3.0 Affected Environment

Introduction

This chapter describes the existing conditions of the physical, biological, cultural, socioeconomic, and other resources that have the potential to be affected by activities related to the Proposed Action and alternatives discussed in Chapter 2. These resources include those that occur within the project area or are adjacent to or otherwise associated with the area, as well as those identified during the scoping process and BLM interdisciplinary team review. More detailed information on existing conditions for air quality, biological, cultural, and paleontological resources is documented in the technical reports in Volume II of this Final EIS.

3.1 Air Quality and Climate

This section identifies existing air quality and climatic conditions within and adjacent to the project site and discusses applicable regulations. Information in this section is largely based on calculations for mechanized equipment use, as well as input received from members of the public during the scoping process.

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following issues related to air quality were raised during scoping: (1) fugitive dust emissions; (2) recovery of soils capacity to prevent wind erosion and fugitive dust; (3) fugitive dust suppression at the project site and access roads; (4) emissions of air quality criteria pollutants; (5) potential to reduce or increase greenhouse gas (GHG) emissions and capacity for carbon storage; and (6) potential influence of climate change on the project. These comments are addressed in the discussion of existing conditions (Section 3.1.2) and impacts analysis (Section 4.1).

3.1.1 Applicable Plans, Policies, and Regulations

3.1.1.1 Federal

Environmental Protection Agency

The Environmental Protection Agency (EPA) implements and enforces the requirements of most federal environmental laws. EPA Region 9 administers federal air programs in California. The Clean Air Act (CAA), most recently amended in 1990, provides the EPA with the legal authority to regulate air pollution from stationary and mobile sources.

The EPA has authority over State Implementation Plan (SIP) general conformity in areas that do not meet federal air quality standards, and the federal land managers have review authority over any new projects that may affect federal Class I areas, as defined in 40 CFR, Part 51.166,40 CFR, Part 51, Subpart W, and 40 CFR, Part 93, Subpart B: General Conformity. These regulations ensure that federal actions conform to state and local plans for attainment. As federal lead agency, the BLM must complete a conformity determination for the project before it can be approved. The General Conformity Rule prohibits federal agency approval of activities that conflict with an applicable implementation plan. When applicable, a program for mitigating effects must be developed.

The project requires a ROW across BLM lands, thus triggering NEPA and the BLM's involvement in the NEPA process. Additionally, the BLM is involved in the conformity determination if emissions would exceed the applicability (de minimis) threshold for each nonattainment pollutant as described in the General Conformity Rule.

The General Conformity Rule was designed to require federal agencies to ensure that projects conform to the applicable SIP. General Conformity regulations apply only to direct and/or indirect emissions for a proposed action that occurs in areas designated as non-attainment or maintenance areas. The BLM is required to analyze emissions from the project to determine if the General Conformity Rule applies. If the project is subject to General

Conformity, then the BLM would prepare a General Conformity Determination for public comment. The General Conformity Determination would outline the methodology by which project emissions would conform to the SIP, such as:

- Emissions would be specifically identified and accounted for in the SIP, or
- Emissions would be fully offset, or there would be a similarly enforceable measure that reduces emissions so that there would be no net increase in emissions.

The portion of the Mojave Desert Air Basin (MDAB) where the proposed activities would occur is designated as a federal PM_{10} and ozone non-attainment area. The emissions of these pollutants would need to be analyzed for each corresponding non-attainment area/maintenance area to determine applicability to the General Conformity Rule.

BLM California Desert Conservation Area Plan: Air Quality Element

The CDCA Plan contains provisions and guidance for public land use management in the California Desert District under the BLM's jurisdiction. Since its first date of publication in 1980, the CDCA Plan has been amended in order to incorporate public concerns and congressional mandates in regards to the use of desert resources, such as the provisions of the California Desert Protection Act of 1994. The CDCA Plan also specifies that the Federal Land Policy and Management Act and the CAA of 1977, along with Executive Order 12088 of 1978, "Federal Compliance with Pollution Control Standards," require the BLM and other federal land-management agencies to preserve and protect air quality-related values on federal lands.

The CDCA Multiple Land Use Class Guidelines require that all land uses within the CDCA be managed to protect air quality and visibility, in accordance with the Class II objectives of Part C of the CAA Amendments, unless they are designated another class by the State of California as a result of the BLM air quality management plan recommendations. Additionally, the CDCA Plan considers air quality monitoring as a key parameter in programs established in the CDCA Plan elements related to wildlife and energy production and utility corridors, as well as one of the support requirements for implementation.

BLM West Mojave Plan: Air Quality Element

The WEMO Plan is an amendment to the CDCA Plan that establishes strategies to conserve and protect sensitive species, such as the desert tortoise, the Mohave ground squirrel, and other sensitive plants and animals within the WEMO planning area. Given the air quality conditions of the WEMO Area, the WEMO Plan includes air quality monitoring as part of the key monitoring elements to be considered for implementation.

In particular, the WEMO Plan identifies emissions containing particulate matter of ten microns in diameter or less (PM_{10}) as the most important air pollutant in the WEMO Area and refers to the Mojave Desert Planning Area (MDPA) Federal Particulate Matter Attainment Plan, issued and administered by the Mojave Desert Air Quality Management District (MDAQMD 1995), as the ruling guidance for PM_{10} emissions control in the WEMO Area. The MDPA includes the Victor Valley, Morongo Basin, Barstow, and the Lucerne Valley.

BLM Fugitive Dust Emissions Control Strategy for the Mojave Desert Planning Area

The BLM Fugitive Dust/PM_{10} Emissions Control Strategy—or BLM Dust Control Strategy—outlines procedures for (1) complying with the CAA and (2) implementing regulations within the MDPA non-attainment area for particulates in accordance with (a) the MDPA Attainment Plan approved in July 1995 and (b) the implementing rule for the MDPA Attainment Plan approved by

MDAQMD in July 1996. In addition, federal regulations (43 CFR, Part 52.850) also require specific procedures to be undertaken for protection of air quality in non-attainment areas during consideration of activities and projects. This strategy identifies how the above procedural requirements would be met (BLM 1997).

Besides ensuring compliance with the MDPA Attainment Plan approved by MDAQMD, the BLM Dust Control Strategy aims to establish the process for Conformity Determinations for public lands activities and a process for determining Reasonably Available Control Measures (RACM) based on the attainment plan and conformity determinations. RACM vary according to the scope and type of activity. Appendix C of the BLM Dust Control Strategy provides lists of RACM recommended for different types of activities (BLM 1997).

The BLM Dust Control Strategy also provides guidance regarding emissions estimations from activities conducted on public lands, including the identification of types of activities on public lands and recommended emission factors to estimate total fugitive dust emissions.

EPA Regulatory Initiatives on GHG

Proposed Endangerment and Cause or Contribute Findings for GHG under the CAA

On April 2, 2007, in *Massachusetts v. EPA*, 549 US 497, the Supreme Court found that Greenhouse Gasses (GHGs) are air pollutants under the CAA. The Court held that the EPA must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the EPA was required to follow the language of Section 202(a) of the CAA. The Supreme Court decision resulted from a petition for rulemaking under Section 202(a) filed by more than a dozen environmental and renewable energy organizations and other entities (EPA 2009b).

After a thorough examination of the scientific evidence on the causes and effects of current and future climate change, as well as other effects of GHGs, the EPA concluded that the science compellingly supports a positive endangerment finding for both public health and welfare. The EPA relied heavily upon the major findings and conclusions from recent assessments of the U.S. Climate Change Science Program and the Intergovernmental Panel on Climate Change. The EPA made this endangerment finding after considering both observed and projected future effects of climate change, key uncertainties, and the full range of risks and effects to public health and welfare occurring within the United States.

In response to this endangerment finding, the EPA issued a final rule on May 13, 2010 to apply Prevention of Significant Deterioration (PSD) requirements to new facilities whose carbon dioxide-equivalent emissions exceed 100,000 tons per year (EPA, 2010). The GHG emissions for the Chevron Lucerne Valley Solar Project are expected to fall below this amount. See Section 4.1 for estimated emissions for the proposed action. Moreover, GHG reductions will be realized by this project. By displacing fossil fuel-based energy generation with renewable energy generation, GHG production will be avoided. See Section 4.1 for GHG emissions and reductions associated with the proposed action and alternative actions.

Mandatory Reporting of Greenhouse Gases Rule

On September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule. Under this rule, suppliers of fossil fuels or industrial GHG, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are

required to submit annual reports to the EPA. The gases covered by the proposed rule are CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, and other fluorinated gases, including nitrogen trifluoride and hydrofluorinated ethers (EPA 2009c). This rule requires that facilities classified as general stationary fuel combustion sources, including electricity services (North American Industry Classification System [NAICS] Code 221) report emissions if annual rates equal or exceed 25,000 metric tons of GHG. However, the rule does not set specific reporting requirements for electric power generation from solar resources (NAICS Code 221119).

BLM Guidance on Greenhouse Gases

On September 14, 2009, Secretary of the Interior, Ken Salazar issued Order No. 3289, addressing the impacts of climate change on domestic water, land, and other natural and cultural resources. The Order establishes an approach for increasing understanding of climate change and responding to potential climate change related impacts as relevant to the resources that the Department of the Interior (DOI) manages. The document specifically identifies potential impact areas including potential changes in flood risk and water supply, sea level rise, changes in wildlife and habitat populations and their migration patterns, new invasions of exotic species and increased threat of wildland fire. The Order includes Climate Change Response Planning Requirements, which require each bureau and office within the DOI (including BLM) to consider and analyze potential climate change impacts when undertaking long range planning exercises, setting priorities for scientific research and investigations, developing multi-year management plans, and making major decisions regarding potential use of resources under DOI's purview.

Mojave Desert Air Quality Management District

The MDAQMD is charged with oversight of air quality and related matters within its jurisdiction. Under the CAA, the MDAQMD has adopted a variety of attainment plans for ozone and PM_{10}. The MDAQMD attainment plans applicable to the project area are indicated in Table 3.1-1.

Table 3.1-1 MDAQMD Attainment Plans Applicable to the Project Area

Name of Plan	Date of Adoption	Applicable Area	Pollutants targeted
1991 Air Quality Attainment Plan	08/26/1991	San Bernardino County	NO_x,[a] VOC[b]
Mojave Desert Planning Area Federal Particulate Matter Attainment Plan	07/31/1995	Mojave Desert Planning Area	PM_{10}[c]
Triennial Revision to the 1991 Air Quality Attainment Plan	01/22/2006	Entire district	NO_x, VOC
2004 Ozone Attainment Plan (state and federal)	04/26/2004	Entire district	NO_x and VOC

Source: MDAQMD 2009

Notes:

[a] NO_x = oxides of nitrogen
[b] VOC = volatile organic compound
[c] PM_{10} = particulate matter with less than 10 microns in diameter

The MDAQMD reviews projects proposed within its jurisdiction to ensure that they would not: (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any air quality standard; or (3) delay timely attainment of any air quality standard or any required interim emission reductions or other milestones of any federal attainment plan. For this purpose, the MDAQMD has established significance criteria for

evaluating potential effects from projects on the background conditions within the MDAB. These significance criteria include emissions thresholds given as daily and annual values and are fully described in Section 4.1.1.

Mojave Desert Planning Area Federal Particulate Matter (PM_{10}) Attainment Plan

On January 20, 1994, the EPA designated a major portion of San Bernardino County as a moderate non-attainment area with respect to the National Ambient Air Quality Standards (NAAQS) for PM_{10}. This re-designation required the MDAQMD to develop a revision to the SIP in order to bring the area into compliance with federal law. The MDPA Federal Particulate Matter (PM_{10}) Attainment Plan—issued by the MDAQMD in July 1995—provides a planning tool for reducing PM_{10} pollution in the MDPA and sets forth an air quality improvement program for the region that has to be implemented by both the public and private sectors (MDAQMD 1995).

Rule 2002 General Federal Actions Conformity

This rule implements Section 176(c) of the CAA §176 (c) (42 U.S.C. § 7506[c]) and regulations under 40 CFR, Part 51, Subpart W, related to the conformity of general federal actions in non-attainment and maintenance areas under the applicable implementation plan. This rule sets forth policy, criteria, and procedures for demonstrating and ensuring conformity of such actions. The detailed requirements for total direct and indirect emissions from federal actions are presented in Section 4.1.1.

MDAQMD Rule 403.2 Fugitive Dust within the Mojave Desert Planning Area

Adopted in July 1996, this rule aims to ensure that the NAAQS for PM_{10} would not be exceeded due to anthropogenic sources of fugitive dust within the MDPA and to implement the control measures contained in the MDPA Federal PM_{10} Attainment Plan. This rule applies to activities on BLM land and presents a list of requirements for identified sources of fugitive dust, such as storing, handling, and processing bulk materials; conducting earthmoving, construction, and demolition activities; and moving vehicles on unpaved roads. This rule also set the requirement for the BLM to prepare a dust control plan (BLM 1997).

Rule 403.2 requires any construction or demolition source to:

- Use periodic watering for short-term stabilization of disturbed areas to minimize fugitive dust emissions. The rule recommends the use of a water truck to maintain moist disturbed surfaces and to spread water during visible dusting episodes;
- Take actions to prevent project-related visible bulk materials deposited on paved public roadways (track out);
- Cover loaded haul vehicles while operating on publicly maintained paved surfaces;
- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than thirty days;
- Clean up project-related bulk material releases or spills on public paved roadways;
- Reduce non-essential earthmoving activity under high wind conditions.

In addition, under Rule 403.2 any construction source disturbing 100 or more acres is required to: (1) prepare and submit to the MDAQMD—prior to starting construction activities—a dust control plan that describes all applicable measures to be implemented for the project; (2) provide stabilized access routes to the project site as feasible; (3) maintain natural topography

to the extent possible; (4) construct parking lots and paved roads first, where feasible; and (5) construct upwind portions of the project first, where feasible.

Furthermore, Rule 403.2 prohibits the operator of a site undergoing weed abatement activity to disrupt the soil crust to the extent that visible fugitive dust is created due to wind erosion.

3.1.1.2 State

California Health and Safety Code § 41700

The Health and Safety Code is implemented by the local air quality management districts and prohibits the discharge of air pollutants that cause injury, detriment, nuisance, or annoyance to the public.

California Clean Air Act, California Health and Safety Code § 42300 et seq.

The California Clean Air Act (CCAA) of 1988 provides for air quality planning and regulation independent of federal regulations. The California Air Resources Board (CARB) is the state's lead air quality agency and adopts standards for the California Ambient Air Quality Standards (CAAQS), some of which are more stringent than NAAQS. CARB is responsible for overseeing the attainment and maintenance of NAAQS and CAAQS, overseeing the operation of local air quality districts, and monitoring motor vehicle air pollution control. CARB also assists the individual air districts with air quality monitoring as well as planning activities, such as performing air pollutant emission inventories and air quality modeling. Under delegation from the EPA, CARB and the individual air districts have the primary authority for managing air quality in California.

CARB Off-Road Mobile Sources Emissions Reduction Program

The CCAA mandates that CARB achieve the maximum degree of emission reductions from all off-road mobile sources (including construction equipment) in order to attain the CAAQS. Tier 1 standards for large compression-ignition engines used in off-road mobile sources went into effect in California in 1996, requiring unregulated construction equipment of model year 2000 and later to achieve exhaust standards for oxides of nitrogen (NO_x), volatile organic compounds (VOCs), carbon monoxide (CO), and PM_{10}. For later model years—Tier 2 (2003 and later) and Tier 3 (2007 and later)—the standards are increasingly stringent. CARB implements a control measure to reduce diesel particulate matter emissions as well as NO_x from in-use (existing) off-road diesel equipment throughout California. Owners and operators of such equipment must report and meet fleet emissions targets in 2010. The intention of this rule is to help ensure that relatively low emitting equipment will be used for construction equipment. The rules for in-use off-road diesel vehicles also include idling limits (California Code of Regulations Title 12, Chapter 9, Article 4.8, Section 2449, et seq.).

California Global Solutions Act: Assembly Bill 32

Assembly Bill (AB) 32 mandates that the state report and verify its GHG emissions in order to reduce GHG emissions statewide to 1990 levels by the year 2020. To facilitate this, CARB is required to adopt a statewide emissions limit, adopt regulations to reduce the amount of GHG emissions, and monitor compliance. CARB is the lead agency for implementing AB 32, which set the major milestones for establishing the program.

Although CO_2 is the largest contributor to climate change, AB 32 references five additional GHGs: CH_4, N_2O, SF_6, HFCs, and PFCs. Key elements of California's recommendations for reducing its GHG emissions to 1990 levels by 2020 include the following:

- Setting targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard;
- Imposing targeted fees on high global warming potential (GWP) gases;
- Implementing additional measures to address emissions from industrial sources. These proposed measures would regulate fugitive emissions from oil and gas recovery and transmission activities; and
- Imposing a high GWP mitigation fee, which is anticipated to promote the development of alternatives to GWP chemicals and improve recycling and removal of these substances when older units containing them are dismantled.

In recognition of the critical role local governments will play in the successful implementation of AB 32, CARB recommended a GHG reduction goal for local governments of 15 percent below current levels by 2020 to ensure that their municipal and community-wide emissions match the state's reduction target. AB 32 establishes a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of GHGs. It also makes CARB responsible for monitoring and reducing GHG emissions and continues the existing Climate Action Team to coordinate statewide efforts. Additional requirements for CARB include the following:

- Establishing a statewide GHG emissions cap for 2020 based on 1990 emissions;
- Adopting mandatory reporting rules for significant sources of GHGs;
- Adopting a plan that indicates how emission reductions would be achieved from significant GHG sources via regulations, market mechanisms, and other actions;
- Adopting regulations to achieve the maximum technologically feasible and cost-effective reductions in GHGs, including provisions for using both market mechanisms and alternative compliance mechanisms;
- Convening an Environmental Justice Advisory Committee and an Economic and Technology Advancement Advisory Committee to advise CARB;
- Evaluating several factors prior to imposing any mandates or authorizing market mechanisms, including, but not limited to, impacts on California's economy, the environment, and public health; equity between regulated entities; electricity reliability and conformance with other environmental laws, as well as ensuring that the rules do not disproportionately impact low-income communities;
- Adopting a list of discrete, early action measures to be implemented before January 1, 2010; and
- Ensuring public notice and opportunity for comment on all CARB actions.

In addition, the Climate Change Scoping Plan, the state's roadmap to reaching GHG reduction goals, considers the following key strategies:

- **Cap-and-Trade Program:** Broad-based to provide a firm limit on emissions; covers 85 percent of California's emissions: electricity generation, large industrial sources,

transportation fuels, and residential and commercial use of natural gas, and provides regional linkage with the Western Climate Initiative, allowing greater environmental and economic benefits.

- **Transportation:** GHG emission standards for cars, low-carbon fuel standard (10 percent by 2020), better land-use planning (Senate Bill 375), and more efficient delivery trucks, heavy duty trucks, and goods movement.
- **Electricity and Energy (imported included):** Improved appliance efficiency standards and other aggressive energy efficiency measures, 33 percent renewables by 2020, increased use of efficient "combined heat and power", million solar roofs, solar hot water heating, green buildings, and water efficiency.
- **Industry (including cement):** Audit of the 800 largest emission sources in California to identify GHG reduction opportunities; regulations on refinery flaring and fugitive emissions; considerations for cement to address "leakage."
- **High GWP Gases:** Capture refrigerants and other high GWP gases already in use; reduce future impact through leak-resistant equipment, restrictions on use, and fees.
- **Forestry:** Preserve forest sequestration and voluntary reductions possible from forestry projects.
- **Agriculture:** More efficient agricultural equipment, fuel use, and water use through transportation and energy measures; reductions from manure digesters; fewer impacts on productivity of crops and livestock.
- **Waste and Recycling:** Reduce CH_4 emissions from landfills and move toward high recycling and zero waste.

3.1.2 Existing Conditions

Climate affects air quality in that it affects the movement of air from source to receptor. It also has an effect on the formation of ozone, and rain affects airborne dust. The project would be located in Lucerne Valley, on the southeastern edge of the Mojave Desert in San Bernardino County, within the MDAB. Climate in the project area is classified as a dry-hot desert (BWh), influenced by topographical barriers created by mountain ranges with long broad valleys that often contain dry lakes (MDAQMD 2009).

Climatic conditions of the area are characterized by high daytime temperatures; occasional high winds; sand, dust, and thunderstorms; and hot, dry summers and mild winters with minimal annual rainfall average (Figure 3.1-1). Average high temperatures in the summer reach over 100 degrees Fahrenheit (°F), while average high temperatures in the winter are between 30° and 50° F (Western Regional Climate Center [WRCC] 2009).

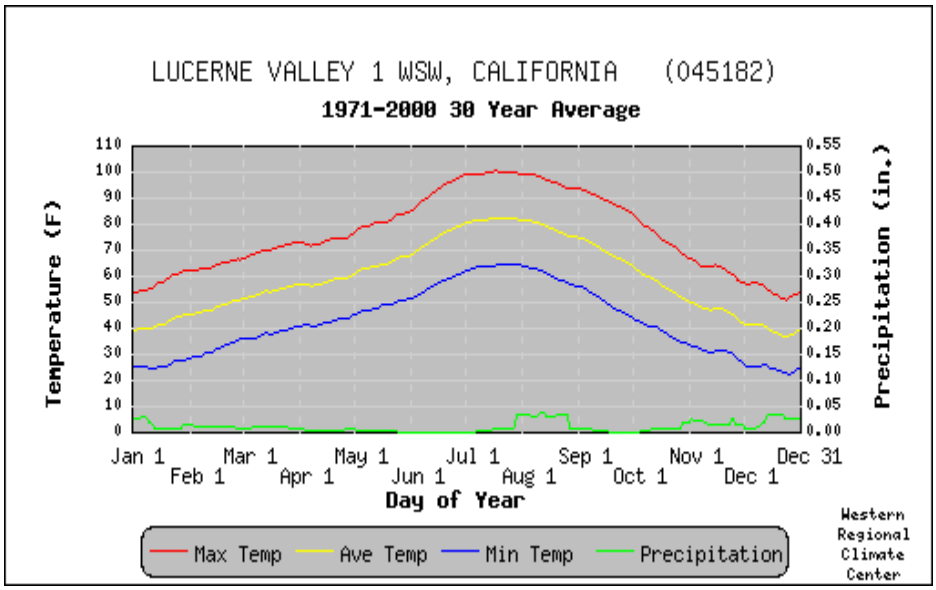


Figure 3.1-1 Historic Temperature and Precipitation Data from Lucerne Valley, California (WRCC 2009)

Average precipitation levels in the MDAB have been reported between three and seven inches per year, with 16 to 30 days with at least 0.01 inches of precipitation. Flash floods occurred 40 times over the past 60 years in southern California, with three flash flood events occurring in Lucerne Valley (NOAA 2007). Additionally, the prevailing winds in the MDAB are out of the west and southwest, resulting in a general west to east flow across the basin. Winds greater than 25 miles per hour occur five percent of the time (Webmet 2010). Wind direction and speed are key factors influencing the dispersion and transport of air pollutants (MDAQMD 2009). The project area also receives significant sunshine throughout the year, which is an additional factor influencing thermal turbulence and dispersion of pollutants (MDAQMD 2008a).

Desert climate is also characterized by the presence of biological soil crusts (also named as cryptobiotic, cryptogamic, or microbiotic crusts) that aid in erosion control, water retention and in minimizing airborne dust generation. These soil crusts are thin veneers of microbial-rich plant material that live on the surface of many soils in desert areas that stabilize the soil and create an environment for higher plants to inhabit harsh environments (USGS 2002). If this layer of microbes is altered, it can take 5 to 250 years to reproduce, depending on rainfall conditions. Loss of these crusts can reduce infiltration by precipitation, leave the soil susceptible to erosion by wind and water, and alter the vegetative cover and habitat of the disturbed area for many years.

In addition, deserts or dry lands have a potential for carbon storage in soils rather than in their vegetation. The carbon storage potential for dry lands ranges from greater than 400 to less than 100 metric tons per hectare, although the majority of desert soils can store less than 225 metric tons per hectare (World Resources Institute 2003). While deserts generally store less carbon than forests on a carbon/unit area basis, the total amount of carbon that desert soils can store is potentially significant due to the extensive areas of these ecosystems.

Existing Ambient Air Quality

Air quality is regulated by federal, state, and local agencies. Pursuant to the CAA, the EPA has established NAAQS for seven criteria air pollutants. Primary standards set limits to protect

public health, including the health of "sensitive" populations, such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings (EPA 2008a). The seven criteria air pollutants for which NAAQS have been promulgated are:

- Sulfur dioxide (SO_2);
- Nitrogen dioxide (NO_2);
- PM_{10};
- PM with diameters less than or equal to 2.5 microns ($PM_{2.5}$);
- Carbon monoxide;
- Ozone (O_3); and
- Lead.

Ozone is not emitted directly from emission sources but is created at near-ground level by a chemical reaction between NO_x and volatile VOCs in the presence of sunlight. As a result, NO_x and VOCs are often referred to as ozone precursors and are regulated as a means to prevent ground-level ozone formation. Criteria air pollutant descriptions and health effects are summarized in Table 3.1-2.

Table 3.1-2 Major Criteria Air Pollutant Descriptions and Health Effects

Pollutant	Description and Health Effects
O_3	High ozone levels result from VOCs and NO_X (oxides of nitrogen) emissions from vehicles and industrial sources, in combination with daytime wind flow patterns, mountain barriers, a persistent temperature inversion, and intense sunlight. Health effects include: • Aggravation of respiratory and cardiovascular diseases; • Impairment of cardiopulmonary function; and • Eye irritation.
NO_2	NO_2 emissions are primarily generated from the combustion of fuels. Health effects include risk of acute and chronic respiratory disease
CO	CO is a product of incomplete combustion, principally from automobiles and other mobile sources of pollution. Wood-burning stoves and fireplaces can also be measurable contributors. Health effects include: • Impairment of oxygen transport in the bloodstream; • Aggravation of cardiovascular disease; • Impairment of the central nervous system; • Fatigue, headache, confusion, dizziness; and • Death at high levels of exposure.
SO_2	SO_2 is produced when any sulfur-containing fuel is burned. Natural gas contains trace amounts of sulfur, while fuel oils contain much larger amounts. Health effects include: • Aggravation of respiratory disease; • Reduced lung function; and • Eye irritation.

Table 3.1-2 Major Criteria Air Pollutant Descriptions and Health Effects

Pollutant	Description and Health Effects
PM_{10} and $PM_{2.5}$	Particulates in the air are caused by a combination of wind-blown fugitive or road dust, particles that come from fuel combustion in motor vehicles and industrial sources, residential and agricultural burning, and from the reaction of NO_X, sulfur oxides (SO_X), and organics. Health effects include: • Aggravation of respiratory disease; • Reduced lung function; • Cough irritation; and • Lung irritation.
Lead	Lead gasoline additives, nonferrous smelters, and battery plants were historically significant contributors to atmospheric lead emissions. Legislation has since reduced lead emissions. Health effects include impairment of central nervous system.
VOCs	A portion of total organic compounds or gases, excluding CH_4, ethane, and acetone (due to low photochemical reactivity). These compounds are regionally important due to their involvement in the photochemical reaction that produces ozone. Health effects include: • Impairment of central nervous system; • Eye, nose, and throat irritation; and • Fatigue, headache, confusion, and dizziness.

Source: CARB 2005

Under the CCAA, the State of California has established additional or more stringent ambient air quality standards for some of these criteria pollutants, as well as ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. NAAQS and CAAQS are summarized in Table 3.1-3.

Table 3.1-3 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
			Primary[c]	Secondary[d]
O_3	8 Hours	0.07 ppm[e]	0.075 ppm	0.075 ppm
	1 Hour	0.09 ppm	— [e]	— [e]
CO	8 Hours	9.0 ppm	9 ppm	—
	1 Hour	20 ppm	35 ppm	—
NO_2	Annual Average	0.03 ppm	0.053 ppm	0.053 ppm
	1 Hour	0.18 ppm	—	—
$S0_2$	Annual Average	—	0.030 ppm	—
	24 Hours	0.04 ppm	0.14 ppm	—
	3 Hours	—	—	0.5 ppm
	1 Hour	0.25 ppm	—	—
$PM_{2.5}$	Annual Geometric Mean	12 µg/m^3	15 µg/m^3	15 µg/m^3
	24 Hours	—	35 µg/m^3	35 µg/m^3
PM_{10}	Annual Arithmetic Mean	20 µg/m^3	—	—
	24 Hours	50 µg/m^3	150 µg/m^3	150 µg/m^3
Lead	30-Day Average	1.5 µg/m^3	—	—
	Rolling 3-Month Average[f]	—	0.15 µg/m^3 [f]	0.15 µg/m^3 [f]
Sulfates	24 Hours	25 µg/m^3	—	—
Hydrogen sulfide	1 Hour	0.03 ppm	—	—

Table 3.1-3 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
			Primary[c]	Secondary[d]
Vinyl chloride	24 Hours	0.010 ppm	—	—

Source: CARB 2008; EPA 2009a

Notes:

[a] California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and $PM_{2.5}$ are values that are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.

[b] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

[c] National Primary Standards represent the levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[d] National Secondary Standards represent the levels of air quality necessary to protect the environment, including public welfare, from any known or anticipated adverse effects of a pollutant.

[e] On June 15, 2005, the 1-hour ozone standard of 0.12 parts per million (ppm) was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact areas (which do not yet have an effective date for their 8-hour designations.)

[f] Final rule signed on October 15, 2008.

ppm = parts per million by volume
$\mu g/m^3$ = micrograms per cubic meter

The EPA and CARB classify an area as attainment, unclassified, or non-attainment, depending on whether the monitored ambient air quality data show compliance, insufficient data available, or non-compliance with the federal and state ambient air quality standards. The current state and federal air quality attainment status designations for the MDAB are summarized in Table 3.1-4.

Table 3.1-4 Attainment Status in the Mojave Desert Air Basin (San Bernardino County)

Pollutant	State Designation[a]	Federal Designation
Ozone (8-hour)	Non-attainment	Severe Non-attainment[b]
Ozone (1 hour)	Non-attainment Moderate	n/a[c]
PM_{10}	Non-attainment	Non-attainment
$PM_{2.5}$	Non-attainment	Unclassified/Attainment[d]
CO	Attainment	Attainment
NO_2	Attainment/Unclassified	Attainment/Unclassified
SO_2	Attainment/Unclassified	Attainment/Unclassified
Sulfates	Attainment	n/a
Lead	Attainment	n/a
Hydrogen Sulfide	Unclassified	n/a

Table 3.1-4 Attainment Status in the Mojave Desert Air Basin (San Bernardino County)

Pollutant	State Designation[a]	Federal Designation
Visibility Reducing Particles	Unclassified	n/a

Source: CARB 2006, 2009a; EPA 2008b; MDAQMD 2009

Notes:

CO = carbon monoxide

n/a = not applicable

NO_2 = nitrogen dioxide

$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

PM_{10} = particulate matter less than 10 microns in diameter

SO_2 = sulfur dioxide

[a] Based on CARB 2006 State Area Designations, effective since July 26, 2007.

[b] Federal standard 84 ppm. Classified Severe-17 (portion of MDAQMD outside of Western Mojave Desert Ozone Non-attainment Area is unclassified/attainment)

[c] On June 15, 2005, the 1-hour ozone standard of 0.12 ppm was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) areas. (Those areas do not yet have an effective date for their 8-hour designations.)

[d] Portion of MDAQMD outside of Western Mojave Desert Ozone Nonattainment Area is unclassified/attainment

The MDAQMD is responsible for leading the regional effort in the MDAB to attain federal and state standards and has developed and implemented the Mojave Desert Air Quality Management Plan to reduce emissions, including emissions from industries and some mobile sources and consumer products. Air Quality Monitoring Stations near the project site within the MDAB are shown in Figure 3.1-2. Existing background concentrations and exceedances of air quality standards at the closest monitoring stations are summarized in Tables 3.1-5 and 3.1-6.

Hazardous air pollutants, also referred to as toxic air contaminants, are pollutants that are known or suspected to cause acute or long-term serious health effects, such as cancer, reproductive effects or birth defects, neurological damage, or other related issues. The EPA manages a list of hazardous air pollutants, and CARB oversees contaminants defined in California's AB 1807 and AB 2588. Diesel particulate matter, benzene, and 1,3-butadiene are the three pollutants, all largely from mobile sources, that contribute the most to baseline ambient risks. Ambient air quality standards, in general, have not been established for these pollutants. However, federal, state, and local regulations and guidelines have been established to reduce their release to the atmosphere. These substances are managed on a case-by-case basis, depending on the quantity and type of emissions and proximity of potential receptors.

Existing Sources of Air Pollutants

Major sources and estimated annual average emissions of air pollutants within the MDAB in San Bernardino County (tons per day) and a list high emitting facilities located in the same air basin as the project are summarized in Tables 3.1-7 and 3.1-8. The largest particulate matter emitter within the project area is a Mitsubishi Cement Plant located in Lucerne Valley—approximately five miles southwest of the project site. This facility emits the highest levels of PM_{10} and $PM_{2.5}$ in the MDAB (1,468 and 928 tons per year, respectively).

Table 3.1-5 Regional Background Air Quality Concentrations in the Project Area

Location	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)		SO_2 (ppm)			CO (ppm)		NO_2 (ppm)	Ozone (ppm)	
	24-hour (1*)	Annual	24-hour (1)*	Annual	24-hour (1)*	3-hour (1)*	8-hour (1)*	1-hour (1)*	Annual	8-hour (1)*	1-hour (1)*
Barstow, San Bernardino County, California	50	--	--	--	--	--	1.1	1.3	0.08	0.09	0.096
Phelan, San Bernardino County, California	--	--	--	--	--	--	--	--	--	0.099	0.116
Victorville, San Bernardino County, California	121	8.43	11	0.001	0.002	0.004	0.9	1.4	0.073	0.089	0.104
Mojave National Preserve, California	--	--	--	--	--	--	--	--		0.086	0.097
Hesperia, San Bernardino County, California		--	--	--	--	--	--	--	--	0.098	0.117

Source: EPA 2008b

Notes:

CO = carbon monoxide

m^3 = cubic meters

NO_2 = nitrogen dioxide

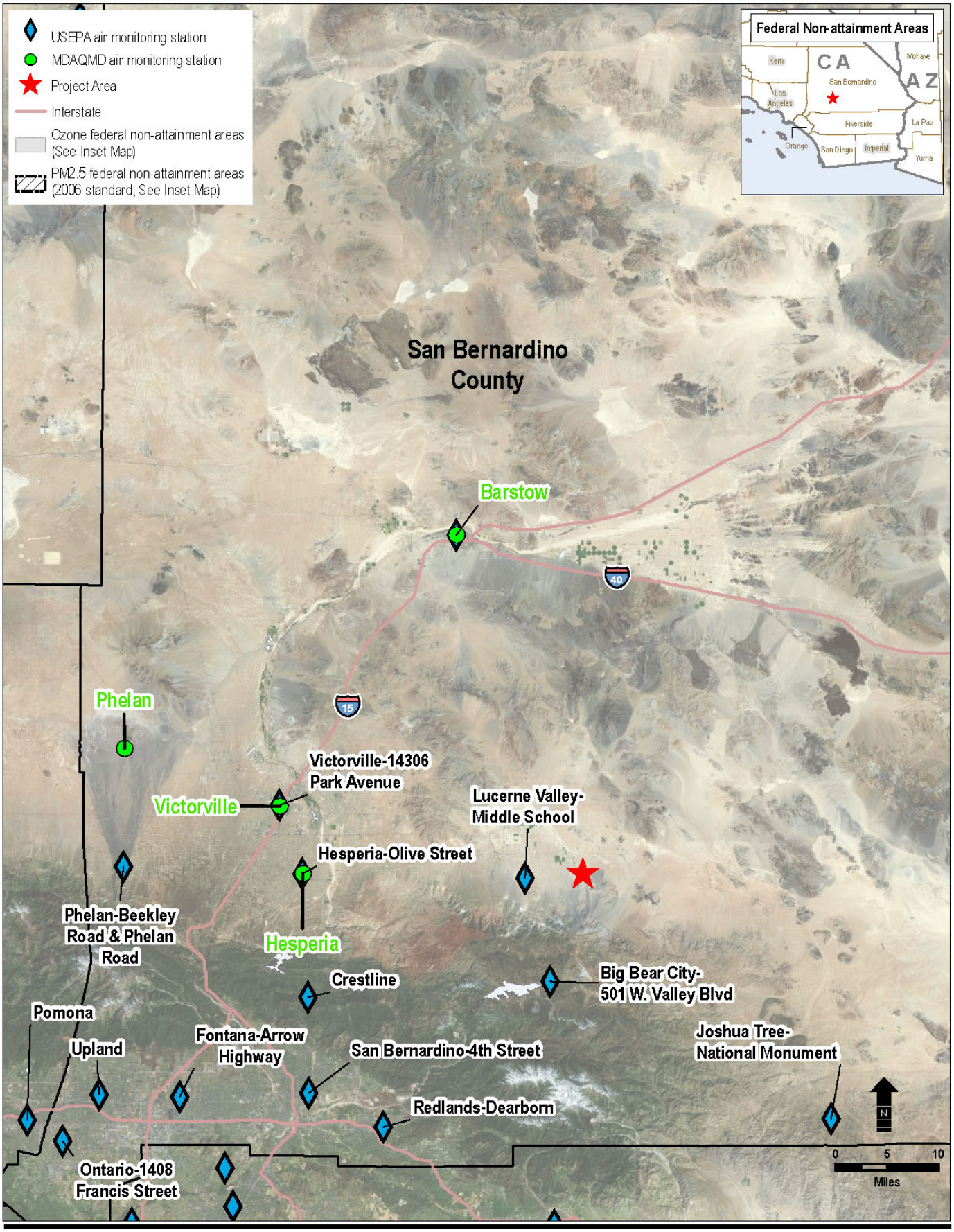
ppm = parts per million

PM_{10} = particulate matter less than 10 microns in diameter

$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

(1) *The average concentrations listed are the fourth-highest daily maximums.

M:\SanFrancisco\Chevron_LuzerneSolar\
Maps\MXD\DEIS_July2010\Fig 3.1-2 AirMonitoringStations_MDAQMD.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
U.S. Environmental Protection Agency, Office of Air and Radiation,
Office of Air Quality Planning and Standards 2007;
Mohave Desert Air Quality Management District 2008.

Figure 3.1-2
Air Monitoring Stations
Lucerne Valley Solar Project
San Bernardino County, California

Table 3.1-6 Exceedances of Air Quality Standards and Existing Maximum Concentrations near the Project Area (2008)

Station	Ozone					CO					Nitrogen Oxide			Sulfur Oxide				PM_{10}			
	Days over state 1h/8h	Days over federal	Max 8h ppm	Max 1h ppm	Avg 1h ppm	Days over state 1h/8h	Days over federal	Max 8h ppm	Max 1h ppm	Avg 1h ppm	Days over state	Max 1h ppm	Avg 1h ppm	Days over state 24h/8h	Max 24h ppm	Max 1h ppm	Avg 1h ppm	Max 1h PM10 ($\mu g/m^3$)	Max daily PM10 ($\mu g/m^3$)	Days avg over 50$\mu g/m^3$	Monthly avg PM10 ($\mu g/m^3$)
Barstow	5/23	7	0.097	0.104	0.033	0/0	0/0	1.2	1.4	0.111	0	0.081	0.019	na/na	na	na	na	NM	NM	NM	NM
Hesperia	29/80	58	0.107	0.132	0.041	na/na	na/na	na	na	na	na	na	na	na/na	na	na	na	NM	NM	NM	NM
Phelan	32/73	50	0.106	0.130	0.046	na/na	na/na	na	na	na	na	na	na	na/na	na	na	na	NM	NM	NM	NM
Trona	3/23	7	0.094	0.100	0.037	NM	NM	NM	NM	NM	0	0.062	0.004	0/0	0.004	0.036	0.001	886	157	22	31
Victorville	16/58	32	0.098	0.109	0.035	0/0	0/0	1.0	2.2	0.167	0	0.064	0.016	0/0	0.002	0.006	0.001	927	266	23	31

Source: MDAQMD 2008b

Notes:

Exceedances of other air criteria pollutants listed on Table 3.1-3 ($PM_{2.5}$, sulfates, lead, hydrogen sulfate and visibly reducing particles) were not reported by the MDAQMD during 2008.
CO = carbon monoxide
na = Non available
NM = No measurement
PM_{10} = particulate matter less than 10 microns in diameter

Table 3.1-7 Estimated Annual Average Air Pollutant Emissions in San Bernardino County (2008)

Air Basin	Emission Source	Estimated Annual Average Emissions (tons per day)						
		ROG*	CO	NO_X	SO_X	PM	PM_{10}	$PM_{2.5}$
Mojave Desert Air Basin	*Stationary sources*							
	Fuel combustion	0.6	5.1	18.4	1.3	7.7	4.8	3.6
	Waste disposal	0.2	0.1	0.1	0.1	0.0	0.0	0.0
	Cleaning and surface coatings	2.1	-	-	-	0.2	0.2	0.2
	Petroleum production and marketing	3.0	0.0	0.0	-	0.0	0.0	0.0
	Industrial processes	1.8	9.4	37.3	2.5	40.1	23.3	13.1
	Total stationary sources	7.7	14.6	55.8	3.9	48.1	28.3	16.8
	Area-wide sources							
	Solvent evaporation	4.8	-	-	-	-	-	-
	Miscellaneous processes	2.7	14.1	1.3	0.0	160.5	83.6	12.9
	Total area-wide sources	7.5	14.1	1.3	0.0	160.5	83.6	12.9
	Mobile sources							
	On-road motor vehicles	13.7	142.2	73.5	0.1	3.6	3.6	3.0
	Other mobile sources	24.7	76.1	32.6	0.5	1.8	1.8	1.5
	Total mobile sources	38.4	218.3	106.1	0.6	5.4	5.3	4.5
	Total San Bernardino County in Mojave Desert	53.6	247.0	163.1	4.6	214.1	117.2	34.2

Source: CARB 2009b

*ROG = reactive organic gases

Table 3.1-8 High Emitting Facilities in the Mojave Desert Air Basin (2008)

Facility Name	City	Highest Annual Emissions (tons per year)			
		ROG	NO_X	PM_{10}	$PM_{2.5}$
Mitsubishi Cement 2000	Lucerne Valley		2,770	1,468	928
Cemex Black Mountain Quarry	Apple Valley		4,754	277	183
TXI Riverside Cement Company	Oro Grande		4,111	755	344
California Portland Cement	Mojave		2,975	329	171
Searles Valley Minerals	Trona		2,001	285	213
National Cement	Lebec		1,300	309	205
PG&E Topock Compressor Station	Needles		1,140		
Lehigh Southwest Cement	Monolith		888		127
Southern California Gas	Needles		808		
Reliant Energy	Dagget		665		
PG&E Hinkley Compressor Station	Hinkle	135			
Antelope Valley Aggregate	Little Rock			691	257
Granite Construction	Little Rock			297	
U.S. Borax	Boron			292	116
High Desert Power Project	Victorville				105
Total Reported by High Emitting Facilities		135	21,412	4,703	2,649

Source: CARB 2009c

*ROG = reactive organic gases

Sensitive Receptors

Residences, schools, day care centers, playgrounds and medical facilities are considered sensitive receptor land uses for criteria air pollutants (MDAQMD 2009). The project site is located within a very sparsely populated area with no sensitive receptors within a one-mile radius of the proposed site. No schools, hospitals, day care centers, or nursing homes were identified within this radius, and there are only seventeen residential receptors identified, with the closest residence located less than 0.1 mile immediately west of the project site, at the southwest corner of Foothill Road and Santa Fe Fire Road.

Greenhouse Gases and Climate Change

Climate change refers to any significant change in measures of climate (temperature, precipitation, or wind) that lasts for an extended period (e.g., decades or longer). Climate change may be affected by a number of factors, including natural cycles (e.g., changes in the sun's intensity or earth's orbit around the sun), natural processes within the climate system (e.g., changes in ocean circulation), and human activities that change the atmosphere's composition (e.g., burning fossil fuels) or land surface (e.g., deforestation, reforestation, urbanization, and desertification).

California is a substantial contributor to global GHG emissions as it is the second largest contributor in the U.S. and the sixteenth largest in the world (CEC 2006). GHGs include:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (NO_x)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF_6)

According to the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report, increased atmospheric levels of CO_2 are correlated with rising temperatures; concentrations of CO_2 have increased by 31 percent above pre-Industrial levels since 1750 (Figure 3.1-3). Climate models show that temperatures will probably increase by 1.4 degrees Celsius (°C) to 5.8 °C between 1990 and 2100. Much of the uncertainty in this increase results from not knowing future CO_2 emissions, but there is also some uncertainty about the accuracy of climate models. The IPCC concluded in a statement released February 2, 2007, that "the widespread warming of the atmosphere and ocean, together with ice-mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone" (IPCC 2007).

GWP is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming and is devised to enable comparison of the warming effects of different gases. It is a relative scale that compares the gas in question to that of the same mass of CO_2. CO_2 equivalence (CO_2e) is a measure used to compare the emissions from various GHGs based on their GWP, when measured over a specified timescale (generally 100 years). CO_2e is commonly expressed as million metric tons (MMT) of carbon dioxide equivalents ($MMTCO_2e$). The CO_2e for a gas is obtained by multiplying the mass (in tons) by the GWP of the gas. For example, the GWP for CH_4 over 100 years is 25. This means that the emission of one MMT of CH_4 is equivalent to the emission of 25 MMT of CO_2, or 25 $MMTCO_2e$.

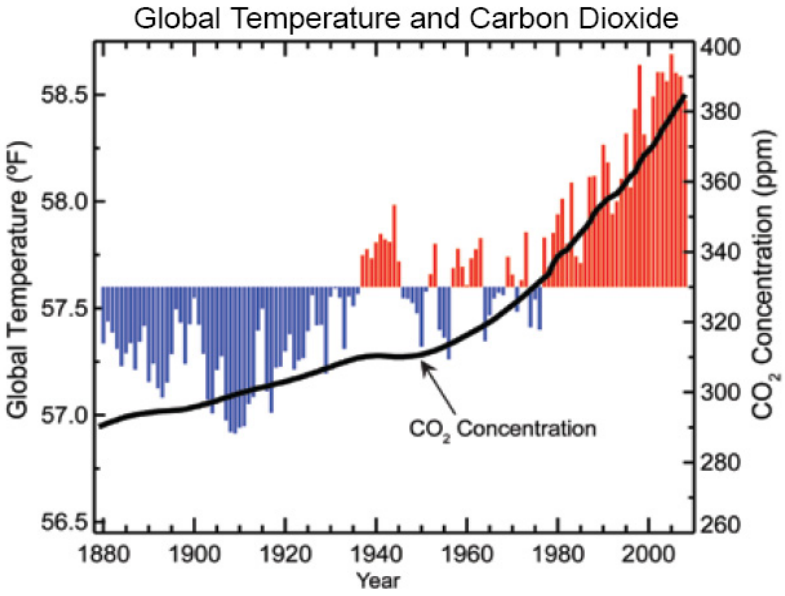


Figure 3.1-3 Relationship Between Global Temperature and Carbon Dioxide (IPCC 2007)

Potential Effects of Climate Change

In November 2004, the California Climate Action Team (CAT) was formed, comprising 14 agencies and 11 subgroups to assist CARB with the Climate Change Scoping Plan. According to the 2006 California CAT Report, the following climate change effects, based on the IPCC trends, can be expected in California over the next century:

- A diminishing Sierra snowpack, declining by 70 to 90 percent, threatening the state's water supply;
- Increasing temperatures from 0.5 °F to 5.8 °F under the higher emission scenarios, leading to a 25 percent to 35 percent increase in the number of days ozone pollution levels are exceeded in most urban areas;
- Increased vulnerability of forests due to pest infestation and increased temperatures; and
- Increased electricity demand, particularly in the hot summer months.

Existing Greenhouse Gas Emissions

Statewide emissions of GHG from relevant source categories in 1990 and later years are summarized in Table 3.1-9. Specific contributions from air basins such as MDAB are not currently specified as part of the state inventory. Emissions of CO_2 occur largely from combustion of fossil fuels. The major categories of fossil fuel combustion CO_2 sources can be broken into sectors for residential, commercial, industrial, transportation, and electricity generation. Other GHG emissions, such as CH_4 and N_2O, are also tracked by state inventories but occur in much smaller quantities.

Table 3.1-9 California Greenhouse Gas Emissions ($MMTCO_2e$)

Emission Inventory Category	1990	2000	2001	2002	2003	2004	2005
Residential Fuel Combustion (CO_2)	29.7	30.25	27.21	27.32	26.40	27.86	--
Commercial Fuel Combustion (CO_2)	14.4	15.63	12.04	17.84	15.06	12.1	--
Industrial Fuel Combustion (CO_2)	103.0	76.17	80.48	71.53	65.47	67.2	--
Transportation Fuel Combustion (CO_2)	150.7	181.68	182.49	190.19	180.64	187.95	--
Electricity Generation, in-State (CO_2)	49.0	55.87	61.35	47.78	45.92	55.10	49.0
Methane (all CH_4 shown as CO_2e)	--	26.32	26.62	27.07	27.49	27.80	--
Nitrous Oxide (all N_2O shown as CO_2e)	--	31.43	30.76	34.48	33.85	33.34	--
Electricity Transmission and Distribution (SF_6 shown as CO_2e)	2.6	1.14	1.10	1.04	1.01	1.02	--
Total California GHG Emissions without Electricity Imports	371.1	440.47	446.35	444.86	423.20	439.19	--
Electricity Imports (CO_2e)	61.6	40.48	47.37	51.73	56.44	60.81	--
Total California GHG Emissions with Electricity Imports	433.29	480.94	493.72	496.59	479.64	500.00	--

Source: CPUC 2008

3.2 Noise

This section discusses applicable plans, policies, and regulations for noise and identifies the existing levels and sources of noise, as well as sensitive receptors. During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following comments and concerns related to noise were raised: (1) effects of industrial development on pristine public lands, and (2) cumulative effects on desert habitat. These comments are addressed in the discussion of existing conditions (Section 3.2.2) and analysis of direct and indirect effects (Section 4.2).

Noise and Vibration Fundamentals

Noise is defined as unwanted sound. Noise can be described in terms of three variables: amplitude (loud or soft), frequency (pitch), and time pattern (variability), and its potential effects can be described in terms of a noise generating source, a propagation path, and a receiver (Federal Transit Administration [FTA] 2006). The ambient sound level of a region is defined by the total noise generated within the specific environment and is usually composed of sound emanating from natural sources and from human activities. Ambient sound levels vary with time of day, wind speed and direction, and level of human activity. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Excessive noise exposure has been shown to cause interference with human activities at home, work, or recreation, community annoyance, and hearing loss, affecting people's health and well-being. Even though hearing loss is the most clearly measurable health hazard, noise is also linked to other psychological, sociological, physiological, and economical effects, either temporary or permanent (EPA 1974). Potential human annoyance and health effects associated with noise may vary depending on factors such as: (1) the difference between the new noise and the existing ambient noise levels; (2) the presence of tonal noise, noticeable or discrete continuous sound, such as hums, hisses, screeches, or drones; (3) low frequency noise; (4) fluctuating, intermittent, or periodic sounds, such as backup alarms; and (5) impulsive sounds (Brüel and Kjær 2000). In some cases, noise can also disrupt the normal behavior of wildlife. Although the severity of the effects varies depending on the species being studied and other conditions, research has found that wildlife can suffer adverse physiological and behavioral changes from intrusive sounds and other human disturbances (National Park Service 2009).

The amplitude of sound is usually described by the decibel (dB), which is a logarithmic measure of the sound pressure level. Pressure variations in the air cause the eardrum to vibrate. This is interpreted as sound by the brain. The stronger the pressure variation, the louder the sound is heard. The level of noise is measured objectively using a sound level meter normally set on the A-weighted scale, which was developed to mimic the way the human ear responds to pressure variations in the air. Since humans are less sensitive to low frequencies (less than 250 hertz [Hz]) than mid-frequencies (500 to 1,000 Hz), and they are most sensitive to frequencies in the 1,000- to 5,000-Hz range, sound measurements are adjusted, or weighted, as a function of frequency to account for human perception and sensitivities.

In terms of human response, it is widely accepted that people are able to begin to detect sound level increases of 3 dB, while an increase in noise level of 10 dB is generally perceived as being twice as loud. However, a five-dB change is generally considered to be a substantially noticeable change above the existing noise environment. Everyday sounds normally range from 30 dB (very quiet) to 100 dB (very loud), as described in Table 3.2-1.

Table 3.2-1 Typical Sound Levels Measured in the Environment and Industry

Noise source at a given distance	A-Weighted Sound Level (dBA)
Military jet takeoff	140
Threshold of pain	130
Front row at rock concert	110
Headphones at maximum volume	100
Vacuum cleaner	80
Busy street traffic	70
Normal conversation	60
Whisper	20
Rustling leaves	10
Threshold of hearing	0

Source: Caltrans 2009

The decrease in sound level due to distance from any single sound source normally follows the inverse square law, i.e., the sound pressure level changes in inverse proportion to the square of the distance from the sound source. In a large open area with no obstructive or reflective surfaces, it is a general rule that at distances greater than 50 feet, the sound pressure level from a point source of sound drops off at a rate of 6 dB with each doubling of distance away from the source. The drop-off rate also varies with both terrain conditions and the presence of obstructions in the sound propagation path. In addition, sound energy is absorbed in the air as a function of temperature, humidity, and the frequency of the sound.

To characterize the average ambient noise environment in a given area, noise level descriptors are commonly used. The L_{eq} (sound level equivalent) is generally used to characterize the average sound energy that occurs during a relatively short period, such as an hour. Two other descriptors, the L_{dn} (Day-Night Level) and CNEL (Community Noise Equivalent Level), would be used for an entire 24-hour period. Both the L_{dn} and CNEL noise metric descriptors place a stronger emphasis on noise that occurs during nighttime hours (10 p.m. to 7 a.m.) by applying a 10-dB "penalty" to those hours, with the difference being that the CNEL also applies a 5-dB penalty to the evening hours of 7 p.m. to 10 p.m.

Vibration is a phenomenon related to noise. It is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration (FTA 2006). The ground borne energy of vibration has the potential to cause structural damage and annoyance; it can be felt outdoors, but the perceived intensity of vibration effects are much greater indoors due to the shaking of structures. Several land uses are sensitive to vibration—for example, hospitals, libraries, residential areas, schools, offices, and cultural resources.

Vibration particle velocity (measured in inches or millimeters per second) and/or vibration velocity level in decibels (VdB) are typically used to describe vibration. For residential uses, the background vibration level is usually 50 VdB or lower, while 75 VdB is generally considered intrusive (Table 3.2-2). Typical outdoor sources of perceptible ground borne vibration are trains, construction-related activities such as blasting, pile-driving, and heavy earth-moving equipment, and traffic on rough roads (FTA 2006).

Table 3.2-2 Typical levels of Ground borne Vibration

Vibration Velocity Levels (VdB) [a]	Human/Structural Response	Typical Sources (50 feet from the source)
100	Threshold of minor damage to fragile buildings	Blasting from construction projects
90–100	Difficulty with tasks, such as reading display screens	Bulldozers and other heavy tracked construction equipment
80–90	Residential annoyance, infrequent events	Rapid transit (upper range)
70–80	Residential annoyance, frequent events	Rapid transit (typical), bus, or truck over bump
60–70	Limit for vibration sensitive equipment. approximate threshold for human perception	Bus or truck (typical)
50	Typical background vibration level	Typical background vibration

Source: FTA 2006
Notes:
[a] Vibration velocity level in dB or VdB relative to 10^{-6} inches/second, which is the vibration reference level used as equal to 0 VdB (Lref).

3.2.1 Applicable Plans, Policies, and Regulations

Federal, state, and local bodies of government establish regulations and guidance to control excessive noise and reduce disturbance due to noise to a level that is acceptable within their jurisdiction. While federal and state laws regulate transportation noise, establish "normally" and "conditionally" acceptable exterior noise limits based on land-use type, and establish maximum acceptable interior noise limits for residences, no federal or state provisions regulate noise levels due to temporary construction activity. This type of noise is generally regulated at the local or county level.

Federal

Noise and land use guidelines have been produced by a number of federal agencies, including the Federal Highway Administration, EPA, Department of Housing and Urban Development, and American National Standards Institute. These guidelines are all based upon statistical noise criteria, such as L_{eq}, L_{dn}, or CNEL. The EPA identified outdoor and indoor noise levels to protect public health and assets. An $L_{eq(24)}$ of 70 dB (sound level equivalent, 24-hour average) was identified as a level of environmental noise that would not lead to measurable hearing loss over a lifetime. An L_{dn} of 55 dBA outdoors and 45 dBA indoors were identified as noise levels that would not result in activity interference or annoyance (EPA 1974).

California Desert Conservation Area Plan

The CDCA Plan (BLM 1980) contains provisions for public land-use management in the California Desert District under the BLM's jurisdiction. Since its first date of publication in 1980, the CDCA Plan has been amended in order to incorporate public concerns and congressional mandates in regard to the use of desert resources, such as the provisions of the California Desert Protection Act of 1994.

In particular, noise-related guidelines established in the CDCA Plan include long-term monitoring of effects of vehicle noise on wildlife (Chapter 3, Wildlife Element) and implementation of land use compatibility standards within limited (vehicle use) areas in order to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands (Chapter 3, Motorized Vehicle Access). The CDCA Plan also identifies energy and utility corridors within the California Desert District, which

are part of the effect analysis framework, particularly in terms of alternatives analysis and cumulative effects.

West Mojave Plan

The WEMO Plan is an amendment to the CDCA Plan that establishes strategies to conserve and protect sensitive species such as the desert tortoise, the Mohave ground squirrel, and other sensitive plants and animals within the WEMO planning area (BLM 2005). Section 3.3.2.5 of the FEIS for the WEMO Plan identifies noise and vibration as part of the 22 effects that may affect desert tortoises and their habitats, as indirect mortality factors for this species within the WEMO planning area. Other noise-related issues discussed as part of the environmental review of the WEMO Plan are noise effects from off-highway vehicles (OHVs) circulating within the Motorized Vehicles Access Network. Special attention is given to noise mitigation measures within these recreational areas, such as careful trail planning and construction of berms to impede or dissipate sound (BLM 2005).

State

The California Department of Health Services has established the Office of Noise Control, which has prepared studies associated with noise levels and their effects on various land uses. Based upon these studies, the state has established interior and exterior noise standards by land use category and standards for the compatibility of various land uses and noise levels (Table 3.2-3). For low density residential areas, such as the rural environment where the project would be located, the maximum normally acceptable noise level established under this guidance is a CNEL of 60 dBA. New construction or development would conditionally reach a maximum noise level of 70 dBA only after a detailed analysis of the noise requirements is made and needed noise insulation features are included in the design.

Table 3.2-3 Noise/Land Use Compatibility Matrix for Community Noise Environments

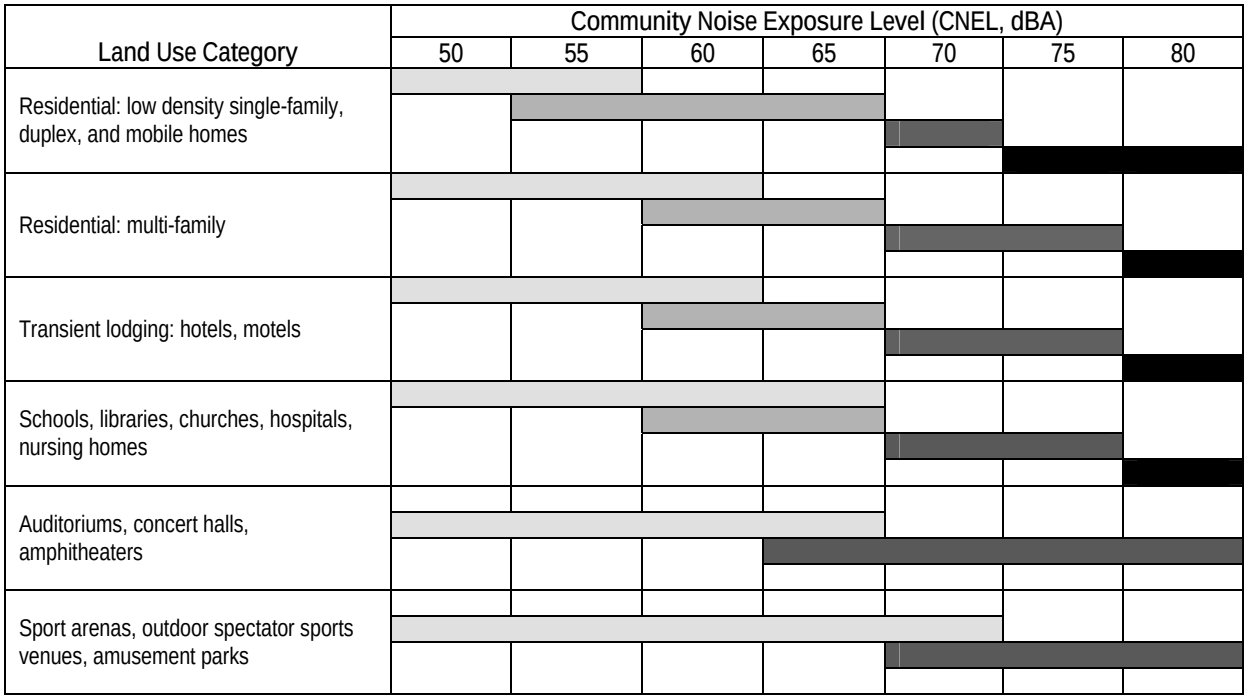


Table 3.2-3 Noise/Land Use Compatibility Matrix for Community Noise Environments

Land Use Category	Community Noise Exposure Level (CNEL, dBA)						
	50	55	60	65	70	75	80
Playgrounds, neighborhood parks							
Golf courses, riding stables, cemeteries							
Office and professional buildings, retail commercial, banks, restaurants							
Industrial, manufacturing, utilities, service stations, warehousing, agriculture							

Source: Office of Planning and Research 2003

Normally acceptable: Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally acceptable: New construction or development should be undertaken only after a detailed analysis of the noise requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air systems or air conditioning, normally suffices.

Normally unacceptable: New construction or development should generally be discouraged. If it does proceed, a detailed analysis of the noise reduction requirements must be made, and needed noise insulation features must be included in the design.

Clearly unacceptable: New construction or development should generally not be undertaken.

In addition, noise limits for highway vehicles are regulated under the California Vehicle Code, §§ 23130 and 23130.5. The limits are enforceable on the highways by the California Highway Patrol and the County Sheriff's Office.

County of San Bernardino

The County of San Bernardino Development Code establishes standards concerning acceptable noise levels for both noise-sensitive land uses and for noise-generating land uses.

Table 3.2-4 (San Bernardino County Noise Standards for Stationary Noise Sources) describes the noise standard for emanations from a stationary noise source as it affects adjacent properties. San Bernardino County also has the following noise limit categories in which no person shall operate, or cause to be operated, a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person who causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following (County of San Bernardino 2007a, 2007b):

(A) The noise standard for the receiving land use as specified in Subsection B (Noise-impacted areas), above, for a cumulative period of more than 30 minutes in any hour.

(B) The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour.

(C) The noise standard plus 10 dBA for a cumulative period of more than five minutes in any hour.

(D) The noise standard plus 15 dBA for a cumulative period of more than one minute in any hour.

(E) The noise standard plus 20 dBA for any period of time.

Table 3.2-4 San Bernardino County Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	7 am-10 pm L_{eq}[a]	10 pm-7 am L_{eq}
Residential	55 dB(A)[b]	45 dB(A)
Professional Services	55 dB(A)	55 dB(A)
Other Commercial	60 dB(A)	60 dB(A)
Industrial	70 dB(A)	70 dB(A)

Source: County of San Bernardino 2007a, 2007b

Notes:

[a]Leq = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically 1, 8 or 24 hours.

[b]dB(A) = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.

The County of San Bernardino Development Code does not have standards concerning acceptable noise levels for construction.

The County of San Bernardino has also adopted the following standards regarding vibration.

(a) Vibration standard. No ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths (0.2) inches per second measured at or beyond the lot line.

(b) Vibration measurement. Vibration velocity shall be measured with a seismograph or other instrument capable of measuring and recording displacement and frequency, particle velocity, or acceleration. Readings shall be made at points of maximum vibration along any lot line next to a parcel within a residential, commercial and industrial land use zoning district.

(c) Exempt vibrations. The following sources of vibration shall be exempt from the regulations of this Section.

(1) Motor vehicles not under the control of the subject use.

(2) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

3.2.2 Existing Conditions

The project would be located within a rural desert environment that is characterized by the predominance of large lots, limited commercial development, and the prevalence of agricultural and animal raising uses in the area (County of San Bernardino 2007a, 2007b). Main land uses located in the proximity of the project area include rural living, resource conservation, agriculture, and recreation. The closest airport runway is located 10 miles south of the site at the Big Bear City Airport (Google Earth 2009).

Noise Sources

Noise sources within the project area are related to vehicular traffic on local roads, OHV use, agricultural equipment, and wildlife noises. Additionally, noise from operations and maintenance of existing utility and energy facilities located within the BLM utility corridors near the project area may contribute as temporary or permanent noise sources, depending on the frequency and nature of activities. Because the closest airport (Big Bear City Airport) is located approximately 10 miles south of the project, noise from airport operations are not considered a noise source for the project.

Light vehicle traffic along roads identified in Table 3.2-5 represents the major noise source within the project area. Vehicle noise is a combination of the noises produced by the engine, exhaust, and tires. The loudness of traffic noise can also be increased by defective mufflers or other faulty equipment on vehicles. The level of highway traffic noise depends on: (1) the volume of the traffic; (2) the speed of the traffic; and (3) the number of trucks in the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater numbers of trucks (FTA 2006).

Table 3.2-5 Major Noise Sources Located near the Project

Major Noise Sources	Relative Location to Project Area	Direction
Foothill Road	Adjacent (boundary)	North
Santa Fe Fire Road	Traverses the site	North to south
Zircon Road	Traverses eastern portion of the site	East
Old Woman Springs Road (SR-247)	0.25 mile	North

Sources: Chevron Energy Solutions 2009; Google Earth 2009

Annual average daily traffic (ADT) data for State Route (SR) 247 indicates a range of 2,650 vehicles in 2008 (Caltrans 2009). A volume of traffic below 5,000 ADT is common in rural areas, such as the project site. The FTA maximum sound exposure level (L_{max}) for automobiles and vans at 50 feet from roadways is 74 dBA (FTA 2006); however, these levels are further reduced by distance and the presence of barriers. Considering the distance between SR-247 and the site (approximately 1,300 feet), noise levels from traffic at the project boundary would be lessened to a range between 59 and 62 dBA L_{max}.[1]

In addition to regular vehicle traffic on roads, OHVs are an additional source of noise within the Mojave Desert. According to the WEMO Plan, specific design and construction techniques, such as trail planning and construction of berms have been recommended to impede or dissipate sound from OHVs in the Mojave Desert (BLM 2005).

Noise Levels

Existing ambient sound levels in the project area are typical of wilderness areas or rural environments, where background noise levels typically range from between 35 and 45 dBA L_{dn} (Department of State 2007). At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of the day and throughout the

[1] According to the FTA (2006), for vehicles passing along a track or roadway (called line sources), divergence with distance is estimated as 3 dB per doubling of distance for L_{eq} and L_{dn}, and 3 to 6 decibels per doubling of distance for L_{max}.

week. The variation is caused for different reasons, for example, changing weather conditions, the effects of seasonal vegetative cover, and human activities.

Sensitive Receptors

Noise- and vibration-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound or vibration could adversely affect the designated land uses. Typically, sensitive receptors on noise-sensitive lands include residences, hospitals, places of worship, libraries and schools, nature and wildlife preserves, and parks. Several land uses are especially sensitive to vibration, including concert halls, hospitals, libraries, vibration-sensitive research operations, residential areas, schools, and offices.

Certain human activities and sensitive land uses (e.g., residences, schools, and hospitals) generally require lower noise levels. A noise level of L_{dn} 55 to 60 dB on the exterior is the upper limit for speech communication to occur inside a typical home. In addition, social surveys and case studies have shown that complaints and community annoyance in residential areas begin to occur at L_{dn} 55 dB (FTA 2006).

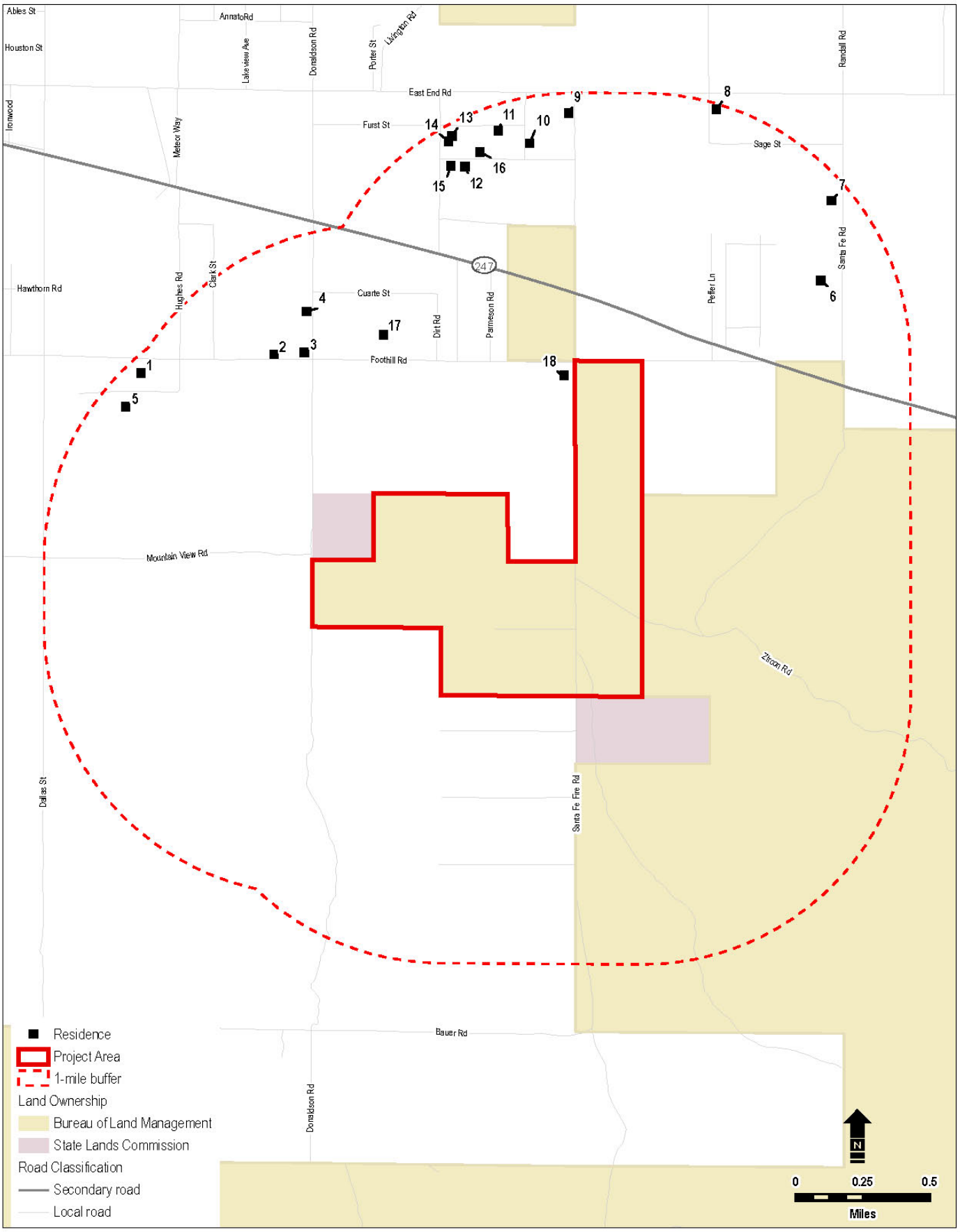
Noise sensitive land uses located in the vicinity of the project are primarily rural residences (very low density residential), as well as recreational and special management areas (special designations). Seventeen residential receptors have been identified within a one-mile radius of the site, most of them located on the northern and northwestern side of the property upper boundary (Table 3.2-6 and Figure 3.2-1). Twelve of these residential receptors (70 percent) are located in the proximity of SR-247, which is considered the main noise source in the area. One residential receptor is located less than 0.1 mile immediately west of the project area at the southwest corner of Foothill Road and Santa Fe Fire Road.

Table 3.2-6 Noise Sensitive Residential Receptors Located within a One-Mile Radius of the Project Area

Noise sensitive land use	Distance to Noise Sensitive Receptor (miles)	Figure 3-2-1 Map No.
Rural (very low density) residential	0.95	1
	0.64	2
	0.59	3
	0.72	4
	0.90	5
	0.73	6
	0.93	7
	0.98	8
	0.92	9
	0.83	10
	0.90	11
	0.83	12
	0.95	13
	0.94	14
	0.86	15
	0.85	16
	0.59	17
	< 0.1	18

Source: Ecology and Environment, Inc. 2009

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_July2010\Fig 3.2-1 Noise_Receptors.mxd



Base Map Source: ESRI 2009; Cal-Atlas 2009;
Ecology & Environment, Inc 2009

Figure 3.2-1

Sensitive Noise Receptors within 1 Mile of the Project Area

Lucerne Valley Solar Project

San Bernardino County, California

Additionally, special management or special designation areas would be sensitive to noise effects on sensitive species. The closest sensitive area is located at 2.1 miles from the site boundary (Table 3.2-7). However, noise sensitive species occur in areas where recreational and motorized vehicle noise is present throughout the Mojave Desert. Detailed discussion of specific land uses in the proximity of the project area, as well as recreational and special interest lands close to or crossed by the site, are presented in Sections 3.9, "Land Use and Realty"; 3.10, "Special Management Areas"; and 3.11, "Recreation."

Table 3.2-7 Noise Sensitive Uses Within 10 Miles of the Project Area

Noise sensitive land use	Distance to Noise Sensitive Receptor (miles)
Critical Biological Areas:	
Gold Mountain	8.53
Bertha Ridge	9.52
South Baldwin Lake	9.66
Wilderness Area:	
Bighorn Mountain	6.49
Rangeland Management Unit:	
Herd Management Unit	3.77
Special Interest Area:	
Arrowhead Landmark	6.15
Arrastre Creek	6.39
Areas of Critical Environmental Concern:	
Upper Johnson Valley Yucca Rings	7.99
Soggy Dry Lake Creosote Rings	5.98
Carbonate Endemic Plants	2.08
Ord-Rodman DWMA	7.12

Source: Ecology and Environment, Inc. 2009

3.3 Geology, Topography, and Geologic Hazards

This section identifies the geology, topography, and geologic hazards within and adjacent to the site of the project and discusses applicable regulations. During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. With regard to geology, topography, and geologic hazards, a comment about the location of active faults was raised. This comment is addressed in the discussion of existing conditions.

3.3.1 Applicable Plans, Policies, and Regulations

3.3.1.1 Federal

Federal Land Policy and Management Act of 1976, as amended

The FLPMA establishes policies and goals to be followed in administration of public lands by the BLM. FLPMA specifies policies for conveyance of mineral resources.

3.3.1.2 State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act of 1972 (formerly the Special Studies Zoning Act) regulates development and construction of buildings intended for human occupancy to avoid the hazard of surface fault rupture. The law resulted from structural damage associated with the 1971 San Fernando Earthquake. While this act does not specifically regulate solar development projects, it does help define areas where fault rupture is most likely to occur. This act groups faults into categories of active, potentially active, and inactive. Historic and Holocene age faults are considered active, late Quaternary and Quaternary age faults are considered potentially active, and pre-Quaternary age faults are considered inactive. These classifications are qualified by the conditions that a fault must be shown to be “sufficiently active” and “well defined” by detailed site-specific geologic explorations in order to determine whether building setbacks should be established.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (Public Resources Code, Chapter 7.8, Division 2) directed the California Department of Conservation, Division of Mines and Geology (now called California Geological Survey [CGS]) to delineate Seismic Hazard Zones. The purpose of this act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards. Cities, counties, and state agencies are directed to use seismic hazard zone maps developed by CGS in their land-use planning and permitting processes. The act requires that site-specific geotechnical investigations be performed prior to permitting most urban development projects within seismic hazard zones.

California Building Code

The California Building Code (CBC 2007) is based on the 2006 International Building Code, with the addition of more extensive structural seismic provisions. Chapter 16 of the CBC contains definitions of seismic sources and the procedure used to calculate seismic forces on structures.

3.3.1.3 Local

San Bernardino County General Plan

The Safety Element of the San Bernardino County General Plan (County of San Bernardino 2007) provides for mitigation of geologic hazards through a combination of engineering, construction, land use, and development standards. The plan addresses the geologic hazards present within the county, including fault rupture, ground shaking, liquefaction, seismically generated subsidence, seiche and dam inundation, landslides/mudslides, nonseismic subsidence, erosion and volcanic activity. The county has prepared hazard overlay maps to address fault rupture, liquefaction hazards, and landslide hazards. Special consideration, including possible engineering/geologic evaluation, is required for development of sites designated on the maps.

3.3.2 Existing Conditions

3.3.2.1 Topography

The site of the project lies on a relatively flat area of land in the Lucerne Valley of the Mojave Desert physiographic province, just north of the Transverse Ranges and San Bernardino Mountains. The Transverse Ranges Province is east trending, and the San Gabriel Mountains form the central part and the San Bernardino Mountains form the eastern part of the Transverse Ranges.

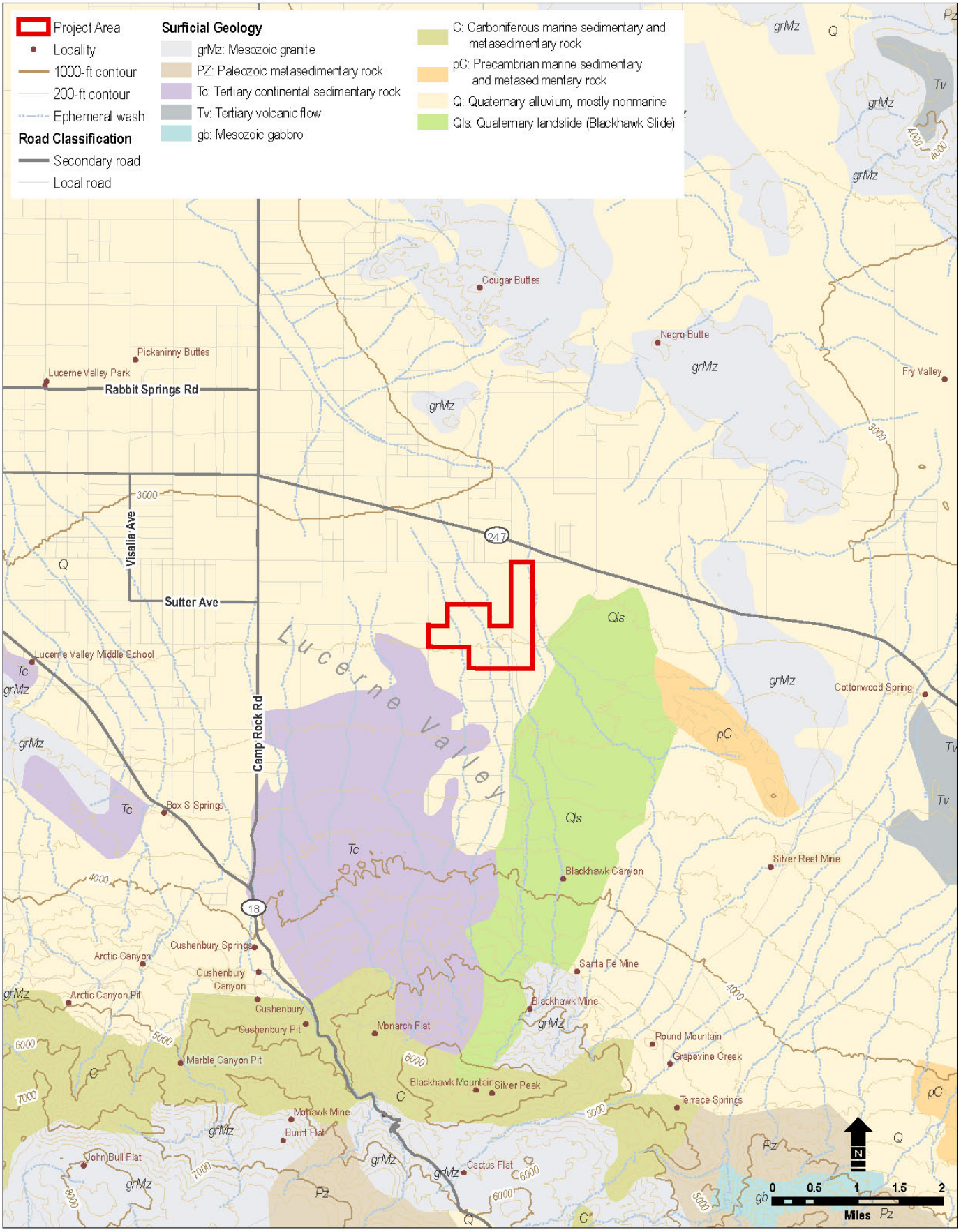
The Mojave Desert is a broad interior region of southeastern California characterized by isolated north-trending mountain ranges separated by broad expanses. The Mojave Desert forms the western portion of the larger Basin and Range Province within the Great Basin. The Mojave Desert is a late Tertiary- and Quaternary-aged infilled basin, bounded to the south and west by the San Andreas Fault Zone and on the north and northwest by the Garlock fault and Basin and Range Province near the California-Nevada state line and the Death Valley National Park region. Interior enclosed drainage and many alluvial fans and playas are characteristic of the Mojave Desert.

3.3.2.2 Geologic Setting

The Lucerne Valley stretches east-west from Deadman's Point to Old Woman Springs and north-south from the Granite and Ord Mountains to the San Bernardino Mountains. The geology and topography of the Lucerne Valley is illustrated in Figure 3.3-1.

Sedimentary Precambrian rocks were metamorphosed during the Mesozoic era. During this era a layer of limestone approximately one mile thick was also deposited. Explosive invading magma broke through the surface, producing the blue granite seen at Cougar Buttes. The Cenozoic period marked an era of large inland lakes and hot springs. Geothermal venting related to the hot springs concentrated metals into vein deposits in the area. Movement from the San Andreas Fault system during the Pliocene Epoch formed the San Bernardino Mountains. The late Miocene/Pliocene Old Woman Sandstone underlies most of the Lucerne Valley and comprises the groundwater basin. The unit is estimated to reach thicknesses of between 600 and 1,000 feet.

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_July2010\Fig 3.3-1 Regional_Geology.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee 1999; California Department of Conservation, Division of Mines and Geology; U.S. Geological Survey 1977.

Figure 3.3-1

Geology and Topography of Lucerne Valley

Lucerne Valley Solar Project

San Bernardino County, California

The surface of the Lucerne Valley is composed of Quaternary alluvium deposits. The Pleistocene alluvium consists of gravels and sand fragments derived from surrounding hills. The deposits are estimated to be of Pleistocene in age and to reach thicknesses of up to several hundred feet. The unconsolidated surface sediments consist of Holocene-age coarse material, younger alluvium, and playa deposits that are unconformable above older formations. The coarse materials are exposed along the base of the San Bernardino Mountains and along other mountains as large fragments derived from surrounding hills, which grade into younger alluvial deposits. The alluvium is composed of gravel, sand, and clay that is also derived from adjacent hills. Younger deposits range in thickness from a few inches to approximately 100 feet. The playa deposits, which are concentrated in the Lucerne (dry) Lake and Rabbit Springs (dry) Lake regions, consist predominantly of fine sand, clay, and silt 100 to 150 feet thick.

The Blackhawk Slide is located southeast of the project area. It was likely triggered by an earthquake about 17,000 years ago, when 400,000,000 tons of Blackhawk Mountain fell vertically nearly 3,000 feet and horizontally 25,000 feet onto the valley floor. The force generated by this event would have equaled a moderate sized nuclear explosion. The site is studied by geologists from around the world.

Table 3.3-1 provides the description and extent of each Quaternary surficial unit within the site. The term “Quaternary” indicates that these sediments were deposited in the recent past, specifically within the past 2.6 million years. The location of surficial units is illustrated in Figure 3.3-2. The Lucerne Valley is composed of a series of alluvial fan deposits. Alluvial fans are wedge- or fan-shaped slopes at the base of mountain ranges created through depositions of thousand to millions of years of eroded material (United States Geological Survey [USGS] 2001). These are deposits of loose sediments that have not been cemented into rock. Due to the loose nature of alluvial fans, they are subject to constant hydrologic reworking. Stream channels migrate over time and continually change the landscape. During heavy precipitation, alluvial fan deposits can be subject to rapid flow changes, resulting in debris flows, landslides, and flash floods. Extreme rain events can suspend sand, gravel, or even boulders and transport them downstream or downslope, resulting in damage to structures impacted by flood waters (USGS 2001).

Table 3.3-1 Quaternary Surficial Units within the Proposed Site

Geologic Label	Name	Description	Acres within Site
Qmof	Moderately old alluvial fan deposits, middle Pleistocene	Cemented sandstone and conglomerate.	3.36
Qof	Old alluvial fan deposits, late Pleistocene	Sand and pebbly to cobbly gravel. Well developed pavement with moderately to strongly varnished pebbles.	19.73
Qvodf	Very old debris flow fan deposits, middle or early Pleistocene	Unsorted; massive. Angular, matrix-supported pebble- to cobble-sized clasts in sand matrix; angular to subrounded clasts. Very well cemented.	28.94
Qvos	Very old slope wash and alluvial deposits, middle or early Pleistocene	Pervasively chalky-cemented sand and pebbly sandstone; firm to hard; poorly sorted; cemented to well cemented.	0.28
Qw	Active wash deposits, late Holocene	Unconsolidated medium- to coarse-grained sand and sandy gravel with subordinate fine sand and silt; white; bar and swale morphology.	34.86

Table 3.3-1 Quaternary Surficial Units within the Proposed Site

Geologic Label	Name	Description	Acres within Site
Qyas	Young alluvial and slope wash deposits, Holocene	Alluvial and slope wash apron on flanks of inselbergs. Unit includes sand and pebbly sand deposited by channelized flow on small alluvial fans and in small washes, and by unconfined overland flow across older surfaces.	0.02
Qyf_3	Young alluvial fan deposits, unit 3, late and (or) middle Holocene	Unconsolidated to slightly consolidated sand and gravel, poorly to moderately sorted. Sand is medium- to coarse-grained; gravel includes mostly pebbles and cobbles.	125.67
Qyf_4	Young alluvial fan deposits, unit 4, late and (or) middle Holocene	Unconsolidated to slightly consolidated sand and gravel, poorly to moderately sorted. Sand is medium- to coarse-grained; gravel clasts are mostly pebbles with scattered cobbles.	70.98
$Qyfw_4$	Young alluvial fan feeder wash deposits, unit 4, late and (or) middle Holocene	Sand and gravel deposited in feeder channels to young alluvial fans of unit 4.	8.48
$Qyso_{s3}$	Young slope wash and alluvial deposits, oxidized, substrate 3, Holocene and latest Pleistocene	Oxidized slope wash and alluvium deposited on substrate of moderately old and (or) very old fan deposits on the middle to upper piedmont of the San Bernardino Mountains.	213.31
Qyw	Young wash deposits, late Holocene	Unconsolidated to slightly consolidated medium- to coarse-grained sand and sandy gravel with subordinate fine sand and silt.	12.39

Source: USGS 2000

3.3.2.3 Seismicity

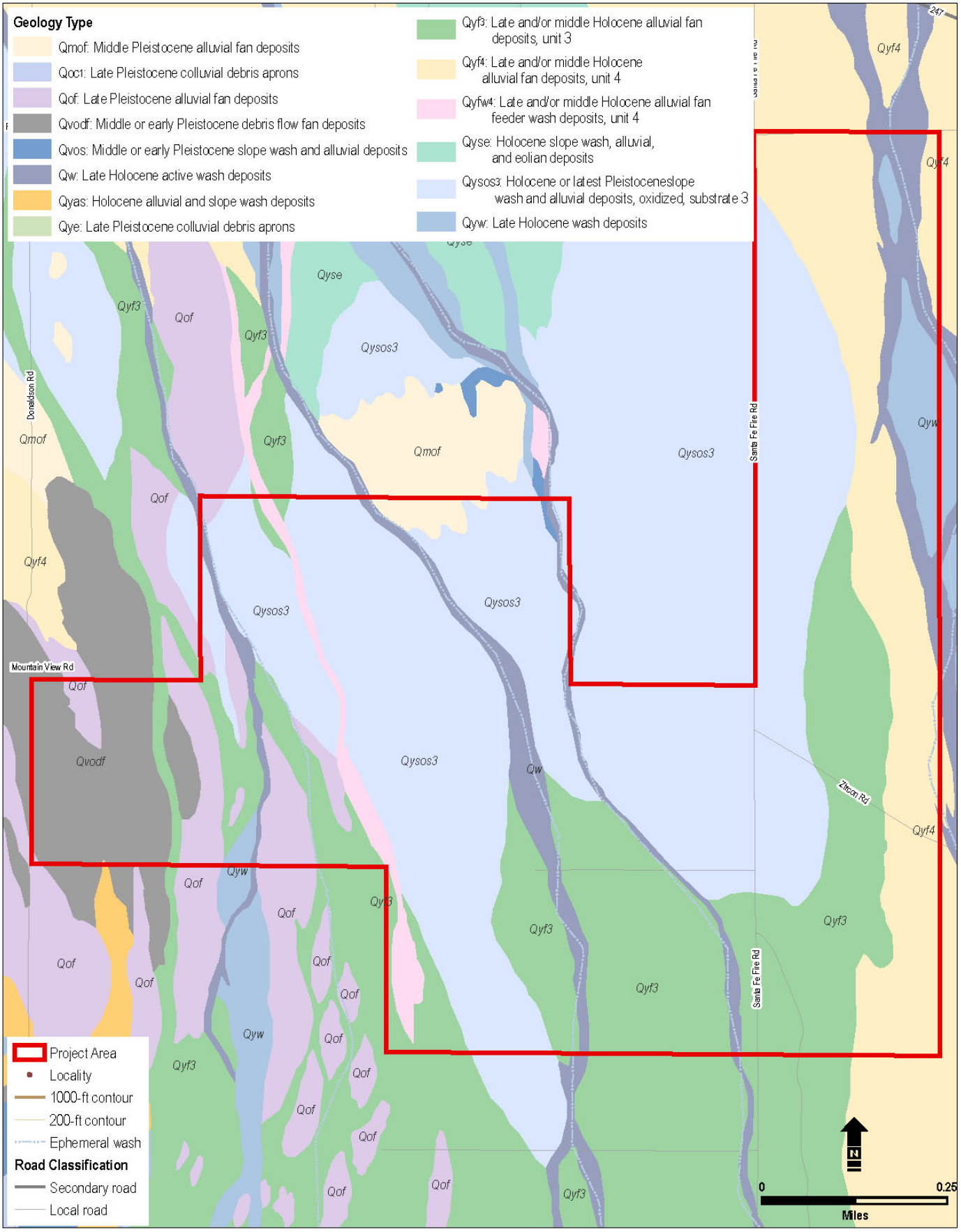
Faults

The site of the project lies in terrain with a long history of complex Mesozoic and Cenozoic tectonics associated with mountain building and development of basins and linear valleys. Throughout the late Tertiary and Quaternary, extensive linear faults (strike-slip) and vertical faults (thrust and normal) developed in the wake of the San Andreas transform fault system, becoming the boundary between the mobile North American Plate and Pacific Plate. As a result, many faults were abandoned as others newly formed to transfer or accommodate upper crustal movements throughout the Quaternary. The major Quaternary fault zones consist of strike-slip faults with some reverse and normal faults. Major fault zones near the site are shown on Figure 3.3-3.

Eastern California Shear Zone

The site of the project lies in the Eastern California Shear Zone (ECSZ). The ECSZ extends northerly across the western half of the Mojave Desert Province, is bounded to the west by the Helendale-South Lockhart Fault Zone and to the east near the Calico-Hidalgo and Pisgah-Bullion Fault Zones (Figure 3.3-3). The Mojave Desert encompasses north- to northwest-trending dextral shear, rigid-block boundary conditions, accompanied by extensional normal faulting and conjugate east striking sinistral faults.

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\
MXD\DEIS_July2010\Fig 3.3-2 Geology_of_Project_Site.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee 1999; California Department of Conservation, Division of Mines and Geology; U.S. Geological Survey 1977.

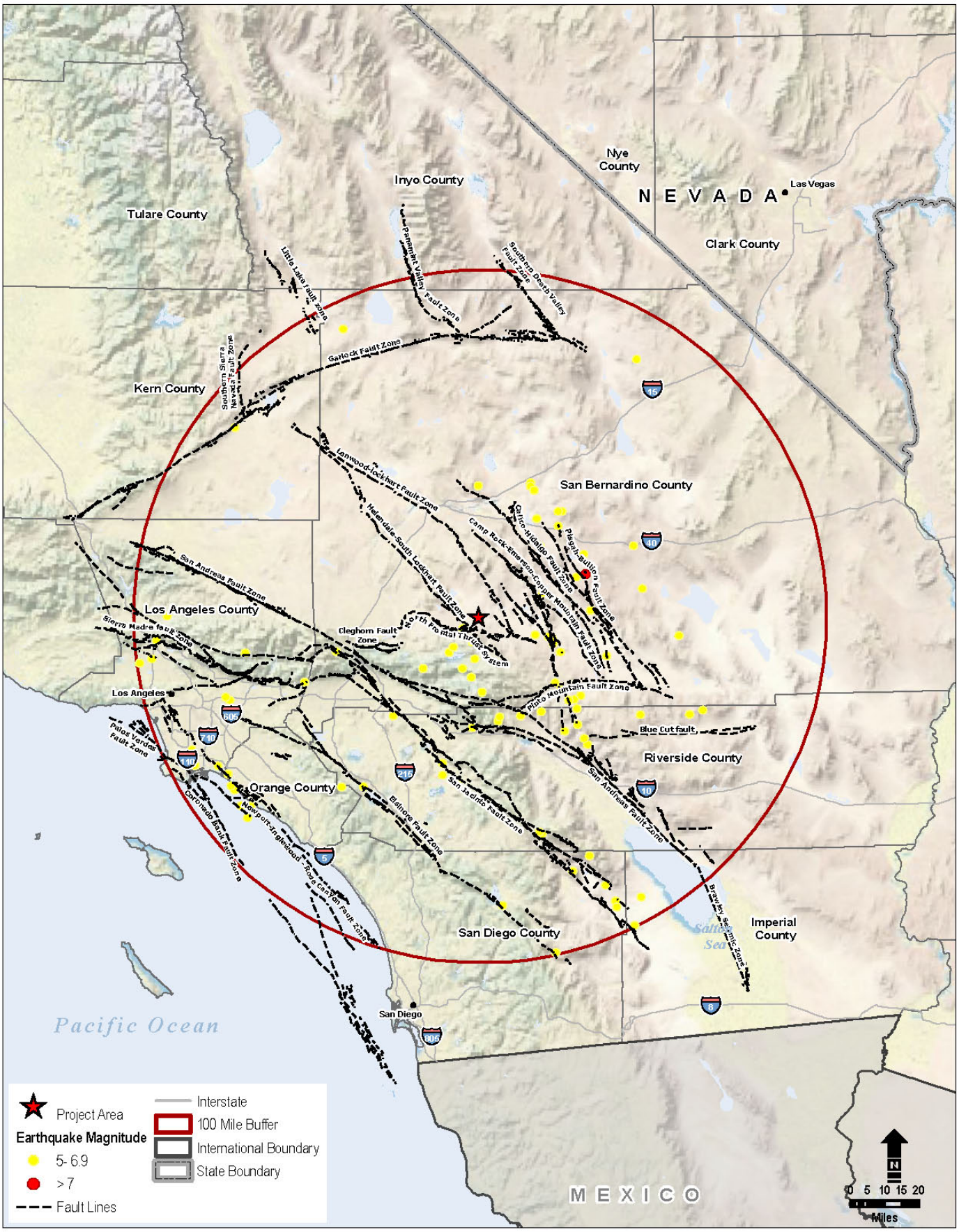
Figure 3.3-2

Surficial Geology of the Project Area

Lucerne Valley Solar Project

San Bernandino County, California

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_Oct2009\3-2_Topo_Geo\Fault_Lines_and quakes 100_Miles.mxd



Source: USGS 2004

Figure 3.3-3

Fault Zones and Epicenters of M ≥ 5.0 Earthquakes Since 1900 Within 100 Miles of the Project Area

Lucerne Valley Solar Project

San Bernardino County, California

The structural domains of the Mojave Desert, described by Miller et al. (2005) relates the transfer of Quaternary strain and accumulation into fault related belts. The faults include, from west to east, the northwest striking Helendale-South Lockhart Fault Zone, the Lenwood-Lockhart Fault Zone, and Harper-Camp Rock Fault Zone (Figure 3.3-3). Kinematic models indicate that structural blocks bounded by northwest-striking dextral faults have undergone little rotation. The blocks bounded by the east-striking sinistral faults have undergone as much as 60 degrees clockwise rotation (Miller et al. 2005). These blocks have accumulated strain in the middle to upper crust because the Miocene are evolving in the Quaternary to form new faults and transfer strain across these rigid blocks from one major dextral fault to the next.

Earthquakes

Since 1900, there have been 106 earthquakes with a magnitude (M) of 5.0 or higher on the Richter scale that have occurred within 100 miles of the proposed route (USGS 2005). Figure 3.3-3 shows the regional distribution of these data. Two earthquakes above 7.0 M have occurred within 100 miles of the site. These two earthquakes and associated damage are described below.

The 7.3 M Landers earthquake occurred in June 1992, approximately 25 miles southeast of the site in the Camp Rock-Emerson-Copper Mountain Fault Zone (USGS 2005). The earthquake resulted in two deaths due to heart attacks and more than 400 injured persons. Surface fault displacements along the 70-kilometer segment amounted to up to 5.5 meters of lateral movements and 1.8 meters of vertical movement (USGS 2009a).

The 7.2 M Hector Mine earthquake occurred in October 1999, approximately 32 miles northeast of the site in the Pisgah-Bullion Fault Zone (USGS 2005). This earthquake was the result of a fault rupture resulting in 5.2 meters of lateral movement. Very strong shaking and moderate damage were reported immediately surrounding the epicenter. In Lucerne Valley, strong shaking and light damage were reported (USGS 2009b). Overall, damage was minimal due to the remote location of the earthquake (Southern California Earthquake Data Center 2009).

Seismic Shaking

Seismic activity may cause hazards that can cause damage and loss of life. Such hazards include ground shaking, landslides, rock falls, and surface faulting. In general, ground shaking produces the most widespread damage because it can affect large areas. The USGS produces seismic hazard maps of peak horizontal acceleration (ground shaking), and the unit of measure is percent of gravity. Peak acceleration is the largest ground acceleration recorded by a particular station during an earthquake (USGS 2008a).

The site is categorized as having peak ground acceleration (PGA) for a 10 percent probability of exceedance in 50 years of 30 percent gravity. This PGA is associated with “moderate” shaking resulting in “low to moderate damage” to structures (USGS 2008b). The data are derived from seismic hazard curves calculated on a grid of sites across the southwestern United States that describe the frequency of exceeding a set of ground motions. The ground motions relate the source characteristics of the earthquake and propagation path of the seismic waves to the ground motion at a site.

3.3.2.4 Landslides

A landslide is the movement of soil, rock, or other earth material downhill in response to gravity (USGS 2004). Several natural events can precipitate landslides, including earthquakes, volcanic eruptions, and most commonly, rainfall. In addition, human activity can cause landslides.

The National Landslide Hazards Program prepared an overview map of landslide incidence and susceptibility by evaluating the geologic map of the United States and classifying the geologic units according to high, medium, or low landslide incidence (number of landslides) and high, medium, or low susceptibility to landslides. The site is categorized as having low susceptibility to and incidence of landslides (Godt 2001).

3.3.2.5 Liquefaction

Liquefaction is a phenomenon in which loose to medium dense, saturated, granular materials undergo matrix rearrangement, develop high pore water pressure, and lose shear strength because of cyclic ground vibrations induced by earthquakes. This rearrangement and strength loss is followed by a reduction in bulk volume of the liquefied soils. The secondary effects of liquefaction can include the loss of load-bearing capacity below foundations, settlement in level ground, and instability in areas of sloping ground (also known as lateral spreading). Typically, liquefaction occurs over a high water table, within 32 feet of the ground surface (Dennen and Moore 1986). Liquefaction risk is anticipated to be low based on the relatively deep occurrence of groundwater at 350 feet (see Section 3.5, “Water Resources/Hydrology”).

3.4 Soils

This section identifies the soil conditions within and adjacent to the project site and discusses applicable regulations. Information in this section is largely based on existing data from the State Soil Geographic database (STATSGO) and Natural Resources Conservation Service (NRCS) county soil survey maps. The NRCS Soil Survey Geographic database does not cover this region.

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. Comments and concerns related to soils resources were raised about fugitive dust and cryptobiotic soils and about erosion. These comments are addressed in the discussion of existing conditions (Section 3.4.2) and the analysis of direct and indirect effects (Section 4.4.2).

3.4.1 Applicable Plans, Policies, and Regulations

Federal and state regulations pertaining to agricultural land and soils include the Farmland Protection Policy Act, the California Land Conservation Act (Williamson Act), and the California Department of Conservation Farmland Mapping and Monitoring Program. The program identifies and designates lands according to categories defined in the Farmland Protection Policy Act (7 United States Code, Section 4201, et. seq.). Agricultural regulations, however, do not pertain to the project because the site is not located on prime farmland (Fahnestock 2009, Federal Surface Mining Control and Reclamation Act 1977, NRCS 2005).

3.4.2 Existing Conditions

Wasco-Rosamond-Cajon soils occur throughout the project site. The association consists of very deep, nearly level to slightly sloping, well-drained, sandy-loam soils. Wasco soils are found on alluvial fans and floodplains formed within the last 15,000 years. Rosamond soils are found on the lower margin of the alluvial fans between the sloping fans and the playas. Cajon soils are found on alluvial fans and river terraces. The soils of this association are unsuitable for cultivation, and their use is restricted to grazing, forestland, or wildlife. The soil limitation in this unit is erosion, which may be an issue unless low-growing plant cover is maintained (U.S. Department of Agriculture [USDA] 1984). Further information is provided in Table 3.4-1.

Table 3.4-1 Summary of Soil Types and Limitations by Percent of the Project Site

Percent of Total	Acres	Soil Association	Texture Class	Capability Class (Non-irrigated)[a, b]	Capability Subclass (Non-irrigated)[c]	Drainage Class	Hydric Class	Slope Percent
100	517.6	Wasco-Rosamond-Cajon	Sandy Loam	7	e	Well drained	Non hydric	2–5

Source: STATSGO 2006

Notes:

[a] Irrigated capability-class and subclass data were available but not included in this table because none of the project site is classified as prime farmland.

[b] Capability Class 7 definition: Soils have very severe limitations that make them unsuitable for cultivation.

[c] Capability Subclass "e" definition: Limitation due to erosion unless low-growing plant cover is maintained.

Erosion

As stated above, soil erosion may be an issue on the project site unless certain erosion control measures are implemented. The project site is ranked in Wind Erodibility Group 2 (STATSGO 2006), indicating that the soils are very highly erodible, and crops can only be grown if intensive measures are used to control wind erosion (USDA 1984).

Cryptobiotic Crusts

Cryptobiotic crusts (biological soil crusts) are thin layers of microbial-rich plant material that live on the surface of many soils types in desert areas. Other names for cryptobiotic crusts include cryptobiotic, cryptogamic, and microbiotic soil crusts. These biological communities serve a number of functions in stabilizing the soil and creating an environment for plant species to inhabit harsh environments. The thin crusts on the soil help control erosion and retain water. If the layer of microbes is altered, it can take from 5 to 250 years to regenerate, depending on rainfall levels. Cryptobiotic soils exist in the Mojave Desert area but are uncommon. According to local NRCS experts, coverage near the project site is less than five percent and not critical for dust suppression (Fahnestock 2009; U.S. Geological Survey 2002).

3.5 Water Resources/Hydrology

This section identifies water resources within and adjacent to the site of the project area, discusses existing conditions, and identifies applicable regulations. Water resources that would be used during construction, operation and maintenance, and decommissioning are discussed.

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following comments and concerns related to water resources were raised: (1) flash flooding; (2) drilling of new wells; (3) water use and volume for various construction and operation activities (e.g., dust suppression and panel cleaning); (4) water rights; and (5) water quality impairment. These comments are addressed in the discussion of existing conditions (Section 3.5.2) and the analysis of direct and indirect effects (Section 4.5.2).

3.5.1 Applicable Plans, Policies, and Regulations

3.5.1.1 Federal

Clean Water Act

In 1972, Congress passed the Federal Water Pollution Control Act, which was reauthorized in 1977, 1981, 1987, and 2000 as the Clean Water Act (CWA). The goal of the law is to eliminate pollution in the nation's waters by imposing uniform standards on all municipal and industrial wastewater sources based on the best available technology.

Sections 301 and 402 Permitting

Sections 301 and 402 of the CWA prohibit the discharge of pollutants from point sources to "Waters of the U.S.," unless authorized under a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits can be issued by the EPA or by agencies in delegated states. The NPDES permit program has been delegated in California to the State Water Resources Control Board (SWRCB).

Safe Drinking Water Act

This act was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and groundwater wells. This act authorizes the EPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. The act also mandates a groundwater/wellhead protection program be developed by each state in order to protect groundwater resources that serve as a source for public drinking water.

National Flood Insurance Program

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA), a component of the U.S. Department of Homeland Security. The NFIP is a federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding. Participation in the NFIP is based on an agreement between local communities and the federal government, which states that if a community adopts and enforces a floodplain management ordinance to reduce future flood risks

to new construction in Special Flood Hazard Areas, the federal government makes flood insurance available within the community as a financial protection against flood losses.

In support of the NFIP, FEMA identifies flood hazard areas throughout the United States and its territories by producing flood hazard boundary maps, flood insurance rate maps, and flood boundary and floodway maps. Several areas of flood hazards are commonly identified on these maps. One of these areas is the special flood hazard area or high-risk area, defined as any land that would be inundated by a flood having a one percent chance of occurring in any given year (also referred to as the base flood).

3.5.1.2 State

State water quality standards allow water bodies to be managed by establishing goals based on 1) designated uses of the water, 2) criteria set to protect human and aquatic organism health, and 3) anti-degradation requirements to prevent current water quality from deterioration. Waters listed as impaired do not fully support their designated uses. Section 305(b) of the CWA requires states to submit water quality reports to the EPA every two years that provide a state-wide assessment of all waters. Section 303(d) requires states to provide a list of impaired waters only, identifying possible pollutants and prioritizing those waters for further pollution controls.

California Porter-Cologne Water Quality Control Act

This act was passed in 1969, and regulates surface water and groundwater within the state and also assigns responsibility for implementing CWA Sections 401, 402, and 303(d) in California. It established the SWRCB and divided the state into nine regions, each overseen by a Regional Water Quality Control Board (RWQCB). The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, but much of its daily implementation authority is delegated to the nine RWQCBs. In California, San Bernardino County programs are administered by the Lahontan RWQCB, Region 6; the Colorado River Basin RWQCB, Region 7; and the Santa Ana RWQCB, Region 8. The regional boards govern the protection of surface waters by assessing the attainment of designated beneficial uses, and currently 23 uses are established for surface waters within the state.

Construction General Permit

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the NPDES program. In California, the SWRCB has been delegated the authority by the EPA to administer the NPDES program through the RWQCBs and has developed a general permit for Storm Water Discharges Associated with Construction Activities, the Construction General Permit (Water Quality Order 99-08-DWQ). However, since the project is schedule to begin construction in late 2010, the Applicant will have to obtain coverage under the Construction General Permit Order 2009-0009-DWQ which will be effective on July 1, 2010. This requirement is for all dischargers (California SWRCB 2009).

Because the project would discharge stormwater, the Applicant is required to obtain an NPDES Construction General Permit Order 2009-0009-DWQ from the Colorado River Basin RWQCB, which would require them to prepare a Stormwater Pollution Prevention Plan (SWPPP) or obtain individual stormwater permits. The SWPPP must contain information about proposed site layout and topography, stormwater collection and discharge points, and drainage patterns across the site. It must also list Best Management Practices (BMPs) that would be used to protect stormwater runoff and visual, chemical, and sediment monitoring programs.

The project area is under the jurisdiction of the Colorado River Basin RWQCB, which would need to be notified of the Applicant's intention to proceed. No specific California SWRCB regulations exist pertaining to the treatment of fuel spills during construction, although petroleum contaminated materials must be disposed of in accordance with applicable state and local regulations.

Groundwater Protection Areas and Wellhead Protection

The California Department of Public Health established the Drinking Water Source Assessment and Protection Program, which provides guidance to local level agencies for source protection of surface water and groundwater drinking water supplies. The California Department of Pesticide Regulation's Groundwater Protection Program is charged with identifying areas sensitive to pesticide contamination and develops mitigation measures and regulations to prevent pesticide movement into groundwater systems.

3.5.1.3 Local

Basin management for the Lucerne Valley is administered by the Mojave Water Agency in San Bernardino County. A Regional Water Management Plan was developed in 1994 and is still in place (California Department of Water Resources [DWR] 2004). One of the primary mandates of the agency is to ensure long-term public water supply through the protection of surface water and groundwater resources, including supply, storage, recharge capability, and chemical quality. The Applicant would confer with the Mojave Water Agency during implementation of the project to ensure protection of groundwater resources and compliance with any established groundwater management plans and, if necessary, to secure permits needed for encroachment on water district easements.

San Bernardino County

Floodplain Management

The San Bernardino County Flood Control District was formed for the preservation and promotion of public peace, health, and safety in the aftermath of disastrous 1938 floods. The District exercises control over all main streams in the county, acquires a ROW for all main channels, constructs channels, and carries out an active program of permanent channel improvements in coordination with the U.S. Army Corps of Engineers. The district administers encroachment permits needed for flood channel crossings or any work within its ROW, should they be required.

Stormwater Management

The unincorporated areas of San Bernardino County, its 16 incorporated cities, and the San Bernardino Flood Control District are included as permittees in the NPDES Municipal Stormwater Permit. The Municipal Stormwater Permit and Section 4 of the Report of Waste Discharge, dated April 1995, require the development and adoption of New Development/Redevelopment Guidelines.

These guidelines are to be used by the permittees of the San Bernardino County Stormwater Program as a supplement to the Drainage Area Management Program and the Report of Waste Discharge. The purpose of preparing the guidelines was to identify pollutant prevention and treatment measures that could be incorporated into development projects. The guidelines recommend which BMPs should be required as standard practice. The guidelines provide information on stormwater quality management planning, general conditions, special conditions, and construction regulatory requirements.

The guidelines also define structural and non-structural BMPs and lists the BMPs that are considered standard practice for new developments. A major philosophy of the county's NPDES stormwater quality program is a regional approach to stormwater quality planning and management on a watershed basis (Camp Dresser and McKee 2000).

Currently, the County of San Bernardino follows state standards for water quality and does not have its own specific standards. During construction, projects are required to obtain coverage under the California's General Permit for Construction Activities, which is administered by the RWQCB. Stormwater management measures are required to be identified and implemented that would effectively control erosion and sedimentation and other construction-based pollutants during construction. Other management measures, such as construction of detention basins, are required to be identified and implemented that would effectively treat pollutants expected for the post-construction land uses.

Because projects are subject to regulatory requirements, effects on water quality standards or waste discharge requirements related to implementation of the County of San Bernardino General Plan are considered less than significant. All future individual construction projects over one acre that are implemented under the County of San Bernardino General Plan would be required to have coverage under the California's General Permit for Construction Activities (County of San Bernardino 2007). As required in the General Permit for Construction Activities, during and after construction, BMPs would be implemented to reduce or eliminate adverse water quality effects resulting from development. In addition, a SWPPP would have to developed, approved, and implemented.

3.5.2 Existing Conditions

3.5.2.1 Surface Water Resources and Flooding

The site of the project is located with the Mojave River Watershed and Blackhawk Canyon and Cougar Buttes subbasins (Cal-Atlas 2009). Annual precipitation in the watershed is low, ranging from four to eight inches. Surface water within the watershed drains into Lucerne Dry Lake, an ephemeral lake northwest of the site (DWR 2004).

The surface of the site is characterized by desert scrub vegetation, desert washes, and disturbed soils. Approximately 96 percent of the site is sparsely to moderately vegetated, with the remaining area made up of desert wash channels (3 percent) and disturbed areas (1 percent), consisting of roads and sediment berms scattered throughout. Alluvium in the site area is composed of clay, sand, and gravel material and is a few inches up to 100 feet thick (Chambers Group 2009). The soils and alluvium are highly erosive, as evidenced by the incised scouring and presence of unconfined drainage channels. There are seven larger drainages on the site, with numerous smaller drainages scattered throughout the area. The few dirt roads on the site are relatively small (less than 5 feet wide). The sediment berms appear to be remnants of historic hand-dug mining activity.

The desert washes, which are typical in the Mojave Desert, are braided in plan view. These streams flow only intermittently during seasonal precipitation events, are unstable, and can migrate laterally during significant runoff. They can also carry destructive bedloads (boulders and gravels) during rain events. Significant desert wash systems are present in the central portion of the site and along the eastern edge. There are no perennial streams, wetlands, or water bodies located on or near the site. Modeling done by the Applicant on the major drainages suggests that these channels could experience high flows during episodic rain

events. Although no floodplain studies or mapping exercises have been conducted to date for this area to assess flooding hazards (DWR 2009); during the public scoping process, residents and resource agencies noted that this area is subject to intense flooding events, including flash floods (Appendix A). The site is identified by FEMA as Zone D, indicating that there are possible but undetermined flood hazards in the area.

Geologically, the site is located on the distal (down gradient) portion of an alluvial fan that forms a large cone-shaped sedimentary deposit. This is a common depositional environment in this region (Reading 1980). The entire project area is an alluvial fan, meaning that it has had significant amounts of flowing water carrying and subsequently depositing sediments across its entire extent. The processes that occur on alluvial fans can be random and difficult to model.

Sediments, which can range from clay to large boulders, are transported across alluvial fans by water in channels, debris flows, and sheet floods. Water flows on alluvial fans in arid climates are triggered by significant precipitation events. Specific to the Mojave Desert region these would include the random summer cloud bursts, which occur infrequently but can supply a large amount of water to a localized area, or a larger storm, such as a tropical storm that occurs on a 100-year time scale.

Another approach to understand and assess flood hazards on alluvial fans has been developed for arid alluvial fans in Nevada. This approach uses geologic mapping to determine active and inactive portions of alluvial fans. Physical features, such as stratigraphic relationships, topography, drainage patterns, soil development, and surface morphology, are used to determine active and inactive portions of fans (House 2005). This approach may improve the accuracy of surface water modeling on alluvial fans and reduce the associated flood hazards.

Surface Water Quality

Although ephemeral streams and washes do not have beneficial use designations assigned by the State of California, these systems do provide natural distribution of water and sediments on floodplains, as well as providing recharge for groundwater in the region. No information is available as to the surface water quality present on the site during rain events, but due to the nature of flooding that occurs, resulting flood waters would be high in turbidity and contain any contaminants that had been present on the soil surface. Cultural resources surveys recorded the presence of discarded Chlorox and Purex bleach bottles, as well as discarded motor oil cans. It is not known if any of these containers still contain product. If so, the soil surface could contain these contaminants. Due to the distance to groundwater and the limited amount of potential pollutant, it is unlikely that contaminants would reach the ground water.

3.5.2.2 Ground Water Resources

The site of the project lies within the Basin and Range Physiographic Province, which has the following principal aquifer media: volcanic rocks, carbonates, and basin-fill sediments. Together these aquifers are called the Basin and Range Aquifer System. The Basin and Range Physiographic Province is broken down at the regional level, depending on geologic drainage features, such as the drainage boundaries of a large river or stream, into hydrographic basins. The site is underlain by the Lucerne Valley Groundwater Basin in the northwest part of the Colorado River Hydrologic Region (DWR 2004). This groundwater basin provides important water supply functions and provides two-thirds of the water supply needed for non-potable and potable public uses in the watershed (USGS 2008). Recharge to the basin is highly seasonal and comes primarily from runoff from the San Bernardino, Granite, Ord, and Fry mountain ranges (DWR 2004). As with surface drainage, the recharge ground waters flow toward Lucerne

Dry Lake. Since 1917, the withdrawal of groundwater from the basin, combined with slow recharge, has frequently resulted in overdraft conditions in many parts of the basin (DWR 2004).

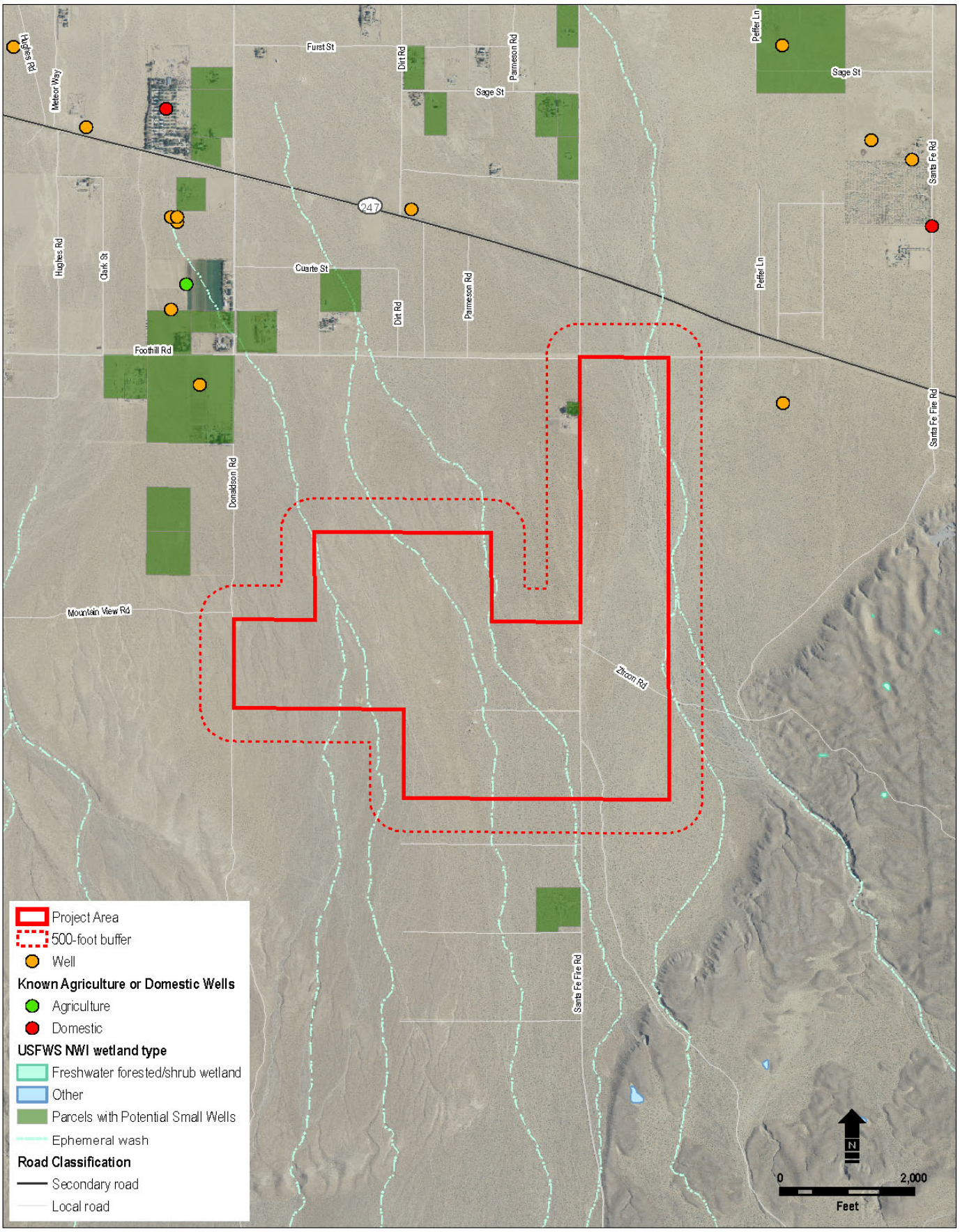
Groundwater Quality

One USGS monitoring well, which has been monitored since October 1994, is present in the site area. Typical well elevations are between 350 and 360 feet below ground surface. Water supply well locations within one mile of the site are provided by DWR, as shown on Figure 3.5-1. Other specific data regarding these wells (e.g., owner, depth, well logs, production rate, and static water level) was not available from DWR.

3.5.2.3 Water Use and Discharge Related to the Project

The project would require water for both construction and operation. Approximately 1,000 gallons of water would be needed to wash a 1-MW block of panels. The worst case washing scenario would be two washings per year; however, many other similar projects have not needed washing in over two years. Panel washing companies use a collection system when washing utility-scale panels in which approximately 50 percent of the water from each panel is collected, filtered, and reused. Assuming that this procedure would be used, water usage would be 500 gallons per 1-MW block of panels per year. When operating at 45 megawatts, a total of 22,520 gallons would be used per wash, or 45,240 gallons per year. The first phase of the Proposed Action (20 megawatts) would use 20,100 gallons per year, or 10,050 gallons per wash (Fotowatio Renewable Ventures 2010). This water would not be supplied from new or existing on-site wells; rather, the water obtained for both construction and operation would be from a permitted off-site source.

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_Oct2009\3-5_WaterResources\Drainage and Well Locations.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; USFWS 1999; NHD 1993; Bing Aerial 2009

Figure 3.5-1

Hydrologic Features

Lucerne Valey Solar Project

San Bernardino County, California

3.6 Biological Resources

This section identifies biological resources within and adjacent to the site of the project and discusses applicable regulations. This section is based largely on the final Biological Assessment for the Chevron Solar Project Site Community of Lucerne Valley, California (Appendix C), Comprehensive Biological Resources Assessment for the Chevron Solar Project Site Community of Lucerne Valley, California (Appendix D), and Eagle Survey for the Chevron Energy Solutions Solar Project (Appendix L).

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. Comments related to biological resources generally concerned effects on desert habitats and plants and animals found on the site, including those afforded greater legal protection owing to heightened concern for conservation status (e.g., desert tortoise [*Gopherus agassizii*]). Wildlife movement corridors and effects on connectivity among habitats were additional concerns.

3.6.1 Applicable Plans, Policies, and Regulations

3.6.1.1 Federal

Federal Endangered Species Act

The Federal Endangered Species Act (ESA) of 1973, as amended, provides for federal protection of plant and animal species listed as threatened or endangered by the federal government. The United States Fish and Wildlife Service (USFWS) administers the ESA on behalf of the United States. The major components of the ESA are as follows:

- Provisions for the listing of threatened and endangered species;
- The requirement for consultation with the USFWS on federal and private projects which may affect federally listed species;
- Prohibitions against “take” of listed species. Under the ESA, the definition of “take” is to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct”; and
- Provisions to allow the incidental taking of threatened and endangered species.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act makes it illegal to take or possess any migratory bird (or any part of a migratory bird including active nests) unless permitted by regulation (e.g. duck hunting).

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act makes it illegal to take bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), or to trade in eagle parts, eggs, or feathers.

3.6.1.2 State and Regional

California Endangered Species Act

The California Endangered Species Act establishes legal protection for state listed threatened and endangered plants and wildlife. The protection is administered under the authority of the

California Department of Fish and Game (CDFG), which also identifies species of concern as those that may become listed as threatened or endangered due to loss of habitat, limited distributions, and diminishing population sizes, or because the species is deemed to have scientific, recreational, or educational value. The CDFG recognizes that plants on California Native Plant Society Lists 1A, 1B, and 2 and some of the plants on Lists 3 and 4 qualify for listing under Sections 2062 and 2067 of the California Endangered Species Act.

California Native Plant Protection Act of 1977

This act designates State rare, threatened, and endangered plants.

California Desert Native Plants Act of 1981

This act protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.

California Code of Regulations Title 14, sections 670.2 and 670.5

These regulations list the plants and animals of California that are declared rare, threatened, or endangered.

California Food and Agriculture Code, Section 403
The California Department of Food and Agriculture is designated to prevent the introduction and spread of injurious insect or animal pests, plant diseases, and noxious weeds.

California Fish and Game Code Sections 3503 and 3503.5

Code Section 3503 makes it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Code 3503.5 makes it unlawful to take, possess, or destroy any birds in the order *Falconiformes* or *Strigiformes* (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird. Construction disturbance during the breeding season that results in the incidental loss of fertile eggs or nestlings, or otherwise leads to nest abandonment, is considered take. Disturbance that causes nest abandonment and/or loss of reproductive effort is also considered take by the CDFG.

California Fish and Game Code Sections 3511, 4700, 5050, and 5515

These codes prohibit the taking and possession of birds and reptiles listed as “fully protected.” The administering agency is the CDFG.

California Fish and Game Code section 3513

Protects California’s migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.

California Food and Agriculture Code Sections 7270–7224

The California Commissioner of Agriculture is granted the authority to investigate and control nonnative invasive weeds.

California Title 3 CCR Section 4500

Lists plant species that are considered noxious weeds.

Desert Tortoise Recovery Plan

The Desert Tortoise (Mojave Population) Recovery Plan established recovery goals and objectives for six "recovery units" and recommended that Desert Wildlife Management Areas be established within each recovery unit. The Recovery Plan is advisory; federal agencies are not required to adopt its suggestions. The principle agency mechanism for implementing recovery plan tasks is through amendments to existing resource management plans or through the development of broader bioregional plans in collaboration with local governments.

BLM California Desert Conservation Area (CDCA) Plan

Administered by the BLM, the CDCA Plan requires that proposed development projects are compatible with policies that provide for the protection, enhancement, and sustainability of fish and wildlife species, wildlife corridors, riparian and wetland habitats, and native vegetation resources.

West Mojave Plan

The BLM produced the West Mojave Plan as an amendment to the CDCA Plan. The West Mojave Plan is a federal land use plan amendment that 1) presents a comprehensive strategy to conserve and protect the desert tortoise, the Mohave ground squirrel, and nearly 100 other plants and animals and the natural communities of which they are part, and 2) provides a streamlined program for complying with the requirements of the California and federal Endangered Species Acts

San Bernardino County Development Code

Removal of any native tree or plant requires a removal permit (provision 89.0115). Desert native plants cannot be harvested or removed except under a permit issued by the Agricultural Commissioner or other applicable county reviewing authority (provision 89.0415).

San Bernardino County General Plan

The County General Plan requires the retention of existing native vegetation for new development projects, particularly Joshua trees (*Yucca brevifolia*), Mojave yuccas (*Yucca schidigera*), creosote (*Larrea tridentata*) rings, and other species protected by the Development Code and other regulations. Conservation practices in the management of grading, replacement of ground cover, protection of soils and natural drainage, and the protection and replacement of trees are encouraged.

City of Victorville General Plan

The City General Plan requires preservation of native Joshua tree woodlands and specimens where possible (Resource Element, Policy 1.5). The City General Plan is implemented in Victorville Municipal Code (Chapter 1333), which prohibits the cutting, damaging, destroying,

digging up, or harvesting of any Joshua tree without the written consent of the Director of Parks and Recreation.

3.6.2 Existing Conditions

The following section describes the existing biological conditions on and around the project area.

3.6.2.1 Vegetation

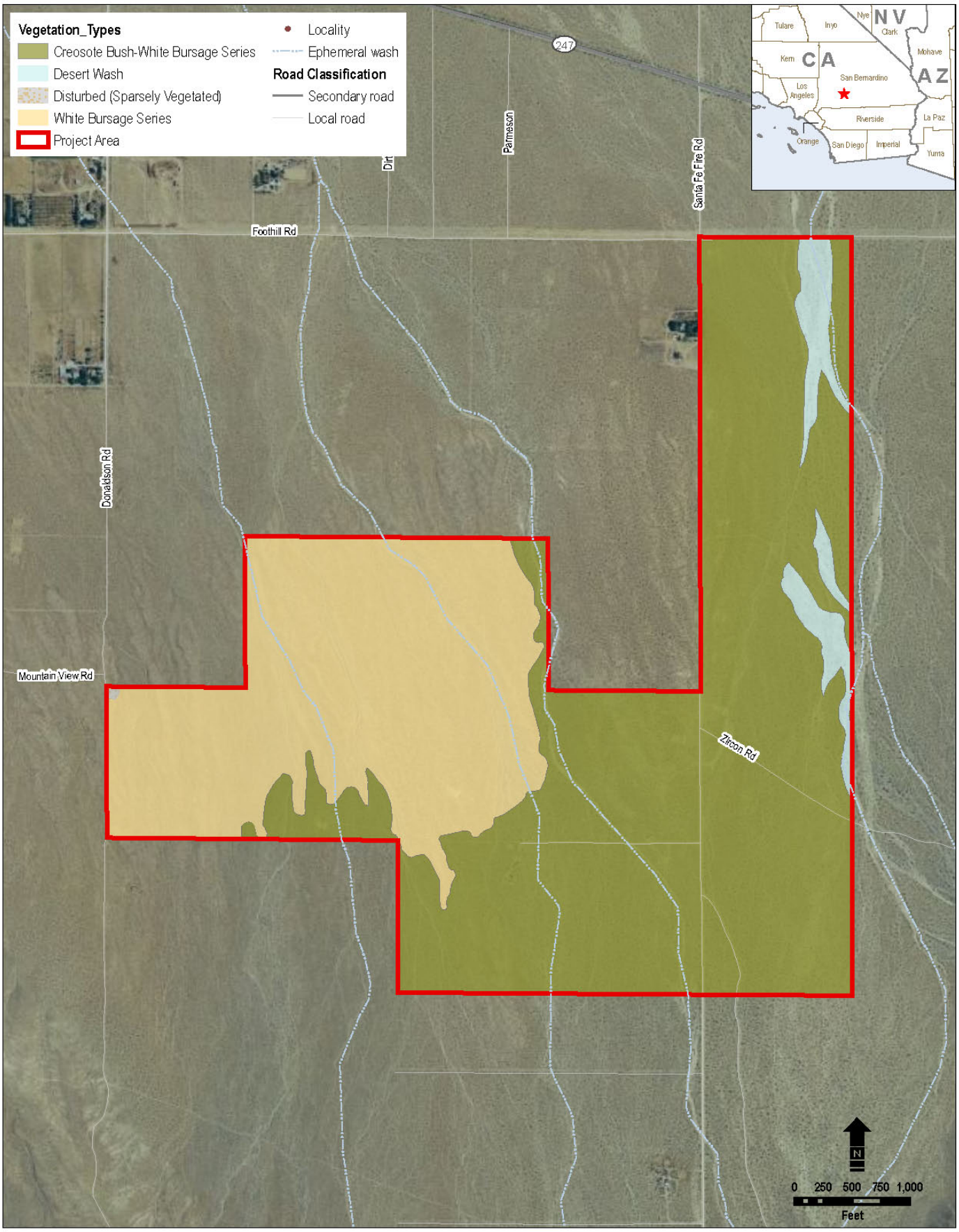
Vegetation consists of both the plant communities and individual plant species. Vegetation communities and plant species detected during site surveys were characteristic of the existing site conditions of relatively flat terrain with both undisturbed and disturbed areas. Vegetation communities and individual plant species were identified during a reconnaissance-level survey in March 2009 and during focused protocol-level surveys conducted in May 2009 (Chambers Group 2009).

Thirty-seven plant species were observed on the site during the one-day reconnaissance level survey, including the creosote bush, white bursage (*Ambrosia dumosa*), Nevada ephedra (*Ephedra nevadensis*), pincushion (*Chaenactis* sp.), scale-broom (*Lepidospartum squamatum*), devil's lettuce (*Amsinckia tesselata*), blunt tansymustard (*Descurainia pinnata* ssp. *glabra*), beavertail cactus (*Opuntia basilaris* var. *basilaris*), bladderpod (*Isomeris arborea*), astragalus (*Astragalus* sp.), phacelia (*Phacelia* sp.), littleleaf rhatany (*Krameria erecta*), Pacific blazingstar (*Mentzelia obscura*), desert mallow (*Sphaeralcea ambigua*), camissonia (*Camissonia* sp.), sapphire eriastrum (*Eriastrum sapphirinum*), California buckwheat (*Eriogonum fasciculatum*), larkspur (*Delphinium* sp.), box-thorn (*Lycium* sp.), and Joshua tree, among others (Chambers Group 2009). The protocol-level survey identified over 100 species of plants while looking for special status plant species.

Plant communities were determined in accordance with the categories set forth by Holland (1986) and Sawyer and Keeler-Wolf (1995). Plants of uncertain identity were collected and subsequently identified from keys, descriptions, and illustrations in Abrams and Ferris (1960), Baldwin et al. (2002), , MacKay (2003), and Munz (1974). Plant nomenclature follows that of *The Jepson Desert Manual: Vascular Plants of Southeastern California* (Wetherwax 2002). Identification and distribution of vegetation across the site was determined from reconnaissance-level field surveys conducted by Chambers Group on March 16, 2009 (Chambers Group 2009).

Three major plant communities (Table 3.6-1) were mapped within the site including creosote bush-white bursage series, white bursage series, and desert wash. Some of the site was disturbed, and low densities of invasive weed species were located throughout the site. Figure 3.6-1 shows the locations of mapped vegetative communities throughout the project area within the Lucerne Valley. A summary of common plant communities is provided below, followed by a discussion of succulent plant species.

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_July2010\Fig 3.6-1 Vegetation_Types.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee, 1999; California Resource Agency, Legacy Project, 2003.

Figure 3.6-1

Vegetation Types Map

Chevron Lucerne Solar Project

San Bernandino County, California

Table 3.6-1 Vegetation Communities in the Project Area

Vegetation Community	Area (acres)	Percentage of Project Area
Creosote bush (white bursage)	319	62
White bursage	176	34
Desert wash	18	3
Disturbed	5	1
Total	518*	100

Source: Chambers Group 2009

*This number is larger than the project site of 516 acres due to rounding.

Creosote Bush-White Bursage Series

Creosote bush-white bursage series is an extremely drought-tolerant mixed evergreen-deciduous shrubland that typically consists of well-drained secondary soils with very low available water holding capacity (Sawyer and Keeler-Wolf 1995). This community type is dominated by creosote bush and white bursage, with creosote bush occupying 55 percent and white bursage occupying 45 percent of the total vegetative cover in this portion of the site (Chambers Group 2009). Total vegetative cover by perennials is approximately 45 percent. This community is found on slopes and fans, and in valleys on well-drained soils at elevations up to 3,300 feet above mean sea level (amsl). Ephemeral herbs within this community typically flower in late March and April if winter rains are sufficient.

This community is located throughout the eastern portions of the site and accounts for 62 percent (319 acres) of the total project area (Chambers Group 2009). In addition to creosote bush and white bursage, other plant species common to this portion of the site include common fiddleneck (*Amsinckia menziesii*), blackbush (*Coleogyne ramosissima*), Nevada ephedra, winter fat (*Krascheninnikovia lanata*), box-thorn, blazingstar species (*Mentzelia* sp.), golden cholla (*Opuntia echinocarpa*), big galleta grass (*Pleuraphis rigida*), and Joshua tree (Chambers Group 2009).

White Bursage

White bursage series is a mixed evergreen-deciduous shrubland dominated by white bursage, with creosote bush in a lower proportion. The shrub canopy, typically less than 10 feet in height, is two-tiered, with an upper tier consisting of a few creosote bush shrubs and a lower tier of white bursage (Sawyer and Keeler-Wolf 1995). Total vegetative cover in this series was approximately 35 percent within this portion of the site, with white bursage comprising 75 percent and creosote bush comprising 25 percent of the plants. The ground layer is open with annual species seasonally present. This community occurs on alluvial fans or at the base of a mountain where several alluvial fans have merged (bajadas), stabilized sand fields, and upland slopes with well-drained soils at elevations up to 4,000 feet amsl (Sawyer and Keeler-Wolf 1995). This series was present where the ground appeared more compacted and with larger soil particles when compared to the ground occupied by the creosote bush-white bursage series within the site (Chambers Group 2009).

This community is present on the northwestern portion of the site and accounts for 34 percent (176 acres) of the total project area (Chambers Group 2009). In addition to white bursage and creosote bush shrubs, other plant species common to this portion of the site include Nevada ephedra, Pima rhatany (*Krameria erecta*), and box-thorn. Less common species found within this community include common fiddleneck, wingnut cryptantha (*Cryptantha pterocarya*), flat-topped buckwheat (*Eriogonum deflexum*), California buckwheat, wishbone bush (*Mirabilis* sp.), phacelia, big galleta grass, and Joshua tree (Chambers Group 2009). Joshua trees were less abundant in this portion of the site than within the creosote bush-white bursage series.

Desert Wash

Desert washes are typically located in sand or gravel drainages with braided channels that migrate with every surface flow event (Holland 1986). The substrate of the desert wash areas at within the site consisted of loose sandy soil with very little ground cover (Chambers Group 2009). This habitat accounts for three percent (18 acres) of the total project area and is located in the northeastern corner and eastern edge of the site. This community supports a larger diversity of plant species than is found throughout other portions of the site. The dominant plant species within this portion of the site are cheesebush (*Hymenoclea salsola*) and blunt tansymustard; white bursage, Nevada ephedra, creosote bush, desert alyssum (*Lepidium fremontii* var. *fremontii*), and sandpaper plant (*Petalonyx thurberi*) are also fairly common (Chambers Group 2009). Other less frequently occurring species in the desert wash include common fiddleneck, four-wing saltbush (*Atriplex canescens*), blackbush, wingnut cryptantha, bladderpod, scalebroom (*Lepidospartum squamatum*), golden cholla, big galleta grass, London rocket (*Sisymbrium irio*), and occasional Joshua trees (Chambers Group 2009).

Disturbed

Approximately one percent (5 acres) of the site is disturbed habitat, defined as areas that are either devoid of vegetation (cleared or graded) such as dirt roads or heavily compacted areas with sparse vegetation. This area is located immediately south of the junction of Donaldson Road and Mountain View Road in portions of the dry washes where scouring has taken place, in large areas of desert pavement, and on sediment berms (Chambers Group 2009). Only sparse vegetation is found growing in disturbed areas and species include stunted white bursage shrubs, red-stemmed filaree (*Erodium cicutarium*), sapphire eriastrum, and Mediterranean schismus (*Schismus barbatus*).

Succulent Plant Species

Succulent plant species are considered important components of desert communities because they are long-lived and many wildlife species depend on them for survival (Chambers Group 2009). Succulent plant species within the site include:

- Cottontop cactus (*Echinocactus polycephalus* var. *basilaris*) (fewer than 5 individuals); and
- Beavertail cactus (30 to 50 individuals).

3.6.2.2 Invasive Species

Nonnative invasive weeds are opportunistic plants that readily colonize disturbed areas and that can adversely affect the habitats they invade economically, environmentally, or ecologically (Chambers Group 2009). They are considered by the BLM to be plants that have been introduced into an environment where they did not evolve (BLM 2009). They usually have no natural predators to limit their reproduction and distribution, thereby quickly spreading out of

control and excluding or outcompeting native species. This can cause habitat homogenization by decreasing the overall species diversity of an area. As a result, invasive species can have dramatic effects on the natural ecosystem by reducing available habitat for native vegetation, as well as altering forage and wildlife habitat. The cost and complexity of managing invasive weeds and restoring native habitats increases the longer these situations are not adequately addressed as eradication is intensive, time consuming, and costly.

Weeds deemed by the California Invasive Plant Council as nonnative invasive in desert provinces could occur on the site and are of concern to the BLM. These weed species include Sahara mustard (*Brassica tournefortii*), London rocket, Russian thistle (*Salsola tragus*), red-stemmed filaree, foxtail chess (*Bromus madritensis* ssp*. rubens*), cheatgrass (*B. tectorum*), and Mediterranean schimus (*Schismus barbatus*).

All the invasive weed species identified by the California Invasive Plant Council, excluding Mediterranean tamarisk (also called salt cedar), have been observed on the site. The overall density of weed species throughout the site was very low. Populations of weeds were concentrated along dirt roads or adjacent to home sites.

3.6.2.3 Wildlife

Wildlife species detected during site surveys were characteristic of the existing site conditions (Chambers Group 2009) of relatively flat terrain with limited vegetation communities. Wildlife and birds were identified in March 2009 and during avian point-count transect surveys (Table 3.6-2; Chambers Group 2009) conducted in spring 2009 during four consecutive weeks on March 26 and 27 and April 1, 2, 9, and 17. Eagle surveys were conducted on June 7 and 9, 2010.

Table 3.6-2 Wildlife Species Observed in the Project Area

Scientific Name	Common Name
Reptiles	
Callisaurus draconoides draconoides	Common zebra-tailed lizard
Cnemidophorus tigris tigris	Great Basin whiptail
Crotalus cerastes	Sidewinder rattlesnake
Crotalus scutulatus	Mojave green rattlesnake
Dipsosaurus dorsalis	Desert iguana
Gambelia sila	Blunt-nosed leopard lizard
Gopherus agassizii	Desert tortoise
Phrynosoma platyrhinos	Desert horned lizard
Uta stansburiana	Common side-blotched lizard
Birds	
Amphispiza belli	Sage sparrow
Amphispiza bilineata	Black-throated sparrow
Asio flammeus	Short-eared owl
Athene cunicularia	Burrowing owl
Buteo jamaicensis	Red-tailed hawk
Callipepla californica	California quail
Carduelis psaltria	Lesser goldfinch
Carpodacus mexicanus	House finch
Cathartes aura	Turkey vulture
Chordeiles acutipennis	Lesser hawk
Circus cyaneus	Northern harrier
Columba livia	Rock pigeon
Corvus corax	Common raven

Table 3.6-2 Wildlife Species Observed in the Project Area

Scientific Name	Common Name
Eremophila alpestris	Horned lark
Falco mexicanus	Prairie falcon
Hirundo rustica	Barn swallow
Petrochelidon pyrrhonota	Cliff swallow
Polioptila melanura	Black-tailed gnatcatcher
Struthio camelus	Ostrich
Sturnus vulgaris	European starling
Toxostoma lecontei	Le Conte's thrasher
Zenaida macroura	Mourning dove
Zonotrichia leucophrys	White-crowned sparrow
Mammals	
Ammospermophilus leucurus	White-tailed antelope ground squirrel
Bos bovis	Domestic cow
Canis familiaris	Domestic dog
Canis latrans	Coyote
Dipodomys species	Kangaroo rat
Equus asinus	Wild burro
Equus caballus	Horse
Lepus californicus	Black-tailed jackrabbit
Ovis aries	Domestic sheep
Procyon lotor	Raccoon
Spermophilus tereticaudus	Round-tailed ground squirrel
Sylvilagus audubonii	Desert cottontail
Urocyon cinereoargenteus	Gray fox
Vulpes velox	Kit fox

Source: Chambers Group 2009

Birds

The one-day reconnaissance level survey detected 12 bird species, including the black-throated sparrow (*Amphispiza bilineata*), sage sparrow (*A. belli*), California quail (*Callipepla californica*), California horned lark (*Eremophila alpestris*), mourning dove (*Zenaida macroura*), rock pigeon (*Columba livia*), black-tailed gnatcatcher (*Polioptila melanura*), ladder-backed woodpecker (*Picoides scalaris*), common raven (*Corvus corax*), European starling (*Sturnus vulgaris*), northern harrier (*Circus cyaneus*), and house finch (*Carpodacus mexicanus*), all of which are commonly found in the region. A series of avian point-count transect surveys did not detect any sensitive avian species, and avian species were fairly evenly distributed within the three main vegetation communities identified at the site (Chambers Group 2009). The most abundant species on-site during avian point-counts were black-throated sparrow, California horned lark, common raven, and sage sparrow. The red-tailed hawk (*Buteo jamaicensis*) is also common to the Mojave Desert, although they were not observed during surveys (Chambers Group 2009). Additionally, eight other bird species were recorded foraging or migrating through the site during the burrowing owl (*Athene cunicularia*) and desert tortoise protocol surveys. Table 3.6-2 provides a complete list of all bird species observed within the site during all surveys.

Mammals

Seven common mammal species were observed on the site during the one-day reconnaissance level survey, including the black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), kit fox (*Vulpes velox*), two species of ground squirrels including antelope ground squirrel (*Ammospermophilus leucurus*) and round-tailed ground squirrel (*Spermophilus tereticaudus*), domestic dog (*Canis familiaris*), and domestic sheep (*Ovis aries*) (Chambers

Group 2009). Table 3.6-2 provides a complete list of all mammal species observed within the site during all surveys.

Reptiles

Reptiles known to occur in the Mojave Desert include lizards, snakes, and the desert tortoise. Common species include Mojave rattlesnake (*Crotalus scutulatus*), mountain kingsnake (*Lampropeltis zonata*), and several species of lizard and iguana, including the chuckwalla (*Sauromalus ater*). Some of these species may occur within the site and/or may forage in the area. Gila monsters (*Heloderma suspectum*) are known to occur within the extreme eastern portions of San Bernardino County but are not considered present in the project area. Table 3.6-2 provides a complete list of all reptile species observed within the site during all surveys.

Migratory Pathways

The project area is located in the Lucerne Valley between the Cougar Buttes to the north, Cushenbury Canyon and Blackhawk Mountain in San Bernardino National Forest to the south, Johnson Valley to the east, and Apple Valley and the Granite Mountains to the west (Figure 3.6-2). The proposed site is south of several critical habitat units for the desert tortoise. Critical habitat for desert tortoise is defined in the federal ESA as the specific areas within the geographic area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection. The closest critical habitat is the Ord-Rodman critical habitat unit located approximately 10 miles to the north of the site (Chambers Group 2009) across SR-247. The Fremont-Kramer critical habitat unit is to the northwest and the Superior-Cronese critical habitat unit is to the north of the Ord-Rodman critical habitat unit. Desert wildlife species, including the desert tortoise, that utilize these critical habitat units may use the project area, as well as other areas of the Lucerne Valley, to forage for vegetation and search for suitable burrow substrate.

3.6.2.4 Special Status Species

Special status species are species that are listed under ESA, given some form of special designation to denote rarity by the state, or are listed as sensitive by the BLM. Special status species, other than those already listed under ESA, are in potential danger of becoming listed under the ESA. The BLM policy for special status species is also contained in BLM Manual 6840.

Plant and animal species of elevated conservation concern were emphasized in field studies and in the literature research. These species include those listed by the CDFG or the USFWS as either threatened or endangered, those considered “sensitive” by the BLM, and those listed as “Species of Special Concern” by the CDFG. Additionally, some nongovernmental organizations maintain watch lists that the reviewing agencies and the public consult when evaluating a project’s potential effects on natural resources. Accordingly, species included on these lists also were considered and are collectively referred to herein as “special status species.” A brief description of the special status species determined to have potential to occur within the project area is provided in Table 3.6-3.

Special Status Vegetation

Thirty-one special status plant species are known to occur in the Lucerne Valley and the region within which the project would be located. Of these, 12 have some potential to occur within the project area due to the presence of suitable habitat. None of the special status plant species were observed during surveys conducted between May 4 and May 14, 2009 (Chambers Group 2009). However, the biologists concluded that two species, the white pygmy-poppy (*Canbya candida*) and Little San Bernardino Mountains linanthus (*Linanthus maculates*), were considered to have moderate potential to occur throughout much of the project area, even though they were not detected during protocol-level focused plant surveys (Chambers Group 2009). The biologists thought these species may have been missed, may not have germinated, or may not have persisted into May when the survey was conducted because these species are very small (less than 1 ¼ inches in height), below average rainfall fell in the Lucerne Valley in the spring of 2009, and both species can flower as early as March for short periods of time. These protocol-level plant surveys were in accordance with the Botanical Survey Guidelines of the California Native Plant Society (CNPS 2001). A brief description of the species determined to have potential to occur within the project area is provided in Table 3.6-3.

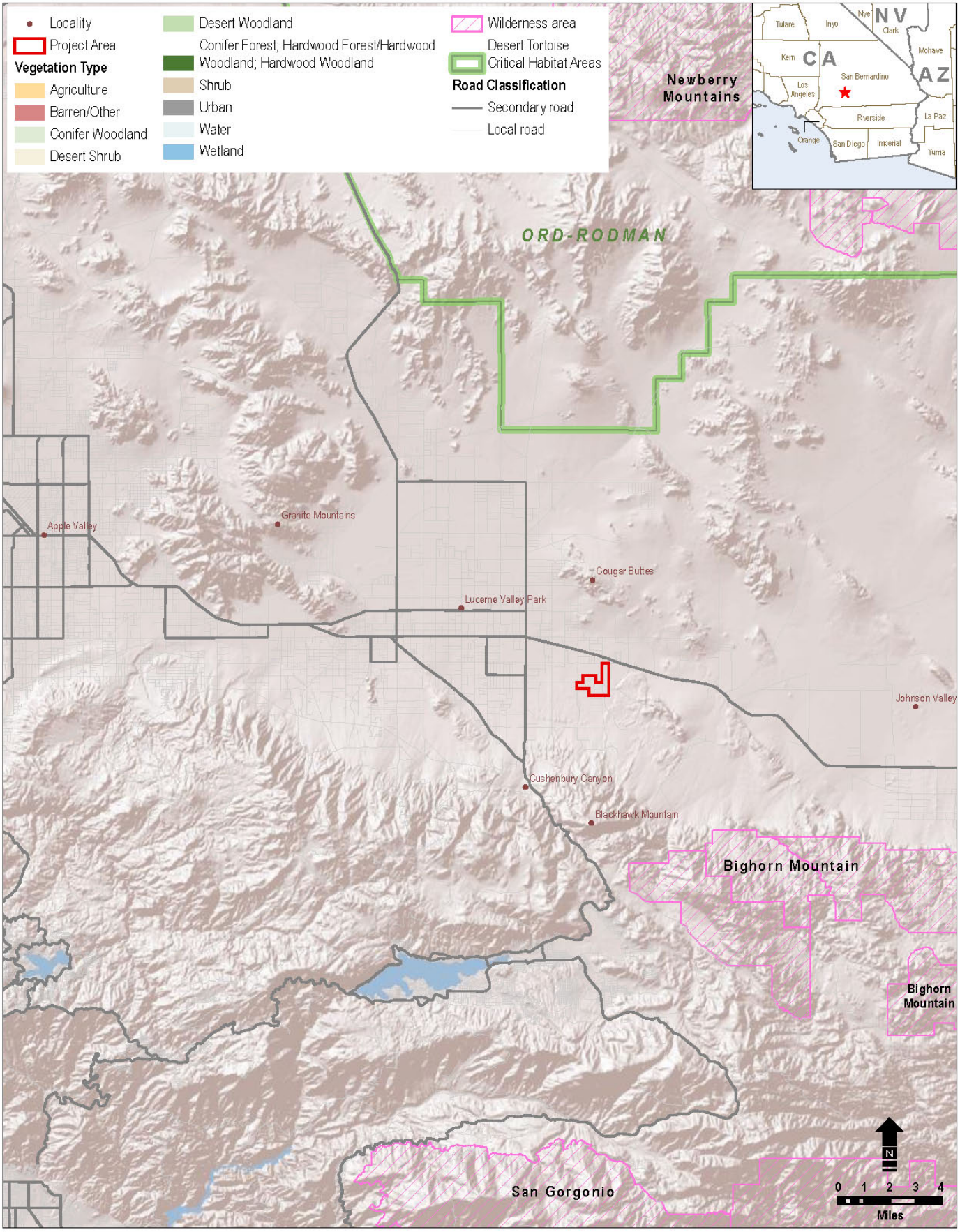
Special Status Wildlife

A literature review and a habitat assessment were used to determine the potential of special status wildlife species to occur in the project area. Factors used to determine potential for occurrence included quality of habitat, effect of surrounding residential development, and the date and location of prior California Natural Diversity Database records of occurrence. It was determined that six special status wildlife species have the potential to occur on-site. Three species were considered to have a low potential to occur on-site due to a lack of both suitable habitat and recorded historical occurrences within five miles of the site. These species include the pallid San Diego pocket mouse (*Chaetodipus fallax pallidus*), western mastiff bat (*Eumops perotis californicus*), and summer tanager (*Piranga rubra*) (Chambers Group 2009). One species, the Mohave ground squirrel (*Spermophilus mohavensis*), was also considered to have a low potential to occur on-site due to a lack of recorded historical occurrences within five miles of the site. However, suitable habitat was present, and a Mohave ground squirrel habitat assessment was conducted in May 2009 (Chambers Group 2009). Based on recorded occurrences within the vicinity of the site and the presence of suitable habitat, the desert tortoise and burrowing owl were considered to have a moderate to high potential to occur on-site and focused protocol-level surveys were conducted in June 2009 (Chambers Group 2009).

Desert Tortoise and Burrowing Owl Surveys

The project area is not located within designated critical habitat for the desert tortoise but is within the known range of desert tortoise, and suitable habitat for the species is present (Figure 3.6-3). Suitable habitat includes river washes, rocky hillsides, slopes, and flat deserts with sandy or gravelly soils. Soil conditions must be friable for burrow and nest construction (Chambers Group 2009). Creosote bush, white bursage, saltbush, Joshua tree, Mojave yucca, and cacti are often present in desert tortoise habitat along with other shrubs, grasses, and wildflowers (Chambers Group 2009).

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_July2010\Fig 3.6-2 DesertTortoise.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee, 1999;
California Resource Agency, Legacy Project, 2003.
U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, 1994.

Figure 3.6-2
Desert Tortoise Map
Chevron Lucerne Solar Project
San Bernandino County, California

Table 3.6-3 Special Status Plant and Wildlife Species with Potential to Occur on the Site

Common Name	Scientific Name	Description	Habitat	Status	Potential to Occur
Plants					
Parish's daisy	*Erigeron parishii*	This perennial herb has pale rose to lavender flowers between May and June.	Typically on limestone alluvium in Mojavean desert scrub and pinyon and juniper woodland, usually in carbonate and sometimes in granitic soils at elevations between 2,600 and 6,600 feet amsl.	FT, CNPS 1B.1, limestone endemic	Not present. Suitable habitat present within the creosote bush-white bursage series or the white bursage series; two known occurrences near State Route 18 at Camp Rock Road within 5 miles.
Little San Bernardino Mountains linanthus	*Linanthus malatus*	This is a small annual herb that grows to only 1 1/8-inch high with thick leaves and bell shaped flowers; the flowering period extends from March to May.	Found in sandy soils of Mojavean desert scrub, desert dunes, Sonoran desert scrub, and Joshua tree woodlands at elevations between 635 and 6,810 feet amsl.	BLM S, CNPS List 1B.2, California endemic	Moderate. Suitable habitat present; no historical populations recorded within 10 miles.
Alkali mariposa lily	*Calochortus striatus*	This bulbiferous herb has three petals and flowers from April to June.	Chaparral, chenopod scrub, Mojavean desert scrub, meadows, and seeps typically in alkaline or mesic soils in ephemeral washes, alkaline meadows, and spring areas at elevations between 230 and 5,200 feet amsl.	BLM S, CNPS 1B.2	Not Present. Suitable habitat present; two known occurrences at Cushenbury Springs and Rabbit Springs recorded within 10 miles.
Mojave monkey flower	*Mimulus mohavensis*	This annual herb is between 1.5 and 2.75 inches tall with reddish-purple leaves; flowers between April and June.	Joshua tree woodland and Mojavean desert scrub, typically in dry sandy or gravelly soils, often in washes. Suitable habitat is present throughout the site, but this species is most likely to be found within the creosote bush-white bursage series or the white bursage series at elevations between 2,000 and 4,000 feet amsl.	BLM S, CNPS 1B.2	Not present. Suitable habitat present; historical populations recorded along Old Woman Springs Road, located within approximately 5 miles.

Table 3.6-3 Special Status Plant and Wildlife Species with Potential to Occur on the Site

Common Name	Scientific Name	Description	Habitat	Status	Potential to Occur
Short-joint beavertail	*Opuntia basilaris* var. *brachyclada*	This stem succulent (cactus) flowers between April and June.	Chaparral, Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland, typically on dry slopes and in washes within the creosote bush-white bursage series or the white bursage series at elevations between 1,400 and 7,500 feet amsl.	BLM S, CNPS 1B.2	Not present. Suitable habitat present; no historical populations recorded within 10 miles.
Desert cymopterus	*Cymopterus deserticola*	This perennial herb flowers between March and May.	Fine to coarse, well-drained sandy soils and flats of Joshua tree woodland and Mojavean desert scrub. Typically grows in blow sand within the creosote bush-white bursage series, desert wash, and white bursage series.	BLM S, CNPS 1B.2	Not present. Marginally suitable habitat; no historical populations recorded within 10 miles.
Forked buckwheat	*Eriogonum bifurcatum*	This annual herb flowers between April and June.	Chenopod scrub, typically in sandy saline soils at elevations between 2,290 and 2,660 feet amsl.	BLM S, CNPS 1B.2	Not present. Marginally suitable habitat in the desert wash areas along the eastern edge of the site; no historical populations recorded within 10 miles.
Death Valley beardtongue	*Penstemon fruticiformis* var. *amargosae*	This perennial herb flowers between April and June.	Mojavean desert scrub on gravelly washes and canyon floors at elevations of 2,800 to 4,600 feet amsl.	BLM S, CNPS 1B.3	Not present. Suitable habitat present; no historical populations recorded within 10 miles.
Death Valley sandpaper plant	*Petalonyx thurberi* ssp. *gilmanii*	This evergreen shrub is less than 3.3 feet tall and flowers between May and September.	Desert dunes, Mojavean desert scrub, desert wash, canyons, dunes, and slopes at elevations between 850 and 4,700 feet amsl.	BLM S, CNPS 1B.3	Not present. Suitable habitat present; no historical populations recorded within 10 miles.

Table 3.6-3 Special Status Plant and Wildlife Species with Potential to Occur on the Site

Common Name	Scientific Name	Description	Habitat	Status	Potential to Occur
Barstow woolly sunflower	*Eriophyllum mohavense*	This annual herb flowers between April and May.	In open sandy or silty areas of chenopod scrub, Mojavean desert scrub, and playas; typically found on caliche and shallow soils at elevations between 1,600 and 3,200 feet amsl.	CNPS 1B.2	Not present. Moderately suitable habitat in the creosote bush-white bursage series, desert wash, and white bursage series; no historical populations recorded within 10 miles.
Latimer's woodland gilia	*Saltugilia latimeri*	This annual herb flowers between March and June.	Chaparral, Mojavean desert scrub, and pinyon and juniper woodland in rocky or sandy, often granitic, soils at elevations between 1,310 and 6,235 feet amsl.	CNPS 1B.2	Not present. Suitable habitat present; no historical populations recorded within 10 miles.
White pygmy-poppy	*Canbya candida*	Grows 1–3 cm with leaves less than 1 cm long. Flowers in March and June.	Found in gravelly, sandy, or granitic soils of Joshua tree woodlands, Mojavean desert scrub, desert dunes, and Sonoran desert scrub and at elevations between 635 and 6,810 feet amsl.	CNPS List 4.2	Moderate. Suitable habitat present; no historical populations recorded within 10 miles.
Birds					
Burrowing owl	*Athene cunicularia*	The burrowing owl is a small, ground-dwelling, often diurnal owl with a round, gray-brown, tuftless head, long and bare yellow legs, bright yellow iris, brown back, and buffy-white underparts with brown barring.	Typically occurs in open, dry, annual or perennial grasslands and in desert and scrublands characterized by low-growing vegetation. It occupies mammal burrows for subterranean shelter and nesting.	CSC, BLM S	High. No burrowing owls or recent sign were observed in 2009; past occurrence of unknown date was observed.
Golden eagle	*Aquila chrysaetos*	A large bird with long broad wings. It is dark brown with golden highlights on its crown and nape.	Forages on squirrels, rabbits, and jackrabbits in open grasslands and shrublands. Nests on cliffs and occasionally on man-made structures.	BLM S, CFP, FP	No nesting habitat present; two active territories, 3.5 and 4.5 miles from project boundary (WRI 2008).
Le Conte's thrasher	*Toxostoma lecontel*	A sandy colored bird with a long curved bill, black eyes, and black tail. The thrasher blends in well with its	Open desert wash, desert scrub, alkali desert scrub, and desert succulent shrub habitats, and in Joshua tree	CSC, BLM S (sensitive in the San Joaquin	Present. Two observations during March and April 2009.

Table 3.6-3 Special Status Plant and Wildlife Species with Potential to Occur on the Site

Common Name	Scientific Name	Description	Habitat	Status	Potential to Occur
		environment.	habitat with scattered shrubs.	population)	
Summer tanager	*Piranga rubra*	A medium-sized songbird. The male is entirely red, and the female has dull yellow coloration.	Breeding habitat in California includes riparian habitat dominated by tall willows and mature cottonwoods.	CSC (nesting)	Not present. No nesting habitat present; recorded observation at Cushenbury Springs, 5 miles away.
Northern harrier	*Circus cyaneus*	A medium-sized hawk with long wings and tail. The male has a light grey and black hood. The female has mottled brown coloration.	Forages for small rodents, insects, and occasionally birds and reptiles in open grasslands and marshes. Nesting habitat is similar.	CSC (nesting)	Present. Observed in June 2009.
Prairie falcon	*Falco mexicanus*	A medium-sized falcon with pale brown and black markings and a white chest with brown spots or bars. Wings are long and pointed.	Hunts medium-sized birds and more infrequently mammals in dry grasslands and prairies. Nests along cliff ledges and protected recesses.	CDFG watch list (nesting)	Present. Observed in June 2009.
Mammals					
Mohave ground squirrel	*Spermophilus mohavensis*	Small brown squirrels with white underparts and thin tails.	Open desert scrub, alkali desert scrub, and Joshua tree communities with sandy to gravelly soils.	ST	Moderate. Suitable habitat present; no historical record within 5 miles.
Western mastiff bat	*Eumops perotis californicus*	A large free-tailed bat with a 2-foot wing span.	Found in a variety of habitats, including desert scrub, chaparral, woodlands, floodplains, and grassland. Roosting habitat includes rocky cliffs and canyons, large boulders, and buildings.	CSC, BLM S	Low. Foraging habitat present; no historical records within 5 miles.
Pallid San Diego pocket mouse	*Chaetodopus fallax pallidus*	Similar in appearance to *C. f. fallax* but lighter in overall coloration.	Common resident of sandy or gravelly to rocky herbaceous areas. Habitats include coastal scrub, chamise-redshank chaparral, mixed chaparral, sagebrush, desert wash, desert shrub, pinyon-juniper, and annual grassland.	CSC	Low. Marginal habitat present; no historical records within 5 miles.

Table 3.6-3 Special Status Plant and Wildlife Species with Potential to Occur on the Site

Common Name	Scientific Name	Description	Habitat	Status	Potential to Occur
Reptiles					
Desert tortoise	*Gopherus agassizii*	A medium-sized tortoise with an adult carapace length of about 8 to 14 inches.	Inhabits river washes, rocky hillsides, slopes, and flat deserts with sandy or gravelly soils suitable for burrowing. Creosote bush, white bursage, saltbush, Joshua tree, Mojave yucca, and cactus are often present in the habitat, along with other shrubs, grasses, and wildflowers.	FT, ST	Present. One observation within the project area in April and June 2009.

Notes:

amsl = above mean sea level

FT = Federally threatened

ST = State threatened

FP_ Federally Protected under the Bald and Golden Eagle Protection Act

FP = Federally Protected under the Bald and Golden Eagle Protection Act

BLM S = Species designated as sensitive by the BLM. BLM sensitive plants are those plant species that are not on federal or state lists as endangered, threatened, candidate, or proposed, but are designated by the BLM State Director for special management consideration.

cm = centimeter

CFP = California Fully Protected

CFP = California Fully Protected

CSC = California species of special concern

CNPS = California Native Plant Society

1A = Plants presumed extinct in California

1B = Plants rare and endangered in California and throughout their range

2 = Plants rare, threatened, or endangered in California but more common elsewhere in their range

3 = Plants about which more information is needed; a review list

4 = Plants of limited distribution; a watch list

CNPS Extensions

0.1 = Seriously endangered in California (greater than 80 percent of occurrences threatened/high degree and immediacy of threat)

0.2 = Fairly endangered in California (20–80 percent occurrences threatened)

0.3 = Not very endangered in California (less than 20 percent of occurrences threatened)

Protocol-level surveys for desert tortoise and burrowing owl were conducted for the project area in June 2009 (Chambers Group 2009). Desert tortoise surveys were conducted by a qualified biologist, in accordance with the USFWS protocol, March 24 to 27, March 31 to April 3, and April 7 to 10, 2009 (Appendix D; Chambers Group 2009). In addition, a burrowing owl survey was conducted in accordance with the CDFG protocol. A second survey was conducted on June 26, 2009, at six locations that exhibited burrowing owl signs from the previous March/April surveys (Chambers Group 2009). Surveys covered 100 percent of the site and within a 500-foot buffer. Parallel to the edge of the site boundary, a 2,400-foot buffer area was also surveyed at a lower intensity. This area is known as the "buffer zone" and includes areas that might be indirectly affected by the project.

One desert tortoise was observed in the southeast corner of the site, five were observed in the southeastern section of the buffer zone, and one was observed in the southwestern section of the buffer zone (Appendix D). Incidental desert tortoise observations were also made during plant surveys in May 2009 in the southeast corner of the site and had been previously identified during the March/April 2009 desert tortoise survey. No visible signs of upper respiratory tract disease were observed in any of the desert tortoises identified. A total of seven desert tortoises were detected during the focused surveys. One live tortoise was observed within the project boundaries in the southeast corner of the site. Five live tortoises were detected within the zones of influence survey area southeast of the project site; this area is an active tortoise area. One live tortoise was observed offsite in the southwest zone of influence survey area (Chambers Group 2009).

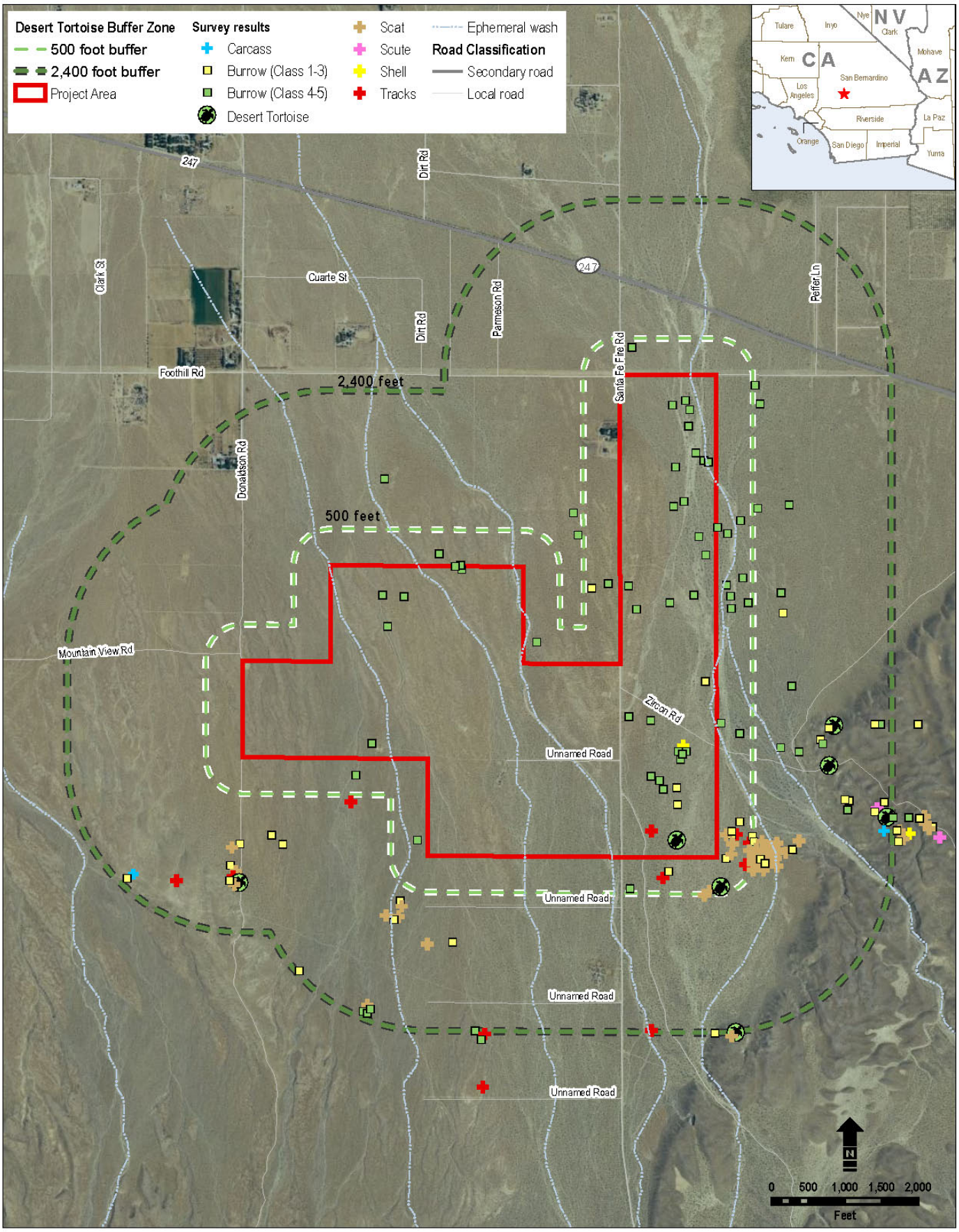
The site also contains suitable burrowing owl habitat. Suitable habitat for the burrowing owl includes dry, open, native or nonnative grasslands, deserts, and other arid environments with low-growing and low-density vegetation (Chambers Group 2009). Burrowing owls may also utilize golf courses, cemeteries, road ROWs, airstrips, abandoned buildings, irrigation ditches, and vacant lots with holes or cracks suitable for use as burrows and will occupy mammal burrows for shelter and nesting (Chambers Group 2009). Burrowing owl burrows with excrement and regurgitated pellets were observed on and near the site during the burrowing owl survey. None of the burrowing owl signs appeared to be fresh and were estimated to be two to three years old (Appendix D; Chambers Group 2009). No new sign or burrowing owls were identified during the June 26, 2009, survey.

Mohave Ground Squirrel Site Assessment

A general habitat assessment was conducted for Mohave ground squirrel in May 2009 (Chambers Group 2009). Before initiating this assessment, a records search of the California Natural Diversity Database, managed by CDFG, was completed.

Mohave ground squirrels were not observed on the site. However, protocol surveys were not conducted for this species so occupancy can not be determined, and species presences must be assumed. The site was determined to be consistent with potential habitat for the Mohave ground squirrel (Chambers Group 2009). The Mohave ground squirrel are found in dry, desert environments with suitable habitat, including open desert scrub, alkali desert scrub, and Joshua tree communities with sandy to gravelly soils. They will also feed in annual grasslands (Chambers Group 2009). They live in underground burrows, most often among the roots of the creosote bush (Gustafson 1993 as cited in Leitner 2008). These burrows can be very extensive, sometimes as much as 20 feet long and 3 feet deep.

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_July2010\Fig 3.6-3 Tortoise ZOI.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee, 1999; California Resource Agency, Legacy Project, 2003.

Figure 3.6-3

Desert Tortoise Buffer Zone Map

Chevron Lucerne Solar Project

San Bernandino County, California

The site is outside the published range of the Mohave ground squirrel, and nearby trappings for other projects did not reveal their presence; therefore, trapping studies were not conducted. The nearest known occurrence of Mohave ground squirrel is over five miles west of the project site, two miles east of the junction of SR 247 and SR 18. Prior to construction, the Applicant would consult with CDFG on survey results and possible mitigation measures.

Raptors

Raptors (birds of prey) collectively include the hawks, eagles, owls, and falcons. The northern harrier (*Circus cyaneus*) and prairie falcon (*Falco mexicanus*) were observed on the site in spring 2009. The golden eagle is common to the Mojave Desert but was not observed during the avian point counts in 2009.

Eagle surveys were conducted on June 7 and 9, 2010. Fourteen golden eagle nest locations representing 6 territories were identified during the survey efforts of which 3 territories were active in 2010. The nearest active nest was approximately 5.5 miles south of the project area, in the Blackhawk Mountain Range (Chambers Group 2010).

No golden eagle nesting habitat is present in the project area, and no golden eagles were observed on the project site. However, there are six territories within 10 miles of the project boundary. Three of these territories are historic and were vacant when surveyed in 2010; three territories were occupied in 2008. Two active territories were observed approximately 3.5, 5.5 and 4.5 miles from the project boundary (WRI 2008, Chambers Group 2010).

The project is within a reasonable foraging distance from these active territories, and the habitat is considered potential foraging habitat for golden eagles. This is far enough away that constructing, maintaining, or operating the project should not disturb the nesting eagles. Although studies are currently in progress, the home range size for golden eagles in arid habitats is unknown. Golden eagles have been demonstrated to forage primarily within 4 miles of the center of their territories in mesic environments (McGrady et al. 2002), but this distance may be longer in xeric habitats, up to 10 miles (Bittner, pers com).

3.7 Cultural Resources

This section identifies the cultural resources within and adjacent to the site of the project and discusses applicable regulations. During the scoping period, meetings were conducted with the public, government agencies, and tribal governments to identify their concerns. Written comments were also received. The following comments and concerns related to cultural resources were raised: (1) effects on a possible future "historic/scenic" designation for Highway 247 (Old Woman Springs Road); (2) government-to-government consultation between the BLM and the tribal governments within the project area; (3) effects on Native American sacred sites in the project area; and (4) strategies to minimize and mitigate effects and ongoing engagement in consultation with local Native American tribes. These comments are addressed in the discussion of existing conditions (Section 3.7.2) and the analysis of direct and indirect effects (Section 4.7.2). The information provided in this section was derived from the *Class III Cultural Resources Inventory for the Lucerne Valley Solar Plant, San Bernardino, California* (Chambers Group 2009).

3.7.1 Applicable Plans, Policies, and Regulations

This section provides an overview of the applicable plans, policies, and regulations that influence the management of cultural resources. Although some of the plans, policies, and regulations listed do not directly apply to the project, they were applied as a basis for the analysis of potential effects on cultural resources (Section 4.7).

3.7.1.1 Federal

American Indian Religious Freedom Act of 1978 (AIRFA)

AIRFA enforces the right of Native American to have access to their sacred places. If a place of religious importance to Native Americans may be affected by an undertaking, AIRFA promotes consultation with Indian religious practitioners, which may be coordinated with National Historic Preservation Act (NHPA) Section 106 consultation.

Antiquities Act of 1906

This was the first law enacted to specifically establish that archaeological sites on public lands are important public resources, and the act obligated federal land management agencies to preserve the scientific, commemorative, and cultural values of such sites on these lands.

Archaeological Resources Protection Act of 1979 (ARPA)

ARPA provides for the protection of archaeological resources and sites that are on public lands and Indian lands. ARPA may impose additional requirements on an agency if federal or Indian lands are involved.

Archaeological and Historic Preservation Act of 1974 (AHPA)

AHPA imposes additional requirements if a project would affect historic properties that have archaeological value and notifies the Department of the Interior when an action under the AHPA does not comply with NHPA Section 106.

Executive Order 11593 (1971), Protection and Enhancement of the Cultural Environment

Executive Order (EO) 11593 provides government leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation and addresses the National Register of Historic Places (NRHP) and provides guidance to those involved with federal properties that should be inventoried and nominated for listing on the NRHP.

Executive Order 13007 (1996), Protection and Preservation of Native American Sacred Sites

EO 13007 established that federal land stewards shall, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites.

Executive Order 13175 (2000), Consultation and Coordination with Indian Tribal Governments

EO 13175 establishes regular and meaningful consultation and collaboration between the United States government and tribal officials in the development of federal policies that have tribal implications.

Executive Order 13287 (2003), Preserve America

EO 13287 requires that the federal government provide leadership in preserving America's heritage by actively advancing the protection, enhancement, and contemporary use of historic properties owned by the federal government.

Federal Land Policy and Management Act of 1976, as amended

FLPMA establishes policies and goals to be followed in administration of public lands by the BLM to include preservation of historic and archaeological resources.

National Environmental Policy Act of 1969, as amended

NEPA requires the analysis of the effect of federal undertakings on the environment to include effects on cultural resources.

National Historic Preservation Act (Section 106; 36 CFR, Part 800)

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and seeks to accommodate historic preservation concerns with the needs of federal undertakings through consultation among the agency official and other parties. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess effects, and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.

Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)

NAGPRA provides a requirement for federal agencies and institutions that receive federal funding to repatriate certain Native American cultural items, including human remains, funerary objects, sacred objects, and objects of cultural patrimony, to lineal descendants and cultural affiliated Indian tribes. For activities on federal lands, NAGPRA requires consultation with "appropriate" Indian tribes prior to the intentional excavation, or removal after inadvertent

discovery, of several kinds of cultural items, including human remains and objects of cultural patrimony.

3.7.1.2 State of California

Administrative Code, Title 14, Section 4307

This requires that no person shall remove, injure, deface or destroy any object of paleontological, archaeological, or historical interest or value.

Health and Safety Code, Section 7050.5

This code requires that construction or excavation be stopped near human remains until a coroner determines whether the remains are Native American; requires the coroner to contact the Native American Heritage Commission (NAHC) if the remains are Native American.

Health and Safety Code, Section 7051

This code addresses the removal of human remains from internment and requires a place of storage while awaiting internment or cremation, with the intent to sell them or to dissect them with malice or wantonness as a public offense punishable by imprisonment in a state prison.

Health and Safety Code, Sections 7052 and 7050.5

Section 7052 establishes that disturbance of Indian cemeteries is a felony. Section 7050.5 establishes that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American.

Penal Code, Title 14, Sections 622.5 and 623

These sections establish that it is a misdemeanor offense for any person other than the owner to willfully damage or destroy archaeological or historical features on public or privately owned land.

Public Resources Code, Section 5097.5

Section 5097.5 provides that no person shall knowingly and willfully excavate upon or remove, destroy, injure, or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological, or historical feature situated on public lands, except with the express permission of the public agency having jurisdiction over the lands. Violation of Section 5097.5 is a misdemeanor.

Public Resources Code, Sections 5097.9 to 5097.991

Sections 5097.9 to 5097.991 establish regulations for the protection of Native American religious places, establishes the NAHC, establishes repatriation of Native American artifacts, and requires notification of discovery of Native American human remains to a most likely descendant.

3.7.2 Existing Conditions

3.7.2.1 Natural Setting

The site of the project is in San Bernardino County on undeveloped lands administered by the BLM. The location of the project in relation to a range of natural resources, including the Mojave River (about 20 miles west of the project area) and the Antelope Valley (within about 25 miles of the project) make it suitable for a variety of life forms and periods of human occupation.

Manmade disturbances to the project area include section roads, informal two-track roads, and mechanized prospecting activity in the form of pits, trenches, and grading. Naturally occurring disturbances to the project area include ephemeral drainages and burrowing activity by reptiles, mammals, and insects.

Geology

The project is located upon Quaternary alluvium deposits. Some deposits on the site date to the Early Pleistocene (about 2.6 million years ago) (Table 3.3-1). Holocene deposits (from about 10,000 years ago to present) also underlie portions of the project area; these deposits have the potential to contain cultural resources. Further discussion of Lucerne Valley geology can be found in Section 3.3, “Geology, Topography, and Geologic Hazards.”

Vegetation

The project area lies in the Lower Sonoran life zone, which is characterized as warm desert found below 6,000 feet in elevation. Vegetation includes sagebrush, rabbitbrush, cacti, and creosote bush. A discussion of specific vegetation communities known to occur in the project area is located in Section 3.6, “Biological Resources.”

Fauna

Mammals found in the Mojave Desert include the desert bighorn sheep, desert kit fox, coyote, spotted skunk, black-tailed jackrabbit, ground squirrels, kangaroo rats, and white-footed mouse. Bird species include the golden eagle, black-billed magpie, raven, turkey vulture, red-tailed hawk, quail, and roadrunner, as well as numerous songbirds, including finches, warblers, sparrows, and wrens. Common reptiles include desert tortoise, three species of rattlesnakes, and chuckwalla lizard. A detailed discussion of animal species known to occur in the project area is in Section 3.6, “Biological Resources.”

3.7.2.2 Prehistoric Background

The area has long supported a variety of floral and faunal resources conducive to human occupation. Human habitation of the Lucerne Valley has occurred for about 12,000 years, as evidenced by archaeological remains. Periods of prehistoric occupation and use of the project area may extend from the Early to Late Holocene. Archaeological sites associated with the period of early human occupation, which archaeologists typically refer to as the Lake Mojave Period (12,000 to 7,000 Before Present [BP]), predominantly include flaked stone tools and, to a lesser degree, ground stone and shell beads. The presence of shell beads and imported mineral resources on sites from this period indicate large-scale trade networks between desert and coastal Native American.

By about 7,000 BP, beginning what is also referred to as the Pinto Period (7,000 to 4,000 BP), artifacts indicate continuing patterns of interaction with groups outside the area, and artifacts were very similar to those found during the Lake Mojave period. Archaeological sites from this period in the Mojave Desert predominantly include an increase in ground stone, shell beads, and imported mineral resources (e.g., obsidian from the Coso Range, about 120 to the northwest of the project). An increase in ground stone tools during this period indicates an

increasing use of plants for subsistence, and the greater need to process small hard seeds from grasses and other vegetation.

By about 4,000 BP, beginning what is also referred to as the Gypsum Period (4,000 to 1,500 BP), artifacts indicate an apparent focus on hunting and connections between peoples of the Mojave Desert and the American Southwest. Archaeological sites from this period in the Mojave Desert predominantly include a greater diversity of projectile forms than in earlier periods, as well as the occurrence of split-twig figurines, which have been found on sites ranging from Newberry Cave just to the south of the Mojave River to sites in the Grand Canyon,

By about 1,500 BP, beginning what is also referred to as the Saratoga Period (1,500 to 700 BP), archaeological sites predominantly contain evidence of a change in hunting implements, human occupation, and trade with other areas, especially the Southwest. Projectile points associated with the period are smaller than in earlier periods and are thought to coincide with the introduction of the bow and arrow. Sites from this period also include dense middens that are generally thought to represent villages, especially in the Antelope Valley west of the project area. Some of these villages are associated with large cemeteries, containing infant burials with as many as 5,000 shell beads.

By about 700 BP, differences in artifacts found in sites north and south of the Mojave River are similar to those found by groups who were encountered in the Mojave Desert at the time of European-American expansion into the region by about 300 BP (i.e., 1700s). Archaeological sites from this period in the Mojave Desert include more sparse deposits of flaked stone tools, ground stone milling equipment, and midden than in earlier periods, indicating more brief camps or occupations. As in all earlier periods, the majority of the obsidian artifacts found in sites from this period derive from the Coso Range; however, during this period, obsidian from Mount Hicks and Obsidian Butte is also present. Archaeological sites from this period also include multiple pottery types and steatite pendants and beads, which may be an indicator of interactions with the California Coast or the Leona Valley about 100 miles southwest of the project area.

3.7.2.3 Ethnohistoric Background

Native American ethnographic records indicate that people affiliated with five ethnic groups—the Mohave, Kawaiisu, Southern Paiute (Las Vegas and Chemehuevi groups), Vanyume/Serrano, and Western Shoshone made use of the project area.

The nature and range of different settlement and subsistence systems operating in the region was not extensively documented prior to Euroamerican disruption and data for some groups are entirely lacking. Although no direct data are available, indirect data suggest the Lucerne Valley would have been used by small groups. Ethnographic data imply that the area was likely used by many different groups coming from many directions, which may help explain why ethnographers attribute the area to different people. Unfortunately, the lack of direct ethnographic observations of groups in the area makes reconstruction of subsistence activities difficult.

The distribution and availability of food resources suggests use by small groups of people as well. Plant foods are likely to have been very important in the diets of people living in the area and an important factor in the decision of when and where to move residence. Ethnographic and historic accounts indicate that trade and exchange were, and still are, important and valued aspects of Native American culture. Besides the exchange of items and the social aspects of

trade, this activity may have helped spread information about the state of environmental circumstances in the surrounding area, such as the location of food resources.

The ancestral life of the Mohave Indians is not well documented; however, ethnohistoric evidence indicates groups of tribes, and other related Yuman-speaking peoples, lived along the lower Colorado River Valley, farming, fishing, and hunting mostly small game for subsistence until about 200 years ago.

The Southern Paiute, especially the Las Vegas and Chemehuevi subgroups, mostly inhabited villages along the lower Colorado River, with a few groups inhabiting the mountains along the California-Nevada state line, especially in the Ivanpah and Kingston Mountains.

The Kawaiisu ranged from the Scodie Mountains south of Walker Pass to the Tehachapi Mountains about 50 miles to the southwest of the project. Although the Kawaiisu core area was in the Sierra Nevada about 100 miles west of the area, ethnohistorical accounts document their use of the Mojave Desert, extending out into at least the Argus Range.

Very little is known of the Vanyume, who may have been linked with the Serrano, a sparse population living along the Mojave River. Ethnohistorical accounts indicate that the area just to the southwest of the Avawatz Mountains was occupied by the Vanyume, which would make them the main residents of the area. If the Vanyume core area was along the Mojave River, they would have been the nearest group, with a distance of only about 15 to 25 miles, separating them from the project. However, Modern Mohave Indians suggest that the Vanyume referred to by anthropologists is not a separate social group, but a Mohave word for the geographic area from Newberry Springs to Hinkley, near Barstow.

No ethnohistorical data clearly indicate that Western Shoshone groups like the Panamint or Timbisha Shoshone made use of the area. However, the high mobility of groups living in the region suggests that such use may have been possible.

3.7.2.4 Historic Background

The first significant European settlement of California began during what historians typically refer to as the Spanish Period (1769 to 1821), when 21 missions and four presidios were established between San Diego and Sonoma. Although located primarily along the coast, the missions dominated economic and political life over the majority of the California region during this period. As part of Spanish exploration of California, Lieutenant Pedro Fages and a small party of soldiers found the Cajon Pass (about 35 miles west of the project) in 1769 while seeking a route through the Mojave Desert to Mission San Gabriel. Seven years later, Father Francisco Garces passed through the present day Victorville area, located about 28 miles west of the project, as part of Juan Bautista de Anza's expedition. The expedition party is believed to have camped approximately 1.5 miles southeast of present-day Hesperia, within about 26 miles of the project. Given the documented heavy use of this region by the Spanish during this period, associated sites have the potential to be located in the proximity of the project area.

From 1821 to 1848, in what historians refer to as the Mexican Period, secularization of the missions occurred, and the vast land holdings of the missions in California were divided into large land grants called ranchos. The Mexican government granted ranchos throughout California to Spanish and Hispanic soldiers and settlers. The Mexican-American War marked the beginning of what historians refer to as the American Period (1848 to present).

In 1826, Jedediah Smith pioneered the section of the Mormon Trail leading from Needles to Mission San Gabriel following the Old Spanish Trail through the high desert, bringing an influx of Mormon settlers to the region. It is estimated that the Mormon Trail routed some 300 to 500 travelers annually across the desert and through the Cajon Pass. Segments of these trails ran along the Mojave River, within about 23 miles of the project. Given the continuous use of the trails during this period, sites associated with settlement activity have the potential to be located in the proximity of the project area.

The discovery of gold initiated the 1849 California Gold Rush, bringing thousands of miners and settlers to California, and most settled in the north. For those settlers who chose southern California, much of their economic prosperity was fueled by cattle ranching rather than by gold. The first recorded European settler in the Lucerne Valley was Peter Davidson, a Scottish immigrant who made his way as a miner to the Valley following mining activities as early as 1880. By 1900, Davidson and others were operating businesses, such as a way station at Rabbit Springs and the Box S. Ranch, and a small school district. By 1900, serious cultivation efforts of the Lucerne Valley region resulted in the federal government authorization of the Victor Valley Water Project, the largest of its era in the nation. The Lucerne Valley Post Office was established in 1912, and by 1928, the valley was home to approximately 250 residents.

The Lucerne Valley has a rich mining history. The Black Hawk/Silver Reef Mines were significant to the development of the area and are located within about four miles southeast of the project. Alongside regional mining developments was the expansion of transportation corridors throughout southern California. Old Woman Springs Road, a trail used by Native Americans and later used as a wagon trail and automotive way, was paved in the early 1960s, becoming SR 247. From 1847, the Atchison, Topeka & Santa Fe Railroad was a significant contribution to the settlement of Southern California by westward bound migrants. The railroad, combined with prospecting, led to a great boom in the region; however, it was not until the late 1850s that Americans chose to settle in the high desert. The Lucerne Valley has remained a relatively small, unincorporated community with an estimated current population of fewer than 10,000. It is possible that features associated with mining activities, including claims, prospects, storage areas, trash scatters, and camps, occur within the project area.

3.7.2.5 Known Archaeological Resources

Chambers Group conducted a BLM Class III cultural resource inventory of the project area (Chambers Group 2009). The report contains a discussion of the records search and tribal consultation conducted for the project. These actions, combined with the cultural resources inventory, ensure the project is compliant with the guidance and strategies set forth between the BLM and the California State Historic Preservation Office for evaluating solar energy; the project (BLM 2008); and the laws, regulations, and policies governing the management of cultural and historic resources on BLM lands.

Records Search

Chambers Group conducted a records search (file # 09-03-03-01) of the California Historical Resources Information System at the San Bernardino County Museum in Redlands, California, to identify any cultural resources recorded within a one-mile radius of the project. The results of the records search showed that only two prior cultural resource investigations have been conducted within a one-mile radius outside the project area (Table 3.7-1). As a result of these inventories, a single isolated find (P36-060), a single jasper flake, was recorded within a one-mile radius outside the project area. No other cultural resources, including those listed for

inclusion with the NRHP (National Park Service 2009) were identified within a one-mile radius of the project.

Table 3.7-1 Previous Cultural Resources Inventories Conducted Within One Mile of the Project

Report No.	Report Title	Sites Within One Mile of the Project
1061377	R&PP Application from Lucerne Valley Unified School District (Sutton 1983)	None
1062515	Class III Cultural Resources Inventory of the Morongo Basin Pipeline Project, Hesperia to Landers, San Bernardino County, California (Lerch 1992)	None

Although the records search resulted in no previously recorded cultural resources in the project area, many prehistoric and historic sites have been recorded between the project and the Victorville area. The prehistoric and historic sites recorded in similar settings near the project include lithic scatters, rock art, rock alignments, or other features (e.g., bedrock milling stations, hearths). Numerous aboriginal trail segments have been recorded, particularly to the north in Sidewinder Canyon and west in the low hills and bajadas overlooking the Mojave River Basin.

Tribal Consultation

At the request of the Chambers Group, the NAHC provided contact information for the nearest tribes that may have knowledge of the cultural resources of the project area. Five contacts from the following four Native American groups were given notice of the project as the first step in the consultation process:

- Morongo Band of Mission Indians;
- San Fernando Band of Mission Indians;
- San Manuel Band of Mission Indians; and
- Serrano Nation of Indians.

At the request of the Chambers Group, the NAHC also performed a search of its Sacred Lands File (SLF) to indicate the presence of Native American cultural resources in the project area. The SLF search failed to indicate the presence of any Native American cultural resources in the project area.

The BLM initially invited Indian Tribes to consult on this project by letter in May of 2009. Letters were sent to Agua Caliente Band of Cahuilla Indians, Chemehuevi, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Morongo Band of Mission Indians, San Manuel Band of Mission Indians, Serrano Band of Indians, Soboba Band of Mission Indians, and Twenty-nine Palms Band of Mission Indians. Additionally, consultation efforts also included follow-up letters and copies of the accepted cultural report in September 2009. The San Manuel Band of Mission Indians requested face to face consultation on all fast tracked energy projects within Barstow Field Office Jurisdiction. A face to face meeting was held on December 4, 2009, at the San Manuel Reservation with Ann Brierty, Cultural Resources Field Manager, Policy and Cultural Resources Management, San Manuel Band of Mission Indians. After discussion it was determined that there were no concerns with this project.

BLM Class III Survey and Inventory

From March 16 to April 17, 2009, Chambers Group conducted a cultural resources inventory of the project area. Chambers methodology for the inventory included a visual inspection of cultural material identified on the ground surface along with surface soil deposition to make a

judgment about potential depth of the resources. Areas with bedrock outcroppings, ridge tops, or on eroding side slopes were presumed to have limited potential for cultural depth.

The inventory identified and recorded 40 newly identified archaeological sites (Table 3.7-2) and 18 isolated finds, consisting of 18 historic artifacts and one prehistoric artifact. All of the sites date to the early to mid-twentieth century and consist mostly of mining-related refuse.

Table 3.7-2 Summary of Newly Identified Archaeological Sites in the Project Area

Site Number	Site Description
SBR-13262 H, 36-020583	Historic debris scatter (mid-twentieth century)
SBR-13263 H, 36-020584	Rock cairn
SBR-13264 H, 36-020585	Rock cairn
SBR-13265 H, 36-020586	Historic debris scatter and a mechanically excavated prospect (mid-twentieth century)
SBR-13266 H, 36-020587	Historic debris scatter (mid-twentieth century)
SBR-13267 H,36-020588	Historic debris scatter (mid-twentieth century)
SBR-13268 H, 36-020589	Historic debris scatter with prospecting features (mid-twentieth century)
SBR-13269 H, 36-020590	Historic debris scatter (mid-twentieth century)
SBR-13270 H, 36-020591	Historic debris scatter with prospecting features (early to mid-twentieth century)
SBR-13271 H, 36-020592	Historic debris scatter (mid-twentieth century)
SBR-13272 H, 36-020593	Historic debris scatter (mid-twentieth century)
SBR-13273 H, 36-020594	Large historic debris scatter with 15 features (mechanically excavated prospect pits and trenches)
SBR-13274 H, 36-020595	Historic debris scatter (mid-twentieth century)
SBR-13275 H, 36-020596	Historic debris scatter with one mechanically excavated prospect pit
SBR-13276 H, 36-020597	Historic debris scatter, a two-track road, and a mechanically excavated prospect (mid-twentieth century)
SBR-13277 H, 36-020598	A mechanically excavated prospect pit
SBR-13278 H, 36-020599	Historic debris with one cairn feature (early to mid-twentieth century)
SBR-13279 H, 36-020600	Historic can scatter with one mechanically excavated prospect
SBR-13280 H, 36-020601	Historic debris scatter (mid-twentieth century)
SBR-13281 H, 36-020602	Historic debris scatter (mid-twentieth century)
SBR-13282 H, 36-020603	Historic debris scatter (mid-twentieth century)
SBR-13283 H, 36-020604	Historic debris scatter (mid-twentieth century)
SBR-13284 H, 36-020605	Historic debris scatter (early to mid-twentieth century)
SBR-13285 H, 36-020606	Historic debris scatter (mid-twentieth century)
SBR-13286 H, 36-020607	Historic debris scatter (mid-twentieth century)
SBR-13287 H, 36-020608	Historic debris and prospecting features (mid-twentieth century)
SBR-13288 H, 36-020609	Historic debris and prospecting features (mid-twentieth century)
SBR-13289 H, 36-020610	Historic debris and one mechanical prospecting feature (mid-twentieth century)
SBR-13290 H, 36-020611	One mechanical prospecting feature
SBR-13291 H, 36-020612	One mechanically excavated prospect trench
SBR-13292 H, 36-020613	Sparse historic debris scatter with four prospecting features (mid-twentieth century)
SBR-13293 H, 36-020614	One historic rock cairn feature

Table 3.7-2 Summary of Newly Identified Archaeological Sites in the Project Area

Site Number	Site Description
SBR-13294 H, 36-020615	One mechanically excavated trench
SBR-13295 H, 36-020616	One mechanically excavated pit
SBR-13296 H, 36-020617	One mechanically excavated trench
SBR-13297 H, 36-020618	One prospecting feature, a claim post, and glass fragments
SBR-13298 H, 36-020619	Collapsed rock cairn
SBR-13299 H, 36-020620	Historic debris scatter (mid-twentieth century)
SBR-13300 H, 36-020621	Two mechanically excavated features and sparse historic debris
SBR-13301 H, 36-020622	Historic debris scatter (mid-twentieth century)

Source: Chambers Group 2009

All newly identified sites listed in Table 3.7-2 were evaluated based on their ability to meet NRHP criteria (refer to section 4.7.1, "Indicators"). None of the newly recorded sites were recommended eligible for listing under any of the NRHP criterion. The potential for intact deposits of subsurface cultural material was also evaluated against NRHP criteria; however, no sites identified during the inventory contained evidence for intact subsurface cultural material.

The BLM has determined that the identification efforts, reports, and the consultant's recommendations for this undertaking are adequate to identify historic properties that may be located within the APE and to support BLM's decision process. Based on the information and analysis, the results of tribal consultation, and the recommendations of the professional consultant, the BLM has made the following determinations regarding eligibility and findings of effect for cultural resources located within the area of potential effect (APE). The BLM has found that no historic properties will be affected by the approval of this undertaking.

The Bureau of Land Management, Barstow Field Office consulted with the California State Historic Preservation Office (SHPO) on the agency's determinations and findings pursuant to Section V.E.2 of the *State Protocol Agreement*[1] which provides for review of evaluations as an element of your oversight role in the *State Protocol Agreement*.

In a letter dated February 26, 2010; the California Historic Preservation Office "concluded that implementation of this undertaking will not affect historic properties."

3.8 Paleontological Resources

This section identifies paleontological resources within and adjacent to the site of the project. Additionally, this section discusses applicable regulations governing paleontological resources. During the scoping period, there were no comments about paleontological resources.

3.8.1 Applicable Plans, Policies, and Regulations

This section provides an overview of the applicable laws, regulations, and standards that influence the management of paleontological resources at the federal, state, and local levels. Although some of these laws do not apply to the project, they were applied as a basis for determining what effects they would have on paleontological resources.

3.8.1.1 Federal

Paleontological Resources Preservation Act of 2009

The Paleontological Resources Preservation Act provides protection for vertebrate (i.e., animals with backbones) paleontological resources on federal lands by limiting the collection of vertebrate fossils and scientifically important fossils to permitted and qualified researchers.

Federal Antiquities Act of 1906

The Federal Antiquities Act establishes that federal land management agencies are obligated to preserve the scientific, commemorative, and cultural values of such sites (National Park Service [NPS] 2007). The Federal Antiquities Act does not refer to paleontological resources specifically; however, the protection of "objects of antiquity" is understood to include paleontological resources.

Federal Land Policy and Management Act of 1976, as amended

The FLPMA provides that "public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values…" (BLM 2001). The FLPMA does not specifically discuss protection for the scientific quality of paleontological resources; however, protection of such resources is implied (e.g., 43 United States Code 1785, Fossil Forest Research Natural Area; Public Law 98-603, Title I, Section 103, 1984; and Public Law 104-333, Division I, Title X, Section 1022, 1996).

National Natural Landmarks Program

The National Natural Landmarks Program, administered by the NPS, encourages the preservation of the nation's best examples of geologic features and identifies landmarks at risk of degradation or damage.

3.8.1.2 State of California

Administrative Code Title 14, Section 4307

The Administrative Code addresses removal, injury, defacement, or destruction of any object of paleontological value.

Public Resources Code Section 5097.5

The Public Resources Code provides that no person shall knowingly and willfully excavate upon, remove, destroy, injure, or deface any historic or prehistoric ruins, burial grounds, or archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological, or historical feature situated on public lands, except with the express permission of the public agency having jurisdiction over the lands. Violation of Section 5097.5 is a misdemeanor.

3.8.1.3 County of San Bernardino

Public Paleontological Resources Overlay of the San Bernardino County Development Code

Chapter 82.20 of the San Bernardino County Development Code provides evaluation criteria for evaluating paleontologic resources and includes qualifications for professional paleontologists working within the County's jurisdiction.

3.8.1.4 Professional Standards and Guidelines

Society for Vertebrate Paleontology

The Society for Vertebrate Paleontology provides standards for conducting paleontological resource monitoring and mitigation activities and curation of resulting fossils and assessment of potential effects on paleontological resources. The San Bernardino County Museum (SBCM) in Redlands issues suggested paleontological treatment and mitigation measures for proposed actions on lands managed by the BLM using guidance published by the Society for Vertebrate Paleontology.

3.8.2 Existing Conditions

Fossils of thousands of plants and animals—including tiny trilobites more than 600 million years old, dinosaurs from between 210 and 65 million years ago, and Ice Age lions and cheetahs—can be found on public lands in the United States managed by the BLM (BLM 2003). Fossil remains of Pleistocene vertebrates have been found in Pleistocene sediments in the region.

Previous geologic mapping indicates that the project is located entirely upon Quaternary younger alluvium of Holocene (about 12,000 years old) or recent age (Bortugno and Sptizer 1986 as referenced in SBCM 2009). Such sediments maintain a low potential to contain significant nonrenewable paleontological resources, yet may overlie older Pleistocene (about 1.8 million to 12,000 years ago) alluvium present in the subsurface (SBCM 2009). Older Pleistocene alluvium has a high potential to contain significant nonrenewable paleontological resources. Section 3.2, "Geology, Topography, and Geologic Hazards," provides greater detail regarding these sediments and the geologic setting of the project area.

3.9 Land Use and Realty

This section identifies existing land use goals, objectives, and policies within and adjacent to the site and discusses applicable regulations. Information in this section is largely based on analysis of the CDCA Plan, as well as input received from the public during the scoping process.

The following issues related to land use were raised during scoping: (1) potential land use conflicts; (2) use of public lands for renewable energy generation; (3) use of previously disturbed lands, and; (4) siting the project to minimize effects on public lands. These comments are addressed in the discussion of existing conditions (Section 3.9.2) and analysis of direct and indirect effects (Section 4.9.2).

3.9.1 Applicable Plans, Policies, and Regulations

The proposed site is located on lands under the jurisdiction of the BLM. No state or county lands would be used for the project. The following land use plans, policies, and regulations would be applicable:

Federal Land Policy and Management Act

The CDCA was designated by Congress in 1976 through the FLPMA and covers 25 million acres of land. For lands under the jurisdiction of the BLM, land use planning guidance for the area is found in the CDCA Plan of 1980, as amended. The FLPMA provides that the public lands in the California desert be managed within the framework of a program of multiple use and sustained yield, and the maintenance of environmental quality.

The FLPMA provides the BLM with an overarching mandate to manage the public lands and resources under its stewardship under the principles of multiple use and sustained yield. "Multiple-use" is a concept that directs management of public lands and their resource values in a way that best meets the present and future needs of Americans and is defined as a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources (FLPMA Section 103[c]). Energy production is one of the intended uses of federal land.

California Desert Conservation Area Plan

All BLM lands covered by the CDCA Plan have been designated geographically into four multiple-use classes based on the sensitivity of resources and types of uses for each geographic area (BLM 1980, as amended). Figure 3.9-1 shows multiple-use classes in the vicinity of the project. The site is located entirely on land in the Multiple Use Class (MUC) M category, which is defined as follows:

- MUC M (Moderate Use): These lands are managed in a controlled balance between higher-intensity use and protection. A wide variety of uses, such as mining, livestock grazing, recreation, energy, and utility development are allowed. Any damage that permitted uses cause must be mitigated.

While the CDCA Plan stipulates that "[a]ll types of electrical generation plants may be allowed in accordance with State, Federal, and local laws" and that solar generating facilities "[m]ay be allowed after NEPA requirements are met," the majority of the site falls within a three-mile-wide BLM-designated "contingent" utility corridor (Corridor "S"). According to the Energy Production

and Utility Corridor Element of the CDCA Plan, allowable uses within the corridor include the following types of linear utility facilities:

- New electrical transmission towers and cables of 161-kilovolt (kV) or above;
- All pipelines with diameters greater than 12 inches;
- Coaxial cables for interstate communications; and
- Major aqueducts or canals for inter-basin transfers of water.

The West Mojave Plan

The WEMO Plan is an amendment to the CDCA Plan that addresses the recovery of the desert tortoise and management of other species in the western Mojave Desert by establishing strategies to conserve and protect the desert tortoise, the Mohave ground squirrel, and nearly 100 other sensitive plants and animals and the natural communities of which they are a part. The WEMO planning area consists of 3,263,874 acres of BLM-administered public lands; 3,029,230 acres of private lands; and 102,168 acres of lands administered by California.

3.9.2 Existing Conditions

The site is located on lands under the jurisdiction of the BLM's California Desert District, Barstow Field Office. Historically, the 516-acre property was used for low-level mineral exploration. No facilities are currently located on the site. The site is currently vacant and undeveloped.

3.9.2.1 Santa Fe Fire Road and Zircon Road

The site is bisected by Santa Fe Fire Road (Figure 1-1), which is a BLM-designated "open route" primarily used for access to the San Bernardino National Forest to the south. Another "open route," Zircon Road, bisects the project area. As part of the project Zircon Road would be rerouted within the site. The project would not change the BLM's route designation of either road. A discussion of other special land uses within and adjacent to the site can be found in Section 3.10, "Special Management Areas."

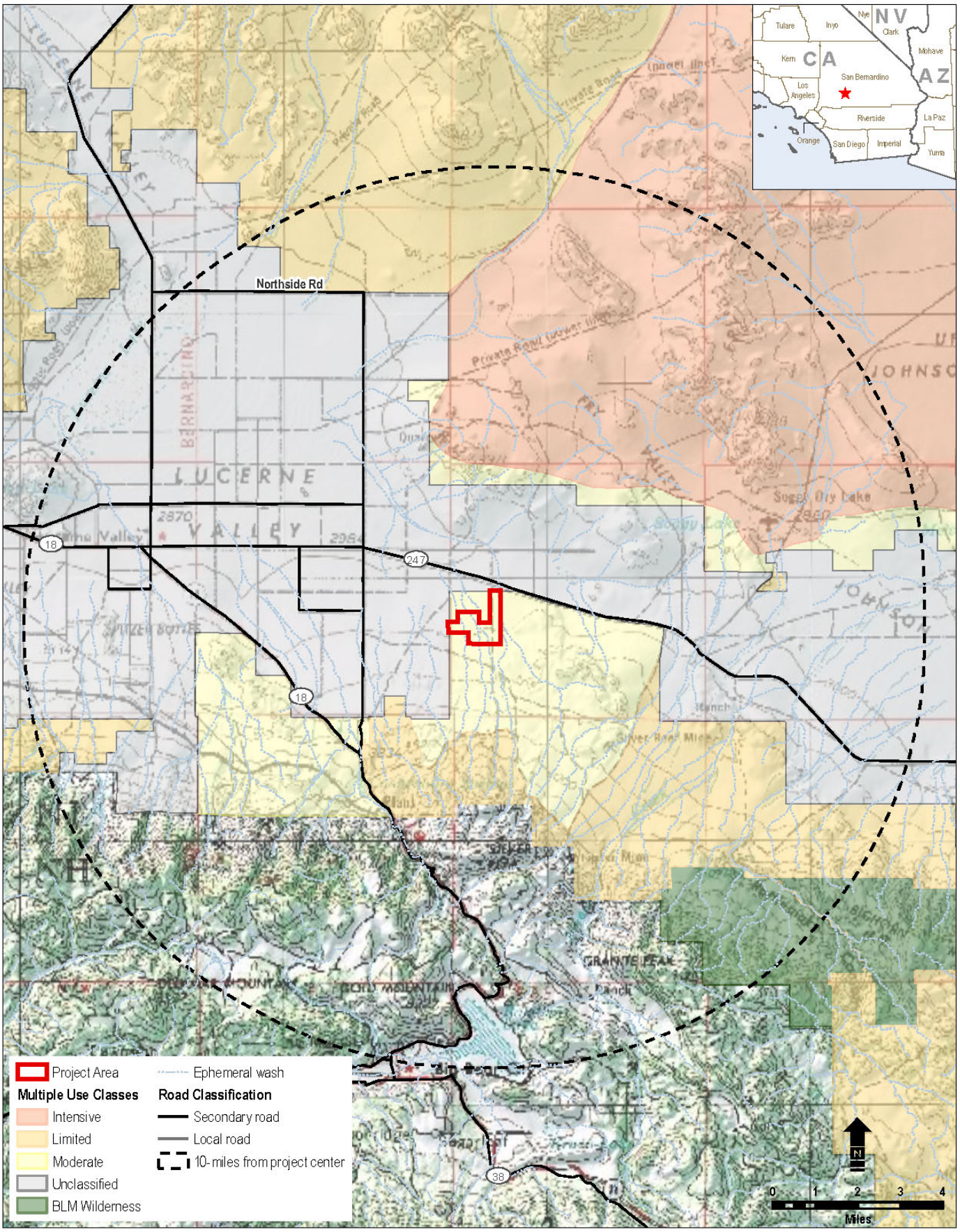
3.9.2.2 Livestock Grazing/Grazing Allotments

No grazing allotments are located within the site.

3.9.2.3 Existing Utility Corridor

The Energy Production and Utility Corridors Element of the CDCA Plan includes the full implementation of a network of planning corridors to meet the projected utility needs to the year 2000, the identification of environmental constraints and siting procedures, and the identification of potential sites for geothermal development, wind energy parks, and power plants. Sixteen planning corridors were identified in the CDCA Plan, and the proposed project site is located within a designated Utility Corridor. The corridor is intended to include new electrical transmission lines of 161 kV or above, all pipelines with diameters greater than 12 inches, cables for interstate communications, and major aqueducts or canals for inter-basin transfers of water. The corridors vary in width from two to five miles. Although the proposed facility would

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\
DEIS_Oct2009\3_9\Multiple_Class_Uses.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999

Figure 3.9-1

BLM Multiple-Use Classes in the Vicinity of the Project Area

Lucerne Valley Solar Project

San Bernardino County, California

result in limiting the available area within the Corridor, future linear facilities could still be placed in the remaining portion of this corridor.
As stated above, the majority of the site extends 1.4 miles into a three-mile-wide "contingent" utility corridor (Corridor "S" under the CDCA Plan). Currently the corridor is traversed by State Highway 247 and contains an SCE 33-kV distribution line that runs along Foothill Road and telephone lines that serve local residences.

According to the Lucerne Solar Corridor Conflict Analysis prepared by the Applicant and reviewed by the BLM, the site is located directly west of rugged terrain, forming "a natural barrier to utility development" (CES 2009). Because the cost of constructing infrastructure over such terrain would be expensive, utility developers would likely opt to circumvent it. Therefore, siting the project within the corridor would not prohibit the BLM from siting other energy infrastructure within the corridor in the future. Figure 3.9-2 depicts the location of the project within the corridor, as well as the rugged terrain to the east of the site.

3.9.2.4 Commercial Filming

Several areas within the Barstow Field Office region are popular commercial filming locations, as follows:

- Johnson Valley OHV area;
- Dumont Dunes OHV area;
- Silurian Dry Lake;
- Soggy Dry Lake;
- Stoddard Valley OHV area; and
- El Mirage Cooperative Management Area.

Commercial production companies must obtain a permit from the BLM for their activities. Permits are reviewed and issued by a BLM staff person based on the type of activity and location that would be used. Commercial filming is allowed upon issuance of a permit. This activity includes production of feature films, television series and commercials, as well as magazine ads and features. Commercial and noncommercial photography projects also require permission to use the BLM lands. Commercial filming permits specify the dates and locations of the planned activity. The permit fees collected are used to help manage the BLM activities, such as improving access to these areas and providing administrative support.

3.9.2.5 Wilderness Characteristics

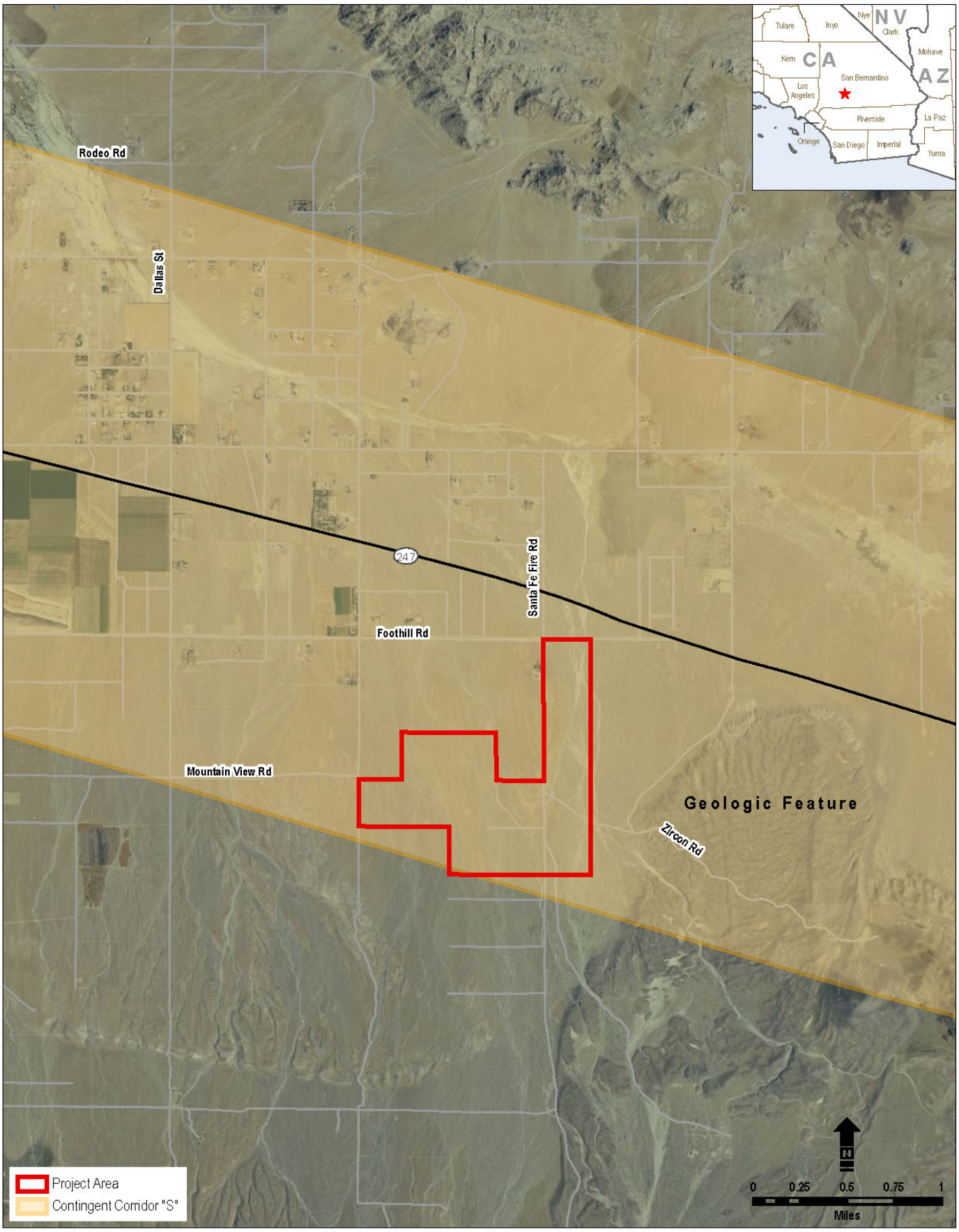
All public lands within the BLM's California Desert District (CDD) were analyzed and summarized in 1979 wilderness inventory decisions performed in accordance with FLPMA. Public land in the Chevron Lucerne Proposed Action (CACA49561) area is contained within CDCA Wilderness Inventory Unit (WIU) #CDCA 217W (BLM 1979).

WIU #CDCA 217W is bounded on the north by State Route 247, on the west by Camp Rock Road, on the south by the San Bernardino National Forest, and on the east by the road east of Silver Reef Mine, which also forms the west boundary of WIU #CDCA 217.

Public lands within the WIU are dominated by a lightly vegetated bajada on the northeast and contain 20 miles of wilderness ways, 8 miles of which are ROWs. There are 129 mining claims covering approximately one-third of the area, and there are noticeable imprints from mining.

The 1979 inventory decision was that no public lands in the area contained requisite wilderness characteristics and no portion was identified as a wilderness study area. There are no changes in conditions since 1979 that would warrant reversal of the 1979 finding that wilderness characteristics are not present in the area (BLM 2010).

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_Oct2009\3-2_Topo_Geo\Utility Corridor Topography.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee 1999

Figure 3.9-2

Contingent Corridor "S" Location

Lucerne Valley Solar Project

San Bernardino County, California

3.10 Special Designations

This section identifies Special Management Areas (SMAs) within and adjacent to the site of the project and identifies applicable regulations pertaining to these areas. The BLM manages federal lands that possess unique and important historical, anthropological, ecological, biological, geological, and paleontological features as SMAs. SMAs include designated Wilderness and Wilderness Study Areas, rare or unique habitats or those occupied by species listed as threatened or endangered, natural environments, open spaces, scenic landscapes, special recreation management areas, historic locations, cultural landmarks, and fossil-bearing regions. SMAs are designated by an Act of Congress or by Presidential Proclamation or are created under the BLM administrative procedures.

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. Concerns were raised regarding the potential existence of special management areas in the project area.

3.10.1 Applicable Plans, Policies, and Regulations

Created in 2000 by the Secretary of the Interior, the National Landscape Conservation System (NLCS) brought into a single system specially designated areas managed on a landscape level under the BLM's multiple-use mandate. Nine years later, passage of the Omnibus Public Lands Management Act [P.L. 111-11 Section 2002(b)] provided a statutory basis for the NLCS. The NLCS is composed of national monuments, national conservation areas and similarly designated lands, wilderness and wilderness study areas, wild and scenic rivers, and national scenic and historic trails. In California, these treasured landscapes are located from the coast to the Sierra Mountains and from the northern forests to the southern desert and include 178 federally recognized areas, over 5 million acres, and 680 miles of rivers and national trails. The mission guiding management of the NLCS is to conserve, protect, and restore nationally significant areas recognized for their exceptional scientific, cultural, ecological, historical, and recreational values for which they were designated.

California Desert Conservation Area Plan

Within the CDCA, specific SMAs also identify designated Wilderness and Wilderness Study Areas; national scenic and historic trails; wild, scenic, and recreational rivers; Areas of Critical Environmental Concern (ACECs); and habitat management planning areas. Chapter 4 of the CDCA Plan addresses ACECs and special areas. Management goals in the CDCA Plan for ACECs are as follows:

- Identify and protect the significant natural and cultural resources requiring special management attention found on BLM-administered lands in the CDCA;
- Provide for other uses in the designated areas, compatible with the protection and enhancement of the significant natural and cultural resources; and
- Systematically monitor the preservation of the significant natural and cultural resources on BLM-administered lands, and the compatibility of other allowed uses with these resources.

Management goals in the CDCA Plan for special areas are as follows:

- Recognize significant natural and cultural resources found on BLM-administered lands in the CDCA;
- Provide for other uses in the designated special areas, compatible with the protection and enhancement of the significant natural and cultural resources; and
- Systematically monitor the qualities of the significant natural and cultural resources on BLM-administered lands and the compatibility of other allowed uses with these resources.

West Mojave Plan

Led by the BLM, federal, state, and local agencies have cooperatively developed a CDCA Plan Amendment to address recovery of the desert tortoise and management of a number of other species in the western Mojave Desert. The WEMO Plan has many SMAs within its jurisdiction, but the closest, the Carbonate Endemic Plants ACEC, is 1.8 miles from the site of the project (Figure 3.10-1); others identified are more distant.

3.10.2 Existing Conditions

Areas of Critical Environmental Concern

The FLPMA Section 103(a) defines an ACEC as an area "within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards."

The BLM uses the ACEC designation to satisfy FLPMA. The BLM identifies, evaluates, and designates ACECs through its resource management planning process. There are three ACECs within 10 miles of the site: the Carbonate Endemic Plants ACEC, located 1.8 miles to the south; the Soggy Dry Lake Creosote Rings ACEC, located 6.1 miles to the east; and the Upper Johnson Valley Yucca Rings ACEC, located 9 miles to the north (Figure 3.10-1).

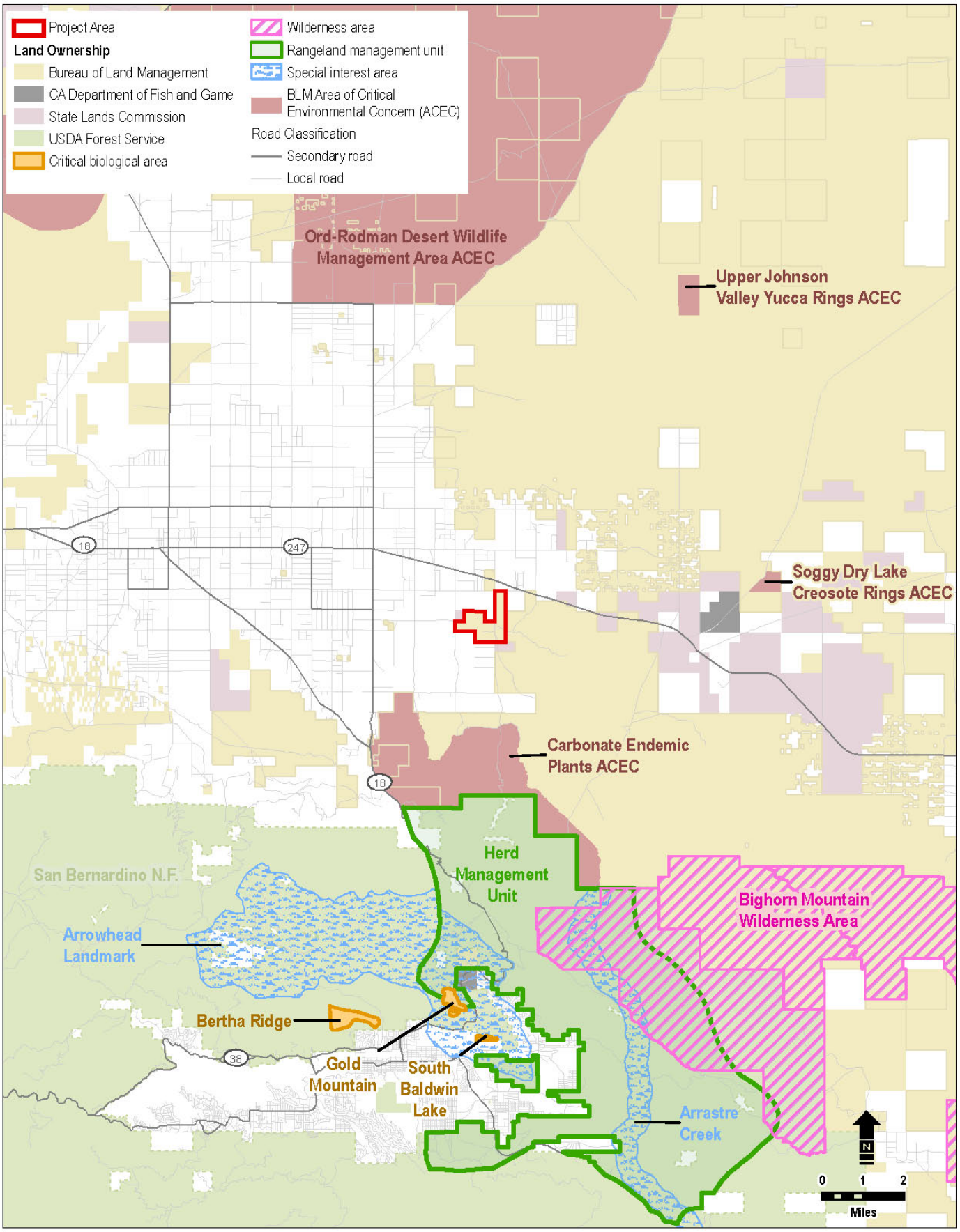
Desert Wildlife Management Areas

Desert Wildlife Management Areas (DWMAs) were established by the U.S. Fish and Wildlife Service (USFWS) as part of the Desert Tortoise (Mojave Population) Recovery Plan (USFWS 1994). DWMAs are areas that are specially designated for protection of desert tortoises and desert tortoise habitats. The nearest DWMA, the Ord-Rodman DWMA, is eight miles from the site.

Wild and Scenic Rivers

The National Wild and Scenic Rivers System was created by Congress in 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Act is notable for safeguarding the special character of these rivers, while also recognizing the potential for their appropriate use and development. It encourages river management that crosses political boundaries and promotes public participation in developing goals for river protection.

Rivers may be designated by Congress or, if certain requirements are met, the Secretary of the Interior. Each river is administered by either a federal or state agency.



Base Map Source: ESRI 2009; Cal-Atlas 2009;
USDA Forest Service - Pacific Southwest Region - Remote Sensing Lab 2009; SoCal Forest Division 2005; BLM 2008

Figure 3.10-1
Special Management Areas
Lucerne Valley Solar Project
San Bernardino County, California

BLM Wilderness Areas

Wilderness is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological or other features of scientific, educational, scenic or historical value.

Wilderness Characteristic Inventory Update

Public lands within the California Desert District were analyzed and summarized in 1979 wilderness inventory decisions, in accordance with the FLPMA. Public land in the Chevron Lucerne project area is contained within CDCA Wilderness Inventory Unit [hereafter WIU] #CDCA 217W.

WIU #CDCA 217W is bounded on the north by Highway 247, on the west by Camp Rock Road, on the south by the San Bernardino National Forest, and on the east by the road east of Silver Reef mine, which also forms the west boundary of WIU #CDCA 217.

Public lands within the WIU are dominated by a bajada to the northeast, which is lightly vegetated. The public land contains 20 miles of wilderness ways, 8 miles of which are ROWs. There are 129 mining claims covering approximately one-third of the area, and there are noticeable imprints from mining.

The 1979 inventory decision was that no public lands in the area contained requisite wilderness characteristics, and no portion was identified as a wilderness study area. There are no changes in conditions since 1979 that would warrant change to the original 1979 finding that wilderness characteristics are not present in the area. Impacts to lands with wilderness characteristics will not be further analyzed since wilderness characteristics are not present on the site.

The nearest wilderness area to the site is the Bighorn Mountain Wilderness located 7.1 miles to the south.

BLM Wilderness Study Areas

A Wilderness Study Area is a roadless area that has been inventoried and found to have wilderness characteristics as described in Section 602 of FLPMA and Section 2[c] of the 1964 Wilderness Act. The WSAs are managed under BLM policy H-8550 Interim Management Policy and Guidelines for Lands under Wilderness Review. During this period of review for a WSA and until Congress has determined otherwise, the Secretary shall continue to manage such lands according to his/her authority under FLPMA and other applicable law in a manner so as to not impair the suitability of such area for preservation as wilderness.

National Scenic and Historic Trails

The Bureau of Land Management is one of several agencies responsible for management of National Historic or Scenic Trails. In 1968, Congress established the National Trails System and designated the first national trails.

National Historic Trails are extended trails that closely follow a historic trail or route of travel of national significance. Designation identifies and protects historic routes,

historic remnants, and artifacts for public use and enjoyment. National Scenic Trails are extended trails that provide maximum outdoor recreation potential and for the conservation and enjoyment of the various qualities – scenic, historical, natural, and cultural – of the areas they pass through.

The nearest National Scenic Trail to the site is the Pacific Crest Trail located 7.6 miles south.

Scenic Highways

California's Scenic Highway Program was created by the State Legislature in 1963. Its purpose is to protect and enhance the natural scenic beauty of California highways and adjacent corridors, through special conservation treatment. The state laws governing the Scenic Highway Program are found in the Streets and Highways Code, Sections 260 through 263.

SR 247 begins in Yucca Valley and runs north through the Lucerne Valley before connecting with Barstow Road. It is located about 0.25 miles north of the site. The California Department of Transportation (Caltrans) has evaluated the highway in its entirety as eligible for inclusion in its scenic highway system; however, it is currently not designated. If the highway is designated as scenic by the California State Legislature and approved by Caltrans, a “scenic corridor protection program” would be drafted for the route. This document would restrict earthmoving activities within the view shed of the highway in order to preserve its scenic nature.

SR 247 is a County-designated Scenic Route from the town of Yucca Valley north to Barstow, according to the San Bernardino County General Plan (2007).

3.11 Recreation

This section identifies recreational resources within and adjacent to the project site and discusses applicable regulations. Information in this section is largely based on the goals and objectives of the CDCA Plan, as amended, as well as input received from members of the public during the scoping process.

The following comments and concerns related to recreational resources were raised during scoping: (1) effects on off-highway vehicle (OHV) use and (2) construction dust. These comments are addressed in the discussion of existing conditions (Section 3.11.2) and the analysis of direct and indirect effects (Section 4.11.2).

3.11.1 Applicable Plans, Policies, and Regulations

This section provides an overview of the applicable plans, policies, and regulations that influence the management of recreational resources at the federal, state, and local levels. Although some of these laws do not apply to the project, they provide context for determining what effects the project would have on recreational resources.

Federal Land Policy and Management Act of 1976

As provided in the FLPMA Section 101, the BLM's legal mandate is to manage public lands in accordance with the principles of multiple-use and sustained yield. The act also directs the BLM to protect "the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use" (Statute 90-2743; 43 United States Code 1601, et seq.).

Specific authorized uses are determined in the land use planning process, as prescribed in Section 202 of FLPMA. The project would be in conformance with the BLM's mandate to manage BLM land for multiple-use as outlined in Sections 101 and 202 of FLPMA.

CDCA Plan of 1980

The BLM's CDCA Plan describes land use management goals and policies within the approximately ten million-acre CDCA Planning Area and provides guidelines and requirements for recreational activities. Goals in the CDCA Plan's Recreation Element (BLM 1980:69) are as follows:

- Provide for a wide range of quality recreational opportunities and experiences, emphasizing dispersed undeveloped use;
- Provide a minimum of recreation facilities. Facilities should emphasize resource protection and visitor safety;
- Manage recreational use to minimize user conflicts, provide a safe recreation environment, and protect desert resources;
- Emphasize the use of public information and education techniques to increase public awareness, enjoyment, and sensitivity to desert resources;

- Adjust management approach to accommodate changing visitor use patterns and preferences;
- Encourage the use and enjoyment of desert recreational opportunities by special populations and provide facilities to meet the needs of those groups;
- Locate areas and trails in officially designated wilderness areas or primitive areas; and
- Locate areas and trails in natural areas only if the authorized officer determines that vehicle use in such locations would not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

Goals in the CDCA Plan's Motorized Vehicle Access Element are as follows:

- Provide for contained motorized vehicle access in a manner that balances the needs of all desert users, private landowners, and other public agencies;
- Avoid impacts on desert resources when designating or amending areas or routes for motorized vehicle access, to the degree possible; and
- Use maps, signs, and published information to communicate the motorized vehicle access situation to desert users, making sure all information materials are understandable and easy to follow.

The project would conform to the management goals stipulated in both the Recreation Element and the Motorized Vehicle Access Element of the CDCA Plan.

Executive Order No. 11644

Executive Order No. 11644 of 1971 established uniform polices regarding OHV use on public lands, requiring agencies to monitor OHV use to assess and minimize effects on important resources on public lands.

3.11.2 Existing Conditions

The project site is on undeveloped lands administered by the BLM in San Bernardino County. The project site lies within partially disturbed desert habitat, north of the San Bernardino National Forest. Recreational activities in the region include hiking and OHV use. The closest BLM-designated recreation area, the Johnson Valley OHV Area, is located 2.5 miles west of the project site.

Lands within or directly adjacent to the project site are not designated recreation areas. There is no documented use of the project site for recreational purposes, although one may use either of the two roads (Zircon or Santa Fe Fire) that exist on the site to access other recreational opportunities. Other than Zircon Road (Figure 1-1), no BLM open routes exist within the project area; however, several recreation areas, including two designated by the BLM, are located within the region (Table 3.11-1). One unimproved dirt road, Santa Fe Fire Road, bisects the project site. The portion of Santa Fe Fire Road within the San Bernardino National Forest is maintained by the United States Forest Service (USFS) for access to the San Bernardino National Forest, which is three miles south of the project site.

Table 3.11-1 Recreation Areas in the Vicinity of the Project Site

Name	Distance	Use
San Bernardino National Forest	3 miles south	Hiking, OHV use, and wildlife viewing
Johnson Valley OHV Area	2.5 miles northwest	OHV use, hiking, rock-hounding, wildlife viewing, amateur mining and hunting
Lucerne Dry Lake	9 miles northwest	Model rocket launching
Lucerne Valley Park	6 miles northwest	Community events
Midway Park	6 miles northwest	Community events
Pioneer Park	6.5 miles west	Athletic fields

San Bernardino National Forest

The project site would be located three miles north of the San Bernardino National Forest, which contains recreation areas administered by the USFS Front Country Ranger District. This area of the San Bernardino National Forest is designated "Roaded Natural" according to the Recreation Opportunity Spectrum (USFS 2005). Roaded Natural areas are defined as relatively undeveloped but within half a mile of a roadway and typically have low to moderate use on trails and moderate to high use on motorized roadways (USFS 1990).

Johnson Valley OHV Area

The closest BLM-designated recreation area is the Johnson Valley OHV area. OHV users are drawn to the area for its varied landscape, punctuated by steep, red rocky mountains, rolling hills, open valleys, dry lake beds, and sandy washes. Elevations range from 4,600 feet at Hartwell Hills to 2,300 feet at Melville Dry Lake. Vegetation consists of creosote scrub, annual grasses, wildflowers, and Joshua trees. Most visitors tour the area in four-wheel-drive vehicles. The area near Anderson and Soggy Dry Lakes is used extensively for competitive racing events and OHV free play. There are numerous opportunities for hiking, amateur geology, and wildlife watching. The eastern boundary is shared with the Twenty-Nine Palms Marine Corps Air-Ground Combat Center (BLM 2009a).

Local Parks

The three parks in the unincorporated community of Lucerne Valley that are close to the project site are the Lucerne Valley Park and Midway Park, which are approximately six miles to the northwest, and Pioneer Park, which is approximately seven miles west of the site on State Route 247. These facilities are used to host community events, including athletics.

Hunting

Hunting is permitted on public lands and is regulated by the California Department of Fish and Game. Hunting of upland game birds in season is allowed in the Stoddard Valley and Johnson Valley with a valid hunting license. On all BLM managed lands hunter's vehicles are restricted to designated routes of travel, as posted and as shown on BLM maps (BLM 2009b). Although hunting and recreational shooting are allowed on land classified as MUC M, the project site is within a zone that has been established where shotgun use only is allowed. The general area just south of State Route 58 and Interstate 40, north of the San Bernardino National Forest, west of the Twentynine Palms Marine Air/Ground Combat Center, and east of the Los Angeles County Line is designated as shotgun-only by San Bernardino County Ordinance due to the presence of scattered residences and recreationists in the area.

3.12 Visual Resources

The BLM manual M-8400 Visual Resource Management and handbooks H-8410 Visual Resource Inventory, and H-8431 Visual Resource Contrast Rating set forth the policies and procedures for determining visual resource values, establishing management objectives, and evaluating proposed actions for conformance to the established objectives for BLM-administered public lands.

All BLM-administered lands are to be inventoried for visual values and management objectives established for managing these values. Visual resource values are determined through a systematic process that documents the landscape's scenic quality, public sensitivity and visibility.

Scenic Quality. Scenic Quality Rating Units (SQRU) are delineated based on common characteristics of the landscape. There are seven criteria used for inventorying the landscape's scenic quality within each SQRU – landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modifications. Each factor is scored for its respective contribution to the scenic quality and is given a rating of A (highest), B, or C (lowest). SQRU for the project are shown in Figure 3.12-1.

Sensitivity Level. Sensitivity Level Rating Units (SLRU) are delineated and evaluated for public sensitivity to landscape change. Criteria used for determining level of sensitivity within each unit includes types of use, amount of use, public interest, adjacent land uses, special areas, other factors. Each criterion is rank high, medium, or low with an overall rating assigned to the unit. SLRU for the project are shown in Figure 3.12-2.

Distance Zones (visibility). The third factor is visibility of the landscape evaluated from where people commonly view the landscape. The distance zones are divided into foreground/middleground (3 to 5 miles); background (5 to 15 miles); and seldom seen (beyond 15 miles or topographically concealed areas within the closer range distance zones). Distance Zones for the project are shown in Figure 3.12-3.

Visual Resource Inventory Classes. The three factors are mapped individually and then compared through an over-layering analysis. The relationships between the rated values of scenic quality, sensitivity level, and visibility are cross-referenced with the Visual Resource Inventory Matrix to determine the Visual Resource Inventory (VRI) Class. There are four VRI Classes I to IV assigned as a representation of the relative visual value with VRI Class I and II having highest value and VRI Class IV having the lowest. VRI Class I is reserved for special congressional designations or administrative decisions such as Wilderness Areas, visually sensitive ACECs, wild portions of Wild and Scenic Rivers, etc.

VRI information is used for informed land use and land management decision making, as well as to serve as the baseline for NEPA analysis. VRI Classes for the project area are shown in Figure 3.12-4.

Visual Resource Management Classes. Visual Resource Management (VRM) Classes are designated during the land use planning process. VRM Classes are similar to VRI Classes in that they range from I to IV. However, they differ in that VRM Classes are management decisions that dictate allowable levels of visual change that may occur on the landscape. VRM

objectives are established under each class designation with VRM Class I being the most restrictive and VRM Class IV allowing for the greatest amount of visual change.

- VRM Class I: The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
- VRM Class II: The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- VRM Class III: The objective of this class is to partially retain the existing character of the landscape. The level of change to characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- VRM Class IV: The objective of this class is to provide for management activities that allow major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

The VRM policy requires that VRM Classes are assigned to all BLM-administered lands during the land use planning process with effects disclosed during analysis of the management alternatives. However, there are older land use plans still in effect that do not designate VRM Classes. When VRM Classes are absent, then Interim VRM Classes are assigned when analyzing individual proposed plans of development. Interim VRM Class designations must match protections of VRI values with existing land use decisions, which balance allowable uses with desired outcomes.

Proposed plans of development are evaluated for conformance to the VRM Class objectives through the use of the Visual Resource Contrast Rating process set forth within BLM Handbook H-8431-1.

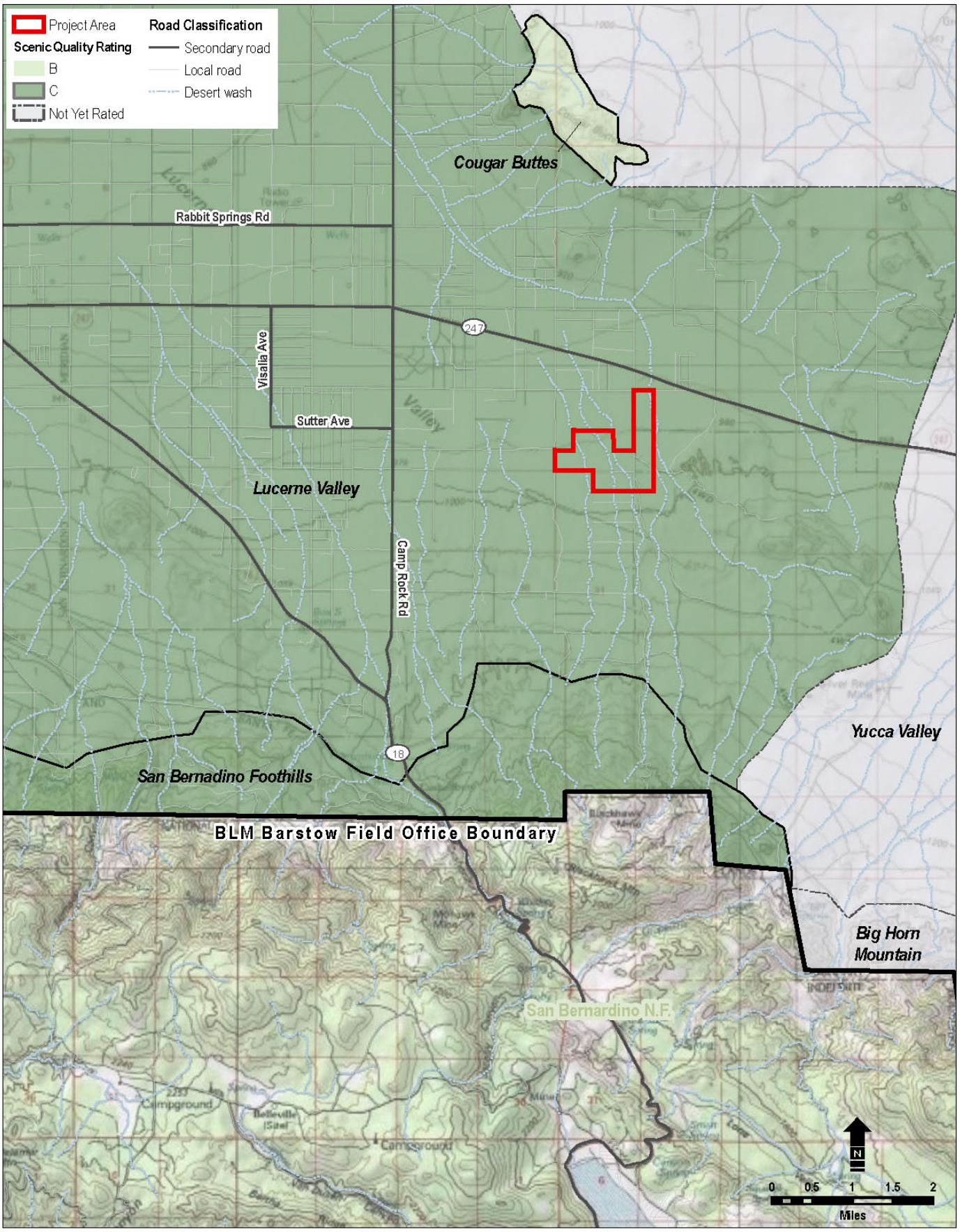
3.12.1 Applicable Plans, Policies, and Regulations

Federal Land Policy and Management Act

The following sections of the FLPMA relate to the management of aesthetic and visual resources on the public lands:

> Section 102(a): “The public lands [shall] be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values.”
>
> Section 103 (c): Identifies “scenic values” as one of the resources for which public lands should be managed.

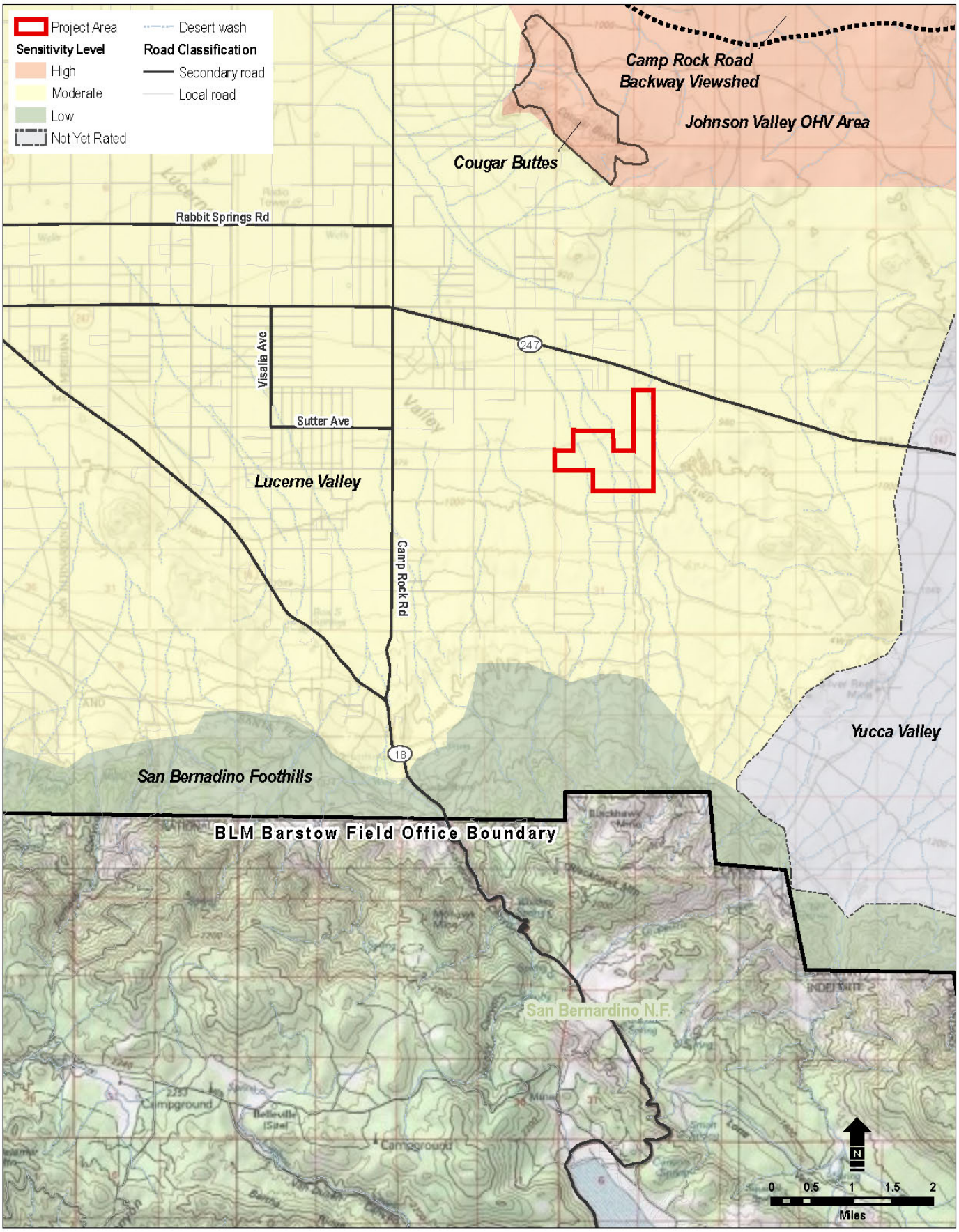
M:\SanFrancisco\Chevron_Luzerne\Distance_Zones.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999;
USDA Forest Service, Region 5, Southern California Forest Plan 2005

Figure 3.12-1
Scenic Quality Rating Units
Lucerne Valley Solar Project
San Bernardino County, California

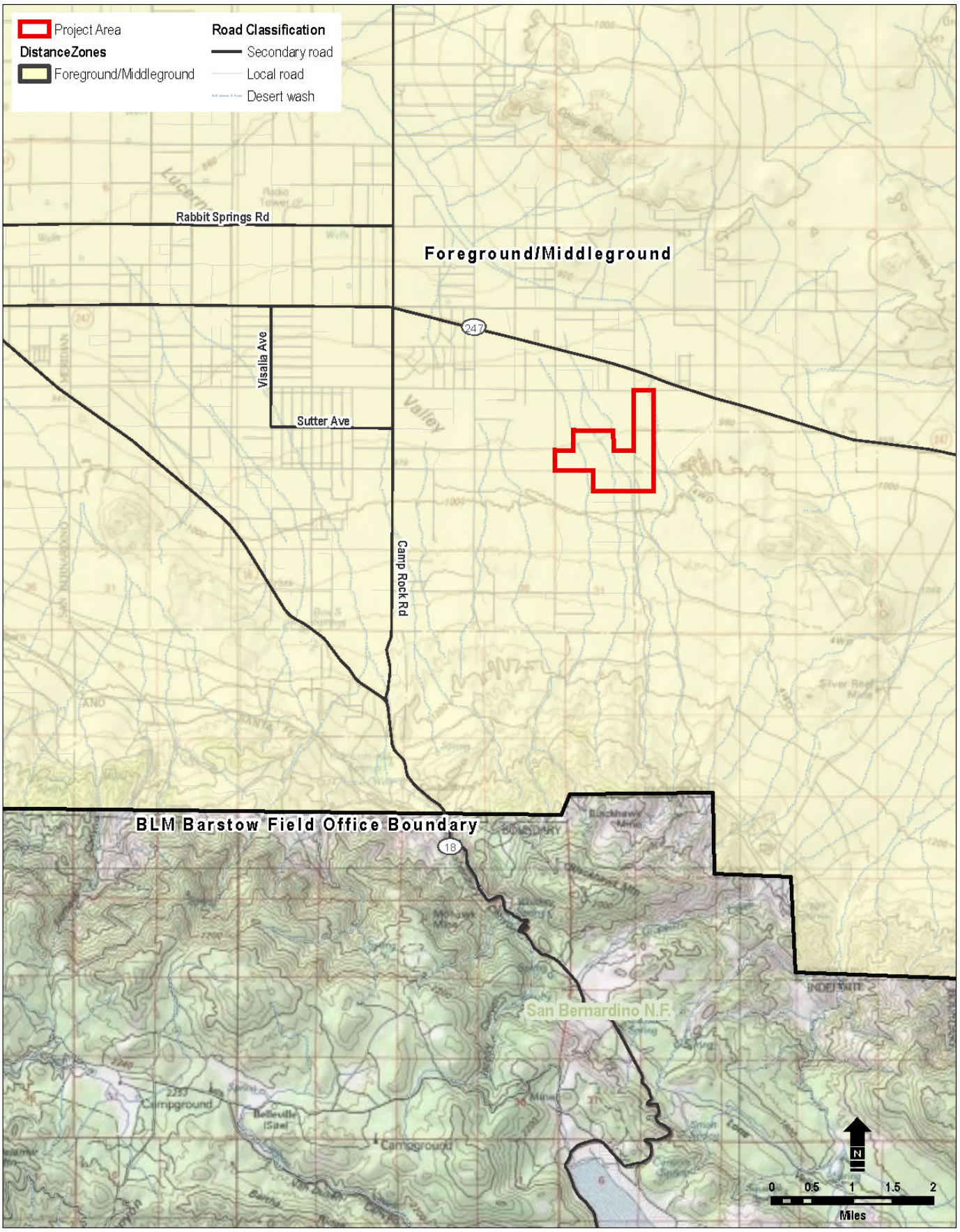
M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_July2010\Fig 3-12-2 Sensitivity Level Units.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999;
USDA Forest Service, Region 5, Southern California Forest Plan 2005

Figure 3.12-2
Sensitivity Level Units
Lucerne Valley Solar Project
San Bernardino County, California

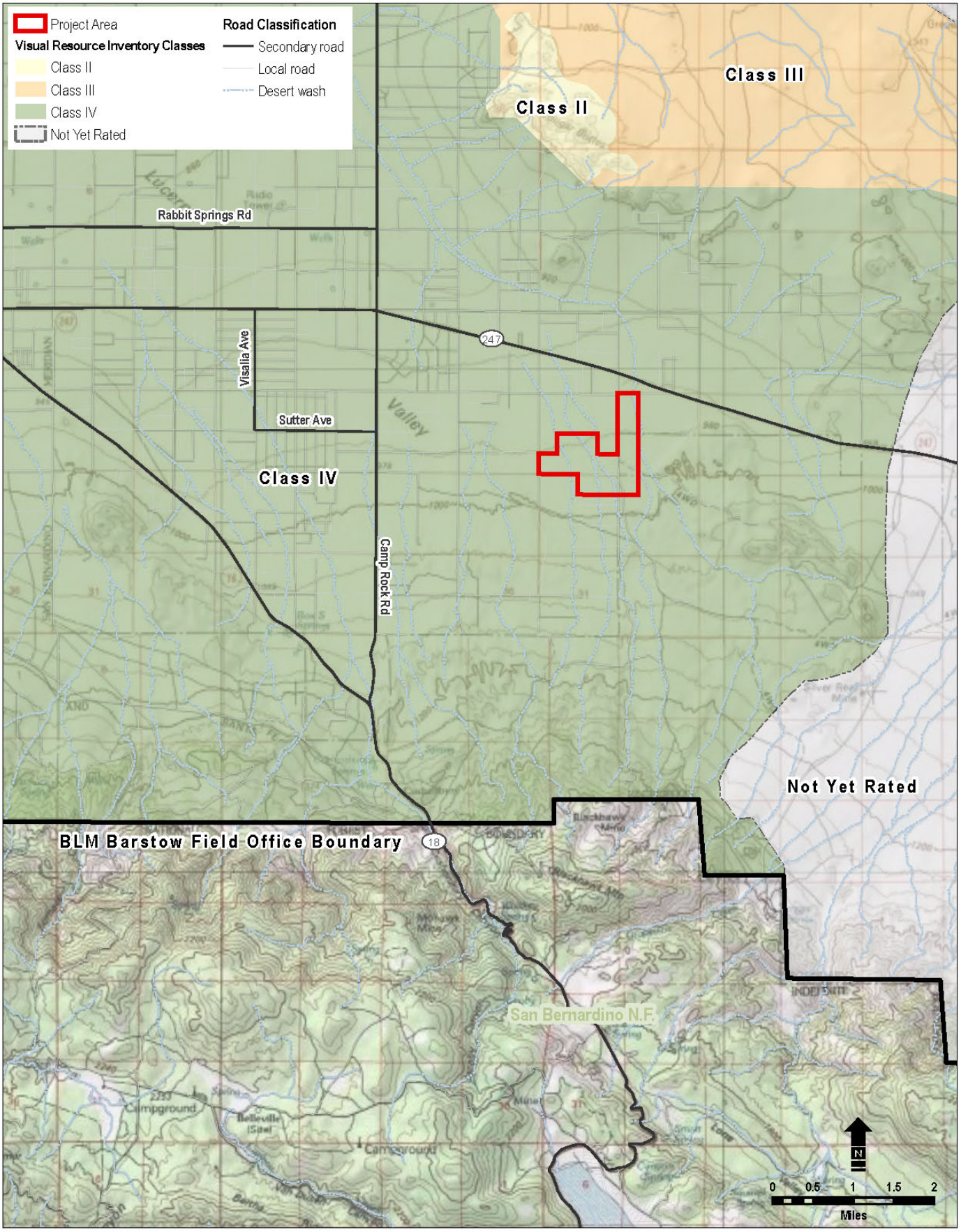
M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_July2010\Fig 3-12-3 Distance Zones.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999;
USDA Forest Service, Region 5, Southern California Forest Plan 2005

Figure 3.12-3
Distance Zones
Lucerne Valley Solar Project
San Bernardino County, California

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_July2010\Fig 3-12-4 Visual Resource Inventory.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999;
USDA Forest Service, Region 5, Southern California Forest Plan 2005

Figure 3.12-4
Visual Resource Inventory Classes
Lucerne Valley Solar Project
San Bernardino County, California

> Section 201(a): "The Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values (including…scenic values)."
>
> Section 505(a): "Each right-of-way shall contain terms and conditions which will… (ii) minimize damage to the scenic and esthetic values."

Federal regulations regarding aesthetics and visual resources related to the project are outlined in the BLM published resource management plans and are enacted through the application of VRM classifications described above.

California Desert Conservation Area Plan

The project would be located on land managed according to the CDCA Plan (BLM 1980, as amended). The CDCA Plan does not include VRM classifications but does include Multiple Use Classes (MUCs), which restrict the level of use and development for lands managed under the CDCA Plan. Refer to Section 3.12.2 for VRI values used in making the interim VRM Class assignment.

Since most management activities involve alteration of the natural character of the landscape to some degree, the Bureau will take the following actions in order to effectively manage for these activities:

1) identify the appropriate levels of management, protection, and rehabilitation on all public lands in the CDCA, commensurate with visual resource management objectives in the multiple-use class guidelines; and
2) evaluate proposed activities to determine the extent of change created in any given landscape and to specify appropriate design or mitigation measures using the Bureau's contrast rating process.

The contrast rating process is a tool used to determine the extent of visual impact that proposed resource management activities would create in a landscape. It serves as a guide for reducing visual impacts to acceptable levels as defined by the visual management objectives and multiple use class guidelines.

All BLM lands covered by the CDCA Plan have been designated geographically into four MUCs based on the sensitivity of resources and types of uses for each geographic area (BLM 1980, as amended). Figure 3.9-1 shows MUCs in the vicinity of the project. The site is located entirely on land in the MUC Category M, which is defined as follows:

- These lands are managed in a controlled balance between higher-intensity use and protection. A wide variety of uses, such as mining, livestock grazing, recreation, energy, and utility development are allowed. Any damage that permitted uses cause must be mitigated.

While the CDCA Plan stipulates that "[a]ll types of electrical generation plants may be allowed in accordance with State, Federal, and local laws" and that solar generating facilities "[m]ay be allowed after NEPA requirements are met," the majority of the project falls within a three-mile-wide BLM-designated "contingent" utility corridor (Corridor "S"). According to the Energy Production and Utility Corridor Element of the CDCA Plan, allowable uses within the corridor include the following types of linear utility facilities:

- New electrical transmission towers and cables of 161 kV (kilovolt) or above;
- All pipelines with diameters greater than 12 inches;
- Coaxial cables for interstate communications; and
- Major aqueducts or canals for interbasin transfers of water.

California Department of Transportation

The California State Department of Transportation (Caltrans) administers the State Scenic Highway Program to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways (California Streets and Highways Code, Section 260, et seq.). The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been so designated. These highways are identified in the Streets and Highways Code, Section 263. The program entails the regulation of land use and density of development, attention to the design of sites and structures, attention to and control of signage, landscaping, and grading, as well as other restrictions. The local jurisdiction is responsible for adopting and implementing such regulations. If a highway is listed as eligible for official designation, it is also part of the Scenic Highway System and care must be taken to preserve its eligibility status. SRs 18 and 247 are not officially designated as a scenic highway but are eligible for the California State Scenic Highway System within the project area (Caltrans n.d.).

Local Government Land Use Plans

Referring to Figure 2-1 of the Lucerne Valley Community Plan, the designation for the site is Non-County Jurisdiction. Therefore, no local land use plans are applicable (County of San Bernardino 2007). However, SR 247 is a San Bernardino County designated scenic route.

3.12.2 Existing Conditions

Developed and Built Landscape

The site is situated outside the community of Lucerne Valley. Land use surrounding the site is dispersed rural residential housing that transitions more into open desert towards Johnson Valley three miles east of the site.

Undeveloped and Natural Landscapes

The site is located in the Mojave Desert in the Great Basin section of the Basin and Range Physiographic Province. The desert scrub and desert dry wash woodland landscapes are composed largely of creosote bush and species typical of the riparian shrub woodland community. Visible mountain ranges to the north and south include the Cougar Buttes, Blackhawk Canyon, and Blackhawk Mountain.

Topography at the site varies between three and eight percent slopes in places. Vegetation consists largely of creosote bush, with sparse transitions to the occasional Joshua tree on the south and eastern sections of the site, where elevation is slightly higher. The desert alluvial fan that characterizes the site transitions south of the project area into a rolling hill landscape, which eventually transitions into a mountainous landscape within the San Bernardino National Forest.

Figure 3.12-5 shows the site boundaries in relation to nearby roads, geologic features, and hydraulic features.

Lucerne Valley Visual Resource Inventory

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following comments and concerns related to visual resources were raised: (1) cumulative visual effects with respect to other solar projects in the region; (2) degradation of views; and (3) views from SR 247, Old Woman Springs Road, a State Eligible Scenic Highway. These comments are addressed in the discussion of existing conditions (Section 3.12.2) and analysis of direct and indirect effects (Section 4.12). These concerns were incorporated into the VRI Sensitivity Level Ratings.

The CDCA was inventoried for visual values in the early 1980s and given the three decades of change within region, the VRI was updated to reflect current conditions. The VRI update was limited to the viewshed associated with the Lucerne Valley Solar Project. The updated inventory was divided into two SQRUs, three SLRUs, and one Distance Zone. The Lucerne Valley Solar Project lies within (See Figures 3.12-1, 3.12-2, 3.12-3, and 3.12-4):

Unit	Rating
Scenic Quality Rating Unit Lucerne Valley	(C)
Sensitivity Level Rating Unit Lucerne Valley	(Moderate)
Distance Zone	(FG-MG)

Comparison of the visual values reveals a VRI Class IV designation. These values are taken into consideration when determining the appropriate VRM Class designation as described in Section 3.12.

The VRM area boundary is defined by the Lucerne Valley floor that has visibility of the site. This single unit represents a contiguous area with uniform landform, vegetation, visual character, and quality. Scenic quality for rating the solar field is determined using the eight key factors, as follows:

1. Landform (rating 1 of possible 1 through 5): Some erosional patterns add subtle variety and shape to the site that is otherwise devoid of distinct landforms;
2. Vegetation (rating 1 of possible 1 through 5): Some variety of vegetation, but only one or two major types;
3. Water (rating 0 of possible 0 through 5): Absent;
4. Color (rating 1 of possible 1 through 5): Little color variations;
5. Adjacent scenery (rating 5 of possible 0 through 5): Adjacent scenery greatly enhances overall visual quality;
6. Scarcity (rating 1 of possible 1 through 5): Indistinctive and very similar to others within the region;

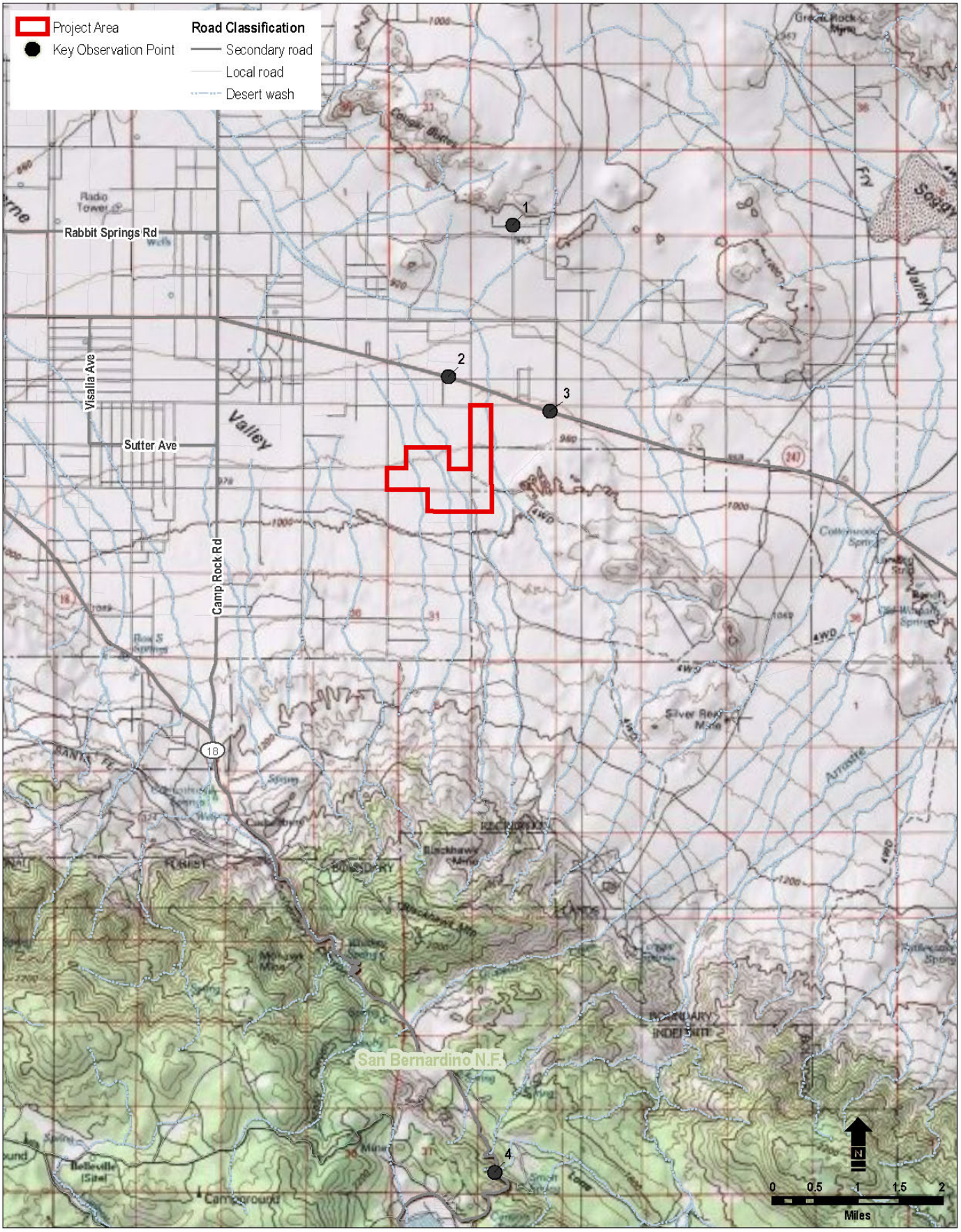
7. Intactness (rating 3 of possible 0 through 5): Majority of site is left intact, with few roads and two track trails bisecting the site; and
8. Cultural modifications (rating 0 of possible 0 through 5): Modifications add little or no visual variety.

For the project, the ratings total 15 points, which ranks in the Scenic Quality C (low) category (17 or less points).

Interim VRM Class IV

Based on the criteria discussed above, it is recommended that the defined rating unit receive an Interim VRM Class IV designation. It is the field manager's determination upon approval of this recommendation that the interim VRM Class be designated as Class IV.

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_Oct2009\3-12_Aesthetics_VisResources\Scenic_Attractiveness.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999;
USDA Forest Service, Region 5, Southern California Forest Plan 2005

Figure 3.12-5
Key Observation Points
Lucerne Valley Solar Project
San Bernardino County, California

3.13 Transportation/Motorized Vehicle Access

This section identifies existing transportation and motorized vehicle access conditions in the project area. Additionally, this section discusses regulations applicable to transportation and vehicle access. Information in this section includes reference to the 2007 *San Bernardino County General Plan Final Program Environmental Impact Report* (County of San Bernardino 2007), as well as input received from members of the public during the scoping process.

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following comments and concerns related to transportation and motorized vehicle access were raised: (1) whether Santa Fe Fire Road would remain open; (2) whether a right-turn lane on SR 247 would provide safer egress during construction; (3) the Town of Apple Valley requested identification of effects related to traffic to SR 18 and Bear Valley Road within the town's sphere of influence and within town limits; and (4) effects that are identified through a traffic study should be mitigated.

3.13.1 Applicable Plans, Policies, and Regulations

This section provides an overview of the applicable laws, regulations, and standards that apply to transportation and that influence the management of vehicular access of the site of the project at the federal, state, and local levels. Although some of these laws do not apply to the project, they provide a context for determining why some cultural resources are considered important at the federal, state, or local level, as well as what effects the project could have on transportation and motorized vehicle access.

3.13.1.1 Federal

California Desert Conservation Area Plan

On federal lands managed by the BLM, motorized routes, in addition to roads that are within the state or locally maintained roadway system, are designated for public use through the BLM's CDCA Plan (BLM 1980). The majority of these routes are unmaintained. A few major arterial roadways are maintained or paved by the BLM (or both). Most routes receive light use and do not have specific policies or regulations governing their use. A few routes that provide access to major use areas or trailheads receive moderate use and may be hardened or maintained. The CDCA Plan designates roads as open, closed, or limited for vehicle use. The area designations are made on the basis of multiple-use classes with certain exceptions (BLM 1980).

The goal of the Motorized-Vehicle Access Element of the CDCA Plan is to provide a system and set of rules governing access to the CDCA by motor vehicles. The specific objectives in the CDCA Plan (BLM 1980) are as follows:

- Provide for constrained motorized vehicle access in a manner that balances the needs of all desert users, private landowners, and other public agencies;
- When designating or amending areas or routes for motorized vehicle access, to the degree possible, avoid adverse impacts on desert resources; and
- Use maps, signs, and published information to communicate the motorized vehicle access situation to desert users. Be sure all information materials are understandable and easy to follow.

The site of the project is within a Class M (Moderate) multiple-use classification area where motorized-vehicle use is allowed only on existing routes of travel unless designated as closed or limited. New routes may be allowed upon approval of the authorized officer (BLM 1980). Routes within the project area that are designated open to motorized vehicle access, but where activities have the potential for resource damage or could cause significant conflicts with other uses, may require specific authorization (BLM 1980).

Additional motorized routes through the BLM lands may be designated for commercial or other authorized use or for administrative agency use. These routes are subject to maintenance and other provisions, based on the level of use, public safety considerations, and environmental effects. Paved routes are generally subject to county road standards.

Nonmotorized transportation routes are also designated on public lands. These may include equestrian and hiking trails that serve as a primary access to specific local destinations or that serve as long-distance nonmotorized trekking routes.

The WEMO Plan is an amendment to the CDCA Plan that establishes strategies to conserve and protect sensitive species such as the desert tortoise, the Mohave ground squirrel, and other sensitive plants and animals within the WEMO planning area (BLM 2005). The WEMO modified the BLM routes of travel network designations made in 2003. The WEMO was later challenged in court, and it was ruled that the WEMO was not explicit enough in its designations. Currently the route designations are codified under 43 Code of Federal Regulations Part 8342.1 as follows:

> The authorized officer shall designate all public lands as open, limited, or closed to off-road vehicles. All designations shall be based on the protection of the resources of the public lands, the promotion of the safety of all the users of the public lands, and the minimization of conflicts among various uses of the public lands; and in accordance with the following criteria:
>
> (a) Areas and trails shall be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands, and to prevent impairment of wilderness suitability.
>
> (b) Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats.
>
> (c) Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
>
> (d) Areas and trails shall not be located in officially designated wilderness areas or primitive areas. Areas and trails shall be located in natural areas only if the authorized officer determines that off-road vehicle use in such locations will not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

3.13.1.2 State

California Department of Transportation

The State of California Department of Transportation (Caltrans) is responsible for maintaining approximately 1,240 miles of roadway throughout San Bernardino County. This includes six federal (interstate) freeways, two federal highways, and 18 state highways. Caltrans is the agency responsible for funding and maintaining the state highway and interstate highway system (Caltrans 2009).

3.13.1.3 Local

County of San Bernardino

Currently more than 10,000 miles of roadways are within San Bernardino County. These facilities fall under the jurisdiction of one of the three government agencies responsible for construction and maintenance of roadway infrastructure. The San Bernardino County Department of Public Works is responsible for maintaining approximately 2,830 miles of both paved and unpaved roadways primarily located in unincorporated areas of the county. These facilities range in classification from major arterials to local streets. The remaining 5,930 miles of roadways within San Bernardino County fall under the jurisdiction of the numerous incorporated municipalities across the county. These facilities range in classification from major arterials to local streets.

Transportation/motorized vehicle access management goals, policies, and regulations are outlined in the San Bernardino County General Plan (County of San Bernardino 2007). The goals, policies, and regulations that pertain to transportation/motorized vehicle access within the project area are as follows:

- The County will provide a transportation system, including public transit, which is safe, functional, and convenient; meets the public's needs; and enhances the lifestyles of county residents;
- The County's comprehensive transportation system will operate at regional, countywide, community, and neighborhood scales to provide connectors between communities and mobility between jobs, residences, and recreational opportunities;
- The County will have a balance between different types of transportation modes to minimize the adverse effects of automobile use on the environment, reduce dependency on the automobile, and promote public transit and alternate modes of transportation;
- The County will coordinate land use and transportation planning to ensure adequate transportation facilities to support planned land uses and ease congestion;
- The County's road standards for major thoroughfares will complement the surrounding environment appropriate to each geographic region;
- The County will encourage and pursue development of regional transportation facilities, including roads, railroads, and airports to be a multimodal transportation hub and promote economic development.

Town of Apple Valley

The Circulation Element of the Terra Nova/Town of Apple Valley General Plan addresses transportation within Apple Valley and the segments of the local transportation system that interface with, and serve as extensions of, the regional roadway system connecting Apple Valley with the broader Victor Valley region and other communities in southern California. The Circulation Element provides maps to guide the orderly development of all aspects of the transportation system, as well as goals, policies, and programs that correlate to the town's transportation system with the types, intensities, and locations of land uses within the planning area (Town of Apple Valley 2009).

3.13.2 Existing Conditions

Major Traffic Routes Within or Adjacent to the Project Area

Roads that would be used for site access are SR 247 (also known as Old Woman Springs Road), Camprock Road, Foothill Road, Zircon Road, and Santa Fe Fire Road (Figure 3.13-1, Table 3.13-1). With the exception of SR 247, these are two-lane unpaved roads (single lane in either direction) that mainly provide access to private parcels and agricultural land. There are no railroads, bridges, or other transportation features in the project area. Other larger thoroughfares that may be used for regional access to the site include Interstate 15 (I-15), SR 18, and Bear Valley Road.

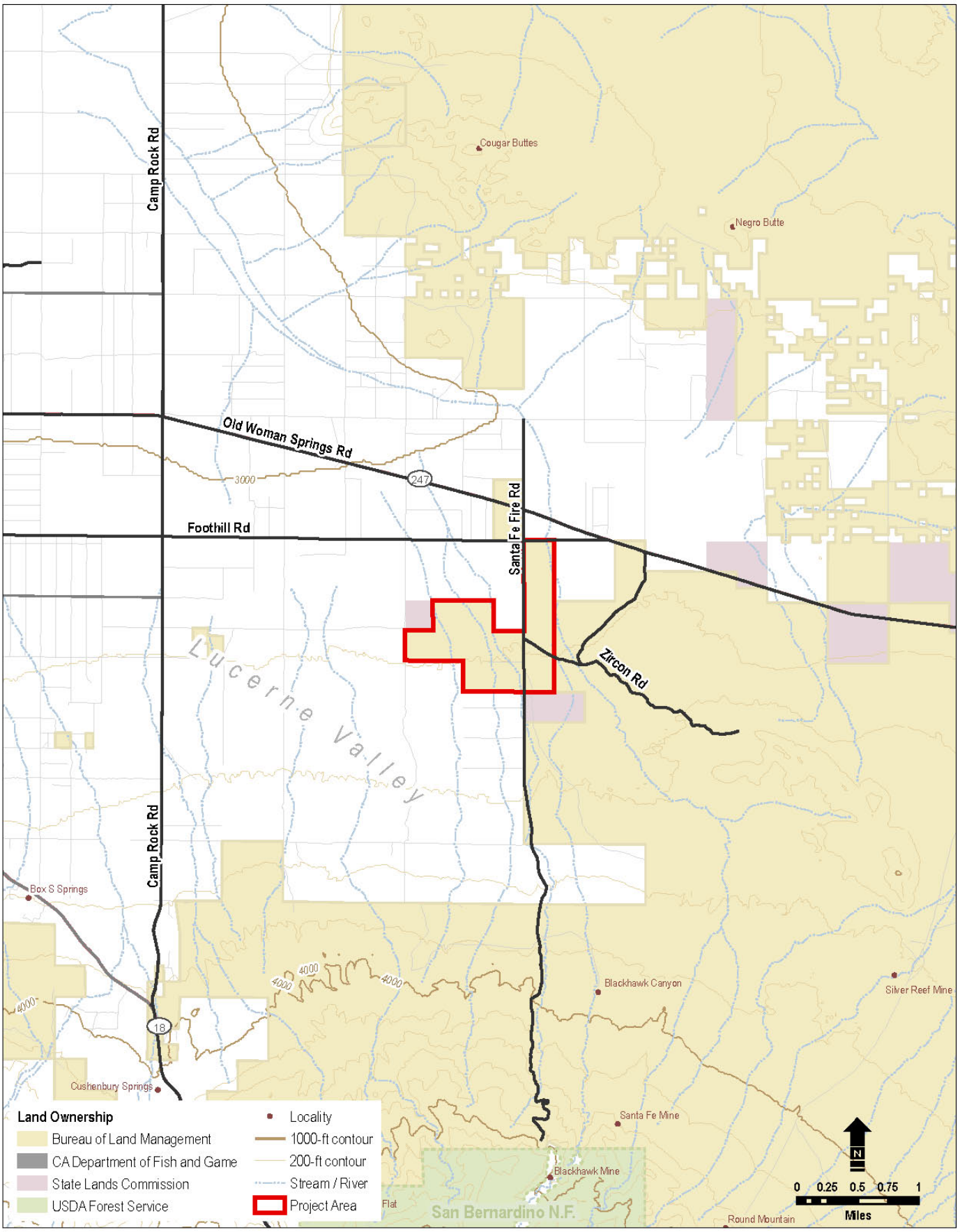
Immediate access to the project site would be off SR 247 via Foothill Road, with secondary access points via Santa Fe Fire Road. In addition, there are dirt trails through the site that provide access from SR 247, Foothill Road, and Santa Fe Fire Road. The site is within a Class M (Moderate) multiple-use classification area. According to the CDCA Plan (BLM 1980), the vehicle access designation is classified as Open, Limited to Existing Routes of Travel. Santa Fe Fire Road is undesignated.

Existing Traffic Volumes

The level of service (LOS) is defined as a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS indicators for the highway and roadway system are based on specific characteristics of traffic flow on designated sections of roadway during a typical day. For mainline freeway and roadway segments, these include overall traffic volume, speed, and density.

Several physical and operational characteristics of the roadway, such as lane configuration, free-flow speed (typical speed between intersections), and number of intersections per mile, are used to determine the vehicular capacity of the roadway segment. When these two sets of data are compared, a volume-to-capacity ratio is calculated. These factors are then converted to a letter grade identifying operating conditions and expressed as LOS A through F. LOS A identifies the best operating conditions along a section of roadway and is characterized by free-flow traffic, low volumes, and little or no restrictions on maneuverability. LOS F characterizes forced traffic flow with high traffic densities, slow travel speeds, and often stop-and-go conditions. For intersections, LOS can be determined by using either the method described above or by using the average control delay (the amount of time a vehicle is delayed by the operations of the traffic signal) calculated at an individual intersection (County of San Bernardino 2007).

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_July2010\Fig 3-13-1 Transportation_Study_Area.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee, 1999

Figure 3.13-1

Transportation Study Area Map

Lucerne Valley Solar Project

San Bernardino County, California

Table 3.13-1 Routes Providing Direct or Indirect Access to the Site of the Project

Route	Direction	Type	Lanes	Description
I-15	North-south	Paved freeway	3-4 (each direction)	Provides a connection between San Diego, Victorville, and Barstow, California, and Las Vegas, Nevada, and beyond and indirect connection to the greater Los Angeles area. SR 18 and SR 247 connect to larger cities and metropolitan areas via I-15.
SR-18	Northwest-southeast	Paved highway	2-4 (total 2-way)	A major access route into the Lake Arrowhead and Big Bear Lake resorts to the south and leads to Apple Valley, Victorville, and I-15 to the northeast. The portion of SR 18 between Victorville and Palmdale operates as a bypass for trucks making deliveries in the western portion of the Los Angeles Metropolitan Region.
SR-247 (Old Woman Springs Road/ Barstow Road)	East/southeast - west/northwest	Paved highway	2 (total 2-way)	A rural highway that originates at I-15 and provides access between Barstow, Lucerne Valley, and Yucca Valley and terminates at SR 62.
Bear Valley Road	East-west	Paved highway	4-6 (total 2-way)	A major east-west corridor through the cities of Victorville, Hesperia, and Apple Valley and provides a shorter alternate connection between SR 18 and southbound I-15. Traveling west, Bear Valley Road is a secondary arterial until it intersects with US 395. It continues as a primary arterial through its intersections with I-15 and Hesperia Road before terminating at SR 18 east of Apple Valley.
Foothill Road	East-west	Gravel/dirt	2 (total)	Connection from Camp Rock Road or SR 18 to the north end of the site.
Santa Fe Fire Road	North-south	Gravel/dirt	2 (total)	Connection from Foothill Road or SR 247 to the Phase I and II site.
Zircon Road	Northwest-southeast	Gravel/dirt	2 (total)	Crosses the Phase II site. Provides access from the west to Wenger Ranch Road.

Source: County of San Bernardino 2007

Table 3.13-2 provides existing traffic volumes and LOS for highways that may be used for indirect access to the project area. The County of San Bernardino has a goal for new development in the desert region of maintaining LOS C on its roadways.

Table 3.13-2 Existing Traffic Volumes and Level of Service

Route	Segment	Peak Hour Volume[a]	Annual Average Daily Traffic[b]	Level of Service
SR 247 (Old Woman Springs Road)	Camp Rock Road to SR 62	235	2,650[1]	B
SR 247 (Barstow Road)	Barstow to Camp Rock Road	NA	2,000–3,000[2]	B
I-15	I 215 to Oak Hill Road	NA	NA	F
I-15	US 395 to SR 18	NA	67,000–84,000[2]	A–C
SR 18	US 395 to Bear Valley Cutoff	690	7,900[1]	D
SR 18 (intersection)	Stoddard Wells Road intersection at I-15 North	3,925	92,000[1]	F
SR 18	Bear Valley Cutoff to SR 38	NA	3,000–9,000[2]	C–E
Bear Valley Road	I-15 to Apple Valley Road	NA	27,000–38,000[2]	C–E

Sources: [1]Caltrans 2009; [2]County of San Bernardino 2007

Notes:

[a]This value is useful for estimating the amount of congestion experienced and shows how near to capacity the highway is operating (average of back and ahead traffic [defined as Back Annual Average Daily Traffic and Peak Hour usually represent traffic south or west of the count location. Ahead Annual Average Daily Traffic and Peak Hour usually represent traffic north or east of the count location]).

[b]The average number of vehicles traveling on a route over a 24-hour period (average of back and ahead traffic).

3.14 Human Health and Safety/Hazardous Materials

This section describes the human health and safety and hazardous materials issues that may be present in the project area. Hazards associated with seismic conditions are addressed in Section 3.3, "Geology, Topography, and Geologic Hazards." Hazards associated with floods are addressed in Section 3.5, "Water Resources/Hydrology."

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following comments and concerns related to human health and safety and hazardous materials were raised: (1) the Draft EIS should address potential direct, indirect, and cumulative effects of hazardous waste from construction and operation; (2) the document should identify projected hazardous waste types and volumes and expected storage, disposal, and management plans; (3) address the applicability of state and federal hazardous waste requirements; (4) appropriate mitigation should be evaluated, including measures to minimize the generation of hazardous waste; (5) alternate industrial processes using less toxic materials should be evaluated as mitigation. This potentially reduces the volume or toxicity of hazardous materials requiring management and disposal as hazardous waste, and; (6) the EPA recommends that the Applicant strive to address the full product life cycle by sourcing photovoltaic (PV) components from a company that minimizes environmental effects during raw material extraction, manufactures PV panels in a zero waste facility, and provides future PV disassembly for material recovery for reuse and recycling.

3.14.1 Applicable Plans, Policies, and Regulations

Hazardous materials handling and hazardous waste management are subject to numerous laws and regulations at all levels of government; laws and regulations related to health and safety are regulated by federal and state agencies. Additionally, there are also laws and regulations applicable to solar panel construction, design, and operations. The laws that may apply to the project are summarized below.

3.14.1.1 Federal

Comprehensive Environmental Response, Compensation, and Liability Act

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or the Superfund Act) of 1980, as amended, and pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan, the BLM has the responsibility for responding to the release or threat of release of oil, petroleum products, hazardous substances, or pollutants and contaminants that pose an actual or potential threat to human health or welfare or to the environment. Under this authority, the BLM may take an action to protect public land resources and users from hazardous substances that pose a threat or potential threat to human health and the environment. As the lead Federal agency for actions taken on BLM public land, the BLM is responsible for the identification of all environmental laws that pertain to any CERCLA cleanup actions.

Occupational Safety and Health Administration

The Occupational Safety and Health Administration (OSHA) administers Occupational Safety and Health Standards (29 CFR Sections 1910 and 1926), which (1) provide regulations for safety in the workplace, (2) regulate construction safety, and (3) require a Hazard

Communication Plan to identify and inventory all hazardous materials for which material safety data sheets will be maintained. OSHA's standards also require employee training in safe handling of said materials.

OSHA Electrical Safety Standards

Title 29 CFR, Part 1910.302, Subpart S, Design Safety Standards for Electrical Systems, and 1910.331, Electrical Safety-Related Work Practices Standard, provides a description of concepts and principles associated with electrical hazards and basic electrical safety for individuals. OSHA's electrical standards for construction recommend following general industry electrical standards whenever possible for hazards that are not addressed by industry-specific standards. The standards address concerns that relate to electrical hazards and exposures to such dangers as electrical shock, electrocution, burns, fires, and explosions. OSHA's electrical standards help minimize these potential hazards by specifying safety aspects in the design and use of electrical equipment and systems.

National Fire Protection Association 780, National Electrical Code

The National Electrical Code (NEC) addresses electrical hazards through guidance related to installation of any electrical power system, including PV systems (NEC 2009). The NEC covers the installation of electrical conductors, equipment, and raceways; signaling and communications conductors; and equipment and optical fiber cables for public and private premises. The activities of the project may require special permission from the San Bernardino County Fire Department, which has jurisdiction for the enforcement of this code. Article 690 of the NEC specifically covers installation and operational requirements for solar PV systems.

Federal Resource Conservation and Recovery Act

The federal Resource Conservation and Recovery Act (RCRA) regulates solar PV product end-of-life disposal and is based on the California Hazardous Waste Control Law (HWCL). If solar panels are determined to be hazardous waste by the regulatory authority, the requirements of RCRA (and HWCL) would regulate their handling, recycling, reuse, storage, treatment, and disposal (County of San Bernardino 2007). Decommissioned or defective solar panels are currently considered hazardous waste if they do not meet the U.S. Environmental Protection Agency Toxicity Characteristic Leaching Procedure standards (this determination varies depending on the technology used). Silicon-based panels typically last 20 to 25 years, and a proactive recycling option can eliminate health and environmental risks of water stream and water contamination for municipalities.

3.14.1.2 State

California Occupational Safety and Health Administration

Title 8 of the CCR, Chapters 3, 4, and 7 (Occupational and Industrial Safety), establish requirements for safe working conditions and safety-related reporting in the state. A hazard communication plan would need to include identification and inventorying of all hazardous materials, for which material safety data sheets are required, and employee training in safe handling of said materials.

California Environmental Protection Agency

The California Environmental Protection Agency enforces the Hazardous Waste Control Act (Title 26 CCR), which defines requirements for proper management of hazardous materials.

California Office of Emergency Services

California Office of Emergency Services (OES) coordinates overall state agency response to major disasters in support of local government (Division 1, Title 2, CCR Chapter 7, The California Emergency Services Act; Hazardous Materials Release Response Plans and Inventory Law of 1985). The OES is responsible for ensuring the state's readiness to respond to and recover from natural, man-made, and war-caused emergencies and for assisting local governments in their emergency preparedness, response, and recovery efforts. During major emergencies, OES may call upon all state agencies to help provide support. Due to their expertise, the California National Guard, California Highway Patrol, Department of Forestry and Fire Protection, Conservation Corps, Department of Social Services, and the California Department of Transportation are the agencies most often asked to respond and assist in emergency response activities. In addition, pursuant to the Hazardous Materials Release Response Plans and Inventory Law of 1985, local agencies are required to develop "area plans" for response to releases of hazardous materials and wastes. These emergency response plans depend to a large extent on the business plans submitted by persons who handle hazardous materials. An area plan must include pre-emergency planning of procedures for emergency response, notification, coordination of affected government agencies and responsible parties, training, and follow up. The California Hazardous Materials Incident Reporting System is a post-incident reporting system to collect data on the accidental release of hazardous materials. Information on accidental releases of hazardous materials is reported to and maintained by OES.

California Environmental Protection Agency

The California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage, and disposal of hazardous waste under RCRA and the California Hazardous Waste Control Law. Both laws impose "cradle to grave" regulatory systems for handling hazardous waste in a manner that protects human health and the environment.

California Department of Forestry and Fire Protection Office of the State Fire Marshall

In 2008, the Office of the State Fire Marshall published a draft copy of the Solar Photovoltaic Installation Guide (in partnership with interested local fire officials, building officials, and industry representatives). This guide was developed to increase public safety for all structures equipped with solar photovoltaic systems. This guidance was developed for PV systems associated with residential and commercial buildings, but some of the information about marking, access, pathways, smoke ventilation, location of direct current conductors, and ground mounting could be applicable (CALFIRE 2008b).

3.14.1.3 Local

County of San Bernardino General Plan, Safety Element

The County Safety Element (County of San Bernardino 2007) describes hazards and hazard abatement strategies to provide guidance on decisions related to zoning, subdivisions, and entitlement permits. The element contains "general hazard and risk reduction goals and policies to minimize potential dangers to residents, workers, and visitors; reduce the level of property loss resulting from events; and, identifies ways to respond to a crisis." The following safety element fire protection goal and policy are relevant to the project: "GOAL S 3. The County will protect its residents and visitors from injury and loss of life and protect property from fires.

Require applicants for new land developments to prepare a site specific fire protection plan, with special emphasis in areas of high and very high fire risk."

The San Bernardino County Fire Department

The San Bernardino County Fire Department, Hazardous Materials Division, is the local agency responsible for the enforcement of a variety of hazardous materials management requirements. It is the state-designated Certified Unified Program Agency (CUPA) for San Bernardino County (excluding Victorville). The CUPA provides consolidation and consistency in reporting requirements, permit formats, inspection criteria, enforcement standards, and fees for various hazardous materials programs. The CUPA is required by state law to maintain a list of facilities within the county that are known to use, store, or generate hazardous materials and wastes. Facilities that handle hazardous materials or generate hazardous waste must obtain a permit from the CUPA. The San Bernardino County Fire Department manages six hazardous material and hazardous waste programs: (1) Hazardous Materials Release Response Plans and Inventory (Business Plan); (2) California Accidental Release Program; (3) Underground Storage Tanks; (4) Aboveground Petroleum Storage Spill Prevention Control and Countermeasure; (5) Hazardous Waste Generation and On-Site Treatment; and (6) Hazardous Materials Management Plans and Inventory Statements under Uniform Fire Code Article 80.

3.14.2 Existing Conditions

The site is located on undeveloped lands administered by the BLM in the Lucerne Valley of San Bernardino County. This section defines existing conditions within the site to establish a baseline against which potential effects may be measured. Potential natural hazards, hazards related to existing infrastructure, and hazards associated with uses of the site and surrounding sites are considered. Hazards that could affect human health include natural hazards, wildfires, and endemic harmful species of snakes and spiders.

There are no permitted facilities or infrastructure at the site that could adversely affect human health. The site is almost entirely vacant and undeveloped. However, there are several occupied buildings of unknown origin that are likely not permitted and graded dirt access roads, indicating there are residents living on the property illegally. There are also old mining test pits and evidence of potential illegal dumping at the site. There is no evidence of previous commercial or industrial development at the site, nor evidence of previous usage of the site for agricultural, commercial, or industrial purposes.

Natural Hazards

The site is located in desert scrub/wash. There are hazards associated with the natural environment and species endemic to the site. The site is hot and dry and subject to significant temperature gradients throughout the day.

Existing Fire Hazards

The California Department of Forestry and Fire Protection (CALFIRE) characterizes fire risk for areas within California. CALFIRE produces Fire Hazard Severity Zone maps that assign hazard scores based on factors that influence fire likelihood and behavior, such as fire history, existing and potential fuel (natural vegetation), flame length, blowing embers, terrain (steep terrain has a greater fire hazard severity), topography, and typical weather for the area. The 2008 Fire Hazard Severity Zone maps include areas where local governments have financial responsibility for wildland fire protection, known as local responsibility areas. Only lands zoned "very high" for

fire hazard severity are identified within local responsibility areas. CALFIRE divided state responsibility areas into three hazard zones: moderate, high, and very high (CALFIRE 2008a).

The project would be developed in desert scrub, which has an associated fire risk. The fire hazard associated with this type of environment has been mapped by CALFIRE as a moderate fire hazard severity zone (CALFIRE 2008a).

Hazardous Wastes/Contaminated Soil and Groundwater

A preliminary search of the California DTSC databases identified no potentially contaminated sites on the site or within one mile of the project area. This database search included listings of federal superfund, state response, volunteer cleanup, school cleanup, evaluation, school investigation, military evaluation, corrective action, hazardous waste permitted, leaking underground storage tanks, and registered industrial sites (DTSC 2009).

However, there are multiple former limestone prospects on the site, and the available information suggests that there may be some hazardous wastes at the site. Remnants of the prospecting activities, excavated trenches or "test pits," were found during the cultural resources inventory. The debris in the test pits varied from pit to pit, but it was characterized by the cultural resource specialists as refuse and household debris, not mining. Much of the debris included cans and bottles, but a few locations had some construction debris, such as wire and some timber. It included motor oil cans and three bottles labeled as Chlorox and Purex, which appeared to have been of household size (32-ounce) (Chambers Group 2009). It is not known if any of these containers still contain product, but if so, they could be considered hazardous waste.

Intentional Destructive Acts

Pursuant to the US Department of Energy's policy set out in December 1, 2006, memorandum, "Need to Consider Intentional Destructive Acts in NEPA Documents," the potential environmental consequences of intentional destructive acts at the Lucerne Valley facility have been considered. The proposed facility presents an unlikely target for an act of terrorism or sabotage and has an extremely low probability of attack (BLM 2009).

3.15 Social and Economic Conditions

3.15.1 Social

This section describes the social and demographic background and existing conditions in the project area, which includes the Lucerne Valley and broader Victor Valley area. Additionally, this section discusses applicable plans, policies, and regulations that embody the social aspirations; community characteristics; and desired lifestyle, values, and goals of the stakeholders. These plans, policies, and regulations are necessary to appreciate social group concerns in the context of renewable energy development. Information compiled is based on regional and national sources as well as input received from members of the public during the scoping process. The following comments and concerns related to socioeconomic conditions were raised during scoping: (1) effects on the region from the number of temporary and permanent workers who would be hired to build and operate the project; (2) effects on the region from tax revenues generated by the project or from payments in lieu of taxes (if applicable) to be paid by the sponsor/developer; (3) integration of restoration and any remedial costs during decommissioning into the total cost of the project, and; (4) effects on property values. The background data and social and demographic trends necessary to place these concerns in their proper context and to provide a platform for effect evaluation are included within this section.

3.15.1.1 Applicable Plans, Policies, and Regulations

Locally, for the Lucerne Valley, the main plans, policies, and goals for preserving the community's rural lifestyle character are articulated within the Lucerne Valley Community Plan (LVCP), which was prepared in conjunction with the County of San Bernardino General Plan (County of San Bernardino 2007). The following LVCP goals are relevant to evaluating how socioeconomic resources may be affected by the project:

- Goal LU 1: Retain the existing rural desert character of the community;
- Goal LU 2: Ensure that commercial and industrial development within the plan area is compatible with the rural desert character and meets the needs of local residents;
- Goal LU 3: Establish locational criteria for future development within the plan area to ensure compatibility between uses and with the character and vision that is desired for the community;
- Goal circulation and infrastructure (CI) 4: Ensure adequate water sources and associated infrastructure to serve the needs of existing and future water users in the LVCP area;
- Goal CI 5: Encourage and promote water conservation; and
- Goal CI 6: Ensure that public services are delivered and maintain capacities at acceptable levels.

3.15.1.2 Existing Conditions

The site of the project is on undeveloped lands administered by the BLM in the Lucerne Valley of San Bernardino County. The region of influence for the project is the Lucerne Valley, an unincorporated community located in the Mojave Desert in the southwestern part of San Bernardino County. The Lucerne Valley is in the eastern portion of the greater Victor Valley, whose main population centers are Victorville, Apple Valley, and Hesperia, communities located

close to Interstate 15. Collectively, the Victor Valley communities are part of an economic region encompassing San Bernardino and Riverside Counties that includes the Inland Empire. Figure 3.15-1 shows the site and vicinity (roads, public facilities, major local features, and resources). The site would be within zip code tabulation area (ZCTA) 92356 and Census Tract 104.05. These geographic groupings have been used for the compilation of demographic and socioeconomic data.

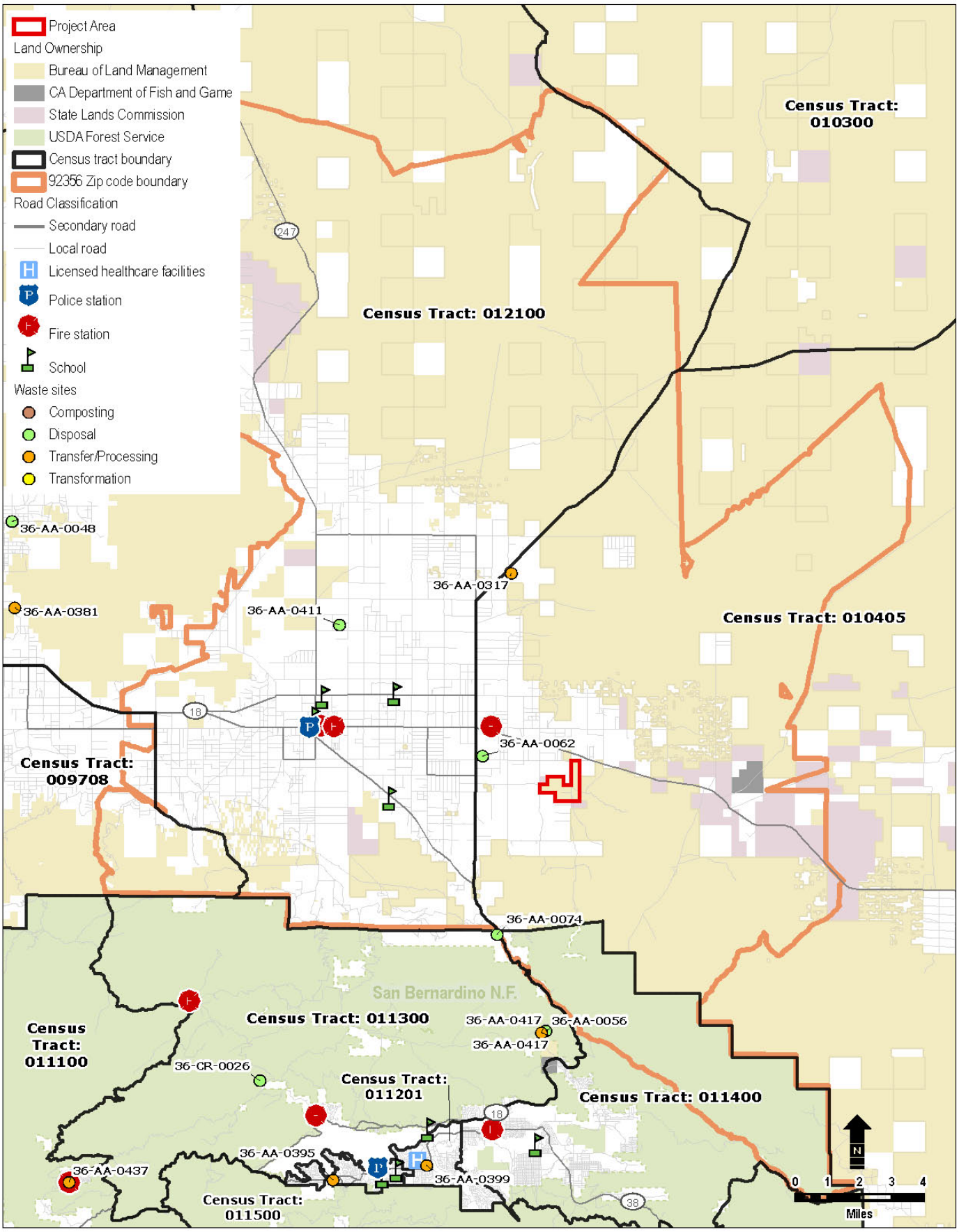
Demographics and Social Trends

The Lucerne Valley is characterized by its high-desert landscape, natural resources, scenic vistas, and rural open environment. The area is defined by large lots/parcels, limited commercial development, and an agriculture-based rural lifestyle. Residents are concerned with issues such as depleted agricultural lands, water scarcity, and the maintenance of pristine environmental habitats for threatened and stressed species. Some groups are also concerned with future economic opportunities given the changing nature of the rural landscape and the background recession. Social groups or constituencies that take an interest in the project's potential effects on, and integration with, their community are comprised of local large lot residents, recreational users (such as hikers and OHV enthusiasts), local groups (e.g., Mountain Home Village, LVEDA etc.) and national environmental groups (e.g., The Wildlands Conservancy). These groups have various views and concerns about the tradeoffs associated with solar energy (and other renewables such as wind) development within the host high desert area landscape. These concerns affect how these stakeholders assess and process proposed developments that would potentially alter their rural, desert lifestyles. The desert landscape and natural resources define the rural character of the community, which prizes open spaces and scenic vistas. Large lot subdivisions allow for raising animals and engaging in agricultural and equestrian activities.

Population: Table 3.15-1 shows recent population estimates, growth rates, and densities (persons per square mile) for Lucerne Valley and the urban centers closest to the site. The Lucerne Valley is an unincorporated area that is represented by ZCTA 92356. The communities within the region have enjoyed relatively strong population growth that has outpaced average growth in California. It is estimated that the Lucerne Valley is home to approximately 7,500 individuals and is a sparsely populated rural area compared to the adjacent Victor Valley urban centers of Hesperia and Victorville and the town of Apple Valley. The area has a relatively older population compared to the state average. For example, ZCTA 92356's population 65 or older is 16.5%, compared to 10.6% for the state.

Housing: Table 3.15-2 shows the quantity and quality of housing stock in San Bernardino County, particularly the availability of temporary housing near the site that might be available to temporary construction workers. Residential development in the Lucerne Valley is low-density, which is consistent with the zoning goals articulated in the LVCP to preserve the community character of rural agrarian lifestyles (County of San Bernardino 2007). Housing conditions within San Bernardino County are closely linked to the construction sector, a major employer in the area. The recession has had a significant effect on the pace of building activity (both residential and commercial) within the Inland Empire, and the construction downturn has contributed to rising unemployment.

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_Oct2009\3-15_SocioEc\CensusMap_Public_Facilities.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; U.S. Department of Commerce, Bureau of the Census 2001; Heberger, Matthew, and Herrera, Pablo 2009; CA DHS 2006.

Figure 3.15-1

Public Facilities and Census Tracts

Lucerne Valley Solar Project

San Bernardino County, California

Table 3.15-1 Population Levels, Growth Rates, and Density

Area	Population Levels		Population Growth Rates		Population/ square mile		
	2000	2008 est.	2000-2008	Average Annual Growth[a]	2000	2008 est.	Land Area (square miles)
California	33,871,648	36,756,666	8.5%	1.0%	217	236	155,959
San Bernardino County	1,709,434	2,015,355	17.9%	2.1%	85	101	20,053
San Bernardino (city)	185,401	198,580	7.1%	0.9%	3,197	3,424	58
Lucerne Valley (ZCTA 92356)	5,251	7,500	42.8%	4.6%	12	17	433
Apple Valley	54,239	70,200	29.4%	3.3%	2,583	3,343	21
Hesperia (city)	62,582	85,883	37.2%	4.0%	934	1,282	67
Victorville (city)	64,029	110,318	72.3%	7.0%	889	1,532	72

Source: U.S. Census Bureau 2008
Note:
[a]Compound average annual growth rate.

Table 3.15-2 Housing Stock Characteristics (2005 to 2007)

Area	Total Housing Units	Homeowner Vacancy Rate	Rental Vacancy Rate	Median Value (dollars)
California	13,159,358	1.8	4.7	$513,200
San Bernardino County	667,836	2.5	5.5	$363,700
San Bernardino (city)	66,210	2.7	5.0	$300,800
Lucerne Valley (ZCTA 92356)	2,655	n.a.	n.a.	$70,800
Apple Valley	24,353	3.2	3.1	$312,200
Hesperia (city)	26,220	2.3	7.8	$320,200
Victorville (city)	30,973	2.8	6.1	$296,700

Source: U.S. Census Bureau 2009
Notes:
Reflects averages over the 2005–2007 period.
n.a. = not available.

Since the time of the housing indicators shown in the official census records (average from 2005 to 2007), the housing sector has deteriorated rapidly in the recession. For example, median home values within the San Bernardino County-Riverside Metropolitan Statistical Area fell from $370,000 in April 2007 to $138,750 in April 2009 (County of San Bernardino 2009).

Within the immediate vicinity there are two motels on SR 18 (Giant Oaks Lodge Motel and Cabins and Lake Motel). South of this area there are more hotels and room capacity located in the town of Big Bear Lake, California.

Affected Groups and Attitudes

This section discusses some of the groups who potentially may be affected by the project. Social effects to these groups and other stakeholders are discussed under Section 4.15.

Classifying stakeholders into groups by no means implies that other stakeholders who do not fit into a group are being ignored or are outside of the social and environmental review process. Discussion of the affected groups is simply a means to highlight and facilitate issue framing related to the social concerns of some stakeholders who may have a particular local or regional relationship to the host landscape that may potentially be developed to exploit solar energy.

Lucerne Valley Economic Development Association (LVEDA): LVEDA provides a forum for discussion and action on important community issues. These issues relate to promoting infrastructure improvements and working with the County and developers to promote development that is both "economic" and compatible with the region's rural lifestyle, environment, and resource availability. The group's purpose is to encourage and facilitate activities that improve the economic viability of this community, provide a forum for guidance and support, provide opportunities to inform, and seek funds necessary for implementing compatible activities that would improve the community. Social attitudes advanced by the group are for sustainable development but are also highly protective of the sanctity of the Mojave Desert (LVEDA 2009).

Environmental Groups / Non-Governmental Organizations: Several national groups have concerns about the siting criteria used for renewable energy projects slated for development in sensitive areas.

Recreational Users: Recreational Users are a distinct group with a particular relationship to the land area that would host the solar farm. These individuals include OHV users, hikers, horseback riders, and wildlife viewing enthusiasts. The recreational user group has a deep appreciation for the natural high desert landscape, and their social attitudes are participatory and protective of this resource. This group is concerned with any future abridgement and restrictions that would be placed on the land that would affect the historic use of the area.

Local Private Land Owners / Residents / Large Lot Owners: Local private land owners with properties that are in the vicinity of the project have various attitudes towards renewable energy development. The attitudes run the gamut from being pro renewable energy development, to being against a change to the desert environment, to being indifferent to the project. Local land owners are also concerned about permanent changes to the natural high desert environment, wildlife, and potential effects to property values.

Project Workers and Suppliers to the Renewable Energy Industry: The project has the potential to affect both the local and non-local labor force from surrounding areas and the nation. Building and operating the project would require both temporary and permanent workers. Since the area is in the midst of a recession, social attitudes towards future employment opportunities are favorable and hopeful. Suppliers to the renewable energy industry are firms and establishments that can provide goods or services necessary to build, operate, and decommission the proposed solar farm or other renewable projects in the area. These firms can potentially be local, regional, or national in origin and have a vested interest in participating in renewable energy development. The livelihood of this group depends on economic opportunities for exploiting renewable energy in the region.

Utility Off-taker and End-use Energy Consumers: The processors, distributors, and ultimate consumers of potential electricity to be generated by the project are a social group that will be considered in the socioeconomic effect evaluation. The solar farm energy output would be delivered to the California grid system for use by consumers located outside of the Lucerne Valley. These consumers have various social attitudes towards renewable energy that relate to

the reliability, cost, and environmental sustainability of this resource. These attitudes also include concerns for the resources consumed and the tradeoffs necessary to achieve emission free solar power generation.

3.15.2 Economic

This section profiles historic and recent trends in the regional economy that would host the project. Recent economic indicators reflect the effect of the Great Recession while historic indicators contrast the high desert region's growth trajectory to State averages. The host region has been severely affected by the recession, and communities within Lucerne Valley and the Victor Valley region have endured a greater contraction in economic activity compared to other communities in California. Concerns related to the current state of the regional economy are directly relevant to comments voiced from stakeholders about the integration of the project within the Lucerne Valley. Renewable energy development and green or clean energy is an economic sector that has been targeted for future growth. The economic profile in this section focuses on the economic base or structure of the local economy and provides key indicators on the distribution of employment by industry, incomes, and recent business cycle trends for the area.

The Lucerne Valley is well known for its mining activities, including one of the largest limestone producing districts in the United States. The mining industry dominates the local economy, with limestone mining a significant visible presence on the northern slopes of the San Bernardino Mountains (County of San Bernardino 2007). The Lucerne Valley provides limestone, cement, and aggregates supporting coastal economic development in California (LVEDA 2009).

3.15.2.1 Economic Conditions

Income, Compensation and Employment Since the most comprehensive set of economic data is available at the county level, the following exhibits highlight key economic profile information for San Bernardino. San Bernardino's personal income was $56 billion in 2007. San Bernardino County contributed 49 percent of the total personal income ($117 billion) to the Riverside-San Bernardino-Ontario metropolitan statistical area (MSA). Within San Bernardino County, approximately 62 percent of personal income was sourced from employee compensation totaling $35 billion in 2007. Personal income is composed of income from all sources.[1]

The county's total employment level was 892,000 in 2007, with government and government enterprises accounting for 15 percent of the employment base (Table 3.15-3).

[1] Personal income includes income received from participation in production as well as from government and business transfer payments. It is the sum of compensation of employees (received), supplements to wages and salaries, proprietors' income with inventory valuation adjustment and capital consumption adjustment, rental income, personal income receipts on assets, and personal current transfer receipts, less contributions for government social insurance (Bureau of Economic Analysis [BEA] 2007).

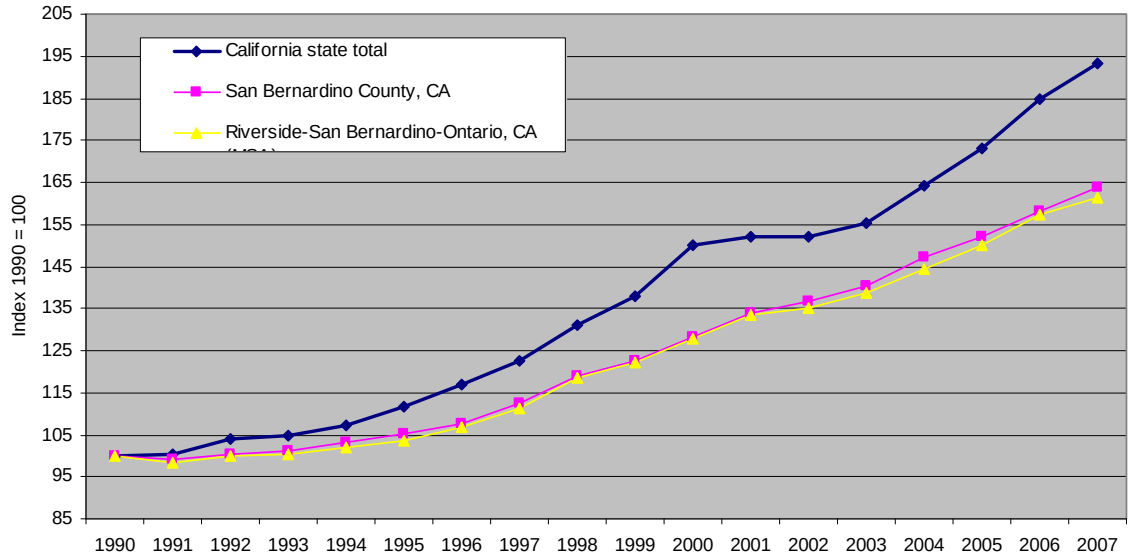
Table 3.15-3 San Bernardino County, California Personal Income, Employee Compensation and Employment by Industry (2007)

	Personal Income (1000s)	%	Employee Compensation (1000s)	%	Employment	%
Total	$56,110,017	100.0%	$34,924,896	100.0%	892,443	100.0%
Farm	-$59,903	-0.1%	$67,771	0.2%	3,558	0.4%
Nonfarm	$38,751,242	69.1%	$34,857,125	99.8%	888,885	99.6%
Total private	$29,699,964	52.9%	$25,805,847	73.9%	753,055	84.4%
Forestry, fishing, related activities	$41,703	0.1%	$32,230	0.1%	1,251	0.1%
Mining	$52,879	0.1%	$47,949	0.1%	959	0.1%
Utilities	$403,817	0.7%	$400,525	1.1%	4,035	0.5%
Construction	$3,362,631	6.0%	$2,546,401	7.3%	62,213	7.0%
Manufacturing	$3,816,306	6.8%	$3,531,907	10.1%	68,478	7.7%
Wholesale trade	$2,266,372	4.0%	$2,147,632	6.1%	41,294	4.6%
Retail trade	$3,345,210	6.0%	$3,056,885	8.8%	110,909	12.4%
Transportation and warehousing	$2,871,673	5.1%	$2,438,673	7.0%	54,580	6.1%
Information	$499,518	0.9%	$476,209	1.4%	9,437	1.1%
Finance and insurance	$1,288,721	2.3%	$1,141,381	3.3%	28,001	3.1%
Real estate and rental and leasing	$924,572	1.6%	$466,762	1.3%	40,335	4.5%
Professional, scientific, and technical services	$1,643,972	2.9%	$1,242,739	3.6%	35,593	4.0%
Management of companies and enterprises	$458,932	0.8%	$458,856	1.3%	6,588	0.7%
Administrative and waste services	$2,016,532	3.6%	$1,809,187	5.2%	75,770	8.5%
Educational services	$371,324	0.7%	$358,126	1.0%	12,559	1.4%
Health care and social assistance	$3,796,197	6.8%	$3,414,331	9.8%	80,705	9.0%
Arts, entertainment, and recreation	$195,648	0.3%	$158,708	0.5%	12,245	1.4%
Accommodation and food services	$1,040,024	1.9%	$997,542	2.9%	57,576	6.5%
Other services, except public administration	$1,303,933	2.3%	$1,079,804	3.1%	50,527	5.7%
Government and government enterprises	$9,051,278	16.1%	$9,051,278	25.9%	135,830	15.2%
Federal, civilian	$1,123,700	2.0%	$1,123,700	3.2%	13,435	1.5%
Military	$1,393,878	2.5%	$1,393,878	4.0%	18,705	2.1%
State and local	$6,533,700	11.6%	$6,533,700	18.7%	103,690	11.6%
State government	$814,425	1.5%	$814,425	2.3%	12,210	1.4%
Local government	$5,719,275	10.2%	$5,719,275	16.4%	91,480	10.3%

Source: BEA 2007

Other important employing sectors include retail trade, healthcare and social assistance, and administrative and waste services and construction.

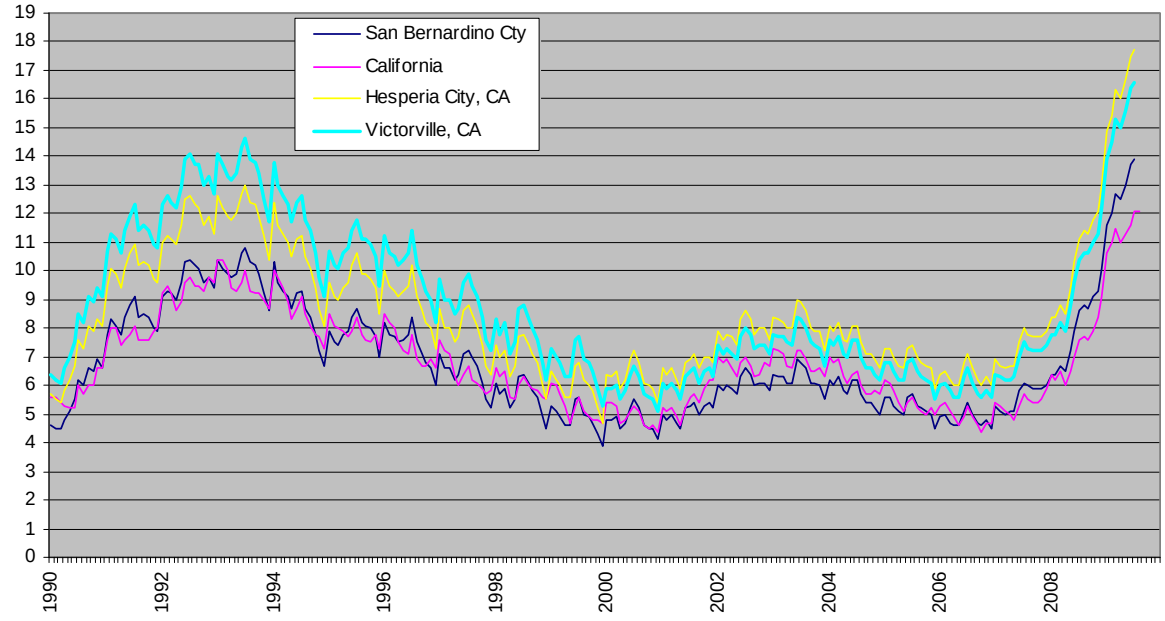
Income Trends: San Bernardino County has not enjoyed the equivalent growth in per capita personal income experienced in California as a whole between 1990 and 2007. Growth in per capita personal income has lagged behind California's average and has grown in line with the broader Riverside-San Bernardino-Ontario MSA. Between the inland high-desert region and the state average, the gap in per capita income also appears to be widening, as shown in Figure 3.15-2. San Bernardino's per capita personal income of $28,024 was 67 percent of California's per capita personal income ($41,805) in 2007.



Source: BEA 2007

Figure 3.15-2 Growth in Per Capita Income

Unemployment Trends: The region surrounding the project area has been hit hard by the recession. Recent local unemployment rates for the cities of Hesperia and Victorville exceed County of San Bernardino and State of California averages by several percentage points. There is not yet an indication that unemployment rates have stabilized as the trends displayed in Figure 3.15-3. The recent recession has had a more severe effect compared to the recession of 1990-1992, where area unemployment rates peaked at lower levels.



Source: BLS 2009

Figure 3.15-3 Unemployment Rates (January 1990 to July 2009)

Within San Bernardino County, the Lucerne Valley is an agriculture and mining-based dependent economy. Mitsubishi Cement, Specialty Minerals (formerly Pfizer), and Omya

(formerly Pluess-Staufer) are companies that mine the North Face of the San Bernardino Mountain range. The area also is involved in water reclamation and reuse. Lucerne Valley has a state-sponsored water reclamation project, where treated wastewater from Big Bear and Holcomb Valley is transported via pipeline and used to irrigate alfalfa farms on the eastern edge of the valley (City of Big Bear Lake 2006; County of San Bernardino 2007).

Public Revenues: San Bernardino County relied on $3.135 billion in revenue in 2008 (County of San Bernardino 2008). Most of the revenue was sourced from operating grants and contributions ($1.35 billion), charges for services ($0.8 billion), and ad valorem taxes ($0.55 billion). Because a great deal of county land is administered by the BLM, the BLM also pays a Payment in Lieu of Taxes to the county based on a formula that takes into account the population and acres under public management.

Public Services and Utilities: The Lucerne Valley has no centrally provided utilities other than electric power. Neighboring communities in the Victor Valley have these services, and the extension of infrastructure and growth issues are of concern to stakeholders who are seeking to preserve the community's rural character (County of San Bernardino 2007).

Water and Wastewater: Within Lucerne Valley, water supplies are provided by 11 purveyors or service providers who were estimated to be producing water supplies for 2,722 residents annually. All of the service providers extracted water from groundwater wells. The estimated annual production for the 11 service providers totaled approximately 662.21 acre-feet, equivalent to an average daily production of 0.591 million gallons per day. In addition to water from these service providers, groundwater is pumped from other private (self-supply) wells. Wastewater is disposed of through the use of septic tanks and leach field systems. There is no central sewage service provided to Lucerne Valley residents (County of San Bernardino 2007).

Fire and Emergency Medical Services: Fire protection services are provided by Lucerne Valley Fire Protection District in the Lucerne Valley Plan area. The San Bernardino County Fire Department provides administration and support for the fire district and other services, such as hazardous materials regulation, dispatch, communication, and disaster preparedness. The North Desert Division has two stations located within the Lucerne Valley Community Plan Area: Lucerne Valley Stations 111 and 112. The California Department of Forestry and Fire Protection (CALFIRE) also has a fire station, providing seasonal fire protection services and fire-related information for the Lucerne Valley community (County of San Bernardino 2007). Table 3.15-4 lists fire stations and facilities and shows their resources and manpower.

Police: The San Bernardino County Sheriff's Department (SBCSD) provides police services to unincorporated areas within the county. The SBCSD has patrol stations in Big Bear and also in Lucerne Valley. In addition, the incorporated cities of Big Bear Lake, Hesperia, Apple Valley, and Victorville are provided services on a contract basis, as follows: full service law enforcement, traffic services, investigations, and a wide variety of safety services (SBCSD 2009). The City of Big Bear Lake has a police station approximately 25 miles southwest of the site of the project. Big Bear Lake contracts with the SBCSD for criminal law and traffic enforcement (City of Big Bear Lake 2009).

Table 3.15-4 Lucerne Valley Fire Stations and Facilities

Fire Stations	Fire District / Agency	Area Served	Equipment	Personnel (number and title)	Emergency Medical Technician (EMT) Response Capabilities	Availability / Ambulance Services
Lucerne Valley Station 111	Lucerne Valley Fire Protection District	County Service Area (CSA) 29	1 Incident Command System (ICS) Type I structure engine, 1 ICS Type III brush engine, 1 ambulance with advanced life support equipment, water tender for additional water needs	1 captain, 1 paramedic firefighter, and 1 limited term firefighter	EMT-automatic external defibrillator (minimum)	1st ambulance medic ambulance 111, 2nd ambulance service under contract
Lucerne Valley Station 112	Lucerne Valley Fire Protection District	CSA 29	MCI trailer-rescue 111 and medic ambulance 111a	Paid call	EMT-automatic external defibrillator (minimum)	1st ambulance medic ambulance 111, 2nd ambulance service under contract
Lucerne Valley CALFIRE Station	State responsibility area wildland responsibility	USFS lands	1 Type III engine, 1 tanker unit, other equipment as provided by USFS	1 captain, 2 firefighters, summer only	EMT	1st ambulance medic ambulance 111, 2nd ambulance service under contract
USFS Station 19, located with Lucerne Valley CALFIRE Station	USFWS	USFS lands	Type III engine, Type IV patrol and utility vehicles	Fire engine (5 person, 7 days, summer only), prevention unit (1 person, year-round)		

Source: County of San Bernardino 2007

Hospitals: The Bear Valley Community Hospital (located in Big Bear Lake) is the facility serving the Lucerne Valley area. Services include 24-hour emergency care, acute respiratory care, inpatient medical care, both in-patient and out-patient surgery, laboratory, physical therapy, as well as a skilled nursing facility and two rural health clinics. The hospital also offers comprehensive diagnostic imaging, including quad detector CT scanning, ultrasound, digital x-ray, and mammography services (Bear Valley Community Hospital 2009).

Schools: The Lucerne Valley Unified School District (LVUSD) is a K-12 district servicing a student population of approximately 1,000. The LVUSD operates an elementary school, a junior and senior high school, and several alternative educational centers that provide community schools and services for traditional home-based education and independent study (LVUSD 2009). Figure 3.15-1 shows the location of public facilities including schools, police stations, fire stations, and hospitals. Table 3.15-5 lists public facilities in the project area.

Table 3.15-5 Public Facilities in the Project Area

Facility Type	Facility Name	Address	Town
Police stations	San Bernardino Sheriff's Station	32770 Old Woman Springs Rd.	Lucerne Valley
	Big Bear Lake Police Department	477 Summit Blvd.	Big Bear Lake
Fire stations	Big Bear City Fire Department	301 W. Big Bear Blvd.	Big Bear City
	Green Valley Lake Fire Station	33596 Green Valley Lake Rd.	Green Valley
	Fawnskin Fire Department	39188 Rim of the World Dr.	Fawnskin
	Big Bear Lake Fire Department	467 Knickerbocker Rd.	Big Bear Lake
Hospitals	Bear Valley Community Hospital	41870 Garstin Dr.	Big Bear Lake
Schools	Lucerne Valley Elementary School	10788 Barstow Road	Lucerne Valley
	Lucerne Valley High School	33233 Rabbit Springs Road	Lucerne Valley
	Lucerne Valley Middle School	33233 Rabbit Springs Road	Lucerne Valley

Solid Waste: Within the immediate vicinity of the site, there are only a few active, permitted, open, and operating solid waste facilities. These facilities include a county-owned transfer station and a solid waste landfill located at a privately owned cement plant. The Camp Rock Transfer Station is located at 29805 Squaw Bush Road in the Lucerne Valley. This facility is permitted and active and is owned by San Bernardino County and provides medium volume transfer and processing of solid wastes. The Mitsubishi Cement Plant Cushenbury L. F., owned by Mitsubishi Cement, is also an active disposal site in the area. This solid waste landfill is located at 5808 State Highway 18. There is also a sanitary solid waste landfill called the Victorville Sanitary Landfill located at 18600 Stoddard Wells Road in Victorville.

3.16 Environmental Justice

This section presents descriptive information about communities in the project area and their racial compositions. Additionally, this section discusses applicable laws and regulations that pertain to environmental justice as it relates to the project.

3.16.1 Applicable Plans, Policies, and Regulations

Executive Order 12898

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, Section 1-101, states that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

Guidance from the Council on Environmental Quality (CEQ) says that "minority populations should be identified where either: (1) the minority population of the affected area exceeds 50% or; (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis" (CEQ 1997).

3.16.2 Existing Conditions

The site of the project is located in the Lucerne Valley area, which is part of the broader Victor Valley area. Table 3.16-1 provides a description of the racial composition in the project area and the percentage of individuals (as a percent of the total population) who subsist on incomes classified as being below the poverty level threshold. The table shows the racial composition and poverty level status of communities within zip code tabulation area (ZCTA) 92356 and Census Tract 104.05 and compares these populations to urban areas farther from the site but within the Victor Valley area.

Table 3.16-1 indicates that the communities closest to the site are less racially diverse than other populations in the Victor Valley area, with the exception of Big Bear Lake City. The Lucerne Valley area does not contain minority community aggregations in excess of 50 percent of the population, and there are fewer Hispanics and Blacks than in the surrounding urban areas. The geographic area (ZCTA 92356) used to describe unincorporated areas in Lucerne Valley shows higher poverty levels compared to county and state averages.

Table 3.16-1 Racial Composition and Poverty Level Status for the Lucerne Valley and Adjacent Communities

County/City/Area	Total	White	Black	American Indian and Alaska Native	Asian	Native Hawaiian and other Pacific Islander	Some other race	Two or more races	Hispanic or Latino (any race)	Minority aggregation*	Individuals below poverty level
California	100%	60.4%	6.3%	0.7%	12.2%	0.4%	16.8%	3.3%	35.7%	36.3%	13.0%
San Bernardino County	100%	61.2%	9.0%	0.9%	5.9%	0.3%	19.2%	3.5%	45.7%	35.3%	13.7%
San Bernardino (city)	100%	56.6%	15.7%	0.9%	4.3%	0.3%	19.9%	2.2%	57.2%	41.2%	25.0%
Lucerne Valley (ZCTA 92356)	100%	84.2%	2.2%	2.1%	1.1%	0.2%	6.0%	4.2%	14.5%	11.6%	19.3%
Census Tract 104.05	100%	91.2%	1.1%	1.4%	0.5%	0.1%	2.9%	2.7%	9.5%	6.1%	21.6%
Apple Valley (town)	100%	69.7%	9.7%	1.9%	2.3%	0.05%	13.4%	3.0%	27.4%	27.4%	17.2%
Hesperia (city)	100%	68.1%	4.8%	0.9%	1.5%	0.20%	21.5%	2.9%	45.6%	29.0%	16.5%
Victorville (city)	100%	57.3%	16.3%	1.5%	4.2%	0.31%	16.4%	4.0%	42.9%	38.7%	18.5%
Big Bear Lake (city)	100%	91.2%	0.7%	1.0%	0.8%	0.04%	3.6%	2.8%	13.7%	6.0%	13.4%

Source: U.S. Census Bureau 2009

Notes:

*Minority aggregation includes the sum of Black, Asian, American Indian and Alaskan Native, Hawaiian and other Pacific Islander, and some other race.

American Community Survey estimates (U.S. Census Bureau 2009) are based on data collected over three years. The estimates represent average population and housing characteristics between January 2005 and December 2007. The estimates do not represent a single point in time.

3.17 Energy and Minerals

This section identifies energy and mineral resources that would be used by and affected by construction, operation and maintenance, and decommissioning of the project. Additionally, this section discusses applicable regulations.

3.17.1 Applicable Plans, Policies, and Regulations

The project would comply with all applicable laws, ordinances, regulations, and standards related to energy and mineral resources during and following construction of the project. The State Surface Mining and Reclamation Act of 1975 guides surface mining reclamation and the identification of mineral resources of regional and statewide significance. The act is administered by the California Department of Conservation, Office of Mine Reclamation. The Federal Surface Mining Control and Reclamation Act of 1977 also applies to the project.

3.17.2 Existing Conditions

Oil and gas resources in the project area were identified using a map produced by the California Department of Conservation (1999). There are no oil or gas producers or seeps within five miles of the project. The nearest oil and gas site is a plugged and abandoned dry hole located 7.3 miles from the site.

Nonpetroleum mineral resources available near the site were identified by compiling data from the U.S. Geological Survey (2005). Multiple mining operations are located within five miles of the project. A list of mining sites, both active and inactive, and the location of the mines in proximity to the site of the project are provided in Table 3.17-1. Distance from the project site perimeter, site name, commodity and operation type, and operation status are outlined in Table 3.17-1.

The majority of mineral resources identified within five miles of the site of the project (Table 3.17-1) have been labeled as past producers (52.1 percent). This means that they were once mined but that mining operations have ceased. Many of the mineral resources (26.1 percent) are in the occurrence stage of development. This means that a mineral resource has been reported but not evaluated for possible commercial use. Some of the mineral resources near the site are in the prospecting stage of development (8.7 percent). This indicates where mineral deposits were evaluated for possible commercial use.

One processing plant, the Blackhawk Property, is located 3.9 miles south of the site (Table 3.17-1). The plant processes uranium, gold, and silver.

The majority of mineral resources along the right-of-way can be accessed with surface mines (34.8 percent). About 13 percent must be accessed underground and 4 percent accessed by some combination of surface and underground mining. No data were available regarding operation type or access means for 34 percent of the mineral resources identified.

Table 3.17-1 Energy and Mineral Resources Within 5 miles of the Project Area

Distance (miles)	Deposit ID #	Mineral Resources Data System ID #	Site Name	Commodity	Operation Type	Development Status
2.1	10034091	M020789	Vida	Copper	Unknown	Occurrence
2.2	10213638		Lucerne Valley Pit	Sand and gravel, construction	Surface	Past producer
2.3	10262562	M020789	Vida	Copper	Unknown	Unknown
3.4	10140563		Arlington and Black Hawk	Limestone, general	Unknown	Occurrence
3.4	10034006	M020678	Aviation	Gold, silver, copper, lead	Unknown	Past producer
3.5	10262499		Arlington Mill	Gold	Processing plant	Past producer
3.5	10140522	M020678	Aviation	Lead, copper, gold, silver	Unknown	Occurrence
3.5	10102985	M020725	Garfield	Lead, silver, galena, wulfenite	Unknown	Past producer
3.5	10165272	M020725	Garfield Mine	Lead, silver	Underground	Past producer
3.5	10035655	M023511	Santa Fe	Gold, lead, copper, iron, quartz	Unknown	Past producer
3.5	10188943	M023511	Santa Fe Mines	Gold, copper, lead	Surface-underground	Past producer
3.7	10236993		Akron-Silver Reef Deposit	Silver	Surface	Prospect
3.8	10116828		Unnamed plant	Gold	Processing plant	Occurrence
3.9	10189514		Little Joe	Gold	Surface	Occurrence
3.9	10189416		Blackhawk Mill Site	Gold	Processing plant	Past producer
3.9	10164312		Blackhawk Property	Uranium, gold, silver	Unknown	Plant
4.0	10212948		Swanson Granite Quarries	Granite	Surface	Past producer
4.0	10262153		Texas Rock Quarry	Stone	Surface	Past producer
4.3	10213235		Unnamed Mine	Gold	Underground	Prospect
4.6	10140771		Cushenbury Quarry	Limestone, general	Surface	Past producer
4.7	10286386		Bruner Pacific Quarry	Stone, crushed/broken	Surface	Producer
4.9	10164730		Texas Granite Quarries	Granite	Surface	Past producer
5.0	10116412		Silver Peak	Silver	Underground	Occurrence

Source: USGS 2005

Gold, copper, silver, and lead have each been prospected, produced, or processed at 16 locations within five miles of the site. Sand, gravel, and stone have been produced at seven locations. Currently, crushed/broken stone is produced at one quarry. Uranium, gold, and silver are processed at one plant within five miles of the site.

Energy and Mineral Resources Used for the Project

Table 3.17-2 identifies metallic mineral, nonmetallic mineral, gravel, and concrete resources that would be used during construction. Metallic minerals would predominantly be used to produce steel and aluminum for the PV panel structures and perimeter fence. Copper and other metallic minerals would be contained in the transformer, switchyard, and transmission line. Silica would be contained in the PV panels.

Table 3.17-2 Mineral Resources Contained in Construction Materials

	Metallic Minerals	Gravel/Concrete	Nonmetallic minerals
Photovoltaic panels	X		X
Photovoltaic panel structures	X	X	
Access roads		X	
Transformer	X	X	
Transmission line	X	X	
Operations and maintenance building	X	X	
Switchyard	X	X	
Fence	X	X	

Refer to Section 2.2.3.4, Construction, for a discussion about vehicles that would be used during construction of the project.

3.18 Cumulative Projects

3.18.1 Introduction and Methodology

Preparation of a cumulative effects analysis is required under NEPA and the Council on Environmental Quality (CEQ) regulations. NEPA identifies three types of potential effects: direct, indirect, and cumulative. As part of Chapter 4, effects to each resource are described in detail. For the cumulative effects analysis, each resource is included in a Cumulative Effects Study Area (CESA) designed to specifically address the cumulative effects for that individual resource. Cumulative effects can result from individually minor but collectively significant actions taken over a period of time. Major past and present land uses and disturbances in the area, which are also projected to continue into the future, include energy generation, military uses, and roadway improvements. Dispersed recreation (including special motorized vehicle events), as well as residential and commercial development, also occur in parts of the CESAs.

According to the CEQ Regulations:

> Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR, Part 1508.7).

Under NEPA, both context and intensity are considered. Among other considerations when considering intensity is:

> whether the action is related to other actions with individually minor but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts (40 CFR, Part 1508.27[b][7]).

The specific actions expected under the proposed action and alternatives, as well as information collected during scoping, provide the foundation for identifying CESAs for this analysis. Cumulative effects are evaluated in terms of the specific resource at the appropriate scale, so the boundaries of the CESAs will vary by resource. For each resource, it was determined the extent to which the environmental effect could be reasonably measured and then the appropriate geographic scale was used to include the effect on each resource. However, some project-related effects affect a number of environmental resources across the same area, so in these instances, CESA boundaries were left identical for multiple resources where it seemed reasonable and prudent to do so. The boundaries of these CESAs have been set to ensure that all reasonably expected effects are identified and analyzed. This approach conforms with guidance from the CEQ, *Considering Cumulative Effects* (CEQ 1997). The CESA for each environmental resource, and the rationale for its boundaries, is described below in each specific resource subsection.

Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Therefore, agencies must look for present effects of past actions that are, in the judgment of the agency, relevant and useful because they have a significant cause-and-effect relationship with the direct and indirect effects of the proposal for agency action and its alternatives.

The cumulative effects analysis identifies past actions that are closely related either in time or location to the project site, catalogues past projects, and discusses how they have affected the environment. The analysis is sufficiently detailed to assist in identifying mitigation measures that would reduce the cumulative effect. Most of the projects listed in Table 3.18-1 have been, are now, or will be required to undergo their own independent environmental review under the California Environmental Quality Act or NEPA, or both. Significant adverse effects from these projects will be required to be reduced, avoided, or minimized through the application and implementation of mitigation measures. The net effect of these mitigation measures is assumed to be a general lessening of the potential for a contribution to cumulative effects.

The key consideration is whether the remaining effect on the human environment will represent an adverse environmental effect. There are two commonly used approaches for establishing the cumulative effect setting or scenario. One is to use a list of past, present, and probable future projects producing related or cumulative effects. The other is to use a summary of projects contained in an adopted general plan or related planning document, or in a prior environmental document that has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative effect.

This EIS uses the list approach to provide a tangible understanding and context for analyzing the potential cumulative effects of the project. General plans and other planning documents were used as additional reference points in establishing the cumulative scenario for the analysis. The project list includes those projects found within a geographic area sufficiently large to provide a reasonable basis for evaluating cumulative effects. The area over which the cumulative scenario is evaluated may vary by resource because the nature and range of potential effects vary by resource (e.g., air quality effects tend to disperse over a large area or region, while biological effects are typically more location-specific). This spatial area is identified as the geographic scope for the analysis of cumulative effects related to a particular resource.

The analysis of cumulative effects considers a number of variables, including geographic (spatial) limits, time (temporal) limits, and the characteristics of the resource being evaluated. The geographic scope of the analysis is based on the nature of the geography surrounding the project and the characteristics and properties of each resource and the region to which they apply. In addition, each project in a region will have its own implementation schedule, which may or may not coincide or overlap with the project's schedule. This is a consideration for short-term effects from the Proposed Action and other action alternatives. However, to be conservative, the cumulative analysis assumes that all projects in the cumulative scenario are built and operating during the lifetime of the project.

3.18.2 Potential Cumulative Projects

Past, present, and reasonably foreseeable projects that could contribute to the cumulative effects analysis are listed in Table 3.18-1 by project name and type, location, and status. Each project is identified by a map number, keyed to Figure 3.18-1. This figure shows the project and indicates projects contributing to the cumulative effects scenario. Collectively, these projects represent known and anticipated activities that may occur in the project vicinity that have the potential to contribute to a cumulative effect on the environment.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
Bureau of Land Management: Barstow Field Office - *Renewable Energy Projects*						
1	LSR Pisgah LLC; CACA 50704	Lucerne T5N, R1E; 4.75 miles northwest	Solar energy; 300 MW; 10,880 acres	ROW application withdrawn on 4/29/2010.	None	None
2	FPL Energy; CACA 47043	West Fry Mountains T5N, R2E; 8 miles northeast	Wind energy; 2,449 acres	Authorized for wind energy testing.	Temporary • Air Quality • Noise • Biological Resources • Cultural and Paleontological Resources • Transportation	Temporary construction effects such as: • temporary increase in air pollutants and dust emissions; • temporary increase in noise ; • temporary or permanent disruption in wildlife patterns from construction activities; • possible loss of biological, cultural, historic or paleontological resources; and • temporary disruption of local traffic patterns and road use

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location (1) Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
	FPL Energy Cont.				Permanent • Biological Resources • Recreation • Hydrology • Visual Resources • Land Use	Permanent effects could occur as a result of operations, including: • Permanent loss of wildlife habitat ; • Effect to existing recreational activities ; • Increase in impermeable surfaces that could lead to increased magnitude or frequency of flooding events; and, • Permanent alteration of visual or aesthetic characteristics. • Permanent land use alteration during the life of the project. Also see Section 3.18.2
3	UPC Wind Management; CACA 47102	Fry Mountains T5N & T6N, R2E & R3E; 8.6 miles northeast	Wind energy; 10,946 acres	Authorized for wind energy testing.	Temporary • Air Quality • Noise • Biological Resources • Cultural and Paleontological Resources • Transportation	Temporary construction effects such as: • temporary increase in air pollutants and dust emissions; • temporary increase in noise ; • temporary or permanent disruption in wildlife patterns from construction activities; • possible loss of biological, cultural, or historic resources; and • temporary disruption of local traffic patterns and road use

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location (1) Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
	UPC Wind Management cont.				Permanent • Biological Resources • Recreation • Hydrology • Visual Resources • Land Use	Permanent effects could occur as a result of operations, including: • Permanent loss of wildlife habitat ; • Effect to existing recreational activities ; • Increase in impermeable surfaces that could lead to increased magnitude or frequency of flooding events; and, • Permanent alteration of visual or aesthetic characteristics. • Permanent land use alteration during the life of the project. Also see Section 3.18.2
4	West Fry Wind, LLC (FPL Energy); CACA 48902	West Fry Mountains T5N, R2E & R3E; 8.2 miles northeast	Wind energy; 34 MW; 3,248 acres	Draft EIS in progress.	Temporary • Air Quality • Noise • Biological Resources • Cultural and Paleontological Resources • Transportation	Temporary construction effects such as: • temporary increase in air pollutants and dust emissions; • temporary increase in noise ; • temporary or permanent disruption in wildlife patterns from construction activities; • possible loss of biological, cultural, or historic resources; and • temporary disruption of local traffic patterns and road use

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location (1) Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
	West Fry Wind, LLC Cont.				Permanent • Biological Resources • Recreation • Hydrology • Visual Resources • Land Use	Permanent effects could occur as a result of operations, including: • Permanent loss of wildlife habitat ; • Effect to existing recreational activities ; • Increase in impermeable surfaces that could lead to increased magnitude or frequency of flooding events; and, • Permanent alteration of visual or aesthetic characteristics. • Permanent land use alteration during the life of the project. Also see Section 3.18.2
5	Solel Inc.; CACA 50150	Johnson Valley T4N, R3E & R4E; 5.75 miles east	Solar energy; 2,436 acres; 500 MW	Pending	Temporary • Air Quality • Noise • Soils • Biological Resources • Cultural Resources • Transportation	Temporary construction effects such as: • temporary increase in air pollutants and dust emissions; • temporary increase in noise ; • temporary increase in soil erosion; • temporary or permanent disruption in wildlife patterns from construction activities; • possible loss of biological, cultural, or historic resources; and temporary disruption of local traffic patterns and road use

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
	Solel Inc.; cont.				Permanent • Biological Resources • Recreation • Hydrology • Visual Resources	Permanent effects could occur as a result of operations, including: • Permanent loss of wildlife habitat ; • Effect to existing recreational activities ; • Increase in impermeable surfaces that could lead to increased magnitude or frequency of flooding events; and, • Permanent alteration of visual or aesthetic characteristics. Also see Section 3.18.2
	LSR Pisgah, LLC; CACA 50706	Johnson Valley T4N, R3E, R4E & R5E; 4.75 miles east-northeast	Solar energy; 17,920 acres	Pending	Temporary • Air Quality • Noise • Soils • Biological Resources • Cultural Resources • Transportation	Temporary construction effects such as: • temporary increase in air pollutants and dust emissions; temporary increase in soil erosion; • temporary increase in noise ; • temporary or permanent disruption in wildlife patterns from construction activities; • possible loss of biological, cultural, or historic resources; and temporary disruption of local traffic patterns and road use

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location (1) Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
	LSR Pisgah (cont.)				Permanent • Biological Resources • Recreation • Hydrology • Visual Resources	Permanent effects could occur as a result of operations, including: • Permanent loss of wildlife habitat ; • Effect to existing recreational activities ; • Increase in impermeable surfaces that could lead to increased magnitude or frequency of flooding events; and, • Permanent alteration of visual or aesthetic characteristics. Also see Section 3.18.2
Other BLM Projects/Authorizations						
6	Johnson Valley Feature Film Shoot; National Geographic documentary on venomous snakes	Cougar Buttes area of Johnson Valley OHV Open Area; T5N, R2E, Sec 36; T5N, R3E, Sec 31; 5.75 miles northeast	Filming; less than 5 acres	Film shot from 6/7/08 – 6/9/08; one-time event	Temporary • Transportation Permanent • None	Temporary effects such as increase in traffic and potential disposal of solid waste. No anticipated long-term environmental effects because the poles would be replacing existing poles.
7	"Beyond Productions"--3-day reality TV film shoot for the History Channel; CACA 50957	Lucerne Dry Lake, T5N, R1W, Sec 26; 9.7 miles northwest	Filming; less than 5 acres	Three-day film shoot involving 20 people and 20 vehicles from 7/16/09–7/18/09; one-time event.	Temporary • Transportation Permanent • None	Temporary effects such as increase in traffic and potential disposal of solid waste. No anticipated long-term environmental effects because the poles would be replacing existing poles.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
8	Chevron PV Geotesting Land Use Permit—CACA-50562	T4N, R2E, Secs. 19 & 20; within project site boundary	Geologic testing; size unknown	Permit Issued	Temporary • Air Quality • Soils • Biological Resources • Noise • Transportation Permanent • None	Construction effects including: • temporary increase in air and fugitive dust emissions, • temporary increase in soil erosion, • temporary disturbance of local wildlife; and. • temporary increase in noise and vibration; and • temporary increase in traffic.
9	JPL Balloon Testing Land Use Permit for Soggy Dry Lake area—CACA-50568	Johnson Valley OHV Open Area T4N, R3E, Secs. 5 & 8	Testing; size unknown	Awaiting BLM review.	Temporary • None Permanent • None	Testing would primarily consist of remote control raising and lowering of balloons. No long-term environmental effects anticipated.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
10	Caltrans Camprock Rd/SR 247 Bridge & Road Realignment Right-of-Way	Big Bear City Quad: T3N, R1E, Sec 3; 3.4 miles southwest	Transportation; size unknown	Right-of-way grant for road realignment issued, work scheduled for early April 2009	Temporary • Air Quality • Noise • Soils • Transportation • Biological Resources • Water Quality Permanent • None	Construction effects including • temporary increase in air and fugitive dust emissions, • temporary increase in noise and vibration; • temporary increase in soil erosion, • temporary increase traffic; • temporary disturbance of local wildlife; • potential changes to local surface water quality.
11	Replacement of 2 fire-damaged poles	Fawnskin Quad, T3N, R1E, Secs. 5 & 6; 5.5 miles west-southwest	Transmission line; size unknown	Awaiting BLM Review	Temporary • Air Quality • Noise Permanent • None	Temporary construction effects including : • temporary increase in air and fugitive dust emissions; and • temporary increase in noise and vibration. No anticipated permanent effects because the poles would be replacing existing poles.
12	Tomasheski Black Gold Exploratory Trenching; 516 DM 11.9 F(9)	Rattlesnake Canyon; 8.8 miles east-southeast	Mining; size unknown	Awaiting BLM staff review of reports and EA.	Temporary • Air Quality • Transportation • Noise Permanent • None	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
13	Cove Road Right-of-Way; pave and widen access to private land	T5N, R1W, along section line between Sections 26 & 35; 9.4 miles northwest	Transportation; size unknown	Awaiting BLM staff review.	Temporary • Air Quality • Transportation • Noise Permanent • None	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise.
14	PGE Cushenbury Natural Gas Line	T3N, R1E, Sec 3—Carb. Endemic ACEC; 3.5 miles southwest	Pipeline; size unknown	Approved	Permanent • Air Quality • Biological Resources • Noise • Soils • Cultural Resources • Visual Resources • Human Health/ Public Safety	Effects from pipeline-related above ground facilities (compressor stations and metering, power lines, and other operations facilities) include: • temporary increase in air and fugitive dust • temporary increase in soil erosion, • loss of native vegetation (habitat); • disruption of wildlife; • loss of cultural or historic resources; • changes in visual quality; • increased predation, avian mortality from power lines; and, • threats to public health and safety. Also see Section 3.18.2.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
San Bernardino County Projects						
SB-1	Boulevard Associates-Next Era/Lucerne Valley P200900663/CF	Haynes Road and Meridian Road, Lucerne Valley; 11 miles northwest	60 MW Solar Energy; 440 acres		Temporary • Air Quality • Transportation • Noise Permanent • Land Use • Hydrology • Drainage	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise. Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2.
SB-2	Granite Wind [2] CACA 048254	T6N, R2W Section 36; 15.5 miles northwest	58 to 84 MW Wind: 2086 acres public, 670 acres private	Draft EIS in Progress (Notice of Availability of Draft EIS issues 4-2-10)	Temporary • Air Quality • Transportation • Noise • Biological Resources Permanent • Visual Resources	• Temporary construction effects including: • Localized and temporary increase in air and fugitive dust emissions • temporary increase in noise and vibration; • temporary increase in traffic; and • temporary disturbance of local wildlife. • Permanent or long-term visual effect.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
SB-3	Rabbit Springs Solar, LLC P200900580	Rabbit Springs Road and State Highway 247, Lucerne Valley; 7.75 miles west-northwest	104 MW Solar Energy; 922 acres		Temporary • Air Quality • Noise Permanent • Visual Resources	Temporary construction effects including: • temporary increase in air and fugitive dust emissions, and • temporary increase in noise and vibration. Permanent visual effect.
SB-4	Strawberry Peak P200900655	Canyon View Road, 0.25 miles south of State Highway 18, Lucerne Valley; 13.75 miles west	15 MW Solar Energy; 160 acres		Temporary • Air Quality • Noise • Biological Resources Permanent • Visual Resources • Air Quality	Temporary construction effects including: • temporary increase in air and fugitive dust emissions, • temporary increase in noise and vibration; • temporary increase in traffic; and • disturbance of local wildlife. Permanent visual effect and likely long-term increase in air and particulate emissions.
SB-25	Parcel Map 18629 to create two parcels - 550 acres	Lucerne Valley; 5.4 miles southwest	Residential; 550 acres	Accepted	Temporary • Air Quality • Transportation • Noise	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
	Parcel Map 18629 (cont)				Permanent • Land Use • Hydrology • Drainage	Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2.
SB-26	SPP to add a wood grinding storage and distribution system to an existing cement plant - a portion of 74 acres	Lucerne Valley; 4.1 miles south-southwest	Wood grinding storage and distribution system; 74 acres	Conditionally Approved	Temporary • Air Quality • Transportation • Noise • Biological Resources Permanent • Visual Resources	Temporary construction effects including: • Localized and temporary increase in air and fugitive dust emissions • temporary increase in noise and vibration; • temporary increase in traffic; and • temporary disturbance of local wildlife. Permanent or long-term visual effect.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
SB-28	CUP to establish a 90' monopalm tower with one 4' diameter microwave antenna, twelve panel antennas and a 185.6 SF equipment shelter on a portion of 1.25 acres	Lucerne Valley; 4.5 miles southwest	Monopalm tower; 1.25 acres	Conditionally Approved	Temporary • Air Quality • Noise Permanent • Visual Resources	Temporary construction effects including: • temporary increase in air and fugitive dust emissions, and • temporary increase in noise and vibration. Permanent visual effect.
SB-29	CUP to establish an asphalt plant with a major variance to allow a silo 74 feet high on a 4 acre portion of a 146.52 acre parcel.	Lucerne Valley; 4.5 miles southwest	Asphalt plant; 146.25 acres	Accepted	Temporary • Air Quality • Noise • Biological Resources Permanent • Visual Resources • Air Quality	Temporary construction effects including: • temporary increase in air and fugitive dust emissions, • temporary increase in noise and vibration; • temporary increase in traffic; and • disturbance of local wildlife. Permanent visual effect and likely long-term increase in air and particulate emissions.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
SB-30	TPM 18506 to create 4 parcels and a remainder on 27 acres	Lucerne Valley; 4.2 miles east	Residential; 27 acres	Incomplete	Temporary • Air Quality • Transportation • Noise Permanent • Land Use • Hydrology • Drainage	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise. Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2.
SB-31	TPM 18452 to create three parcels - 5 acres	Lucerne Valley; 3.3 miles west	Residential; 5 acres	Conditionally Approved	Temporary • Air Quality • Transportation • Noise Permanent • Land Use • Hydrology • Drainage	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise. Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2.
SB-32	TPM 18018 to create 2 parcels - 15 acres.	Lucerne Valley; 1.75 miles north	Residential; 15 acres	Conditionally Approved	Temporary • Air Quality • Transportation • Noise	Construction would result in: • localized and temporary increases in dust and air emissions; and,

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
						• localized and temporary increases in traffic, and noise. Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2.
					<u>Permanent</u> • Land Use • Hydrology • Drainage	
SB-33	Department review to recognize a pot belly pig rescue - 10 acres	Lucerne Valley; 1.9 miles northeast	Residential; 10 acres	Conditionally Approved/ Existing	Existing – no new effects	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise. Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
SB-34	TPM 18531 to create 4-parcels - 5 acres	Lucerne Valley; 2.8 miles west	Residential; 5 acres	Conditionally Approved	<u>Temporary</u> • Air Quality • Transportation • Noise <u>Permanent</u> • Land Use • Hydrology • Drainage	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise. Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
SB-35	TPM 17919 to create 4-parcels - 5 acres	Lucerne Valley; 2.75 miles west	Residential; 5 acres	Conditionally Approved	Temporary • Air Quality • Transportation • Noise Permanent • Land Use • Hydrology • Drainage	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise. Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2.
SB-36	TPM 19099 to create 4-parcels and a remainder parcel - 10 acres	Lucerne Valley; 2.8 miles west	Residential; 10 acres	Accepted	Temporary • Air Quality • Transportation • Noise Permanent • Land Use • Hydrology • Drainage	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2.

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location [1] Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
SB-44	TPM 18691 to create 4-parcels - 20 acres	Lucerne Valley; 5.4 miles west-northwest	Residential; 20 acres	Accepted	Temporary • Air Quality • Transportation • Noise Permanent • Land Use • Hydrology • Drainage	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise. Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2.
SB-61	TPM 17569 to create 2 parcels - 10 acres	Lucerne Valley; 4.6 miles north	Residential; 10 acres	Conditionally Approved	Temporary • Air Quality • Transportation • Noise Permanent • Land Use • Hydrology • Drainage	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2

Table 3.18-1 Potential Cumulative Projects

Map ID No.	Description	Location (1) Distance from Project Site	Project Type and Size	Status	Resources Potentially Affected	Potential Effects
SB-62	TPM 18699 to create 2 parcels - 10 acres	Baldy; 4.3 miles north	Residential; 10 acres	Conditionally Approved	Temporary • Air Quality • Transportation • Noise Permanent • Land Use • Hydrology • Drainage	Construction would result in: • localized and temporary increases in dust and air emissions; and, • localized and temporary increases in traffic, and noise. Permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping are anticipated, which could alter the local drainage patterns. Also see Section 3.18.2.

Notes:
(1) All San Bernardino Baseline and Meridian
(2) Joint BLM/ County of San Bernardino project
SPP = Site Plan Permit
CUP = Conditional Use Permit
TMP = Tentative Parcel Map

Cumulative Project Types

The following project types are listed in Table 3.18-1 and are the basis for the cumulative effects discussion.

Renewable Energy Projects

There are two primary types of solar technologies: concentrating solar power (CSP), which converts the sun's heat to create steam to drive a turbine, and PV, which uses semiconductor cells to convert sunlight directly to electricity.

Three solar thermal projects are proposed with six miles of the project site. Some of these projects are in the early planning stages, or do not have detailed project descriptions, or have not undergone formal impact assessment. Both CSP and PV solar technologies have similar effects on land-based resources, although CSP usually has a substantial requirement for water for cleaning and cooling. Typically, both types of construction projects cause a:

- Temporary increase in air pollutants and dust emissions;
- Temporary increase in noise;
- Temporary or permanent disruption in wildlife patterns from construction activities;
- Possible loss of biological, cultural, or historic resources;
- Temporary disruption of local traffic patterns and road use.

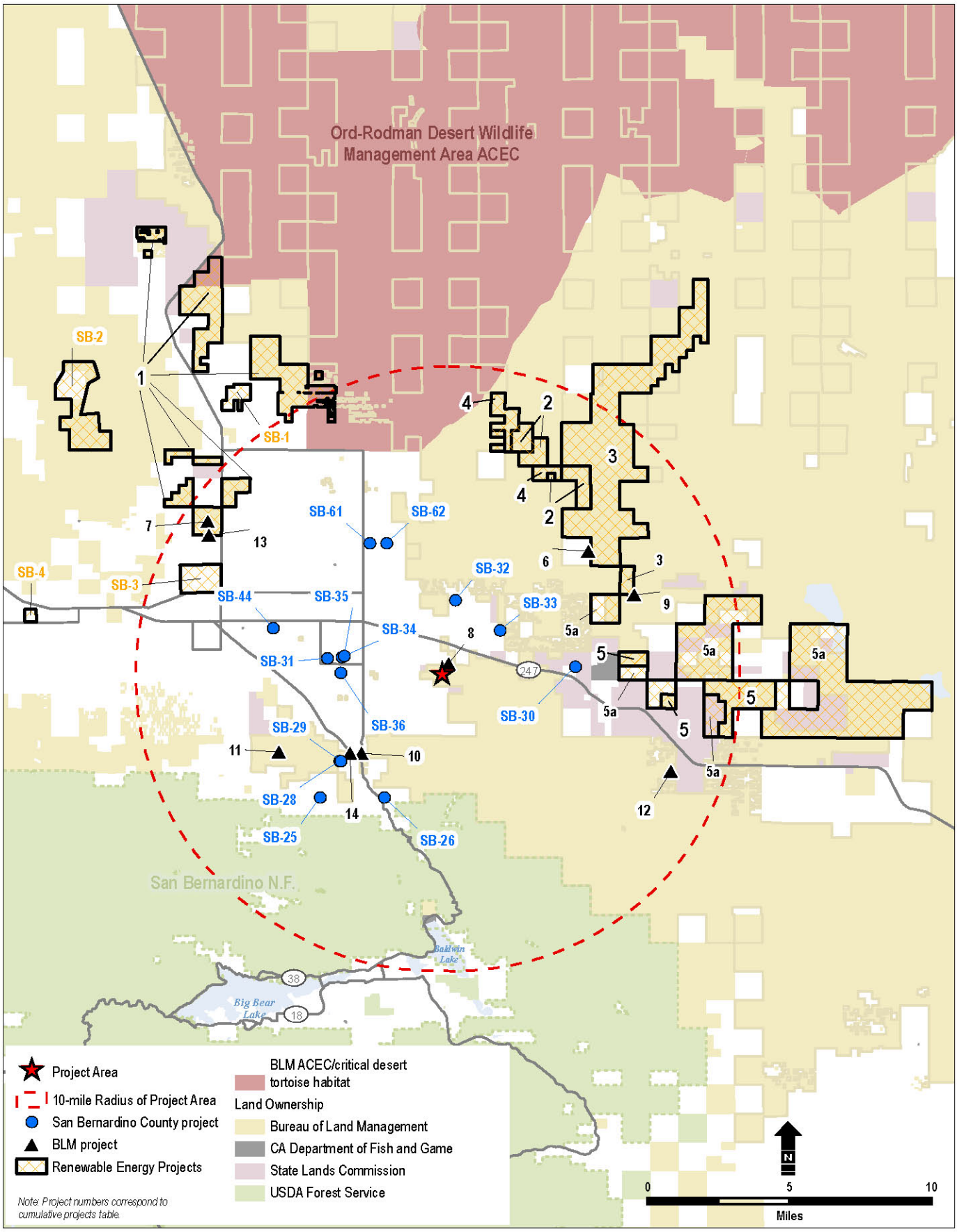
Most construction effects can be mitigated through site-specific BMPs and other mitigation measures. However, because solar projects may preclude other land uses, several permanent effects could occur as a result of operations, including:

- Permanent loss of wildlife habitat;
- Effect to existing recreational activities;
- Increase in impermeable surfaces that could lead to increased magnitude or frequency of flooding events;
- Permanent alteration of visual or aesthetic characteristics;
- Permanent change in land use over the life of the project.

Residential and Commercial Development

Multiple temporary use permits, conditional use permits, tentative parcel maps, and a site plan permit have been issued within six miles of the site of the project. Issuance of these permits implies that the land will be developed for the permitted use. Residential and commercial developments have similar effects. In general, construction would result in localized and temporary increases in dust and air emissions, traffic, and noise. Since these permits have been approved, it can be assumed that the issuing body would ensure that no threatened and endangered species or cultural resource would be adversely affected by the development or the effects would have to be mitigated. The land may or may not have been previously developed; therefore, it is not possible to determine for many of these sites if habitat would be lost. However, commercial and residential developments represent permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping. These factors can alter the local drainage patterns.

M:\SanFrancisco\Chevron_LuzerneSolar\Maps\MXD\DEIS_July2010\Fig 3-18-1 CumulativeImpacts.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; Bureau of Land Management 2009; San Bernardino county 2009.

Figure 3.18-1
Cumulative Projects Map
Lucerne Valley Solar Project
San Bernardino County, California

The potential cumulative effects of these types of developments depend upon their proximity to the site of the project and the timing of their potential construction. At this time, the timing of any of these residential or commercial developments is unknown.

Pipelines

Most pipelines are linear underground facilities that require trenching to bury the pipe. Typically, the disturbed area is larger during construction to allow for equipment, pipe laydown, and staging areas. Much of this land is reclaimed after construction ends. Above-ground infrastructure includes compressor stations and metering, power lines, and other operations facilities. Effects include loss of native vegetation (habitat), disruption of wildlife, loss of cultural or historic resources, changes in visual quality, increased predation, avian mortality from power lines, and threats to public health and safety.

Transmission Lines

Environmental effects from construction and operation of transmission lines are similar to pipelines, except that the footprint from electric transmission facilities is smaller, usually only affecting land where the towers or other associated infrastructure is placed. Vegetation is affected along the entire ROW for access roads for maintenance and emergency repairs and to reduce the threat from wildfire or trees falling onto the lines. High voltage transmission lines create a threat to birds, especially raptor species, which often build nests that sometimes cause electrical shorts that kill or seriously injure birds.