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WRIGHT SOLAR PARK HABITAT CONSERVATION PLAN DRAFT ENVIRONMENTAL ASSESSMENT

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Acronyms and Abbreviations

$\mu g/m^3$	micrograms per cubic meter
A-2	Exclusive Agriculture
AADT	Annual Average Daily Traffic
AASHTO	American Association of State Transportation and Highway Officials
AB	Assembly Bill
AC	alternating current
ACHP	Advisory Council on Historic Preservation
ADT	average daily traffic
amsl	above mean sea level
AMTB	Amah Mutsun Tribal Band
APE	Area of Potential Effects
APP	Avian Protection Plan
applicant	Wright Solar Park, LLC
AQMPs	air quality management plans
ARB	California Air Resources Board
ASF	age sensitivity factors
ASTM	American Society for Testing and Materials
Background Report	2030 Merced County General Plan, Revised Draft Background Report
BESS	battery energy storage system
BMP	best management practices
BO	Biological Opinion
BP	before present
C_2H_3Cl	vinyl chloride
CAA	federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CAL FIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California Division of Occupational Safety and Health
CalEEMod	California Emissions Estimator Model version 2013.2.2]
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CBC	California Building Code
CBSC	California Building Standards Code
CCIC	Central California Information Center
CCR	California Code of Regulations

CDFW	California Department of Fish and Wildlife
CDP	Census Designated Places
Central Valley Water Board	Central Valley Regional Water Quality Control Board
CEQ	Council for Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGC	California Government Code
CHRIS	California Historical Resources Information System
CHSC	California Health and Safety Code
cm	centimeter
CMP	congestion management program
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
Construction General Permit	General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities
CTY	Chowchilla Tribe of Yokuts
CUP	conditional use permit
CUPA	Certified Unified Program Agency
CVP	Central Valley Project
CWA	Clean Water Act
dB	decibel
dBA	A-Weighted Decibel
dBC	C-Weighted Decibel
DC	direct current
DPM	diesel particulate matter
DPR	California Department of Parks and Recreation
DPS	Distinct Population Segment
DTSC	California Department of Toxic Substance Control
DTWG	Dumna Wo-Wah Tribal Government
E	Endangered
EA	Environmental Assessment
Eagle Act	Bald and Golden Eagle Protection Act

Earthquake Fault Zones	corridors along active faults
EC	Environmental Commitments
ECORP	ECORP Consulting, Inc.
EIR	Environmental Impact Report
EMFAC	emission factor
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESRP	Endangered Species Recovery Program
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FIS	Flood Insurance Study
Fish and Game Code	California Fish and Game Code
FLIR	forward looking infrared radar
FMMP	Farmland Mapping and Monitoring Program
FR	Federal Register
GHG	greenhouse gas
GIS	geographic information system
GPS	global positioning system
gWh	gigawatt hours
GWP	global warming potential
H2S	hydrogen sulfide
HCP	Habitat Conservation Plan
Hz	Frequency: Hertz
I	Interstate
I-5	Interstate 5
IBC	International Building Code
IEC	International Electrotechnical Commission
ITP	incidental take permit
Km	kilometers
KOPs	Key observation viewpoints
kV	kilovolt
kWh	kilowatt hours
Ldn	Day-Night Level
Leq	Equivalent Sound Level
LGIA	Large Generator Interconnection Agreement
Li-ion	lithium ion
Lmax	Maximum Sound Level
Lmin	Minimum Sound Level

LOS	level of service
Lxx	Percentile-Exceeded Sound Level
MBTA	Migratory Bird Treaty Act
MCE	Maximum Considered Earthquake
methane	CH4
MLD	most likely descendants
mpg	miles per gallon
mph	miles per hour
MSDS	material safety data sheets
MUTCD	Manual on Uniform Traffic Control Devices
MW	megawatt
MWh	megawatt hours
N2O	nitrogen dioxide
NAAQS	National Ambient Air Quality Standards
NACD	Native American Consultation Database
NAHC	Native American Heritage Commission
NCCP	natural community conservation plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O&M	operations and maintenance
OEHHA	California Office of Environmental Health Hazard Assessment
OSHA	Occupational Safety and Health Administration
P	Protected
Pb	lead
PCBs	polychlorinated biphenyls
PCE	passenger car equivalent
Peak Velocity or PPV	Peak Particle Velocity
PG&E	Pacific Gas and Electric Company
PM	particulate matter
PM10	particulate matter less than or equal to 10 microns
PM2.5	particulate matter less than or equal to 2.5 microns
pphm	parts per hundred million
ppm	parts per million

PPV	peak particle velocity
PRC	Public Resources Code
project EIR	Wright Solar Park Environmental Impact Report
PSD	Prevention of Significant Deterioration
PV	photovoltaic
QA	qualified archaeologist
RAS	Riggs Ambulance Service
REC	recognized environmental conditions
Reclamation	U.S. Bureau of Reclamation
Regional Water Boards	regional water quality control boards
RES	Renewable Energy Standard
ROG	reactive organic gases
RPS	Renewable Portfolio Standard
SB	Senate Bill
SCAB	South Coast Air Basin
SCADA	Supervisory Control and Data Acquisition
SCAQMD	South Coast Air Quality Management District
SCIC	Suppression through Cooling, Isolation, and Containment
Service	U.S. Fish and Wildlife Service
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SJCOG	San Joaquin Council of Governments
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SKOPs	Simulated KOPs
SO_2	sulfur dioxide
SO_4	sulfates
SOPs	standard operating procedures
SPCC	spill prevention, control, and countermeasure
SR	State Route
SRA	State Responsibility Area
SSC	Species of Special Concern
SSMN	Southern Sierra Miwuk Nation
State Water Board	State Water Resources Control Board
SWP	State Water Project
SWPPP	storm water pollution prevention plan
T	Threatened
TACs	toxic air containments
TCRs	transportation concept reports

TMDL	Total Maximum Daily Load
TSCA	Toxic Substances Control Act of 1976
Upland Recovery Plan	Recovery Plan for the Upland Species of the San Joaquin Valley, California
USACE	U.S. Army Corps of Engineers
USC	United States Code
USGS	U.S. Geological Survey
Valley	San Joaquin Valley
VERA	Voluntary Emissions Reduction Agreement
VOC	volatile organic compounds
Wright Solar Park or applicant	Wright Solar Park, LLC

Chapter 1
Purpose and Need

1.1 Introduction

This environmental assessment (EA) has been prepared by the U.S. Fish and Wildlife Service (Service) pursuant to the National Environmental Policy Act (NEPA). It evaluates the effects of issuing an incidental take permit (ITP) under Section 10 (a)(1)(B) of the federal Endangered Species Act (ESA) for activities covered by the *Wright Solar Park Habitat Conservation Plan* (HCP). Under Section 10(a)(2)(A) of the ESA, any application for an ITP must include a "habitat conservation plan" that details the impacts of the incidental take allowed by the ITP on affected species and how the impacts of incidental take will be minimized and mitigated to the maximum extent practicable.

The permit applicant, Wright Solar Park, LLC (Wright Solar Park or applicant), proposes to construct, operate, maintain, and ultimately, decommission a 200-megawatt (MW) ground-mounted solar photovoltaic (PV) power generating facility on 1,400 acres within unincorporated Merced County, California (Figure 1-1). The power generated by the solar facility would be interconnected to existing Pacific Gas and Electric Company (PG&E) power grid infrastructure for delivery to the purchaser of the power.

The proposed solar facility would contribute to California's Renewables Portfolio Standard (RPS) goals and help reduce greenhouse gas (GHG) emissions pursuant to California Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006. California has a goal of generating 33% of the energy it uses through renewable energy sources such as wind and solar energy by 2020. The solar facility would reduce GHG emissions when compared to traditional generation methods such as fossil fuel power plants. The solar facility would also contribute to policies in the *2030 Merced County General Plan* which encourage rural energy production that does not interfere with agricultural practices or conflict with sensitive habitats and allow the conditional development of renewable energy projects in the county (Merced County 2013).

Covered activities in the HCP include the construction, operation, maintenance, and eventual decommissioning of the solar energy facility. The facility would consist of an array of PV panels, tracker components, direct current (DC) to alternating current (AC) power inverters, tracking materials, low/medium voltage transformer and power conditioning equipment, a medium voltage collection system, a substation, a battery energy storage system, access roads, and an electrical interconnection switching station. The proposed solar park and associated facilities would be located primarily on private cultivated dry-land farmed agricultural lands, with limited annual grassland habitat and aquatic habitat, in an unincorporated area of western Merced County, California. Construction and testing of the solar facility would take a total of 26 months to complete and is expected to be completed by late 2016, at which point the facility would become operational. The solar facility has a planned life of 35 years, so decommissioning is projected to occur in 2051. Decommissioning would involve removal of all structures, facilities, and access roads, and restoration of the site to the existing preproject conditions.

The solar facility would be constructed in a location that supports suitable habitat for three species listed as threatened or endangered under ESA: California tiger salamander (*Ambystoma californiense*) Central California Distinct Population Segment (DPS), blunt-nosed leopard lizard

(*Gambelia sila*), and San Joaquin kit fox (*Vulpes macrotis mutica*). The HCP has been developed to ensure that impacts on federally listed species are adequately avoided, minimized, and mitigated in accordance with requirements pursuant to ESA Section 10.

ESA and its implementing regulations prohibit take of any fish or wildlife species that is federally listed as threatened or endangered without prior approval pursuant to either Section 7 or Section 10(a)(1)(B) of the ESA. ESA defines *take* as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 50 Code of Federal Regulations (CFR) 17.3 further defines the term *harm* in the take definition to mean any act that actually kills or injures a federally listed species, including significant habitat modification or degradation.

Issuance of a Section 10 ITP constitutes a discretionary federal action by the Service and is thus subject to NEPA, which requires that all federal agencies assess the effects of its action on the human environment.

1.2 Background

The ITP requested by the applicant would cover impacts on three federally-listed species associated with construction, operation, maintenance, and decommissioning of a 200-MW solar facility. The permit would also cover proposed HCP conservation actions, which would be implemented across a 5,181-acre permit area (or covered lands) which encompasses the 2,731-acre solar facility site, upon which 1400 acres would be developed into the power generating facilities would be constructed (project site) and the 2,450 acres identified as proposed offsite mitigation lands to provide San Joaquin kit fox habitat (Figure 1-2). The project site is approximately 2.7 miles southeast of the community of Santa Nella and approximately 6 miles southwest of Los Banos. It is generally bounded by Interstate 5 (I-5) on the east, the Agua Fria Multi-Species Conservation Bank on the northwest, and Los Banos Reservoir on the south.

The Merced County zoning designation for the project site, which is dry-land farmed due to the lack of available surface or groundwater, is Exclusive Agriculture (A-2). More than 70% of the site is currently and consistently planted in dry-farmed hay crops such as winter wheat (*Triticum* sp.). In a typical year, this means that from late fall through early spring these crops densely cover the cultivated parcels at heights of 2–4 feet, depending on various factors.

The applicant must obtain a conditional use permit (CUP) from Merced County to develop the solar facility. As conditions of approval, the solar facility must also comply with requirements set forth in the Merced County General Plan with respect to solar energy development (Merced County 2013). Merced County is preparing a separate environmental impact report (EIR) to comply with the California Environmental Quality Act (CEQA) in its decision of whether to issue the CUP for the solar facility.

1.3 Species Covered by the HCP

This HCP proposes coverage for three federally listed species: California tiger salamander, blunt-nosed leopard lizard, and San Joaquin kit fox. To allow for incidental take authorization, the HCP would provide for long-term mitigation, monitoring, and management of the species at a level sufficient to offset any impacts from covered activities.

An additional 53 special-status plant and animal species potentially occurring in the area were considered for inclusion in the HCP but are not covered for various reasons. These species, and the rationale for not including each in the HCP, are discussed in Appendix A of the HCP.

1.4 Proposed Action Addressed in this EA

The proposed action considered in this EA is the Service's issuance of an ESA Section 10 ITP for activities covered in the HCP. The HCP addresses two sets of activities: (1) construction, operation, maintenance, and eventual decommissioning of facilities associated with Wright Solar Park (referred to as covered activities in the HCP), and (2) those activities proposed to protect and conserve California tiger salamander, blunt-nosed leopard lizard, and San Joaquin kit fox in the course of carrying out the covered activities. The Section 10(a)(1)(B) permit holder would be Wright Solar Park, LLC. The proposed permit duration for the HCP is 40 years, corresponding with a 35-year project life and up to 5 years to complete construction and decommissioning of the solar facility.

Accordingly, this EA analyzes the direct, indirect, and cumulative impacts of approving the HCP and issuing an ITP, including impacts of the covered activities and conservation measures proposed to avoid, minimize, or mitigate potential effects on the covered species.

1.5 Purpose and Need for the Proposed Action

The purpose of and need for the proposed federal action is to achieve the following goals.

- Protect, conserve, and enhance the survival of the covered species (i.e., California tiger salamander, blunt-nosed leopard lizard, and San Joaquin kit fox) and their habitat in the covered lands.
- Provide a means and take steps to conserve the ecosystems on which the covered species depend.
- Contribute toward the long-term survival and recovery of the covered species through protection and management of the covered species and their habitat.
- Respond to Wright Solar Park's application for an ITP based on the covered activities proposed in the HCP. Incidental take of the covered species may occur as a result of construction, operation, maintenance, and eventual decommissioning of the solar facility and implementation of conservation actions within the 5,181-acre permit area in Merced County, California. The Service's decision on issuance of an ITP will consider the applicants objectives, which are to develop an economically viable and commercially financeable solar energy facility that can provide renewable energy to the Northern California power grid to meet California's RPS goals and help reduce GHG emissions pursuant to AB 32 and the Merced County General Plan. To achieve these objectives, the applicant must place the proposed facility in a location with the potential to produce solar power exceeding 480 gigawatt hours (gWh), and in an area with a low cost connection to an existing electrical transmission system.

This purpose and need establishes the basis for determining whether other viable alternatives to the proposed action may meet the intended purpose, applicant's objectives, and reduce potential effects.

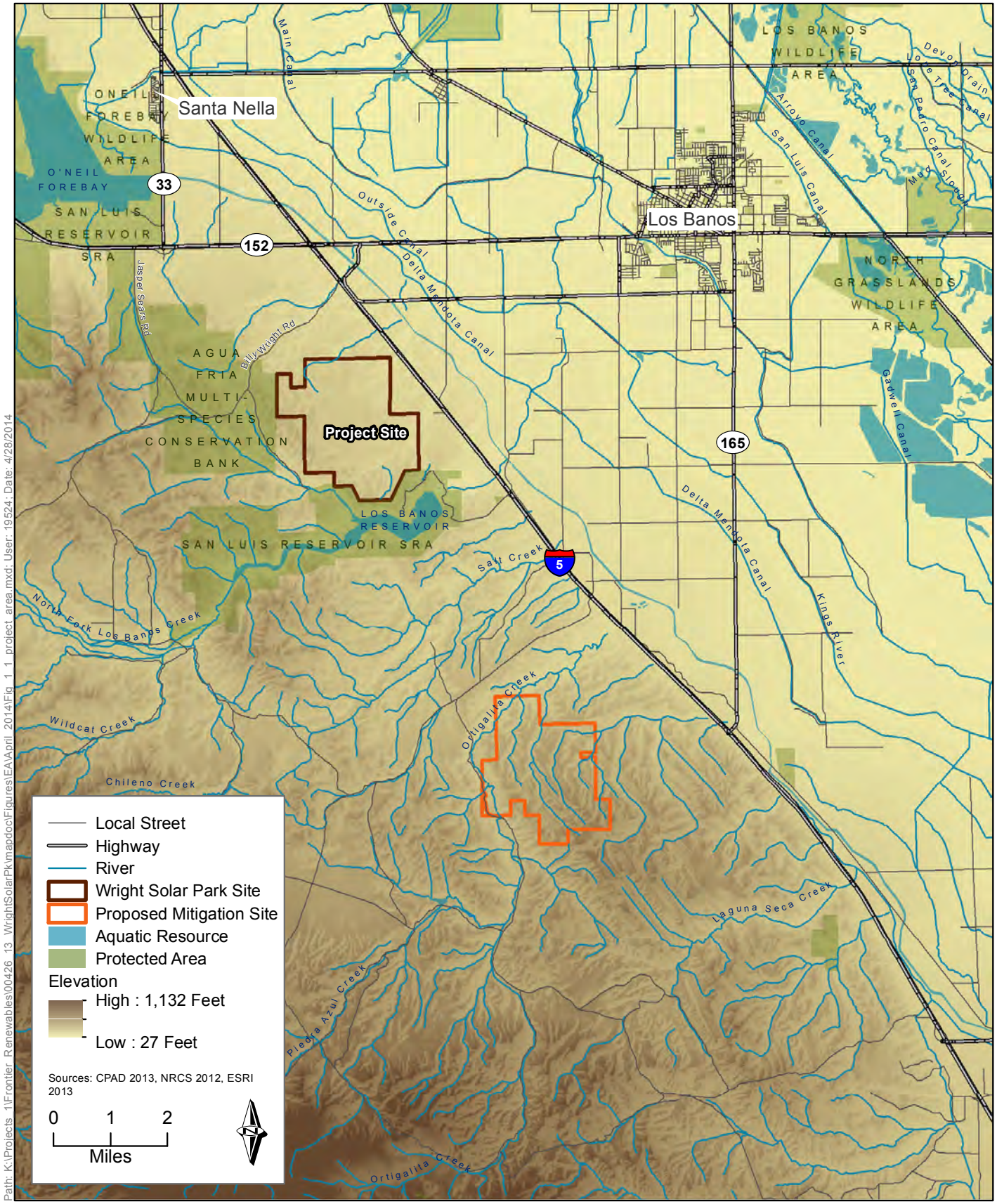

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Figure 1-1
Proposed Action Vicinity

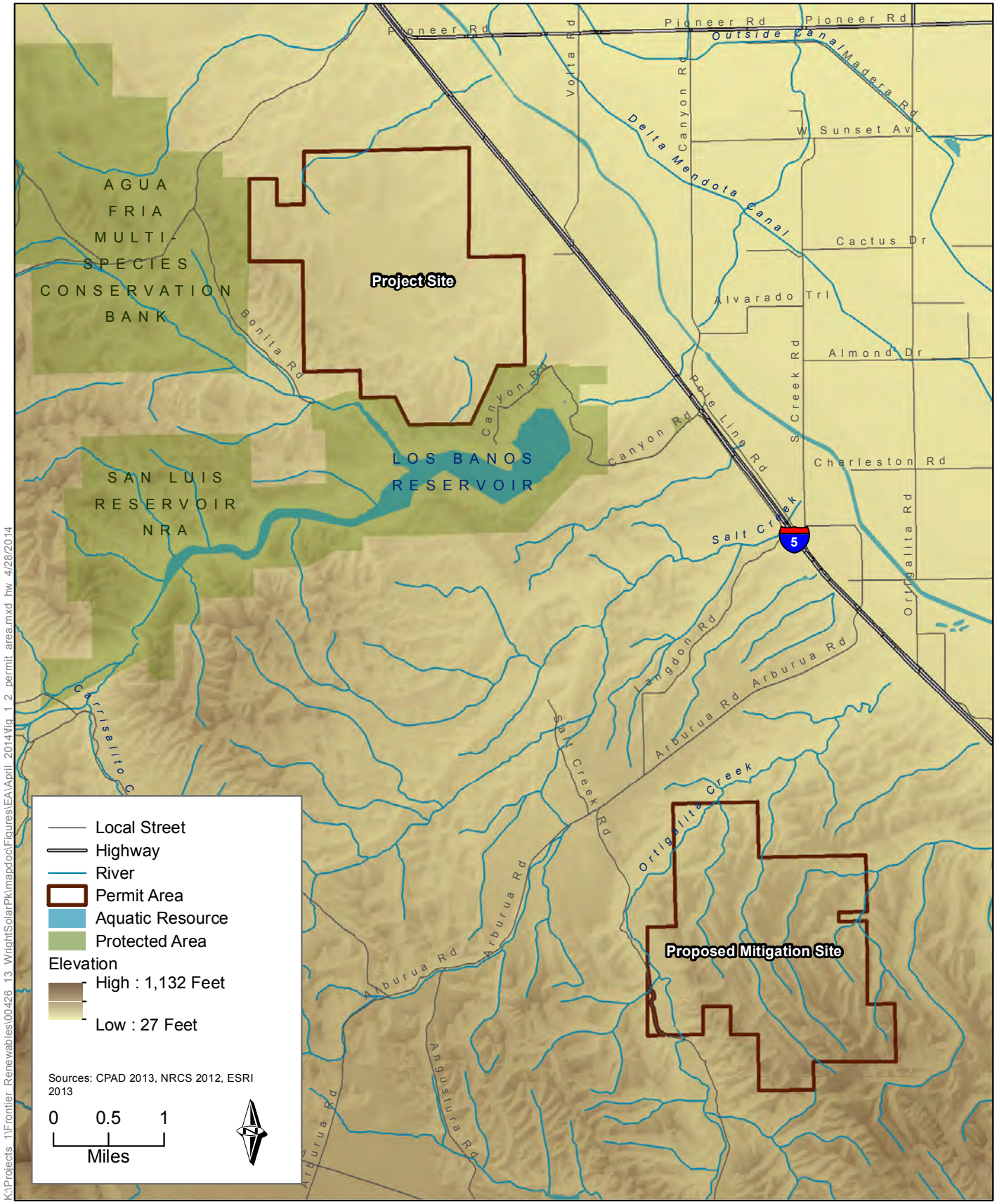

Figure 1-2
Proposed Action Covered Lands

Chapter 2
Proposed Action and Alternatives

As referenced in the Council for Environmental Quality's (CEQ's) National Environmental Policy Act (NEPA) regulations regarding the contents of an Environmental Assessment (EA) (40 Code of Federal Regulations [CFR] 1508.9[b]), NEPA Section 102[2][E] requires federal agencies to develop, study, and briefly describe alternatives to any proposed action with the potential to result in unresolved resource conflicts. This chapter describes the alternatives development process and presents the alternatives evaluated in this EA (the No Action Alternative and Proposed Action Alternative). It also includes a summary of alternatives considered but not carried forward for detailed analysis in this EA.

2.1 Alternatives and HCP Development Process

The U.S. Fish and Wildlife Service (Service) and permit applicant, Wright Solar Park, LLC (applicant) considered a full range of alternatives to meet the purpose and need of the proposed action, including the proposed *Wright Solar Park Habitat Conservation Plan* (HCP), consideration of alternate site locations in Merced County, construction of a smaller solar facility within the project site, and relocation of infrastructure within the project site to reduce impacts on federally listed species.

The size and configuration of the solar facility were largely informed by the applicant's objectives to develop an economically viable and commercially financeable solar energy facility in Merced County. To achieve these objectives, the applicant indicated the proposed facility must produce solar power exceeding 480 gigawatt hours (gWh), and must be located in area with a low cost connection to an existing electrical transmission system. With these criteria in mind, the Service considered alternatives that would meet the applicant's objectives while minimizing project-related environmental effects, including take of federally listed species.

The following sections describe alternatives analyzed in detail in this EA, including a No Action Alternative and Proposed Action Alternative, and other alternatives considered but eliminated from detailed consideration.

2.2 Alternatives Analyzed in Detail

2.2.1 Alternative 1: No Action Alternative

Under the No Action Alternative, the applicant would not construct the proposed solar facilities. There would be no take of federally listed species as a result of the solar facility, and no renewable solar energy would be made available to public utilities, municipal utilities, or private consumers from project operations. Agricultural uses—dry-land farming and grazing—would continue on the project site and offsite mitigation lands.

The No Action Alternative would be implemented if the applicant chose to abandon the solar facility, or if the Service denied the incidental take permit (ITP) application submitted by Wright Solar Park. Permit denial would prevent the applicant from proceeding with the covered activities because of the chance that the covered activities would result in take of the covered species. In either scenario, failure to implement the covered activities in the HCP would avoid all potential project-related impacts on listed species, including the potential for take of listed species.

2.2.2 Alternative 2: Proposed Action Alternative

Under the Proposed Action Alternative, the applicant would develop and operate a 200-megawatt (MW) ground-mounted solar photovoltaic (PV) power plant on private agricultural lands in an unincorporated area of western Merced County, California (Figure 1-1). The power generated by the solar facility could be sold to public utilities, municipal utilities, or large private consumers of power and would be interconnected to existing Pacific Gas and Electric Company (PG&E) power grid infrastructure for delivery to the purchaser of the power.

As described below, the Proposed Action Alternative would include construction, operation, maintenance, and eventual decommissioning of the solar facility. As illustrated in Figures 2-1 and 2-2, the facility would include access roads, solar modules, tracker components, direct current (DC) to alternating current (AC) power inverters, medium voltage transformers, a medium voltage collection system, a substation, and an interconnection switching station. In addition, the Proposed Action Alternative includes construction of a battery energy storage system to aid in shaping and controlling the timing of energy production for the electrical grid.

The Proposed Action Alternative would also include conservation measures to offset potential impacts on covered species. Conservation measures would include management 1,331 acres of grassland areas onsite but outside the footprint of the solar infrastructure for the benefit of the covered species; conservation in perpetuity of 2,450 acres of offsite mitigation lands to provide for San Joaquin kit fox movement corridors; and effectiveness and compliance monitoring on all mitigation lands. The design of specific components under the Proposed Action Alternative (e.g., permeable perimeter fencing) also reflect measures to reduce effects on covered species.

Location

The Proposed Action Alternative would be located on 5,181-acres in western Merced County, California (Figure 1-1). This area encompasses both the 2,731 acre site where the power generating facilities would be constructed (project site) and the 2,450 acres identified as offsite mitigation lands (collectively referred to as the covered lands). The offsite mitigation lands are separated from the project site by approximately 5 miles.

The project site is approximately 2.7 miles southeast of the community of Santa Nella and approximately 6 miles southwest of Los Banos. It is generally bounded by Interstate 5 (I-5) on the east, the Agua Fria Multi-Species Conservation bank on the northwest, and Los Banos Reservoir on the south (Figure 1-1). The mitigation site is approximately 5 miles south of Los Banos Reservoir and southeast of the project site (Figure 1-1). Both the project site and mitigation site are on private cultivated dry-land farmed agricultural lands, with limited annual grassland and aquatic habitats.

Covered Species

Three federally listed species would be covered under the Proposed Action Alternative: California tiger salamander, blunt-nosed leopard lizard, and San Joaquin kit fox. Both blunt-nosed leopard lizard and San Joaquin kit fox are federally listed as endangered; California tiger salamander (Central California Distinct Population Segment [DPS]) is federally listed as threatened.

Covered Activities

The Proposed Action Alternative would include construction, operation, maintenance and decommissioning of a 200-MW PV power generating facility and implementation of conservation actions within the proposed permit area (collectively referred to as the covered activities). The following describes the mechanical and electrical components associated with the solar facility, as well as the discrete construction, operation, maintenance and decommissioning actions necessary to implement these components. The proposed conservation measures are also described below.

Mechanical Components within the Solar Field

PV panels would be installed in arrays across the project site (Figure 2-1). The PV panels would be self-contained, durably constructed units designed to withstand exposure to the elements for a period of 30 years or more. The panels may be constructed of glass encasing (i.e., crystalline silicon, polycrystalline silicon, or amorphous silicon with small quantities of copper–indium–gallium–selenide, cadmium–telluride, or other metal and non-metal materials within the silicon matrix) and would be dark blue or black in color with minimal light reflection. All panels would be electrically connected to the grounding system of the power plant in accordance with local and state codes and regulations. The final panel selection would be determined at the detailed project-engineering phase.

To support the PV panels, the solar facility would utilize a fixed-tilt mounting system or a single-axis tracking system designed to optimize power production of the panels by ensuring proper orientation to the sun throughout the day and seasons. Should new technology become available that makes the collection of solar energy more efficient, installation of those components to existing infrastructure may occur. Installation of any new technology would occur within the existing footprint of the facility and would be require implementation of appropriate construction-related best management practices (BMP) and species avoidance and minimization measures to minimize impacts. Figure 2-3 shows a typical single-axis tracking system.

The fixed-tilt mounting and single-axis tracking systems are supported by metal piers driven or screwed into the ground by a pile-driving machine. These machines are similar to those found on highway construction jobs driving guardrail piers. Pier placement begins with a precise surveyed layout, ensuring proper positioning of remaining tracker assembly parts. Affixed to the top of each pier is a pier cap and bearing assembly that supports and allows proper movement of a *torque tube assembly*. The torque tube assembly serves two purposes: to provide an attachment point for the PV panels, and to move through the range of positions needed to optimize panel production.

Single-axis tracking systems require a drive system that provides directional force to the torque tube. This can be accomplished with either a mechanical or hydraulic drive arm and tube assembly that “pushes and pulls” the torque arm through its range of motion, or by a geared assembly that redirects rotational force to the tubes. Both approaches require a small geared motor or hydraulic

system mounted on a pile support or pad strong enough to move the system through its daily range of motions.

Shielded cables would be used throughout the solar field. All shielded electrical cables would be directly buried to a depth of between 42 to 48 inches. Conduit would not be installed around buried electrical wiring as conduit would not allow for proper heat dissipation. Any cables or wiring that runs between the ground and the panels would be appropriately protected to avoid gnawing by fossorial mammals.

Tracker design varies by manufacturer, but generally consists of a series of tracker panel rows with a drivetrain system usually located in the center of the system, dividing the tracker into two sides. The number of rows within a tracker block is a measure of desired output from the tracker as well as the drive system's ability to move multiple torque tube assemblies. Row design is also determined by the amount of the desired solar output to the inverters.

As part of the tracker system, a controller is needed to provide the information to track the system throughout the day and keep the panels' orientation as perpendicular to the sun's rays as possible. The controller accounts for daily and seasonal changes in the sun's position and is used to position the tracker during off-production periods, such as the nightly stow period and for maintenance. In the event of a serious weather event, the system would move the tracker to the safest position to avoid damage. Multiple tracker systems are deployed within proximity to the power conditioning station where the DC produced by the panels is converted to AC for movement to the substation and eventual delivery to the electric grid. The number of trackers connected to the power conditioning station varies with panel output relative to inverter size and desired output from the power conditioning station.

Tracker layout is also constrained by the need to access the interior rows of the trackers by maintenance and emergency personnel. Under the Proposed Action Alternative, trackers would be separated by distances that would accommodate maintenance personnel traveling in trucks or other maintenance vehicles. The preliminary design specifies that the distance between rows of the trackers would be between 6.5 feet and 8.5 feet, and row length would be no longer that 150 feet on each side of the drive arm assembly.

Electrical Components within the Solar Field

Direct Current Collection System

DC electricity is collected from the PV panels through a DC collection system and sent to the power conditioning station. Panels attached to the tracking system are first grouped into a series circuit. Each tracker consists of a number of circuits determined by optimized individual panel output for total tracker performance. Circuits are collected in parallel through tracker electrical harnesses that travel through the cable trays to combiner boxes. The number of combiner boxes varies with final tracker design and can be sized to accommodate electrical design. The cables run from the combiner boxes to the power conditioning station skids. While elevated and exposed in the tracker cable tray, the shielded cables would be directly buried where the cables leave the tracker for collection to the power conditioning station.

Power Conditioning Station and Inverters

A power conditioning station consists of inverters, a medium voltage transformer, and the auxiliary power system for the trackers. These components are often mounted on a metal platform, referred to as a skid, with or without an enclosure. Each power conditioning station collects DC power from the tracker combiner boxes. From the tracker to the power conditioning station, the DC cables are buried to a depth of between 42 and 48 inches.

At the power conditioning station, the DC power cables originating from the trackers are terminated on the DC side of the power inverter. The inverter converts the DC power from the panels into three-phase AC power for movement across the project site to the high voltage substation. The combined quantity of inverters creates the AC rating for the power conditioning station. The AC rating for the power conditioning station skids may be 1–2.5 MW. This rating, optimized for the site, determines how many power conditioning station skids would be present on the project site. The conceptual layout for the Proposed Action Alternative assumes 134 power conditioning station skids.

The power conditioning station skids provide another point of power routing back to the control boxes and motors that run the tracking system. This source of auxiliary power is critical to the primary operation of the tracker systems and can be fed to the system even when solar irradiance is inadequate to generate power from the solar panels.

Medium Voltage Collection System

The power that exits the medium voltage transformers from the power conditioning station skid would travel in three-phase cables buried 42–48 inches deep. These cables may also be spliced above ground in clearly marked junction boxes. The medium voltage collection system travels between the medium voltage transformers found on each power conditioning station skid, adding power in parallel until the quantities reached are optimized for a given medium voltage collection system circuit. The initial design for the solar facility assumes that 13–15 MW of power would be carried by one circuit; however, this capacity would depend on the length of the directly buried cable and what amount of line loss would be considered acceptable for the system.

Alternatively, approximately 1.5 miles of the medium voltage collection system would be routed as a medium voltage overhead transmission line (and associated poles) within the project site to the substation. A final optimized design would determine whether overhead line components, underground line components, or some combination of both would be used in the medium voltage collection system incorporating potential shading issues from pole sets and conductors.

All circuits of the medium voltage collection system would be routed across the project site to the substation. The medium voltage collection system would then be collected into the substation through a series of circuit breakers and into the low power side of the electrical bus system of the substation.

Electrical Components in the High Voltage Systems

Substation

The substation is the portion of the system where power is transformed to match the specification of the interconnection into the electric grid. The substation is characterized as having a low side and a high side, as defined by the point of power transformation from 34.5 kilovolts (kV) (low side) stepped up in voltage to match the grid specifications in the transmission system (high side). Under

the Proposed Action Alternative, the power would be stepped up to 230 kV at the substation. The footprint of the substation would be approximately 2.1 acres.

Transmission Line

The Proposed Action Alternative would include an electric transmission line (*gen-tie line*) to connect the solar facilities to generation facilities owned and operated by PG&E. The gen-tie line would be composed of a span of three conductors between the substation dead end structures and the adjacent switching station dead end structures. The line would be less than 500 feet in length, and sizing of the conductor would be relative to the exact length of the span necessary and the avoidance of calculated line losses. The dead end structures on both sides of the facilities would also carry a fiber communications system between the control rooms of the facilities. No additional transmission lines are proposed.

Switching Station and Point of Interconnection

A switching station would be located within the project site, approximately 200–500 feet from tower #92 of the Los Banos-Panoche 230-kV line. The switching station would include breakers, switches, meters, and related equipment, as required by the interconnection provider. The switching station would provide a point of isolation for the solar generation facility and for the two circuits of the transmission line. After the switching station is built and tested, PG&E would have the ability to isolate circuits of the Los Banos-Panoche 230-kV line.

The switching station facility would have its own perimeter fencing that would be independent from the solar facility's fence line and would be directly accessible by the facility operator. At the conclusion of construction, the switching station would be owned and operated by PG&E, per the Large Generator Interconnection Agreement (LGIA). PG&E would control all access to the switching station.

There are three 230-kV transmission lines that run directly through the property. The point of interconnection would be on the property at the switching station and would consist of a loop into the Los Banos-Panoche 230-kV line.

Communications and Metering

Supervisory Control and Data Acquisition

A Supervisory Control and Data Acquisition (SCADA) system would be installed to provide plant visibility and control of the solar field and all components of the electrical system to the plant and grid operators. Physically, the system would be installed with a series of fiber communication lines running within the same trenches of the medium voltage collection system to each of the power conditioning station skids. This fiber system would connect points (i.e., an item to be monitored) of the electrical system to the control room of the substation, where the fiber would be terminated at servers of the operating system. Fiber is also run from all the high voltage components that require monitoring, such as the breakers within the substation. This SCADA system is used to remotely operate breakers within the substation, and is integral to the safe operation of the substation.

Energy Storage

A battery energy storage system would be constructed within the solar facility to provide dispatchable energy under various operating conditions. The ability to store energy would improve

the operability of the solar facility and enhance the integration of as-available solar-generated energy resources into the transmission network by offering additional ramp rate control and more consistent energy flows.

The battery energy storage system would be constructed as a single building, with a footprint of up to 4 acres. The primary storage components would consist of self-contained electrochemical battery systems using conventional storage technologies with proven safety and performance records, such as lithium ion (Li-ion) or zinc bromide flow battery.

Operation and Maintenance Facilities

The Proposed Action Alternative would include an operations and maintenance (O&M) facility that would consist of a pre-engineered 35-foot by 100-foot metal building constructed on a 10-inch concrete slab. Water for washing the solar panels and for supplying the O&M building's water system would be obtained through water allocation from existing landowners' approved rights to irrigation water from the San Luis Water District.

Security Fencing and Lighting

The project site would be remotely monitored by Wright Solar Park or an affiliated company. Site security would consist of an 8-foot-high chain-link fence with three-strand barbed wire installed around the perimeter of solar panel arrays and installation of a monitored camera system designed to cover the entire facility. The camera system would be remotely monitored and security breaches would be reported to emergency responders as well as site operations. Security fences installed on the perimeter of the project site would be designed to enable passage of kit foxes and their prey, as described under *Conservation Strategy* below. Exclusionary fencing would also be installed around the switchyard and substation to exclude access by kit fox.

Lighting would be installed for ongoing maintenance and security purposes, and would occur at the switchyard, substation, O&M facility, entry and egress gates, and at strategic locations around the facility. All lighting would use amber colored lenses where possible and be shielded and directed downward to minimize the potential for glare or spillover onto adjacent ownerships. Lighting would be used from dusk to dawn and switched lights, which would only be activated when workers are present, would be installed and left in the off position until needed or as code requires, where possible. Security lighting would be set up to use infrared or forward looking infrared radar (FLIR) technology.

Construction Actions

Phased construction is planned to begin in 2014 to take advantage of federal tax credits that contribute to the financial feasibility of the solar facility. Construction and testing of the solar facility is estimated to take a total of 26 months to complete. In total, about 1,600 acres would be disturbed during construction, including 1,400 acres that would support solar infrastructure and 200 acres that would be temporarily disturbed during construction for staging and access.

Construction Sequence

The sequence for installing the proposed civil (e.g., roads, utilities, fencing), mechanical (e.g., tracking components, PV panels), and electrical infrastructure under the Proposed Action Alternative is listed below.

Civil Infrastructure Activities

- Survey and project layout, including road, panel, switching station, and support buildings.
- Construction of roads, including placement of aggregate.
- Construction of temporary facilities, parking, and staging areas.
- Installation of the chain-link fence and gates.
- Watering for dust control and soil compaction.
- Installation of the switching station, skid/inverter, and control room pads.

Mechanical & Electrical Infrastructure Activities

- Installation of I-beam foundations and placement of a racking system on top of I-beam/tubular steel foundations.
- Placement of PV solar modules and DC collection system.
- Installation of a wire harness, fuses, and wire grounding.
- Trenching for wires to be buried underground.
- Installation of buried wiring.
- Installation of the inverter/transformer structures.
- Wiring and interconnection.
- Installation of the AC collection system.
- Trenching and overhead installation of medium voltage collection system from inverters/transformers to the switching station.
- Construction of the substation.
- Construction of the switching station.
- Construction of the interconnection to the PG&E transmission/distribution system.
- Installation of telecommunication equipment.
- Installation of meteorological equipment.
- Construction of the O&M facility.
- Construction of the battery energy storage system.

Site Access and Construction Staging

Access to the project site would be via Billy Wright Road, which intersects State Route (SR) 33/152, a divided four-lane, fully surfaced regional transportation route (Figures 2-1 and 2-2). Some sections of Billy Wright Road would need to be improved (grading, repaving) to accommodate equipment delivery during construction (Figure 2-3). All access and interior roads would be surfaced with aggregate, be dust free, and would be maintained to facilitate onsite circulation for emergency vehicles during all weather conditions.

Construction staging would involve development of specific areas for parking and other temporary construction-related facilities including trailers and storage sheds, sanitary facilities, and drinking water and waste disposal areas. In total, approximately 200 acres would be temporarily disturbed during construction. All temporarily disturbed areas would be restored to pre-construction conditions (i.e., re-contoured, as necessary, and reseeded with native vegetation). Figure 2-1 shows the location of the temporary work area and associated construction parking.

Site Disturbance, Grading, and Compaction

The Proposed Action Alternative has been designed to limit grading to the extent feasible. Earthwork would focus on cut and engineered fill as necessary to create finished grade slopes of a maximum 15%, suitable for the solar panel installation. Graded areas would be cleared and grubbed; vegetative material would be stockpiled onsite and distributed back onto disturbed surfaces once grading is complete.

As noted above, the maximum footprint of the Proposed Action Alternative would be approximately 1,600 acres, including staging areas and access roads. Approximately 3,111,000 cubic yards of dirt/soil would be generated by the grading assumed necessary for installing the inverter pads, switching station, roads, arrays, battery storage, and other improvements. Approximately 82,000 cubic yards of material (mostly gravel for all weather roads) would be imported to the site. Soil compaction, soil strengthening agents, or geo fabric may be used for access and circulation roads. Compaction may also be required for the construction of inverter pads, the switching station, control rooms, and roads. Road construction would require soil conditioning to achieve proper compaction. Roads and other work areas would be periodically sprayed with water to reduce dust. Roads and work areas may also be treated with dust-suppression products approved by Merced County.

Operation and Maintenance Activities

Once in operation, the solar facility would generate electricity during daylight hours (i.e., dusk until dawn), typically from 6:00 a.m. until 6:00 p.m. Operational activities would largely be controlled remotely through the SCADA system, remote security system, and other onsite systems, which would limit the number of personnel and vehicles routinely accessing the site.

Access to and within the site would be limited to designated roads and paths, which would be periodically sprayed with water to reduce dust.

Facility maintenance would include periodic maintenance of buildings, solar panels, solar components, and the internal road network. The level of vehicle activity entering and leaving the site during operation would be limited to scheduled and emergency maintenance visits and monthly delivery vehicles. To the extent possible, solar park O&M activities would occur in the early evening or early morning hours (between 7:00 a.m. and 7:00 p.m.) to avoid interference with the solar facility's peak hours of generation. If it is necessary to complete O&M activities during nighttime hours (e.g., emergency or security response), the work would be confined to the smallest area possible and exclusion fencing would be utilized to exclude special-status species, where appropriate.

Panel washing to remove dust particles from the solar panels would be done several (up to three) times per year from vehicles located on existing roadways. Approximately 1,500,000 gallons of water would be used to clean the panels per year (the applicant estimates 500,000 gallons of water

per panel washing event). Water would be provided by a 50,000-gallon water storage tank filled with water obtained from existing irrigation water rights. Panel washing would occur over several days during daylight hours.

Site Decommissioning

Decommissioning and site restoration may occur at the end of the life of the project. If site decommissioning occurs, it would likely involve the removal of most aboveground structures, restoration of topsoil, revegetation, and seeding. For the purposes of this EA, it is assumed that the life of the project would be approximately 35 years; however, if the facility remains economically and technically viable, the operator may choose to keep the facility in operation for a period longer than 35 years. Any decision to extend the life of the solar facility beyond 35 years would be made in consultation with the Service, and could trigger the need for a new or amended ITP.

While most structures would be removed during decommissioning, it may be advantageous to leave some site improvements in place to support the future agricultural operations that would follow removal of the solar generating facility. For example, the battery storage and operations and maintenance buildings, and all of the all weather roads, would likely be retained to facilitate agricultural practices on the restored site. In addition, the switching station would be deeded to PG&E and would remain onsite in perpetuity (or at their discretion). A detailed decommissioning and site reclamation plan, describing what (if any) features may be left in place, would be prepared for review and approval by Merced County and the Service.

Equipment that would be removed includes the solar modules, substation, electrical wiring, equipment on the inverter pads, the battery energy storage system, and the interconnection transformer pad and associated equipment. Equipment would be de-energized prior to removal, salvaged (where possible), placed in appropriate shipping containers, and secured in a truck transport trailer for shipment off site. Removal of the solar modules would involve removing the racks to which the solar panels would be attached and placing them in secure transport crates, and then into a trailer for storage and ultimate transport to another facility. The bolts and reusable fasteners that attach each solar module to the racks would be removed and saved for reuse. Once the solar modules were removed, the racks would be disassembled and the structures supporting the racks would be removed. The substation would also be lowered and removed from the site. All oils used for cooling of the step up transformer and any breakers would be pumped out, removed from the site, and recycled. All concrete foundations for the steel structures would be broken up and clean concrete removed from the project site for use as clean fill. All structures greater than 4 feet in buried depth would be left in place.

All other aboveground site infrastructure, including fences, awnings, and the concrete pads that supported the inverters, transformers, and related equipment (with the exception of the switching station) would be removed. The fences and gates would be removed, and all materials would be recycled to the greatest extent possible.

All roads and other areas compacted during original construction (except as noted above) or by equipment used in the decommissioning process would be tilled to restore the subgrade material to a density and depth consistent with adjacent areas. An appropriate seed mixture would be broadcast or drilled across the project site to revegetate the site to conditions compatible with continued farming in accordance with a site-specific revegetation plan. Temporary erosion and sedimentation control BMPs would be used during decommissioning and restoration.

Conservation Strategy

The following outlines the conservation strategy provided under the Proposed Action Alternative to avoid and minimize impacts on the covered species. Design features and general avoidance and minimization measures that apply to all covered species are described, as well the species-specific measures that would be implemented to benefit California tiger salamander, blunt-nosed leopard lizard, and San Joaquin kit fox.

Design Features

The following measures have been incorporated into the proposed solar array design to avoid and minimize impacts on the covered species.

- To lessen the potential direct effects on covered species, the solar facility has been designed so that the areas that would be directly affected (on which the solar arrays and roads would be constructed) would occur almost entirely in areas that are currently cultivated and therefore least suitable habitat for the covered species.
- Security fences installed on the perimeter of the project site would be designed to enable passage of kit foxes and their prey, while impeding the passage of larger predators of kit foxes, such as coyotes and larger domestic dogs. All fencing would leave a 4- to 8-inch opening between the fence mesh and the ground. The bottom of the fence fabric would be knuckled (wrapped back to form a smooth edge) to protect wildlife that pass under the fence. Fences would be monitored regularly to ensure that any damage or vandalism is quickly repaired.
- Exclusionary fencing would be installed around the switchyard and substation to exclude access by kit fox.
- Areas of the project site between the solar arrays would be left fallow and managed (e.g., grazed or mowed) to allow annual grassland species and prey species to recolonize the project site and to maintain two wildlife corridors through the entire project site in a generally north-south direction.
- Exterior lighting installed in common areas would be low-intensity, focused, directional lights to reduce light spillage into adjacent open space. This approach would minimize disturbances to San Joaquin kit fox.
- The grassland areas within the project site would not be affected by construction activities and would be left in their existing condition. These areas would continue to be grazed to keep grass height and density low.
- Wetland areas within the project site would not be affected by construction activities and would be left in their existing condition.

Avoidance and Minimization Measures

The following summarizes the avoidance and minimization measures that would be implemented whenever covered activities occur under the Proposed Action Alternative. Refer to Chapter 5, *Conservation Strategy*, in the HCP for a complete description of the general avoidance and minimization measures provided in the HCP (and considered under the Proposed Action Alternative).

- All employees and contractors would receive environmental training prior to the commencement of construction activities. Avoidance and minimization measures would be outlined in the training. All personnel on the construction site would follow these measures to avoid or reduce effects on the covered species. The training would include a printed handout (printed in both English and Spanish) that would be handed to all personnel. All employees and contractors would be required to sign a sign-in sheet indicating that they attended the training and understand the material presented.
- At least 30 days prior to the onset of ground-disturbing activities, the name(s) and credentials of a supervisory project biologist responsible for approving and overseeing all project biological monitors and other biologists performing biological work, would be submitted to the Service for approval.
- Approved biological monitors would be required onsite as long as construction crews and vehicles are accessing the site. Monitoring would cease once construction traffic and activity have ceased and the site is operable.
- Biological monitors would have the authority to halt construction activities, and would order construction activities to stop in the following instances: (1) the monitor observes activities that may result in mortality or harm to covered or listed species; (2) the monitor observes that any of the avoidance and minimization measures described in the HCP are not being implemented; or (3) if at any time a covered or federally-listed species is in danger of experiencing mortality or harm. Work shall not resume until the situation has been rectified to the satisfaction of the supervisory project biologist. If a biological monitor orders a halt to construction activities, he or she shall immediately contact the supervisory project biologist for further instructions.
- All construction-related activities would occur within designated work areas.
- All construction and O&M activities would terminate 30 minutes before sunset and would not resume until 30 minutes after sunrise, with the following exception. Some discrete maintenance activities must occur when the facility is not generating power, at night. Those activities would be conducted under the supervision of a qualified biologist.
- To prevent inadvertent entrapment of San Joaquin kit foxes or other animals during construction, all excavated, steep-walled holes or trenches more than 5-feet deep shall be covered at the close of each working day by plywood or similar materials. Any covers that are installed would be able to be removed quickly by construction staff should the need arise. If covers require heavy equipment to lift them, some means of inspecting the inside of the hold would be installed (e.g., Plexiglass windows) so that biological monitors can ensure no animals are trapped inside. Holes and trenches less than 5-feet may either be covered or provided with escape ramps at a rate of one ramp every 100 feet. Escape ramps may be constructed of earth fill or wooden planks with a slope no steeper than 45 degrees. If wooden planks are used, perpendicular groves or rungs shall be provided to aid in traction. All holes and trenches, whether covered or uncovered, more than 2 feet deep shall be inspected for trapped animals, regardless of whether or not work is occurring in that area. Before holes or trenches are filled, they shall be thoroughly inspected for trapped animals. Work would not continue until trapped animals have moved out of or are removed from the open trench and relocated to a location approved by the Service and California Department of Wildlife (CDFW).

- Speed limits within the project site would be limited to 15 mph during daylight hours and 10 mph at night. All project-related vehicles and equipment would be restricted to established roads, construction areas, and designated staging areas.
- Food-related trash would be disposed of in closed containers and removed from the project site at least once daily.
- No pets or firearms would be permitted on the project site.
- Within 1 working day of finding a dead, sick, or injured covered species on the project site, the biologist would notify the Service and CDFW orally and within 3 working days in writing.
- A map of the location of all covered species observed during preconstruction surveys and during monitoring would be prepared and submitted to the Service and CDFW. This information would be presented to the California Natural Diversity Database (CNDDB).
- A revegetation plan would be prepared for the project. Upon completion of the project, all areas temporarily subject to ground disturbance, including staging areas, would be revegetated according to a site-specific revegetation plan. The plan would be submitted to the Service following construction and prior to its implementation.

Species-Specific Avoidance and Minimization Measures

Table 2-1 summarizes the species-specific avoidance and minimization measures for each of the covered species. These measures build on the design and general avoidance and mitigation measures described above, and reflect the biological goals and objectives identified for each species in the HCP. Refer to Chapter 5, Conservation Strategy, in the HCP for a complete description of the biological goals and species-specific avoidance and minimization measures provided in the HCP (and considered under the Proposed Action Alternative).

Table 2-1. Proposed Action Alternative Species-Specific Avoidance and Minimization Measures

Species	Covered Activity	Avoidance and Minimization Measure
California tiger salamander	Construction, O&M and Decommissioning of Solar Park	Conduct preconstruction surveys for California tiger salamander according to Service and CDFW protocols. If an occupied burrow is located, contact the Service and CDFW and follow removal and relocation protocols in consultation with the wildlife agencies. Submit results of preconstruction survey to the Service and CDFW for review and approval. Limit ground-disturbing activities to dry weather between April 15 and October 31 to the greatest extent practicable. Wet weather is defined as when there has been 0.25 inch of rain in a 24-hour period. Ground disturbing activities halted due to wet weather may resume when precipitation ceases and the National Weather Service 72-hour weather forecast indicates a 30% or less chance of precipitation. No ground-disturbing work will occur during a dry-out period of 48 hours after wet weather. Prepare a relocation plan for California tiger salamander for the Service and CDFW review and approval. If a California tiger salamander is found in the work area during construction and cannot or does not move offsite on its own, a Service- approved biologist shall trap and move the California tiger salamander to a location outside the work area consistent with the Service-approved relocation plan. No monofilament plastic will be used for erosion control. Install tightly woven exclusion fencing between the work area and alkali vernal pools to prevent California tiger salamander from entering the work area. Determine the specific location of the fencing in consultation with the Service and CDFW. Rodenticide and pesticide use is prohibited. Limit herbicide applications to areas where mowing is not possible (e.g., around buildings and against poles and other infrastructure).
Blunt-nosed leopard lizard	Construction, O&M, and Decommissioning of Solar Park	Conduct preconstruction surveys of suitable blunt-nosed leopard lizard habitat according to Service protocols. If an occupied burrow is located, contact the Service and CDFW and follow removal and relocation protocols in consultation with the wildlife agencies. Submit results of preconstruction survey to the Service and CDFW for review and approval. Prepare a relocation plan for blunt-nosed leopard lizards for review and approval by the Service and CDFW. No monofilament plastic will be used for erosion control. Between April 1 and September 30, mowing is allowed only when temperatures are below 75 degrees Fahrenheit (F), measured 1-2 centimeter (cm) above the ground in the sun, to avoid optimal activity temperatures (i.e., 77F-95F measured 1-2 cm above the ground [California Department of Fish and Game 2004]) for blunt nosed leopard lizard.

Species	Covered Activity	Avoidance and Minimization Measure
		Rodenticide and pesticide use is prohibited. Limit herbicide applications to areas where mowing is not possible (e.g., around buildings and against poles and other infrastructure).
	Decommissioning of Solar Park	Conduct survey of areas where ground disturbance would occur during the lizard's active season. Presence/absence surveys according to Service and CDFW protocols would be conducted in those areas where ground disturbing activities would occur. If an occupied burrow is located, contact the Service and CDFW and follow removal and relocation protocols in consultation with the wildlife agencies. Submit results of preconstruction survey to the Service and CDFW for review and approval.
San Joaquin Kit Fox	Construction, O&M, and Decommissioning of Solar Park	Conduct preconstruction surveys for kit fox dens according to Service protocols. If active dens are found, contact the Service and CDFW and follow avoidance and exclusion protocols in consultation with the wildlife agencies. Submit results of preconstruction survey to the Service and CDFW for review and approval.
		Consult with the Service and CDFW if San Joaquin kit fox activity is documented on the site to determine if additional avoidance and minimization measures are required.
		All construction pipes, culverts, or similar structures with a 4-inch or greater diameter that are stored at the construction site for one or more overnight periods shall be closed off at both ends and thoroughly inspected before they are buried, capped, or otherwise used or moved in any way. If a kit fox is discovered in a pipe, that section of pipe shall not be moved until the kit fox is allowed to leave unimpeded or the Service and CDFW have been consulted.
		All materials staged on the project site, and especially in staging area, shall be spaced to provide areas suitable for the covered species to seek shelter. At no time shall materials be haphazardly piled on the project site. All materials shall be inspected by a biological monitor prior to being moved.
		As necessary, establish exclusion zones around San Joaquin kit fox dens according to type (i.e., potential den, known den, and natal/pupping den).
		Install artificial escape tunnels along the outside edge of the solar arrays (outside of the fencing) and facing the 300-foot wide 230-kV transmission corridor.
		Rodenticide and pesticide use is prohibited. Limit herbicide application to areas where mowing is not possible (e.g., around buildings and against poles and other infrastructure).

Habitat Preservation and Management

To offset the permanent loss and degradation of approximately 1,400 acres of habitat and temporary disturbance of an additional 200 acres within the project site, the Proposed Action Alternative would include management of habitat onsite, outside of the project footprint, and conservation of approximately 2,450 acres of grazed grasslands southeast of the project site (Figure 1-2). All land that would be protected for the purpose of mitigation would be placed under a permanent conservation easement and would meet the following criteria, consistent with the biological objectives identified in the HCP.

- Provide for the habitat needs of California tiger salamanders (for movement and aestivation), blunt-nosed leopard lizard (for breeding and movement), and San Joaquin kit fox (for breeding foraging, and movement).
- Preserve suitable habitat offsite and within western Merced County.
- Protect key parcels that support the protection of habitat connecting San Joaquin kit fox populations in western Merced County with the core kit fox population in Panoche Valley, to the south.

Habitat Management on the Project Site

The area disturbed during construction would be seeded with a native grass mix. Once established, the newly seeded grassland is expected to provide ecological benefits to native species in the region because it would support a prey base (e.g., small mammals, insects) that has been absent from the site for several decades while the land has been under cultivation.

Vegetation maintenance would be required on the project site to reduce the risk of fire. Mowing, which would occur two to four times per year, would be utilized to keep vegetation down along the base of the solar panels and to manage open areas of grassland. In lieu of mowing, a grazing program may be utilized to control and manage vegetation within the project site. In particular, sheep grazing provides a cost effective and efficient alternative to mowing. Grazing would occur for approximately 2 weeks between April through June, and would keep residual dry matter down and reduce the risk of fire. Shepherds would be present at all times sheep are onsite to minimize the risk of predation.

As described above, perimeter fencing would be designed to allow kit fox movement through the site. Although the project site would not be placed under a conservation easement, it is expected to provide additional habitat value for the covered species during project operations.

Habitat Management on the Mitigation Site

Under the Proposed Action Alternative, approximately 2,450 acres of land located about 5 miles south of the project site would be set aside as offsite mitigation and protected under a conservation easement (Figures 1-1 and 1-2). The conservation easement would require continuation of current land management practices, including livestock grazing, which favor upland habitat for California tiger salamander, blunt-nosed leopard lizard, and San Joaquin kit fox. Setting aside this site under a conservation easement would ensure that these lands remain suitable for the covered species and allow for kit fox movement within and through the mitigation site in perpetuity. All future management and monitoring of the mitigation site would be detailed in a Service-approved Habitat Management Plan.

Livestock grazing would be conducted under a grazing management plan with specific guidance on grass height and onsite residual dry matter aimed at protecting the grasslands and allowing them to continue to function as kit fox habitat. Onsite grazing management would focus on keeping grasses short (less than 12 inches) while also retaining enough residual dry matter to protect soil health and prevent erosion. Grazing would be year-round during normal and wet years, and the number of animals onsite at any time would vary to meet habitat objectives. During years of extreme weather, such as drought, the grazing intensity would be adjusted to properly meet the grass height and residual dry matter criteria provided in the grazing management plan. Decisions on the approach for grazing management would be made by the landowner based on grassland monitoring in the spring and fall of each year, and would be monitored by a third party easement holder to ensure consistency with the conservation easement.

Livestock grazing would primarily involve cattle. Limited sheep or goat grazing may be used to maintain fire breaks around the edge of the property, although this would only be employed if cattle grazing is not adequately meeting County fire management requirements (i.e., "defensible space regulations"). Mowing one to two times per year may also be utilized to maintain fire breaks, depending on rain patterns and grass growth. In all circumstances mowing would only be used during times of the year when blunt-nosed leopard lizard would not be affected.

The grazing operation would include daily visitation by the grazing operator to observe the herd and make sure that water and fencing infrastructure are working property. Perimeter fencing would be maintained for site security. Minimal interior fencing currently exists, and no new fencing is proposed. Access would occur primarily on existing roads. No new roads are proposed.

Monitoring

Under Service policy, monitoring is required to verify completion of the HCP requirements (i.e. compliance monitoring), assess the level of take resulting from the HCP (i.e., effects monitoring), and to evaluate the effectiveness of the conservation strategy (i.e., effectiveness monitoring). Compliance and effects monitoring would be informed by preconstruction surveys for the covered species and construction monitoring. As described above, a Service-approved biological monitor would be responsible for ensuring adherence to the general and species-specific avoidance and minimization measures in the HCP, and for preparing monthly and year-end reports documenting the outcome of the monitoring efforts. The HCP would be deemed "in compliance" if all of the terms and conditions of the ITP were implemented. Similarly, the results of the biological monitoring would be used to inform the Service and applicant about the actual levels of take that occur as the result of the covered activities.

Effectiveness monitoring on the mitigation lands would be focused on ensuring habitat remains suitable for the covered species. Success criteria for the covered species would be detailed in a Service-approved Habitat Management Plan and generally would be based on existing vegetation conditions (e.g., grass height, residual dry matter) on the mitigation lands measured annually in the spring and fall. Monitoring would be conducted annually for the first 5 years and then at a reduced frequency for the remainder of the permit term, provided success criteria are met. Effectiveness monitoring results at the mitigation lands may be compared to a reference site (e.g., a nearby conservation bank) if the site is accessible and kit fox have been detected there in the previous 5 years. In addition to habitat-based monitoring, land management staff with range management experience would continue to qualitatively assess the vegetative condition on the mitigation lands at least annually to help guide vegetation management. Qualitative vegetation monitoring would be

conducted periodically during the grazing period, and the grazing intensity modified based on monitoring results and management recommendations.

Effectiveness monitoring on the project site would be used to determine if kit fox are moving around the periphery of the site, through the movement corridors within the project site, and/or within the solar arrays themselves. Motion-activated cameras would be installed within 6 months following construction and would be located along the outer perimeter fence and within the interior of the solar site at fixed locations no more than 250 feet apart. Camera monitoring would occur continuously between February 15 and August 15 for 5 years after the solar infrastructure is installed and operational, with images downloaded at least monthly depending on the level of activity detected by the cameras and the size of the memory cards. Any detection of kit foxes would be reported to the Service and summarized in the annual report.

To supplement the camera monitoring, surveys using scat detection dogs would be conducted during Years 1, 3, and 5 following construction. These surveys would occur in late spring or early summer (i.e. June or July), once young kit foxes have emerged from dens and are dispersing to new territories. Surveys would cover the solar array itself, all movement corridors within the arrays, and the accessible undeveloped lands adjacent to the solar arrays. Survey results would be summarized in the annual report, and any detection of San Joaquin kit fox presence reported to the Service.

Adaptive Management

Adaptive management is the process by which management is implemented, monitored and evaluated, and then refined, based on monitoring results. The primary source of uncertainty under the Proposed Action Alternative, relative to the biological goals and objectives identified in the HCP, involves the likelihood that the mitigation lands would provide habitat for the covered species over time. For example the habitat quality at the mitigation site is highly dependent on the presence of California ground squirrels. While land management practices can enhance habitats to promote ground squirrel colonization, ultimately the factors that influence their population dynamics are difficult to control or predict.

The success of the conservation strategy would be measured by evaluating the compliance, effects, and effectiveness monitoring results summarized above. Success criteria would be described in the management plan for the mitigation area. If monitoring results indicate that the success criteria are unmet and the quality of the habitat is declining, the applicant would work with the Service to refine the management techniques to achieve the success criteria.

Environmental Commitments

In addition to the conservation measures set forth in the HCP to avoid, minimize, or mitigate impacts on the covered species, the following environmental commitments are incorporated into the covered activities to reduce the effects on the human environment associated with implementing the Proposed Action Alternative. These environmental commitments are similar to the requirements of Merced County, the local agency with discretionary approval of the project. The requirements will become conditions of approval in the County's conditional use permit (CUP) for the proposed action, and implementation of the requirements would be ensured by the County. Failure to comply with any of the County's conditions of approval can result in revocation of the CUP. If the final requirements of the CUP differ from those identified below, the Service would be contacted to determine if the changes require an amendment to the HCP, this EA or, if issued, the Section 10(a)(1)(B) permit.

EC-1. Prepare and implement a construction fugitive dust control plan

The applicant will develop, implement, and adhere to the conditions of a construction fugitive dust control plan in accordance with industry standards and appropriate San Joaquin Valley Air Pollution Control District (SJVAPCD) requirements. This plan will also require stabilization/restoration of all temporarily disturbed areas. The plan will be sufficiently detailed to demonstrate that the best available control measures are being implemented. It will also establish a process for addressing complaints received from sensitive receptors (either directly or through the County) and procedures for resolving such complaints.

EC-2. Implement emission controls

The applicant will implement standard emission control measures, such as reduction of idling time, proper maintenance and adjustment of equipment, limiting the hours of operation for heavy equipment, and ensuring that sources of emissions are equipped with appropriate emission control systems.

EC-3. Minimize disturbance of wetlands and other aquatic features

To the extent possible, the applicant will site solar infrastructure outside of wetland areas or aquatic features, and incorporate design components to minimize impacts on the hydrology of those features. Where wetlands or aquatic features cannot be avoided, the applicant will apply for and obtain the necessary permits from CDFW and the Central Valley Regional Water Quality Control Board (Central Valley Water Board) prior to construction of the proposed action.

EC-4. Avoid and minimize impacts on nesting birds

The following measures will be implemented to ensure that the Proposed Action Alternative does not significantly affect nesting bird species.

- Remove suitable nesting habitat (trees and ground vegetation) during the non-breeding season (generally September 1–January 31).
- To the extent feasible, avoid construction activities in or near suitable or occupied nesting habitat during the breeding season (generally February 1–August 31).
- If construction activities (including vegetation removal, clearing, and grading) will occur during the nesting season for migratory birds, a qualified biologist will conduct preconstruction nesting bird surveys within 14 days prior to construction activities within a given work area. Suitable habitat within the construction area and areas within a 500-foot buffer will be surveyed for tree-nesting raptors, and a 50-foot buffer will be surveyed for all other bird species. The initial survey should be conducted at least 14 days prior to construction to allow sufficient time to develop an avoidance strategy if nests are identified. A final survey should be conducted within 24 hours of ground-disturbing activities.
- If an active nest is identified near a given work area and work cannot be conducted outside the nesting season (February 1–August 31), a no-activity zone will be established around the nest by a biologist with avian experience in coordination with the Service. Fencing and/or flagging will be used to delineate the no-activity zone. To minimize the potential to affect the reproductive success of the nesting pair, the extent of the no-activity zone will be based on the distance of the activity to the nest, the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the species, and the dissimilarity of the

proposed activity to background activities. The no-activity zone will be large enough to avoid nest abandonment and will be between 50 and 1,000 feet from the nest, or as otherwise required by the Service.

EC-5. Design considerations for avian-safe transmission towers, poles, and line

The developer will construct all transmission towers, poles, and lines in accordance with the guidelines in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee 2006), or the most current version of the guidelines available at the time of construction, and in *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (Avian Power Line Interaction Committee 2012).

EC-6. Stop work if cultural resources are encountered during ground-disturbing activities

If buried cultural resources such as chipped or ground stone, historic debris, or building foundations, are inadvertently discovered during ground-disturbing activities, work will stop in that area and within a 100-foot radius of the find until a qualified archaeologist (QA) can assess the significance of the find and, if necessary, develop a response plan, with appropriate treatment measures, in consultation with the Service, Merced County, the State Historic Preservation Officer (SHPO), and other appropriate agencies.

EC-7. Stop work if human remains are encountered during ground-disturbing activities

If human skeletal remains are encountered, ground-disturbing activities will be stopped within a 100-foot radius of the discovery. The county coroner must be contacted immediately and is required to examine the discovery within 48 hours. If the county coroner determines that the remains are Native American, the coroner is required to contact the Native American Heritage Commission (NAHC) within 24 hours. A QA should also be contacted immediately. The coroner is required to notify and seek out a treatment recommendation of the NAHC-designated Most Likely Descendant (MLD).

- If NAHC identifies an MLD, and the MLD makes a recommendation, and the landowner accepts the recommendation, then ground-disturbing activities may resume after the QA verifies and notifies the County that the recommendations have been completed.
- If NAHC is unable to identify the MLD, or the MLD makes no recommendation, or the landowner rejects the recommendation, and mediation per Public Resources Code (PRC) 5094.98(k) fails, then ground-disturbing activities may resume, but only after the QA verifies and notifies the County that the landowner has completely reinterred the human remains and items associated with Native American burials with appropriate dignity on the property, and ensures no further disturbance of the site per PRC 5097.98(e) by county recording, open space designation, or a conservation easement.

If the coroner determines that no investigation of the cause of death is required and that the human remains are not Native American, then ground-disturbing activities may resume, after the coroner informs the Service and the County of such determination. According to state law, six or more human burials at one location constitute a cemetery and disturbance of Native American cemeteries is a felony (PRC Sections 21083.2, 5094.98, 5097.5, 5097.9; California Health and Safety Code Sections 7050.5, 7052).

EC-8. Conduct a final geotechnical investigation and report and incorporate results into project design

Prior to construction, the applicant will complete a final geotechnical field and laboratory investigation of the project site. As required by the County, the geotechnical investigation and subsequent report will address the potential for ground shaking, slope failure, and expansive soils at the project site, and will prescribe site-specific design requirements to address these hazards, as appropriate. All design requirements will be reviewed by a structural engineer and approved by the County prior to construction.

EC-9. Prepare a stormwater pollution prevention plan with construction site best management practices

Prior to construction-related ground disturbance, the applicant and their contractors will acquire any necessary regulatory approvals from the State Water Resources Control Board (State Water Board) and the Central Valley Regional Water Quality Control Board (Central Valley Water Board) to ensure compliance with and coverage under the National Pollution Discharge Elimination System (NPDES) program General Permit for Storm Water Discharge Associated with Construction and Land Disturbance Activities (Construction General Permit). The applicant will prepare a storm water pollution prevention plan (SWPPP) in compliance with the NPDES Construction General Permit requirements and identify best management practices (BMP) to reduce anticipated impacts related to construction and postconstruction activities on the project site.

EC-10. Develop a hazard materials emergency response plan and a spill prevention, control, and countermeasure plan

In accordance with the California Health and Safety Code and California Code of Regulations (CCR), the applicant will prepare a hazard materials emergency response plan (business plan) and a spill prevention, control, and countermeasure (SPCC) plan to avoid spills and minimize impacts in the event a spill occurs. The plan will discuss hazardous materials management, delineation of hazardous material and hazardous waste storage areas, prevention and response procedures, access and egress routes, and notification procedures. All hazardous materials (e.g., paints, solvents) will be stored in accordance with manufacturer's specifications and federal, state and local regulations.

EC-11. Prepare and implement a fire protection plan

The applicant will coordinate, or as a contract specification, require its contractors to coordinate, with the Merced County Fire Department to prepare a fire protection plan for construction and O&M activities. The Merced County Fire Department will approve the plan before construction begins in areas with moderate to high fire hazards. The fire protection plan will include the following measures (among others).

- Internal combustion engines, stationary and mobile, will be equipped with spark arresters. Spark arresters shall be in good working order.
- Contractor will keep all construction sites and staging areas free of grass, brush, and other flammable materials.
- Personnel will be trained in the practices of the fire safety plan relevant to their duties. Construction and maintenance personnel shall be trained and equipped to extinguish small fires.

- Work crews shall have fire-extinguishing equipment on hand, as well as emergency numbers and cell phone or other means of contacting the Fire Department.
- Security gates will be approved by the Fire Department and, as required, including the installation of a Merced County coded "Knox" key switch or "Knox" padlock, whichever is most appropriate.
- Smoking will be prohibited while operating equipment and shall be limited to paved or graveled areas or areas cleared of all vegetation. Smoking will be prohibited within 30 feet of any combustible material storage area (including fuels, gases, and solvents). Smoking will be prohibited in any location during a Red Flag Warning issued by the National Weather Service for the project area[1].
- Water tanks/supply capable of supplying the required fire flow (per California Fire Code requirements) for fire protection will be used. Water tanks shall be continuously tended during a Red Flag Warning issued by the National Weather Service for the project area if this equipment is in use.

EC-12. Implement noise-reducing construction practices

The applicant will implement noise-reducing construction practices to ensure compliance with applicable County noise standards. Measures to be employed include but are not limited to the following.

- Limit onsite truck speed to 5 mph to reduce truck-generated noise.
- Fixed construction equipment, including compressors and generators, will be located as far as feasibly possible from residential properties.
- All construction equipment powered by gasoline or diesel engines will have sound control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation.
- Where necessary noise-reducing enclosures or temporary barriers will be used around noise-generating equipment. Where feasible existing barrier features (terrain, structures) will be used to block sound transmission.

EC-13. Limit construction near residences to daylight hours

No construction activities should continue past daylight hours (generally 7:00 a.m. to 6:00 p.m.) within 0.5 mile of residences to reduce construction effects on sensitive viewers in the proposed action vicinity (i.e., construction activities would be taking place during business hours when most viewer groups are likely away from their residences at work).

Term of the Incidental Take Permit

Under the Proposed Action Alternative, the Service would issue an ITP with a term of 40-years, which reflects a 35-year project life and up to 5 years to construct and decommission the solar facilities.

[1] "Red-Flag Warning" is a term used by fire-weather forecasters to call attention to limited weather conditions of particular importance that may result in extreme burning conditions.

2.3 Alternatives Eliminated from Further Consideration

The following alternatives to the Proposed Action were not carried forward for detailed analysis in this EA for the reasons described below.

2.3.1 Alternate Site Locations

As described in Section 2.1, *Alternatives and HCP Development Process*, when developing the HCP, the Service and the applicant considered alternate locations that could potentially met the applicant's objectives of constructing an economically viable and commercially financeable solar energy facility in Merced County, while reducing impacts to federally listed species. In considering alternate locations, the applicant indicated that the project site would need to have a high solar irradiance (i.e., the potential to produce 480 gWh of solar energy) and would need to be located in close proximity to an existing electrical transmission system. Additional site considerations included the quality of the agricultural land (i.e., low quality grazing land without access to water rights was preferable to more valuable irrigable agricultural land) and its existing level of disturbance (i.e., sites which were previously disturbed as a result of weed, pest, and/or fire control actions were preferable to undisturbed sites).

No other location in Merced County (or the surrounding area) would provide the unique combination of high solar irradiance in close proximity to an electrical transmission line as that of the project site. In addition, the project site is located on highly disturbed, low productivity agricultural land that would require minimal site grading to install the solar array (i.e., other sites may require more intensive site recontouring to configure the solar array and/or more disturbance of previously undisturbed habitat). As a result, alternate site locations were not identified, and are not considered in this EA.

2.3.2 Reduced Footprint

The Service also considered a reduced footprint alternative which would limit solar infrastructure to the area located east of the 230-kV transmission line corridor (Figure 2-1), or approximately 60% of the project site associated with the Proposed Action Alternative. This proposed configuration followed the existing high tension power line corridor along the northeastern corner of the project site (Figure 2-1) and was selected for three reasons: (1) to provide a broader corridor for San Joaquin kit fox to move across the project site; (2) to reduce impacts on agricultural lands under Williamson Act contracts (a concern identified by Merced County); and (3) to limit solar infrastructure on the higher elevations of the project site to reduce visual impacts. The analysis of this alternative completed by the County for this alternative concluded that reductions (approximately 540 acres) in the loss of marginal agricultural lands, combined with a potential reduction in visual impacts, would not be substantial enough to offset the financial disincentives for downsizing the proposed solar facilities (Merced County 2014). As noted above, the size of the proposed solar array is based on the economics of constructing a commercially viable and financeable solar energy facility. By spreading the transmission costs across a 200-MW solar project, the costs per unit can support the economics of interconnecting the project to the larger transmission grid. By reducing the facility size by 60%, the interconnection per unit cost would become prohibitively high, making the solar array uncompetitive and ultimately uneconomic. In

addition, the development, permitting, and land costs for the proposed solar array are predicated on a 200-MW facility. If the project footprint were reduced by 40%, development and deployments costs would not support developing a smaller project.

Finally, downsizing the solar facilities would trigger a series of revised studies to support a potential amendment to the executed LGIA between Wright Solar Park and PG&E. A substantial delay in the review and permitting process as a result of this amendment would jeopardize the ability for the solar facilities to come online before the expiration of the Federal Investment Tax Credit. Without this tax credit, the applicant considers the proposed solar facilities uneconomic.

For these reasons, a reduced footprint alternative was eliminated from further consideration in the EA.

Of note, the Service also considered footprints smaller than 60% of the proposed project site to maximize the size of kit fox movement corridors within the project site. However, it was determined that smaller project footprints would not offer substantial additional benefits to kit fox because the majority of habitat is clustered at the north end of the site, in the vicinity of the existing power line corridor and where the original footprint reduction efforts were focused. Further, smaller footprints would complicate the delivery of collected energy to the substation by requiring a longer line, presumably underground, from the western arrays to the substation.

2.3.3 Alternate Substation Location

As described in *Covered Activities*, the proposed solar facility would include a lighted substation to transfer the power generated by the facility to PG&E. The substation would be located adjacent to the existing Los Banos-Panoche 230-kV transmission corridor. This corridor, which would remain open after installation of the solar arrays, would provide linear open space that could allow San Joaquin kit fox to continue to move across the site along a northwest to southeast axis.

San Joaquin kit fox is most active at night. Because kit fox avoid brightly lighted areas, placing a lighted substation at the proposed location could have an adverse effect on the ability of fox to traverse the site. As a result, the Service considered relocating the substation to the eastern portion of the project site, outside of the transmission line corridor, or modifying the lighting at the facility.

Locating the proposed substation away from the corridor would require a longer run of electrical transmission line (gen-tie line) to connect the solar facilities to generation facilities owned and operated by PG&E. In addition, the LGIA between Wright Solar Park and PG&E would need to be revisited given it (and all supporting studies) are based on a specific point of interconnection (i.e., Tower 92 / #406) within the existing transmission corridor. As noted above, a substantial delay in the review and permitting process as a result of an amendment to the LGIA would jeopardize the ability for the solar facility to come online before the expiration of the Federal Investment Tax Credit, and may require costly upgrades to the design as a result of the amendment process. For these reasons, moving the substation to the east portion of the project site was eliminated from further consideration in the EA.

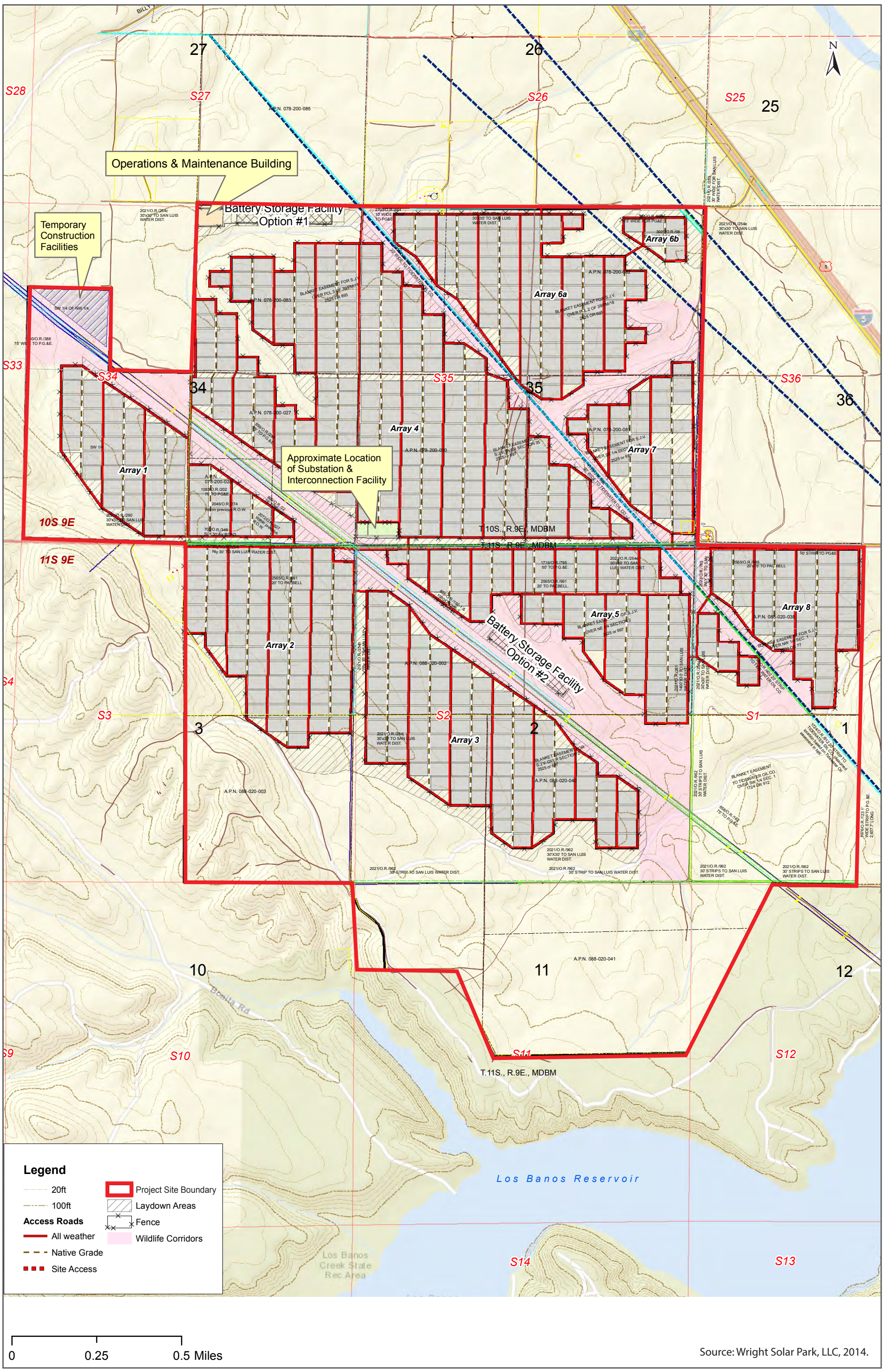

Figure 2-1
Proposed Action Alternative – Site Plan

Source: Wright Solar Park, LLC, 2013.

Graphics ... 0055213 (3-17-2014)

Figure 2-2
Proposed Action Alternative – Construction Access and Haul Routes

Source: Wright Solar Park, LLC, 2013.

Graphics ... 0055213 (4-30-2014)

Figure 2-3
Typical Single-Axis Tracking System

Chapter 3
Affected Environment and Environmental Consequences

This chapter describes the affected environment (i.e., the environmental and regulatory setting) and the potential environmental consequences (i.e., direct and indirect effects) that could result from implementation of the proposed action. As described in Chapter 1, *Purpose and Need*, the proposed action considered in this Environmental Assessment (EA) is the U.S. Fish and Wildlife Service's (Services') response to an application for an incidental take permit (ITP) submitted by Wright Solar Park, LLC (applicant) for activities covered in the *Wright Solar Park Habitat Conservation Plan* (HCP). Under the HCP, the applicant proposes to construct, operate, maintain, and potentially decommission a 200-megawatt (MW) ground-mounted solar photovoltaic (PV) power generating facility on 1,400 acres within unincorporated Merced County, California (Figure 1-1).

The following resource areas are described in the individual sections in this chapter.

- Air Quality and Climate Change
- Agricultural Resources
- Biological Resources
- Cultural Resources
- Geology, Seismicity, Soils, and Mineral Resources
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Socioeconomics and Environmental Justice
- Transportation and Traffic
- Utilities and Public Services
- Visual Resources

This EA does not specifically address potential effects on recreational resources. Both the project site and offsite mitigation lands are on private property that does not provide public access for any purpose, including recreational use. In addition, none of the covered activities would affect access to existing recreational facilities, or substantively increase use of those facilities. The nearest recreational facility to the project site is Los Banos Creek Reservoir, approximately 3 miles north of the offsite mitigation lands and less than 1 mile southwest of the project site. Access to Los Banos Creek Reservoir would not be affected during construction or operation of the proposed action. In addition, long-term operation of the proposed solar facilities would require less than 12 permanent employees and would not involve activities that could increase the use of existing neighborhood or regional parks or other recreational facilities, accelerate physical deterioration of such facilities, or require the construction or expansion of recreational facilities. Because the proposed action would

have no effect on recreational use, access, or opportunities, the potential effects of the alternatives on recreation are not considered in detail in this EA.

Covered Lands and Study Area

As described in Section 1.2, *Background*, the area covered by the proposed action (also referred to as the covered lands) includes about 5,181 acres in western Merced County, including the 2,731 acre site where the power generating facilities would be constructed (project site) and the 2,450 acres identified as offsite mitigation lands under the HCP (Figure 1-2). The offsite mitigation lands are separated from the project site by approximately 5 miles.

The study area, as the term is used in this chapter, represents the area considered in characterizing the affected environment, and varies by resource topic. In some cases, the study area is concurrent with the covered lands, or project site and offsite mitigation lands. For other resource areas, the study area extends beyond the boundary of the covered lands to account for potential effects on resources affected by the covered activities. For example, the air quality section encompasses the entire airshed where the proposed action would occur. For resource topics that require evaluation of a study area that is different from the covered lands, a description of that study area is provided in the introduction to that section.

Alternatives Evaluated

As described in Chapter 2, *Proposed Action and Alternatives*, two alternatives are considered in detail in this EA: No Action Alternative and Proposed Action Alternative.

No Action Alternative

Under the No Action Alternative, the applicant would not construct the proposed solar facilities. There would be no take of federally listed species as a result of the solar facility, and no renewable solar energy would be made available to public utilities, municipal utilities, or private consumers from project operations. Agricultural uses—dry-land farming and grazing—would continue on the project site and offsite mitigation lands.

Proposed Action Alternative

Under the Proposed Action Alternative, the applicant would develop and operate the solar facility noted above, and implement conservation measures to offset potential impacts on species covered under the HCP, including California tiger salamander (*Ambystoma californiense*) Central California Distinct Population Segment (DPS), blunt-nosed leopard lizard (*Gambelia sila*), and San Joaquin kit fox (*Vulpes macrotis mutica*) (covered species). Conservation measures would include management of grassland areas onsite but outside the footprint of the solar infrastructure for the benefit of the covered species; conservation in perpetuity of the 2,450 acres associated with the offsite mitigation lands; and effectiveness and compliance monitoring on all mitigation lands.

The power generated by the solar facility could be sold to public utilities, municipal utilities, or large private consumers of power and would be interconnected to existing Pacific Gas and Electric Company (PG&E) power grid infrastructure for delivery to the purchaser of the power.

Methods for Assessing Direct and Indirect Impacts

The National Environmental Policy Act (NEPA) requires federal agencies to consider the direct and indirect effects of their actions (40 Code of Federal Regulations [CFR] 1502.16). Direct effects are caused by the federal action and occur at the same time and place as the action. Indirect effects are "…caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable…" (40 CFR 1508.8[b]).

The level of detail in the analysis of direct and indirect effects in this EA is driven by the underlying action before the Service. As noted above, the federal action analyzed in this EA is the approval of the Wright Solar Park HCP and issuance of an ITP for the covered species, pursuant to Section 10(a)(1)(B) of the federal Endangered Species Act (ESA). The proposed federal action would not approve or entitle any development project, including the proposed solar facilities on the covered lands. As such, the scope of the effects analysis in this EA is focused principally on the potential effects that issuance of an ITP would have on the covered species, and the indirect effects the proposed action would have on other resource areas. Any development that would occur on the covered lands would be subject to a separate approval process by Merced County, including an environmental review process pursuant to the California Environmental Quality Act (CEQA). Additional project-specific authorizations, including permits from other federal, state, regional, or local entities (e.g., U.S. Army Corps of Engineers [USACE], State Water Resources Control Board [State Water Board]) would also be required.

Through these planning, review, and entitlement processes, mitigation measures for the direct and indirect effects described in this chapter would be anticipated. With the exception of the potential effects on covered species (which would be addresses by the Service as part of the ESA Section 10 or Section 7 processes), the implementation of these mitigation measures would be the responsibility of agencies other than the Service. Where appropriate, the Service has identified Environmental Commitments (ECs) to be implemented under the proposed action, many of which reflect requirements that will be imposed and enforced by other agencies during review and approval of the proposed action.

Refer to Chapter 4, *Additional Topics Required by NEPA*, for a discussion of the potential cumulative effects of the proposed action.

3.1 Air Quality and Climate Change

This section describes the potential effects of the proposed action on air quality and climate change. It summarizes the overall regulatory framework for air quality management in California and the region, describes existing air quality conditions in the vicinity of the proposed action, and identifies sensitive land uses. This section also summarizes the current regulatory framework related to GHG emissions and climate change and considers greenhouse gas (GHG) emissions associated with the proposed action. Where appropriate, mitigation measures are identified to address adverse effects.

For the purposes of this section, the study area includes the San Joaquin Valley Air Basin (SJVAB) (which encompasses Merced County) and the South Coast Air Basin (SCAB) (where a portion of the haul truck trips during construction would occur).

3.1.1 Affected Environment

Regulatory Setting

The air quality management agencies with primary jurisdiction in the study area include the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (ARB), and the San Joaquin Valley Air Pollution Control District (SJVAPCD). EPA has established federal air quality standards for which ARB and SJVAPCD have primary implementation responsibility. As described below, ARB and SJVAPCD are also responsible for ensuring that state air quality standards are met.

A portion of the haul truck trips during construction would occur within the SCAB, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). These truck trips would involve picking up and delivering materials from the Port of Long Beach. Because only a temporary element associated with implementation of the proposed action (i.e., construction-related haul truck trips) would occur within an area under jurisdiction of the SCAQMD (i.e., no long-term emissions associated with operation of the proposed action would occur within the SCAB), this section focuses on existing conditions found in the SJVAB, as a preponderance of operation-related activities and emissions would occur within the SJVAB. Baseline activities and emissions associated with the SCAB are included as assumptions in the SCAQMD thresholds and therefore are not discussed separately.

Federal

Clean Air Act

The federal Clean Air Act (CAA), promulgated in 1963 and amended several times thereafter, establishes the framework for modern air pollution control. The CAA directs EPA to establish National Ambient Air Quality Standards (NAAQS) for six pollutants: ozone, carbon monoxide (CO), lead, nitrogen dioxide (NO_2), particulate matter (PM), and sulfur dioxide (SO_2) (Table 3.1-1). CAA also requires that all federally funded projects come from a plan or program that conforms to the appropriate State Implementation Plan (SIP) so that they do not interfere with strategies employed to attain NAAQS. The rule applies to federal projects in areas designated as nonattainment areas for any of the six criteria pollutants and in some areas designated as maintenance areas. Project-level

conformance with the SIP is demonstrated through compliance with federal *de minimis* thresholds or through a project-specific general conformity determination. A general conformity determination is required if a project's total direct and indirect emissions would be above the federal *de minimis* threshold levels for criteria pollutants in nonattainment or maintenance areas (see 40 CFR 51.853). If a project's total emissions are below the federal *de minimis* thresholds, it is presumed to conform to the applicable SIP for each affected pollutant and no further analysis or determination is required.

Table 3.1-1. National and California Ambient Air Quality Standards

Criteria Pollutant	Average Time	California Standards	National Standards[a]	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None[b]	None[b]
	8–hour	0.070 ppm	0.075 ppm	0.075 ppm
Particulate matter (PM10)	24-hour	50 μg/m^3	150 μg/m^3	150 μg/m^3
	Annual mean	20 μg/m^3	None	None
Fine particulate matter (PM2.5)	24-hour	None	35 μg/m^3	35 μg/m^3
	Annual mean	12 μg/m^3	12.0 μg/m^3	15 μg/m^3
Carbon monoxide (CO)	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
Nitrogen dioxide (NO_2)	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur dioxide[c] (SO_2)	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.14 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead (Pb)	30-day Average	1.5 μg/m^3	None	None
	Calendar quarter	None	1.5 μg/m^3	1.5 μg/m^3
	3-month average	None	0.15 μg/m^3	0.15 μg/m^3
Sulfates (SO_4)	24-hour	25 μg/m^3	None	None
Visibility-reducing particles	8-hour	–[d]	None	None
Hydrogen sulfide (H_2S)	1-hour	0.03 ppm	None	None
Vinyl chloride (C_2H_3Cl)	24-hour	0.01 ppm	None	None

Source: California Air Resources Board 2013a.

ppm = parts per million.

μg/m^3 = micrograms per cubic meter.

[a] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

[b] The federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and a benchmark for SIPs.

[c] The annual and 24-hour NAAQS for SO_2 apply only for 1 year after designation of the new 1-hour standard to those areas that were previously nonattainment areas for the 24-hour and annual NAAQS.

[d] The CAAQS for visibility-reducing particles is defined by an extinction coefficient of 0.23 per kilometer (visibility of 10 miles or more due to particles when relative humidity is less than 70%).

General Conformity

EPA requires federal actions conform to the appropriate SIP for attaining clean air (*general conformity*) when the total direct and indirect emissions that will result from the federal action would exceed certain de minimis thresholds. *Direct emissions* are "emissions of a criteria pollutant or its precursors that are caused or initiated by the federal action and originate in a nonattainment or maintenance area and occur at the same time and place as the action and are reasonably foreseeable" *Indirect emissions* are defined as "emissions of a criteria pollutant or its precursors (1) that are caused or initiated by the federal action and originate in the same nonattainment or maintenance area but occur at a different time or place as the action; (2) that are reasonably foreseeable; (3) that the agency can practically control; and (4) for which the agency has continuing program responsibility" (40 CFR 93.152).

The conformity regulations further state that: "For purposes of this definition [of indirect emissions], even if a federal licensing, rulemaking or other approving action is a required initial step for a subsequent activity that causes emissions, such initial steps do not mean that a federal agency can practically control any resulting emissions" (40 CFR 93.152).

Conformity only applies to nonattainment and maintenance areas. In such areas, conformity requirements only apply to the pollutants for which the areas were designated nonattainment or maintenance.

The federal action addressed in this EA is issuance of an ITP in accordance with Section 10(a)(1)(B) of the federal ESA. This federal action would not directly result in emissions of criteria pollutants, nor would the federal action result in indirect emissions because the Service does not exercise control over any development activities that would result in emissions of criteria pollutants after issuance of the ITP. As the regulatory definition of indirect emissions states, a federal approval that is a necessary first step for a later activity that will result in emissions does not mean that the federal agency can practically control any of these emissions. In this case, the federal action is a necessary first step to any development activity that will ultimately occur on the covered lands. However, the Service does not practically control any of this development activity.[1] Thus, a conformity determination is not required for this federal action.

State and Local

California Clean Air Act

The California Clean Air Act, adopted in 1988, establishes the statewide air pollution control program in California and requires all air districts in the state to meet California Ambient Air Quality Standards (CAAQS) by the earliest practical date. CAAQS are generally more stringent than NAAQS and incorporate additional standards for sulfates (SO_4), hydrogen sulfide (H_2S), vinyl chloride (C_2H_3Cl), and visibility-reducing particles (Table 3.1-1). The ARB and local air districts have primary implementation responsibility for the NAAQS and CAAQS.

As noted above, the study area is within the SJVAB, which is under the jurisdiction of SJVAPCD. SJVAPCD has adopted attainment plans to address ozone, PM, and CO. The *2007 Ozone Plan* (San

[1] EPA's guidance document *General Conformity Guidance: Questions and Answers*, also indicates a conformity analysis is not required to support the proposed action. Specifically, it states: "Direct and indirect emissions must be reasonably foreseeable and the Federal agency must be able to practically control tem as part of its continuing program responsibility." Question 6 (emphasis added) (U.S. Environmental Protection Agency 1994).

Joaquin Valley Air Pollution Control District 2007a) contains a comprehensive list of regulatory and incentive-based measures to reduce volatile organic compounds (VOC) and NO_X emissions within the SJVAB. Similarly, the *2007 PM10 Maintenance Plan* (San Joaquin Valley Air Pollution Control District 2007b) and *2012 PM2.5 Plan* (San Joaquin Valley Air Pollution Control District 2012) include strategies to reduce PM emissions throughout the air basin. Finally, Rule 9510, Indirect Source Review, prescribes design features and onsite measures that can be employed to meet the emission reduction commitments in the ozone and PM10 attainment plans. If required emissions reductions are not achieved through traditional means, projects may purchase offsets on a per ton basis from the SJVAPCD offsite emission reduction fee program to comply with the requirements of Rule 9510.

Limited construction-related haul trips would occur within the SCAB. SCAQMD has adopted a series of air quality management plans (AQMPs) to meet the CAAQS and NAAQS. SCAQMD adopts rules and regulations to implement portions of the AQMPs, several of which may apply to construction or operation of the proposed action. For example, SCAQMD Rule 403 requires the best available fugitive dust control measures to be implemented during active operations that may generate fugitive dust (e.g., onsite earthmoving, construction/demolition, transporting construction equipment on paved and unpaved roads).

2030 Merced County General Plan

Merced County also considers air quality impacts in their land use planning process. Specifically, the Air Quality element of the *2030 Merced County General Plan* (Merced County 2012) includes specific policies to achieve the County's vision for air quality and reduction of GHG emissions, including policies to use best performance standards adopted by the SJVAPCD during development (Policy AQ-2.7) and to reduce particulate emissions from construction (Policy AQ-6.1), among others.

Toxic Air Containment Regulation

California regulates toxic air containments (TACs) primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). In August 1998, ARB identified diesel particulate matter (DPM) emissions from diesel-fueled engines as a TAC. In September 2000, ARB approved a comprehensive diesel risk reduction plan to reduce emissions from both new and existing diesel-fueled engines and vehicles (California Air Resources Board 2000). Because these ARB measures are enacted prior to construction, the proposed action would be required to comply with applicable diesel control measures.

Climate Change Regulations

Numerous efforts at legislation at the state and federal levels have resulted in policies with targets for GHG emissions reduction. The State of California has several existing programs in place to reduce and minimize GHG emissions.

- Executive Order S-3-05, which applies to all state actions, is designed to reduce California's GHG emissions to (1) 2000 levels by 2010, (2) 1990 levels by 2020, and (3) 80% below 1990 levels by 2050.
- AB 32, the Global Warming Solutions Act of 2006, sets the same overall GHG emissions reduction goals as Executive Order S-3-05 while further mandating that ARB create a plan which includes market mechanisms and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

- Executive Order S-01-07 set forth the low-carbon fuel standard for California. Under this executive order, the carbon intensity of California's transportation fuels is to be reduced by at least 10% by 2020.
- AB 1493 requires ARB to implement regulations to reduce automobile and light truck GHG emissions. The vehicle standards resulting from AB 1493 are expected to increase average fuel economy to roughly 43 miles per gallon (mpg) by 2020 and reduce GHG emissions from the transportation sector in California by approximately 14%.
- Senate Bill (SB) 1078 (2002) and SB 107 (2006) created the Renewable Energy Standard (RES) program, which required electric companies to increase their procurement of eligible renewable energy resources by at least 1% of their retail sales annually, until reaching 20% by 2010. SB 2X 1 (2011) requires a Renewable Portfolio Standard (RPS; functionally the same thing as the RES) of 33% to be implemented by 2020.

Climate change and GHG reduction are also a concern at the federal level. For example:

- In 2009, the EPA Administrator found that current and projected concentrations of GHGs threaten the public health and welfare, and that the combined emissions of GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare. These findings do not themselves impose any requirements on industry or other entities, but are a prerequisite to EPA's new Corporate Average Fuel Economy (CAFE) standards. The CAFE standards incorporate stricter fuel economy standards for light- and heavy-duty vehicles and require automakers to cut GHG emissions in new vehicles by roughly 25% by 2016.
- In 2010, EPA set GHG thresholds to define when permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities. In 2012, EPA proposed a carbon pollution standard for new power plants.
- In June 2013, President Obama released his Climate Action Plan (CAP), a broad-based plan to cut carbon pollution in the U.S. Many of the executive actions outlined in the CAP are specifically directed at federal agencies, federal activities, and federal infrastructure (Executive Office of the President 2013).

The Council on Environmental Quality (CEQ) has also issued a memorandum (Draft Guidance) providing guidance on the consideration of the effects of climate change and GHG emissions under NEPA. The Draft Guidance suggests that the effects of projects directly emitting GHGs in excess of 25,000 metric tons annually be considered in a qualitative and quantitative manner. Although the Draft Guidance provides 25,000 tons as a reference point, it does not propose it as a threshold for determining significance (Sutley 2010).

Environmental Setting

Regional Topography, Meteorology, and Climate

The project site and offsite mitigation lands are located within the SJVAB. The mountain ranges bordering the air basin near the project site (the Coast Ranges to the west and Sierra Nevada to the east) influence wind direction and speed and atmospheric inversion layers in the San Joaquin Valley. These mountain ranges channel winds through the valley, affecting both the climate and dispersion

of air pollutants. Temperature inversions—when the upper air is warmer than the air beneath it—occur frequently in the valley. The inversions trap pollutant emissions near the earth's surface and prevent upward dispersal to the atmosphere. Inversions occur frequently throughout the year in the San Joaquin Valley, though they are more prevalent and of a greater magnitude in late summer and fall.

Portions of the haul route would occur within the SCAB, which includes the nondesert portions of Los Angeles, San Bernardino, and Riverside Counties, and all of Orange County. The climate of the SCAB is semi-arid and characterized by warm summers, mild winters, infrequent seasonal rainfall, moderate daytime onshore breezes, and moderate humidity. With low average wind speeds, there is a limited capacity to disperse air contaminants horizontally.

Existing Air Quality Conditions

Existing air quality conditions in SJVAB can be characterized by monitoring data collected in the region. Though the Merced–385 S. Coffee Avenue monitoring station is the closest station to the project site, this monitoring station does not report CO or PM10 conditions in the area. The closest monitoring station to monitor CO is the Turlock–900 S. Minaret Street monitoring station approximately 32 miles north of the project site in Stanislaus County. The closest monitoring station to monitor PM10 is the Merced–2334 M Street monitoring station approximately 32 miles northwest of the project site. Recent air quality monitoring results from these stations are summarized in Table 3.1-2. The data represent air quality monitoring for the last 3 years for which a complete dataset is available (2010–2012). As indicated in Table 3.1-2, there have been some violations of state and federal air quality standards during this time period for ozone, PM10, and PM2.5.

Attainment Status

Local monitoring data (Table 3.1-2) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the NAAQS and CAAQS. The four designations are defined as follows.

- Nonattainment—assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- Maintenance—assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.
- Attainment—assigned to areas where pollutant concentrations meet the standard in question over a designated period of time.
- Unclassified—assigned to areas were data are insufficient to determine whether a pollutant is violating the standard in question.

EPA has classified Merced County as an extreme nonattainment area for the federal 8-hour ozone standard and a nonattainment area for the federal PM2.5 standard. For the federal CO standard, EPA has classified the County as an unclassified/attainment area. The SJVAB is classified as a serious maintenance area with regard to the federal PM10 standards. Similarly, ARB has classified Merced County as a severe nonattainment area for the state 1-hour ozone standard and a nonattainment area for the state 8-hour ozone, PM10, and PM2.5 standards. ARB has classified Merced County as an attainment area for the state CO standard.

Table 3.1-2. Summary of 2010–2012 Ambient Air Quality in the Vicinity of the Project Site

Pollutant Standards	2010	2011	2012
Ozone—Merced – 385 S. Coffee Avenue			
Maximum 1-hour concentration (ppm)	0.117	0.102	0.100
Days exceeding[a] the CAAQS 1-hour standard (>0.09 ppm)	7	2	2
Maximum 8-hour concentration (ppm)	0.096	0.087	0.086
Days exceeding[a] the CAAQS 8-hour (>0.070 ppm)	31	41	25
Days exceeding[a] the NAAQS 8-hour (>0.075 ppm)	14	19	9
Carbon monoxide (CO)—Turlock – 900 S. Minaret Street			
Maximum 8-hour concentration (ppm)	1.53	1.44	1.29
Days exceeding[a] the NAAQS 8-hour (≥9.0 ppm)	0	0	0
Days exceeding[a] the CAAQS 8-hour (≥9.0 ppm)	0	0	0
Nitrogen dioxide (NO_2)—Merced – 385 S. Coffee Avenue			
State maximum 1-hour concentration (ppm)	0.050	.051	0.043
Annual average concentration (ppm)	0.007	0.007	0.007
Days exceeding[a] the CAAQS 1-hour (0.18 ppm)	0	0	0
Particulate matter (PM10)—Merced – 2334 M Street			
National[b] maximum 24-hour concentration (μg/m^3)	93.4	79.9	89.4
State[c] maximum 24-hour concentration (μg/m^3)	91.4	75.0	89.4
Days exceeding[a] the NAAQS 24-hour (>150 μg/m^3)[g]	0	0	0
Days exceeding[a] the CAAQS 24-hour (>50 μg/m^3)[g]	3	8	9
Particulate matter (PM2.5)—Merced – 385 S. Coffee Avenue			
National[b] maximum 24-hour concentration (μg/m^3)	57.4	63.0	50.7
State[c] maximum 24-hour concentration (μg/m^3)	–	–	–
Days exceeding[a] the NAAQS 24-hour (>35 μg/m^3)	10	21	8

Source: California Air Resources Board 2013b.

ppm = parts per million.
CAAQS = California Ambient Air Quality Standards.
NAAQS = National Ambient Air Quality Standards.
μg/m^3 = micrograms per cubic meter.
– = data not available.

[a] An exceedance is not necessarily a violation. This is a mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been rounded.

[b] Measurements usually are collected every 6 days.

[c] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

Table 3.1-3 summarizes the attainment status of Merced County with regard to the NAAQS and CAAQS.

Table 3.1-3. Federal and State Attainment Status for Merced County

Criteria Pollutant	Federal Designation	State Designation
Ozone (1-hour)	–[a]	Severe Nonattainment
Ozone (8-hour)	Extreme Nonattainment (2008)	Nonattainment
CO	Attainment	Unclassified
PM10	Serious Nonattainment	Nonattainment
PM2.5	Nonattainment (1997, 2006)	Nonattainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Attainment (2008)	Attainment
SO_4	(No federal standard)	Attainment
H_2S	(No federal standard)	Unclassified
Visibility	(No federal standard)	Unclassified

Sources: California Air Resources Board 2012; U.S. Environmental Protection Agency 2013.
CO = carbon monoxide.
PM10 = particulate matter less than or equal to 10 microns.
PM2.5 = particulate matter less than or equal to 2.5 microns.
NO_2 = nitrogen dioxide.
SO_2 = sulfur dioxide.
Pb = lead.
SO_4 = sulfates.
H_2S = hydrogen sulfide.
[a] The federal 1-hour standard of 12 parts per hundred million (pphm) was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in the SIPs.

Sensitive Receptors

For the purposes of air quality analysis, sensitive land uses are defined as locations where human populations, especially children, seniors, and sick persons, are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (e.g., 24-hour, 8-hour, and 1-hour). Typical sensitive receptors include residences, hospitals, and schools. While the project site is in a rural area of Merced County, scattered residences are located adjacent to the project site. Single-family residences exist approximately 900 feet northwest of the site, 6,000 feet southeast of the site, 5,000 feet east of the site, and 4,500 feet northeast of the site. Sensitive receptors of all types are also located along the haul routes to the project site, which extend to locations including Los Banos and Long Beach.

Climate Change and Greenhouse Gas Emissions

The phenomenon known as the *greenhouse effect* keeps the atmosphere near the earth's surface warm enough for the successful habitation of humans and other life forms. Sunlight, including infrared, visible, and ultraviolet light, passes through the atmosphere. Some of the sunlight that strikes the earth is absorbed and converted to heat, which warms the surface. The surface emits infrared radiation to the atmosphere where some of it is absorbed by GHGs and re-emitted toward the surface; some of the heat is not trapped by GHGs and escapes into space. Rising atmospheric concentrations of GHGs in excess of natural levels enhance the greenhouse effect, which contributes

to global warming of the earth's lower atmosphere and induces large-scale changes in ocean circulation patterns, precipitation patterns, global ice cover, biological distributions, and other changes to the earth system that are collectively referred to as climate change (Center for Climate and Energy Solutions 2011).

The California Natural Resources Agency (2009) and California Climate Change Center (Moser et al. 2012) identify the following consequences of climate change as primary concerns to the state of California.

- Sea level rise.
- Increased frequency and intensity of wildfires.
- Increased frequency and intensity of extreme heat events.
- Diminished Sierra snowpack.
- Increased frequency of extreme precipitation and/or flooding events.
- Shifts in precipitation patterns and amounts.
- Shifts in plant and animal distributions.

Of these, extreme heat events pose the primary threats to the project site because of its location. Secondary effects that are anticipated to result in the San Joaquin Valley from climate change include increased energy demand, stresses on agriculture, deterioration in air quality, and water management challenges.

With respect to the San Joaquin Valley, including the project site, climate change effects will be similar to California-wide impacts, and are expected to include the following conditions (RMC Water and Environment 2012).

- Reductions in mean annual flow on the Merced River ranging from 3 to 6%, associated with increases in air temperature ranging from 2 to 6°C.
- Earlier runoff timing ranging from 2 to 6 weeks earlier than normal for the Merced River. Changes in seasonal runoff timing may affect electrical generation capabilities, flood protection, water storage and deliveries.
- Increased average low-flow durations for the Merced River ranging from 2 to 4 weeks longer than normal. Low flow conditions deplete meadow groundwater reserves and soil moisture, which can increase flood risk, result in habitat degradation, increase wildfire risk, and worsen downstream water quality.
- Increased water demand due to greater irrigation needs associated with longer growing seasons, increased temperatures and evapotranspiration, and more frequent and severe droughts.
- Reduced water supply due to reduced Sierra snowpack, shifting runoff timing, and increased pressure on groundwater resources.
- Reduced water quality due to lower river flows, reduction in area of meadows which can filter contaminants from water, more frequent and severe droughts which can increase turbidity, and higher water temperatures which can reduce dissolved oxygen levels and support increased algal blooms.

- Higher flood risk due to more frequent and severe storms, earlier springtime runoff, and a reduction in meadows which can neutralize flooding.
- Greater stress and vulnerability in the hydropower system due to increased customer demand, changes in springtime runoff timing, and more frequent and severe storms.
- Degradation of habitat due to decreased snowpack, shifting runoff patterns, more frequent and severe storms and flooding, more frequent and severe droughts and wildfires, longer low-flow periods, and higher water temperatures.
- Hotter and drier conditions which may worsen pest outbreaks and stress precarious sensitive populations.

The primary GHGs that would be generated by the proposed action would include CO_2, CH_4, and N_2O. As a method of simplifying reporting, GHG emissions are discussed in terms of metric tons of carbon dioxide equivalents (CO_2e), which accounts for the relative warming capacity (i.e., global warming potential [GWP]) of each gas.

3.1.2 Environmental Consequences

Approach and Methods

The following summarizes the approach and methods used to estimate the construction- and operation-related emissions of the alternatives, to assess potential health effects, and to consider cumulative GHG emissions as a metric for climate change. Thresholds for identifying comparing the alternatives and identifying significant impacts are also described.

In general, the effects of the proposed action on air quality and climate change are considered to be indirect effects of the proposed action, in that they are related to future development that may be facilitated by issuance of an ITP by the Service. Whether such effects are significant primarily depends on the mitigation measures put in place by other federal, state, and local authorities pursuant to their project-specific approval processes.

Construction and Operational Emissions

Construction emissions were estimated for each phase of construction for off-road equipment and on-road vehicles (including truck trips and worker commutes) based on information provided by the applicant and derived from the project Environmental Impact Report (EIR) (Merced County 2014). In turn, the EIR analysis relied on the following sources to estimate emissions: the California Emissions Estimator Model [version 2013.2.2] (CalEEMod) (South Coast Air Quality Management District 2013), the EPA Emissions Factors & AP 42 Compilation of Air Pollutant Emission Factors document (U.S. Environmental Protection Agency 1995a, 1995b), and the ARB emission factor (EMFAC) 2011 model (California Air Resources Board 2013c).

Operational emissions were estimated for off-road equipment (maintenance/operation activities) and on-road vehicles (including truck trips and worker commutes). Calculation methods from the same sources as listed above for construction emissions were used to estimate operational emissions, and were based on the detailed analysis provided in the EIR (Merced County 2014).

Screening Level Health Risk Assessment

Potential health risks associated with the use of heavy equipment operations during construction, and associated diesel exhaust, were estimated using the SJVAPCD's diesel truck travel health risk assessment screening tool. The California Office of Environmental Health Hazard Assessment (OEHHA) has concluded that the cancer risk from a 70-year exposure to DPM at a concentration of 1 $\mu g/m^3$ ranges from 130 to 2,400 excess cancer cases per million people (Office of Environmental Health Hazard Assessment 2000). OEHHA also found that exposure to DPM results in a greater incidence of chronic non-cancer health effects, such as cough, labored breathing, chest tightness, wheezing, and bronchitis (California Air Resources Board 2000). Cancer risks were weighted by age sensitivity factors (ASF) proposed by OEHHA, which account for the possible differences in risk associated with early-in-life (i.e., children) and adult exposures (Office of Environmental Health Hazard Assessment 2009), as well as different type of sensitive receptors (e.g., residences, schools, construction workers).

Carbon Monoxide Hotspots

SJVAPCD requires localized CO concentrations associated with congested traffic be analyzed to ensure that monitored concentrations remain below CAAQS and NAAQS, and to ensure that sensitive receptors are not exposed to elevated localized concentrations near roadways that may not show up at monitoring stations. SJVAPCD has developed a set of preliminary screening criteria that can be used to determine with fair certainty whether a project would cause a potential CO hotspot at any given intersection. A project would not create a CO violation or localized *hotspot* if the level of service (LOS) on one or more streets or intersections is reduced to LOS E or F, or it is determined the project would not substantially worsen an already LOS F street or intersection within the project vicinity.

Greenhouse Gas Emissions

The analysis in this section considers the cumulative contribution of GHG emissions under the proposed action. This approach reflects the global nature of GHGs as pollutants and their ability to persist and accumulate in the atmosphere over long periods of time. No single emitter of GHGs is large enough to trigger global climate change on its own. Rather climate change is the result of the individual contributions of countless, past, present and future scenarios, and is inherently cumulative. Therefore, while GHG emissions are presented for 2015 and 2016 construction years along with 2016 operational years, impacts are analyzed with respect to cumulative year 2016 emissions only. 2015 construction year emissions are presented for informational purposes only.

Thresholds of Significance

An alternative would be considered to have a significant effect on air quality and climate change if it would result in any of the conditions listed below.

- Exceed federal *de minimis* thresholds for criteria air pollutants.
- Exceed construction-related or operational thresholds for air pollutants set by the ARB, SJVAPCD, or SCAQMD.
- Expose sensitive receptors to a substantial amount of DPM or create a CO hotspot.

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and no construction or operational emissions, or potential health related impacts, would occur. The No Action Alternative would not result in the development of a new, renewably energy facility and, therefore, would not offset ongoing fossil fuel electrical generation or reduce GHG emissions from existing energy facilities.

Proposed Action Alternative

Construction-Related Emissions

Construction of the Proposed Action Alternative has the potential to result in air quality impacts from the use of construction equipment, worker vehicle trips, and haul truck trips. In addition, earthmoving activities would result in minor fugitive dust emissions. Short-term emissions of reactive organic gases (ROG), NO_X, CO, PM10, and PM2.5 would be generated during the construction activities. Pollutant emissions would vary daily, depending on the level of activity, specific operations, and prevailing weather.

The Proposed Action Alternative includes two environmental commitments specific to air quality emissions (see Chapter 2). EC-1 requires preparation of a dust control plan to limit fugitive dust emissions during construction. This environmental commitment is consistent with the SJVAPCD requirement that all construction activities comply with fugitive dust control requirements as provided in an approved dust control plan (Siong pers. comm.). EC-2 requires implementation of standard emission control measures, such as reduction of idling time, proper maintenance and adjustment of equipment, limiting the hours of operation for heavy equipment, and ensuring that sources of emissions are equipped with appropriate emission control systems, to reduce concentrations of criteria pollutants typically associated with construction activities, such as NO_x.

With these ECs in place, criteria pollutant emissions that would be generated during construction were quantified using standard air quality models and information provided by the applicant, as described in *Approach and Methods*. Table 3.1-4 summarizes anticipated construction emissions in the SJVAPCD assuming implementation of EC-1 and EC-2. As indicated in that table, emissions of NO_x in 2015 would exceed SJVAPCD significance thresholds for construction emissions by 0.0147 ton (i.e., based on an unrounded total of modeled emissions). All other criteria pollutant emissions would remain below SJVAPCD significance thresholds for all years analyzed. Mitigation Measures AQ-1 and AQ-2 would be implemented to reduce construction-related emissions of NO_x in the SJVAPCD to less than significant levels.

Table 3.1-4. Emissions of Criteria Pollutants from Construction Activities in the SJVAPCD (tons per year)

Construction Year	ROG	CO	NO_X	SO_2	PM10 Exhaust	PM10 Dust	PM10 Total	PM2.5 Exhaust	PM2.5 Dust	PM2.5 Total
2015										
Off-road equipment	1.0	6.8	4.7	0.1	0.2	0.5	1.1	0.2	0.6	1.1
On-road vehicles	0.6	6.6	5.3	0.0	0.1	1.0	1.3	0.1	0.2	0.4
Total	1.6	13.4	10.0 [a]	0.2	0.3	1.6	2.4	0.2	0.8	1.5
2016										
Off-road equipment	0.9	5.3	3.4	0.1	0.1	0.0	0.5	0.1	0.0	0.4
On-road vehicles	0.3	5.3	1.5	0.0	0.1	0.0	0.1	0.0	0.0	0.1
Total	1.2	10.6	4.9	0.1	0.2	0.0	0.5	0.2	0.0	0.5
SJVAPCD threshold	10	NA	10	NA	NA	NA	15	NA	NA	15
Threshold exceeded in 2015?	No	No	**Yes**	No	No	No	No	No	No	No
Threshold exceeded in 2016?	No	No	No	No	No	No	No	No	No	No

[a] The unrounded total for NO_x is 10.0147 tons, therefore, the threshold would be exceeded by 0.0147 ton.

Table 3.1-5 summarizes emissions in the SCAQMD. All criteria pollutant emissions would remain below SCAQMD significance thresholds for all years analyzed.

Table 3.1-5. Emissions of Criteria Pollutants from Construction Activities in the SCAQMD (pounds per day)

Construction Year and Activity Type	ROG	CO	NO_X	SO_2	PM10 Exhaust	PM10 Dust	PM10 Total	PM2.5 Exhaust	PM2.5 Dust	PM2.5 Total
2015										
Off-road equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-road vehicles	3.7	27.1	75.7	0.2	1.4	0.0	1.4	1.3	0.0	1.3
Total	3.7	27.1	75.7	0.2	1.4	0.0	1.4	1.3	0.0	1.3
2016										
Off-road equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-road vehicles	1.7	18.2	23.6	0.1	0.4	0.0	0.4	0.3	0.0	0.3
Total	1.7	18.2	23.6	0.1	0.4	0.0	0.4	0.3	0.0	0.3
SCAQMD threshold	75	150	100	150	NA	NA	150	NA	NA	55
Threshold exceeded in 2015?	No	No	No	No	No	No	No	No	No	No
Threshold exceeded in 2016?	No	No	No	No	No	No	No	No	No	No

In summary, with implementation of EC-1 and EC-2, as well as Mitigation Measures AQ-1 and AQ-2, construction-related emissions under the Proposed Action Alternative would be less than significant. These emissions would be more significant than those under the No Action Alternative, however, where no construction would occur.

Mitigation Measure AQ-1: Comply with SJVAPCD Rule 9510

The applicant will enter into a development agreement with SJVAPCD to reduce construction-related NO_x and PM10 emissions in accordance with Rule 9510, Indirect Source Review.

Mitigation Measure AQ-2: Enter into a Voluntary Emissions Reduction Agreement with SJVAPCD

The applicant will enter into a Voluntary Emissions Reduction Agreement (VERA) with the SJVAPCD to reduce construction-related NO_X emissions within the SJVAB to below SJVAPCD's numeric threshold of 10 tons per year. This requirement will be enforced and verified by SJVAPCD.

Operational Emissions

Operational emissions under the Proposed Action Alternative would result from employee trips, use of roads within the project and mitigation sites, and use of off-road equipment (including ATV's and panel washing rigs) to maintain infrastructure on the project site. Table 3.1-6 summarizes modeled operation emissions that would occur under the Proposed Action Alternative. As indicated in that table, all operational criteria pollutant emissions would remain below SJVAPCD significance thresholds and would be less than significant. No operational emissions would occur in the SCAQMD. These impacts are more significant than the No Action Alternative, however, where operational emissions would not occur.

Table 3.1-6. Emissions of Criteria Pollutants from Proposed Action Alternative Operations in the SJVAPCD (tons per year)

Operational Element	ROG	CO	NO_X	SO_2	PM10 Exhaust	PM10 Dust	PM10 Total	PM2.5 Exhaust	PM2.5 Dust	PM2.5 Total
Off-road equipment	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-road vehicles	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.2	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SJVAPCD threshold	10	10	NA	NA	NA	NA	15	NA	NA	15
Threshold exceeded?	No	No	No	No	No	No	No	No	No	No

Expose Sensitive Receptors to Substantial Pollutant Concentrations

Diesel Exhaust from Construction Activities

Construction activities would involve the operation of diesel-powered equipment and the generation of diesel exhaust, which is considered a TAC. Cancer health risks associated with exposures to diesel exhaust typically are associated with chronic exposure, in which a 70-year exposure period often is assumed. Although elevated cancer rates can result from exposure periods of less than 70 years, acute exposure (i.e., exposure periods of 2–3 years) to diesel exhaust typically does not typically result in significant health risks. In addition, SJVAPCD does not consider cancer risks associated with operation of diesel-powered construction equipment to be an issue because of the short-term nature of construction activities (Siong pers. comm.).

Construction of the Proposed Action Alternative is anticipated to take 24 months, a much shorter time frame than the 70-year exposure period used in health risk assessments. Tables 3.1-4 and 3.1-5 illustrate that PM10 emissions from construction-related diesel exhaust are anticipated to be relatively low. Therefore, construction of the Proposed Action Alternative is not anticipated to result in an elevated cancer risk to exposed persons or a significant impact on sensitive receptors. This impact would, however, be more substantial than the No Action Alternative where no construction-related emissions would occur.

Diesel Exhaust from Haul Truck Trips during Construction

Potential health risks associated with construction haul trips were estimated using the SJVAPCD's diesel truck travel health risk assessment screening tool, and derived from review of the project EIR. As summarized in Table 3.1-7, potential health risks associated with truck trips were estimated to result in a maximum total of 8.57 cases of cancer in 1 million for student receptors, which is below the accepted threshold of 10 cases of cancer per million. All chronic hazard indices were shown to be less than the SJVAPCD health risk threshold of 1.0 for DPM. As such, construction-related toxic emission impacts under the Proposed Action Alternative would be less than significant, but greater than those under the No Action Alternative, where construction-related emissions would not occur.

Table 3.1-7. Cancer Risk and Non-Cancer Chronic Hazard Index from Haul Truck Trips during Construction

	DPM Cancer Risk (per million)				Non-Cancer Chronic Hazard Index
Construction Year	No CRAF	Residential CRAF (1.7)	Student CRAF (3)	Worker CRAF (1.0)	
2015	2.327	3.96	6.98	2.33	<0.01
2016	0.529	0.90	1.59	0.53	<0.01
Total risk for all years	2.86	4.86	8.57	2.86	<0.01
SJVAPCD threshold	10	10	10	10	1
Threshold exceeded?	No	No	No	No	No

Carbon Monoxide Hotspots

As noted in the *Approach and Methods* section above, a project will not create a CO violation or create a localized hotspot if the LOS on one or more streets or intersections will be reduced to LOS E or LOS F, or if it is determined that the project would not substantially worsen an already LOS F street or intersection within the project vicinity. According to the traffic impact analysis presented in Section 3.11, *Transportation/Traffic*, with implementation of mitigation, all intersections and roadway segments within the vicinity of the proposed action would operate at LOS D or better during the existing plus proposed action condition. Therefore, the Proposed Action Alternative would not generate CO hotspots. This impact would be less than significant, but greater than the No Action Alternative where no construction or construction-related traffic would occur.

Operational TAC Emissions

No meaningful sources of TAC emissions would occur on the project site or offsite mitigation area after the Proposed Action Alternative is implemented. Emissions would be limited to those associated with minimal employee trips, and limited use of roads and off-road equipment within the

project site and offsite mitigation area. As a result, operation-related TAC emissions would be less than significant, although slightly more substantial than the No Action Alternative, where no TAC emissions would be generated.

Conflict with Applicable Local, State, or Federal Plan or Policy

Merced County is designated an extreme nonattainment area for the federal 8-hour ozone standard and a nonattainment area for the federal PM2.5 standard (Table 3.1-3). The most recent SJVAPCD air quality attainment plans (i.e., the 2007 Ozone Plan, 2007 PM10 Maintenance Plan, and 2012 PM2.5 Plan) estimate future emissions in the SVJAB and determine strategies necessary for emissions reductions through regulatory controls. Emissions projections are based on population, vehicle, and land use trends typically developed by the SJVAPCD and San Joaquin Council of Governments (SJCOG).

A project is deemed inconsistent with air quality plans if it would result in population and/or employment growth that exceeds estimates used to develop applicable air quality plans, or if the proposed densities exceed estimates in the plan. Projects that propose development that is consistent with the population or employment growth and development densities anticipated by the relevant land use plans are considered consistent with the SJVAPCD air quality plans.

The Proposed Action Alternative would allow for the construction, operation, and maintenance of solar PV facilities for the long-term generation of renewable energy from solar power. As noted in Section 3.9, *Land Use and Planning*, the Proposed Action Alternative would not result in any significant long-term employment or growth within the region beyond projections developed by SJCOG. Moreover, the Proposed Action Alternative would enhance environmentally positive features on the site, would increase the amount of renewable energy available in California, and would contribute to the region's long-term goals of increasing energy efficiency and reducing air pollution. Because the Proposed Action Alternative would not result in changes to employment, it also would be consistent with recent growth projections for the region and would not conflict with the current SJVAPCD air quality plans. The Proposed Action Alternative would also comply with all SJVAPCD rules and regulations.

Similar to the No Action Alternative, the Proposed Action Alternative would not conflict with or obstruct implementation of any applicable land use plan or policy. This impact would be less than significant.

Generation of Greenhouse Gas Emissions

Construction and operation of the Proposed Action Alternative would generate GHG emissions in both the SJVAB and SCAB. As described in the *Regulatory Setting* section, CEQ has issued Draft Guidance on the consideration of the effects of climate change and GHG emissions in NEPA documents which suggests that the effects of projects directly emitting GHGs in excess of 25,000 metric tons annually be considered in a qualitative and quantitative manner. Although the proposed action would not generate 25,000 metric tons of GHGs, the quantitative analysis of construction and operational GHG emissions provided in the project EIR has been reviewed and carried forward into this section to facilitate comparison between the No Action and Proposed Action Alternatives. Additional information on the methodology employed for this analysis is available in the EIR (Merced County 2014).

Greenhouse Gas Emissions in the San Joaquin Valley Air Basin

Construction-related GHG emissions within SJVAB would result from operation of onsite construction equipment, as well as operation of offsite vehicles used to transport workers and building materials/equipment to and from the project site. Additional construction GHG emissions would occur indirectly through energy and water use (e.g., indirect emissions originating at the power plant producing the electricity to facilitate construction and to supply water to the project site). Operational GHG emissions within the SJVAB would result from equipment and vehicles use at both the project site and offsite mitigation area, as well as indirectly from energy use, water consumption, wastewater treatment, and solid waste generation. In addition, the Proposed Action Alternative would result in an increase in renewable energy generation (490,000,000 kWh per year), which is anticipated to offset fossil-fuel derived energy currently provided to the grid.

Total GHG emissions in the SJVAPCD associated with construction and operation of the Proposed Action Alternative, including emission offsets due to an increased use of renewable energy, are summarized in Table 3.1-8. As shown in that table, total GHG construction emissions in the SJVAB in the form of CO_2e would be approximately 6,989 metric tons. These emissions amortized over a 35-year period equal approximately 200 metric tons per year. Adding to that anticipated operation emissions of 64.5 metric tons CO_2e per year, total GHG emissions under the Proposed Action Alternative in the SJVAB would be approximately 264 metric tons CO_2e per year.

Operation of the solar infrastructure under the Proposed Action Alternative would, however, reduce energy production-related contributions to climate change overall because it would contribute an additional 490 million kilowatt hours (kWh) of renewable electricity per year to PG&E's power grid and would therefore replace the same amount of conventional (largely carbon-based) energy production. Using an emission factor of 445 pounds of CO_2e per megawatt hours (MWh) of delivered electricity developed by PG&E for its 2012 energy production portfolio (Pacific Gas and Electric Company 2014) and the EPA eGRID emission factors for CH_4 and N_2O of 28.49 and 6.03 pounds per GWh, respectively (U.S. Environmental Protection Agency 2014), it is estimated that the Proposed Action Alternative would result in an annual GHG emissions reduction of 99,438 metric tons CO_2e. Therefore, operation of the Proposed Action Alternative would result in a net reduction of approximately 99,174 metric tons CO_2e per year (99,438 metric tons of CO_2e offset and 264 metric tons of CO_2e produced from construction and operation) (Table 3.1-8). This impact would be beneficial, and less significant than the GHG emissions that would be generated under the No Action Alternative.

Table 3.1-8. Greenhouse Gas Emissions from Construction and Operational Activities in the SJVAPCD

	Estimated Total Emissions (metric tons)			
Emissions Category	CO_2	CH_4	N_2O	CO_2e
Construction activities (all years)	6,912.1	0.6	0.2	6,988.5
Amortized (per year for 35 years)	197.5	<0.1	<0.1	199.7
Operational activities (per year)				
Off-road equipment	12.4	<0.1	<0.1	12.5
On-road vehicles	44.8	<0.1	<0.1	45.1
Energy use	4.4	<0.1	<0.1	4.5
Water use	1.4	<0.1	<0.1	1.4
Solid waste generation	0.0	<0.1	0.0	0.8
Wastewater generation	0.0	<0.1	0.0	0.2
Total	63.1	<0.1	<0.1	64.5
Total construction and operation emissions (per year)	260.6	0.1	<0.1	264.2
GHG reductions from offsetting grid electricity (per year)	-98,905.9	-6.3	-1.3	-99,438.4
Net GHG emissions (per year)	-98,645.4	-6.3	-1.3	-99,174.2

Greenhouse Gas Emissions in the South Coast Air Basin

A portion of the equipment- and material-related truck trips under the Proposed Action Alternative would originate at the Port of Long Beach and within the SCAB, which is under SCAQMD jurisdiction. Total GHG emissions within the SCAB associated with construction of the Proposed Action Alternative are presented in Table 3.1-9. As shown in that table, total GHG construction emissions in the form of CO_2e would be approximately 1,135 metric tons. These emissions amortized over a 35-year period equal approximately 32 metric tons CO_2e per year. There would be no operational emissions.

Table 3.1-9. Greenhouse Gas Emissions from Construction and Operational Activities in the SCAQMD

	Estimated Total Emissions (metric tons)			
Emissions Category	CO_2	CH_4	N_2O	CO_2e
Construction activities (all years)	1,120.8	<0.1	0.1	1,135.3
Amortized (per year for 35 years)	32.0	<0.1	<0.1	32.4
Operational activities (per year)	0.0	0.0	0.0	0.0
Total construction and operation emissions (per year)	32.0	<0.1	<0.1	32.4
SCAQMD threshold—commercial/residential				3,000
SCAQMD threshold—industrial				10,000
Threshold exceeded?				No

Emissions would be below both the commercial/residential threshold of 3,000 metric tons CO_2e per year and the industrial threshold of 10,000 metric tons CO_2e per year set by the SCAQMD. In addition, the Proposed Action Alternative would produce renewable energy that would offset electricity largely derived from fossil-fuels and, therefore, result in an annual GHG emissions reduction of 99,438 metric tons CO_2e, as described above. These emission reductions would offset all direct GHG emissions from construction activities within the SCAQMD (1,135 metric tons CO_2e).

3.2 Agricultural Resources

This section describes the regulatory and existing environmental setting for agricultural resources and the potential impacts of the proposed action on those resources. Where appropriate, mitigation measures are identified to address adverse effects.

For the purposes of this section, the study area is concurrent with the project site and offsite mitigation lands.

3.2.1 Affected Environment

Regulatory Setting

State

Williamson Act

The California Land Conservation Act of 1965 (Government Code Section 51200, et seq.), also known as the Williamson Act, protects farmland from conversion to other uses by offering owners of agricultural land a property tax incentive to maintain their land in agricultural use. Under the Williamson Act, the landowner contracts with the county or city in which their property is located, promising to maintain the land in agriculture or a compatible use for a minimum period of 10 years. In return, the property tax on the land is based on its productive value rather than its assessed value. A Williamson Act contract automatically renews each year and enrollment in a Williamson Act contract is voluntary.

The Williamson Act program is administered locally. Merced County is a party to and enforces the contracts on lands within its unincorporated area. The California Department of Conservation has a limited oversight role. There are two methods by which a Williamson Act contract may be terminated. The first and preferred method is through *non-renewal*. The landowner can file a notice of non-renewal with the County and the contract will expire 10 years from that time. The second method is cancellation. The landowner can petition for cancellation of the contract and, if the County Board of Supervisors agrees to the cancellation, the County will make certain mandatory findings of fact relating either to the cancellation's consistency with the Williamson Act or to its being "within the public interest." At that time, the contract is cancelled immediately. A penalty for early termination is levied on the landowner whenever a cancellation is approved.

Portions of the project site (approximately 1,282 acres, or approximately 47% of the project site) are currently subject to Williamson Act contracts, as are all of the offsite mitigation lands. Williamson Act contracts cover approximately 2 square miles on the west side of Interstate (I)-5, including lands on the project site and lands to the northeast of the project site. The contracted land closest to the project site is east of I-5 and separated from the project site by both I-5 and the California Aqueduct. The contracted land closest to the project site on the west side of I-5 is approximately 2 miles to the southwest, on the other side of Los Banos Reservoir, and is used for grazing (California Department of Conservation 2013a).

Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP) is a non-regulatory program of the Department of Conservation that inventories the state's important farmlands and tracks the conversion of farmland to other land uses. The FMMP publishes reports of mapped farmland and conversions every 2 years. The FMMP categorizes farmland on the basis of its soil quality, the availability of irrigation water, current use, and slope, among other criteria. The following are the categories of farmland identified in the FMMP.

- *Prime farmland*. Farmland with the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
- *Farmland of statewide importance*. Farmland similar to prime farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
- *Unique farmland*. Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the 4 years prior to the mapping date.
- *Farmland of local importance*. Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.
- *Grazing land*. Land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities.

The FMMP considers all but grazing land to be *important farmland*.

Local

2030 Merced County General Plan

The *2030 Merced County General Plan* designates the project site as Foothill Pasture (Merced County 2013). This land use designation is applied where the land is subject to "non-cultivated agricultural practices which typically require larger areas of land due to soil quality, limited water availability and steeper slopes."

As described in Section 3.8, *Land Use and Planning*, the General Plan includes several policies specific to allowed land uses within the study area, many of which provide protections for agricultural lands. For example, Policy LU-2.5 provides the criteria the County must consider in considering a conditional use permit (CUP) application to locate commercial or industrial uses in rural areas, such as a solar facility, which include impacts on agricultural land (among others). Policy LU-2.7 provides an allowance for the development of renewable energy facilities, including solar facilities, in Agricultural and Foothill Pasture areas provided such uses do not interfere with agricultural practices or conflict with sensitive habitats or other biological resources. Similarly, Policy AG-3.11 encourages the installation of solar and wind energy production facilities in

agricultural areas so long as they do not result in a tax burden to the County, do not result in permanent water transfers off of productive agricultural land, do not require cancellation of Williamson Act contracts, and do not conflict with sensitive habitats or other biological resources. Finally, Policy AG-2.2 requires that productive agricultural areas be protected from conversion to nonagricultural and urban uses by establishing and implementing an agricultural mitigation program that matches areas converted with farmland acres of similar quality to those preserved at a 1:1 ratio, where *Productive farmland* is defined as "farmland that has received water supplies in three of the prior 10 years and is classified as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland on the Statewide Important Farmland map."

County Zoning

The County's zoning ordinance describes the allowable land uses within the unincorporated areas of the county and the regulations controlling the development of those land uses. It differs from the general plan in that zoning establishes enforceable development standards while the general plan identifies future land use patterns. Zoning implements the land use policies described in the general plan.

The zoning designation for the study area is Exclusive Agriculture (A-2). This zone is applied where agriculture is the primary use of the property. The A-2 zone allows one single-family residence per parcel of land, agricultural production, a ranch office, and accessory buildings. A solar facility of the type being proposed may be allowed upon approval of conditional use permit(s) by the County.

Environmental Setting

The study area is in an agricultural unincorporated area of western Merced County. Most of the project site is being used for cattle grazing, with a large portion also planted in winter wheat and dry-land farmed. With the exception of areas along the southern and western boundaries of the project site, the land has also been disced and tilled annually (Wright Solar Park 2013). No irrigated farming has occurred in the study area for many years. Similarly, the 2,450 acres associated with the offsite mitigation lands are currently in agricultural production, and are used primarily for cattle grazing.

According to the Natural Resources Conservation Service (NRCS) soils maps, the project site is underlain by a variety of soil types including Apollo Clay Loams, Aruburua Loams, Ayar Clays, Ballvar Loam, Damluis Clay Loam, Los Banos Clay Loams, Mollic Xerofluvents, Oniel Silt Loams, Oquin Silt and Fine Sandy Loams, San Timoteo-Wisflat Sandy Loams, and Wisflat-Rock Outcrop Aruburua Complex (Natural Resources Conservation Service 2013). The NRCS assigns land capability classes to soils to describe their potential productivity for agricultural use. Classes range from Class 1 soils, which have few limitations that restrict their use, to Class 8 soils, that have limitations that preclude commercial plant production. The soils underlying the project site range in quality from Class 4 (soils have very severe limitations that reduce the choice of plants or that require very careful management, or both) to Class 7 (soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing or wildlife habitat). Class 4 soils are the most common type found in the project site.

Merced County contains a large amount of land identified as prime farmland. This is reflected in the high economic value of agricultural production in the county. As of 2011, Merced County was ranked as the fifth most productive agricultural county in California, with the gross value of agricultural production being approximately $3.26 billion (California Department of Food and Agriculture 2013).

The FMMP reported that in 2010, there were approximately 1.16 million acres of agricultural land in Merced County (approximately 92% of the county's total acreage). This includes approximately 271,100 acres of prime farmland, 151,340 acres of farmland of statewide importance, 109,030 acres of unique farmland, 65,067 acres of farmland of local importance, and 562,461 acres of grazing land (California Department of Conservation 2011a).

The project site is identified on the 2010 FMMP farmland map for Merced County as being comprised of farmland of local importance and grazing land (California Department of Conservation 2010). Farmland of local importance makes up approximately 1,975 acres of the project site. Grazing land accounts for approximately 755 acres, located primarily along its southern and western reaches. All of the offsite mitigation lands (2,450 acres) are identified as grazing land. Figure 3.2-1 illustrates the distribution of important farmlands on the project site, offsite mitigation lands, and nearby surrounding area.

In general, there has been a trend in the California toward the conversion of all types of farmland to urban or other uses (California Department of Conservation 2013b). This trend has been less pronounced in Merced County than in Fresno or Kern Counties, for example. On average, during the period from 2000 to 2010, approximately 1,600 acres of farmland were converted to urban use in Fresno County (California Department of Conservation 2011b). Kern County converted an average of 3,350 acres of farmland to urban use each year during the period between 2004 and 2010 (California Department of Conservation 2011c). During the period between 1992 and 2010, approximately 1,190 acres of agricultural land were converted to other uses in Merced County each year. About 558 acres of this total represented conversions to urban and built-up land (California Department of Conservation 2011d).

3.2.2 Environmental Consequences

Approach and Methods

The potential effects of the proposed action on agricultural resources in the study area were considered in the context of short-term construction related impacts to agricultural lands, as well as potential long-term conversion. Specifically, the proposed action's impact on agricultural resources is based on the proposed long-term conversion at the project site of approximately 1,388 acres of agricultural land to a solar facility, and temporary disturbance of an additional 202 acres of agricultural land during construction (see Table 3.4-3). There would be no agricultural land conversion at the offsite mitigation lands. This land would be protected under a conservation easement, which would require continuation of current land management practices, including livestock grazing. Therefore, potential impacts on important farmland as they relate to the offsite mitigation lands are not discussed further.

Thresholds of Significance

An alternative would be considered to have a significant impact on agricultural resources in the study area if it would result in any of the conditions listed below.

- Convert prime farmland, unique farmland, farmland of statewide importance, or farmland of local importance (important farmland), as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to nonagricultural use.
- Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract.

- Involve other changes in the existing environment that, due to their location or nature, could result in conversion of important farmland to nonagricultural use.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and the study area would continue to be dry-land farmed and grazed. There would be no short- or long-term conversion of agricultural land to nonagricultural uses, and presumably existing Williamson Act contracts in the study area would continue to the end of their term.

Proposed Action Alternative

Conversion of Important Farmland to Nonagricultural Use

The proposed action would result in the long-term (minimum 35 years[1]) conversion of approximately 1,388 acres of agricultural land to nonagricultural use. It would also result in the temporary disturbance of approximately 202 acres of cropland during construction (Table 3.3-4); this area would be replanted and returned to agricultural use following the completion of construction.

Decommissioning and site restoration would occur at the end of the life of the solar facility, as provided in a site-specific decommissioning plan. Implementation of the decommissioning plan would return the land to its current agricultural use (i.e., grazing land and dry-land farming). As described in Chapter 2, the majority of the solar facility-related structures, including fencing, would be removed and the land would be reconditioned and replanted during the decommissioning process.

Conversion of those portions of the project site that are currently identified as farmland of local importance would trigger compliance within General Plan Policy AG 2.2, which implements the County's agricultural mitigation program described above. The specific mitigation requirements would be negotiated with the County during the permitting review process, and are anticipated to reduce impacts on farmland of local importance to a less-than-significant level. Mitigation Measure AG-1 reiterates this local planning requirement, and specifies the compliance process the County will likely require the applicant to pursue to offset long-term conversion impacts on agricultural lands. This impact would be more substantial than the No Action Alternative, where no agricultural land conversion would occur.

Because the agricultural uses (dry-land farming and grazing) at the offsite mitigation lands would not change with implementation of the proposed action, there would be no impact on agricultural resources at that site.

Mitigation Measure AG-1: Enter into a Community Benefits Agreement

In order to compensate for the direct and indirect loss of agricultural employment, reductions in tax revenues, and harm to the commercial viability of agriculture in Merced County associated

[1] For the purposes of this analysis, it is assumed that the life of the project would be approximately 35 years. However, if the proposed solar facility remained economically and technically viable, the operator may choose to keep the facility in operation for a longer period.

with the long-term conversion of approximately 1,388 acres of cropland, the applicant will enter into a Community Benefits Agreement with Merced County, as required by the County, that provides for direct compensation for accrued losses over the lifetime of the solar facility.

Conflict with Existing Zoning for Agricultural Use

The County zoning ordinance allows solar energy facilities for energy use offsite upon approval of a CUP, which is currently being pursued by the applicant. Therefore, although the proposed action is not currently consistent with the provisions of the County zoning ordinance for an A-2 zone, it would not proceed without approval by the County, at which point the Proposed Action Alternative would be consistent with the County zoning ordinance. Therefore, this impact would be less-than-significant and similar to the No Action Alternative.

Conflict with a Williamson Act Contract

Portions of the project site and all of the offsite mitigation lands are located on land currently under Williamson Act contracts. Under the Proposed Action Alternative, the offsite mitigation lands would be set aside and protected under a conservation easement which would require continuation of current land management practices, including livestock grazing, to benefit federally listed species. The terms of the conservation easement would generally be consistent with the Williamson Act in that they would provide long-term protection of farmland from conversion to other uses. As a result, it is not anticipated that management of the offsite mitigation lands would affect Williamson Act contracts, or result in an adverse effect on Williamson Act Lands.

A solar energy farm, however, is neither an allowed nor compatible use under the County's Williamson Act program. Accordingly, the applicant proposes to cancel the portions of those contracts that cover land that is within the Wright Solar Park and has submitted the required cancellation application to the County. A total of approximately 1,282 acres of contract land are proposed for cancellation. The contracted land proposed for cancellation is grazing land and is relatively isolated from other Williamson Act contracted land. The closest contracts on the west side of I-5 are approximately 2 miles away, west of Los Banos Reservoir and over the ridge from the project site. Because of the physical separation involved, cancellation of the contracts on the project site would not have an adverse effect on those contracts. Contracted lands to the east are separated from the project site by I-5 and the California Aqueduct and similarly would not be affected by the cancellations on the project site.

The proposed action cannot proceed unless the County approves the Williamson Act cancellation requests. State law authorizes the cancellation of Williamson Act contracts under specific circumstances. In this case, the cancellation is anticipated to be within the public interest in that it would enable the development of a renewal energy source consistent with the State of California's RPS program.[2] Solar energy projects, such as the Proposed Action Alternative, advance the statewide public interest of achieving the RPS. Therefore, although the proposed action may currently conflict with existing Williamson Act contracts at the project site, it would not proceed unless the requested cancellation is approved by the County pursuant to the Williamson Act as being within the public interest. Therefore, in consideration of the County review and approval process,

[2] Originally established in 2002 under Senate Bill 1078, accelerated in 2006 under Senate Bill 107 and expanded in 2011 under Senate Bill 2, the RPS program is intended to reduce California's GHG emissions by requiring investor-owned utilities and other electric service providers to increase the amount of energy procured from eligible renewable energy resources, such as solar power, to 33% of the utilities' total procurement by 2020.

this impact would be less than significant but more substantial than the No Action Alternative, where no Williamson Act contracts would be cancelled.

Cause Changes in the Existing Environment that Could Result in Conversion of Important Farmland to Nonagricultural Use

The Proposed Action Alternative would convert existing grazing and dry-land farming operations on the project site to a solar facility. The direct effects on agriculture would be limited to the project site. The infrastructure necessary to support this operation would be within the project site boundary. The transmission line needed to carry the energy collected by the solar facility to the power grid is already in place and runs through the site. No new, offsite transmission lines are proposed.

Implementation of the proposed solar facility would have limited indirect offsite impacts. During operations, there would be limited daily traffic resulting from employees going to and from the site and from occasional access by employees for emergency repair or periodic maintenance activities. This level of travel on site access roads would not be higher than that associated with existing agricultural activities at the site. Therefore operational traffic associated with the Proposed Action Alternative would not result in indirect effects on agricultural operations in the vicinity.

The number of employees at the project site would be small. Therefore, the Proposed Action Alternative would not result in a substantial new demand for housing in the area that could encourage new home building and the resultant conversion of farmland. Existing County zoning on surrounding A-2 zoned properties allows a single-family home to be built on each lot. That level of development is considered to be consistent with agricultural activities. Implementation of the Proposed Action Alternative would not change the zoning.

There is no evidence to indicate that the Proposed Action Alternative would stimulate the submittal of similar proposals for solar energy collection facilities and thereby indirectly result in the conversion of important farmland to nonagricultural uses. Further, because the Williamson Act contracted lands are not adjoining other Williamson Act contracted lands, there is no potential for the proposed cancellation of Williamson Act contracted lands on the project site to encourage cancellations on adjoining lands.

The offsite mitigation lands would not substantially change existing farming or grazing operations on that site. A grazing management plan would be implemented with specific guidance on grass height and onsite residual dry matter, as provided in the Service-approved Habitat Management Plan. Further, the entire area of offsite mitigation lands is designated as grazing lands, which is not considered important farmland under the FMMP. Therefore, there would be no conversion of agricultural land to nonagricultural use at the offsite mitigation site.

In summary, the Proposed Action Alternative would not cause changes in the existing environment that would result in conversion of important farmland to nonagricultural use. Accordingly, this impact would be less than significant. However, the impact would be greater than the No Action Alternative where no changes in land use at the project site would occur.

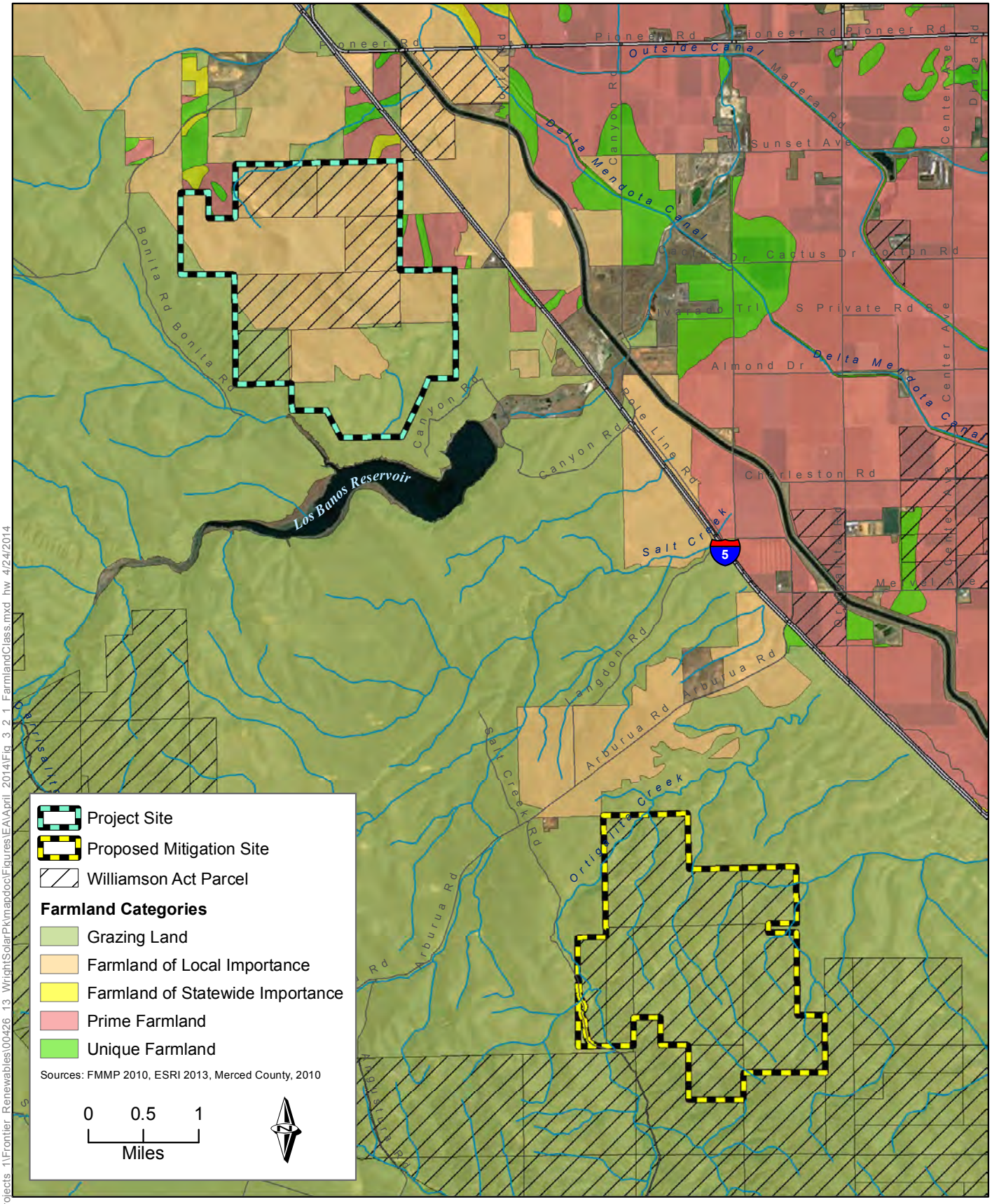

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Figure 3.2-1
Farmland Classifications and
Parcels under Williamson Act Contract

3.3 Biological Resources

This section describes the existing biological conditions in the study area and the applicable regulatory setting. It identifies the impacts to biological resources that could result from the implementation of the proposed action, and includes mitigation measures that would reduce these impacts, where necessary.

This analysis considers potential impacts on all biological resources in the study area and gives special consideration to special-status species. For the purposes of this analysis, special-status species are defined as those listed as threatened or endangered under the ESA, California Endangered Species Act (CESA), or those listed as a candidate under either act; designated as fully protected by the California Department of Fish and Wildlife (CDFW); designated as a Species of Special Concern by CDFW; given a rating of 1 or 2 by the California Native Plant Society (CNPS); or otherwise considered sensitive by local jurisdictions.

For the purposes of this analysis the study area includes the project site (2,731 acres) and offsite mitigation lands (2,450 acres).

3.3.1 Existing Conditions

Regulatory Setting

Federal

Endangered Species Act

ESA (16 United States Code [USC] 1531 et seq.) was enacted to provide a means by which endangered and threatened species and the ecosystems on which they depend may be conserved. ESA and its implementing regulations (50 CFR 17.1 et seq.) include provisions for the protection and management of federally listed threatened or endangered plants and animals and their critical habitats. Generally, the Service has jurisdiction over terrestrial and freshwater fish species, and the National Marine Fisheries Service (NMFS) oversees protection of marine, anadromous, and estuarine species.

Section 4 of the ESA requires the Service and NMFS to make determinations on whether a species should be listed as an endangered or threatened species and to designate critical habitat (16 USC 1533). Section 9 of the ESA prohibits the take of any fish or wildlife species listed under ESA as endangered or threatened. *Take*, as defined by the ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Harm is defined as "any act that kills or injures the species, including significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering" (50 CFR 17.3). Section 9 also prohibits the "removal or reduction to possession" of any listed plant species "under federal jurisdiction" (i.e., on federal land, where federal funding is provided, or where federal authorization is required).

ESA includes mechanisms that provide exceptions to the Section 9 take prohibitions. These are addressed in Section 7 for federal actions and Section 10 for nonfederal actions. Specifically,

Section 7 of the ESA requires federal agencies to consult with the Service and/or NMFS and obtain a biological opinion prior to carrying out any federal program or agency action that may adversely affect threatened or endangered species. The ESA Section 7 consultation and biological opinion process includes an evaluation of whether a project, including issuance of an ITP under ESA Section 10, is likely to jeopardize the continued existence of any endangered or threatened species or result in the "destruction or adverse modification" of critical habitat. Section 10 of the ESA provides a mechanism for authorizing otherwise prohibited take through the ITP process provided in Section 10(a)(1)(B). Incidental take is defined by ESA as take that is "incidental to, and not the purpose of, the carrying out of otherwise lawful activities." The required components of an ITP application under Section 10, which include preparation of an HCP, are described in Chapter 1, *Purpose and Need*.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC 703) protects migratory birds, their occupied nests, and their eggs (16 USC 703, 50 CFR 21, 50 CFR 10). Most actions that result in taking of or the permanent or temporary possession of a protected species constitute violations of the MBTA. The Service is responsible for overseeing compliance with the MBTA. Most bird species and their occupied nests that occur in the study area would be protected under the MBTA.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (Eagle Act) prohibits the taking or possession of and commerce in bald and golden eagles with limited exceptions. Under the Eagle Act, it is a violation to "take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest, or egg, thereof." *Take* is defined to include pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, and disturb. Disturb is further defined in 50 CFR Part 22.3 as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available (1) injury to an eagle; (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Recent revisions to the Eagle Act authorize take of bald eagles and golden eagles under the following conditions: (1) where the take is compatible with the preservation of the bald eagle and golden eagle; (2) is necessary to protect an interest in a particular locality; (3) is associated with but not the purpose of an otherwise lawful activity; and (4) for individual instances of take, where the take cannot be avoided; or (5) for programmatic take, where take is unavoidable even though advanced conservation practices are being implemented (50 CFR 22.26). Permits issued under this regulation usually authorize disturbance only; however, in limited cases a permit may authorize lethal take that results from but is not the purpose of an otherwise lawful activity.

As summarized in Table 3.3-2, there are records of golden eagle occurrences in the project vicinity.

Clean Water Act

USACE and EPA regulate the discharge of dredged or fill material into waters of the United States under Section 404 of the federal Clean Water Act (CWA). Project proponents must obtain a permit from USACE for all discharges of fill material into waters of the United States, including wetlands, before proceeding with a proposed action. Waters of the United States are broadly defined in 33 CFR

328.3(a) to include navigable waters, perennial and intermittent streams, lakes, rivers, and ponds, as well as wetlands, marshes, and wet meadows. CWA extends additional protection to certain rare and/or sensitive aquatic habitats, including wetlands.

USACE has determined that wetlands and other waters on the project site are not subject to federal jurisdiction under the CWA (U.S. Army Corps of Engineers 2013). Therefore, Section 404 does not apply to the proposed action.

Executive Order 11990: Protection of Wetlands

Executive Order 11990 (May 24, 1977) established the protection of wetlands and riparian systems as the official policy of the federal government. The executive order requires all federal agencies to consider wetland protection as an important part of their policies; take action to minimize the destruction, loss, or degradation of wetlands; and preserve and enhance the natural and beneficial values of wetlands.

Federal Noxious Weed Act and Code of Federal Regulations (Title 7, Part 360)

These laws and regulations are primarily concerned with the introduction of federally designated noxious weed plants or seeds across the United States' international borders. The Federal Noxious Weed Act (7 USC 2801–2813) also regulates the interstate movement of designated noxious weeds under the U.S. Department of Agriculture's permit system.

State

California Endangered Species Act

CESA (California Fish and Game Code [Fish and Game Code] 2050 et seq.) is intended to conserve, protect, restore, and enhance any state-protected endangered or threatened species and its habitat and is implemented by CDFW. The Fish and Game Code authorizes the take of endangered, threatened or candidate species either through a state permit under Section 2081, or through a federal consistency determination under Section 2080.1, when an applicant has obtained an ITP pursuant to the ESA and that permit is found to be consistent with CESA.

The Fish and Game Code lists fully protected species (Sections 3511, 4700, 5056, and 5515). Presently, take of fully protected species incidental to otherwise lawful development is not permitted under state law. *Take* under state law is defined as actions to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill" (Fish and Game Code 86). This definition does not include *harm* or *harass* as included in the ESA definition. Because take (as defined by state law) of fully protected species is prohibited and may not be authorized, all potential take of fully protected species must be avoided.

California Fish and Game Code, Section 1600-1616

Fish and Game Code Section 1602 state that it is unlawful for any person to "substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of any river, stream or lake" without first notifying CDFW of that activity. If CDFW determines that an activity may substantially adversely affect an existing fish or wildlife resource within a stream, river, or lake, or its adjacent floodplain, an applicant must obtain a Lake or Streambed Alteration Agreement before they may implement the proposed activity.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act provides regional water quality control boards (Regional Water Boards) the jurisdiction to regulate discharges to wetlands or waters of the state that may or may not be subject to federal regulation under CWA. Similar to the CWA, to obtain a waste discharge requirement from the Regional Water Board, an applicant must demonstrate a project has been designed to avoid, minimize and mitigate for unavoidable effects on waters of the state, including wetlands, and that it would not result in a net loss of wetlands.

Native Plant Protection Act of 1977

The Native Plant Protection Act of 1977 (Fish and Game Code 1900 et seq.) authorizes CDFW to designate rare and endangered native plants and provides specific protection measures for state listed species.

Local

Merced County General Plan

The *2030 Merced County General Plan* (Merced County 2013) includes policies that recognize high-quality wetlands as an important habitat type and that encourage the minimization of impacts on wetlands and habitat for threatened and endangered species. These policies specify that threatened and endangered plant and wildlife species and their habitat should be protected in accordance with state and federal laws and that private and public projects should consider the projects effects on biological resources, and that responsible and trustee wildlife agencies should be consulted and their comments considered when reviewing private and public projects.

Environmental Setting

Land Cover

For the purposes of this section, a *land cover type* is defined as the dominant character of the land surface discernible from aerial photographs, as determined by vegetation, water, or human uses. Land cover types are the most widely used units in analyzing ecosystem function, habitat diversity, natural communities, wetlands and streams, and species habitat. The land cover types of the project site and offsite mitigation lands are shown in Figures 3.3-1a and 3.3-1b. Between June 2011 and May 2013, several field surveys were conducted to characterize the conditions within and in the vicinity of the project site. The methods and results for these surveys are presented in the *Biological Resources Report for the Wright Solar Project* (Ecology and Environment 2013a). An additional survey of the project site was conducted by ICF biologists in December 2013 to reassess the suitability of certain features mapped during the wetland delineation as special-status species habitat, to evaluate other previously identified land cover types, and to evaluate the general site conditions for special-status wildlife. Land coverage type acreages presented in this document reflect the Ecology and Environment (2013a) report, as modified by the ICF 2013 field survey results.

Each land cover type found in the study area is described below. Table 3.3-1 summarizes the acreages of each land cover type in the study area.

Upland Habitats

California Annual Grasslands

California annual grassland or nonnative grassland is an herbaceous plant community dominated by nonnative annual grasses found throughout most of California primarily below 3,000 feet in elevation. The annual grasses make a dense to sparse groundcover and are often associated with numerous species of showy, native annual wildflowers, especially in years of ample rainfall. The grasses and flowers germinate with the onset of the late fall rains. Growth, flowering, and seed-set occur winter through spring. With few exceptions, the plants die by the summer, yet these species persist as seeds until the winter rains. California annual grassland occupies an estimated 3,101 acres of the study area, of which 655 acres are on the project site and 2,446 acres are on the offsite mitigation lands (Table 3.3-1; Figures 3.3-1a and 3.3-1b).

There is an elderberry shrub located within the northeast section of the project site within a patch of annual grassland. During the December 2013 site visit, the shrub was found to be in poor shape because of what appeared to be browsing by livestock or tule elk (*Cervus elaphus nannodes*), which are known to occur in the area and were observed during the site visit. The shrub is approximately 4 feet in height and had two stems that measured 2 and 4 inches in diameter at ground level. There were several smaller stems (approximately 0.5 inch in diameter) that had been recently browsed and had green tissue within the outer layers, indicating that the shrub is still alive.

Cropland (Dry-Farmed Agriculture)

Dry-farming is the production of crops, without irrigation, on lands that receive annual rainfall of 20 inches or less. In a typical year, this means that from late fall through early spring, these crops densely cover cultivated parcels at heights of 2–4 feet, depending on various factors. The crops are usually harvested in spring, after which the fields are tilled and disced for fire and weed control, and again readied for replanting in early fall.

Opportunistic patches of weeds can colonize after the hay fields are mowed and include common ruderal species such as black mustard (*Brassica nigra*), pepperweed species (*Lepidium* sp.), barley (*Hordeum marinum*), hare barley, filarees, ripgut brome, and soft chess (Ecology and Environment 2013a). Dry-farmed agriculture occupies an estimated 2,065 acres all of which is on the project site (Table 3.3-1; Figure 3.3-1a).

Rock Outcrop

Approximately 0.8 acre of rock outcrop is present in the study area in the grasslands along the western edge of the project site (Table 3.3-1; Figures 3.3-1a and 3.3-1b). These outcrops are exposures of bedrock that typically lack soil and have sparse vegetation. Within the project site, rock outcrops are composed of sedimentary rock, primarily sandstone or shale (Ecology and Environment 2013a). One special-status plant species, rayless ragwort (*Senecio aphanactis*) (Table 3.3-2), may be found on rock outcrops at the project site.

Table 3.3-1. Land Cover Types in the Study Area (acres)

Land Cover Type	Project Site	Offsite Mitigation Lands	Total Study Area
Terrestrial Land Cover			
California Annual Grassland	655	2,446	3,101
Cropland	2,065	–	2,065
Rock Outcrop	0.8	–	0.8
Tree Stands	2.1		2.1
Cottonwood Riparian	–	2	2
Subtotal Terrestrial	2,722.9	2,448	5,170.9
Aquatic Land Cover			
Seasonal Wetland	1.1	1	2.1
Ponds	2.3	–	2.3
Ephemeral Swales	2.3	–	2.3
Ditches	0.2	–	0.2
Alkali Vernal Pool	1.7	–	1.7
Subtotal Aquatic	7.6	1	8.6
Total	2,730.5	2,449	5,179.5

[a] The acreage in the table includes the haul road widening areas but excludes 0.066 acre of existing structures. Land cover types represented in this section are slightly less than the acreages provided for the project site and total study area in other sections of the EA due to rounding.

Tree Stands

No forest or woodland habitats occur at the project site. However, small stands of trees (totaling 2.1 acres) are present at the south end of the project site. A small number of individual trees are also present at scattered locations within the project site. These individual trees are included in and discussed as a component of the tree stand habitat.

An approximately 1.1-acre stand of blue gum (*Eucalyptus globulus*) trees is located at the south end of the project site. Another stand of blue gum trees is located in a line along a dirt road, presumably for a windbreak. Other individual trees within the project site include blue gum, Peruvian pepper (*Schinus molle*), mimosa (*Acacia dealbata*), white mulberry (*Morus alba*), several olive trees (*Olea europaea*), corkscrew willow (*Salix matsudana*), black willow (*Salix gooddingii*), and blue elderberry (*Sambucus mexicana*). In total, tree stands comprise about 2.1 acres within the project site (Table 3.3-1).

Cottonwood Riparian

Cottonwood is a deciduous tree that thrives on wet sites, especially on floodplains. They are found in and along the margins of the active channel on intermittent and perennial streams. Generally, no single species dominates the canopy, and composition varies with elevation, aspect, hydrology, and channel type. In these areas, cottonwoods can form extensive stands and can grow to up to 120 feet in height. Cottonwood grows rapidly when young and forms dense stands on newly disturbed areas (Ecology and Environment 2013a).

Cottonwood riparian occupies approximately 2 acres of the study area, all of which is on the offsite mitigation lands (Table 3.3-1; Figures 3.3-1a and 3.3-1b).

Aquatic Habitats

Seasonal Wetlands

Seasonal wetlands are freshwater wetlands that support ponded or saturated soil conditions during winter and spring and are dry through the summer and fall until the first substantial rainfall. The vegetation is composed of wetland generalists, such as hyssop loosestrife (*Lythrum hyssopifolia*), cocklebur (*Xanthium* spp.), and Italian ryegrass that typically occur in frequently disturbed sites, such as along streams. San Joaquin kit fox (*Vulpes macrotis mutica*) may use seasonal wetlands as movement habitat.

A seasonal wetland is located in the southeast corner of project site, between two gently sloping hillsides. This wetland does not have defined banks and is a seasonal feature with nonpersistent emergent vegetation patches. The wetland likely receives significant water only during high precipitation events. As indicated by the small amount (less than 100 square feet) of emergent vegetation (i.e., bulrush [*Scirpus* sp.]) near the northern berm, this is the only area where persistent ponding has occurred. Wetland vegetation observed onsite included bulrush, toad rush, ripgut brome, barnyard grass (*Echinochloa crus-galli*), and barley. The bulrush and rush plants were last year's emergence, indicating no recent ponding in the 2012/2013 wet season (Ecology and Environment 2013a). The seasonal wetland on the offsite mitigation lands is located in the southwest portion of the site and is only visible after a severe rain event. Seasonal wetlands occupy an estimated 2.1 acres in the study area, of which 1.1 acres are on the project site and 1 acre is on the offsite mitigation lands (Table 3.3-1; Figures 3.3-1a and 3.3-1b).

Ponds

Thirteen ponds, encompassing 2.3 acres, are present at the project site (Table 3.3-1). All of the ponds are anthropogenic features constructed within ephemeral swales/drainages (described below). None of the ponds held water during the February 2013 wetland delineation and no other evidence of hydrology was reported (Ecology and Environment 2013b). These ponds may hold water seasonally; however based on a review of aerial photographs taken between 1998 and 2013, including the 2005/2006 wet season (an above-average precipitation year for areas north of Los Angeles, California [California Department of Water Resources 2006]), the features do not show any signs of ponding (Google 2013). These ponds may have been constructed to either capture and hold water for livestock or capture and detain water during large storm events to minimize downstream flooding.

Ephemeral Swales/Drainages

Three ephemeral swale/drainages, totaling 2.3 acres, are present at the project site (Table 3.3-1). The swale/drainages are inundated seasonally during years with normal or above-normal rainfall, primarily during or immediately following rainfall events (Ecology and Environment 2013b). These features consist mostly of swales (areas without a defined channel).

Ditches

Four ditches, totaling 0.2 acre, are present at the project site (Table 3.3-1). All of the ditches are anthropogenic features that are inundated seasonally during years with normal or above-normal rainfall (Ecology and Environment 2013b).

Alkali Vernal Pool

An alkali vernal pool, encompassing about 1.7 acres, is located in the southeast portion of the project site, outside of the proposed solar facility footprint (Figure 3.3-1a). Vernal pools are seasonal wetlands that pond water on the surface for extended durations during winter and spring and dry completely during late spring and summer. They support a typical flora largely composed of native wetland plant species. Vernal pools occur in distinctive topography with low depressions mixed with hummocks or mounds.

This pool is a highly disturbed with little diversity of vegetation species on its edges and no vegetation in the center. Plants ringing the border of the vernal pool include facultative ruderal grasses and forbs, with Italian ryegrass, broadleaf filaree, and London rocket as dominant species. Grazing occurs within and around this vernal pool, and the shallowness and low density of the hoof prints indicated that the system did not hold significant water for long periods during the winter prior. The alkali vernal pool represents potential breeding habitat for California tiger salamander during a normal wet year, though California tiger salamander breeding in this wetland may be limited by its presumed high salt content (demonstrated by the presence of extensive salt crusts left behind after water has evaporated from the pool).

Special-Status Species

As noted above, special-status species are animals and plants that are legally protected under ESA, CESA, or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing. The list of special-status species with potential to occur in the study area or vicinity was derived from the following sources.

- U.S. Fish and Wildlife Federal Endangered and Threatened Species that occur in the Howard Ranch, Ingomar, San Luis Ranch, San Luis Dam, Volta, Los Banos, Los Banos Valley, Ortigalita Peak NW, and Charleston School U.S. Geological Survey (USGS) 7.5 Minute Topographic Quadrangles (U.S. Fish and Wildlife Service 2011a)
- California Natural Diversity Database (CNDDB) records search of the Howard Ranch, Ingomar, San Luis Ranch, San Luis Dam, Volta, Los Banos, Los Banos Valley, Ortigalita Peak NW, and Charleston School USGS 7.5 Minute Topographic Quadrangles (California Department of Fish and Wildlife 2013).
- California Native Plant Society's (CNPS's) online Inventory of Rare and Endangered Plants of California (California Native Plant Society 2013).

Wildlife

Based on a review of the CNDDB (California Department of Fish and Wildlife 2013), Service species lists (U.S. Fish and Wildlife Service 2011a), and other environmental documents prepared for projects near the study area, 39 special-status wildlife species were identified as having the potential to occur in the study area (Table 3.3-2). Of these species, seven species have not been observed and are not expected to occur in the study area because they have extremely limited ranges or are limited to habitats that are not present in the study area: foothill yellow-legged frog (*Rana boylii*), silvery legless lizard (*Anniella pulchra pulchra*), giant garter snake (*Thamnophis gigas*), yellow rail (*Coturnicops noveboracensis*), Nelson's antelope squirrel (*Ammospermophilus nelson*), Fresno kangaroo rat (*Dipodomys nitratoides exilis*), and giant kangaroo rat (*Dipodomys ingens*) (Table 3.3-2). The remaining 32 species, including the three species covered in the HCP, have the

potential to occur in the study area and may be affected by the proposed action (Table 3.3-2). The following discussion provides additional species-specific information for the covered species to provide further context for the analysis.

San Joaquin Kit Fox

The San Joaquin kit fox is listed as endangered under the ESA and threatened under CESA. Critical habitat has not been designated for the species. The *San Joaquin Kit Fox Recovery Plan* (U.S. Fish and Wildlife Service 1983) was the initial recovery plan for the species. Subsequently, a recovery strategy for San Joaquin kit fox was included in the *Recovery Plan for the Upland Species of the San Joaquin Valley, California* (Upland Recovery Plan) (U.S. Fish and Wildlife Service 1998). More recently, the Service completed a 5-year review for the San Joaquin kit fox and determined that the species continues to meet the definition as endangered (U.S. Fish and Wildlife Service 2010a).

Currently, kit foxes occur in some areas of suitable habitat on the floor of the San Joaquin Valley and in the surrounding foothills of the Coast Ranges, Sierra Nevada, and Tehachapi Mountains from Kern County north to Contra Costa, Alameda, and San Joaquin Counties (U.S. Fish and Wildlife Service 1998). There are known occurrences in Alameda, Contra Costa, Fresno, Kern, Kings, Madera, Merced, Monterey, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Stanislaus, and Tulare Counties. The largest extant populations of kit fox are in Kern County (Elk Hills and Buena Vista Valley) and San Luis Obispo County in the Carrizo Plain Natural Area (U.S. Fish and Wildlife Service 1998).

There are several San Joaquin kit fox CNDDB occurrences within 10 miles of the study area (California Department of Fish and Wildlife 2013). In recent years, several studies and projects have occurred in western Merced County which documented the presence of San Joaquin kit foxes in western Merced County. In 2004, two San Joaquin kit fox occurrences were recorded in western Merced County, including an adult kit fox observed approximately 12 miles south of the project site and a natal den, including one adult and two pups, approximately 2 miles west of the project site near the intersection of Billy Wright Road and Jasper Sears Road. In October 2013, ICF biologists conducted a site visit of the project site as well as the proposed offsite mitigation lands. During the site visit, the biologists observed San Joaquin kit fox scat at the entrance of a suitable burrow on the proposed offsite mitigation lands.

From 2005 to 2007, biologists from California State University–Stanislaus' Endangered Species Recovery Program (ESRP) conducted extensive San Joaquin kit fox surveys in western Merced County to determine abundance and distribution. ESRP observed kit foxes on two occasions along Billy Wright Road north of the project site (Figure 3.3-2). Based on the results of their surveys, ESRP concluded that kit fox populations are not homogeneously distributed throughout western Merced County. Consistent detections in the southern area of western Merced County (south of SR 152) suggest a resident population may be present whereas the infrequent detections in the northern area (north of SR 152) suggest that kit foxes may be transient in this area (Constable et al. 2009). Additionally, ESRP assessed the distribution of suitable habitat for San Joaquin kit fox in the areas that were identified as the species' range in the *1998 Upland Recovery Plan* (Cypher et al. 2013). The areas in western Merced County with natural vegetation near the project site have been ranked as medium to high suitability for San Joaquin kit fox. The areas on the project site itself, which have been, and still are dry-land farmed, were ranked as low suitability for San Joaquin kit fox. The ESRP concluded that in order to enhance the long-term viability of populations present in western Merced

County, movement corridors connecting this population and the core population in Panoche Valley, to the south, and the northern satellite population should be maintained.

California Tiger Salamander

The California tiger salamander is state listed as threatened throughout its range, and federally listed as threatened in the study area (i.e., the central California population). Critical habitat has been designated for the central California populations only. A recovery plan for the central California population has not been developed.

The California tiger salamander is endemic to California. Historically, the California tiger salamander probably occurred in grassland habitats throughout much of the state. Although this species still occurs within much of its range, it has been extirpated from many areas it once occupied (Stebbins 2003; Fisher and Shaffer 1996).

California tiger salamanders occur in the Central Valley and the adjacent Sierra Nevada foothills up to 1,500 feet, generally from Yolo County south to Kern County (California Department of Fish and Game 2010). Most populations occur at elevations below 1,500 feet (457 meters), but California tiger salamanders have been recorded at elevations up to 3,660 feet (1,116 meters), just below Rose Peak in the Ohlone Regional Wilderness, Alameda County (California Department of Fish and Game 2010). Although populations have declined, the species continues to breed at a large number of locations within its current range (59 Federal Register [FR] 18353–18354 [April 18, 1994]). At most historic breeding sites below 200 feet (61 meters) elevation, ponds remain present but no longer support California tiger salamanders. These sites are typically occupied by nonnative species (Fisher and Shaffer 1996).

There are nine records of California tiger salamander within approximately 10 miles of the project site, two of which are approximately 3 miles west of the project site (California Department of Fish and Wildlife 2013).

The ponds and the seasonal wetlands that were identified in 2013 by Ecology & Environment do not represent suitable aquatic habitat (breeding) for California tiger salamander because there are no indications that these features pool long enough to support breeding habitat (Ecology and Environment 2013b). A review of historic aerial photographs between 1998 and 2013 do not show any of these mapped ponds holding water (Google 2013). Pooling water was observed within one pond that occurs within the project site in December 2013. This pond appears to have been filled as a result of the purging of an agricultural irrigation filtration system. Because the purging of this system is likely to be periodic, it would not support extended periods of continuous inundation, and therefore would not provide suitable aquatic habitat. The seasonal wetland also does not pond to a sufficient depth or duration to support California tiger salamander breeding.

The alkali vernal pool in the southwest corner of the project site (Figure 3.3-1a) represents potential breeding habitat for California tiger salamander during a normal wet year. This wetland appears to pool to a maximum depth of 12–18 inches and was observed to be saturated to the surface in December 2013, which suggests that it could pool for an extended period of time, especially considering that very little rain had fallen up to that point in the year (just under an inch). California tiger salamander breeding in this vernal pool may be limited by its high salinity and alkalinity. CDFW only considered freshwater habitats as suitable for the species in their 2010 status review for the species (California Department of Fish and Game 2010) and the Service only considers fresh water habitat as part of the primary constituent elements in the listing of critical habitat for the

central population (70 FR 49280–49458). However, a subspecies of tiger salamander, the blotched tiger salamander (*Ambystoma tigrinum melanostictum*), has been reported occurring in habitats with a high salinity and alkalinity (Gasser and Miller 1986), and there are records within the CNDDB that report of California tiger salamanders occurring in alkali habitats (California Department of Fish and Wildlife 2013). It is therefore possible that California tiger salamanders may use the alkali vernal pool as aquatic habitat.

The Service considers upland habitat within 1.24 miles (2 kilometers [km]) of California tiger salamander breeding habitat to represent potential upland habitat for the species (U.S. Fish and Wildlife Service 2003). In addition to the alkali vernal pool, there are other aquatic features within 1.24 miles of the study area including the Los Banos Reservoir; an unnamed stream flowing into Los Banos Reservoir from the north, which is just southwest of the study area; a pond 0.8 mile (1.3 km) north of the project site and just south of Billy Wright Road; and several pools within and adjacent to Los Banos Creek below the reservoir. Los Banos Reservoir does not represent suitable habitat for California tiger salamander because it is a perennial water body that is stocked with sport fish. Portions of the unnamed stream that pool above its connection with the Los Banos Reservoir may support California tiger salamander breeding. A review of historic aerial photographs (Google 2013) shows the pond off of Billy Wright Road inundates from winter into mid to late summer. There are several pools observable from aerial photographs that occur downstream of the reservoir that could support salamander breeding. A review of historic aerial photographs (Google 2013) show several of these pools dried down during the summer months with a few appearing to remain inundated into fall.

Grassland within the study area that contain mammal burrows could potentially be occupied by California tiger salamander if they breed within the aquatic habitats identified above.

Blunt-Nosed Leopard Lizard

The blunt-nosed leopard lizard is listed as endangered under both ESA and CESA. It is also a fully protected species under the California Fish and Game Code. No critical habitat rules have been published for the blunt-nosed leopard lizard. A recovery strategy for blunt-nosed leopard lizard was included in the *Recovery Plan for the Upland Species of the San Joaquin Valley, California* (U.S. Fish and Wildlife Service 1998). More recently, the Service completed a 5-year review for the blunt-nosed leopard lizard and determined that the species continues to meet the definition of endangered (U.S. Fish and Wildlife Service 2010b).

The blunt-nosed leopard lizard is endemic to the San Joaquin Valley and surrounding foothills. Historically, this species occurred from Stanislaus County in the north to the Tehachapi Mountains in Kern County in the south. The foothills of the Sierra Nevada and the Coast Ranges roughly define the eastern and western boundaries of its distribution, except for populations on the Carrizo Plain and in the Cuyama Valley west of the San Joaquin Valley. The blunt-nosed leopard lizard is not found above 2,624 feet (800 meters) in elevation (U.S. Fish and Wildlife Service 1998). Blunt-nosed leopard lizards are known to hybridize with long-nosed leopard lizards where their ranges overlap in the Cuyama River watershed in Santa Barbara and Ventura Counties (U.S. Fish and Wildlife Service 1998).

No comprehensive survey has been conducted of the entire range of the blunt-nosed leopard lizard. The current known distribution includes scattered units of undeveloped land on the valley floor and in the foothills of the Coast Ranges. In the northern part of its range, the blunt-nosed leopard lizard is known to occur in the Firebaugh and Madera Essential Habitat Areas (U.S. Fish and Wildlife

Service 1998). Long-term population studies for blunt-nosed leopard lizards have not been conducted in Merced County. The status of blunt-nosed leopard lizard populations in western Merced County is not known (U.S. Fish and Wildlife Service 2010b).

There are five extant CNDDB records for blunt-nosed leopard lizards in western Merced County (California Department of Fish and Wildlife 2013). One of these records is between 0.5 to 3 miles west of the project site (according to the CNDDB GIS polygon data). This record is from a 1979 report describing the distribution of blunt-nosed leopard lizard (California Department of Fish and Wildlife 2013). The more heavily grazed annual grasslands in the study area represent potential habitat for blunt-nosed leopard lizard. The steeper areas, croplands, and patches of annual grasslands within the croplands represent low quality habitat for blunt-nosed leopard lizard. These conclusions are based the knowledge that the species typically occurs in areas of low relief, that farming activities would likely preclude the species from occupying these areas, and because the patches of grassland within the cropland have dense vegetation, which is generally not occupied by this species.

Plants

Nineteen special-status plants plant species occur in or within 10 miles of the study area (California Department of Fish and Wildlife 2013). Eight of the species are unlikely to occur in the study area because suitable habitat is not present: Lost Hills crownscale (*Atriplex coronata* var. *vallicola*), hispid bird's-beak (*Chloropyron molle* subsp. *hispidum*), Delta button-celery (*Eryngium racemosum*), Hall's bush mallow (*Malacothamnus hallii*), Sanford's arrowhead (*Sagittaria sanfordii*), Arburua Ranch jewelflower (*Streptanthus insignis* subsp. *lyonii*), slender-leaved pondweed (*Stuckenia filiformis* subsp. *alpina*) and Wright's trichocoronis (*Trichocoronis wrightii*). The remaining 11 species have the potential to occur in the study area and may be affected by the proposed action (Table 3.3-3). None of these plant species are federally listed or included as covered species in the HCP.

No protocol-level surveys for special-status plants have been conducted at the project site or offsite mitigation lands. Therefore, a habitat assessment approach was used to evaluate the potential for special-status plants to occur in the study area.

Table 3.3-2. Special-Status Wildlife Potentially Occurring in Western Merced County and Study Area

Common Name *(Scientific Name)*	Status (Federal/ State)	Geographic Distribution	Habitat Requirements	Likelihood of Occurrence in Study Area
Invertebrates				
Conservancy fairy shrimp *(Branchinecta conservatio)*	E/–	Occurs in large turbid vernal pools from Butte and Tehama Counties south to Ventura County	Small vernal pools, alkali sink pools, drainage ditches, and vegetated seasonal wetlands	Low. The alkali vernal pool in the southwest corner of the project site may provide suitable habitat.
Longhorn fairy shrimp *(Branchinecta longiantenna)*	E/–	Occurs in small pools from Contra Costa to San Luis Obispo Counties	Small pools on sandstone outcrops, turbid pools, road side ditches, and clear pools within grassland/iodine bush	Low. The alkali vernal pool in the southwest corner of the project site may provide suitable habitat.
California linderiella *(Linderiella occidentalis)*	–/–	Occurs in a variety of vernal pools and other seasonal wetlands in the Central Valley and central coastal California	Small vernal pools, alkali sink pools, drainage ditches, and vegetated seasonal wetlands	Low. The alkali vernal pool in the southwest corner of the project site may provide suitable habitat.
Vernal pool tadpole shrimp *(Lepidurus packardi)*	E/–	Shasta to Merced Counties	Vernal pools and ephemeral stock ponds	Low. The alkali vernal pool in the southwest corner of the project site may provide suitable habitat.
Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*	T/–	Streamside habitats below 3,000 feet throughout the Central Valley	Riparian and oak savanna habitats with elderberry shrubs; elderberry is the host plant	Low. An elderberry shrub occurs in northeastern portion of the project site but is in relatively poor condition.

Common Name *(Scientific Name)*	Status (Federal/ State)	Geographic Distribution	Habitat Requirements	Likelihood of Occurrence in Study Area
Amphibians				
California tiger salamander *Ambystoma californiense* (= A. tigrinum c.)	T/SSC	Central Valley, including Sierra Nevada foothills to approximately 1,000 feet, and coastal region from Butte to northeastern San Luis Obispo Counties	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy	Moderate. Grasslands within the study area include mammal burrows and provide suitable upland and dispersal habitat. The species may use the alkali vernal pool in the southwest corner of the project site as aquatic habitat, although the potential for occurrence is low due to poor habitat quality.
Western spadefoot *(Spea hammondii)*	–/SSC	Sierra Nevada foothills, Central Valley, Coast Ranges, coastal counties in southern California	Shallow streams with riffles and seasonal wetlands such as vernal pools in annual grasslands and oak woodlands	Moderate. Grasslands within the study area provide suitable upland habitat for this species. The alkali vernal pool in the southwest corner of the project site may provide suitable aquatic habitat.
Foothill yellow-legged frog *(Rana boylii)*	–/SSC	Extends west of the crest of the Cascade Mountains in Oregon south to the Transverse Ranges in Los Angeles County, and in the Sierra Nevada foothills south to Kern County.	Require shallow, flowing water in small to moderate-sized streams with at least some cobble-sized substrate.	None. There is no suitable habitat for this species in the study area.
California red-legged frog *(Rana draytonii)*	T/SSC	Along the coast and coastal mountain ranges of California from Marin to San Diego Counties and in the Sierra Nevada from Tehama to Fresno Counties	Permanent and semipermanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation; may aestivate in rodent burrows or cracks during dry periods.	Low. Grassland in the study area may be used by the species for cover and dispersal but there is no suitable aquatic habitat in the study area. The species is known to occur to the west of the project site in Los Banos Creek. There are ponds downstream of the Los Banos Reservoir that are east of and within 1 mile of the project site that provide potential habitat for this species.

Common Name *(Scientific Name)*	Status (Federal/ State)	Geographic Distribution	Habitat Requirements	Likelihood of Occurrence in Study Area
Reptiles				
Western pond turtle *(Actinemys marmorata)*	–/SSC	From Oregon border of Del Norte and Siskiyou Counties south along the coast to San Francisco Bay, inland through the Sacramento Valley and on western slope of Sierra Nevada	Ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests.	Low. There is no suitable aquatic habitat for this species within the study area and grasslands within the project site are at least a ¼ mile north of suitable aquatic habitat (Los Banos Reservoir), which is separated from the project site by a steep, 60–100-foot embankment. Western pond turtles could potentially nest within the southern portion of the project site; however there is suitable nesting habitat closer to the reservoir.
Blunt-nosed leopard lizard *(Gambelia sila)*	E/FP	Endemic to the San Joaquin Valley and adjacent foothills	Inhabits open, sparsely vegetated areas of low relief in nonnative annual grasslands and valley sink scrub	Low. The majority of the study area has been disturbed due to the past cultivation of crops. Grasslands are generally characterized by dense vegetation and would not likely be suitable. Grazed annual grassland in the southern portion of the project site and offsite mitigation lands may be more suitable.
Blainville's horned lizard *(Phrynosoma blainvillii)*	–/SSC	Extends along the Pacific coast from the Baja California border west of the deserts and the Sierra Nevada, north to the Bay Area, and inland as far north as Shasta Reservoir; occurs on the Kern Plateau east of the crest of the Sierra Nevada	Areas with an exposed gravelly sandy substrate supporting scattered shrubs, chamise chaparral, annual grassland, broadleaf woodland, and conifer forest; most common in lowlands along sandy washes with scattered shrubs for cover.	Moderate. The project site contains friable soils that could support the species but species has not been documented within 10 miles of the project site.

Common Name *(Scientific Name)*	Status (Federal/ State)	Geographic Distribution	Habitat Requirements	Likelihood of Occurrence in Study Area
Silvery legless lizard *(Anniella pulchra pulchra)*	–/SSC	Endemic to California; ranges from Antioch in Contra Costa County south through the Coast, Transverse, and Peninsular Ranges, along the western edge of the Sierra Nevada Mountains and parts of the San Joaquin Valley and Mojave Desert to El Consuelo in Baja California	Occur primarily in areas with sandy or loose loamy soils such as under sparse vegetation of beaches, chaparral, or pine-oak woodland; or near sycamores, cottonwoods, or oaks that grow on stream terraces.	Low. The study area contains sandy loam soils within the annual grasslands but the dry conditions there likely preclude the study area as habitat.
San Joaquin whipsnake *(Masticophis flagellum ruddocki)*	–/–	Extends from Colusa County in the Sacramento Valley, south to the Grapevine in Kern County in the San Joaquin Valley, and west to the inner South Coast Ranges	Open, dry vegetative associations with little or no tree cover	High. Areas of annual grassland and rock outcrops in the southern portion of the project site provide suitable habitat for this species. The species is known to occur south of the project site.
Giant garter snake *(Thamnophis gigas)*	T/T	Found in suitable habitat, as described, throughout the Sacramento and San Joaquin Valleys, including the following counties: Butte, Colusa, Contra Costa, Fresno, Glenn, Madera, Merced, Sacramento, San Joaquin, Solano, Sutter and Yolo.	Requires habitat that offers permanent or summer water with vegetative cover, dense populations of food organisms, and higher elevation uplands not subject to flooding	None. There is no suitable habitat for this species in the study area. The ponds and wetlands within the study area do not appear to inundate for any extended period of time during the species active season (May to October).
Birds				
Cackling goose *(Branta hutchinsii leucopareia)*	–/–	Wintering habitat in California is mainly in Del Norte County, the San Francisco Bay Area, and the southern Central Valley	Lakes and ponds for roosting and moist grasslands, croplands, pastures, and meadows for foraging	Moderate. May roost on Los Banos Reservoir to the south and could forage in the agricultural portions of the study area. Species has been documented within 10 miles of the project site.

Common Name *(Scientific Name)*	Status (Federal/ State)	Geographic Distribution	Habitat Requirements	Likelihood of Occurrence in Study Area
Golden eagle *(Aquila chrysaetos)*	Eagle Act/FP	Foothills and mountains throughout California; uncommon nonbreeding visitor to lowlands (e.g., Central Valley)	Nests on cliffs and escarpments or in tall trees overlooking open country; forages in annual grasslands, chaparral, and oak woodlands with plentiful medium and large-sized mammals	High. The study area provides suitable foraging habitat but no suitable nesting habitat. Species has been documented nesting within 5 miles of the project site.
Ferruginous hawk *(Buteo regalis)*	–/SSC	Does not nest in California; winter visitor along coast from Sonoma to San Diego Counties, east to Sierra Nevada foothills and southeastern deserts, Inyo-White Mountains, plains east of Cascade Range, and Siskiyou County	Open terrain in plains and foothills where ground squirrels and other prey are available	High. The study area provides suitable winter foraging habitat. The species has been documented within 1 mile of the project site.
Swainson's hawk *(Buteo swainsoni)*	–/T	Lower Sacramento and San Joaquin Valleys, Klamath Basin, and Butte Valley; highest nesting densities near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grainfields	High. Species was observed in flight over the project site in 2013. The project site provides suitable foraging habitat for the species and it is known to nest within 5 miles of the project site. Species could potentially nest in isolated trees and transmission towers within the project site.
Northern harrier *(Circus cyaneus)*	–/SSC	Throughout lowland California; has been recorded in fall at high elevations	Grasslands, meadows, marshes, and seasonal and agricultural wetlands	High. The project site has suitable foraging habitat for the species but limited nesting habitat due to cultivation and the low stature of the annual grasslands in the majority of the project site.

Common Name *(Scientific Name)*	Status (Federal/ State)	Geographic Distribution	Habitat Requirements	Likelihood of Occurrence in Study Area
White-tailed kite *(Elanus leucurus)*	–/FP	Lowland areas west of Sierra Nevada from head of Sacramento Valley south, including coastal valleys and foothills, to western San Diego County at Mexico border	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging	Moderate. The study area provides suitable foraging habitat. Nesting habitat is limited to some isolated trees and the transmission towers. The species has not been recorded nesting within 10 miles of the project site.
Merlin *(Falco columbarius)*	–/SSC	Does not nest in California; rare but widespread winter visitor to Central Valley and coastal areas	Forages along coastline in open grasslands, savannas, and woodlands; often forages near lakes and other wetlands	High. Suitable wintering habitat for this species occurs at the project site. The species has been observed within 10 miles of the project site.
Prairie falcon *(Falco mexicanus)*	–/SSC	Permanent resident in south Coast, Transverse, Peninsular, and northern Cascade Ranges; southeastern deserts, Inyo-White Mountains, foothills surrounding the Central Valley; and in the Sierra Nevada in Modoc, Lassen, and Plumas Counties; winters in Central Valley, along the coast from Santa Barbara to San Diego Counties, and in Marin, Sonoma, Humboldt, Del Norte, and Inyo Counties	Nests on cliffs or escarpments, usually overlooking dry, open terrain or uplands	High. Suitable foraging habitat occurs within the study area but no suitable nesting habitat. Species has been documented nesting within 10 miles of the project site.
Yellow rail *(Coturnicops noveboracensis)*	–/SSC	From Siskiyou and Modoc counties to much of northeastern California; length of the coast, and formerly the northern San Joaquin Valley, but are mainly from the greater San Francisco Bay region.	Require sedge marshes/meadows with moist soil or shallow standing water	None. No suitable wintering habitat and the study area is outside of the species currently known breeding range.

Common Name *(Scientific Name)*	Status (Federal/ State)	Geographic Distribution	Habitat Requirements	Likelihood of Occurrence in Study Area
Western burrowing owl *(Athene cunicularia hypogea)*	–/SSC	Lowlands throughout California, including Central Valley, northeastern plateau, southeastern deserts, and coastal areas; rare along south coast	Level, open, dry, heavily grazed or low stature grassland or desert vegetation with available burrows	High. Suitable cover (burrows) and foraging habitat occur within the s. The species is known to occur within a few miles of the project site.
Loggerhead shrike *(Lainus ludovicianus)*	–/SSC	Resident and winter visitor in lowlands and foothills throughout California; rare on coastal slope north of Mendocino County, occurring only in winter	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines or other perches	High. The species was observed in the project site in 2013 and there is suitable nesting and foraging habitat within the study area.
Tricolored blackbird *(Agelaius tricolor)*	–/SSC	Permanent resident in Central Valley from Butte to Kern Counties; breeds at scattered coastal locations from Marin to San Diego Counties and at scattered locations in Lake, Sonoma, and Solano Counties; rare nester in Siskiyou, Modoc, and Lassen Counties	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grainfields; habitat must be large enough to support 50 pairs; likely requires water at or near the nesting colony	High. The study area provides suitable foraging habitat but no suitable nesting habitat. Species has been documented nesting within 5 miles of the project site.
Yellow-headed blackbird *(Xanthocephalus xanthocephalus)*	–/SSC	East of the Cascade Range and Sierra Nevada, in Imperial and Colorado River valleys, in the Central Valley, and selected locations in the coast ranges west of the Central Valley; portions of the Central Valley and in Imperial Valley	Freshwater emergent wetlands with dense cover, typically in cattails, tules along the border of lakes or ponds	Moderate. Suitable foraging habitat occurs within the study area. There is no suitable nesting habitat within the study area. The species has not been documented within 10 miles of the project site.

Common Name *(Scientific Name)*	Status (Federal/ State)	Geographic Distribution	Habitat Requirements	Likelihood of Occurrence in Study Area
Mammals				
Pallid bat *(Antrozous pallidus)*	–/SSC	Occur throughout California except at high elevations	Grasslands, shrublands, woodlands, and forests	Moderate. The study area provides suitable foraging habitat for this species and the old structure within the project site may provide roost habitat for the species.
Townsend's big-eared bat *(Corynorhinus townsendii)*	–/P	Occurs throughout California except at higher elevations	Occurs in a variety of habitat except for subalpine and alpine habitats; require caves, mines, tunnels, buildings, or other human-made structures for roosting	Moderate. The study area provides suitable foraging habitat for this species and the old structure within the project site may provide roost habitat for the species.
Western red bat *(Lasiurus blossevillii)*	–/SSC	Occurs throughout California west of the Sierra Nevada/Cascade crest and deserts; winter range includes western lowlands and coastal regions south of San Francisco	Habitat includes forests and woodlands from sea level up to mixed conifer forests	Moderate. The study area provides suitable foraging habitat for this species and trees within the project site may provide roost habitat for the species.
Hoary bat *(Lasiurus cinereus)*	–/–	Occur throughout California but have a patchy distribution in the southeastern deserts	Roost in woodlands and forests with medium to large-size trees and dense foliage; forage in open habitat or habitat mosaics with access to trees for cover	Moderate. The study area provides suitable foraging habitat for this species and trees within the project site may provide roost habitat for the species.
Western small-footed myotis *(Myotis ciliolabrum)*	–/–	Found throughout California and occurs in deserts, chaparral, riparian, and western coniferous forests	Roost singly or in small groups in cliff or rock crevices, buildings, overpasses, caves, and mines; forage over a wide variety of habitats	Moderate. The study area provides suitable foraging habitat for this species and the old structure within the project site may provide roost habitat for the species.

Common Name *(Scientific Name)*	Status (Federal/ State)	Geographic Distribution	Habitat Requirements	Likelihood of Occurrence in Study Area
Western mastiff *(Eumops perotis californicus)*	–/SSC	Occurs throughout most of California	Roost in buildings and large boulders where there is at least a 3 meter drop; found in a variety of habitats including, desert scrub, chaparral, oak woodland, ponderosa pine, and high elevation meadows of mixed conifer forests; forage in a variety of grassland, shrub, and wooded habitats, including riparian and urban areas, although most commonly in open, arid lands	Low. The study area provides suitable foraging habitat for this species and the old structure within the project site has a low flat roof and thus does not have enough space for the species to drop from the roost.
Nelson's antelope squirrel *(Ammospermophilus nelson)*	T/T	Found in Elk Hills and on the Carrizo and Elkhorn Plains in Kern County, and the Panoche and Kettleman Hills areas.	Habitat consists of dry flat or rolling terrain, on alluvial and loamy soils, soils with sandy or gravelly texture, or fine-grained soils that are nearly brick-hard when dry; grassy, sparsely shrubby ground (shrubs include saltbush, ephedra, bladder pod, goldenbush, snakeweed, etc.).	Low. The study area is north of the current known range for the species.
Giant kangaroo rat *(Dipodomys ingens)*	E/E	Endemic to areas within and near the San Joaquin Valley.	Dry, sandy grasslands.	None. The study area is outside of the known range of the species. No burrow colonies similar to those made by the species were observed during site surveys.
Fresno kangaroo rat *(Dipodomys nitratoides exilis)*	E/E	Endemic to areas within and near the San Joaquin Valley.	Arid, often strongly alkaline, flat plains with sparse vegetation of grasses or sometimes orache; Ponds that occur during wet season	Low. The species is only known from the flat valley floor, but may occur in grasslands areas south of the project site or in the offsite mitigation lands.

Common Name *(Scientific Name)*	Status (Federal/ State)	Geographic Distribution	Habitat Requirements	Likelihood of Occurrence in Study Area
San Joaquin kit fox *(Vulpes macrotis mutica)*	E/T	San Joaquin Valley floor from southern Kern County north to Tracy in San Joaquin County, and up into more gradual slopes of the surrounding foothills and adjoining valleys of the interior Coast Range	Alkali scrub/shrub and arid grasslands	High. The grassland/ruderal portions of the study area provide suitable habitat for the species. There are several records for kit fox within the vicinity of the study area, including observations of kit fox on the offsite mitigation lands.
American badger *(Taxidea taxus)*	–/SSC	Found throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties	Open, arid habitats but most commonly are associated with grasslands, savannas, and mountain meadows; require sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground	High. Suitable habitat occurs within the study area. Species has been documented within 10 miles of the project site. Potential badger claw marks observed around burrows during a December 2013 site visit.

Source: California Department of Fish and Wildlife 2013.

Federal:

T = Threatened.
E = Endangered.

State:

T = Threatened.
E = Endangered.
P = Protected (listing proposal being considered by CDFW).
SSC = Species of Special Concern.

Table 3.3-3. Special-Status Plant Species Occurring in Western Merced County and the Study Area

Common Name *(Scientific Name)*	Status (Federal/ State/CNPS)	Geographic Distribution	Habitat Requirements	Blooming Period	Likelihood of Occurrence in Study Area
Alkali milk-vetch *(Astragalus tener* var. *tener)*	–/–/1B.2	Alameda, Merced, Napa, Solano, and Yolo Counties	Alkali playa, valley and foothill grassland, vernal pools; below 200 feet	Mar–Jun	Low. Alkali vernal pool in the southwest corner of the project site may provide habitat for alkali milk-vetch, however potential for occurrence is low due to habitat quality.
Heartscale *(Atriplex cordulata)*	–/–/1B.2	Western Central Valley and valleys of adjacent foothills	Alkali grassland, alkali meadow, alkali scrub; below 660 feet	May–Oct	Low. Alkali vernal pool adjacent in the southwest corner of the project site may provide habitat for heartscale, however potential for occurrence is low due to habitat quality.
Lesser saltscale *(Atriplex minuscula)*	–/–/1B.1	San Joaquin Valley and the Livermore Valley; disjunct occurrences have been reported in Butte County and western Alameda County	Valley sink scrub and alkali grassland habitats on sandy, alkali soils, often on the margins of slickspots or alkaline rain pools	May–Oct	Low. Alkali vernal pool in the southwest corner of the project site may provide habitat for lesser saltscale, however potential for occurrence is low due to habitat quality.
Vernal pool smallscale *(Atriplex persistens)*	–/–/1B.2	Widely scattered occurrences in the Central Valley from Colusa County to Tulare County	Alkali vernal pools	Jun–Oct	Low. Alkali vernal pool in the southwest corner of the project site may provide habitat for vernal pool smallscale, however potential for occurrence is low due to habitat quality.
Round-leaved filaree *(California macrophyllum)*	–/–/1B.1	Scattered occurrences in the Central Valley, southern North Coast Ranges, San Francisco Bay Area, South Coast Ranges, Channel Islands, Transverse Ranges, and Peninsular Ranges	Grasslands and open, grassy areas in oak woodland	Mar–May	Low. Grasslands in the study area provide potential habitat for this species, however these habitats are highly fragmented, isolated, and disturbed and are not likely to support special-status plants.

Common Name *(Scientific Name)*	Status (Federal/ State/CNPS)	Geographic Distribution	Habitat Requirements	Blooming Period	Likelihood of Occurrence in Study Area
Lemmon's jewelflower *(Caulanthus lemmonii)*	–/–/1B.1	From the southeastern San Francisco Bay area south into the South Coast Ranges and adjacent San Joaquin Valley, from Alameda to Ventura Counties	Dry exposed slopes in grasslands and pinyon-juniper woodlands, generally between 260 and 4,000 feet above sea level	Mar–May	Low. Grasslands in the study area are potential habitat for this species, however these habitats are highly fragmented, isolated, and disturbed and are not likely to support special-status plants
Recurved larkspur *(Delphinium recurvatum)*	–/–/1B.2	Widespread in the Central Valley from Colusa to Kern Counties, although it has been extirpated from the Sacramento Valley	Chenopod scrub and grasslands on poorly drained, fine, alkaline soils	Mar–May	Low. Grasslands in the study area may provide habitat for this species, however these habitats are highly fragmented, isolated, and disturbed and are not likely to support special-status plants.
Coulter's goldfields *(Lasthenia glabrata* ssp. *coulteri)*	–/–/1B.1	Widely scattered locations throughout central and southern California, including the Central Valley	Alkaline soils in playas, vernal pools, and adjacent grasslands	Feb–Jun	Low. Alkali vernal pool in the southwest corner of the project site may provide habitat for Coulter's goldfields, however potential for occurrence is low due to habitat quality.
Shining navarretia *(Navarretia nigelliformis* ssp. *radians)*	–/–/1B.2	Throughout the South Coast Ranges, although additional occurrences are reported from the central San Joaquin Valley	Clay soils in grasslands and oak woodland, sometimes in association with drying depressions	Apr–Jun	Low. Grasslands in the study area provide potential habitat for this species, however these habitats are highly fragmented, isolated, and disturbed and are not likely to support special-status plants
Prostrate navarretia *(Navarretia prostrata)*	–/–/1B.1	Scattered locations in the San Francisco Bay Area, western San Joaquin Valley, Inner South Coast Ranges, coastal southern California, and the Peninsular Ranges	Vernal pools at elevations between 50 and 2,300 feet	Apr–Jul	Low. Alkali vernal pool in the southwest corner of the project site may provide potential habitat for prostrate navarretia, however potential for occurrence is low due to habitat quality.

Common Name *(Scientific Name)*	Status (Federal/ State/CNPS)	Geographic Distribution	Habitat Requirements	Blooming Period	Likelihood of Occurrence in Study Area
Rayless ragwort *(Senecio aronicoides)*	–/–/2.2	Scattered locations in the California Coast Ranges south of San Francisco Bay, the Transverse Ranges, southwest California (including Santa Cruz Island), and Baja California	Area with low vegetation cover in grassland and coastal scrub, on various substrates: clay, coarse sand, rock outcrops (including serpentinite), and soils with high gypsum content or high alkalinity	Mar–Jun	Possible. Rock outcrops at the project site provide potential habitat for this species.
Lost Hills crownscale *(Atriplex coronata var. vallicola)*	–/–/1B	Fresno, Kern, and San Luis Obispo counties	Dried beds of alkaline pools within scrub or annual grassland communities	May–Aug	None. Outside the range of the species.
Hispid bird's-beak *(Chloropyron molle ssp. hispidum)*	SSC/–/1B	Alameda, Kern, Merced, Placer, and Solano counties	Grows in saline or alkaline soils in vernal pools, meadows, sinks, inland playas, and valley and foothill grassland	Jun–Sep	None. Suitable habitats absent from the study area.
Delta button-celery *(Eryngium racemosum)*	–/E/1B	Calaveras, Contra Costa, Merced, San Joaquin, and Stanislaus counties	Freshwater Wetlands, wetland-riparian	Jun–Oct	None. Suitable habitats absent from the study area
Hall's bush mallow *(Malacothamnus hallii)*	–/–/1B.2	The northern Diablo Range in Contra Costa, Alameda, Santa Clara, Stanislaus, and Merced counties	Mixed northern chaparral and chamise chaparral, primarily in grassy openings associated with shrubs such as chamise, California sagebrush, bush monkey flower and poison oak	May–Sep	None. Suitable habitats absent from the study area

Common Name *(Scientific Name)*	Status (Federal/ State/CNPS)	Geographic Distribution	Habitat Requirements	Blooming Period	Likelihood of Occurrence in Study Area
Sanford's arrowhead *(Sagittaria sanfordii)*	–/–/1B.2	Sacramento County along the American River Parkway, and records exist for Butte, Del Norte, El Dorado, Fresno, Merced, Mariposa, Orange, Placer, Shasta, San Joaquin, Tehama, and Ventura Counties	Shallow, freshwater marshes and swamps	May–Oct	None. Suitable habitats absent from the study area
Arburua Ranch jewelflower *(Streptanthus insignis* ssp. *lyonii)*	–/–/1B.2	Merced and San Benito counties	Northern Coastal Scrub	Mar–May	None. Suitable habitats absent from the study area.
Slender-leaved pondweed *(Stuckenia filiformis* ssp. *alpina)*	–/–/2B.2	San Joaquin Valley, San Francisco Bay area, and the central high Sierra Nevada	Marshes and swamps (assorted shallow freshwater)	May–Jul	None. Suitable habitats absent from the study area.
Wright's trichocoronis *(Trichocoronis wrightii)*	–/–/2B.1	May be extirpated in the Central Valley	Meadows and seeps, marshes and swamps, riparian forest, and vernal pools	May–Sep	Low. Unlikely to occur in study area due to limited range. Possibly extirpated from California.

Source: California Department of Fish and Wildlife 2013.

Federal:

T = Threatened.
E = Endangered.

State:

T = Threatened.
E = Endangered.
SSC = Species of Special Concern.

California Native Plant Society (CNPS):

List 1A species = presumed extinct in California.
List 1B species = rare, threatened, or endangered in California and elsewhere.
List 2 species = rare, threatened, or endangered in California but more common elsewhere.

3.3.2 Environmental Effects

This section describes the methods and assumptions used to determine the direct and indirect effects of the proposed action on biological resources.

Approach and Methods

The methods of analysis of impacts on biological resources are based on professional standards and information cited throughout this section. The key effects were identified and evaluated based on the environmental setting and biological resources known to occur in the study area, and the expected magnitude, intensity, and duration of activities related to the proposed action.

Permanent impacts on biological resources were quantified using the estimated amount of land cover that would be converted as a result of construction of new facilities. Temporary effects on biological resources were quantified using the estimated amount of land cover that would be temporarily disturbed during project construction, but would be restored to preconstruction conditions within 1 year of disturbance. The discussion of impacts also reflects ongoing maintenance and monitoring at the offsite mitigation lands, including continued grazing and vegetation management.

Impacts on biological resources identified during surveys conducted within the project site were determined using geographic information system (GIS) software. The proposed action footprint and associated temporary impact areas were overlain on the habitats, wetland data, and other biological resource data mapped within the project site (e.g., trees, nests) to quantify the permanent and temporary impacts associated with the ground-disturbing activities.

Thresholds of Significance

An effect would be considered significant if the proposed action or alternative could lead to any of the conditions listed below.

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status in local or regional plans, policies, or regulations, or by the Service or CDFW.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marshes, vernal pools, coastal wetlands) through direct removal, filling, hydrological interruption, or other means.
- Substantially reduce the habitat of a common native terrestrial plant or wildlife species. For purposes of this analysis, an effect would be considered substantial if it would cause a common native terrestrial plant or wildlife population to drop below self-sustaining levels.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and there would be no impact on biological communities, special-status species, or waters of the United States as a result of proposed development and management activities in the study area. There would be no take of federally listed species as a result of the proposed action, and the offsite mitigation lands would not be set aside in perpetuity as habitat for the covered species. Agricultural uses—dry-land farming and grazing—would continue on the project site and offsite mitigation lands, although the potential for future development compatible with current land uses would continue to exist.

Proposed Action Alternative

Land Cover Conversion

Construction of the Proposed Action Alternative would disturb approximately 1,600 acres of land on the project site and result in permanent conversion of about 1,400 acres and temporary disturbance of about 200 acres (Table 3.3-4). Permanent land cover conversions would be associated with construction of the solar trackers, access roads, O&M building, substation, interconnection facilities, and battery storage area. The majority of the permanent land cover conversion (99.7%) would be of cropland (1,388 acres; Table 3.3-4). An additional 207 acres (primarily cropland), located in the 20-foot wide strips between the solar trackers and in the areas between the trackers and the proposed fence, would be temporarily disturbed during construction but revegetated once construction is complete.

Approximately 2,450 acres of grazed grasslands (Table 3.3-1) southeast of the project site would be preserved in perpetuity to offset the permanent loss of grassland land cover on the project site (i.e., the offsite mitigation lands). As described in Chapter 2, these lands would be permanently protected and enhanced for the benefit of native species, and have been identified as a key site that support the protection of a regional linkage for San Joaquin kit fox along the foothills of the Coast Range. Although construction of the Proposed Action Alternative would result in the loss of large areas of cropland, this impact would be less than significant because, from a biological resources perspective, the project site currently provides marginal foraging habitat for various bird and mammal species (for which better habitat is generally available in the vicinity); because the site will remain permeable to San Joaquin kit foxes, allowing them to move throughout the site; because habitat for the San Joaquin kit fox would be compensated at the offsite mitigation lands; and because avoidance and minimization measures and environmental commitments would be implemented to reduce species-specific impacts during construction and operation of the Proposed Action Alternative (as described below). This impact would, however, be more substantial than the No Action Alternative where all cropland, and other land cover types, would remain intact within the project site.

Impacts on Wetlands and Aquatic Habitats

Permanent land disturbance associated with preparation of the solar panel areas and construction of piers, foundations, and new roads would result in the permanent loss of approximately 0.003 acre of seasonal wetland, 0.05 acre of ponds, 0.01 acre of ditches, and 0.5 acre of ephemeral swale (Table 3.3-4). Temporary land disturbance associated with project grading and staging would result in an additional temporary disturbance of approximately 0.01 acre of seasonal wetland, 0.5 acre of ponds, 0.1 acre of ditch, and 0.2 acre of ephemeral swale (Table 3.3-4).

The Proposed Action Alternative would include implementation of EC-3, which requires the applicant to avoid disturbance of wetlands and other aquatic features to the extent practicable, and to obtain permits from the required regulatory agencies prior to construction where avoidance is not possible. As a result, impacts on wetland and aquatic features during construction of the Proposed Action Alternative would be less than significant, but greater than the No Action Alternative, where no disturbance would occur.

Table 3.3-4. Project Impacts on Biological Resources

Land Cover	Permanent Conversion	Temporary Disturbance
Upland Habitats		
Cropland	1,388	202
Annual Grassland	4.1	4
Rock Outcrops	0.3	0.03
Tree Stands	0	0
Subtotal	1,392	206
Aquatic Habitats		
Seasonal Wetland	0.003	0.012
Ponds	0.129	0.513
Ditches	0.013	0.099
Ephemeral Swale/Drainage	0.538	0.198
Subtotal	0.684	0.822
Total	1,393	207

San Joaquin Kit Fox

Construction-Related Impacts

The project site currently provides low quality denning habitat and may provide movement and foraging habitat for San Joaquin kit fox. Construction of the Proposed Action Alternative has the potential to adversely affect San Joaquin kit fox if individuals occupy dens within or adjacent to the project site, where construction activities could result in direct mortality and disruption in normal behavior. In addition, the Proposed Action Alternative would result in the permanent loss or degradation of about 1,200 acres of kit fox habitat, and may disrupt kit fox movement within and through the project site.

The conservation strategy described in Chapter 2, *Proposed Action and Alternatives*, outlines specific avoidance and minimization measures that would be implemented under the Proposed Action Alternative to reduce construction-related impacts on kit fox. As summarized in Table 2-1, where suitable kit fox habitat is present in and adjacent to proposed work areas, the applicant would conduct preconstruction surveys for dens according to Service protocols (U.S. Fish and Wildlife Service 2011b) and avoid or exclude known dens where possible. Exclusion zones would also be established around kit fox dens, as necessary; in cases where avoidance is not possible, limited destruction of dens may be allowed in coordination with the Service. Grading and construction activities would be conducted during daylight hours, when kit fox are less likely to move through the project site, and all construction pipes, culverts, or similar structures with a 4-inch or greater diameter that are stored onsite overnight would be closed to avoid trapping kit fox. Provisions for

covering and inspecting holes and trenches left overnight would be implemented and all materials staged on the project site would be spaced to provide areas suitable for kit fox to seek shelter. Finally, all employees and contractors would receive environmental awareness training prior to the commencement of construction activities to ensure they are aware of the avoidance and minimization measures prescribed for kit fox in the HCP.

As noted above, construction of the Proposed Action Alternative could also disrupt kit fox movement through the project site and would result in the loss or degradation of 1,200 acres of low quality denning, foraging and movement habitat. The solar facility would be located in an area approximately 2 miles wide, between the hills along the western boundary of the project site extending east toward I-5. Although the Proposed Action Alternative would retain some permeability for wildlife by retaining a 300-foot wide area of grassland within the transmission line corridor along the north-south boundary of the project site, impacts on species movement through this area would occur.

There are no studies of kit fox reactions to solar farms. However, San Joaquin kit fox typically avoid areas with dense trees, which the solar panels would resemble. As a result, kit fox may be reluctant to enter the project site and utilize the transmission corridor. This could cause kit foxes to travel around the solar site, expending more energy and/or directing them towards I-5, increasing the likelihood that an animal may try to cross the highway and be subsequently struck by a vehicle.

To better understand movement through and within the project site by kit foxes after the solar facility is constructed, the applicant would establish fixed camera monitoring stations along the perimeter fence and within the solar array. As described in Chapter 2, camera monitoring would occur continuously between February 15 and August 15 for 5 years after the solar infrastructure is installed and operational, and would be supplemented by scat detection dog surveys during Years 1, 3 and 5 following construction. The conservation strategy described in Chapter 2 also includes design, avoidance and minimization measures to reduce impacts on kit fox movement through the project site. Specifically, all perimeter fencing would be designed to leave a 4- to 8- inch opening between the fence mesh and ground to enable passage of kit fox and their prey, while impeding the passage of larger predators of kit fox, such as coyotes and large domestic dogs. Areas of the project site between the solar arrays would be left fallow and managed (e.g., grazed or mowed) to allow annual grassland species and prey species to recolonize the project site and to generally maintain wildlife corridors in a north-south direction. Exterior lighting installed in common areas would be low-intensity, focused, directional lights to reduce light spillage into adjacent open space and to minimize disturbances to kit fox. Artificial escape tunnels would be installed along the outside edge of the solar array, outside of the fencing and facing the 300-foot wide transmission corridor. In addition, the applicant would maintain all areas outside of footprint of the solar facility as managed grasslands. Approximately 2,450 acres of grazed grasslands southeast of the project site would be preserved in perpetuity to offset the loss of suitable habitat on the project site (i.e., the offsite mitigation lands). As described in Chapter 2, these lands include key parcels that protect habitat for the local Santa Nella satellite population, and linkage to and the core kit fox population in Panoche Valley, to the south.

Preservation and management of both onsite and offsite mitigation lands, in combination with the design criteria and conservation strategy identified above, would reduce construction-related impacts on kit fox to a less-than-significant level. As a result, significant impacts on the local population of kit fox, or the species rangewide, is not anticipated. Although these impacts would be greater than the No Action Alternative, where no construction-related impacts would occur, the

Proposed Action Alternative would provide permanent protection of 2,450 acres of land, a benefit that would not occur under the No Action Alternative.

Operations-Related Impacts

Operation and maintenance activities under the Proposed Action Alternative also have the potential to impact San Joaquin kit fox. Kit foxes could be struck by vehicles or equipment if they are moving through or foraging on the project site. They could also be attracted to prey displaced from O&M sites or to garbage left behind, and thus be exposed to an elevated potential for injury or mortality. The risk would be greatest when it is dark, when their movements are most likely to occur, although project-related vehicular traffic is expected to be minimal during this time. Kit foxes moving through or foraging near work areas during O&M activities could also be affected by noise, vibration, and lighting; such disturbance could disrupt kit fox movement through the project site.

The conservation strategy described in Chapter 2 outlines specific design criteria and avoidance and minimization measures that would be implemented under the Proposed Action Alternative to reduce operation-related impacts on kit fox. Speed limits within the project site would be limited to 10 miles per hour (mph) at night to reduce the potential for collisions with kit fox during their active period. Food related trash would be disposed of in closed containers and removed from the project site at least once daily. Use of rodenticides and pesticides would be prohibited on the project site, and the use of herbicides would be limited to areas where mowing is not possible (e.g., within fenced areas around buildings and beneath solar panels). To reduce impacts from maintenance and security lighting (which would be located at the switchyard, substation, entry and egress gates, and strategic locations around the facility), lighting would be shielded and directed downward to minimize the potential for glare or spillover onto adjacent lands. Lights would use amber colored lenses when possible and be shaded from producing upward escaping light. Lighting would be used from dusk to dawn and switched lights, only activated when workers are present, would be installed and left in the off position until needed or as code requires. Security lighting would be set up to use infrared or forward looking infrared (FLIR) technology. With implementation of the above design criteria and avoidance and minimization measures, operation-related impacts on kit fox under the Proposed Action Alternative would be less than significant. These impacts would, however, be greater than the No Action Alternative, where O&M activities on the project site would not occur.

Site Decommissioning Impacts

Decommissioning activities have the potential to result in impacts on the San Joaquin kit fox if individuals occur within the project site at that time. Impacts would primarily be associated with potential collisions with construction vehicles, or if burrows are excavated or otherwise collapse under heavy machinery while kit fox are inside. As described above, the conservation strategy under the Proposed Action Alternative includes species-specific avoidance and minimization measures that would be implemented during ground-disturbing activities to reduce the potential for kit fox in and adjacent to the project site to be disturbed, injured, or killed (see *Construction-Related Impacts* above). Implementation of these measures would reduce site decommissioning-related impacts to a less-than-significant level, and ensure the local and regional populations of kit fox are not significantly affected. These impacts would, however, be greater than the No Action Alternative, where site decommissioning would not occur.

Offsite Mitigation Lands Management Impacts

As described in Chapter 2, the conservation easement and Service-approved Habitat Management Plan for the offsite mitigation lands under the Proposed Action Alternative would require continuation of current land management practices which favor upland habitat for kit fox. Although some activities (e.g., use of mowing equipment) could result in the collapse or removal of burrows, potential impacts on kit fox dens are anticipated to be minimal. Equipment or vehicles used on the offsite mitigation lands also have the potential to result in kit fox injury or death, or otherwise alter their behavior such that they are forced into less-than-suitable habitat. However, because the use of equipment or vehicles would generally be infrequent and of short duration (limited to a monitoring effect or grassland enhancement projects), or associated with slow-moving grazing activities (cattle or sheep foraging), these impacts would be low. Overall, management of the offsite mitigation lands under the Proposed Action Alternative would benefit kit foxes by protecting and enhancing sites that provide a regional linkage to the foothills of the Coast Range in perpetuity. As a result, management actions at the offsite mitigation lands would have a beneficial impact on kit fox, an improvement compared to the No Action Alternative, where future land use of the area would remain uncertain.

California Tiger Salamander

Construction-Related Impacts

The Proposed Action Alternative would result in the permanent conversion of about 4.0 acres of annual grassland and temporary disturbance of another 4.0 acres of annual grassland on the project site (Table 3.3-4), which is within approximately 1.24 miles of potential California tiger salamander breeding habitat. All of the grassland habitat that would be affected, however, occur in small and isolated patches within the extensive cropland land cover type, and are unlikely to provide upland habitat for tiger salamanders in the study area. In addition, the alkali vernal pool in the southwest portion of the project site (Figure 3.3-1a) has been identified as potential habitat for California tiger salamanders. Although direct effects to this pool would not occur as a result of the Proposed Action Alternative (it is more than 500 feet from proposed ground-disturbing activities), construction activities may result in the injury or mortality of California tiger salamanders if they occupy or disperse through the project site or across access routes during construction. In addition, salamanders may experience harassment or harm when being moved from a construction zone to an area outside of the construction zone during implementation of the avoidance measures summarized below.

The conservation strategy described in Chapter 2 includes avoidance and minimization measures to reduce impacts on California tiger salamander during construction. As summarized in Table 2-1, the applicant will complete preconstruction surveys of all grassland areas for salamanders 24 hours prior to ground disturbance. If an occupied burrow is located (or if an individual is otherwise found onsite), the applicant would remove and relocate the individual(s) according to approved protocols and in consultation with the Service and CDFW. Ground-disturbing activities would generally be limited to dry weather. Work crews or the onsite biological monitor would inspect open trenches, pits, and under construction equipment and material left onsite in the morning and evening to look for amphibians that may have become trapped or are seeking refuge. No monofilament plastic would be used for erosion control, and tightly woven exclusion fencing would be used between the work area and potential habitat to prevent California tiger salamanders from entering the work area.

Finally, the applicant would maintain all areas outside of footprint of the solar facility as managed grasslands and would conserve and enhance approximately 2,450 acres of grazed grasslands southeast of the project site in perpetuity (i.e., the offsite mitigation lands). These lands would provide movement and aestivation habitat for salamanders and, in combination with the conservation strategy identified above, would reduce construction-related impacts on California tiger salamander to a less-than-significant level. Significant impacts on the local population of salamanders, or the species rangewide, are not anticipated. Although these impacts would be greater than the No Action Alternative, where construction-related impacts would not occur, the Proposed Action Alternative would provide permanent protection of 2,450 acres of land, a benefit that would not occur under the No Action Alternative.

Operations-Related Impacts

O&M activities have the potential to affect California tiger salamanders if they occupy the project site after temporarily affected areas are restored. Maintenance vehicles could drive over salamanders during periods when they are active on the surface, which would generally be during fall/winter and spring evenings when there are rain events or the humidity is relatively high. Other maintenance activities that result in the removal or collapse of small mammal burrows have potential to entomb salamanders. In addition, perimeter fencing could preclude dispersal of salamanders through the site, and periodic washing of the solar panels could result in surface runoff which would change the hydrology or chemistry of the offsite alkali seasonal wetland which may provide habitat for California tiger salamander.

The amount of water used for solar panel washing (about 500,000 gallons of water per washing event) is not anticipated to affect the hydrology or chemistry of the offsite alkali seasonal wetland because the wetland is more than 500 feet from the solar panels, and a hydrologic conduit (e.g., connected ephemeral or intermittent drainage) is not present. The conservation strategy for the Proposed Action Alternative also includes design criteria and avoidance and minimization measures to reduce operation-related impacts on California tiger salamander. As summarized in Chapter 2, all O&M activity would terminate 30 minutes before sunset and would not resume until 30 minutes after sunrise during the migration/active season of salamanders (November 1 to June 15). Mowers would be set to a height no lower than 8 inches, and mowing would not occur when ambient air temperature (measured 1 centimeter [cm] above the ground) is above 75 degrees Fahrenheit to reduce the risk that California tiger salamanders are moving above ground. In addition, a 4-inch gap below the bottom of the perimeter fence would be provided to allow salamanders to pass through the project site. Finally, the use of rodenticides and pesticides would be prohibited on the project site, and herbicide applications would be limited to areas where mowing is not possible.

With implementation of the above design criteria and avoidance and minimization measures, operations-related impacts on California tiger salamander under the Proposed Action Alternative would be less than significant. Significant impacts on the local population of salamanders, or the species rangewide, are not anticipated. These impacts would, however, be greater than the No Action Alternative, where O&M activities on the project site would not occur.

Decommissioning Impacts

Decommissioning activities have the potential to result in injury or mortality of California tiger salamander if individuals occupy the project site at the time of decommissioning. As described above, the conservation strategy under the Proposed Action Alternative includes species-specific avoidance and minimization measures that would be implemented during ground-disturbing

activities to reduce impacts on salamanders (see *Construction-Related Impacts* above). Implementation of these measures would reduce site decommissioning-related impacts to less than significant, and would not result in a significant impact on the local or rangewide populations. These impacts would, however, be greater than the No Action Alternative, where the proposed action would not occur and site decommissioning would not be necessary.

Offsite Mitigation Lands Management Impacts

As described in Chapter 2, the conservation easement and Service-approved Habitat Management Plan for the offsite mitigation lands under the Proposed Action Alternative would require continuation of current land management practices which favor upland habitat for California tiger salamander. Some activities, such as the use of mowing equipment or livestock grazing, could directly affect salamanders if their burrows are collapsed or removed, or if they are crushed or injured by equipment, vehicles or livestock. Salamander movement to and from aquatic and upland habitat could also be disrupted by management activities, particularly if those activities occur during wet weather.

Because equipment and vehicle access to the mitigation lands would generally be infrequent and of short duration (limited to a monitoring effect or grassland enhancement projects), or associated with slow-moving grazing activities (cattle or sheep foraging), these impacts would be low. In addition, it is not anticipated that equipment would be used during or immediately after heavy rain events (i.e., when tiger salamanders are most likely to be moving overland) because dirt roads would become unusable. Overall, management of the offsite mitigation lands under the Proposed Action Alternative would benefit California tiger salamander by protecting in perpetuity 2,450 acres of movement and aestivation habitat. As a result, management actions at the offsite mitigation lands would have a beneficial impact on California tiger salamander, an improvement compared to the No Action Alternative, where future land use of the area would remain uncertain.

Blunt-Nosed Leopard Lizard

Construction-Related Impacts

Currently, the project site provides poor quality habitat for blunt-nosed leopard lizard due to the frequent disking activities in cropland and the density of the vegetation within the patches of grasslands. As such, blunt-nosed leopard lizard is not expected to occur within the project site and would not be affected by the construction of the Proposed Action Alternative. This impact is similar to the No Action Alternative.

Operations-Related Impacts

Over the life of the solar facility, areas within the solar arrays may become suitable for blunt-nosed leopard lizard because of the discontinuation of farming, maintenance of low-growing vegetation, and a potential increase in the number of small mammals occupying these areas and providing additional refuge habitat. If habitat conditions improve and blunt-nosed leopard lizards occupy the project site, maintenance activities that require ground disturbance and vehicle use could result in injury or mortality of blunt-nosed leopard lizards occurring there.

The conservation strategy described in Chapter 2 includes avoidance and minimization measures to reduce operations-related impacts on blunt-nosed leopard lizard. Specifically, mowers would be set to a height no lower than 8 inches, and any mowing that occurs onsite between April 1 and

September 30 would be constrained to the middle part of the day when ambient air temperatures are warm enough to ensure reptiles and amphibians are able to move out of harm's way. The use of rodenticides and pesticides would be prohibited within the project site, and herbicide applications would be limited to areas where mowing is not possible. In addition, the applicant would manage all areas outside of the footprint of the solar facility as wildlife habitat, and would conserve approximately 2,450 acres of grazed grasslands southeast of the project site in perpetuity (i.e., the offsite mitigation lands). These lands would provide breeding and movement habitat for blunt-nosed leopard lizard and, in combination with the conservation strategy identified above, would reduce operations-related impacts to the lizard to a less-than-significant level. Significant impacts on the local population of blunt-nosed leopard lizard, or the species rangewide, is not anticipated.

Decommissioning-Related Impacts

Decommissioning activities have the potential to result in injury or mortality of blunt-nosed leopard lizard if individuals occupy the project site at the time of decommissioning. As described in Chapter 2, the conservation strategy under the Proposed Action Alternative includes avoidance and minimization measures that would be implemented during decommissioning to reduce impacts on lizards during ground disturbance. Specifically, the applicant would be required conduct preconstruction surveys of suitable blunt-nosed leopard lizard habitat prior to ground disturbance, and remove and relocate individuals in accordance with a Service-approved relocation plan and in consultation with the Service and CDFW. Work crews or the onsite biological monitor would inspect open trenches, pits, and under construction equipment and material left onsite in the morning and evening to look for amphibians that may have become trapped or are seeking refuge. All employees and contractors would receive environmental awareness training prior to the commencement of decommissioning activities, and no monofilament plastic would be used for erosion control.

Implementation of these measures would reduce site decommissioning-related impacts on blunt-nosed leopard lizard to a less-than-significant level, and significant impacts on the local or rangewide populations would not be anticipated. These impacts would, however, be greater than the No Action Alternative, where the proposed action would not occur and site decommissioning would not be necessary.

Special Status Invertebrates

Construction-Related Impacts

An alkali vernal pool is located in the southwest portion of the project site, more than 500 feet away from the proposed disturbance footprint for the solar array (Figure 3.3-1a). This vernal pool may provide habitat for special-status species invertebrates (i.e., conservancy fairy shrimp, longhorn fairy shrimp, California linderiella, and vernal pool tadpole shrimp), although the habitat is generally considered marginal. Implementation of EC-9, which requires the preparation of a stormwater pollution prevention plan (SWPPP) and implementation of construction best management practices (BMP) would ensure that any construction-related indirect effects on this vernal pool (such as sediment runoff) are avoided, As a result, construction-related impacts on special-status invertebrates under the Proposed Action Alternative are not anticipated. This impact is the same as under the No Action Alternative.

Construction activities have the potential to adversely affect valley elderberry longhorn beetle if the elderberry shrub on the project site is removed or otherwise damaged. Implementation of Mitigation Measure BIO-1, which requires a buffer be established around the elderberry shrub

(among other measures), would reduce this impact to a less-than-significant level. This impact would be slightly greater than the No Action Alternative, where no construction activities in the vicinity of the elderberry shrub would occur.

Mitigation Measure BIO-1: Protect elderberry shrub

The following measures will be implemented prior to and during construction to ensure that the construction activities would not have a significant impact on valley elderberry longhorn beetle.

- Avoid removal of the elderberry shrub on the project site.
- Orange construction barrier fencing will be placed along a perimeter 100 feet from the elderberry shrub. No construction activities will be permitted within the buffer zone other than those activities necessary to erect the fencing. As specified in Conservation Guidelines for the Valley Elderberry Longhorn Beetle (U.S. Fish and Wildlife Service 1999), signs will be posted every 50 feet along the perimeter of the buffer area fencing. The signs will contain the following information: *This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.* The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.
- Buffer area fences around the shrub will be inspected weekly by a qualified biological monitor during ground-disturbing activities and monthly after ground-disturbing activities until construction is complete or until the fences are removed, as approved by the biological monitor. The biological monitor will be responsible for ensuring that the contractor maintains the buffer area fences around elderberry shrub throughout construction. Biological inspection report will be provided to the Service and the County.

Once the solar park has been constructed, the applicant will incorporate protections for the elderberry shrub into its operations and management plan, or equivalent, developed for the project site. The developer will provide onsite staff with a map identifying the location of the shrub and written guidance describing the protections for avoiding and minimizing impacts on the shrub. This guidance shall include, but is not limited to, the following.

- No insecticides, herbicides, fertilizers, or other chemicals that might harm the shrub or valley elderberry longhorn beetle will be used within 100 feet of the elderberry shrub.
- Mowing or weed trimming of grasses around the shrub may occur from July through April to reduce fire hazard. No mowing or trimming will occur within 5 feet of the dripline of the elderberry shrub.

Operations-Related Impacts

Periodic solar panel washing under the Proposed Action Alternative would use approximately 1,500,000 gallons of water per year (500,000 gallons per panel washing event, which would occur three times a year). Considering that there would be about 1,400 acres of land equipped with solar panels under this alternative, each washing event using 500,000 gallons of water would result in the application of approximately 360 gallons of water per acre. This amount of water applied over this area would not result in surface runoff or contributions to groundwater and would not affect the hydrology of the offsite alkali seasonal wetland (i.e., habitat for special-status species invertebrates). Therefore, there would be no operations-related impacts on special-status invertebrates under the

Proposed Action Alternative. This impact would be the same as the No Action Alternative. Vegetation management during the life of the Proposed Action Alternative could result in impacts on valley elderberry longhorn beetle if the elderberry shrub onsite were removed or impacted. Implementation of Mitigation Measure BIO-1 would ensure the elderberry shrub is not disturbed, and reduce this impact to a less-than-significant level.

Decommissioning-Related Impacts

Similar to initial site construction activities, decommissioning, which would include the removal of infrastructure and site reclamation, could remove or damage the existing elderberry shrub on the project site. Implementation of Mitigation Measure BIO-1 would ensure that decommissioning activities avoid the shrub and potential impacts to valley elderberry longhorn beetle. This impact would be less than significant, but greater than the No Action Alternative, where decommissioning would not occur.

Special Status and Migratory Birds

Construction-Related Impacts

The construction of the Proposed Action Alternative would permanently remove approximately 1,392 acres of foraging habitat (annual grassland and cropland; Table 3.3-4) and temporarily disturb an additional 206 acres of foraging habitat for several special-status and migratory birds, including Swainson's hawk, cackling goose, golden eagle, ferruginous hawk, northern harrier, white-tailed kite, merlin, prairie falcon, loggerhead shrike, California horned lark, tricolored blackbird, and yellow-headed blackbird (Table 3.3-2). The affected patches of annual grassland (4 acres permanently affected and 4 acres temporarily affected) within the project site, and the two medium sized trees that would be removed during construction, could also provide nesting habitat for several bird species. In addition, ground-disturbing activities and activities that generate loud noises have the potential to disrupt nesting in the project site and adjacent areas.

Compensation for the permanent loss of cropland and grassland habitat would be provided on the offsite mitigation lands, where 2,450 acres of annual grasslands would be preserved in perpetuity and managed as habitat for foraging and/or nesting birds (among other species). In addition, EC-4 would be implemented to avoid and minimize impacts on nesting birds during construction. This environmental commitment, in combination with preservation of offsite mitigation lands, would construction-related impacts to special-status bird species under the Proposed Action Alternative to a less-than-significant level. Although these impacts would be greater than the No Action Alternative, where no construction-related impacts would not occur, the permanent protection of 2,450 acres of land is considered a beneficial impact that would not occur under the No Action Alternative.

Operations-Related Impacts

The addition of up to 500 feet of new transmission line between the substation and PG&E generation facilities and the addition of 1.5 miles of aboveground, medium voltage collection system lines across the project site under the Proposed Action Alternative has the potential to adversely affect special-status bird species. These new lines represent a collision hazard for birds, especially during periods of low visibility, and an electrocution hazard for large raptors.

Implementation of EC-5, which requires all transmission towers, poles, and lines be designed and constructed in accordance with the guidelines in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee 2006), or the most current version of the guidelines available at the time of construction, and *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (Avian Power Line Interaction Committee 2012), would reduce this impact to less than significant. EC-5 is consistent with standard measures used to minimize collision and electrocution hazards of migratory birds from transmission lines, and would be coordinated with the Service, Division of Migratory Bird Management, to ensure compliance with the Migratory Bird Treaty Act. This impact would be greater than the No Action Alternative, however, where no aboveground transmission lines or towers would be constructed.

The proposed solar arrays also have the potential to attract migratory waterfowl and shorebirds that could mistake the grouped panels for a body of water. The attraction of waterfowl to the project site could result in mortality from the collision with panels, fences, and transmission lines and by attracting water birds that are dependent on water for taking flight (e.g., grebes). The use of anti-reflecting coating to reduce reflection from the solar panels, as described in Chapter 2, may reduce this impact. In addition, as provided in Mitigation Measure BIO-2, the applicant would develop an Avian Protection Plan (APP) prior to implementation of the Proposed Action Alternative to monitor avian mortality and injury from collisions with proposed solar infrastructure. Monitoring results may inform design and operational measures over the life of the proposed action. This impact would be less-than-significant after mitigation.

Mitigation Measure BIO-2: Prepare an Avian Protection Plan

The developer shall implement an Avian Protection Plan (APP) for the proposed solar facility, subject to approval by the Service, Migratory Bird Division, CDFW, and the County. The APP shall include monitoring and reporting requirements for avian species during construction and for two years following construction to document avian use of the project site and any mortality or injury that occurs as a result. Monitoring will occur at an increased frequency during periods of migration. All mortality events will be reported to the Service and CDFW and may be used to inform design and operational measures over the life of the project to reduce avian mortality.

Special Status Plants

Construction-Related Impacts

Almost all ground-disturbing activities on the project site would be within the cropland land cover type. Small remnant patches of grassland (8 acres total) and rock outcrop (0.33 acre total) present within cropland areas would be permanently converted or temporarily disturbed, which could adversely affect special-status plants occurring in those habitats. However, these habitat remnants are highly fragmented, isolated, and disturbed and are not likely to support special-status plants. Therefore, the Proposed Action Alternative would have no substantial adverse effects on special-status plants, and the impact would be less than significant. This impact would be similar to the No Action Alternative.

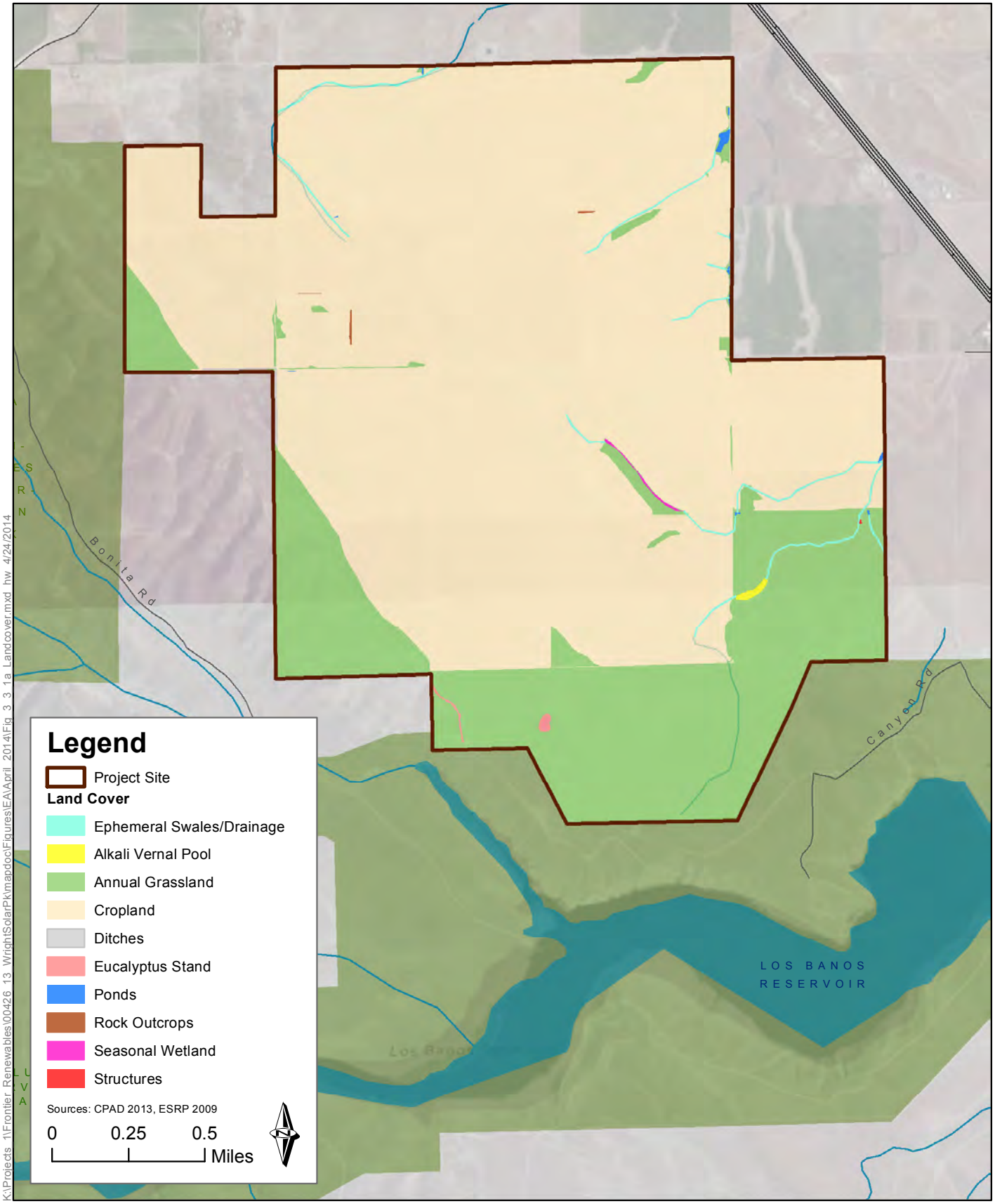

Figure 3.3-1a
Land Cover in Permit Area

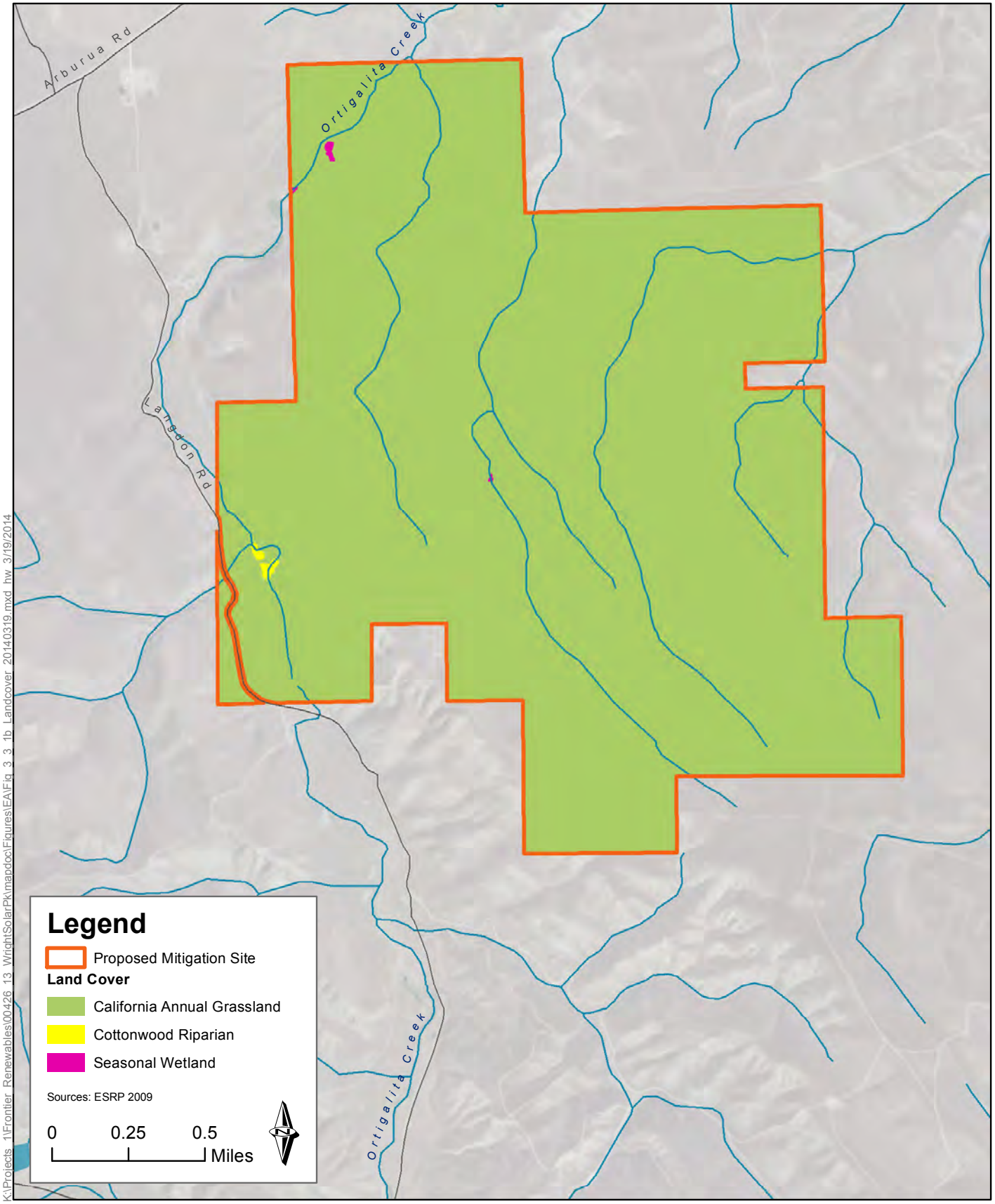

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Figure 3.3-1b
Land Cover in Permit Area

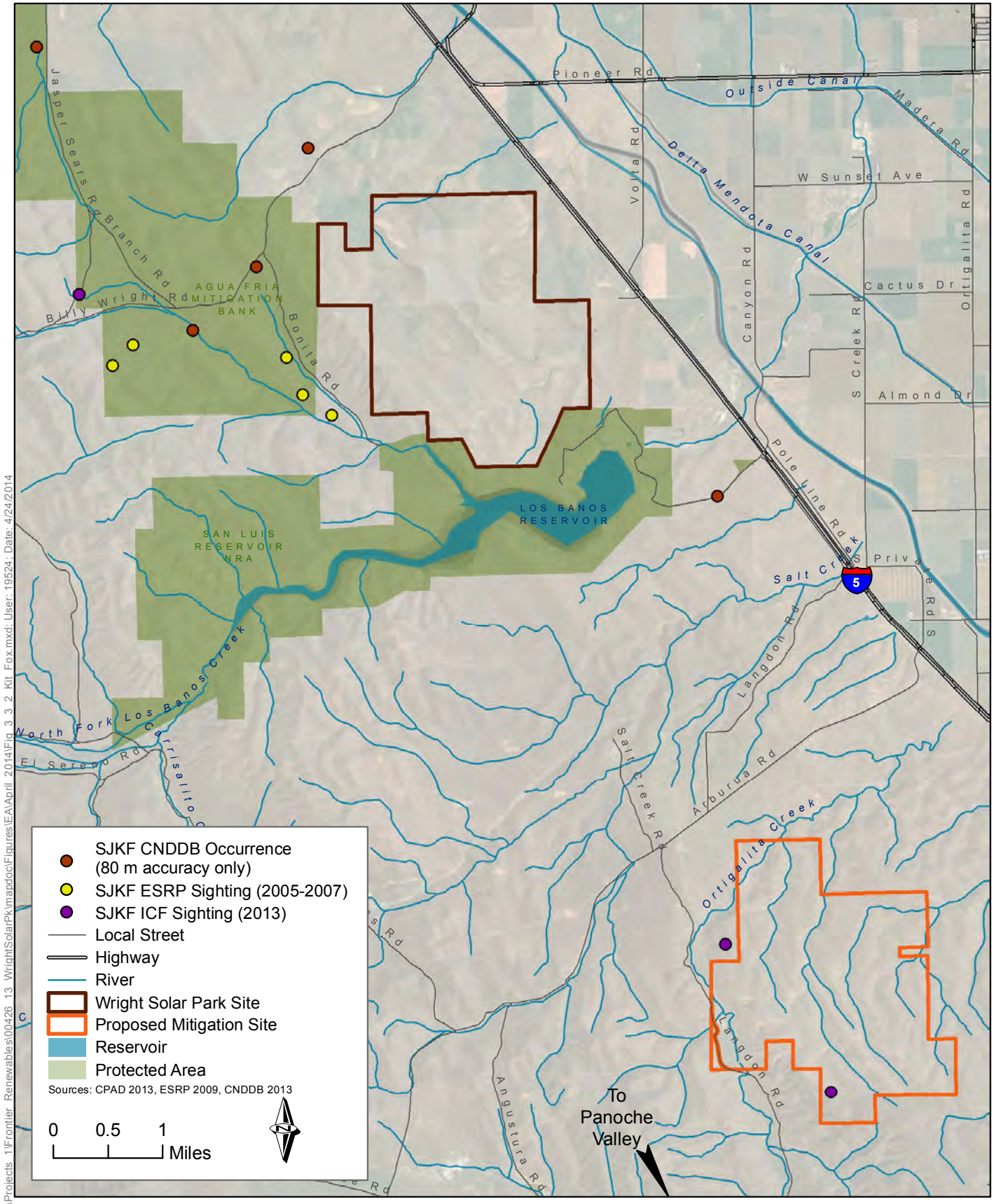

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Figure 3.3-2
San Joaquin Kit Fox Sightings

3.4 Cultural Resources

This section summarizes the affected environment—the environmental and regulatory setting for cultural resources, and describes historic and archaeological resources known to the area of proposed ground disturbance. It also describes potential environmental consequences on cultural resources that would result from implementation of the proposed action and identifies mitigation for significant impacts, as necessary.

For the purposes of this section, the study area is concurrent with the boundaries of the project site and offsite mitigation lands.

3.4.1 Affected Environment

Regulatory Setting

Federal

National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) of 1966 and its implementing regulations (36 Code of Federal Regulations [CFR] 800) requires federal agencies to consider the effects of their actions, including actions they fund or permit, on properties that are determined eligible for listing or are listed in the National Register of Historic Places (NRHP), and to offer the Advisory Council on Historic Preservation (ACHP) and other interested parties an opportunity to comment on federal actions. The potential issuance of an incidental take permit (ITP) by the Service is considered a federal action and therefore subject to compliance with Section 106 of the NHPA.

The Section 106 review process consists of five steps.

1. Initiate the Section 106 process by establishing the undertaking, developing a plan for public involvement, and identifying other consulting parties.
2. Identify historic properties in the Area of Potential Effects (APE).
3. Assess adverse effects.
4. Resolve adverse effects.
5. Implement the proposed action according to a memorandum of agreement or without a memorandum of agreement, if no agreement is necessary.

To determine whether an undertaking could affect NRHP-eligible properties, cultural resources (including archaeological, historical, architectural, and traditional cultural properties) must be inventoried and evaluated for the NRHP. To be listed in the NRHP, a property must be at least 50 years old (or be of exceptional historic significance if less than 50 years old) and meet one or more of the NRHP criteria. To qualify for listing, an historic property must represent a significant theme or pattern in history, architecture, archaeology, engineering, or culture at the local, state, or national level. It must meet one or more of the four criteria listed below and have sufficient integrity to convey its historic significance. The criteria for evaluating the eligibility of a historic property for listing in the NRHP are defined in 36 CFR Section 60.4 as follows.

- Criterion A – Association with events that have made a significant contribution to the broad patterns of our history.
- Criterion B – Association with the lives of persons significant to our past.
- Criterion C – Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.
- Criterion D – Resources that have yielded, or may be likely to yield, information important to history or prehistory.

In addition to meeting the significance criteria, a significant historic property must possess integrity to be considered eligible for listing in the NRHP. *Integrity* refers to a property's ability to convey its historic significance. Integrity is a quality that applies to historical resources in seven specific ways: location, design, setting, materials, workmanship, feeling, and association. To be considered a significant historic property, a resource must possess two, and usually has more, of these kinds of integrity, depending on the context and the reasons why the property is significant.

Section 106 regulations define an adverse effect as an effect that alters, directly or indirectly, the qualities that make a resource eligible for listing in the NRHP (36 CFR Part 800.5[a][1]). Consideration must be given to the property's location, design, setting, materials, workmanship, feeling, and association, to the extent that these qualities contribute to the integrity and significance of the resource. Adverse effects may be direct and reasonably foreseeable, or may be more remote in time or distance (36 CFR Part 8010.5[a][1]). Examples of adverse effects are listed below.

- Physical destruction of or damage to all or part of the property.
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the *Secretary's Standards for the Treatment of Historic Properties* and applicable guidelines.
- Removal of the property from its historic location.
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance.
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features.
- Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to a Native American tribe or Native Hawaiian organization.
- Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

State

Human Remains

Section 7050.5 of the California Health and Safety Code (CHSC) states the following in regard to the discovery of human remains.

(a) Every person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor, except as provided in Section 5097.99 of the [California Public Resources Code (PRC)]. The provisions of this subdivision shall not apply to any person carrying out an agreement developed pursuant to subdivision (l) of Section 5097.94 of the [PRC] or to any person authorized to implement Section 5097.98 of the [PRC].

(b) In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the [California] Government Code [CGC], that the remains are not subject to the provisions of Section 27491 of the [CGC] or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the [PRC]. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains.

(c) If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the [Native American Heritage Commission (NAHC)] (CHSC Section 7050.5).

Of particular note to cultural resources is subsection (c), requiring the coroner to contact the NAHC within 24 hours if discovered human remains are determined to be Native American in origin. After notification, NAHC will follow the procedures outlined in PRC Section 5097.98, which include notification of most likely descendants (MLDs), if possible, and recommendations for treatment of the remains. The MLD will have 24 hours after notification by the NAHC to make their recommendation (PRC Section 5097.98). In addition, knowing or willful possession of Native American human remains or artifacts taken from a grave or cairn is a felony under State law (PRC Section 5097.99).

Environmental Setting

A brief overview of the cultural resources environmental setting is provided below. Additional detail is available in the cultural resources technical report prepared for the proposed action by ECORP Consulting, Inc. (ECORP) (Westwood et al. 2013).

Pre-Contact Setting

Archaeological data to date indicates that humans have occupied the San Joaquin Valley (Valley) since at least 11,500 years before present (BP). Early inhabitants of the area practiced a mobile hunter-gatherer lifestyle that focused on big-game. Archaeological sites associated with these initial inhabitants consist mainly of large stone basally thinned and fluted projectile points and butchered large mammal bone. Material from these early sites indicates that occupational sequences were brief and associated with small groups of people. This big-game hunting model appears to have persisted until approximately 8,550 BP, at which point plant resources became a greater component of the diet and regional trade networks became increasingly complex and wide-ranging (Rosenthal et al. 2007:151).

The Archaic Period is the term used for the period of human occupation in California following the big-game hunting-focused model discussed above. Spanning from approximately 8,550 BP to 1,000 BP, the Archaic Period is characterized by a more sedentary lifestyle, use of plants in the diet, medium and small game hunting, and complexity and extent of trade networks. The shift to greater plant use is evident by the substantial increase and widespread appearance of groundstone tools, such as manos and metates—these implements were used to process seeds, especially acorns, for consumption (Rosenthal et al. 2007:151–157; Moratto 2004:185–207).

Typically larger and with longer occupational sequences when compared to their predecessors, Lower (8,550–5,550 BP) and Middle (5,550–2,550 BP) Archaic sites in the Valley are typically located along valley floor rivers, and contain trade goods, specialized tools, and food items (plants and animal remains) representing year-round collection and hunting. A high degree of regional morphological variability is seen in projectile points from Lower and Middle Archaic sites, with local source material emphasized, but some exotic obsidian also used. Mortuary practices become increasingly developed during these periods; extended burials are by far the most common type during these periods, and grave goods are also increasingly common (Rosenthal et al. 2007:151–155; Moratto 2004:185–207; Chartkoff and Chartkoff 1984:74–97).

The archaeological record from the Valley dating to the Upper Archaic (2,550–1,000 BP) becomes much more complex than that of earlier periods. The Upper Archaic was a period of continual specialization in subsistence practices, stemming from adaptations to local environments and those resources available therein. During the period, trade networks expanded and became more complex, evident from the widespread appearance of distinct shell bead types, acquired from coastal peoples, throughout the Valley. Also, well-made artifacts, such as beads and charmstones, indicate that social stratification and craft specialization were increasing during the period (Rosenthal et al. 2007:155–157; Moratto 2004:185–207).

A large number of archaeological sites are known within the Central Valley which date from approximately 1,000 BP to Euro-American contact. A major development of the period was the introduction of the bow and arrow, replacing the atlatl and dart, sometime between 1,100 BP and 800 BP. Small residential sites along streams and rivers became abundant, as did continued diversification in subsistence practices. Acorns and seeds were a staple, supplemented by a large variety of terrestrial mammals, waterfowl, fishes, berries, among other foods. As expected with the transition to the arrow, projectile point forms from this period are smaller than earlier types, and are made from a wide range of stone types, and commonly from exotic obsidian (Rosenthal et al. 2007:157–159; Moratto 2004:192–193, 211–214).

Ethnographic Setting

The Northern Valley Yokuts occupied the study area and vicinity during ethnographic times. The Northern Valley Yokut territory extended throughout the Central Valley from the confluence of the San Joaquin, Old, and Mokelumne Rivers in the north, to the large westward bend in the San Joaquin River in the south. The ethnographic record for these people is limited due to the rapid and dramatic reduction in population from post-European contact disease, missionization, and conflict with Euro-American settlers (Wallace 1978:462–463; Shipley 1978:81–84; Kroeber 1976:474–476,484–486). No known ethnographic settlements are located in or near the study area (Wallace 1978:462–468; Kroeber 1976:474–476, 484–486, 492–493, 496–497, 521–533).

The Northern Valley Yokuts, along with the Southern Valley Yokuts and Foothills Yokuts, were Penutian Stock-speaking groups inhabiting the majority of Central California at the time of Euro-

American contact. Estimates place the Yokut arrival in Central California to within the last 1,500 years, at earliest (Moratto 2004:557). At Euro-American contact, the Northern Valley Yokuts had established a network of villages on mounds in the Sacramento–San Joaquin River Delta, and along the banks of drainages. Settlements consisted of small, round, wood-framed houses, topped by tule thatch roofs; sweathouses and ceremony structures were also components of many villages. Social organization was based on the family and marriage practices were matrilocal and often included polygamy. Political organization was based on the tribelet of approximately 300 people each, and chiefs gained their position through a combination of wealth and inheritance. Though mostly sedentary, the Northern Valley Yokuts would make hunting and gathering expeditions at various times of the year to exploit seasonally available resources. Fish, especially King salmon but also other species, and acorns were the principal sources of food. However, the subsistence regime was very diverse, also including waterfowl, tule elk, pronghorn antelope, seeds, and berries, among other resources. The principle items in the Northern Valley Yokut toolkit were the bow and arrow, tule rafts, baskets, pottery, mortars and pestles, and a variety of flaked-stone projectile points and tools.

The Spanish arrival on the coast in 1769 began a period of sustained contact, though initially fairly minimal, between the Northern Valley Yokuts and Euro-Americans. Possibly the earliest European expedition in the Valley was that of José Canizares, in 1776. The majority of Yokuts managed to avoid Spanish missionization, but Euro-American-introduced epidemics decimated the population, including an 1833 epidemic (probably malaria) that raged through the Valley and is thought to have killed upwards of 75% of the Native population. After gold was discovered in 1848 in present-day Coloma, to the north, the massive influx of miners and other settlers led to the virtual destruction of the Northern Valley Yokut culture (Wallace 1978:468–469; Cook 1978:91–92; Castillo 1978:99–109).

Historic Setting

Juan Rodriguez Cabrillo, sailing for Spain, is thought to have been the first European to have visited California when he landed in San Diego in 1542. Other than scattered coastal landings, European contact with Native Americans was rare until the latter part of the eighteenth century. Setting off from San Diego in 1769, a Spanish expedition led by Gaspar de Portolá travelled the California coast to as far north as Monterey. This led to the Spanish establishing Catholic missions throughout California, though none in the Central Valley. The purpose of the missions was to convert Native peoples and firmly impose Spanish control over the region (Castillo 1978:99–104; Starr 2005:22–23, 32–37).

After gaining its independence from Spain in 1821, Mexico assumed control over California. Throughout the 1830s, Mexico closed the missions and sold former mission lands and previously unoccupied (by Euro-Americans) lands to Mexicans for cattle ranching. This led to further displacement of Native Americans throughout the region (Starr 2005:49–50; Castillo 1978:105).

The 1826–1827 fur-trapping expedition led by Jedediah Smith brought the earliest Anglo-Americans to the Central Valley. Another notable expedition into the area was that of United States Army General John C. Fremont, passing through the Valley in 1844. In 1848, the Treaty of Guadalupe ended the Mexican-American War, and transferred ownership of California from Mexico to the United States. Gold was discovered in Northern California the same year and brought a flood of hopeful miners and other settlers. Farming and cattle ranching quickly increased throughout the Valley in order to fulfill the needs of these new settlers (Starr 2005:57, 74, 78–83).

Merced County was established in 1855 after the division of Mariposa County into 10 separate counties (Parker 1881:86). In 1870, construction of the Stockton and Visalia Division of the Central Pacific Railroad began, branching off from Lathrop and running through the center of Merced County. The railroad line went through the city of Merced, which quickly grew and became the County seat the same year as the railroad's installation. The city centered around agricultural activities and cattle ranching. As early as the 1860s, irrigation projects had been carried out to supply the arid area with water from the region's drainages; wheat, fruits, nuts, and alfalfa were among the most important crops grown in the area (Parker 1881:86, 98, 170–180). Much more extensive and reliable irrigation systems came in the mid-twentieth century with the Central Valley Project (CVP) and the State Water Project (SWP). The California Aqueduct flows in the project vicinity to the east (Kahrl 1978:21, 25, 46–57).

Cultural Resources within the Area of Potential Effects

The effort to identify cultural resources in the APE included a records search of previous cultural resource investigations and recorded sites; background research and a review of literature relevant to the prehistory, ethnography, and history of the vicinity; site visits and pedestrian surveys of the project site; and consultation with Native American representatives. For the purposes of this analysis, the APE is defined as the maximum possible area of direct impact resulting from the proposed action, including all areas that would be subject to ground disturbance. The area is conservatively assumed to encompass 1,600 acres within the project site, where proposed infrastructure may be installed and where temporary ground disturbance may occur during construction (Figure 2-1). The APE does not include portions of the offsite mitigation area because ground disturbance is not proposed.

Records Search and Archival Research

In July 2013, ECORP requested a records search from the California Historical Resources Information System (CHRIS) Central California Information Center (CCIC) for the project site and vicinity (within 0.5 mile). The purpose of the records search was to determine the extent of previous cultural resources studies and location of previously recorded historical resources within the search area.

ECORP also conducted focused archival research on the two historic resources (WSP-001 and WSP-002) identified during the field survey (see below). Because these two resources are power transmission lines owned and operated by PG&E, ECORP requested construction details of and historical information on the resources from PG&E's environmental management. ECORP also researched online repositories for transmission line history, historical aerial imagery, and historical topographic maps (Westwood et al. 2013).

Fieldwork

In 2013, ECORP conducted an intensive pedestrian survey of the entire project site. The ground surface was examined for evidence of cultural deposits, and the general morphological characteristics of the ground surface were inspected for indications of subsurface deposits that may be manifested on the surface, such as circular depressions and ditches. All cultural resources encountered during the survey were recorded using California Department of Parks and Recreation (DPR) 523-series forms approved by SHPO. Resources were photographed, mapped using a handheld survey grade global positioning system (GPS) receiver, and sketched as necessary.

Although the project site has been cultivated during dry-land farming, that activity would not necessarily expose buried archeological materials that may be on the site. Any materials in place below the level of discing or other cultivation would remain undisturbed and therefore would not be visible to the team conducting the field survey. The only method for conclusively determining whether there are undiscovered archeological resources on the site would be to undertake extensive test excavations. Given the size of the project site (approximately 1,600 acres would be disturbed during construction), it was determined this approach was neither practical nor feasible. It is not practical because there are no indications from the records of previously identified archaeological sites and the consultation with the Native American Heritage Commission (NAHC) that any such resources are likely to exist on the site. It is not feasible because there is no reason to believe that the excavation would be successful in finding subsurface archaeological resources within a reasonable period of time.

Native American Consultation

As part of the cultural resources study for the proposed action (Westwood et al. 2013), the NAHC was consulted. This consultation consisted of a Sacred Lands File records search and a request for a list of Native American contacts who may be interested in the proposed action. No known cultural resources within the APE or vicinity are listed in the Sacred Lands File. The NAHC provided a list of eight Native American contacts, with contact information, who may be interested in the proposed action. The consultant conducting the cultural resources study, ECORP, subsequently contacted or attempted to contact all of the individuals on the list provided by the NAHC. As of April 2014, responses have been received from the following individuals.

- Amah Mutsun Tribal Band (AMTB) Chairperson, Valentin Lopez
- AMTB Representative, Edward Ketchum
- Southern Sierra Miwuk Nation (SSMN) Spiritual Leader, Les James
- Chowchilla Tribe of Yokuts (CTY) Representative, Jerry Brown
- Dumna Wo-Wah Tribal Government (DTWG) Chairperson, Robert Ledger, Sr.

Mr. Lopez and Mr. Ketchum requested, and received from ECORP, additional information regarding the proposed action and its location. Mr. James responded to ECORP in a phone call stating that he was unfamiliar with the study area but requested that proper measures be taken to ensure that Native American resources are protected. Tara Brown of CTY responded to ECORP by email on behalf of (CTY representative) Jerry Brown, requesting involvement in the project. Mr. Ledger, Sr. responded to ECORP by email, requesting that a Native American monitor be present during any ground-disturbing project activities.

In February 2013, ICF International completed a search of the Native American Consultation Database (NACD) to identify federally recognized tribes with an ethnographically documented association with the project site and vicinity (Hoffman pers. comm.). The Service is coordinating with all federally recognized tribes identified in the NACD and all non-federally recognized tribes that might attach significance to the location of the proposed action, requesting information on possible unrecorded Native American resources in the APE and also inquiring as to whether or not they have any concerns regarding sacred sites or traditional cultural properties in the vicinity.

Findings

Previously Recorded Historical Resources

The records search shows that three previously recorded isolates, three previously recorded prehistoric cultural resources sites, and one State Point of Historical Interest are located within 0.5 mile of the project site; no previously recorded cultural resources of any kind are located within the project site or APE. Two of the isolates are prehistoric single chert flakes, and one is an historic-period isolate glass fragment. The sites are all prehistoric and consist of a midden site, a house pit, and a small village site. The State Point of Historical Interest is Los Banos Creek.

Newly Recorded Historical Resources

No archaeological resources were encountered during the pedestrian survey.

As noted above, two historical resources (WSP-001 and WSP-002), both historic-period power transmission lines, were identified within the project site during the field survey. The proposed action would include construction of a power transmission loop from the proposed switching station into WSP-001, but would not affect WSP-002. Both resources were evaluated for inclusion on the NRHP and subsequently recommended as not eligible for listing on the NRHP.

3.4.2 Environmental Consequences

Approach and Methods

This section considers the potential environmental consequences of the proposed action on cultural resources based on information collected for the study area during the records search and pedestrian survey described above.

Thresholds of Significance

An adverse effect on a cultural resource is any effect that alters, directly or indirectly, the qualities that make a resource eligible for listing in the NRHP.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and the project site would remain in agricultural use. No adverse effects on known archaeological or historic resources would occur, and no new ground-disturbing activities would occur or otherwise have the potential to affect previously unknown cultural resources.

Proposed Action Alternative

Potential Effects on Historic Resources

As described above, two historical resources (WSP-001 and WSP-002), both historic-period power transmission lines, are located in the project site. Under the Proposed Action Alternative, a power transmission loop would be constructed from a proposed switching station to WSP-001.

Both WSP-001 and WSP-002 were evaluated and recommended as not eligible for listing on the NRHP. Therefore, modifications to either resource under the Proposed Action Alternative would not alter, directly or indirectly, the qualities that make the resource eligible for listing in the NRHP. This effect would be the same as the No Action Alternative, where no impacts on historic resources would occur.

Potential Effects on Archaeological Resources

No archaeological resources are known to the project site. However, the potential exists for encountering unrecorded prehistoric or history-period archaeological (subsurface resources) during construction of the Proposed Action Alternative.

Two environmental commitments are included in the Proposed Action Alternative in the event that previously unrecorded archaeological resources or human remains are discovered during construction (see Chapter 2). EC-6 requires that the contractor stop work if any cultural resources are encountered during ground-disturbing activities. EC-7 specifically addresses the discovery of human remains, and requires that the County coroner be contacted prior to proceeding with additional work. With implementation of these two ECs, the effects of the Proposed Action Alternative would be less than significant. This impact would be potentially more significant than the No Action Alternative, where no ground-disturbing activities would occur, and there would be no potential to disturb previously unknown cultural resources.

If at any future time ground-disturbing activities are proposed for the off-site mitigation area, at minimum, a cultural resources records search would be conducted during the initial planning stages to identify any previously recorded cultural resources that may be located onsite.

3.5 Geology, Seismicity, Soils, and Mineral Resources

This section describes the regulatory and environmental setting for geology, seismicity, soils, and mineral resources and the potential effects that could result from implementation of the proposed action. For the purposes of this section, the study area encompasses the project site and offsite mitigation lands.

3.5.1 Affected Environment

Regulatory Setting

Federal

Section 402 of the Clean Water Act

Section 402 of the CWA establishes a framework for regulating municipal and industrial stormwater discharges under the National Pollutant Discharge Elimination System (NPDES) permit program. EPA delegated authority for the NPDES permit program in California to the State Water Board, which is responsible for developing and enforcing water quality objectives and implementation plans. In turn, the State Water Board has delegated specific responsibilities for development and enforcement actions to the state's nine Regional Water Boards.

Under the NPDES Phase II Rule, construction activity disturbing 1 acre or more must obtain coverage under the state's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit). Construction General Permit applicants are required to prepare a Notice of Intent (NOI), SWPPP and implement and maintain BMPs to avoid adverse construction-related effects on receiving water quality. Because the proposed action would result in the disturbance of an area greater than 1 acre, the applicant would need to submit the required documentation to obtain coverage under the Construction General Permit prior to construction.

State

Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Act (Public Resources Code [PRC] 2621 et seq.) is intended to reduce the risk to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy across the traces of active faults and strictly regulates construction in the corridors along active faults (Earthquake Fault Zones). It also defines criteria for identifying active faults, giving legal weight to terms such as *active*, and establishes a process for reviewing building proposals in and adjacent to Earthquake Fault Zones.

Under the Alquist-Priolo Act, faults are zoned and construction along or across them is strictly regulated if they are *sufficiently active* and *well-defined*. A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during the Holocene epoch (the last 11,700 years). A fault is considered well-defined if its trace can be clearly identified

by a trained geologist at the ground surface or in the shallow subsurface, using standard professional techniques, criteria, and judgment (Bryant and Hart 2007).

Seismic Hazards Mapping Act

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act: the state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards, and cities and counties are required to regulate development within mapped Seismic Hazard Zones.

Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites in Seismic Hazard Zones until appropriate site-specific geologic or geotechnical investigations have been carried out, and measures to reduce potential damage have been incorporated into the development plans. Geotechnical investigations conducted within Seismic Hazard Zones must incorporate standards specified by California Geological Survey Special Publication 117a, *Guidelines for Evaluating and Mitigating Seismic Hazards* (California Geological Survey 2008).

Mapping is prioritized so that the state's urban areas are mapped first. Accordingly, no Seismic Hazard maps have been prepared for the study area.

California Building Standards Code

The state's minimum standards for structural design and construction are given in the California Building Standards Code (CBSC) (California Code of Regulations [CCR] 24). The CBSC is based on the International Building Code (IBC) (International Code Council 2011), which is used widely throughout the United States (generally adopted on a state-by-state or district-by-district basis) and has been modified for California conditions with numerous, more detailed or more stringent regulations. The CBSC requires that "classification of the soil at each building site will be determined when required by the building official" and that "the classification will be based on observation and any necessary test of the materials disclosed by borings or excavations." In addition, the CBSC states that "the soil classification and design-bearing capacity will be shown on the (building) plans, unless the foundation conforms to specified requirements." The CBSC provides standards for various aspects of construction, including (i.e., not limited to) excavation, grading, and earthwork construction; fills and embankments; expansive soils; foundation investigations; and liquefaction potential and soil strength loss. In accordance with state law, certain aspects of the proposed action would be required to comply with all provisions of the CBSC.

The California Building Code (CBC) requires extensive geotechnical analysis and engineering for grading, foundations, retaining walls, and other structures, including criteria for seismic design.

Local

Merced County General Plan

The Merced County General Plan has established goals and policies for soil and mineral resources and geologic and seismic hazards in the Natural Resources and Health and Safety Elements, respectively (Merced County 2013). In general, these goals and policies require new structures be designed to minimize the loss of life, injury or property damage due to seismic and geologic hazards, and in compliance with the federal and state standards noted above. The general plan also includes policies to protect soil resources and minimize erosion during construction.

Geotechnical Investigations

Local jurisdictions typically regulate construction activities through a multistage permitting process that may require a site-specific geotechnical investigation. The purpose of the investigation is to provide a basis for the development of appropriate construction design. Site-specific geotechnical investigations are to be based on adequate test borings or excavations in the area where construction would occur and prepared by a civil engineer who is registered by the state.

The soils report is to contain required information indicated in the *Merced County Improvement Standards and Specifications* (Merced County 2009) and the *Merced County Storm Drainage Manual* (Merced County 1986). Merced County also requires investigation of the soils underlying proposed areas of grading in conformance with the mandates of the IBC/CSBC.

A preliminary geotechnical report has been prepared for the proposed action (Earth Systems Pacific 2013).

Grading, Erosion, and Sediment Control

Merced County does not have a grading ordinance but the *Merced County Improvement Standards and Specifications Manual* and *Merced County Storm Drainage Design Manual* provide requirements and guidance relevant to grading, erosion and sediment control. In general, these manuals provide required erosion and sediment control measures for road and development work in the County, and outline standard procedures for designing drainage improvements.

Environmental Setting

This section describes the regional geologic framework and project site topography and geology; provides information on soil and mineral resources within the project site; and describes seismic hazards within the study area. Because no new buildings or other major infrastructure would be constructed on the offsite mitigation lands, details on geologic and mineral resources at that location are not discussed herein. General information regarding soils on the offsite mitigation lands is described however, given the potential for ongoing and future grazing to result in erosion.

Regional Geologic Framework

Merced County is located within three geomorphic provinces: the Sierra Nevada foothills of the Sierra Nevada range, the San Joaquin Valley portion of the Great Valley lowland, and the Coast Ranges (California Geological Survey 2002). The Coast Ranges are made up of many individual mountain ranges of varying sizes. The project site is in the southeastern portion of the Diablo Range,

which is part of the Coast Ranges geomorphic province. The San Joaquin Valley begins immediately east of the project site boundary.

The Great Valley is presently an extensive, near sea-level lowland receiving sediment from the Sierra Nevada and the Coast Ranges from innumerable streams and rivers (California Geological Survey 2002). However, the Great Valley has been a deep to shallow trough receiving sediments since the Upper Jurassic (approximately 150 million years) and its sediments were deposited in deep ocean, submarine fan, coastal lowlands, lake and alluvial (river) environments (Page et al. 1998). The older sedimentary rocks are grouped into the Great Valley Sequence and are made up of many individual rock formations representing different sedimentary depositional environments of different ages. These deep sedimentary formations are the source of much of the oil and gas production of the Great Valley.

The sedimentary rocks in the deep trough underlying the Great Valley form a large synclinal structure. Synclines are folds in rocks where the sides have been relatively tilted upwards and the center relatively pushed down. This relationship means that older rocks are found at the sides of the syncline with younger rocks in the center. The Great Valley Sequence rocks of the eastern side of the Great Valley syncline do not outcrop at the surface. However, these Great Valley Sequence sedimentary formations do outcrop to the west of the west margin of the Great Valley where they have been uplifted by, and incorporated into, the Coast Ranges. Since, in outcrop, only one side of the syncline arm is found it is referred to as a *homocline*. This Great Valley Sequence homocline flanks much of the eastern Coast Ranges including the eastern Diablo Range (Page et al. 1998:Figure 6). The project site is on this homocline and is underlain by Great Valley Sequence sedimentary rock formations.

During their deposition and subsequently, the rocks described above have been deformed and broken by a numerous faults although most of these are currently inactive (see *Surface Rupture and Faulting*). The current Coast Range, and the various mountain ranges within them, were formed due to a wide range of tectonic activity along fault systems from approximately 3.5 million years ago through the present (Page et al. 1998:Figure 1). The San Andreas fault and its offshoots are the fault systems responsible for breaking the earth's crust in the region into individual segments. Depending on the local forces, some of these segments were pushed up and some dropped down. Those that were pushed up are individual mountain ranges. Those that dropped down are lowlands such as San Francisco Bay, the Santa Clara Valley, and the upper Los Banos Valley. As these individual mountain ranges were pushed up they were also eroded by streams which deposit sediment in the down dropped areas (Page et al. 1998).

Project Site Topography and Geology

Geology

As noted above, the project site is underlain by Great Valley Sequence rock formations. Additionally, the area has been eroded by stream systems as it was uplifted and stream deposits (alluvium) also occur. Figure 3.5-1 shows the project site geology (Earth Systems Pacific 2013). From oldest to youngest these rocks are the Panoche Formation, Moreno Shale Formation, Tulare Formation and Alluvium. The Panoche and Moreno Shale rock formations are part of the Great Valley Sequence homocline and outcrop linearly with a northwest to southeast trend.

The Panoche Formation is mapped as sandstone units and sandstone interbedded with clay shale. Shale is a mud rock which is a combination of clay size and silt size fine sediment. The Moreno Shale

Formation is mapped as clay shale or claystone or cemented sandstone. The Tulare Formation is claystone with minor sand and pebble conglomerate. The Tulare Formation is a stream terrace of ancestral Los Banos Creek which has been left above Los Banos Creek as it continued to erode downward. Alluvium is mapped in an unnamed stream that drains eastward into the San Joaquin Valley. Other geologic units are mapped in Figure 3.5-1 but do not occur within the project site boundary.

Structural Features

The primary structural feature in the project site is the homocline of the Panoche and Moreno Shale Formations of the Great Valley Sequence. These rock formations dip down to the east-northeast as much as 50 degrees and have a southeast to northwest outcrop trend (Figure 3.5-1).

Topography

The project site ranges from over 700 feet above mean sea level (amsl) on its west side to approximately 250 feet amsl on its east side. The west margin is dominated by a high topographic ridge of the Panoche Formation (Figure 3.5-1). To the west this ridge forms a steep slope leading down to a stream that drains southeast into Los Banos Creek (this creek is not within the project site boundary). Although small portions of this western ridge are within the project site boundary, no project components are planned on it. The northeast central part of the project site forms a small plateau at just over 400 feet amsl. That area then slopes downward to the east. In the western part of the project site, the small streams generally follow the linear trend of the underlying Great Valley Sequence rocks and drain to the southeast or to the northwest. That is, their trend is controlled by the underlying geologic structure. However, the main shallowly incised streams drain northeastward into the San Joaquin Valley.

Los Banos Creek is south of the project site. It is a large watershed whose headwaters extend about 15 miles west. Los Banos Creek has incised through the Great Valley Sequence homocline and drains into the San Joaquin Valley. It is a transverse stream—it existed prior to the local uplift and maintained its course eroding into the rocks as they were uplifted.

Soils

Surface Soils

The characterization of soils at the project site is based on mapped data provided by the NRCS and summarized in the geotechnical report for the project site (Earth Systems Pacific 2013). As provided in that report, there are 15 soil mapping units (i.e., individual soils or soil complexes) within the project site (see Figure 3.5-2; Table 3.5-1). Soils are primarily developed in weathered sedimentary bedrock and their depths range from 20 to more than 60 inches to unweathered bedrock. The soil depths are shallow as rock outcrops and rock ridges are approached. All the soils are identified as having limitations (permeability and/or shallow depth to bedrock) for septic tank absorption fields.

Table 3.5-1. Soils and Some Soil Characteristics for the Project Site

Soil Map Unit	Shrink-Swell Potential	Erosion Hazard Rating	Hydrologic Soil Group[a]
Apollo clay loam, 2 to 8% slopes	Moderate	Slight	C
Apollo clay loam, 8 to 15% slopes	Moderate	Moderate	C
Apollo clay loam, 15 to 30% slopes	Moderate	Moderate	C
Arburua loam, 2 to 8% slopes	Moderate	Slight	B
Arburua loam, 8 to 15% slopes	Moderate	Moderate	B
Arburua loam, 15 to 30% slopes	Moderate	Moderate	B
Ayar clay, 8 to 15% slopes	High	Slight	D
Ayar clay, 15 to 30% slopes	High	Moderate	D
Damluis clay loam, 2 to 8% slopes	High	Slight	D
Los Banos clay loam, 2 to 8% slopes	High	Slight	D
Oneil silt loam, 30 to 50% slopes		Severe	C
San Timoteo–Wisflat sandy loams complex, 8 to 15% slopes	n/a[b]	Moderate	B
San Timoteo–Wisflat sandy loams complex, 15 to 30% slopes	n/a[b]	Moderate	B
Wisflat–Rock Outcrop–Arburua complex, 50 to 75% slopes	n/a[b] (High for Arburua)	Very Severe	D
Wisflat-Rock Outcrop–Oneil complex, 30 to 50% slopes	n/a[b]	Severe	D

Source: Earth Systems Pacific 2013 (based on Natural Resources Conservation Service web map).

[a] Hydrologic Soil Group. Group A – low runoff potential and high infiltration rates; Group B – moderate infiltration rate; Group C – low infiltration rate; Group D – high runoff potential.

[b] Properties too variable to be determined.

The NRCS mapping indicates that, overall, the soil expansion potential (shrink-swell potential) ranges from moderate to high reflecting the soil clay content. The preliminary geotechnical report notes the field observation of surface soil cracks reflecting soil shrinkage during drying; the clays absorb water and expand during wet periods (Earth Systems Pacific 2013). NRCS mapping also indicates that all the soils on the project site are rated low for concrete corrosion and high for steel corrosion (except the Oneil soil which is rated moderate for steel corrosion).

Although specific soil mapping of the offsite mitigation lands have not been completed, given its close proximity to the project site, surface soil conditions are anticipated to be similar to those described above.

Seismicity and Faults

Seismic hazards are earthquake fault ground rupture and ground shaking (primary hazards) and liquefaction and earthquake-induced slope failure (secondary hazards).

Surface Rupture and Faulting

As described above, the purpose of the Alquist-Priolo Act is to regulate development near active faults to mitigate the hazard of surface rupture. As defined under the Alquist-Priolo Act, an *active fault* is one that has had surface displacement within the Holocene epoch (the last 11,700 years); an

early Quaternary fault is one that has had surface displacement during Quaternary time (the last 1.6 million years); and a *pre-Quaternary fault* is one that has had surface displacement before the Quaternary period.

The project site is not identified as being located in an Alquist-Priolo Earthquake Fault Zone (Bryant and Hart 2007). There is no evidence of recent (i.e., Holocene epoch) faulting in the project site and no active faults are mapped near the project site (California Geological Survey 2010; International Conference of Building Officials 1998; U.S. Geological Survey 2010; Earth Systems Pacific 2013). The nearest mapped active and Quaternary faults pertinent to the proposed action are summarized in Table 3.5-2.

Table 3.5-2. Fault Systems–Status and Distance from the Project Site

Fault Name	Status[a]	Distance/Direction
San Joaquin/Great Valley Fault	Late Quaternary	7 km E
O'Neill Fault System	Late Quaternary	3 km S, 2 km N
Ortigalita Fault	Holocene	8 km W
Calaveras Fault	Active	45 km W
San Andreas Fault	Active	45 km W/SW
Bear Mountain Fault	Pre-Quaternary	65 km E

Source: California Geological Survey 2010.
km = kilometers.
[a] Fault status definitions: Pre-Quaternary (greater than 1.6 million years); Late Quaternary (during past 700,000 years); Holocene (during past 11,700 years).

Ground-Shaking Hazard

The project site is in a region of California characterized by strong ground shaking by regional earthquakes (International Conference of Building Officials 1998). There have been about 76 magnitude 5.0 or greater earthquakes within 65 miles of the project site since 1800 (Earth Systems Pacific 2013). The highest estimated peak ground acceleration from these earthquakes was 0.07g (where one g equals the force of gravity) from a 5.7 magnitude 1822 earthquake that occurred about 15 miles west of the project site. The 1989, 7.0 magnitude Loma Prieta earthquake produced an estimated peak horizontal ground acceleration of 0.05g at the project site.

Regional earthquakes would produce strong ground shaking at the project site and vicinity. Table 3.5-3 provides preliminary seismic coefficients for a "very dense soil or soft rock soil profile" (Earth Systems Pacific 2013). The higher the coefficient the greater the associated ground shaking that would be experienced at a site. The seismic coefficients and the associated ground shaking are used to determine the necessary engineering design features for project facilities.

Table 3.5-3. California Building Code Seismic Parameters

Seismic Category	C
Site Class	C
Maximum Considered Earthquake (MCE) Ground Motion	
Short Period Spectral Response S_s	1.883g
1 Second Spectral Response, S_1	0.600g
Site Coefficient, F_a	1.01
Site Coefficient, F_v	1.30
Design Earthquake Ground Motion	
Short Period Spectral Response, S_{DS}	1.256g
1 Second Spectral Response, S_{D1}	0.520g
Source: Earth Systems Pacific 2013.	

Liquefaction and Associated Hazards

Liquefaction is a phenomenon in which the strength and stiffness of unconsolidated sediments are reduced by earthquake shaking or other rapid loading. Poorly consolidated, water-saturated fine sands and silts having low plasticity and located within 40 feet of the ground surface are typically considered to be the most susceptible to liquefaction. Soils and sediments that are not water-saturated and that consist of coarser or finer materials are generally less susceptible to liquefaction. Geologic age also influences the potential for liquefaction. Sediments deposited within the most recent millennia are generally more susceptible to liquefaction than older Holocene sediments; Pleistocene sediments are even more resistant; and pre-Pleistocene sediments are generally immune to liquefaction (California Geological Survey 2008).

Two potential ground failure types associated with liquefaction in the region are lateral spreading and differential settlement (Association of Bay Area Governments 2001). Lateral spreading involves a layer of ground at the surface being carried on an underlying layer of liquefied material over a gently sloping surface toward a river channel or other open face. Differential settlement (also called ground settlement and, in extreme cases, ground collapse) occurs as soil compacts and consolidates after the ground shaking ceases, when the layers that liquefy are not of uniform thickness, which is a common problem when the liquefaction occurs in artificial fills. Settlement can range from 1 to 5%, depending on the cohesiveness of the sediments (Tokimatsu and Seed 1984).

Based on the geologic age of the earth materials, average relative density of the subsurface material, the relatively shallow depth to rock, and the absence of a permanently elevated groundwater table, (see Section 3.7, *Hydrology and Water Quality*) for the project site, the potential for liquefaction, dynamic compaction, or seismically induced settlement or bearing loss is considered low even with a high ground shaking hazard.

Static and Seismically Induced Slope Failures

The preliminary geotechnical investigation and field reconnaissance did not identify any slope failure concerns at the project site (Earth Systems Pacific 2013). Although there are some areas of steeper slopes at the project site, the soils in these areas are relatively shallow, which minimizes potential instability. No other indications of slope instability such as seeps or springs were observed. Additionally, due to the absence of permanently elevated groundwater table, the relatively low

seismicity of the area, and the relatively shallow depth to rock, the potential for seismically induced slope instability is considered negligible.

Other Hazards

Other geologic and seismic hazards (seiche, mudflow, land subsidence, volcanic activity, and tsunami) that could be experienced in the larger region are unlikely to affect the proposed action. Seiches occur from the movement of water in lakes or reservoirs that are set in motion by earthquakes. Strong earthquakes could cause seiche impacts along the shoreline of Los Banos Reservoir beyond the southernmost extent of the project site. However, because no infrastructure is planned for the southern part of the project site under the proposed action, and no seiches at Los Banos Reservoir could overtop the drainage divide at the southern end of the project site, impacts from seiches at the project site are not anticipated. The project site is underlain by bedrock which is not susceptible to subsidence and, as noted under *Static and Seismically Induced Slope Failures,* above, there is minimal potential for local slope instability from mudflows at the project site (Earth Systems Pacific 2013). There are no active volcanoes in close proximity to the project site. The project site is not adjacent to an ocean coastline or bay and therefore would not be subject to tsunamis.

Mineral Resources

The study area is not currently used for any mining or other mineral extraction activities and is not within an area mapped as a potential location for a significant source for sand and gravel resources sites (Mintier & Associates 2007; Merced County 2013).

3.5.2 Environmental Consequences

Approach and Methods

Potential impacts in the study area related to geology, soil and mineral resources, and seismicity that could occur as a result of implementing the alternatives were assessed based on the preliminary geotechnical report prepared for the Wright Solar Project (Earth Systems Pacific 2013), other available data (maps, soil surveys), and professional judgment.

Thresholds of Significance

An alternative would be considered to have a significant impact if it would result in any of the conditions listed below.

- Expose people or structures to increased risk related to strong seismic ground shaking.
- Expose people or structures to increased risk of landslides or other slope failure.
- Result in substantial soil erosion or the loss of topsoil.
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (International Code Council 1997), creating substantial risks to life or property.
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems.
- Result in the loss of availability of a known mineral resource.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and current dry-land farming and grazing activities would continue. Therefore, no impacts on geological, soils, and mineral resources in the study area would occur beyond those associated with existing conditions, which are generally limited to minimal soil erosion from livestock grazing. Seismic risks to people and structures in the study area would remain unchanged and generally low, given the lack of built infrastructure.

Proposed Action Alternative

Increased Exposure to Risk from Seismic Ground Shaking, Ground Failure and Landslides

The project site is not identified as being located in an Alquist-Priolo Earthquake Fault Zone (Bryant and Hart 2007), and the International Conference of Building Officials recognizes no seismic sources at the site (International Conference of Building Officials 1998). There is no evidence of recent faulting within the project site and no active faults are mapped at or near the site (California Geological Survey 2010; International Conference of Building Officials 1998; Merced County 2012; U.S. Geological Survey 2010; Earth Systems Pacific 2013). Accordingly, the Proposed Action Alternative would not be subject to surface rupture hazards.

The ground-shaking hazard in the study area is high and a large earthquake on a nearby fault could cause substantial ground shaking at the project site, potentially resulting in an increased risk of structural loss, injury, or death. As part of the proposed solar facility design, the applicant would be required to implement IBC and CBSC standards for applicable features to minimize the potential ground-shaking hazards on associated project features. Additionally, the number of onsite employees routinely accessing the study area in general, and the project site specifically, would be limited and periodic because operational activities would be controlled remotely through a Supervisory Control and Data Acquisition (SCADA) system, remote security system, and other onsite systems. Facility maintenance would be periodic and would be limited to scheduled and emergency maintenance visits. Further, there would be no major structures constructed on the offsite mitigation lands. With the exception of new perimeter fencing and changes in grazing management, conditions at the offsite mitigation lands would be similar to existing conditions and thus there would be no increase in the exposure of people or structures to seismic ground shaking and landslides. Therefore, the risk for exposure to seismically induced injury or death in the study area as a result of implementing the proposed action would be low.

Seismic-related ground failure, including liquefaction, as well as seismically-induced landslides should they occur, could compromise the structural integrity of the proposed new facilities and cause injury to project construction and/or O&M staff at the project site. However, based on the geologic age of the earth materials, average relative density of the subsurface material, groundwater conditions, and anticipated ground-shaking hazard for the site, the potential is considered low. Furthermore, because the design of the solar facilities would adhere to IBC and CBSC standards for applicable features, potential liquefaction hazards on associated infrastructure would be minimized thereby reducing the risk for injury or death.

The Proposed Action Alternative includes EC-8, which would require that a final geotechnical investigation be completed for the study area prior to implementation of the proposed action. The

purpose of EC-8 would be to ensure that the preliminary findings of the geotechnical report for the site (as represented in this analysis) are accurate and consider the final project design. Results from the final geotechnical report would guide design requirements to address issues of strong ground motion, slope failure, and expansive soils. Implementation of EC-8, along with adhering to applicable IBC and CBSC design standards, would ensure that this potential impact is less than significant. The risk for injury due to seismic-related ground shaking and ground failure under this alternative would, however, be greater than under the No Action Alternative because no infrastructure would be constructed under the No Action Alternative.

Soil Erosion and Loss of Topsoil

The development of the solar facility under the Proposed Action Alternative would result in a total of approximately 1,600 acres of ground disturbance, approximately 1,400 acres of site grading would be permanent (for the life of the project) and approximately 200 acres of disturbance would be temporary (areas to be restored following construction). Grading, excavation, removal of vegetation cover, and loading activities associated with construction could temporarily increase erosion, runoff, and sedimentation. Construction activities also could result in soil compaction and wind erosion effects that could adversely affect soils and reduce the revegetation potential at the construction sites and staging areas.

To minimize these effects, the Proposed Action Alternative would include implementation of EC-9, which would require preparation and implementation of a SWPPP and identification of project-specific BMPs consistent with the Construction General Permit. In addition to the SWPPP, adherence to the applicable *Merced County Design and Improvement Standards Manual* and *Merced County Storm Drainage Manual* would minimize effects from erosion, runoff, and sedimentation during construction, operation and maintenance of the proposed solar facility. Finally, a site-specific revegetation plan would be prepared and implemented as part of the avoidance and minimization measures included in the Proposed Action Alternative (see Chapter 2, *Proposed Action and Alternatives*). In accordance with the revegetation plan, all areas temporarily subject to ground disturbance, including staging areas, would be revegetated.

No grading, excavation, or large-scale construction activities would occur at the proposed offsite mitigation lands under the Proposed Action Alternative, and soil erosion or loss of topsoil from these activities would not occur. Moreover, future management of the offsite mitigation lands would be detailed in a Service-approved Habitat Management Plan which would, among other things, include a grazing management plan aimed at protecting grasslands and soils onsite and minimizing erosion. As described in Chapter 2, onsite grazing management would focus on keeping grasses short (less than 12 inches) while also retaining enough residual dry matter to protect soil health and prevent erosion. During years of extreme weather, such as drought, the grazing intensity would be adjusted to properly meet the grass height and residual dry matter criteria provided in the grazing management plan. Further, if new fencing is required at the offsite mitigation site, it is unlikely that the activities required to install fencing would result in substantial soil erosion or loss of topsoil. As such, the potential for erosion at the offsite mitigation lands site under the Proposed Action Alternative would be low.

In summary, although grading and construction activities under the Proposed Action Alternative could temporarily result in soil erosion, site-specific measures (e.g., SWPPP implementation, compliance with county erosion control and drainage standards), implementation of a revegetation plan, and adherence to a Service-approved Habitat Management Plan on the offsite mitigation lands would ensure that this impact is less than significant. This impact would be somewhat greater than

the No Action Alternative on the project site, where no construction activities would occur. However, erosion at the offsite mitigation lands may be reduced compared to the No Action Alternative, given that vegetation and grazing would be managed and monitored over the long-term in accordance with a Service-approved Habitat Management Plan.

Location of Facilities on Expansive Soils

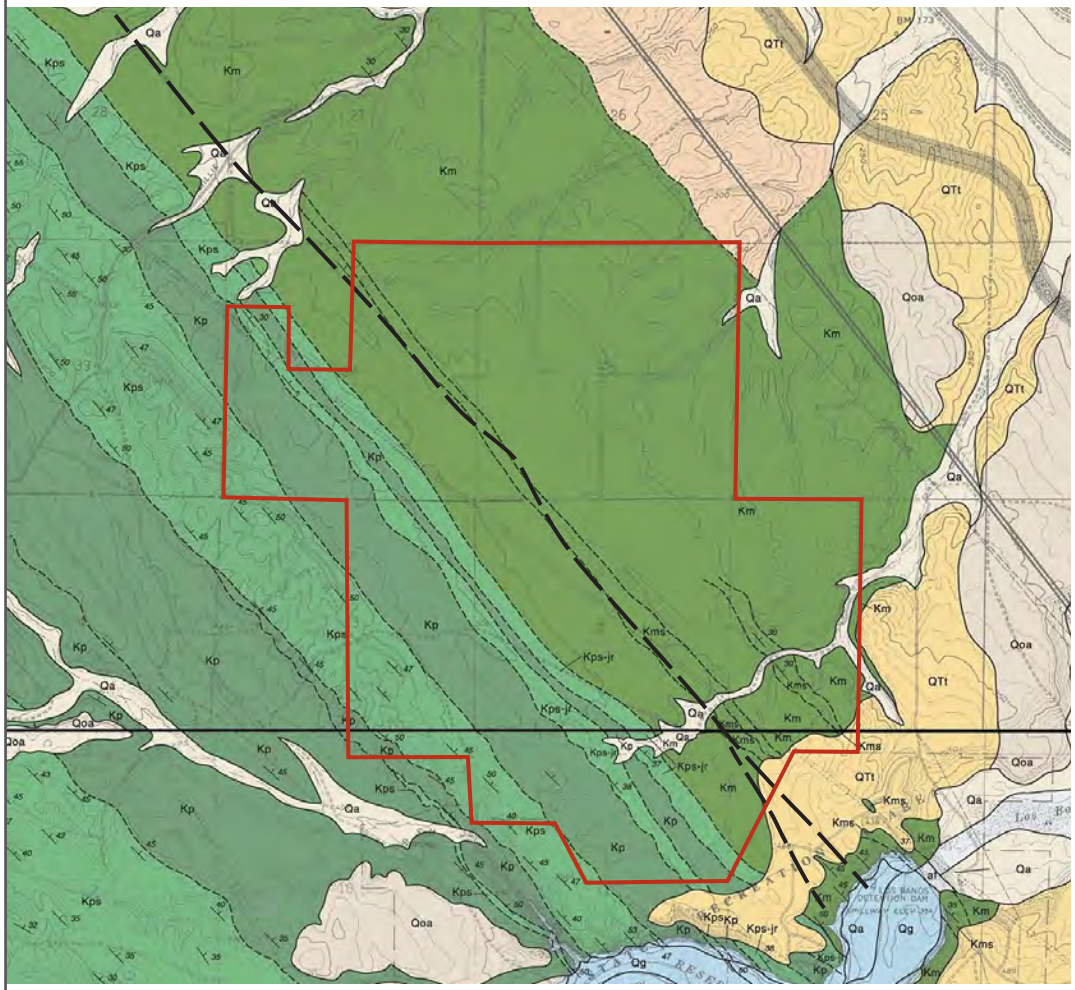
As indicated in the preliminary geotechnical report and the soils report for the project site (Earth Systems Pacific 2013), clay soils occur at the project site. Clay soil types generally have slow permeability and a medium to high water capacity and, as such, can be potentially expansive. Expansive soils could potentially compromise the structural integrity of the solar facility and, as a result, pose a safety risk. Development of a final geotechnical report and implementation of design requirement recommendations from that report, as provided in EC-8, would ensure that this impact is less than significant. This impact is potentially greater than the No Action Alternative, however, where no infrastructure would be constructed.

Location of Septic Tanks or Alternative Wastewater Disposal Systems on Unstable Soils

During construction of the Proposed Action Alternative, portable toilets would be used. Once the solar facility is built and operational, the O&M facility would have an engineered and approved, gravity-fed septic system. As noted above, the clay soils typical of the project site show low permeability and are generally not appropriate for a septic field (Earth Systems Pacific 2013). Development of a final geotechnical report, as provided in EC-8, would detail the specific design requirements for a septic system and would ensure this impact is less than significant. This impact is potentially greater than the No Action Alternative, however, where no septic system would be installed.

Loss of Availability of Mineral Resources

As described under *Environmental Setting*, the study area is not currently used for any mining or other mineral extraction activities and is not within an area mapped as a potential location for a significant source for sand and gravel resources sites. Therefore, the impact under the Proposed Action Alternative would be the same as under the No Action Alternative, and there would be no impact on mineral resources.



EXPLANATION

Approximate Limits of Proposed Solar Park Site

O'Neill Fault (Jennings & Bryant, 2010)

Geologic Units

Qa
Alluvium
-gravel, sand, silt and clay

Qoa
Older Alluvium
-gravel and sand

QTt
Tulare Formatin
Claystone with minor sand and pebble conglomerate

Km | Kms
Moreno Shale Formation
Km-Clay shale or claystone
Kms- sandstone, cemented

Kps | Kps-jr
Panoche Formation - Kp
Kps - Sandstone
Kps-jr - Sandstone interbedded with clay shale

Geologic Symbols

Contact
Dashed where approximately located or inferred

High-angle fault
Dashed where approximately located or inferred; dotted where concealed

Thrust or reverse fault
Dashed where approximately located or inferred; dotted where concealed. Saw-teeth on upper plate. Dip of fault plane between 30° and 80°

Anticline
Showing axis at surface. Dashed where approximately located; dotted where concealed

Syncline
Showing axis at surface. Dashed where approximately located; dotted where concealed

Horizontal — Inclined (30) — Vertical (90)
Strike and dip of beds

Extract from:
Geologic map of the San Luis Dam and Volta quadrangles, Merced County, California, by Dibblee, T.W., and Minch, J.A., 2007
Geologic map of the Ortigalita Peak NW and Charleston School quadrangles, Merced and Fresno Counties, California, by Dibblee, T.W., and Minch, J.A., 2007

Source: Earth Systems Pacific. 2013. *Desktop Geotechnical Study Report, Wright Solar Park, Los Banos Area of Merced County, California.* July 10. Prepared for Wright Solar Park, LLC.

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Mile

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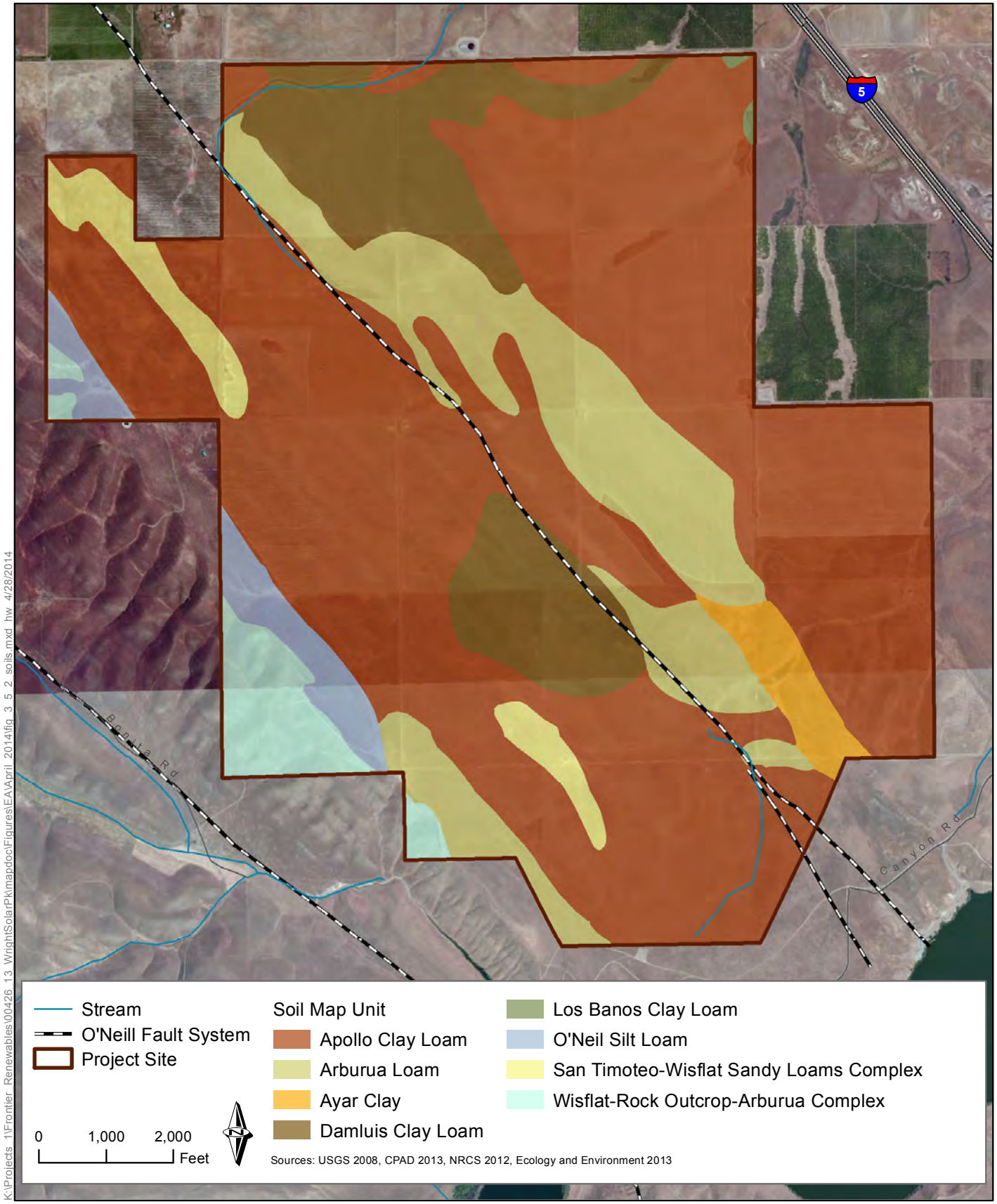
Figure 3.5-1
Geologic Map



K:\Projects_1\Frontier_Renewables\00426_13_WrightSolarPk\mapdoc\Figures\EA\April_2014\fig_3_5_2_soils.mxd hw 4/28/2014

Figure 3.5-2
Soils Map

3.6 Hazards and Hazardous Materials

This section describes the regulatory and environmental setting for hazards and hazardous materials as well as the potential impacts related to the use of hazardous materials and other potential hazards that could result from implementation of the proposed action.

For the purposes of this section, the study area is concurrent with the project site and offsite mitigation lands.

3.6.1 Affected Environment

Regulatory Setting

Federal

Comprehensive Environmental Response, Compensation and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC Section 9601 et seq. 1980) provides federal funds to clean up uncontrolled or abandoned hazardous waste sites, accidents, spills, discharges, and other emergency releases of pollutants and contaminants into the environment. Through CERCLA, EPA has authority to seek out those parties responsible for any hazardous release and compel their cooperation in the cleanup.

CERCLA requires that all releases of hazardous substances exceeding reportable quantities be reported by the responsible party. If an accidental chemical release exceeds the Emergency Planning and Community Right-to-Know Act applicable minimal reportable quantity, the facility must notify the State Emergency Response Commissions and Local Emergency Planning Committees for any area likely to be affected by the release, as well as the National Response Center, and provide a detailed written follow-up as soon as practicable.

Toxic Substances Control Act

The Toxic Substances Control Act of 1976 (TSCA) (15 USC 2601 et seq. 1976) gives EPA authority to establish reporting, recordkeeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. TSCA addresses the production, import, use, and disposal of specific chemicals, such as polychlorinated biphenyls (PCBs), asbestos, radon, and lead-based paint.

Section 402 of the Clean Water Act

Section 402 of the CWA establishes a framework for regulating municipal and industrial stormwater discharges under the NPDES permit program. EPA delegated authority for the NPDES permit program in California to the State Water Board, which has been designated by EPA to develop and enforce water quality objectives and implementation plans. The State Water Board has delegated specific responsibilities for the development and enforcement actions to the state's nine Regional Water Boards.

Under the NPDES Phase II Rule, construction activity disturbing 1 acre or more must obtain coverage under the state's Construction General Permit. Construction General Permit applicants are

required to prepare a Notice of Intent, SWPPP, and implement and maintain BMPs to avoid construction-related effects on receiving water quality. Because the proposed action would result in the disturbance of an area greater than 1 acre, the applicant would need to submit the required documentation to obtain coverage under the Construction General Permit prior to construction.

State

California's hazardous materials and wastes regulations are equal to or more stringent than federal regulations. EPA has granted the state primary oversight responsibility to administer and enforce hazardous waste management programs. State regulations require planning and management to ensure that hazardous materials are handled, stored, and disposed of properly to reduce risks to human health and the environment. Several key state laws pertaining to hazardous materials and wastes are discussed below.

California Hazardous Substance Account Act

The California equivalent to CERCLA, the Carpenter-Presley-Tanner Hazardous Substance Account Act (California Health and Safety Code, Chapter 6.8), was adopted in 1999. This act requires past and present owners and operators to assume liability for the remediation of hazardous waste sites within California. The California Department of Toxic Substance Control (DTSC) administers and enforces the California Hazardous Substance Account Act. Specifically, DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous material waste. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. These regulations also require hazardous materials users to prepare written plans, such as a hazardous materials business plan, that describe hazardous materials inventory information, storage and secondary containment facilities, emergency response and evacuation procedures, and employee hazardous materials training programs.

Occupational Safety and Health Act

The Occupational Safety and Health Administration (OSHA) administers the Occupational Safety and Health Act, (29 USC 15) which requires special training of handlers of hazardous materials, notification to employees who work in the vicinity of hazardous materials, and acquisition from the manufacturer of material safety data sheets (MSDS). An MSDS describes the proper use of hazardous materials and is intended to provide workers and emergency personnel with procedures for handling or working with that material. The Act also requires the training of employees to remediate any hazardous materials accidental releases.

The California Division of Occupational Safety and Health (Cal/OSHA) assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices within the state. At sites known to be contaminated, a site safety plan must be prepared to protect workers. The site safety plan establishes policies and procedures to protect workers and the public from exposure to potential hazards at the contaminated site.

Fire Protection

The PRC includes fire safety regulations that apply to State Responsibility Areas (SRAs) during the time of year designated as having hazardous fire conditions. During the fire hazard season, these

regulations: (a) restrict the use of equipment that may produce a spark, flame, or fire; (b) require the use of spark arrestors on equipment that has an internal combustion engine; (c) specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and (d) specify fire-suppression equipment that must be provided onsite for various types of work in fire-prone areas.

Local

Merced County Certified Unified Program Agency

The Merced County Certified Unified Program Agency (CUPA) is responsible for administering a unified hazardous waste and hazardous materials management program in Merced County, including hazardous materials response and inventory plans and hazardous waste permitting programs. CUPA is also responsible for regulatory oversight of investigations and cleanups at sites affected by substances other than petroleum products from underground storage tanks.

Merced County Fire Code

The Merced County Fire Department currently reviews development plans and building permits for compliance with the California Building Code and the Merced County Fire Code in the study area. Merced County utilizes the current edition of the California Fire Code in addition to Title 14 Natural Resources, Division 1.5 Department of Forestry, Chapter 7 – Fire Protection, Sub chapter 2 SRA Fire Safe Regulations for projects in the State Responsibility Area (SRA).

California Fire Code Section 507 requires developers to provide approved water supplies capable of delivering adequate fire flow for fire protection to all premises upon which buildings or portions of buildings are constructed. Water supply may consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of supplying the required fire flow. Merced County Fire Code Ordinance requires an annual operational permit to be on file for hazardous material storage and use.

Merced County General Plan

The Health and Safety Element of the *2030 Merced County General Plan* includes several goals and policies applicable to management of hazardous materials and control of urban and wildland fires (Merced County 2013). Specifically, Policy HS-3.1 encourages weed abatement programs throughout the County to promote fire safety and Policy HS-3.13 requires the Uniform Code to be used as a guide for project-level fire prevention and suppression activities. Policy HS-5.1 requires that hazardous materials be used, stored, transported, and disposed of in a safe manner, in compliance with local, state, and federal safety standards.

Environmental Setting

This section describes the existing hazards and/or hazardous conditions within the study area. Information used in this section was compiled, in part, from the Phase I Environmental Site Assessment of the project site completed in 2013 (Enviro Assessment PC 2013).

A Phase I assessment of the offsite mitigation lands was not completed because no ground disturbing activities, other than replacing portions of the existing perimeter fence, would occur under the proposed action. No known hazardous materials or other hazardous conditions are known to the offsite mitigation lands. As a result, the following discussion focuses on conditions at the project site, where grading and ground disturbance activities would be concentrated.

Project Site Conditions

A database search, review of aerial photographs, and visual reconnaissance survey were completed in support of the Phase I assessment of the project site. The database search, compiled pursuant to Government Code Section 65962.5, included all available federal, state, regional, and local agency database listings.

As provided in the Phase I assessment, there is no significant risk of environmental contamination at the project site, nor is there any need for environmental cleanup of existing conditions. Aerial photographs indicate the project site was primarily undeveloped and utilized as farmland since before 1954. Two rural residences and irrigation canals are visible in 1967. By 1977, outbuildings and the Los Banos Reservoir are present. Other than a few small structures and a high voltage power line appearing on the 1998 map, the project site remains relatively unchanged (Enviro Assessment PC 2013). The project site is not listed on the hazardous materials databases searched for the report. In addition, no "recognized environmental conditions" (REC) were identified at the project site during the June 2013 visual reconnaissance (Enviro Assessment PC 2013), where the term, "recognized environmental conditions," as defined by the American Society for Testing and Materials (ASTM) Standard E1527-13 refers to:

> "…the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions."

The property was inspected for typical RECs listed below. None of the listed RECs were observed on the project site.

- Odors
- Pools of liquid
- Electric or hydraulic equipment likely to contain PCBs
- Storage tanks
- Drums or other containers
- Pits, ponds, lagoons
- Stained soil or pavement
- Solid waste
- Waste water discharge
- Wells or septic systems

Nearby Schools and Airports

The school nearest to the study area is Los Banos High School (1966 S 11th Street, Los Banos), which is approximately 5.4 miles northeast of the project site and 8.2 miles northeast of the offsite mitigation lands. Los Banos Elementary School (1260 7th Street, Los Banos) is approximately 5.5 miles northeast of the project site and 8.5 miles northeast of the offsite mitigation lands.

The public use airport closest to the study area is Los Banos Municipal Airport, 4.4 miles northeast of the project site and 8.3 miles northeast of the offsite mitigation lands. The nearest private airstrip

is Eagle Field, which is approximately 16 miles southeast of the project site and 11.4 miles southeast of the offsite mitigation lands.

Fire Protection

Fire protection for the study area is provided by the California Department of Forestry and Fire Protection (CAL FIRE) because the study area is located within an SRA. SRAs include much of the wildlands in unincorporated Merced County. The project site is in an area considered at high to moderate risk for wildland fires and the offsite mitigation lands are categorized as being at moderate risk for wildland fires (California Department of Forestry and Fire Protection 2007). The CAL FIRE station closest to the study area is the station at 31011 West Gonzaga Road in Gustine, approximately 5.5 miles west of the project site near San Luis Reservoir and 11.5 miles northwest of the offsite mitigation lands. The Gustine station is part of CAL FIRE's Madera-Mariposa-Merced Unit. The unit has 20 engines, 3 bulldozer/transport units, and 5 hand crews.

Due to the fire hazard zoning and the proposed action's location within an area where fire protection is under state jurisdiction, the public safety requirements (such as California PRC regulations discussed previously) to minimize the risk of wildland fire would apply to the study area.

3.6.2 Environmental Consequences

Approach and Methods

Potential impacts related to hazards and hazardous materials were assessed based on the Phase I Environmental Site Assessment for the project site, and an evaluation of the potential for people or the environment to be exposed to hazardous materials or other hazards as a result of the proposed action.

Thresholds of Significance

An alternative would be considered to have a significant impact if it would result in any of the conditions listed below.

- Create a substantial hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Create a substantial hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- Be located on a site that is included on a list of hazardous materials sites that would create a significant hazard to the public or the environment.
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

Because the study area is located more than 4 miles away from any school or airport, the potential for a significant impact on school children or school employees related to hazard or hazardous material, and/or on air traffic or airport safety related to implementation of the proposed action, is

considered nonexistent and is therefore not considered further in this analysis. In addition, because the Phase I Environmental Site Assessment for the project site concluded that there are no significant risks of hazards to the public due to existing contamination, the potential effects of locating the proposed action on a site with hazardous materials is not considered further.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and current dry-land farming and grazing activities would presumably continue. No impacts related to hazards or hazardous materials would occur in the study area beyond those related to the current agricultural activities, such as the risk of wildland fire or the accidental release of farm-related chemicals (e.g., pesticides, herbicides) into the study area.

Proposed Action Alternative

Hazards to the Public or Environment Related to Construction

With the exception of the installation of new fencing on the perimeter of the offsite mitigation lands under the Proposed Action Alternative, no construction activities would occur at this site and no substantial hazards would be expected to occur during construction activities.

Construction of the proposed solar facility would involve small quantities of commonly used materials, such as fuels, oils, lubricants, to operate construction equipment. These materials could be accidentally released into the environment during routine use and could affect construction personnel or the environment. Implementation of EC-9, which requires preparation of a SWPPP and identification of project-specific BMPs, would be implemented under the Proposed Action Alternative to minimize the potential for construction-related impacts on water quality (including downstream delivery of hazardous materials and sediment). In addition, the applicant would implement EC-10, which would require the development of a hazard materials emergency response plan and a spill prevention, control, and countermeasure (SPCC) plan in the event hazardous materials are accidentally released. Implementation of these two environmental commitments, which include provisions to avoid, control and cleanup hazardous spills and leaks should they occur, would ensure this impact is less than significant, although potentially greater that under the No Action Alternative, where no construction-related hazards would occur.

Hazards to the Public or Environment Related to Operation and Maintenance and Site Decommissioning

Operations & maintenance activities under the Proposed Action Alternative would include use and periodic maintenance of buildings, solar panels, the battery energy storage system (BESS), solar components, and the internal road network. The offsite mitigation lands would require mowing or discing one to two times per year. Project site decommissioning and restoration would occur at the end of the life of the project[1] and would likely involve the removal of most aboveground structures, restoration of topsoil, revegetation and seeding.

[1] For the purposes of this EA, it is assumed that the life of the project would be approximately 35 years; however, if the facility remains economically and technically viable, the operator may choose to keep the facility in operation

The majority of hazardous materials to be used during O&M activities and, eventually, decommissioning—fuels, oils, and lubricants—are of low toxicity. As these materials are required for operation of the solar facility at the project site, and farm equipment (e.g., trucks or mowers) at the offsite mitigation lands site, EC-10 would be implemented to reduce the exposure to or potential for accidental spills involving the use of hazardous materials.

In addition, chemicals associated with the BESS may be hazardous to O&M staff, the public, and the environment if misused or otherwise exposed. Specifically, two battery storage technologies are being considered at the solar facility: lithium ion (Li-ion) and zinc bromide battery flow. The primary safety concern associated with the use of the zinc bromide battery is the risk of exposure to elemental bromine, which can be fatal. However, the risk of exposure to elemental bromine during battery operation would be minimal because the zinc bromide flow battery cells are hermetically sealed, with redundant capture systems to contain and separate all working fluids. Further, the units would be aggregated into 40-foot storage containers that contain monitoring and control mechanisms, temperature regulators and air conditioning units, and automated fire suppression systems. Thus, potential hazards associated with the use of zinc bromide batteries would be minimal.

Li-ion batteries are capable of spontaneous ignition and subsequent explosion due to overheating. Overheating may be caused by electrical shorting, rapid discharge, overcharging, manufacturers defect, poor design, or mechanical damage due to improper handling, among many other causes. In general, Li-ion battery fire risks can be managed through proper planning, risk assessment, storage methods, and response protocols. Under the proposed action, hazards associated with use of the Li-ion battery would be minimized through implementation of a fire protection system which would employ a "Suppression through Cooling, Isolation, and Containment" (SCIC) system for fire containment. To that end, the containerized battery energy storage system would include a gaseous fire suppressant and an automatic fire extinguishing system with sound and light alarms designed in accordance with National Fire Protection Association safety standards. The automatic shut-down system for fans and windows would keep the container sealed when the fire extinguishing system is activated. In addition, personnel training would be required to help address the unique issues this type of battery technology presents, such as, battery fire behavior, emergency response procedures, and fire extinguisher use (Li-ion battery focus). Further battery standard operating procedures (SOPs) would include processes that guide shipping and receiving, installation, handling, daily use, storage, and other functions involving the batteries. With these BMPs in place, hazard risks to personnel, the public and the environment would be minimized.

Although the potential for hazards related to O&M of the solar facility under the Proposed Action Alternative would be greater than under the No Action Alternative, this impact would be less than significant.

Impairment of Implementation of, or Physical Interference with an Adopted Emergency Response Plan or Emergency Evacuation Plan

It is estimated that a total of 10,307 truck deliveries would be required to import construction materials and deliver equipment to the project site. Based on the preliminary construction schedule and duration of construction elements, the majority of heavy construction work would take place in

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for a period longer than 35 years. Any decision to extend the life of the solar facility beyond 35 years would be made in consultation with the Service.

2015. The average daily truck trip generation would be 128 trips during the peak month for haul activity (month 6 or 7) and 34 truck trips during the month with the highest employment (month 14). As described in Section 3.11, *Transportation and Traffic*, sections of Billy Wright Road would need to be improved to allow for equipment delivery requiring grading and repaving, which may result in temporary lane closures and affect emergency access.

The Proposed Action Alternative would include mitigation measures to address construction-related traffic concerns. Implementation of Mitigation Measures TRA-1, TRA-2, TRA-3, TRA-4, and TRA-5 would be implemented to reduce construction-related effects on safety and traffic circulation at the intersection of SR 152/33 and Billy Wright Road. These measures reflect variations or options that would be evaluated by the applicant, Caltrans and the County during final design of the proposed action to determine the most appropriate approach for reducing traffic-related impacts, including potential impacts on emergency access, to less-than-significant levels. Implementation of the selected measures would reduce impacts on emergency vehicle access to a less-than-significant level. This impact would be more substantial than under the No Action Alternative where construction-related traffic, and associated potential effects on emergency response activities or evacuation plans, would not occur.

Exposure of People or Structures to a Substantial Risk Involving Wildland Fires

As described above, the project site is located in an area considered at high to moderate risk for wildland fires and the proposed offsite mitigation lands site is categorized as being at moderate risk for wildland fires (California Department of Forestry and Fire Protection 2007). The study area consists primarily of grassland and grazing land. Dry climate conditions create circumstances rich with fuels, although areas with active grazing and agricultural irrigation provide some fuel reduction. Human activities are the primary reason wildfires start, although lightning strikes do occasionally occur and start fires. Construction activities under the Proposed Action Alternative would involve the use of heavy equipment, welding, and other activities that have potential to ignite fires.

Once the solar facility is built, fewer personnel would be required onsite, thereby lowering the potential for human-caused fires. Solar panels are manufactured from fire-resistant materials and other electrical equipment would be enclosed in fire-resistant material. All wiring would be in accordance with current electrical codes, including clear-area setbacks from utility poles. Malfunction of equipment leading to a potentially significant increase in fire hazards is not expected during operations and maintenance. Additionally, as previously discussed, Li-ion batteries are capable of spontaneous ignition and subsequent explosion due to overheating. However, facility design, personnel training, and implementation of battery SOPs would minimize the fire risk associated with the use of the Li-ion batteries.

In addition, vegetation maintenance would be required on the project site to reduce the risk of fire. Mowing, which would occur two to four times per year, would be utilized to keep vegetation down along the base of the solar panels and to manage open areas of grassland. In lieu of mowing, a grazing program may be utilized to control and manage vegetation within the project site. Livestock grazing would also be conducted under a Service-approved Habitat Management Plan on the offsite mitigation lands, along with occasional mowing or discing to maintain fire breaks, depending on rain patterns and grass growth.

Perimeter and interior access roads would conform to Merced County and State of California Fire Code standards. Existing roads would be improved and new roads constructed to a minimum 20-

foot width and would be made using all-weather aggregate base. In addition, the minimum standards set forth by PRC 4290, Title 14, for fire protection and emergency water standards would be met.

To further reduce the potential for wildland fires as a result of construction or operation of the proposed action, the Proposed Action Alternative would include EC-11, which requires the applicant to prepare and implement a fire protection plan. Implementation of this plan, in combination with the vegetation management and design considerations described above, would ensure impacts associated with wildland fires would be less than significant. This impact would be greater than the risk for human-caused fires in the study area under the No Action Alternative where no new infrastructure or personnel would be required.

3.7 Hydrology and Water Quality

This section describes the affected environment pertaining to hydrology and water quality and the potential environmental consequences that could result from implementation of the proposed action. For the purposes of this section, the study area is comprised of four separate and small local watersheds located within a single larger watershed, the San Luis Holding Reservoir watershed that includes the project site and offsite mitigation lands.

3.7.1 Affected Environment

Regulatory Setting

Federal

Clean Water Act

The federal CWA is intended to restore and maintain the chemical, physical, and biological integrity of the nation's waters (33 CFR 1251). It identifies water quality standards, criteria, and guidelines for protecting water quality and requires a federal permit for discharges to waters of the United States. Section 404 of the CWA authorizes USACE to issue permits regulating the discharge of dredged and fill material into waters of the United States, including wetlands. Section 401 of the CWA requires an applicant requesting a federal permit (including a CWA Section 404 permit) for an activity that may result in any discharge into navigable waters to provide state certification that the proposed activity will not violate state and federal water quality standards. Section 303(d) of the CWA lists streams and other waters of the United States that have *Water Quality Limited Segments* or portions that do not meet water quality standards, and requires a Total Maximum Daily Load (TMDL) be established to determine the maximum amount of a pollutant that the listed waterbody can received and still meet water quality standards.

National Pollutant Discharge Elimination System

Created under CWA, the NPDES permit program applies to stormwater and point source discharges. EPA has delegated regulatory authority for the NPDES program in California to the State Water Board and nine Regional Water Boards. In 2009, the State Water Board adopted the Construction General Permit, which regulates stormwater discharges from construction sites that involve 1 acre or more of disturbed area (State Water Resources Control Board 2009). Coverage under the Construction General Permit is obtained by submitting a NOI to the State Water Board, which includes site-specific information and certification of compliance with the terms of the Construction General Permit. A risk level assessment of project sediment generation and receiving water characteristics must be conducted to determine the level of BMPs and monitoring requirements.

Additionally, a site-specific SWPPP that identifies an effective combination of erosion control, sediment control, and non-stormwater BMPs to reduce construction effects on receiving water quality must also be submitted to the State Water Board with the NOI. The SWPPP also includes demonstration of compliance with all applicable local and regional erosion and sediment control standards, identification of responsible parties, a detailed construction timeline, and a BMP monitoring and maintenance schedule.

National Flood Insurance Program

The National Flood Insurance Program requires the Federal Emergency Management Agency (FEMA) to delineate floodplains throughout the United States and present the information on Flood Insurance Rate Maps (FIRMs). FIRMs are used to determine if existing or future projects are located in flood hazard areas and to determine if those projects would be prone to future flood risks.

The project site is mapped by FEMA as Zone D. Zone D is for areas in which flood hazards are undetermined, but possible (Federal Emergency Management Agency 2013). No FEMA designated Special Flood Hazard Areas or mapped regulatory floodways exist in the project site (Federal Emergency Management Agency 2013). The FEMA Flood Insurance Study (FIS) for Merced County does not make any reference to any flood hazards in the project site (Federal Emergency Management Agency 2008). In addition, the proposed action would not include the construction of any housing. As a result, the potential for increased flooding as a result of the proposed action is not discussed further in this section.

Environmental Setting

Surrounding Land Uses, Soils, and Vegetation

The project site is on the eastern foothill alluvial fans of the Coast Range above the western margin of the San Joaquin Valley floor. The California Aqueduct is located as close as 0.6 mile east of the study area's eastern boundary and the Los Banos Reservoir is located 0.25 mile directly south of the site's southern boundary, but within a different watershed. Elevations in the project site range from about 700 feet on a ridge along the western boundary to 300 feet in a dry drainage to the southeast. Temperatures at the site often reach into the 100s during the summer and precipitation ranges from 9 to 11 inches annually, in years not affected by drought conditions. Most of the rainfall occurs between November and May.

The lands in and around the site have been cultivated and species introduction and agricultural weeding practices have eliminated most of the native species (Clearwater Hydrology 2013). Use of the Coast Range foothills as rangeland has resulted in soil erosion and loss of natural vegetation. The grazed areas now generally consist of grasses and forbs, including soft chess, brome, wild oat, and filaree (U.S. Soil Conservation Service 1990).

In 2013, the majority of the site was covered with the residual 4–6 inches of winter wheat. A few fields at the southern edge of the project site and the rolling hill slopes located on the western portions of project site were composed of grazed annual, nonnative grasslands. Vegetation coverage of the entire site was estimated at 75% in 2013 (Clearwater Hydrology 2013).

The project site lies within the San Luis Water District's service area boundary.

Hydrology

Surface Water

The hydrology of the project site has been modified over the past 15 years. Consistent agricultural use and the placement of numerous soil berms, artificial impoundments (i.e., ponds and ditches likely created for irrigation and drainage purposes), and bermed access roads have physically altered the natural hydrology and aquatic habitats within and surrounding the area. The water patterns across the site are highly fragmented, and in conjunction with frequent soil disturbance

and compaction, most water onsite is directed to flow quickly off the site. Thus, these modifications have resulted in aquatic systems that under normal conditions held water occasionally as driven by seasonal precipitation and now have become increasingly erratic with diminished water-holding capacity. Further, as the site is dry-farmed and no longer irrigated for crops, the aquatic habitats are currently highly ephemeral and generally dry throughout the year.

Eight ephemeral swales, one emergent wetland, one vernal pool, thirteen ponds, and four drainage ditches were identified in or directly abutting the project site. None of these delineated features have an associated riparian zone or the potential to support such a community due to the current hydrological environment within the agricultural landscape (Ecology and Environment 2013).

The only surface water feature located on the offsite mitigation lands is a single ephemeral drainage ditch that runs along the along the southwest portion of the site. The drainage ditch only contains water after severe storm events. As a result, impacts on surface water on the offsite mitigation lands are not anticipated, and are not discussed further in this section.

The project site is located in the headwaters of four separate and small watersheds. Approximately 53.4% of the project site is within Watershed 1 (Figure 3.7-1, Table 3.7-1), which contains one intermittent drainage flowing southeast that is joined by a second intermittent drainage flowing northeast. The combined intermittent drainages exit the project site and flow northeast toward the California Aqueduct. USGS topographic quadrangle that encompasses the project site shows this as an intermittent drainage that flows under Interstate 5 (I-5) and ends before reaching the California Aqueduct. Inspection of aerial photography shows the drainage flows through a culvert under I-5 and then infiltrates into the flat fields on the other side where there is no detectable channel on the aerial.

Table 3.7-1. Watershed Characteristics of the Project Site and Area

Watershed	Total[a] Area (acres)	Area within Project Site Boundary (acres)[b]	Percent of Total Watershed within Project Site Boundary	Percent of Project Site within the Watershed
1	2,203.2	1,458.3	66	53.4
2	1,158.0	555.5	48	20.3
3	1,025.5	558.4	54	20.5
4	2,402.7	76.7	3	2.8

[a] Total watershed areas are based on outlet locations set at the boundary with the California Aqueduct. Runoff may actually fully infiltrate into the ground prior to reaching the aqueduct.

[b] Approximately 3.0% (81.6 acres) of the project site drains into the Los Banos basin and the Los Banos Reservoir. This small area is located along the ridgetop in the southeast portion of the project site.

Approximately 20.3% of the project site is within Watershed 2 (Figure 3.7-1, Table 3.7-1). The intermittent drainages within Watershed 2 originate in the northeast portion of the project site and flow northeast, joining with additional small drainages before going under I-5. No defined channel is detectable on the northeast side of I-5 as any runoff disperses onto the flat field and infiltrates into the ground prior to reaching the California Aqueduct.

Approximately 20.5% of the project site is within Watershed 3 (Figure 3.7-1, Table 3.7-1). The watershed's intermittent drainage originates in the northwest portion of the site and flows north

then northeast and into a culvert under I-5. Aerial photography indicates runoff in the drainage eventually infiltrates into the ground in a field located between I-5 and the California Aqueduct.

Approximately 2.8% of the project site is within Watershed 4 (Figure 3.7-1, Table 3.7-1). The watershed's intermittent drainage originates in the far northwest portion of the project site and connects with other intermittent branches outside the project site boundary where it flows northeast, under I-5, through culverts under the California Aqueduct and State Route (SR) 33, and across the Delta Mendota Canal before infiltrating into farm fields.

The project conveyances may have historically drained to the San Joaquin Valley floor. However, with the construction of the SWP and the CVP, in conjunction with land modifications, much of this water has been redirected and cut off from the valley systems, including the sloughs of the San Luis Wildlife Area and the San Joaquin and Merced Rivers. As a result, all of the drainages that originate in the project site are intermittent and not tributary to other perennial drainages downstream, with most of the runoff infiltrating into fields below. Furthermore, the drainages within the project site are not all continuous. Natural runoff patterns have been modified by agricultural activities within the project site including several small earthen embankments, artificial and seasonal impoundments, and access road berms that impede the natural flow paths. Some of the project site drainages terminate at a road berm impoundment at the northern or eastern property boundaries and no culvert or overflow spillway exists (Clearwater Hydrology 2013).

Water Quality

Surface water quality in Merced County differs from east to west and from north to south, caused by differences in the climate, geology, and land use effects over time. Surface water originating in the Sierra Nevada is of very high quality, but major changes in water quality occur as surface waters enter the San Joaquin Valley (Merced County 2012). The east side streams and rivers from the Sierra Nevada have low dissolved solids, while the west side streams have a much higher salinity because of the marine sedimentary rocks comprising the Diablo Range of the Coastal Mountains. Moving toward the valley floor from east or west, water quality in streams is generally diminished by diversions and regulation that decrease flows and the higher concentrations of natural and applied pollutants carried by agricultural return flows (Merced County 2012).

According to the Merced County General Plan Update Background Report (Merced County 2012), surface water quality in the San Joaquin-Tulare Basin unit is poor and, in some instances, samples exceeded guidelines and criteria. Furthermore, the number of nonnative fish species and fish with external anomalies were especially high (Dubrovsky and others 1998 *in* Merced County 2012). Agricultural return flows continue to adversely affect surface water quality in downstream reaches and grazing, agricultural activities, and runoff from roads and rural residences contribute to degradation of surface water quality in the study area. Specifically, sediment input from construction disturbances and agricultural / grazing activities may cause reduced light penetration, clog filter feeding organisms, and transport hydrophobic contaminants such as organo-chlorine pesticides. Metals and petroleum hydrocarbons washed from roadways and parking lots, as well as fertilizers, pesticides, and herbicides from agricultural areas, may degrade water quality and wildlife habitat in receiving water bodies.

The Central Valley Water Board maintains the list of impaired or threatened water bodies for watersheds within Merced County (i.e., the 303[d] list), which was last updated in 2006. The 303(d) list is a comprehensive public accounting of all impaired or threatened water bodies, regardless of the cause or source of the impairment or threat. Standards may be violated by an individual

pollutant, multiple pollutants, thermal pollution, or an unknown cause of impairment. A water body is considered threatened if it currently attains water quality standards but is predicted to violate standards by the time the next Section 303(d) list is submitted to EPA. Although there are no streams within the study area listed as being impaired for any constituents, the *Tributary Rule* states that upstream unimpaired water shall not contribute to downstream water quality impairments.

Groundwater

Nearly all of the project site is located just outside the western boundary of the Delta-Mendota Subbasin of the San Joaquin Valley Groundwater Basin (California Department of Water Resources 2006). A small southern section of the project site lies within the boundary of this subbasin. Groundwater below the project site likely flows downward and laterally toward the San Joaquin Valley trough where it then upwells to areas of discharge along rivers and marshes (Sneed et al. 2013).

Three water-bearing zones exist in the Delta-Mendota groundwater subbasin. The lower zone contains confined fresh water in the lower section of the Tulare Formation. The upper zone contains confined, semi-confined, and unconfined water in the upper section of the Tulare Formation and younger deposits. The shallow zone contains unconfined water within about 25 feet of the land surface (California Department of Water Resources 2006). Groundwater levels averaged over the entire subbasin increased by 202 feet from 1970 to 2000, largely because of reduced reliance on groundwater pumping made possible by surface water imports from the Delta Mendota Canal and the California Aqueduct (California Department of Water Resources 2006). Interruption of the surface water deliveries, primarily during drought years when not enough water is available in the canals, can lead to quick declines in groundwater levels, which was experienced in the periods 1796–1977, 1987–1992, and 2007–2010 (Sneed et al. 2013).

Unsustainable pumping and drought conditions have led to groundwater overdraft in sections of Merced County, particularly near the town of El Nido and Le Grand, and east of Turlock within the Eastside Water District. The use of groundwater conjunctive use, conservation, and recharge basins has been active in an attempt to reduce groundwater overdraft.

3.7.2 Environmental Consequences

Approach and Methods

The focus of the environmental impact analysis is to determine how construction and operation of the proposed action could potentially alter surface water, groundwater conditions, and water quality. Clearwater Hydrology conducted a study to assess how the proposed action would potentially change surface water runoff characteristics, flooding, drainage patterns, erosion and sedimentation, and groundwater recharge (Clearwater Hydrology 2013).

Thresholds of Significance

An alternative would be considered to have a significant impact on hydrology or water quality in the study area if it would result in any of the conditions listed below.

- Substantially increase erosion or siltation within existing drainage patterns.
- Degrade water quality by increasing the rate or amount of surface water runoff within the study area.

- Deplete the groundwater supply.
- Cause prolonged alterations to the historical baseline or desired water quality conditions.
- Create flood hazards.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and the study area would remain in grazing and agricultural use. No effects on seasonal drainages, wetland features, or waters of the United States would occur and there would be no effects on groundwater resources, water quality, or flood risk.

Proposed Action Alternative

Construction-Related Impacts

Construction of proposed infrastructure, including substations, the operations and maintenance (O&M) building, and the battery storage area, would convert approximately 12.0 acres (0.6%) of agricultural lands within the project site to impervious surfaces. Grading of the project site would also create minor modifications of existing drainage paths. However, the layout of the solar array would not encroach into intermittent drainages with well-defined channels, such as those in the southeast portion of the site, and would largely be positioned in areas with sheet flow and up-gradient of appreciable channelized flow. Thus, the flow paths of channelized water within the project site (and at exit points from the project site) would be unchanged. Furthermore, grading would reduce slopes within the solar array to 15% or less, which would slow runoff velocities and reduce the potential for erosion and sedimentation once construction is complete.

Proposed grading and construction activities have the potential to create short-term discharges of sediment and other nonpoint source pollutants that could drain to offsite areas and degrade local water quality. Approximately 3,111,000 cubic yards of material would be graded to install inverter pads, the switching station, roads, arrays, battery storage, and other improvements. Approximately 82,000 cubic yards of material (mostly gravel for all weather roads) would be imported to the project site to facilitate construction. Soil compaction, soil strengthening agents, or geo fabric may be used for access and circulation roads. Compaction may also be required for the construction of inverter pads, the switching station, control rooms, and roads. Road construction would require soil conditioning to achieve proper compaction. Roads and other work areas would be periodically sprayed with water to reduce dust, and may be treated with dust-suppression products approved by Merced County. The Proposed Action Alternative includes EC-9, preparation of a SWPPP and identification of project-specific BMPs consistent with the Construction General Permit to reduce construction-related impacts on water quality. Implementation of EC-9 would reduce construction-related impacts on hydrology and water quality under the Proposed Action Alternative to less than significant. This impact would be greater than the No Action Alternative, however, where no construction would occur.

Operational Impacts

Historic plowing and tilling activities have created and maintained broad and shallow swale channels in the project site that lower runoff velocities and limit channelization (Clearwater Hydrology 2013). It is possible that discontinuation of plowing and tilling could allow surface water runoff to concentrate and form more well-defined drainage paths, which could increase drainage and peak runoff rates. However, the magnitude of this increase would be minor, if it increases at all, because the volume of water available for runoff is predicted to decrease under the Proposed Action Alternative (Clearwater Hydrology 2013). Grading would reduce slopes to 15% which would slow runoff velocities, and runoff would leave the site in small, intermittent drainages that ultimately infiltrate into the ground at lower elevations (and are not tributary to other receiving water bodies).

The Proposed Action Alternative would require approximately 4.79 acre-feet of water annually for O&M. Water for O&M would be supplied by the San Luis Water District via existing surface water rights. No groundwater would be utilized for the Proposed Action Alternative.

The majority of water used would be for washing solar panels three times per year. Much of the runoff from the panel washing would infiltrate back into the ground as it runs off the solar panels and is not anticipated to create additional surface water runoff that would exceed the capacity of existing drainage systems.

There would be no chemicals in the wash water used to clean the solar panel. The overall amount of runoff pollution originating from the project site could decrease compared to existing conditions because any pesticides or fertilizers used in former farming practices would be discontinued and opportunities for filtration into the ground would still exist. This may have a slight beneficial effect on the water quality of the study area.

In summary, long-term operation of the Proposed Action Alternative would not adversely affect water quality or lead to a violation of water quality standards. Water used in O&M activities would run off the panels and infiltrate into the ground below, and not cause sedimentation or other water quality concerns. An engineered and approved septic system would be installed in the O&M facility and would be gravity fed from the facility's plumbing. Septic system permits would be obtained and strictly adhered to in the installation. The Proposed Action Alternative would not contribute to runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Therefore, impacts to stormwater runoff and water quality would be less than significant, and similar (if not reduced) to those associated with the No Action Alternative.

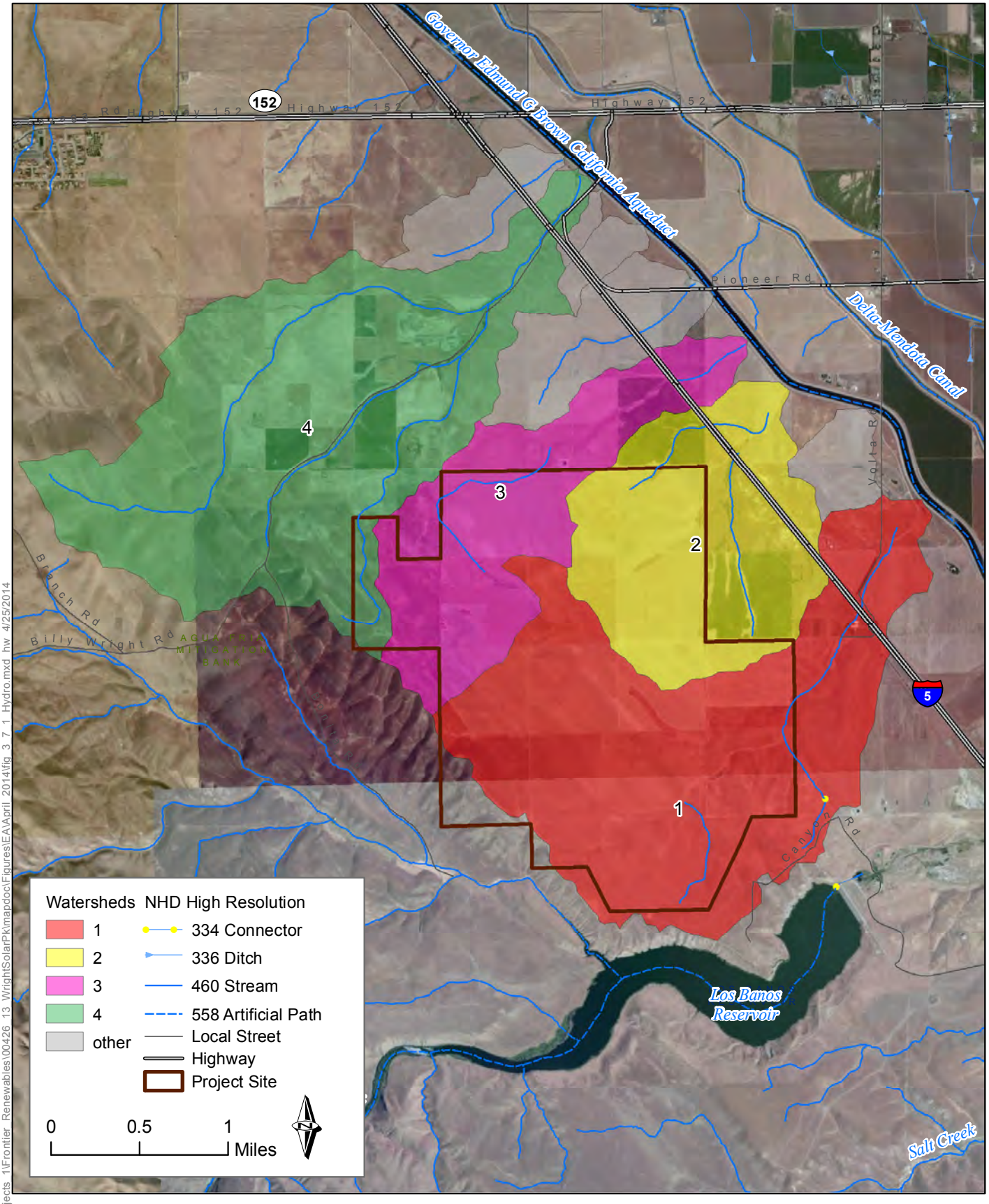

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Figure 3.7-1
Site Hydrology

3.8 Land Use and Planning

This section describes regulations and policies affecting land use and planning and the potential impacts of the proposed action on existing and planned land uses in the study area. For the purposes of this section, the study area includes the project site and offsite mitigation lands.

3.8.1 Existing Conditions

Regulatory Setting

Local

Merced County General Plan

The *2030 Merced County General Plan* (Merced County 2013) sets out the pattern of future land use within the unincorporated areas of the Merced County including, among other things, agricultural lands, areas of existing communities, and areas of future planned communities. All land uses within the County are provided a specific designation that governs their future use. The land use designation for the study area is Foothill Pasture, which is applied where the land is subject to "non-cultivated agricultural practices which typically require larger areas of land due to soil quality, limited water availability and steeper slopes" (Merced County 2013).

The Merced County General Plan includes several policies specific to allowed land uses within the study area. For example, Policy LU-2.5 provides the criteria the County must consider in considering a conditional use permit application to locate commercial or industrial uses in rural areas, such as impacts on agricultural land and sensitive natural resources, impacts on surface and groundwater resources, impacts on public services and transportation resources, and consistency with various elements of the General Plan (among others). Policy LU-2.7 provides an allowance for the development of renewable energy facilities, including solar facilities, in Agricultural and Foothill Pasture areas provided such uses do not interfere with agricultural practices or conflict with sensitive habitats or other biological resources. Finally, the natural resources element of the General Plan provides a range of policies specific to the protection of sensitive resources, such as wetlands and vernal pools, agricultural lands, grasslands, special-status species habitats, and wildlife movement and migration corridors, among others. The Natural Resources Element also includes a goal (Goal NR-2) to provide adequate and efficient energy supplies by increasing renewable energy production and energy conservation in the county.

Merced County General Plan polices that apply to the study area are summarized in Table 3.8-1.

Merced County Zoning Code

The Merced County zoning code identifies allowed land uses and mandatory standards for development within specific land use zones. It differs from the general plan in that the zoning ordinance establishes enforceable development standards while the general plan identifies future land use patterns. Zoning implements the land use policies described in the general plan.

The zoning designation for the study area is Exclusive Agriculture (A-2). This zone is applied where agriculture is the primary use of the property. The A-2 zone allows one single-family residence per parcel of land, agricultural production, a ranch office, and accessory buildings. A solar farm of the type being proposed may be allowed upon approval of a CUP by the County.

Environmental Setting

Land Use

The study area consists of agricultural land located in western Merced County. Most of the project site is currently used for cattle grazing, with a large portion also planted in winter wheat and dry-land farmed. With the exception of areas along the southern and western boundaries of the project site, the land has also been disced and tilled annually (Wright Solar Park 2013). The project site slopes upward to the west, rising in elevation from approximately 300 feet to approximately 700 feet amsl. A major electrical transmission line crosses the project site in a general southeast to northwest direction.

The land to the north and south of the project site is utilized primarily for grazing, although almond trees are being cultivated on a parcel located between the project site and I-5. San Luis Reservoir and O'Neill Forebay are approximately 5 miles north of the project site. There is a PG&E substation, small residential tract, and visitor-serving commercial area located south of the junction of SR 152 and SR 33. The Billy Wright County landfill is approximately 1 mile north of the project site. To the west are the beginnings of the Coast Range, with grazing land on increasingly hilly slopes. Los Banos Reservoir is located approximately 0.25 mile south and west of the project site. To the east is grazing land, the almond orchard, and I-5. The community of Santa Nella is approximately 8 miles north of the project site. The city of Los Banos is approximately 4 miles east of the project site and on the east side of I-5 (Figure 3.8-1).

There are five homes north of the project site that rely on Billy Wright Road as their primary access route. The closest home is approximately 600 feet from the northeastern corner of the project site and the other homes are generally spread over a large area.

3.8.2 Environmental Consequences

Approach and Methods

In general, the potential effects of the proposed action were considered in terms of whether the alternatives would conflict with an applicable land use plan, policy, or regulation.

Thresholds of Significance

An alternative would be considered to have a significant impact on land use if it would result in any of the conditions listed below.

- Physically divide an established community.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the proposed action (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.

- Conflict with any applicable HCP or natural community conservation plan (NCCP).

The study area consists of dry-land farmed and grazed agricultural land. There is currently no established community within the study area, and an HCP or NCCP applicable to the study area has not been adopted. Therefore, these issues are not considered further in this section.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and land uses in the study area would continue. There would be no impact on land use.

Proposed Action Alternative

Potential to Conflict with Land Use Plans and Policies

As noted above, the study area is designated Foothill Pasture in the general plan. As summarized in Table 3.8-1, the Proposed Action Alternative would be consistent with all of the Merced County General Plan goals and policies that apply to the study area, including all provisions for siting renewable energy facilities in agricultural areas. This impact would be less than significant, although slightly greater than the No Action Alternative, where no changes in land use at the project site would occur.

Table 3.8-1. 2030 Merced County General Plan Consistency Evaluation – Proposed Action Alternative

General Plan Goal/Policy	Policy Text	Consistency Evaluation
Policy LU 2.3	Land Use Activity Limitations. Limit allowed land use within Agricultural and Foothill Pasture areas to agricultural crop production, farm support operations, and grazing and open space uses.	The proposed action does not include crop production, farm support operations, or grazing and open space uses. Policies LU 2.5 and LU 2.7 provide that other land uses maybe approved in agricultural areas upon approval of a discretionary land use permit. Determination: **Consistent**
Policy LU 2.5	Agricultural Support Facilities. Allow consideration of locating characteristically-specific commercial and industrial uses in rural areas in limited cases based on the unique nature of the use and for health and safety reasons, which require location on large parcels or in sparsely populated areas. In addition, consider the following criteria during the Conditional Use Permit review process: The use requires location in a rural area because of one or more of the following characteristics: unusual site area requirements, natural resource production purposes, the use is directly agricultural related, or because of specific operational characteristics which pose a health or safety problem to urban populations. a) The use is located near or readily accessible to a probable work force. b) The use is consistent with the intent and policies of the Agricultural, Natural Resources, and Health and Safety Elements. c) The use will not significantly impact adjacent agricultural, recreational, natural, cultural, wildlife, or other identified Natural Resources Element. d) The use is protected from hazards identified in the Health and Safety Element. e) The use is not located on productive agricultural land when nonproductive agricultural land is available in the vicinity of the proposed project.	The proposed action is neither commercial nor industrial, although it has some characteristics of industrial use. Therefore, the criteria under this policy are applicable as the means of determining whether to approve a CUP for the project. Implementation of the proposed action would not proceed without approval of the CUP, which would ensure consistency with this policy. Determination: **Consistent**

General Plan Goal/Policy	Policy Text	Consistency Evaluation
	f) The use is limited in size, time of operation, or length of permit authority where necessary to ensure compatibility with adjacent land uses. g) The use shall not have a detrimental effect on surface or groundwater resources. h) The use shall provide adequate infrastructure and improvements to reduce impacts on County services. i) The use shall have access to adequate transportation facilities without creating abnormally high traffic volumes and shall provide road improvements to mitigate impacts generated by the project.	
Policy LU 2.7	Rural Energy Production. Allow the development of ethanol production, co-generation, solar, and wind facilities in Agricultural and Foothill Pasture areas that produce renewable energy, support agricultural-related industries, and/or use agricultural waste, provided that such uses do not interfere with agricultural practices or conflict with sensitive habitats or other biological resources.	The proposed action includes construction of a solar energy facility on the project site, which would produce renewable energy, available to the grid, consistent with this policy. Determination: **Consistent**
Goal AG-2		
Policy AG-3.11	Solar and Wind Energy Production Facilities. Encourage the installation of solar and wind energy production facilities in agricultural areas so long as they do not result in a tax burden to the County, do not result in permanent water transfers off of productive agricultural land, do not require cancellation of Williamson Act contracts, and do not conflict with sensitive habitats or other biological resources. In addition, approval of such facilities shall require dedications of agricultural land and habitat mitigation when impacts to these resources have been determined to be significant pursuant to CEQA, and measures to control erosion, and assurances for financing decommissioning activities.	The applicant would enter into a Community Benefits Agreement with the County as a condition of approval that would ensure that the proposed action would not result in a tax burden to the County. The proposed action does not propose any permanent water transfers off of productive agricultural land. The proposed action would include habitat mitigation, measures to control erosion, and assurances for financing decommissioning activities under a decommissioning and reclamation plan. The proposed action would require cancellation of portions of Williamson Act contracts on five parcels. However, cancellations would be at the discretion of the County, and only approved if found to be in the public interest. Determination: **Consistent**

General Plan Goal/Policy	Policy Text	Consistency Evaluation
Goal NR-1		
Policy NR-1.1	Habitat Protection. Identify areas that have significant long-term habitat and wetland values including riparian corridors, wetlands, grasslands, rivers and waterways, oak woodlands, vernal pools, and wildlife movement and migration corridors, and provide information to landowners.	The Wright Solar Park EIR, prepared by Merced County, provides a comprehensive description of habitat and wetland values in the study area in compliance with this policy. Section 3.3, *Biological Resources*, of this EA also summarizes habitat values within the study area in the context of the proposed action. Determination: **Consistent**
Policy NR-1.2	Protected Natural Lands. Identify and support methods to increase the acreage of protected natural lands and special habitats, including but not limited to, wetlands, grasslands, vernal pools, and wildlife movement and migration corridors, potentially through the use of conservation easements.	Impacts on habitat on the project site would be avoided outside areas where solar infrastructure would be located, and further reduced by the protection in perpetuity of 2,450 acres of mitigation lands offsite. Determination: **Consistent**
Policy NR-1.4	Important Vegetative Resource Protection. Minimize the removal of vegetative resources which stabilize slopes, reduce surface water runoff, erosion, and sedimentation.	During construction, existing vegetation would be removed from approximately 1,600 acres (1,400 acres of permanent disturbance and 200 acres of temporary disturbance) of the project site. However, this area would be revegetated upon completion of construction or decommissioning to reduce the potential for erosion, runoff, and sedimentation. Standard BMPs would also be employed during construction to reduce construction-related runoff. Determination: **Consistent**
Policy NR-1.6	Terrestrial Wildlife Mobility. Encourage property owners within or adjacent to designated habitat connectivity corridors that have been mapped or otherwise identified by CDFW or the Service to manage their lands in accordance with such mapping programs. In the planning and development of public works projects that could physically interfere with wildlife mobility, the County shall consult with CDFW and the Service to determine the potential for such effects and implement any feasible mitigation measures.	The study area is used by San Joaquin kit fox as a movement corridor. Impacts on kit fox movement through the study area would be minimized through design features, avoidance and minimization measures, and preservation in perpetuity of the offsite mitigation lands. Determination: **Consistent**

General Plan Goal/Policy	Policy Text	Consistency Evaluation
Policy NR-1.17	Agency Coordination. Consult with private, local, State, and Federal agencies to assist in the protection of biological resources and prevention of degradation, encroachment, or loss of resources managed by these agencies.	The applicant is currently working with various regulatory and resource agencies, including the Service, to obtain the necessary authorizations to implement the proposed action. The evaluation considered in this EA specifically addresses the potential effects of the proposed action on federally listed species, in accordance with the ITP application submitted in accordance with ESA Section 10(a)(1)(B). The applicant will be required to obtain the ITP, along with other authorizations, before proceeding with the proposed action. Determination: **Consistent**
Goal NR-2		
Policy NR-2.1	Renewable Energy Use. Promote the development and use of renewable energy resources to reduce dependency on petroleum-based energy sources.	Implementation of the proposed action would produce renewable energy in the form of electricity generated from PV solar arrays. Determination: **Consistent**
Policy NR-2.4	Solar Power. Encourage on-site solar power use in residential, commercial, and industrial buildings, and utility-scale solar facilities in rural locations that do not harm long-term agricultural productivity and habitat values consistent with Policies AG-3.11 and LU-2.7.	Implementation of the proposed action would produce renewable energy in the form of electricity generated from PV solar arrays. Impacts on agricultural land would be limited. Habitat values would be maintained through implementation of the proposed action, including preservation in perpetuity of the offsite mitigation lands. Determination: **Consistent**
Policy NR-2.6	Open Space Impacts. Work with public agencies and private energy providers to ensure that energy projects avoid or minimize impacts to open space, natural resources, and productive agricultural land.	The applicant is currently working with various regulatory and resource agencies, including the Service, to obtain the necessary authorizations to implement the proposed action. The evaluation considered in this EA specifically addresses the potential effects of the proposed action on federally listed species, in accordance with the ITP application submitted in accordance with ESA Section 10(a)(1)(B). The applicant will be required to obtain the ITP, along with other authorizations, before proceeding with the proposed action. Determination: **Consistent**

General Plan Goal/Policy	Policy Text	Consistency Evaluation
Goal NR-3		
Policy NR-3.1	Soil Protection. Protect soil resources from erosion, contamination, and other effects that substantially reduce their value or lead to the creation of hazards.	Implementation of the proposed action would protect the project site against erosion through applicable BMPs, including the required SWPPP (EC-9) and the mitigation measures that would be required through the CUP. Determination: **Consistent**
Policy NR-3.2	Soil Erosion and Contamination. Require minimal disturbance of vegetation during construction to improve soil stability, reduce erosion, and improve stormwater quality	The project site would be revegetated upon completion of construction to avoid erosion during operation. Existing activities, grazing and dry-land farming, would continue at the mitigation site and grazing management would ensure that erosion is prevented. Determination: **Consistent**
Goal NR-4		
Policy NR-4.1	Scenic Resource Preservation. Promote the preservation of agricultural land, ranch land, and other open space areas as a means of protecting the County's scenic resources.	The proposed action would convert the project site to nonagricultural use. This would change the view of this land from open grazing land to flat panel solar arrays. However, because I-5 is not a state scenic highway within view of the project site, the proposed action would not conflict with this policy. Determination: **Consistent**
Policy NR-4.2	Special Review Process for Structures Adjacent to Scenic Highways. Coordinate with Caltrans, during the review of proposed structures and activities located adjacent to State-designated scenic highways, to ensure that scenic vistas and local scenic values are not significantly degraded.	I-5 and SR 152 are designated state scenic highways north and west of their junction. The project site is not visible from those segments of I-5 and SR 152 that are designated state scenic highways. As such, the proposed action is not subject to coordination with the California Department of Transportation (Caltrans) on that account. Determination: **Not Applicable**

General Plan Goal/Policy	Policy Text	Consistency Evaluation
Goal AQ-2		
Policy AQ-2.4	Mitigation. Require that local and regional air quality impacts identified during CEQA review for projects reviewed and approved by the County are consistently and fairly mitigated.	Impacts on air quality due to implementation of the proposed action would be minimized or avoided with implementation of applicable ECs and mitigation measures. Determination: **Consistent**
Policy AQ-2.7	Air District Best Performance Standards (RDR). Require the County to use the Best Performance Standards adopted by SJVAPCD during the development review and decision-making process to ensure new projects meet the targets set by the district.	The SJVAPCD best performance standards under Regulation VIII and other rules would be incorporated into the project's mitigation measures. Determination: **Consistent**
Goal AQ-6		
Policy AQ-6.1	Particulate Emissions from Construction. Support the SJVAPCD's efforts to reduce particulate emissions from construction, grading, excavation, and demolition to the maximum extent feasible and consistent with State and Federal regulations.	The proposed action would be subject to the rules and regulations of the SJVAPCD; compliance with SJVAPCD rules would ensure consistency with this policy. Determination: **Consistent**
Policy AQ-6.3	Paving Materials. Require all access roads, driveways, and parking areas serving new commercial and industrial development to be constructed with materials that minimize particulate emissions and are appropriate to the scale and intensity of use.	The proposed action would be subject to the rules and regulations of the SJVAPCD, and would implement ECs and mitigation measures to avoid or minimize particulate emissions. Determination: **Consistent**

CDFW = California Department of Fish and Wildlife.
Caltrans = California Department of Transportation.
SJVAPCD = San Joaquin Valley Air Pollution Control District.

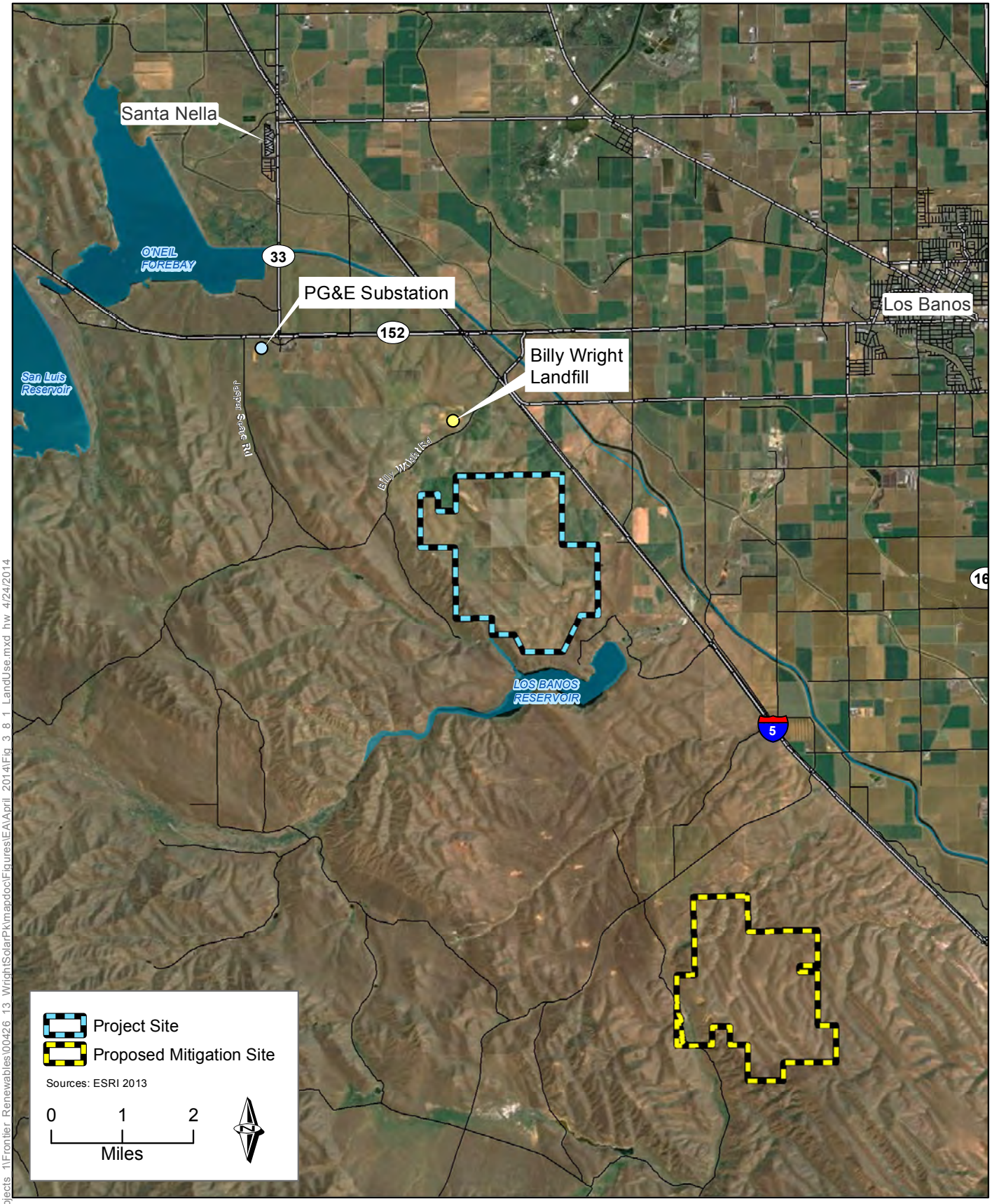

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Figure 3.8-1
Existing Land Uses

3.9 Noise

This section describes the affected environment pertaining to noise and the potential environmental consequences that could result from implementation of the proposed action. This discussion is based primarily on technical information provided in the Wright Solar Park Environmental Impact Report (project EIR) (Merced County 2014). It is also prefaced by a brief discussion of relevant terminology due to the specialized technical character of noise-related analyses.

For the purposes of this section, the study area includes the covered lands (project site and offsite mitigation area) as well as sensitive receptors that may be affected by construction- or operation-related noise generated under the proposed action.

3.9.1 Affected Environment

Background Information and Terminology

Noise may be defined as unwanted sound. A decibel (dB) is a unit of measurement which indicates the relative amplitude of a sound. The zero on the dB scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in dB are calculated on a logarithmic basis. An increase of 10 dB represents a ten-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 dB increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities.

Although the dB scale is used to quantify sound intensity, it does not accurately describe how sound intensity is perceived by human hearing. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called *A-weighting*, written as *dBA* and referred to as *A-weighted decibels*.

Table 3.9-1 provides definitions of terms commonly used in noise analyses. Table 3.9-2 summarizes typical A-weighted sound levels for different noise sources.

For a point source, such as a stationary compressor or construction equipment, sound attenuates based on geometry at a rate of 6 dB per doubling of distance. For a line source, such as free flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance (California Department of Transportation 2013). Atmospheric conditions including wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface such as grass attenuates at a greater rate than sound that travels over a hard surface such as pavement. The increased attenuation is typically in the range of 1–2 dB per doubling of distance. Barriers such as buildings and topography that block the line of sight between a source and receiver also increase the attenuation of sound over distance.

Table 3.9-1. Definition of Sound Measurements

Sound Measurements	Definition
Decibel (dB)	A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
C-Weighted Decibel (dBC)	The sound pressure level in decibels as measured using the C-weighting filter network. The C-weighting is very close to an unweighted or *flat* response. C-weighting is only used in special cases when low-frequency noise is of particular importance. A comparison of measured A- and C-weighted level gives an indication of low frequency content.
Maximum Sound Level (L_{max})	The maximum sound level measured during the measurement period.
Minimum Sound Level (L_{min})	The minimum sound level measured during the measurement period.
Equivalent Sound Level (L_{eq})	The equivalent steady state sound level that in a stated period of time would contain the same acoustical energy.
Percentile-Exceeded Sound Level (L_{xx})	The sound level exceeded *xx* % of a specific time period. L_{10} is the sound level exceeded 10% of the time. L_{90} is the sound level exceeded 90% of the time. L_{90} is often considered to be representative of the background noise level in a given area.
Day-Night Level (L_{dn})	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 a.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Peak Particle Velocity (Peak Velocity or PPV)	A measurement of ground vibration defined as the maximum speed (measured in inches per second) at which a particle in the ground is moving relative to its inactive state. PPV is usually expressed in inches/second.
Frequency: Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.

Table 3.9-2. Typical A-Weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	—110—	Rock band
Jet flyover at 1,000 feet		
	—100—	
Gas lawnmower at 3 feet		
	—90—	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	—80—	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	—70—	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	—60—	
		Large business office
Quiet urban daytime	—50—	Dishwasher in next room
Quiet urban nighttime	—40—	Theater, large conference room (background)
Quiet suburban nighttime		
	—30—	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	—20—	
		Broadcast/recording studio
	—10—	
	—0—	

Source: California Department of Transportation 2013.

Vibration

Operation of heavy construction equipment, particularly pile driving and other impact devices, create seismic waves that radiate along the surface of the earth and downward into the earth. These surface waves can be felt as ground vibration. Vibration from operation of this equipment can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance result in different vibration levels containing different frequencies and displacements. Perceptible groundborne vibration is generally limited to areas within a few hundred feet of construction activities. Table 3.9-3 summarizes typical vibration levels generated by construction equipment by vibration amplitude, or peak particle velocity (PPV) (Federal Transit Administration 2006).

Table 3.9-3. Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 Feet
Pile driver (impact)	0.644 to 1.518
Pile drive (sonic/vibratory)	0.170 to 0.734
Vibratory roller	0.210
Hoe ram	0.089
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003

Source: Federal Transit Administration 2006.
PPV = peak particle velocity.

Tables 3.9-4 and 3.9-5 summarize guideline vibration annoyance and damage potential criteria, respectively, as suggested by Caltrans (California Department of Transportation 2004).

Table 3.9-4. Guideline Vibration Annoyance Potential Criteria

	Maximum PPV (in/sec)	
Human Response	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Source: California Department of Transportation 2004.
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
PPV = peak particle velocity.

Table 3.9-5. Guideline Vibration Damage Potential Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: California Department of Transportation 2004.

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

PPV = peak particle velocity.

Regulatory Setting

There are no state or federal noise regulations directly applicable to the proposed action. In California, noise standards for non-transportation noise sources are generally provided at the county level. Within Merced County, these standards are provided in the Health and Safety Element of the *2030 Merced County General Plan* (Merced County 2012) (Table 3.9-6).

As summarized in Table 3.9-6, for outdoor residential areas, a limit of 55 dBA-L_{50} (75 dBA-L_{max}) is defined for daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dBA-L_{50} (70 dBA-L_{max}) for nighttime hours (10:00 p.m. to 7:00 a.m.). For interior locations, a limit of 35 dBA-L_{50} (55 dBA-L_{max}) is defined for any time of the day.

Table 3.9-6. Draft 2030 Merced County Non-Transportation Noise Standards (Median L_{50}/Maximum L_{max})[1]

	Exterior[2]		Interior[3]	
Receiving Land Use	Daytime	Nighttime	Day or Night	Notes
All Residential	55/75	50/70	35/55	
Transient Lodging	55/75	–	35/55	4
Hospitals and Nursing Homes	55/75	–	35/55	5, 6
Theaters & Auditoriums	–	–	30/50	6
Churches, Meeting Halls, Schools, Libraries, etc.	55/75	–	35/60	6
Office Buildings	60/75	–	45/65	6
Commercial Buildings	55/75	–	45/65	6
Playgrounds, Parks, etc.	65/75	–	–	6
Industry	60/80	–	50/70	6

Source: Merced County 2012: Table HS-2.

Notes:

1 These standards shall be reduced by 5 dB for sounds consisting primarily of speech or music, and for recurring impulsive sounds. If the existing ambient noise level exceeds the standards in this table, then the noise level standards shall be increased at 5 dB increments to encompass the ambient.

2 Sensitive Outdoor Areas include primary outdoor activity areas associated with any given land use at which noise-sensitivity exists and the location at which the County's exterior noise level standards are applied.

3 Sensitive Interior Areas includes any interior area associated with any given land use at which noise-sensitivity exists and the location at which the County's interior noise level standards are applied. Examples of sensitive interior spaces include, but are not limited to, all habitable rooms of residential and transient lodging facilities, hospital rooms, classrooms, library interiors, offices, worship spaces, theaters. Interior noise level standards are applied within noise-sensitive areas of the various land uses with windows and doors in the closed positions.

4 Outdoor activity areas of transient lodging facilities are not commonly used during nighttime hours.

5 Since hospitals are often noise-generating uses, the exterior noise level standards are applicable only to clearly identified areas designated for outdoor relaxation by either hospital staff or patients.

6 The outdoor activity areas of these uses (if any) are not typically used during nighttime hours.

7 Where median (L_{50}) noise level data is not available for a particular noise source, average (L_{eq}) values may be substituted for the standards of this table provided the noise source operates for at least 30 minutes. If the source operates less than 30 minutes the maximum noise level standards shown shall apply.

Environmental Setting

This section discusses existing land uses and the existing noise conditions in the proposed action vicinity.

Existing Land Uses

The project site is on the west side of the San Joaquin Valley, southwest of the intersection of I-5 and SR 152. The area west of I-5, including the study area, slopes gently upward toward the Coast Ranges. It supports grazing and dry-farmed agriculture. Three 230-kilovolt (kV) transmission lines run north-south through the area. Otherwise it has no distinguishing features.

The lands immediately east of I-5 support orchards, grazing, and dry-farming, as well as the aqueduct of the CVP. Farther east, irrigated agriculture is the predominant land use. In general, the study area is rural in character. There are a few homes along Billy Wright Road, the primary access road to the project site, and there is an isolated residential subdivision, small commercial area, and power substation located together at the junction of SR 152 and SR 207 north of the project site. The community of Santa Nella to the north and city of Los Banos to the west are several miles from the study area.

Existing Noise Conditions

The existing noise environment can be characterized by an area's general level of development because the level of development and ambient noise levels tend to be closely correlated. Areas which are not urbanized are relatively quiet, while areas which are more urbanized are noisier as a result of roadway traffic, industrial activities, and other human activities.

Table 3.9-7 summarizes typical ambient noise levels based on level of development. Given the rural nature of the study area, ambient noise levels are expected to be in the range of 40 to 50 L_{dn}.

Table 3.9-7. Population Density and Associated Ambient Noise Levels

	dBA, L_{dn}
Rural	40–50
Small Town or quiet suburban residential	50
Normal suburban residential	55
Urban residential	60
Noisy urban residential	65
Very noisy urban residential	70
Downtown, major metropolis	75–80
Area adjoining freeway or near major airport	80–90
Source: Hoover and Keith 2000.	

3.9.2 Environmental Consequences

Approach and Methods

The Federal Highway Administration (FHWA) Roadway Construction Noise Model methodology was used as the primary method to evaluate noise impacts associated with the proposed action. A modified spreadsheet that calculates noise levels (L_{max} and L_{eq}) at incremental distances for a variety of construction equipment was used to estimate construction noise. It was assumed that a worst-case noise scenario for construction activity under the proposed action would entail the operation of the three noisiest pieces of equipment (grader, scraper, tractor) simultaneously. Noise associated with pile-driver activity, construction traffic, and operation of the trackers was also evaluated using the modified spreadsheet.

Thresholds of Significance

An alternative would result in a significant noise impact if it would result in any of the conditions listed below.

- Expose persons to or generate noise levels in excess of standards established by Merced County (Table 3.9-6).
- Expose persons to or generate excessive groundborne vibration or groundborne noise levels.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and no construction or operational noise would be generated at the project site. Typical rural noises associated with agricultural operations would continue at the offsite mitigation area, but would be consistent with (lower than) County noise standards and less than significant.

Proposed Action Alternative

Construction-Related Noise Impacts

Construction of the proposed solar facilities under the Proposed Action Alternative would occur over a period of approximately 24 months. As described in Chapter 2, *Proposed Action and Alternatives*, construction would generally include the following steps.

- Vegetation clearing.
- Minor grading.
- Soil compaction for inverter pads, switching station, control rooms, and roads.
- Installation of civil, and mechanical and electrical infrastructure.
- Site reclamation.

Table 3.9-8 lists equipment that is expected to be used to construct the proposed solar facilities, along with typical noise levels reported in FHWA's Roadway Construction Noise Model (Federal Highway Administration 2006). L_{max} sound levels at 50 feet are shown along with the typical acoustic use factor. The acoustic use factor is the percentage of time each piece of construction equipment is assumed to be operating at full power (i.e., its loudest condition) during construction and is used to estimate L_{eq} values from L_{max} values. For example the L_{eq} value for a piece of equipment that operates at full power 50% of the time (acoustical use factor of 50) is 3 dB less than the L_{max} value.

A reasonable worst-case noise condition for general construction activity (excluding pile driving) is that a grader, scraper, and tractor would operate simultaneously. This represents a conservative scenario, as it assumes that all three pieces of equipment would be operating at the same time and same place. Although unlikely, this scenario would result in a combined noise level of 85 dBA-L_{max} and 81 dBA-L_{eq} at 50 feet. The nearest residences to the project site are located within about 1,400 feet of where general construction activity would occur (Figure 3.9-1). Based on point source attenuation of 6 dB per doubling of distance with additional attenuation of 1.5 dB per doubling of distance for ground absorption (7.5 dB per doubling of distance total), the predicted construction

noise level at the nearest residence to the project site is 49 dBA-L_{max} and 45 dBA-L_{eq}. Over an 8-hour work day this corresponds to 40 L_{dn}.

Table 3.9-8. Typical Construction Noise Emission Levels

Equipment	Reference Equipment from FHWA 2006	Typical Noise Level (L_{max})[a]	Acoustical Use Factor	Typical Noise Level (L_{eq})
Backhoe	Backhoe	78	40	74
Grader	Grader	85	40	81
Scraper	Scraper	84	40	80
Track loader	Front end loader	79	40	75
Compactor	Compactor	83	20	76
Dump truck	Dump truck	76	40	72
Skid steer loader	Front end loader	79	40	75
35-ton crane	Crane	81	16	73
Forklift 10,000–15,000 pounds	Pickup truck	75	40	71
Bush hog	Tractor	84	40	80
Farm tractor	Tractor	84	40	80
Trencher	Excavator	81	40	77
Pile driver (vibratory)	Vibratory pile driver	101	20	94
Diesel welding machine	Welder	74	40	70

Source: Federal Highway Administration 2006.
[a] dBA, A-weighted decibel level, measured at 50 feet.

Impact-driving support posts in support of the Proposed Action Alternative could occur within about 1,800 feet of the nearest residence. As indicated in Table 3.9-8, pile driving could produce a sound level of 101 dBA-L_{max} and 94 dBA-L_{eq} at 50 feet. The predicted noise level from pile driving at the nearest residence at 1,800 feet would be about 55 dBA-L_{max} and 48 dBA-L_{eq}. Over an 8-hour work day this corresponds to 43 L_{dn}.

Construction-related traffic (i.e., materials delivery trucks and employee commute vehicles) would pass as close as about 120 feet of several rural residences located along the two access roads to the project site. Construction-related deliveries are expected to result in 10,307 truck trips. Daily hauling activity during the peak month of hauling activity is expected to be 128 trips per day, with hourly activity expected to be a maximum of 10 trips per hour Traffic noise levels, which were calculated using the FHWA Traffic Noise Model, conservatively assume 10 trucks per hour could pass by during a busy hour. Ten trucks per hour traveling at 45 mph would produce a sound level of about 73 dBA-L_{max} and 58 dBA-L_{eq} at 100 feet. Over an 8-hour work day this corresponds to 53 L_{dn}.

Noise generated from employee commute trips was also evaluated using the Traffic Noise Model. An estimated 272 employee trips during the AM and PM Peak Hours in the month of peak construction employment (month 14) would result in a noise level at the residences of 51 L_{dn} or 59 dBA-L_{eq}, with a maximum noise level of approximately 62 dBA.

No construction would occur on the offsite mitigation lands and no construction-related noise would be generated.

Table 3.9-9 summarizes the results of the construction noise analysis for the Proposed Action Alternative. As provided in that table, construction and truck activity noise would not exceed County daytime or L_{dn} noise standards at the nearest residences (see Table 3.9-6). Maximum noise levels due to truck activity (73 dBA) would almost reach the daytime maximum exterior residential noise standard (75 dBA), but the noise-reducing construction practices specified in EC-12 would reduce truck noise and noise from other construction equipment to levels that are even further below the exterior noise standard. Specifically, EC-12 would require the applicant to implement certain noise-reducing construction practices, including limiting onsite truck speed to 5 miles per hour, locating fixed construction equipment as far as feasibly possible from residential properties, installing sound control devices on construction equipment powered by gasoline or diesel engines, and, where necessary, using noise-reducing enclosures and barriers to block sound transmission. Under the Proposed Action Alternative, EC-12 would be implemented to reduce noise-related impacts. With implementation of EC-12, potential adverse noise impacts would be less than significant, although greater than the No Action Alternative, where no construction activities would occur.

Table 3.9-9. Summary of Construction Noise Analysis for Proposed Action Alternative

Source	Distance to Nearest Residence	Sound Level at Residence		
		L_{max}	L_{eq}	L_{dn}
General construction	1,400 feet	49	45	40
Pile driving	1,800 feet	55	48	43
Project construction trucks	120 feet	73	58	53
Employee commute vehicles	120 feet	62	59	51

Vibration Impacts

The solar panels associated with the Proposed Action Alternative would be supported by metal piers that would be driven into the ground by a pile-driving machine. Table 3.9-10 provides a general estimation of ground vibration from typical construction equipment, including pile driving equipment, at several distances based on methods specified in the Federal Transit Administration's *Transit Noise and Vibration Impact Assessment* (Federal Transit Administration 2006). The nearest residence to the project site would be about 1,800 feet from the nearest solar panel and associated pile driving. As illustrated in Table 3.9-10, vibration from pile driving at the project site would be well below the potential annoyance or damage thresholds listed in Tables 3.9-4 and 3.9-5, respectively. The Proposed Action Alternative therefore would not expose people to excessive ground vibration and vibration-related impacts would be less than significant, although greater than those under the No Action Alternative, where construction activities and related ground vibration would not occur.

Table 3.9-10. Vibration from Construction Equipment

Equipment	PPV at 25 Feet	PPV at 50 Feet	PPV at 75 Feet	PPV at 100 Feet	PPV at 175 Feet
Pile driver (sonic/vibratory)	0.734	0.2595	0.1413	0.0918	0.0396
Large bulldozer	0.089	0.0315	0.0171	0.0111	0.0048
Loaded trucks	0.076	0.0269	0.0146	0.0095	0.0041
Jackhammer	0.035	0.0124	0.0067	0.0044	0.0019
Small bulldozer	0.003	0.0011	0.0006	0.0004	0.0002

Source: Federal Transit Administration 2006.
PPV = peak particle velocity.

Operational Noise Impacts

PV solar plants generally do not create much noise. Sources of noise include operation of the tracking motors that are used to rotate the panels to follow the sun and operation of the inverter/transformer buildings. Any noise produced by the motors or the inverter/transformers would be limited to daytime hours when the solar arrays are generating electricity.

The sound level that would be produced by the specific tracker motors at the project site is not known. However, International Electrotechnical Commission (IEC) regulation IEC 60034-9 limits the A-weighted sound power level of solar tracker motors to the range of 85–90 dBA. A sound power of level of 90 dBA corresponds to a sound pressure level of 58 dBA at 50 feet. In the project site, it was assumed that a worst-case scenario would be that noise from up to 50 trackers could affect any given residence. Under this conservative assumption, a total of 50 trackers operating simultaneously would result in a sound pressure level of 75 dBA at 50 feet. At the nearest residence, this corresponds to 36 dBA. This noise level is well below the County daytime noise standards and likely would not be audible above the ambient sound level.

Inverter/transformer buildings typically produce a sound level of about 65 dBA at 10 feet (Bureau of Land Management 2010). Based on the site layout under the Proposed Action Alternative, the closest inverter/transformer building would be over 1 mile from the nearest residence. At this distance, the noise level would drop to well below the ambient sound level.

O&M would also include panel washing up to three times per year. Panel washing would occur over several days and would require approximately 500,000 gallons of water, supplied by a 50,000 gallon water tank. The water would likely be pumped through hoses to wash the panels. The sound level potentially produced by this operation is not known; however, sound data from a car wash would likely be similar and indicates that the washing operation would produce a sound level of about 68 dBA at 50 feet. With the nearest residence about 1,800 feet from where washing could occur, this noise level would reduce to about 29 dBA, which is well below the County daytime noise standard and likely would not be audible above the ambient sound level. In addition, washing would be a short-term and infrequent maintenance activity.

Finally, operation activities at the offsite mitigation area would be typical of an agricultural property in rural land use, similar to current conditions, and would be below the County daytime noise standard.

This analysis indicates that operation of the solar facility under the Proposed Action Alternative would not result in noise that exceeds County standards, or in a substantial permanent increase in existing ambient noise levels. This impact would be less than significant, but greater than the No Action Alternative, where the project site would continue to be used for grazing and noise associated with the tracking system, buildings, and O&M activities would not occur.

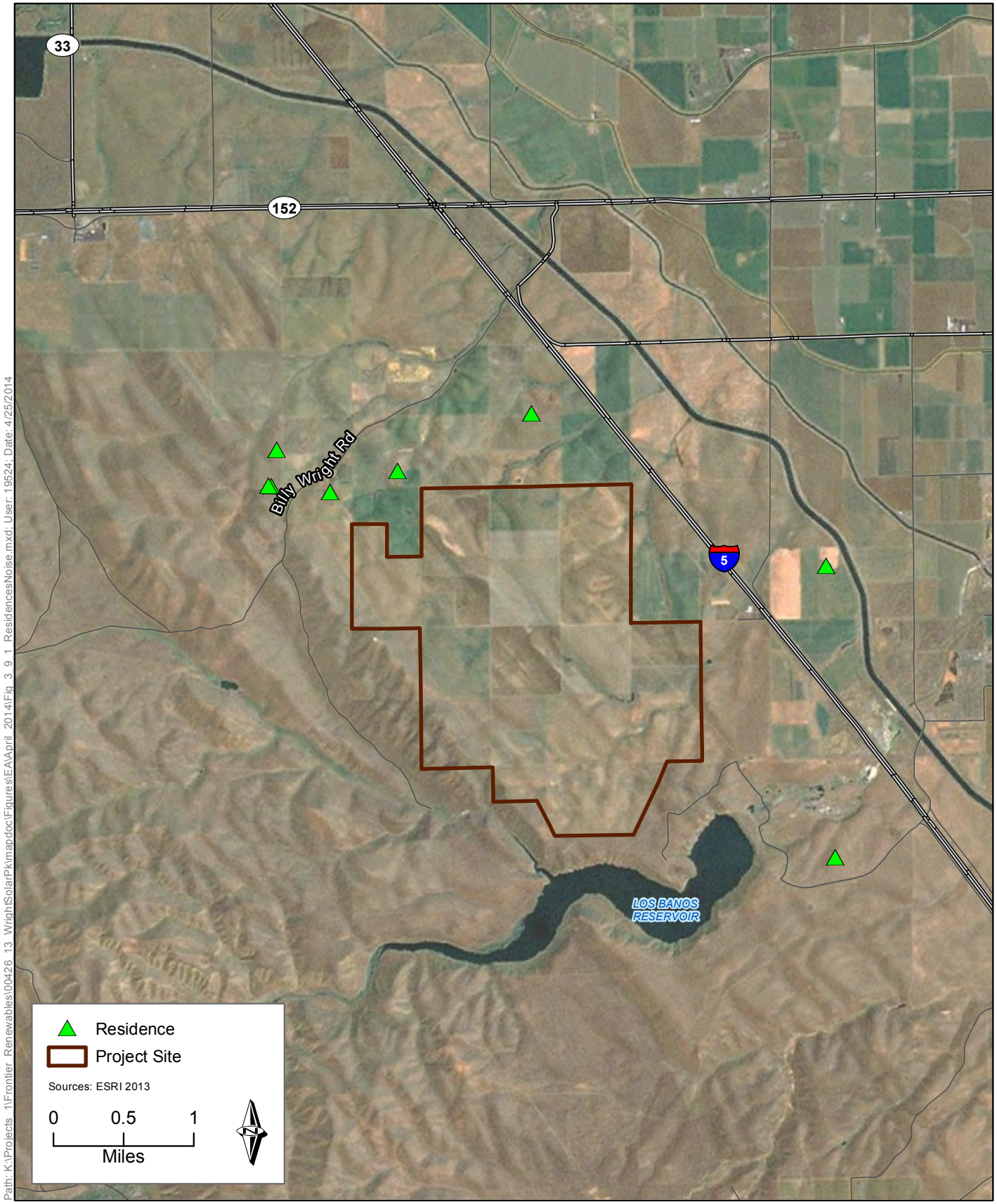


Figure 3.9-1
Residences Near the Project Site

3.10 Socioeconomics and Environmental Justice

This section describes the current population and demographics and considers potential effects on low income and minority populations. For purposes of this section, the study area is concurrent with the project site and offsite mitigation lands, with reference to population and demographic data for Merced County and the state of California where appropriate.

3.10.1 Affected Environment

Regulatory Setting

Federal

Executive Order 12898

Executive Order 12898, Federal Action to Address Environmental Justice in Minority Populations (1994), requires that all federal agencies consider environmental justice concerns when evaluating the potential effects of a proposed action. In general, Executive Order 12898 seeks to ensure that environmental effects potentially associated with a federal action will not disproportionately generate high and/or adverse human health or environmental effects on minority and low-income populations and communities. EPA has summarized environmental justice concerns as follows.

> Environmental justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies (U.S. Environmental Protection Agency 1998).

In 1997, CEQ issued guidance regarding the analysis of environmental justice issues by federal agencies (Council on Environmental Quality 1997). This environmental justice guidance defines *minority* to mean people of African, Asian, American Indian, and Alaskan Native, Native Hawaiian or other Pacific Islander, or Hispanic origin.[1] The guidance states that, for purposes of assessing potential environmental justice effects,

> "…minority populations should be identified [by a federal action agency] when either (a) the minority population of the affected area exceeds 50 percent or (b) 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 geographical analysis."

According to the environmental justice guidance, "low income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty." As described below, the 2008–2012

[1] As defined by the U.S. Census Bureau, the term *Hispanic* is considered to indicate an ethnic and cultural identity and not a category of race. As a result, tabulations that include Hispanic responses on census questionnaires do not add up to 100% because respondents may describe themselves as both Hispanic and as a member of a specific racial category.

American Community Survey (U.S. Census Bureau 2012) was used to assess income and poverty levels in the study area and vicinity.

Environmental Setting

Population

The study area is in a rural area of western Merced County dominated by agricultural uses. The city of Los Banos, approximately 4 miles east of the project site and on the east side of I-5 (Figure 3.8-1) is the city closest to the project site. The community of Santa Nella is approximately 8 miles north of the project site.

There are only a few residences near the project site, the closet of which are to the north, in the vicinity of Billy Wright Road, generally spread out over a large area. There are also several residences northwest and northeast of the offsite mitigation lands.

Demographics

Race and Hispanic Origin

Table 3.10-1 lists the race and Hispanic origin for Census Designated Places in close proximity to the study area, as well as Merced County and the state of California as a whole (California Department of Finance 2011).

Table 3.10-1. Race and Hispanic/Latino Origin by Percentage

Jurisdiction	Total 2010 Population	White (%)	Black or African American (%)	American Indian and Alaska Native (%)	Asian (%)	Native Hawaiian and Other Pacific Islander (%)	Some Other Race (%)	Two or More Races (%)	Hispanic or Latino Origin (%)
California	37,253,956	57.6	6.2	1.0	13.0	0.4	17.0	4.8	37.6
Merced County	255,793	58.0	3.9	1.4	7.4	0.2	24.5	4.6	54.9
City of Los Banos	35,972	58.0	3.8	1.4	3.2	0.4	28.1	5.1	64.9
Santa Nella	1,380	60.3	1.6	1.8	2.2	0.0	31.4	2.7	70.1

Sources: California Department of Finance 2010, 2011.

Labor Force and Unemployment Rates

The number of people considered to be in the labor force (i.e., actively working or seeking work) and the unemployment rate for California, Merced County, and Census Designated Places near the study area are shown in Table 3.10-2. These data reflect the last 5 years in which employment data for Merced County have been reported by the California Employment Development Department (i.e., 2013, 2008, 2007, 2006, and 2005).

Table 3.10-2. Labor Force and Unemployment Rates[a]

	California	Merced County	City of Los Banos	Santa Nella[a]
2005 Labor Force	17,544,800	99,000	12,300	–
2005 Unemployment Rate	5.4%	10.0%	10.6%	–
2006 Labor Force	17,686,700	98,200	12,200	–
2006 Unemployment Rate	4.9%	9.1%	10.0%	–
2007 Labor Force	17,921,000	100,000	12,500	–
2007 Unemployment Rate	5.4%	10.1%	10.6%	–
2008 Labor Force	18,207,300	102,300	12,800	–
2008 Unemployment Rate	7.2%	12.5%	13.2%	–
2013 Labor Force	18,596,800	112,700	14,100	511
2013 Unemployment Rate	8.9%	14.7%	15.4%	9.4%

Sources: California Employment Development Department 2013; U.S. Census Bureau 2012.

[a] Annual average data, with the exception of Santa Nella, which was only available from the 2008–2012 American Community Survey completed by the U.S. Census Bureau (and represented here as 2013 data).

Income and Poverty Levels

Income levels for individuals and families collected during the 2008–2012 American Community Survey are shown in Table 3.10-3 (U.S. Census Bureau 2012).

Table 3.10-3. Family and Individual Income and Poverty Levels

Jurisdiction	Median Family Income	Per Capita Income	Families below Poverty Level (%)	Individuals below Poverty Level (%)
California	$69,883	$29,551	11.5	15.3
Merced County	$48,561	$18,343	20.3	24.6
City of Los Banos	$53,019	$17,881	21.4	24.8
Santa Nella	$22,292	$17,017	33.3	35.2

Source: U.S. Census Bureau 2012.

3.10.2 Environmental Consequences

Approach and Methodology

Demographic data from the U.S. Census Bureau and California Employment Development Department were used to assess potential effects on population and employment in the study area, including potential effects on environmental justice communities.

Thresholds of Significance

An alternative would be considered to have a significant impact if it would adversely affect socioeconomic conditions, or disproportionately affect a minority or low income population.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would be not implemented and there would be no effect on socioeconomic conditions or environmental justice populations.

Proposed Action Alternative

Implementation of the Proposed Action Alternative would result in the construction and operation of a new solar facility on the project site. Although construction activities could create some new jobs within the study area, it is unlikely these jobs would be of sufficient number to have a meaningful effect on unemployment rates or income and poverty levels in the study area or vicinity. Similarly, it is unlikely that the population in the study area would be affected by implementation of the Proposed Action Alternative.

Table 3.10-1 summarizes the population composition in the study area by race and Hispanic origin. For the purposes of this analysis, minority populations include all ethnic groups that identify as anything other than *White*. Minority populations in Merced County represent 42.0% of the population, a percent comparable to the city of Los Banos (42.0%), community of Santa Nella (39.7%) and the state of California as a whole (42.4%). Populations of Hispanic origin in the study area are notably higher than the statewide average of 37.6%, with 54.9%, 64.9%, and 70.1% of individuals in Merced County, the city of Los Banos, and the community of Santa Nella (respectively) identifying as Hispanic or Latino origin (Table 3.10-1). With respect to income, income levels in Merced County are notably lower than the statewide average, and poverty levels are higher (Table 3.10-3). County income statistics are comparable to the city of Los Banos; however, the community of Santa Nella has the lowest incomes and highest poverty levels in the vicinity of the study area, where 35.2% of individuals live below the poverty level, as do 33.3% of families (Table 3.10-3).

Although income levels in the vicinity of the study area are lower than the statewide average, and there are more populations of Hispanic origin in the vicinity, it is unlikely that the Proposed Action Alternative would have a different or disproportionate effect on low income or minority populations. None of the potential effects identified in this EA (e.g., temporary increases in traffic and air emissions during construction) would be realized exclusively by a minority or low income population, or in a way that would result in a disproportionate effect on a minority or low income community, either as a result of the nature or the location of the specific impact. The proposed action would not bisect any communities, and would not result in the displacement of any residential homes or structures. In addition, jobs created within the study area as a result of the proposed action may benefit the local population, which could benefit the relatively high unemployment rate and/or reduce poverty levels. As a result, impacts on socioeconomic conditions would be less than significant, and disproportionate impacts on environmental justice communities would not be anticipated. This impact would be similar to the No Action Alternative, although small revenue and employment changes resulting from the Proposed Action Alternative could benefit the local economy and population.

3.11 Transportation and Traffic

This section describes the affected environment pertaining to traffic and transportation and the potential environmental consequences that could result from implementation of the proposed action. Mitigation is identified, as necessary. This discussion is based in large part on technical information provided in the project EIR (Merced County 2014).

For the purposes of this section, the study area includes transportation infrastructure (roads, highways) that would be used for construction or operational access to the project site or offsite mitigation area.

3.11.1 Affected Environment

Regulatory Setting

State and Local

California Department of Transportation Guidance

Caltrans has authority over the State highway system, including freeways, interchanges, and arterial SRs. Caltrans approves the planning, design, and construction of improvements for all State-controlled facilities including SR 152 that provides primary regional access to the project site. Caltrans requirements are described in their *Guide for the Preparation of Traffic Impact Studies* (California Department of Transportation 2002), which states that Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State highway facilities. However, Caltrans acknowledges that maintaining this LOS may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway is operating at less than the appropriate target LOS, the existing level should be maintained.

Caltrans prepares transportation concept reports (TCRs) for SRs as long-range planning documents that "identify existing route conditions and future needs, including existing and forecasted travel data, a concept [i.e., desired] LOS standard, and the facility needed to maintain the concept LOS and address mobility needs over the next 20 years" (California Department of Transportation 2010). As noted above, although Caltrans strives to maintain LOS C on its facilities, the agency recognizes that it may not always be possible to achieve that goal. The SR 152 TCR identifies the Concept LOS for the portion of SR 152 in the project study area as LOS D.

2030 Merced County General Plan

The Transportation and Circulation Element of the Merced County General Plan includes specific policies to maintain acceptable traffic operations and an efficient roadway system. Policies that relate to the proposed action are listed below.

> **Policy CIR-1.5: County Level of Service Standards.** Implement a countywide roadway system that achieves the following LOS standards during peak traffic periods: a) For roadways located within rural areas, LOS "C" or better; and b) For roadways located outside Urban Communities that serve as connectors between Urban Communities, LOS of "D" or better.

Policy CIR-1.6: Level of Service "E" Exception. Allow LOS "E" or worse only on a minor component of the circulation system (such as a left turn movement from a local roadway) if the major component of the circulation system (such as a through movement on a collector or arterial roadway) would be significantly compromised in the process of improving the LOS of the minor component.

Policy CIR-1.8: Private Roadway Improvements. Require private roads and related improvements to be designed and installed to County standards as contained in the Improvement Standards and Specifications Manual (Title 16 of County Code) and Subdivision Code (Title 17), unless it can be demonstrated to the satisfaction of the approval authority that alternative improvements will be provided sufficient to fulfill the goals and objectives of this Chapter and the respective Codes.

Policy CIR-1.17: Encroachment Permits. Require encroachment permits to control access points on public roads.

Environmental Setting

Roadway System

Regional highway access to the project site is provided by SR 152 (approximately 2 miles north of the project site). SR 152 is an east/west four-lane divided highway that connects I-5 and SR 33 to the west, passes through the city of Los Banos, and connects to SR 165 to the east. Local access to the project site is provided via Billy Wright Road, which connects with SR 152 approximately 0.75 mile east of I-5. Billy Wright Road is a rural two-lane County road. To access the project site, vehicles travel from SR 152 southwest along Billy Wright Road for approximately 2.8 miles and then turn east on an unnamed access road. Vehicles may also access the project site by turning south off of Billy Wright Road onto an unnamed access road approximately 1.1 miles from the SR 152/Billy Wright Road intersection. Figures 2-1 and 3.11-1 show the roadway system in the vicinity of the project site.

The most recent daily traffic counts reported by Caltrans indicate that in 2012, SR 152 carried an annual average daily traffic (AADT) volume of 27,000 vehicles in the area east of the I-5 interchange. The annual peak hour volume on the road is 2,150 vehicles per hour. Caltrans reports that trucks comprise 17% of the daily traffic volume in this area.

Regional access to the offsite mitigation area is provided by SR 165 and local access is generally provided by Arburua Road. Because the proposed action would not result in additional construction- or operation-related traffic to the offsite mitigation area, traffic conditions and LOS of those roadways are not discussed further in this EA.

Traffic Conditions

The discussion of existing traffic operations on SR 152 in the vicinity of the project site are based on the *2030 Merced County General Plan, Revised Draft Background Report* (Background Report) prepared for the 2030 General Plan (Merced County 2012) and the traffic assessment of the SR 152 / Billy Wright Road conditions prepared for the proposed action (Anderson pers. comm.).

As provided in the Background Report, the 2005 traffic operation condition was found to be LOS B to C, with average daily traffic (ADT) ranging between 20,200 and 32,500 vehicles per day between SR 33 and Ortigalita Road. Although the traffic analysis was conducted for 2005, the existing ADT (23,000 to 27,000 vehicles per day) along the SR 152 segment has not increased in the past years and Caltrans data indicate that in 2012, SR 152 carried an AADT volume of 27,000 vehicles in the area east of the I-5 interchange (Anderson pers. comm.). Therefore, it is expected that existing traffic

operation on SR 152 in the vicinity of the project site would be similar to the 2005 traffic condition (i.e., LOS B to C), which is better than the Caltrans target of LOS D (California Department of Transportation 2004).

The Background Report also indicated that I-5 between SR 165 and SR 33 in the vicinity of the project site operated at LOS B to C, with 2005 ADT ranging between 30,500 and 36,000 vehicles per day. Similar to SR 152, the existing ADT (29,000 to 32,000 vehicles per day) along the I-5 segment has not increased in the past years and the LOS is better than or consistent with the Caltrans target of LOS C for this segment of I-5 (California Department of Transportation 2012:26).

Billy Wright Road between SR 152 and the project site currently serves as the access road for five rural residences in the area, agriculture activities, and the Billy Wright county landfill, which primarily serves the cities of Dos Palos, Gustine, and Los Banos, and the unincorporated communities of western Merced County. Therefore, existing traffic traveling along Billy Wright Road consists of residents' vehicles, trucks associated with seasonal agriculture operations, and garbage trucks that deliver municipal solid waste to the landfill.

Existing traffic conditions for the SR 152 / Billy Wright Road intersection are derived from a traffic assessment technical memorandum prepared in support of the proposed action (Anderson pers. comm.). The existing volume of traffic turning onto and off of SR 152 at the Billy Wright Road intersection is very low (i.e., less than 20 total vehicles in the PM Peak Hour). As a result, the existing LOS during the AM and PM Peak Hour periods is LOS A or B. Currently, traffic conditions at the intersection of SR 152 / Billy Wright Road do not warrant traffic signals pursuant to the 2010 *California Manual on Uniform Traffic Control Devices* (MUTCD), Warrant 3 (Peak Hour) criteria (California Department of Transportation 2010), nor left-turn lanes according to the American Association of State Transportation and Highway Officials (AASHTO) publication *A Policy on Geometric Design of Highways and Streets* (2004). KD Anderson & Associates also found that because the existing volume of traffic turning from SR 152 onto Billy Wright Road is very low, these roads do not warrant any modifications to acceleration or deceleration lanes (Anderson pers. comm.).[1] Trucks do use this route to reach the Billy Wright county landfill and over the 5 hours traffic was monitored, two trucks turned right onto eastbound SR 152 (Anderson pers. comm.).

Alternative Transportation

The project site is surrounded by agricultural land in rural, unincorporated Merced County. No public transit service is available in the vicinity of the project site. Non-motorized transportation, such as bikeways and pedestrian sidewalks, are not provided on Billy Wright Road and SR 152 in the vicinity of the project site. The closest public airport is the Los Banos Municipal Airport, approximately 5 miles northeast of the project site. The Compatibility Policy Map for Los Banos Municipal Airport contained in the *Draft Los Banos Municipal Airport Land Use Compatibility Plan* (Merced County Airport Land Use Commission 2012) shows that the project site is well outside of any of the airport's safety zones and is not in the direct flight path for approach or departure from the airport.

[1] Separate acceleration lanes typically are required when slow-moving vehicles entering a highway may interfere with the flow of through traffic, or when the number of gaps between vehicles is not sufficient to accommodate the number of entering vehicles and a poor LOS results. Typical requirements for acceleration lane length are presented in AASHTO Exhibit 10-70. Assuming acceleration from a stop, a length of 1,410 feet is required for a roadway with a 65 mile per hour (mph) speed limit. Because the existing volume of traffic entering SR 152 at Billy Wright Road is low, acceleration lanes are not currently needed.

3.11.2 Environmental Consequences

Approach and Methods

Traffic impacts associated with the proposed action would primarily be related to temporary construction and routine maintenance activities. Accordingly, the traffic assessment focuses on short-term traffic impacts associated with changes in traffic patterns and increases in traffic in the vicinity of the project site during construction and O&M activities.

The impact analysis also involves specific study of the adequacy of the SR 152 / Billy Wright Road intersection within the context of the following criteria.

- Operational LOS based on 2010 Highway Capacity Manual (Transportation Research Board 2010).
- Traffic signal warrant based on MUTCD Warrant 3 (Peak Hour).
- Criteria for left-turn lane channelization based on AASHTO guidelines, *A Policy on Geometric Design of Highways and Streets.*
- Vehicle acceleration / deceleration requirements for SR 152 based on Caltrans Highway Design Manual.

Vehicle trips generated during construction and operation were estimated using the construction information (construction schedule and duration, and number of truck and worker trips) and the operation and maintenance information (frequency, duration, and number of truck and worker trips) provided by the applicant and described in detail in the project EIR (Merced County 2014) and traffic assessment technical memorandum (Anderson pers. comm.).

Thresholds of Significance

The alternatives would be considered to have a significant effect on traffic or transportation resources if they would result in any of the conditions listed below.

- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system.
- Conflict with an applicable congestion management program (CMP), including, but not limited to, LOS standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways.
- Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.
- Result in inadequate emergency access.
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

For the following reasons, potential impacts on a CMP, alternative transportation (transit service, bikeways, pedestrian sidewalks), and air traffic patterns are not analyzed further in this section.

- There is no CMP for highway facilities in Merced County, therefore, the proposed action would not conflict with a CMP and there would be no impact.
- No public transit service is available in the study area and no bikeways or pedestrian sidewalks are identified on Billy Wright Road and SR 152 in the vicinity of the project site. Therefore, the proposed action would not conflict with polices, plans, or programs regarding these alternative transportation modes, or degrade the performance of such facilities. There would be no impact.
- The project site is well outside of any of the Los Banos Municipal Airport's safety zones and is not in the direct flight path for approach or departure from the airport. Therefore, the proposed action would not result in a change in air traffic patterns or otherwise result in a safety risk. There would be no impact.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and no construction-related traffic would occur. Limited operations (agricultural-related) traffic to both the project site and offsite mitigation area would continue, but would not result in a change in traffic patterns, levels, or locations; would not affect emergency access; and would not conflict with any local plans or policies specific to traffic management.

Proposed Action Alternative

Construction-Related Traffic

Construction of the Proposed Action Alternative is expected to take place from 2015 to late 2016, with the majority of the heavy construction work conducted in 2015. It is estimated that a total of 10,307 truck deliveries would be required to import construction materials and deliver equipment to the project site. Table 3.11-1 summarizes the type and estimated number of construction vehicle trips for monthly, daily, and AM and PM Peak Hour conditions. As noted in Table 3.11-1, the average daily truck trip generation would be 128 trips during the peak month for haul activity (month 6 or 7), and 34 truck trips during the month with the highest employment (month 14).

Table 3.11-1. Construction Truck Trip Generation Estimates

			Trip Generation				
				AM Peak Hour (6:00 to 9:00 a.m.)		PM Peak Hour (4:00 to 6:00 p.m.)	
	Type	Monthly Loads	Daily	In	Out	In	Out
Trucks during peak construction haul month (month 6 or 7)	Flat bed	225	23				
	Gravel trucks	796	80				
	Concrete trucks	23	2				
	Van and trailer	185	19				
	Misc.	39	4				
	Total	1,268	128	10	10	1	1
				40 PCE	30 PCE	4 PCE	3 PCE
Trucks during peak construction employment month (month 14)	Flat bed	81	8				
	Gravel trucks	8	1				
	Concrete trucks	23	2				
	Van and trailer	185	19				
	Misc.	35	4				
	Total	332	34	3	3	0	0
				12 PCE	9 PCE	0 PCE	0 PCE

PCE = passenger car equivalent.

As noted in Table 3.11-1, during peak construction haul months, these assumptions yield estimates for 10 inbound and 10 outbound truck trips during the AM Peak Hour and 1 inbound and 1 outbound truck trip during the PM Peak Hour. Because the acceleration and deceleration requirements of trucks differ from regular automobiles, the anticipated trucks trips under the proposed action have been converted to *Passenger Car Equivalents (PCE's).* PCE factors of 1.5 to 4.0 are typically used based on the size of truck involved and whether it is loaded or empty. This analysis applies a PCE factor of 4.0 to all entering truck trips and a factor of 3.0 to all exiting truck trips.

The number of employees working on the site at any time may vary. Table 3.11-2 presents the estimated monthly average and daily construction employee trips for solo drivers and carpools during both the peak construction haul month (month 7) and the peak construction employment month (month 14). Based on construction carpooling experienced at similar project sites, the analysis assumes 15% of employees would carpool. Table 3.11-2 also provides the anticipated trip generation distribution for the AM and PM Peak Hour periods. By month 7, regular employment would reach approximately 262 persons, and the highest employment would be 320 persons in month 14 (Table 3.11-2) (Anderson pers. comm.).

Table 3.11-2. Employee Commute Trip Generation Estimates

			Trip Generation				
				AM Peak Hour (6:00 to 9:00 a.m.)		PM Peak Hour (4:00 to 6:00 p.m.)	
	Type	Monthly Average	Daily	In	Out	In	Out
Construction employees month 7	Solo drivers	223	446	223	0	0	223
	Carpool riders	39	0	0	0	0	0
	Total	262	446	223	0	0	223
Construction employees month 14	Solo drivers	272	544	272	0	0	272
	Carpool riders	48	0	0	0	0	0
	Total	320	544	272	0	0	272

Source: Anderson pers. comm.

Access to the project site for construction workers and construction deliveries would be via Billy Wright Road, which intersects with SR 152. From SR 152, access from the north and south may be made via I-5, exiting to SR 152 and turning right onto Billy Wright Road; access from the east would be made via SR 152 and turning left on Billy Wright Road. Construction traffic exiting the project site would travel northeast on Billy Wright Road and then west on SR 152 to reach I-5, or east on SR 152 to access other points in Merced County.

As described above, SR 152 was found to operate at LOS B to C and I-5 was found to operate at LOS B in the vicinity of the project site. These levels of service are better than the Caltrans targets of LOS D for SR 152 and LOS C for I-5 (California Department of Transportation 2004, 2012). The temporary increase in construction vehicle trips on SR 152, I-5, and surrounding roadway network would be a small fraction of existing ADT[2], and thus is not expected to substantially degrade the traffic operation of the surrounding roadway network to an unacceptable LOS.

As noted above, no left-turn lanes or signals are provided at the intersection of SR 152 and Billy Wright Road. Because there is no left-turn lane provided at the intersection and the intersection is not signalized, the increase in left-turning vehicles could temporarily disrupt the traffic flow on SR 152 and cause an increased delay for vehicles approaching the intersection. The increase in left-turning vehicles at the intersection could also potentially increase the delay for garbage trucks to and from the landfill.

Project trips, expressed as PCE's were estimated for the peak month construction employment and construction truck activity and are presented in Table 3.11-3. These estimates represent the maximum traffic volumes that may occur during construction of the proposed action. These trips were added to the current background traffic volume to create the "existing plus project" volumes used to evaluate the potential effects of the proposed action.

[2]The maximum daily trips (i.e., 672 trips, comprised of 128 truck trips [Table 3.11-1] and 544 employee vehicles [Table 3.11-2]) would result in about a 1.2% increase of in the total AADT on SR 152 (336 / 27,000 = 1.2%).

Table 3.11-3. Project Trip Generation (PCE's) Estimates

	AM Peak Hour			PM Peak Hour		
Description	In	Out	Total	In	Out	Total
Construction employees[a]	272	0	272	0	272	272
Peak construction trucks[b]	40	30	70	4	3	7
Total	312	30	342	4	275	279

Source: Anderson pers. comm.
[a] Reflects monthly average of 320 construction employees (see Table 3.11-2).
[b] See Table 3.11-1.

Table 3.11-4 compares "existing" and "existing plus project" LOS at the SR 152 / Billy Wright Road intersection. The addition of construction-related trips would not result in conditions that exceed LOS D during the AM Peak Hour but would result in conditions that could reach LOS F during the PM Peak Hour.

Table 3.11-4. SR 152 / Billy Wright Road Peak Hour Levels of Service Estimates

	AM Peak Hour				PM Peak Hour			
	Existing		Existing Plus Project		Existing		Existing Plus Project	
Condition	LOS	Avg Delay (seconds)	LOS	Avg Delay (seconds)	LOS	Avg Delay (seconds)	LOS	Avg Delay (seconds)
Existing geometry								
Northbound left+right	B	10.2	C	20.4	B	14.6	**F**	**84.2**
Westbound left turn	A	7.7	A	8.7	B	11.6	B	11.6
Add northbound right turn lane on Billy Wright Road							D	28.1
							B	11.6

Source: Anderson pers. comm.

An evaluation of the "existing plus project" traffic volumes at the study intersection using 2010 MUTCD Warrant 3 (Peak Hour) criteria indicates that although PM Peak Hour traffic volumes associated with traffic leaving the project site could justify installation of a traffic signal, traffic volumes occurring throughout the rest of the day would not. Further, because the increased traffic volume would be temporary and associated only with construction of the proposed action, installing a traffic signal is not recommended.

Existing plus project traffic volumes were also compared to AASHTO guidelines to determine whether a separate left turn lane would be justified based on estimated construction traffic volumes. The comparison indicates that the combination of left turn and through traffic volumes generated by construction of the proposed action would justify a separate westbound left turn lane on SR 152 at the Billy Wright Road intersection.

Additionally, during construction, the maneuvering of slow-moving construction trucks and equipment among the general-purpose traffic on SR 152 in the project site vicinity could temporarily disrupt traffic flow and cause potential conflicts with vehicles traveling on SR 152. The increase in left-turning vehicles and trucks at the SR 152 / Billy Wright Road intersection would increase potential conflicts and traffic hazards with through-moving vehicles on SR 152, especially during peak construction periods (months 6/7 and 14). Eastbound construction trucks exiting SR 152 and turning right onto Billy Wright Road would need to substantially reduce their speed, resulting in an appreciable speed differential between decelerating eastbound trucks and through traffic on SR 152, causing a potential safety hazard. Similarly, the volume of trucks leaving the project site and entering eastbound SR 152 could contribute to traffic safety concerns during the PM Peak Hour when construction employees would also be leaving the site and eastbound traffic on SR 152 is at a higher volume. Finally, the analysis indicates a potential for conflict from trucks turning left onto westbound SR 152 because of the distance needed to achieve acceleration, particularly during the AM Peak Hour period (6:00–9:00 a.m.), the period of highest westbound traffic volume on SR 152.

Construction would involve improvements to Billy Wright Road and may result in temporary lane closures. Short-term lane closures and construction-related increases in truck trips and employee commutes to and from the project site could affect emergency access to the project area and in the immediate vicinity. Several mitigation measures are identified to address the potential effects of construction-related truck and employee vehicle trips under the Proposed Action Alternative. Specifically, Mitigation Measures TRA-1, TRA-2, TRA-3, TRA-4, and TRA-5 would be implemented to reduce construction-related effects on safety and traffic circulation at the intersection of SR 152/33 and Billy Wright Road. Implementation of these mitigation measures would also ensure emergency access to the project area would not be adversely affected during construction. Figure 3.11-1 identifies the mitigation options that would involve modifications of Billy Wright Road and SR 152. These measures reflect variations or options that would be evaluated by the applicant, Caltrans and the County during final design of the proposed action to determine the most appropriate approach for reducing traffic-related impacts to less-than-significant levels. The selected measures would, in turn, be noted on final construction design plans or in construction contracts as appropriate. Implementation of the selected measures would reduce construction-related impacts, including impacts on traffic at this intersection, to less than significant.

Finally, during construction, sections of Billy Wright Road would need to be improved to allow for equipment delivery. Some sections of the road would require grading and repaving (see Figure 3.11-1) and could require temporary lane closures. It is anticipated that only one lane would be closed at a time to ensure through traffic. Because of the low vehicle use of Billy Wright Road and the short duration of the improvement, the temporary lane closures are not expected to substantially degrade the traffic operation on Billy Wright Road or conflict with Billy Wright landfill traffic. This impact would be less than significant.

Although construction-related traffic impacts under the Proposed Action Alternative would be less than significant with implementation of mitigation, they would be more substantial than the No Action Alternative, where no construction-related traffic would be generated.

Mitigation Measure TRA-1: Maintain PM Peak Hour LOS on Billy Wright Road approach to SR 152

The applicant will select and implement one of the following alternative means of addressing the PM Peak Hour LOS on Billy Wright Road prior to construction.

1. Prior to project construction, the applicant shall install, under an encroachment permit from Merced County, a separate right turn lane on the Billy Wright Road approach to SR 152. The additional lane shall be located within the existing 60-foot wide access opening on SR 152 and shall not require any widening of that opening (Figure 3.11-1).
2. The applicant shall stage the construction employee work schedule so that no more than 200 employees will leave the site during the PM Peak Hour (4:00–6:00 p.m.). This staggered work schedule shall be clearly required in construction plans and contracts.

Mitigation Measure TRA-2: Address safety concerns at Intersection of SR 152/33 and Billy Wright Road

The applicant shall construct a westbound left turn lane on SR 152 under an encroachment permit from and subject to the design approval of Caltrans District 10. The lane shall be a minimum of 665 feet in length (Figure 3.11-1).

Mitigation Measure TRA-3: Address safety concerns at SR 152 approaching Billy Wright Road

Caltrans, and the applicant with the approval of the County, will select and implement one of the following means of addressing the safety concerns of eastbound truck traffic approaching SR 152 prior to construction. The measure will be clearly indicated in construction plans and contracts.

1. The applicant shall construct a separate eastbound right turn lane on SR 152 approaching the Billy Wright Road intersection under an encroachment permit from and subject to the design approval of Caltrans District 10. A full, 665-foot long deceleration lane shall be installed with 4-foot wide shoulder in the area of the existing 8-foot wide shoulder on SR 152.
2. The applicant shall widen the existing shoulder on eastbound SR 152 approaching the Billy Wright Road intersection to 12 feet for a distance of 665 feet to temporarily accommodate construction-related trucks. This would be undertaken under an encroachment permit from and subject to the design approval of Caltrans District 10.

Mitigation Measure TRA-4: Address truck-turning conflicts at SR 152 and Billy Wright Road

Caltrans, and the applicant with the approval of the County, will select and implement one of the following means of addressing the safety concerns due to truck-turning conflicts at SR 152 / Billy Wright Road intersection prior to construction. The measure will be clearly indicated in construction plans and contracts.

1. The applicant shall prohibit trucks associated with the construction of the solar facility from exiting the site during the PM Peak Hour between 4:00 and 6:00 p.m.

2. The applicant shall widen the existing shoulder on eastbound SR 152 east of Billy Wright Road from 8 feet in width to 12 feet in width for a minimum distance of 1,400 feet under an encroachment permit from and subject to the design approval of Caltrans District 10. Or, the applicant shall construct a separate acceleration lane on eastbound SR 152 under an encroachment permit from and subject to the design approval of Caltrans District 10. The separate lane shall be a minimum of 12 feet in width and 1,400 feet in length.

Mitigation Measure TRA-5: Address truck-turning conflicts at SR 152 and westbound traffic

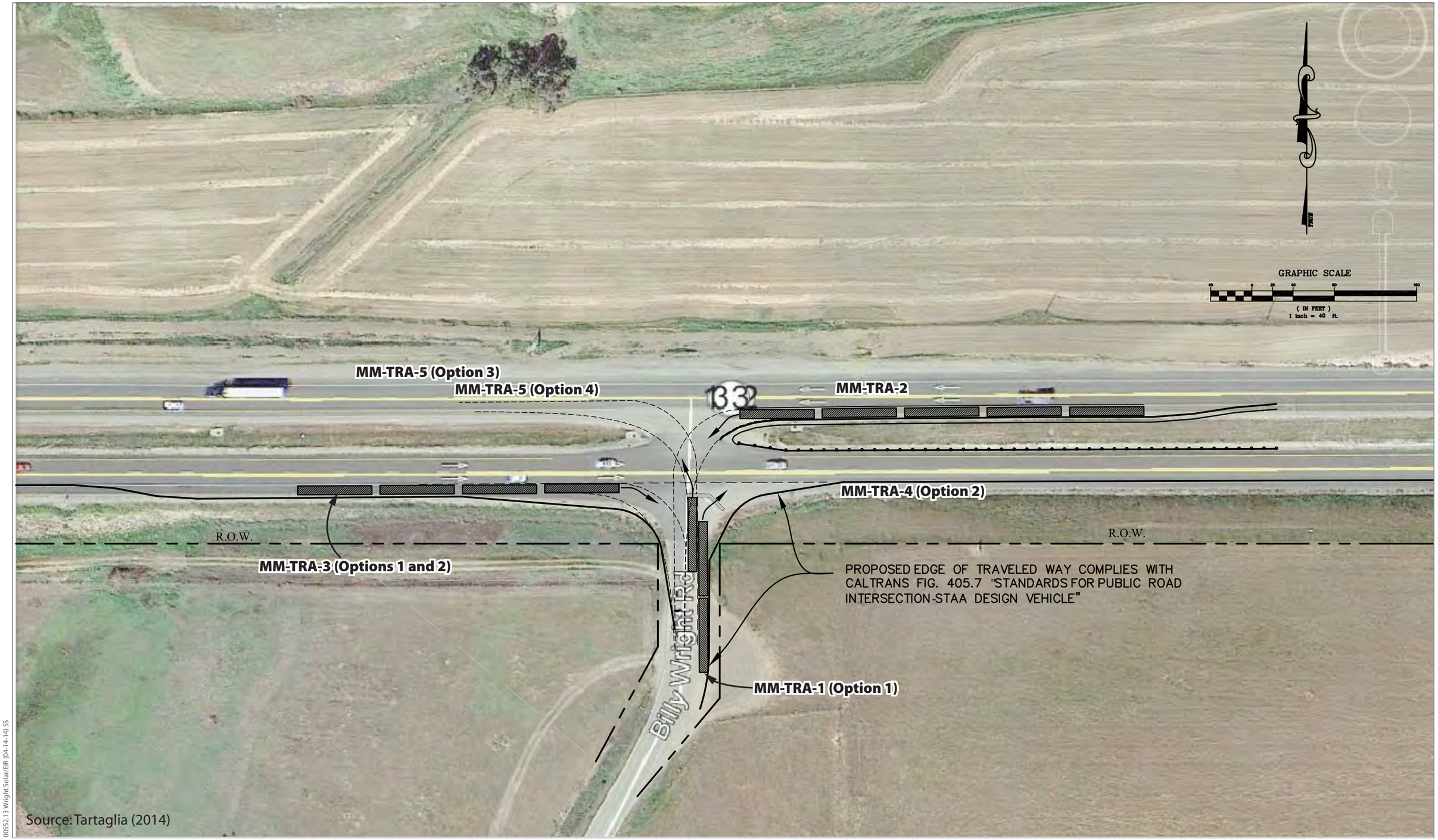
The applicant will implement one of the following options to minimize conflicts between trucks turning left onto westbound SR 152 and other westbound traffic. The selected measure will be determined prior to construction and identified on construction plans and contracts.

1. The applicant, as part of the construction contract documents, shall prohibit construction truck turns from Billy Wright Road onto westbound SR 152 (i.e., left turns from Billy Wright Road).
2. The applicant, as part of the construction contract documents, shall prohibit trucks from exiting Billy Wright Road during the AM Peak Hour period of 6:00–9:00 am.
3. The applicant shall widen the outside shoulder on westbound SR 152 west of the Billy Wright Road intersection to a width of 12 feet, under an encroachment permit from and subject to the design approval of Caltrans District 10.
4. The applicant shall install a separate westbound acceleration lane within the median area, under an encroachment permit from and subject to the design approval of Caltrans District 10. The separate lane shall be a minimum of 12 feet in width and 1,400 feet in length.

Operation-Related Traffic

Once in operation, the Proposed Action Alternative would employ up to six employees to service and maintain the solar arrays. During scheduled maintenance and emergency repairs, additional crews of two or more technicians could be required. The scheduled maintenance activities, such as washing dust from the solar panels, would typically take place two to three times per year. Because the scheduled maintenance and emergency repairs would only generate up to 16 employee trips per day and few infrequent delivery vehicle trips, the increase in maintenance vehicle trips is not expected to substantially degrade the traffic operation of surrounding roadway network to unacceptable levels of service. Similarly, the ongoing and limited access to the offsite mitigation lands would be comparable to existing conditions, and would not result in traffic congestion or degradation in levels of service.

Operation-related traffic impacts under the Proposed Action Alternative would be less than significant, although slightly greater than the No Action Alternative due to additional traffic to and from the project site.



Source: Tartaglia (2014)

00552.13 Wright Solar/EIR (04-14-14) SS

Figure 3.11-1
Location of Mitigation Options

3.12 Utilities and Public Services

This section describes the regulatory and environmental setting for utilities and public services and the potential effects on those services that could result from implementation of the proposed action.

For the purposes of this section, the study area is concurrent with the project site, where all proposed new infrastructure would be located and where any new public services could be required. No new physical structures would be constructed on the offsite mitigation lands, and no new public services or utilities would otherwise be required to support ongoing management. Therefore, no impacts on utilities or public services would occur at the offsite mitigation lands and they are not discussed further in this section.

3.12.1 Affected Environment

Regulatory Setting

Local

2030 Merced County General Plan

The Public Facilities and Services Element of the *2030 Merced County General Plan* includes the following pertinent goals and policies that apply to the study area (Merced County 2013).

Goal W-2. Ensure adequate wastewater collection, treatment, and disposal within the County.

Policy PFS-2.6: Septic System Standards. Require adequate standards for private septic systems to protect water quality and public health.

Goal PFS-5. Ensure the provision of adequate utilities to the residents of Merced County.

Policy PFS-5.3: New Transmission Lines and Distribution Lines. Encourage new transmission and distribution lines within existing utility easements and right-of-ways, joint-use of easements among different utilities.

Policy PFS-5.7: Utility System Expansion. Coordinate with local gas and electric companies in the design and location, and appropriate expansion of gas and electric systems, while minimizing impacts to agriculture and minimizing noise, electromagnetic, visual, and other impacts on residents.

Environmental Setting

The study area is in a rural area and has limited utility service. No municipal water or sewer service is available at the project site. Irrigation water is available from the San Luis Water District. There are no municipal stormwater collection or transmission facilities serving the project site. Water availability is based on the District's CVP Water Service Contract which is administered by the U.S. Bureau of Reclamation (Reclamation). Potential sources of water supply include the CVP's agricultural allocation that is associated with the project site. Unused allocated water can be carried over to the following year and stored in the San Luis Reservoir (Martin pers. comm.).

Utilities

Electricity services in Merced County are provided primarily by PG&E. Merced Irrigation District and Turlock Irrigation District also supply electric services to the County. PG&E provides all the natural gas services within Merced County (Merced County 2012).

Telecommunication services are primarily provided by SBC/AT&T, with a wide range of other service providers in the market for wireless and long distance services (Merced County 2012).

Public Services

Law Enforcement

Law enforcement near the study area is provided by the Merced County Sheriff's Department in unincorporated Merced County and the Los Banos Police Department in the city of Los Banos.

Fire Protection

Fire protection is provided by CAL FIRE because the study area is located within an SRA. SRAs include much of the wildlands in unincorporated Merced County and the study area. The project site is in an area considered to have a high to moderate risk for wildland fires (California Department of Forestry and Fire Protection 2007). The CAL FIRE station closest to the study area is the station at 31011 West Gonzaga Road in Gustine, approximately 5.5 miles west of the project site near San Luis Reservoir and 11.5 miles northwest of the proposed offsite mitigation lands. The Gustine station is part of CAL FIRE's Madera-Mariposa-Merced Unit. The Unit has 20 engines, 3 bulldozer/transport units, and 5 hand crews. Wildland fire safety during construction and operation is discussed in Section 3.6, *Hazards and Hazardous Materials*.

Waste Management

The study area is served by Gilton Solid Waste Management, which offers both residential and commercial services. Solid waste disposal is available at Merced County's Billy Wright Landfill north of the project site. The Billy Wright Landfill facility serves the cities of Dos Palos, Gustine, and Los Banos, as well as unincorporated communities in western Merced County. The capacity of the landfill, following implementation of a recently approved expansion plan, will be reached in approximately 2054 (Merced County 2013).

Schools and Libraries

Los Banos High School and Los Banos Elementary school in Los Banos are within approximately 5.5 miles of the project site to the northeast. Romero Elementary School in Santa Nella is approximately 5.7 miles north of the project site.

The Santa Nella and Los Banos public libraries are both within 5.5 miles north and northeast of the project site, respectively.

Hospitals and Ambulance Services

Three hospitals provide medical services to county residents: Mercy Medical Center Merced in the city of Merced; Memorial Hospital in Los Banos; and Dos Palos Memorial Hospital in Dos Palos.

Riggs Ambulance Service (RAS) in Merced is the current provider of emergency and non-emergency medical transportation near the study area, and serves as the County Emergency Medical Dispatch Center within Merced County. RAS provides ambulance service under contract to Merced County on both an exclusive and non-exclusive basis.

3.12.2 Environmental Consequences

Approach and Methods

The potential effects of the proposed action were considered in terms of whether the alternatives would result in an inability to maintain adequate utilities and appropriate public service levels and facilities, or otherwise interfere with the ability to provide those services (e.g., as a result of changes or increased use of the exiting road system).

Thresholds of Significance

An alternative would be considered to have a significant impact on utilities and public services if it would result in any of the following conditions.

- Result in substantial adverse effects on school, law enforcement, fire, or emergency medical services.
- Require or result in the expansion or construction of a utilities system, including a wastewater treatment plant or landfill, where the construction would cause substantial environmental effects.
- Result in the need for new or expanded entitlements for water supplies.
- Be served by a landfill with sufficient permitted capacity to accommodate the proposed action's solid waste disposal needs.

Under the proposed action, water would be required for washing the solar panels and for supplying the O&M building's water system. Water would be obtained through water allocation from existing landowners' approved rights to irrigation water from the San Luis Water District. Therefore, implementation of the proposed action would not require new or expanded water supply entitlements. As such, this potential impact is not discussed further in this section.

Issues related to stormwater drainage are addressed in Section 3.7, *Hydrology and Water Quality*.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and the proposed solar facility would not be constructed. The project site would continue under current agricultural uses (i.e., dry-land farming and grazing) and no impacts on public services or utilities would occur.

Proposed Action Alternative

Impacts on Schools, Law Enforcement, Fire Protection, and Emergency Medical Services

Construction and O&M activities under the Proposed Action Alternative would not be expected to generate a substantial or increased need for police or fire protection, emergency medical services or school services, or other public facilities, such as libraries, and would not otherwise interfere with those services. Fire and police departments in the area are adequately equipped to handle most foreseeable emergencies that may occur as a result of the Proposed Action Alternative, and there would be no need for additional public services. Onsite security would be provided by the applicant and its contractor, as warranted. Accordingly, this impact would be less than significant. This impact could be slightly greater than the No Action Alternative, assuming some minor increase in emergency, fire, or law enforcement services are required over the life of the project.

Impacts on Existing Utilities, Wastewater Treatment Plants, and Landfills

No new or expanded water or wastewater treatment facilities or landfills would be needed for operation of the solar facility under the Proposed Action Alternative. The proposed solar facility would be served by an onsite septic system with adequate capacity, and panel washing water would not require treatment of water. As such, implementation of the proposed action would not create any need for new or expanded facilities to treat water or wastewater. Water would be provided by a 50,000-gallon water storage tank filled with water that would be obtained from existing irrigation water rights.

Once in operation, the solar facility would generate electricity during daylight hours. This electricity would supplement the energy capacity of the existing power grid of Northern California, thereby increasing the stability and operability of the transmission system. The Proposed Action Alternative would include an electric transmission line to connect the solar facilities to generation facilities owned and operated by PG&E. The connection of the solar facility to the grid would not cause any substantial (i.e., greater than a couple of hours) disruption to existing electricity services in the area. With the exception of this transmission line, there would be no need for expansion or construction of utilities in or around the study area.

Decommissioning of the solar facility may occur at the end of the life of the project. The decommissioning process would involve the removal of aboveground structures. All structures buried greater than 4 feet deep would be left in place. All materials would be recycled to the greatest extent possible. It is likely that materials that cannot be recycled, as well as debris, would be disposed of at the Billy Wright Landfill. The capacity of the landfill, following implementation of a recently approved expansion plan, will be reached in approximately 2054. Accordingly, it is assumed that the landfill would have sufficient capacity to accommodate solid waste from site decommissioning and there would be no need for expansion or construction of a new landfill. Therefore, this impact would be less than significant, although greater than under the No Action Alternative, where no additional waste from the proposed action would be generated.

3.13 Visual Resources

This section describes the regulatory and environmental setting for visual resources, as well as the potential impacts on visual resources that could result from implementation of the proposed action. Where appropriate, mitigation measures are identified to address adverse effects.

For the purposes of this section, the study area includes all areas within 0.5 mile of the project site, where all proposed ground disturbance activities and construction would occur. No ground disturbing activities or new physical structures would be constructed on the offsite mitigation lands,. Therefore, no impacts to visual resources would occur at the offsite mitigation lands. Existing agricultural uses (i.e., dry-land farming and grazing) would continue as part of the proposed action. Currently, the site has perimeter fencing and minimal interior fencing, which would remain. New perimeter fencing may be installed to replace part or all of the existing perimeter fencing as needed to maintain site security. If implemented, this new fencing would have of similar dimensions and aesthetics. Therefore, views of the mitigation site would not be affected by the proposed action. Visual resources within the offsite mitigation lands are not discussed further in this section.

3.13.1 Affected Environment

Regulatory Setting

Aesthetics and visual resources are regulated indirectly through a variety of federal, state, and local laws and programs. For example, the federal government does not explicitly regulate visual resources, but recognizes their value and preserves them under the aegis of the National Park, National Wildlife Refuge, National Monument, and National Scenic Byway Systems. Similarly, aesthetic values are preserved at the state level through the establishment of state parks and preserves and through the California Scenic Highway Program. In addition, although local jurisdictions are not required to address visual resources as a separate topic in their general plans, most do consider aesthetic values in developing their planning framework.

There are no federally designated National Parks, Wildlife Refuges, Monuments or Scenic Byway Systems in the vicinity of the study area. The following summarizes the state and local regulations that govern visual resources in the study area.

State

There are two state scenic highways in the study area: (1) I-5, within Merced County, extending from the Stanislaus County line to SR 152; and (2) SR 152, within Merced County, extending from the Santa Clara County line to the I-5 and SR 152 intersection (California Department of Transportation 2014). Designated scenic corridors are subject to protection, including the regulation of land use, site planning, advertising, earthmoving, landscaping, and design and appearance of structures and equipment. Examples of visual intrusions that would degrade scenic corridors as stipulated by Caltrans include dense and continuous development, highly reflective surfaces, development along ridge lines, extensive cut and fill, scarred hillsides and landscape, exposed and unvegetated earth, and dominance of exotic vegetation (California Department of Transportation 2008:1, 23–25).

Local

The *2030 Merced County General Plan* includes several policies related to the protection of visual resources within the study area, such as design guidelines for hillside developments; policies to preserve agricultural land, ranch land, and other open space areas as a means of protecting the County's visual and rural character; building and road design criteria that consider site orientation, setbacks, landscape, and topography to protect scenic values; and light pollution reduction strategies, among others (Merced County 2013). The Merced County General Plan also requires the County to coordinate with Caltrans when siting structures adjacent to scenic highways to ensure the scenic vistas and local scenic values are not significantly degraded (Merced County 2013; Policy NR-4.2). As noted above, portions of I-5 and SR 152 in the vicinity of the study area are designated as scenic corridors and would be subject to these design review considerations where the study area would be visible from the scenic corridor.

Environmental Setting

Terminology and Background

The environmental setting for visual resources was identified using FHWA methodology (Federal Highway Administration 1988), which provides a systematic, standardized approach for evaluating effects on visual resources. This approach identifies a view's aesthetic value based on its inherent visual character, its visual quality, and viewers' response to it.

Visual Character

Natural and artificial landscape features contribute to the visual character of an area or view. Visual character is influenced by geologic, hydrologic, botanical, wildlife, recreational, and urban features. The perception of visual character can vary significantly seasonally, even hourly, as weather, light, shadow, and elements that compose the viewshed change. The basic components used to describe visual character for most visual assessments are the elements of form, line, color, and texture of the landscape features (U.S. Department of Agriculture Forest Service 1995:28–34, 1-2–1-15; Federal Highway Administration 1988:37–43). The appearance of the landscape is described in terms of the dominance of each of these components.

Visual Quality

Visual quality of a view is described in terms of its vividness, intactness, and unity. Vividness describes the power or *memorable-ness* of landscape components as they combine in visual patterns. Intactness refers to the visual integrity of the natural or built landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, as well as in natural settings. Unity is the visual coherence and compositional harmony of the landscape considered as a whole. Typically, high-quality views are highly vivid, are relatively intact, and exhibit a high degree of visual unity. Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity (Jones et al. 1975; Dunne and Leopold 1978; Federal Highway Administration 1988).

Viewer Exposure and Sensitivity

Viewer response to a view—and to potential changes in that view—depends on viewer exposure and viewer sensitivity. This analysis emphasizes the sensitivity of individual viewers rather than

overall viewer exposure. Viewer exposure reflects the number of viewers, the distance from which they view the resource, and the duration of viewing. Viewer sensitivity describes the public's level of concern for particular views. It depends in part on viewer exposure, but is also affected by viewer activity, awareness, and expectations. For example, visual sensitivity is higher for views seen by people who are driving for pleasure; people engaging in recreational activities such as hiking, biking, or camping; and homeowners. Visual sensitivity tends to be lower for views seen by people driving to and from work or as part of their work (U.S. Soil Conservation Service 1978; Federal Highway Administration 1988; U.S. Department of Agriculture Forest Service 1995).

Regional Visual Character

The *regional visual character*—which describes aesthetic conditions within a 30 mile radius of the study area—reflects a mix of agricultural, developed, and natural landscapes. The proposed action is in the Central Valley of California, southwest of Los Banos, in unincorporated Merced County (Figure 1-1). Hollister and the communities of Crows Landing, Newman, Gustine, Hilmar, Livingston, Atwater, El Nido, Dos Palos, Tres Pinos, and Ridgemark are also located in the region. Most regional development occurs along transportation corridors, such as I-5, SR 152, and SR 33 that run roughly through the middle of the region. The Diablo Range and its foothills west of the study area are an integral part of the region's visual character that provides topographical visual interest compared to the flat valley floor that the landforms border. East of the Diablo Range, open agricultural land is dotted with rural development that becomes increasingly urbanized near the limits of cities and towns in the region.

Agricultural land in the region dominates, and is planted predominantly with orchard and row crops. A patchwork of fields separates cities and small towns from one another. These fields offer expansive views that extend over the valley floor to the east and Diablo Range to the west when haze is at a minimum. These landscape views are strongly characteristic of the Sacramento–San Joaquin Valley and have contributed to the regional identity.

Merced County has generally limited the conversion of agricultural land under its jurisdiction to community plan areas where planned development is clustered around a commercial core. As a result, conversion of agricultural land within the I-5 corridor has not been as extensive as other areas in the larger region. On a regional basis and considering other neighboring counties, development radiating out from cities, particularly along the Highway 99 corridor, is converting agricultural land and closing the gap between larger and smaller outlying cities. This is beginning to change the visual character along Highway 99 from rural/agricultural to suburban.

Water features in the greater region include the San Joaquin River and its tributaries, San Luis and Los Banos Creek Reservoirs, O'Neill Forebay, the Delta-Mendota Canal, California Aqueduct, numerous creeks and sloughs, and smaller drainages and local irrigation ditches.

Visual Character of Study Area

Key observation viewpoints (KOPs), shown in Figure 3.13-1, were selected to represent the relative landscape and affected views to and from the project site; representative photographs from these locations are shown in Figure 3.13-2. The study area is located at the eastern base of the Diablo Range foothills, immediately west of I-5, within approximately 8 miles (south) of the I-5/SR 152 interchange. The study area vicinity is comprised primarily of agricultural and open space land uses and is characterized by rolling terrain.

I-5 runs northwest-southeast east of the study area. As described above, the segment of I-5 north of SR 152 is designated as a state scenic highway; however, it does not have views of the project site due to distance and intervening rolling terrain. Views from I-5 south of SR 152 toward the study area are also often limited, although there are a few breaks in the terrain that allow views of the project site. Distance and intervening rolling terrain also limit views of the project site from SR 152 west of I-5 (Figure 3.13-2, KOP 2). Farther east along SR 152, views toward the project site are present, but distance precludes distinguishing discernable details (Figure 3.13-2, KOP 3). In addition, intervening terrain, vegetation, and atmospheric haze, common in the vicinity, further limit views.

Several local roads (e.g., Billy Wright Road, Canyon Road, Langdon Road, and Arburua Road) provide access to the larger roadways and serve as local travel routes in the area. Travelers on these roadways have views of the project site, particularly when they are in close proximity (Figure 3.13-2, KOP 4); however, views are often limited when only a short distance away from the site, such as along Billy Wright Road, due to intervening terrain, vegetation, and atmospheric haze (Figure 3.13-2, KOP 5).

The San Luis and Los Banos Creek Reservoirs, O'Neill Forebay, the Delta-Mendota Canal, and the California Aqueduct are the major waterways in the vicinity. The San Luis and Los Banos Creek Reservoirs and O'Neill Forebay are all a part of the San Luis Reservoir State Recreation Area and are used for active and passive recreation. Views from the San Luis Reservoir and O'Neill Forebay of the project site are not available due to the rolling terrain. Similarly, views from Los Banos Creek Reservoir of the project site are mostly unavailable from public use areas along the shoreline, which is located below the surrounding terrain (Figure 3.13-2, KOP 6). However, views of the project site, for example, are available from higher vantages above the reservoir, such as from access roads and trails (Figure 3.13-2, KOP 7).

While no officially designated scenic vistas are identified in the vicinity of the study area, the rolling terrain often allows for scenic views from high points along local roadways, trails, and from rural residential locations out and over the landscape. Views in the vicinity are composed of rolling terrain, grasslands and agricultural fields, rural residences and businesses, roadways, and human-made features (concrete-lined waterways, wooden utility poles, and transmission lines) back-dropped by the Diablo Range and flat valley floor extending east from the foot of the range and into the distant background. The overall visual character is moderately high due to the picturesque quality of the rolling terrain contrasting against the adjacent flat valley floor and relatively few anthropogenic features that detract from the overall quality of views within the landscape.

Viewer Groups and Viewer Response

Residents

A small number of rural residences are located within or adjacent to the study area. Two residences with views of the study area are located about 0.3 mile northwest of the project site. In addition, one residence is located approximately 1.15 miles southeast of the project site along Canyon Road. Residents along SR 152 do not have views of the study area (Figure 3.13-2, KOP 8).

Residents are likely to have a high sensitivity to visual changes at the project site because they are likely to have a high sense of ownership of views of the surrounding landscape, which is largely undeveloped.

Businesses

The Billy Wright Landfill is north of Billy Wright Road, approximately 0.8 mile north of the project site. Views of the study area from the landfill are limited due to rolling terrain (Figure 3.13-2, KOP 9). There is also a nursery located 0.3 mile east of the project site, immediately adjacent to I-5, which would have views toward the project site.

In general, these viewers would have low sensitivity to changes in their surroundings because their focus would be primarily on business operations, rather than the scenic character of the surrounding landscape.

Recreationists

Recreationists include people using the access roads along the California Aqueduct for walking, jogging, running, or cycling. Cycling also takes place on local roadways. Given the distance between the project site and larger residential areas, the number of recreationists in the study area is anticipated to be small.

Recreationists are likely to be moderately sensitive to visual changes at the project site, but are also accustomed to the presence of infrastructure in the study area vicinity.

Roadway Users

Viewers who frequently travel I-5, SR 152, and local roadways generally possess low visual sensitivity to their surroundings. Travelers on this portion of I-5 may have glimpses of the project site, but would be traveling at high rates of speed, averaging 70–80 mph. In addition, the rolling terrain mostly precludes view of the project site. Travelers on local roadways include rural residents, agricultural workers, people accessing the landfill, and commuters driving to the businesses in the area. Their views toward the project site are also largely obscured by the rolling terrain, except when in very close proximity to the site or when an elevated vantage point affords views. The passing landscape becomes familiar for roadway users, and their attention typically is not focused on the passing views. At standard roadway speeds, views are of short duration and roadway users are fleetingly aware of surrounding traffic, road signs, their immediate surroundings within the automobile, and other visual features.

These viewers have low sensitivity to their surroundings because their focus is concentrated on driving and roadway conditions.

3.13.2 Environmental Consequences

Approach and Methods

The analysis of the potential visual impacts of the proposed action are based on the following.

- Direct field observation from vantage points, including neighboring buildings, properties, and roadways and photographic documentation of key views of and from the project site.
- Evaluation of regional visual context.
- Review of construction drawings.
- Review of the proposed action in regard to compliance with state and local ordinances and regulations and professional standards pertaining to visual quality.

- Simulated KOPs (SKOPs) depicting before and after visual conditions.

Thresholds of Significance

An alternative would be considered to have a significant impact on visual resources if it would result in any of the conditions listed below.

- Have a substantial adverse effect on a scenic vista.
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway.
- Substantially degrade the existing visual character or quality of the site and its surroundings.
- Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

Because the officially designated segments of I-5 and SR 152 are located 2 miles north of the project site and would not have views of the site due to distance and intervening rolling terrain, there would be no substantial effect on scenic resources along either highway. Therefore, potential impacts on state scenic highways are not addressed further in this section.

Effects

No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented and the proposed solar facility would not be constructed. The project site would continue under current agricultural uses (i.e., dry-land farming and grazing) and no impacts on visual resources would occur.

Proposed Action Alternative

Temporary Visual Impacts Caused by Construction Activities

Construction of the Proposed Action Alternative would create temporary changes in views of and from the project site. Construction activities would introduce heavy construction equipment and associated vehicles, including backhoes, compactors, tractors, and trucks into the viewshed of all viewer groups. Construction would also require establishment of a number of temporary facilities, such as assembly areas, parking areas, and staging areas, and construction traffic along Billy Wright Road and the project site access road would be visible in the foreground and middleground.

Although viewers in the study area are accustomed to seeing heavy machinery associated with agricultural operations, construction activities under the Proposed Action Alternative would likely be more intense and isolated than typical of the area and normal uses, and may occur on weekends and in the evening. In particular, construction occurring past daylight hours would require the use of high-intensity lighting to illuminate construction activities that occur in the dark. While construction would be temporary, visual impacts could be potentially significant if in close proximity to sensitive viewers, such as residences.

Accordingly, under the Proposed Action Alternative, EC-13 would be implemented to limit construction activities within 0.5 mile of residences to daylight hours (i.e., between 7:00 am and 6:00 pm). This would reduce construction effects on sensitive viewer groups because most construction activities would be taking place during business hours (when most viewer groups are

likely away from their residences at work). In addition, standard BMPs, such as dust control measures to reduce the potential for construction-related dust to impair short-range views, and restoration activities to return temporarily disturbed areas to the preconstruction conditions typical of the project site once construction is completed, would be implemented. With implementation of EC-1 and these standard construction BMPs, potential adverse impacts on sensitive viewers during construction would be less than significant. This impact would, however, be greater than the No Action Alternative where no construction activities or associated visual impacts would occur.

Long-Term Changes in Visual Character and Changes in Scenic Vista Views

While no officially designated scenic vistas are identified in the study area or vicinity, the rolling terrain often allows for scenic views from high points along local roadways, trails, and from rural residential locations out and over the picturesque landscape. These views are comprised of the Diablo Range's rolling, grassy foothills that transition to the patchwork of the valley's flat agricultural floor. The solar facility would introduce solar fields, or arrays, (making up much of the solar park's footprint) on about half of the project site, which would alter the existing visual character. In addition, collection lines, an office/storage building, gravel access roads, and an 8-foot-high chain-link perimeter fencing with three-strand barbed wire would be visible from the foreground and middleground of vista views available to residences along the surrounding roadways, to agricultural workers in nearby fields, and to roadway travelers using surrounding roadways. As described above, the most sensitive viewers in the study area are the residences that live near the project site, the closest of which are 0.3 mile north of the project site.

The solar modules would be composed of individual panels that would each be about 3- to 4-feet wide and 5- to 6-feet long. The modules would have a 1- to 2-foot clearance from the ground, for a total module height of about 9 feet from the ground. The distance between rows of the trackers would be roughly 9 feet (east-west) and 4 feet (north-south), and row length would be no longer that 150 feet on each side of the drive arm assembly. The total solar block dimension would be approximately 237 feet wide by 285 feet long, and a series of these blocks would comprise the solar array for the power plant. The panels would be arranged in rows that run north-south across the rolling terrain, with the panels facing east-west, which would create repetitive lines by the form and layout of the panels as illustrated in Figure 2-1. The rolling terrain would make the linear pattern of the array more pronounced, compared to installation on level ground, because viewers would be able to clearly see the array pattern on the undulating terrain.

The array pattern would not be evident within middleground views, as shown in the simulations in Figures 3.13-3 through 3.13-5. The illustrations show vista views of the solar array from distances of approximately 0.2 mile away. Figure 3.13-3 shows a vantage available from access roads and trail areas near Los Banos Creek Reservoir and is also representative of views available to the residence along Canyon Road. Figure 3.13-4 is representative of views available from I-5, where breaks in the terrain allow for views of the project site.[1] Figure 3.13-5 is representative of views northwest of the project site, from a local access road. These figures also illustrate how the solar array would appear as a greyish color variation that drapes over the rolling terrain and slightly contrasts against the browns and tans of the existing terrain. Buildings, fencing, and electrical generation infrastructure

[1] It should be noted that Figure 3.13-4 is from a slightly higher vantage point along an unpaved portion of Volta Road that fronts I-5. Views from I-5 would still be available from this location but to a lesser degree because I-5 is situated slightly lower and intervening terrain between the project site and I-5 would obscure some views at this elevation.

(i.e., power conditioning stations, substation and control room, gen-tie-line and associated transmission line poles, switching station, and battery storage facility) would not be visible from these distances. They may be visible, however, from locations where the project site is within the foreground of vista views. For example, some infrastructure would be located in close proximity to the access roads or the project site boundary (e.g., battery storage facility), where it may be more readily observed, and/or is taller than the solar panels or otherwise located on elevated viewing points (e.g., some power conditioning stations, switching station). However, some infrastructure (e.g., substation and control room) would be less visible because it would be located within and surrounded by the solar array, away from sensitive receptors. In some instances, the terrain would help obscure views of some infrastructure from certain vantage points; however, most components would be visible to viewers under certain circumstances.

The Proposed Action Alternative would introduce a considerable amount of infrastructure and anthropogenic features to the study area. It would alter the existing visual character from rural/agricultural to more industrial in nature, and would reduce the existing scenic quality with the intrusion of human-made elements on land that is currently farmed and largely undeveloped. However, proposed infrastructure would generally not be evident within the middleground, where sensitive viewers with the most potential for exposure (i.e., residents and recreationalists) would likely occur. In addition, the number of sensitive viewers in the study area is relatively low, and comprised primarily of limited recreationists and two residences with views of the project site. As a result, impacts associated with long-term changes in the visual character of the study area are less than significant, although more substantial than the No Action Alternative where the proposed action would not be constructed.

Changes in Daytime or Nighttime Views due to Substantial Light of Glare from the Solar Facility

The project site is currently devoid of lighting sources from interior or exterior locations such as lit buildings and street lighting. Very minor sources of light are present from adjacent residences. Under the Proposed Action Alternative, lighting would be installed for ongoing maintenance and security purposes, and would occur at the switchyard, substation, O&M facility, entry and egress gates, and at strategic locations around the facility. All lighting would use amber colored lenses where possible and be shielded and directed downward to minimize the potential for glare or spillover onto adjacent ownerships. Lighting would be used from dusk to dawn and switched lights, which would only be activated when workers are present, would be installed and left in the off position until needed or as code requires, where possible. Security lighting would be set up to use infrared or FLIR technology. These lighting measures would reduce the amount of light trespass falling outside the boundaries of the project site, and is not expected to affect sensitive viewers (residences) in the general vicinity.

There are currently only very minor sources of daytime glare at the project site. A solar power plant of the size proposed would introduce a considerable source of glare from the reflective surfaces of the solar collectors. While the panels would be dark blue or black in color with minimal light reflection, the panels have a microscopically irregular surface designed to trap the incident rays of sunlight. However, any incident radiation not absorbed and transmitted would be reflected. A typical untreated silicon solar cell absorbs two-thirds of the sunlight reaching the panel's surface and reflects one-third.

The proposed solar array would be installed in rows that run north–south and use a tracking system that follows the sun in its path from east to west across the sky as the day progresses. When the sun

is high in the sky (close to noon or in the summer) and the panel is low to the ground, the law of reflection indicates that the reflected ray would be reflected in an upward direction toward the light source and back into the atmosphere away from terrestrial-based receptors. This would reduce the potential for glare. However, when the sun is low on the horizon (near dawn or dusk or in the winter) and the panel is raised higher and more vertical, the potential for fugitive glare on terrestrial-based receptors would increase. Depending on time of year and the receptors' location in respect to the solar array, these impacts can be expected to last from a half an hour to more than an hour. In addition, the rolling terrain has the ability to increase glare resulting from the solar array because the slopes would expose more panel faces and, essentially, create variable facets for the sun to reflect off of compared to a flat installation that generally creates one uniform facet (i.e., a uniform and even panel orientation).

Residents, recreationists, roadway travelers, and businesses in close proximity to the panels may experience some glare. Recreationists and roadway travelers would be transitory in the vicinity of the project site and the effects of glare on these viewers would be limited. Similarly, the effects of glare on businesses would be seasonal, based on hours of operation, and less than significant. The rolling terrain may also help to limit glare from the project site by obscuring views of the panels both by businesses in the vicinity and along Billy Wright Road and much of I-5. However, the existing residents within 1 mile of the project site may be affected by glare from the solar panels because their views of the project site would be constant and more sensitive to changes in permanent use. Glare impacts on these residents may be significant if siting, terrain, and panel angles align in a manner that adversely affects these residents. Implementation of Mitigation Measure VIS-1 would reduce this impact by providing visual buffers and screening adjacent to residential properties in the vicinity, as necessary and requested by the property owner. This impact would be less than significant, although greater than the No Action Alternative where no lighting or glare sources would be created.

Mitigation Measure VIS-1: Implement landscape planting on residential properties to offset glare impacts

Residents located within 1 mile of the project site at the time project operation commences may request that landscape plantings, such as trees and shrubs, be planted to offset the impacts of glare associated with the solar facility. Glare may or may not cause significant impacts on individual properties, based on building orientation, elevation, and presence of existing structures and vegetation around private residential properties. Therefore, landscaping will only be installed at the request of the property owner and will be limited to the area in between the affected buildings and the project site. Residential property owners will have up to 1 year after project implementation to determine if glare is causing a significant impact and if plantings are warranted. This will allow for one full seasonal rotation and sun angle shifts to adequately gauge the impacts of glare.

Native, drought-tolerant plants will be used in the plantings. Under no circumstances will any invasive plant species be used at any location. The private property owner will be responsible for maintaining and watering the plants following installation.

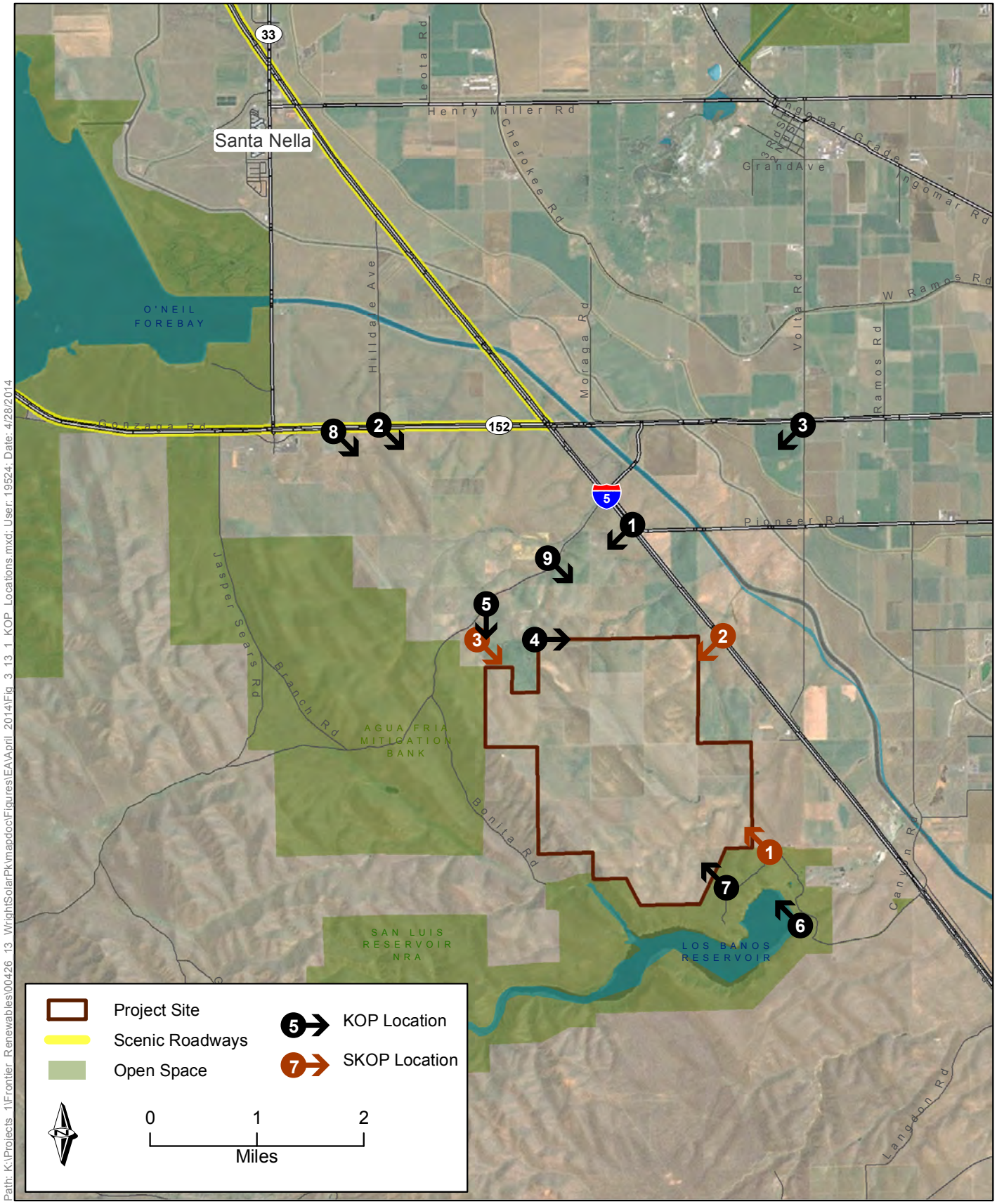


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Figure 3.13-1
Representative Key Observation Viewpoints
and Simulated Key Observation Viewpoint Locations

KOP 1. View from West Pioneer Road looking southwest toward I-5 and the project site.

KOP 2. View from SR 152 at Hilldale Avenue, west of I-5, looking southeast toward the project site.

Graphics ... 0055213 (2-14-14) tm

Figure 3.13-2
Representative Photographs of Key Observation Viewpoints at the Project Site

KOP 3. View from Volta Road at SR 152, east of I-5, looking southwest toward the project site.

KOP 4. View from the access road along the northern project boundary looking east toward the project site.

Graphics ... 0055213 (2-14-14) tm

Figure 3.13-2
Representative Photographs of Key Observation Viewpoints at the Project Site (continued)

KOP 5. View from Billy Wright Road looking south toward the project site.

KOP 6. View from Canyon Road, south of Los Banos Creek Reservoir and dam, looking northwest toward the project site.

Graphics ... 0055213 (2-14-14) tm

Figure 3.13-2
Representative Photographs of Key Observation Viewpoints at the Project Site (continued)

KOP 7. View from Canyon Road, north of Los Banos Creek Reservoir, looking northwest toward the project site.

KOP 8. View from the eastern end of Gonzaga Road, looking southeast toward the project site.

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Figure 3.13-2
Representative Photographs of Key Observation Viewpoints at the Project Site (continued)

KOP 9. View from the Billy Wright Landfill entrance, located north of Billy Wright Road, looking southeast toward the project site.

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Figure 3.13-2
Representative Photographs of Key Observation Viewpoints at the Project Site (continued)

Graphics... 00552.13 (3-14-14) tm

Figure 3.13-3
Existing and Simulated Views of Wright Solar Park Site:
Looking North from Canyon Road (SKOP 1)

Graphics ... 00552.13 (3-14-14) tm

Figure 3.13-4
Existing and Simulated Views of Wright Solar Park Site:
Looking Southwest from Interstate 5 (SKOP 2)

Graphics ... 00552.13 (3-14-14) tm

Figure 3.13-5
Existing and Simulated Views of Wright Solar Park Site:
Looking Southeast from Access Road (SKOP 3)

Chapter 4
Additional Topics Required by NEPA

The Council on Environmental Quality's (CEQ) National Environmental Policy Act (NEPA) regulations require an environmental analysis include a discussion of "…any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented" (40 Code of Federal Regulations [CFR] 1502.6). This chapter addresses those additional required NEPA analyses, and summarizes the cumulative effects of the proposed action for each of the resource areas considered in Chapter 3, Affected Environment and Environmental Consequences.

4.1 Unavoidable Adverse Effects

As described in Chapter 3, the design criteria, avoidance, minimization and mitigation measures, conservation strategy, and environmental commitments associated with the Proposed Action Alternative would reduce adverse effects on all resource areas from the covered activities to a less-than-significant level. Unavoidable adverse impacts on the human environment are not anticipated.

4.2 Short-Term vs. Long-Term Productivity

Implementation of the Proposed Action Alternative would result in the permanent conversion of about 1,400 acres within the 2,731-acre project site from cropland / grassland to a developed use over the anticipated 35-year life of the proposed action. In addition, short-term uses related to construction activities have the potential to temporarily degrade habitat, disturb species known to the project site and result in short-term air quality, traffic, and noise impacts.

Short-term uses related to construction activities are not expected to result in substantial adverse effects due to the design criteria, avoidance, minimization and mitigation measures, conservation strategy, and environmental commitments included in the Proposed Action Alternative (see Chapter 2, *Proposed Action and Alternatives*). Moreover, the applicant would maintain all areas outside of footprint of the solar facility as managed grasslands, and would protect and manage in perpetuity 2,450 acres of grazed grasslands southeast of the project site as habitat for San Joaquin kit fox, California tiger salamander, and blunt-nosed leopard lizard (among others), with the goal of improving the productivity of the offsite mitigation lands for the covered species. Finally, the Proposed Action Alternative would result in the generation of renewable energy, which is anticipated to reduce impacts typical of fossil-fuel consumption (e.g., air quality and climate change) over the long-term.

4.3 Irreversible and Irretrievable Commitment of Resources

Implementation of the Proposed Action Alternative would result in an irretrievable commitment of materials necessary to construct the solar arrays, substation, electrical collection system and interconnections, access roads, and operations and maintenance (O&M) building. Energy resources would also be expended during construction; however, because the proposed action would involve creation of a renewable energy source, this expenditure would be offset by operation of the solar facilities once operational. Approximately 1,400 acres of grassland and cropland would be converted to developed infrastructure during the anticipated 35-year life of the proposed action. However, this acreage would be restored to current uses when the solar facilities are decommissioned.

4.4 Cumulative Effects

CEQ's NEPA regulations (40 CFR 1580.25, 1508.7) require federal agencies to consider the cumulative impacts of a proposed action. A cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions…"(40 CFR 1508.7).

The analysis of cumulative effects in this Environmental Assessment (EA) considers ongoing land management activities and other future land use planning efforts or large-scale projects in the vicinity of the proposed action that could contribute to the cumulative effects of the proposed action. Because cumulative effects occur at the landscape or regional level, the cumulative effects analysis area considered in this EA generally includes other planning efforts or projects in western Merced County that would occur in close proximity to the project site or offsite mitigation lands. For some resource areas, such as air quality, the cumulative effects analysis area has been expanded to reflect the scope of potential cumulative impacts (e.g., to include the entire air basin).

The following summarizes the reasonably foreseeable actions that are included in the analysis of cumulative effects in this chapter.

4.4.1 Other Reasonably Foreseeable Actions

As provided in the *2030 Merced County General Plan*, the project site and offsite mitigation lands are generally surrounded by lands designed as Foothill Pasture, which allow for non-cultivated agricultural practices and limited development (Merced County 2013). The closest existing developments to the project site include the urban community of Santa Nella and the city of Los Banos. Land use within the city limits of Los Banos is governed by the City's general plan and land use within Santa Nella is governed by a community specific plan. All growth within these communities is confined to designated and respective boundaries.

Los Banos Reservoir, San Luis Reservoir, O'Neil Forebay, and the Billy Wright County landfill are also in relatively close proximity to the project site and offsite mitigation lands. Continued use of these facilities, for recreation, sanitation, or other purposes, would continue, concurrent with construction, operation, and maintenance of the proposed action.

Two proposed urban, mixed-use communities in the vicinity of the project site and offsite mitigation lands are also described in the Merced County General Plan. The Fox Hills development adjoins the northeast corner of the project site and would consist of a golf course, 3,460 residential units, a commercial area, and open space (Merced County 2014). It would be located on both sides of Interstate 5 (I-5), with the majority of the proposed development east of I-5; only the golf course would occur west of I-5. All project-specific approvals for this development have been obtained and some infrastructure (e.g., roads, water lines) have been constructed, although full buildout of the 1,250-acre development is not anticipated in the near term due to lack of funding and low housing demand (as anecdotally described by Merced County representatives).

The Villages of Laguna at San Luis development would adjoin the northern boundary of the project site and extend to State Route (SR) 152. This 6,200-acre development would include several villages with residential, mixed use, commercial, and schools focused on a village center. The development would include approximately 15,895 residential units; 1.44 million square feet of retail commercial space; 2.85 million square feet of office, research and development, and light industrial space; elementary, middle, and high schools; and municipal utilities. Open space and parks would also be part of this mixed-use development (Merced County 2014).

For the purposes of this EA, the Fox Hills development is considered a reasonably foreseeable project that may contribute to the cumulative effects of the proposed action due to the existing federal, state, and local approvals that allow for its implementation, including a Biological Opinion (BO) issued by the U.S. Fish and Wildlife Service (Service) for potential effects on San Joaquin kit fox (U.S. Fish and Wildlife Service 1994). Although the near-term construction of the development is unlikely, with funding and an increase in local housing demand, this development could move forward as planned within a foreseeable planning horizon.

Conversely, although the Villages of Laguna San Luis has been approved by the County, permits from other regulatory and resource agencies have not been obtained, including permits from the Service and the California Department of Fish and Wildlife (CDFW) for incidental take of listed species under the federal and state Endangered Species Acts (ESA). Given the potential effects on state and federally listed kit fox from this proposed development, it is highly likely that refinements in the configuration or extent of this planned development, and additional mitigation or minimization measures to reduce effects on the species, would be required during the project permitting process. As a result, this development is considered speculative (i.e., there is not enough accurate information available to inform a meaningful analysis of cumulative effects) and is not considered a cumulative project in this EA.

4.4.2 Air Quality and Climate Change

The analysis of air quality in Section 3.1 is based on the regional impacts of criteria pollutants within the San Joaquin Valley and South Coast Air Basins under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD) and South Coast Air Quality Management District (SCAQMD), respectively. Accordingly, the analysis and associated thresholds of significance are inherently cumulative because they establish a threshold above which emissions would contribute to an air basin's nonattainment status. As described in that section, the Proposed Action Alternative would not result in significant construction-related or operational increases of nonattainment criteria pollutants and would not contribute to a cumulative impact on air quality.

Total greenhouse gas (GHG) emissions associated with the Proposed Action Alternative are presented in Table 4-1. The Proposed Action Alternative would result in a net reduction in GHG emissions once operational. Construction-related emissions (8,124 metric tons of carbon dioxide equivalents (CO_2e), or 232 metric tons CO_2e annual when amortized over 35 years) and operational emissions (65 metric tons CO_2e) under the Proposed Action Alternative would result in a combined annual total of 297 metric tons CO_2e. However, renewable energy generated under the Proposed Action Alternative would offset electricity largely derived from fossil-fuels and would result in a net annual decrease of GHG emissions of 99,172 metric tons CO_2e. This would result in a cumulatively beneficial impact, which would be less significant than the GHG emissions anticipated under the No Action Alternative (where no renewable energy would be generated at the project site).

Table 4-1. Greenhouse Gas Emissions from Construction and Operational Activities under the Proposed Action Alternative

	Estimated Total Emissions (metric tons)			
Emissions Category	CO_2	CH_4	N_2O	CO_2e
Total construction activities (all years)[a]	8,032.9	0.6	0.3	8,123.8
Annual construction activities (amortized over 35 years)[a]	229.5	<0.1	<0.1	232.1
Operational activities (per year)	63.1	<0.1	<0.1	64.5
Total construction[a] and operation emissions (per year)	292.6	0.1	<0.1	296.6
GHG reductions from offsetting grid electricity (per year)	-98,905.9	-6.3	-1.3	-99,438.4
Net GHG emissions (per year)	-98,645.4	-6.3	-1.3	-99,172.2

CO_2 = carbon dioxide.
CH_4 = methane.
N_2O = nitrogen dioxide.
[a] Combined emissions within SJVAPCD and SCAQMD.

4.4.3 Agricultural Resources

Similar to other San Joaquin Valley counties, Merced County is experiencing a steady loss of important farmlands through conversion to nonagricultural uses. Implementation of the Proposed Action Alternative would have a less-than-significant individual impact on agricultural land conversion. In terms of its contribution to cumulative effects, the proposed action would not be located on prime farmland or land that defined as "productive farmland" under the *2030 Merced County General Plan* (Merced County 2014). Further, the project site would be restored to dry-land farming at the end of its use as a solar facility. As such, the Proposed Action Alternative would result in a less-than-significant cumulative contribution to the loss of agricultural land within the San Joaquin Valley.

4.4.4 Biological Resources

The area around the junction of I-5 and SR 152 has over the years become a pinch point for the north-south movement of wildlife along the western side of the San Joaquin Valley. The past development of the San Luis Reservoir, O'Neill Forebay, the California Aqueduct, Delta-Mendota

Canal, Outside Canal, Los Banos Reservoir, the commercial and residential development around Santa Nella, agricultural development east of I-5, and the presence of I-5 and SR 152 themselves have created substantial barriers to the north-south movement of wildlife in the region, and resulted in the loss of habitat for special-status species and impacts on sensitive aquatic areas.

As described in Section 3.3, construction of the proposed solar facilities would result in the permanent conversion of 1,200 acres of grassland / cropland to a developed use, which could disrupt kit fox movement through the project site and result in the loss or degradation of habitat for other sensitive species. Other planned and ongoing developments in the vicinity, including the Fox Hills development and continued buildout of the community of Santa Nella, could also affect the covered species, and specifically kit fox habitat. As described above, the Fox Hills development would adjoin the northeast corner of the project site and would be located on both sides of I-5, although all proposed land uses west of I-5 (and adjacent to the project site) would be associated with open space uses, including a golf course, and would allow for kit fox movement at night. In addition, the BO for the Fox Hills development includes several avoidance and minimization measures, to reduce potential impacts on kit fox and their habitat, including the establishment of a preserve of at least 378 acres, speed limits during project activities, placement of escape ramps in all trenches or holes that are left open for longer than 24 hours, provisions for an on-site biological monitor to inspect potential dens and confirm kit fox absence prior to excavation, weekly compliance inspections, and completion of a Service-approved revegetation plan (U.S. Fish and Wildlife Service 1994). As a result, the Fox Hills development is not anticipated to contribute to a cumulative effect on wildlife movement west of I-5 or adjacent to the project site.

Continued development in the community of Santa Nella would contribute to the cumulative loss of open space in the vicinity, although much of the development within this urban community is slated for low density residential development, which allows for no more than six units per acre, with a minimum lot or parcel size of 6,000 square feet (Merced County 2013). Although continued buildout of this community would likely result in a loss of kit fox habitat, it would not appreciably impede kit foxes from moving north and south across SR 152, particularly given the low density of the population north of SR 152.

As described in Section 3.3, the highest priority for San Joaquin kit fox conservation in the region is to protect the local Santa Nella satellite population and to retain a connection between that population and the Panoche Valley. Neither the Fox Hills development nor continued buildout of the community of Santa Nella would result in a loss of connection between these populations. Similarly, potential effects on kit fox movement from the Proposed Action Alternative would be limited to movement within the local region, not between populations.

Cumulative effects on movement within the local Santa Nella satellite population of kit fox, along with a reduction in available dispersal, foraging, and low quality denning habitat as a result of the Proposed Action Alternative, would be offset by maintenance of all areas outside of the footprint of the solar facility as managed grasslands, and preservation in perpetuity of approximately 2,450 acres of grazed grasslands southeast of the project site (i.e., the offsite mitigation lands). As described in Chapter 2, the offsite mitigation lands include key parcels that support the protection of movement corridors connecting kit fox populations in western Merced County with the core kit fox population in Panoche Valley to the south, and would provide breeding, foraging, aestivation, and nesting habitat for many other special-status and native species.

In addition, species-specific avoidance and minimization measures are included in the Proposed Action Alternative to reduce habitat and movement impacts on other covered species, and various best management practices (BMPs) and environmental commitments (see Chapter 2) would be prescribed to minimize short-term, construction-related impacts on wildlife. Preservation and management of both onsite and offsite mitigation lands, in combination with the design criteria, conservation strategy, avoidance and minimization measures, and BMPs and environmental commitments provided for the Proposed Action Alternative, would reduce cumulative effects on biological resources to less than significant. Moreover, the preservation of the offsite mitigation lands would represent a benefit that would not occur under the No Action Alternative, where future land use of the area would remain uncertain.

4.4.5 Cultural Resources

The Proposed Action Alternative is not anticipated to result in adverse effects on cultural resources and would not result in cumulative effects when considered in combination with reasonably foreseeable actions in the area. Standard avoidance, minimization, and mitigation measures, including the environmental commitments prescribed under the Proposed Action Alternative (see Chapter 2), would be incorporated into the proposed action and other cumulative projects to reduce impacts to both known and previously undiscovered resources, limiting the potential for cumulative effects.

4.4.6 Geology, Seismicity, Soils, and Mineral Resources

Construction in a seismically active region can put people and structures at risk from a range of earthquake-related effects, such as surface fault ruptures, strong ground shaking, and landslides. Similarly, structures built on expansive soils can fail if not sited properly. As discussed in Section 3.5, *Geology, Seismicity, Soils, and Mineral Resources*, various mechanisms are in place to reduce seismic-related risk and risks of constructing on expansive soils, including required compliance with state and international building codes specific to designing and constructing structures in seismically and geologically sensitive areas. Prior to construction, the applicant would prepare a final geotechnical investigation, as provided in EC-8, which would further evaluate the potential for strong ground motion, slope failure, and expansive soils to affect proposed infrastructure based on the final design of the proposed action. Implementation of this environmental commitment, along with adherence to applicable International Building Code (IBC) and California Building Standards Code (CBSC) design standards, would ensure that the Proposed Action Alternative would not contribute substantially to a cumulative impact for injury due to seismic hazards or expansive soils.

Impacts from soil erosion under the Proposed Action Alternative would be reduced through implementation of environmental commitments and avoidance and minimization measures aimed at reducing construction-related erosion (e.g., stormwater pollution prevention plan [SWPPP], revegetation plan) and grazing-related erosion (e.g., Service-approved Habitat Management Plan). These measures would ensure the Proposed Action Alternative would not contribute to a cumulatively significant impact on soil resources or soil stability.

There would be no cumulative impact on mineral resources because the study area is not currently used for any mining or other mineral extraction activities and is not within an area mapped as a potential location for a significant source for sand and gravel resources sites.

4.4.7 Hazards and Hazardous Materials

The hazardous materials (e.g., fuels, oils, lubricants, battery storage) that would be used on the project site or offsite mitigation lands during construction or O&M activities would be of low toxicity. EC-9 prescribes BMPs to be implemented during construction to reduce the potential for these materials to affect water quality, and EC-10 would require a hazard materials emergency response plan and a spill prevention, control, and countermeasure (SPCC) plan be developed in the event of a spill. In addition, as described in Section 3.6, *Hazards and Hazardous Materials*, the applicant would ensure that the battery storage technology used at the solar facility is properly stored, monitored, and maintained, and that appropriate personnel training and standard operating procedures are employed to minimize the risk of hazards spills or inadvertent fire. While implementation of other foreseeable actions, such as continued operations at the Billy Wright County landfill or implementation of the Fox Hills development, has the potential to result in similar impacts, it is assumed that other actions would also implement applicable BMPs to avoid significant impacts related to the use of hazardous materials. Therefore, there would not be a cumulative impact under the Proposed Action Alternative.

The project site has a moderate to high risk for wildland fire hazards and the offsite mitigation lands have a moderate risk for wildland fires. As described in Section 3.6, *Hazards and Hazardous Materials*, a fire protection plan (EC-11) would be implemented under the Proposed Action Alternative. In addition to the plan, the Proposed Action Alternative would conform to Merced County and State of California Fire Code standards, and would meet the minimum standards set forth by Public Resources Code (PRC) 4290, Title 14, for fire protection and emergency water standards. These measures would reduce fire risks associated with construction and O&M under the Proposed Action Alternative. Similar practices can be assumed for other foreseeable projects in the area. Consequently, the risk of loss, injury, or death involving wildland fires as a result of the Proposed Action Alternative, in concert with other foreseeable projects, would be less than significant.

4.4.8 Hydrology and Water Quality

The Proposed Action Alternative would result in minimal hydrological changes in the cumulative effects analysis area. Although it would increase impervious surfaces on the project site by approximately 0.4%, all runoff would be contained onsite and therefore would not contribute to water quality degradation related to drainage or runoff. In addition, the Proposed Action Alternative would rely on surface water supplied by the San Luis Water District under existing contracts and would not contribute to groundwater overdraft in Merced County. Any potentially adverse effects on water quality during construction of the Proposed Action Alternative would be mitigated through implementation of a SWPPP and BMPs, as provided in the statewide National Pollution Discharge Elimination System (NPDES) Construction General Permit, and required under EC-9.

4.4.9 Land Use and Planning

The Proposed Action Alternative would be consistent with the Merced County General Plan and would not physically divide an established community. Similarly, all ongoing development within the community of Santa Nella and proposed development at Fox Hills would be required to be consistent with the community specific plan and site-specific plans, respectively. As such, there

would be no impact on land use and implementation of the Proposed Action Alternative would not contribute to an adverse cumulative impact on land use in the study area.

4.4.10 Noise

The Proposed Action Alternative would not result in adverse cumulative noise effects on sensitive receptors because noise levels would either not exceed Merced County noise criteria, or would be reduced by implementation of environmental commitments included in the Proposed Action Alternative, such as EC-12, which prescribes specific noise-reducing construction practices to comply with county noise standards.

4.4.11 Socioeconomics and Environmental Justice

As described in Section 3.10, the Proposed Action Alternative would not have a disproportionate impact on minority or low income communities. As a result, it would not contribute to a cumulative impact on socioeconomics or environmental justice communities in the cumulative effects analysis area.

4.4.12 Transportation and Traffic

The California Department of Transportation's (Caltrans') *State Route 152 Transportation Concept Report* (California Department of Transportation 2004) establishes a concept level of service (LOS) of D for the portion of SR 152 that would be affected by construction traffic under the Proposed Action Alternative. It notes that, without improvements, the section between I-5 and Los Banos Creek will operate at LOS D by 2025. While this future LOS would not exceed the concept LOS, the Proposed Action Alternative would generate a substantial amount of truck traffic during its construction phase. This traffic would result in congestion at the intersection of SR 152/33 and Billy Wright Road, particularly when considered in combination with the existing truck traffic accessing the Billy Wright landfill. Although the Proposed Action Alternative would make a considerable contribution to a short-term cumulative impact at this intersection, implementation of Mitigation Measures TRA-1 through TRA-5 would reduce the proposed action's contribution to this potential cumulative impact to a less-than-significant-level.

The *Caltrans' Interstate 5 Transportation Concept Report* (California Department of Transportation 2012) establishes a concept LOS of C for the segments of I-5 in the vicinity of the project site. The current level of service is found to operate at LOS B. By 2030, the I-5 segment north of SR 152 is expected to operate at LOS F and the segment south of SR 152 is expected to operate at LOS D. As a result, future long-term traffic increases on I-5 would contribute to significant cumulative impacts on congestion levels. However, while the Proposed Action Alternative is expected to contribute truck traffic on I-5 during its construction phase, primarily from trips originating south of the I-5/SR 152 interchange, the temporary increase in construction vehicle trips would be a small fraction of existing average daily traffic (ADT) on I-5 and would not be expected to substantially degrade traffic operations. Moreover, construction-related traffic trips would end well before 2030 (when LOS is anticipated to fall below Caltrans' recommendations). Therefore, cumulative traffic impacts as a result of the Proposed Action Alternative are not anticipated.

4.4.13 Utilities and Public Services

Implementation of the Proposed Action Alternative would not result in a cumulative impact on utilities and public services. There would be no substantial increase in demand on or interruption of public services or utilities during construction or operation of the solar facilities. Water necessary for construction would be used primarily for dust control, and water necessary for O&M activities (including panel washing) would be derived from the existing landowners' approved rights to water from the San Luis Water District; no municipal or groundwater would be required. Wastewater and the majority of solid waste would be processed onsite via septic systems or recycled for resale. Infrastructure removed from the project site during decommissioning would be recycled to the extent possible, or otherwise disposed of at the Billy Wright landfill. It is not anticipated that material disposal at the landfill would exceed current or planned capacity.

4.4.14 Visual Resources

As described in Section 3.13, the proposed action vicinity is characterized by rolling terrain which often allows for scenic views from high points along local roadways, trails, and from rural residential locations out and over the landscape. The Proposed Action Alternative would introduce solar fields and associated infrastructure on about half of the project site, which would alter the existing visual character. In addition, collection lines, an office/storage building, gravel access roads, and an 8-foot-high chain-link perimeter fence with three-strand barbed wire would be visible from the foreground and middleground of vista views available to residences along the surrounding roadways, to agricultural workers in nearby fields, and to roadway travelers using surrounding roadways.

Although the Proposed Action Alternative would alter the existing visual character of the landscape from one that is rural to more industrial in nature, and would reduce the existing scenic quality with the intrusion of human-made elements on land that is currently farmed and largely undeveloped, proposed infrastructure would generally not be evident within the middleground, where sensitive viewers with the most potential for exposure (i.e., residents and recreationists) would likely occur. In addition, the number of sensitive viewers in the area is relatively low, and comprised primarily of limited recreationists and two residences with views of the project site. Continued development in Santa Nella and proposed development at Fox Hills may also alter views in the region, although much of the development allowed around the periphery of Santa Nella would be limited to low density residential, and proposed land uses adjacent to the project site from the Fox Hills development would be limited to open space and a golf course, which would reduce adverse visual impacts in close vicinity to the proposed solar facility.

Mitigation Measures VIS-1 would require the applicant to provide visual buffers and screening adjacent to residential properties in the vicinity of the solar facility, as necessary and requested by the owner. Implementation of this mitigation measure would ensure the cumulative effects of the Proposed Action Alternative on sensitive viewers near the project site are less than significant.

Chapter 5
List of Preparers

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Chapter 6
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