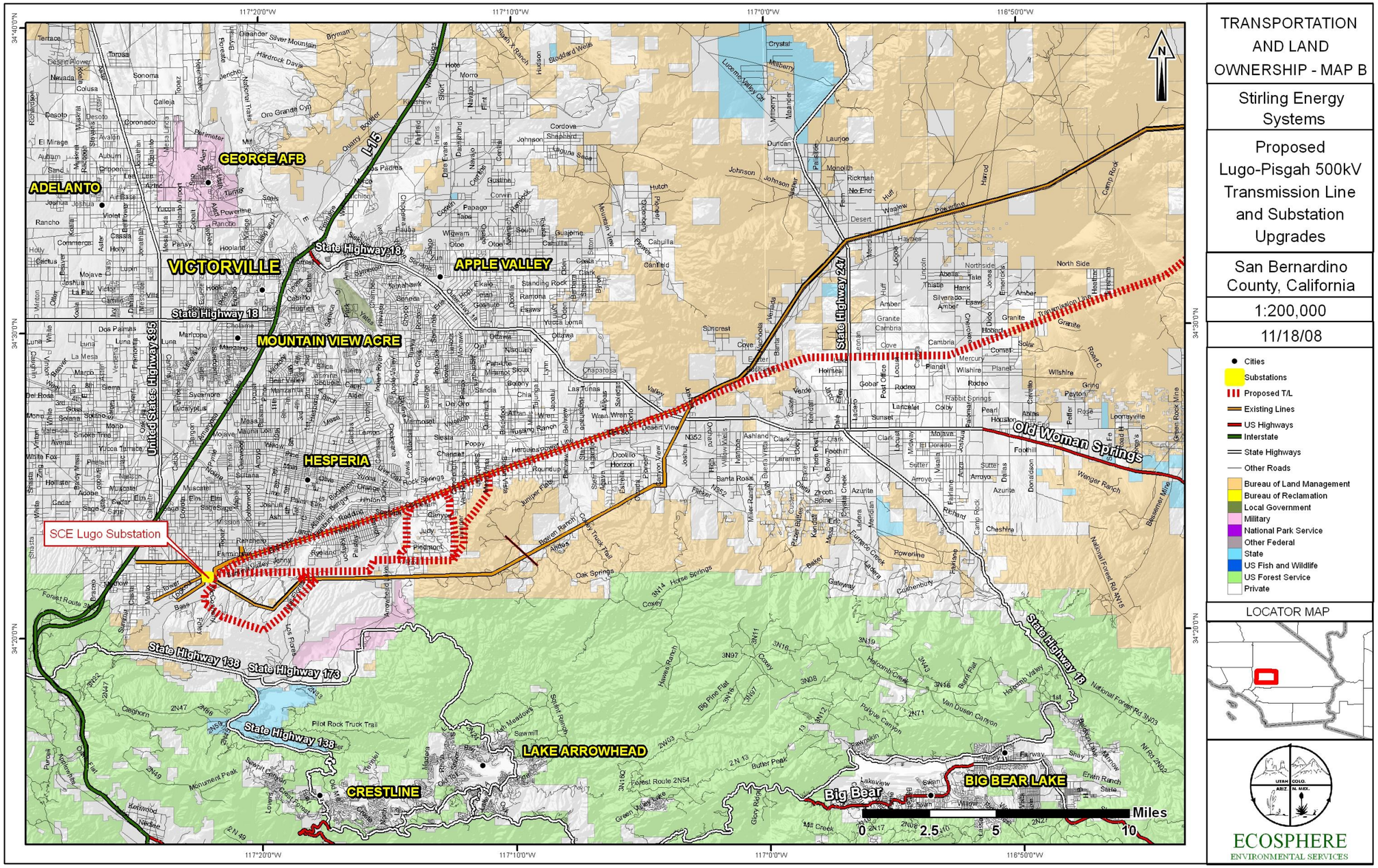

Figure 7. Special Designations

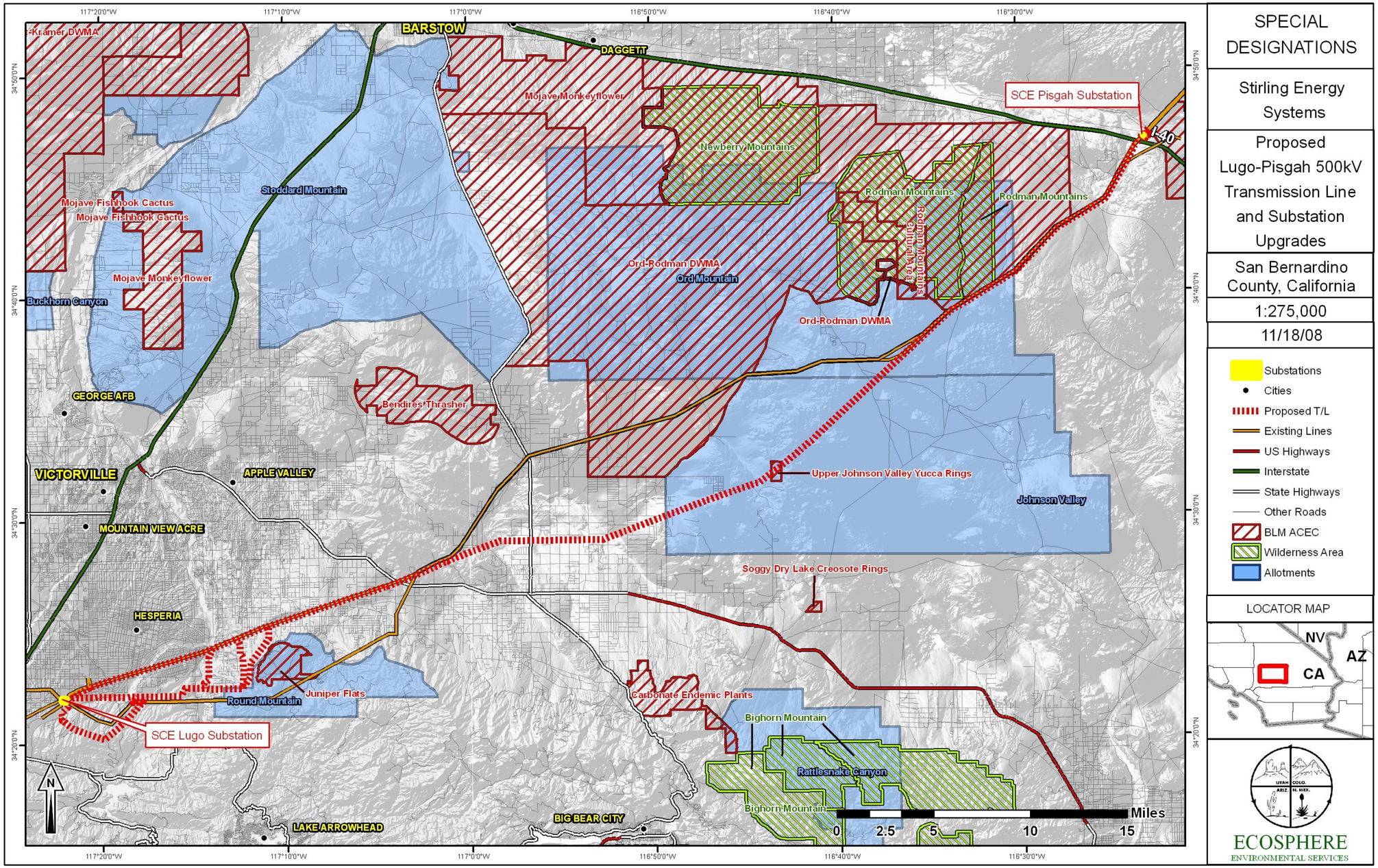
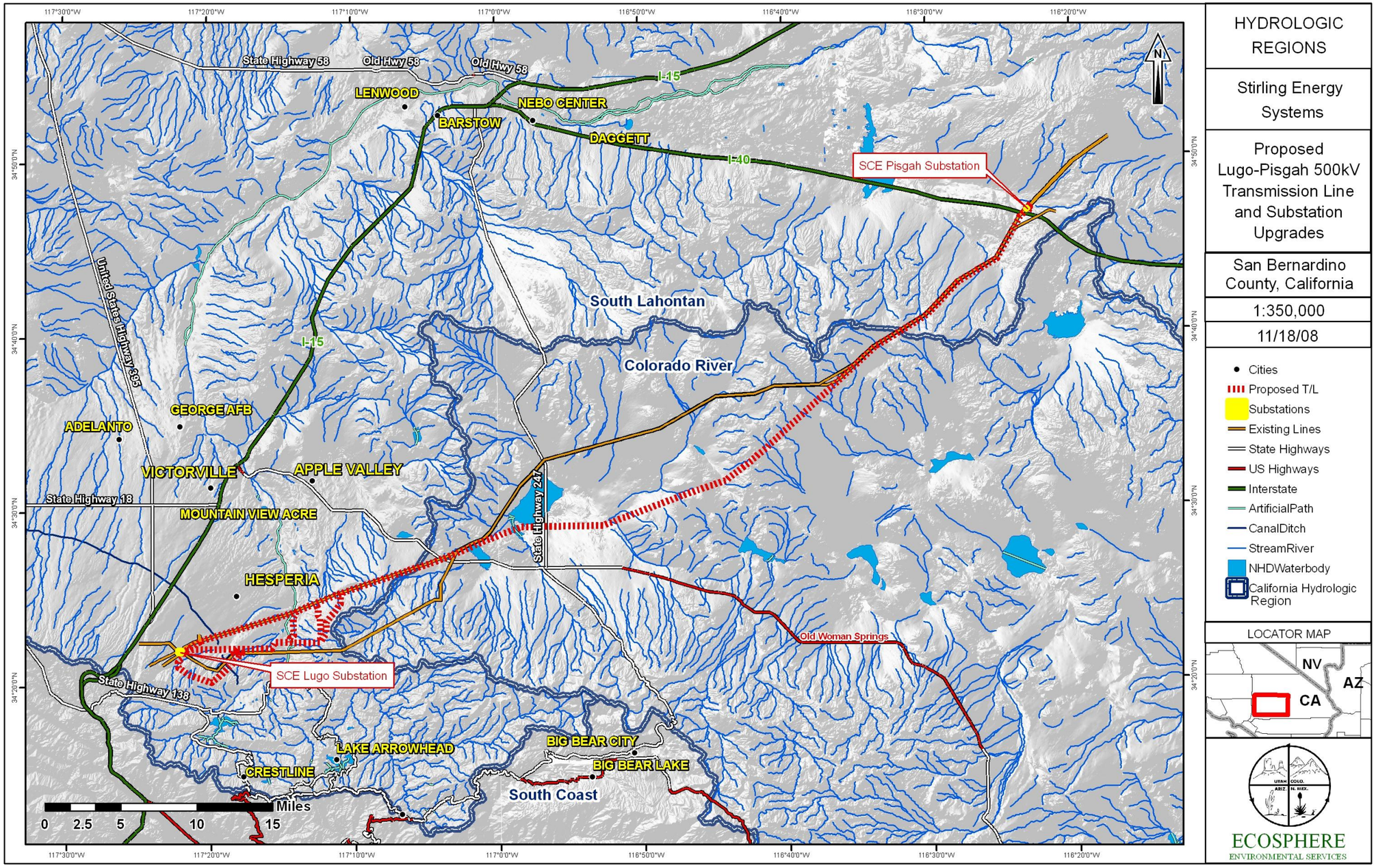
Figure 8. Hydrologic Regions