FINAL Environmental Impact Statement/Environmental Impact Report

San Luis Transmission Project

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Western AREA POWER ADMINISTRATION

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY

Western Area Power Administration
San Luis & Delta-Mendota Water Authority

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Cover Sheet

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Abstract: Western Area Power Administration (Western) and the San Luis & Delta-Mendota Water Authority (Authority) prepared an Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) for the proposed San Luis Transmission Project (SLTP) in compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

The Bureau of Reclamation (Reclamation) entered into a contract with Pacific Gas & Electric Company (PG&E) in 1965 for power transmission and distribution service between Western's Tracy Substation and Reclamation's San Luis Unit (SLU) facilities. The existing transmission contract with PG&E expires in March 2016, and PG&E has stated that it will not be renewed. Without the contract or a federal transmission line to serve the primary SLU facilities, the federal government will have to take transmission service under the California Independent System Operator Tariff, which would substantially increase Reclamation's transmission costs, which are paid by its water service contractors, including members of the Authority. Reclamation submitted a transmission service request to Western to consider various transmission service arrangements, including the construction of new federal transmission lines for Reclamation's continued delivery of federal water after the PG&E contract expires. In October 2013, an eligible Western transmission customer submitted a transmission service request to Western for transmission service within the same corridor as requested by Reclamation. Western is evaluating both requests jointly in order to determine if it can satisfy Reclamation's need and the eligible customer's request with a single project.

Therefore, Western proposes to construct, operate, and maintain the San Luis Transmission Project, which comprises 95 miles of new transmission lines within easements ranging from 125 to 250 feet wide along the foothills of the Diablo Range in the western San Joaquin Valley, California. Additional components of the SLTP would include two new 500-kV substations, substation improvements, communication facilities, improvements to existing access roads, new permanent access roads, and temporary access roads to facilitate construction activities.

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List of Acronyms

ACE	Altamont Corridor Express
ACHP	Advisory Council on Historic Preservation
AM	Amplitude modulation
ASC	Agricultural Services Center
ASR	Alternatives Screening Report
BAAQMD	Bay Area Air Quality Management District
BGEPA	Bald and Golden Eagle Protection Act
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAISO	California Independent System Operator
CAS	Corrective Action Study
CCWD	Contra Costa Water District
CDFW	California Department of Fish and Wildlife
CDPR	California Department of Parks and Recreation
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon monoxide
CORP	California Outdoor Recreation Plan
CRPR	California Rare Plant Rank
CVP	Central Valley Project
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
DATC	Duke American Transmission Company
DOC	California Department of Conservation
DOE	U.S. Department of Energy
DOE-PI	U.S. Department of Energy's Office of Policy and International Affairs
DOT	U.S. Department of Transportation
DPM	Diesel particulate matter
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
ECAP	East County Area Plan
ECSP	East County Specific Plan
EDD	Employment Development Department
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMF	Electromagnetic Field
EPA	Environmental Protection Agency
EPM	Environmental Protection Measure
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act

FM	Frequency modulation
FMMP	Farmland Mapping and Monitoring Program
FP	Foothill Pasture
FPPA	Farmland Protection Policy Act
GA	General aviation
GHG	Greenhouse gas
HAP	Hazardous Air Pollutant
HCP	Habitat Conservation Plan
HR	Hydrologic Region
HRA	Health Risk Assessment
HWCL	Hazardous Waste Control Law
IEEE	Institute of Electrical and Electronics Engineers
IPCC	Intergovernmental Panel on Climate Change
JUF	Joint Use Facility
KOP	Key Observation Point
LOS	Level of Service
LPA	Large Parcel Agriculture
MBTA	Migratory Bird Treaty Act
MLD	Most Likely Descendant
MMRP	Mitigation Monitoring and Reporting Program
MOA	Memorandum of Agreement
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NASA	National Aeronautics and Space Administration
NASS	National Agricultural Statistics Service
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NREL	National Renewable Energy Laboratory
OATT	Open Access Transmission Tariff
OHP	Office of Historic Preservation
OHV	Off-highway vehicle
OS	Open Space
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PAID	Planned Agricultural Industrial Development
PFYC	Potential Fossil Yield Classification
PM2.5	Fine particulate matter (less than 2.5 microns in diameter)
PM10	Particulate matter (less than 10 microns in diameter)
PPV	Peak particle velocity

PRC	Public Resources Code
PRPA	Paleontological Resources Preservation Act
PSMM	Power System Maintenance Manual
PSOM	Power Systems Operations Manual
PSSM	Power System Safety Manual
PV	Photovoltaic
RCRA	Resource Conservation and Recovery Act
RMP/GP	Resource Management Plan and General Plan
ROD	Record of Decision
ROW	Right-of-way
RPO	Regional Preservation Official
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act
SHPO	State Historical Preservation Officer
SIP	State Implementation Plan
SJMSCP	San Joaquin County Multi-Species Conservation and Open Space Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLTP	San Luis Transmission Project
SLU	San Luis Unit
SMARA	Surface Mining and Reclamation Act of 1975
SNR	Sierra Nevada Region
SR	State Route
SRA	State Recreation Area
SSC	Species of Special Concern
ST	Swainson's hawk
SVP	Society of Vertebrate Professionals
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAC	Transmission Access Charge
TCP	Traditional Cultural Property
TDS	Total dissolved solids
TLV	Threshold Limit Value
TMDL	Total maximum daily load
UCMP	University of California Museum of Paleontology
UPRR	Union Pacific Railroad
UR	Urban Reserve
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile organic compound

Executive Summary

ES.1 Introduction

The Western Area Power Administration (Western), a power marketing administration within the U.S. Department of Energy (DOE), and the San Luis & Delta-Mendota Water Authority (Authority), a California joint powers agency, have prepared this Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) for the San Luis Transmission Project (SLTP or Proposed Project). In conformance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), this EIS/EIR is intended to inform decision makers, other agencies, and the public regarding the environmental and public safety effects that could result from construction, operation, maintenance, and decommissioning of the SLTP. Western is the federal lead agency under NEPA, and the Authority is the State lead agency under CEQA. The Bureau of Reclamation (Reclamation) is a NEPA Cooperating Agency. The California Department of Water Resources (DWR) is a CEQA Responsible Agency.

The Draft EIS/EIR, as revised in this document, comments received during the public comment period, and written responses collectively comprise the Final EIS/EIR. Where the Draft EIS/EIR has been revised, the text has been marked in ~~strikethrough~~ for deletions and underline for additions. These revisions have been made in response to comments received on the Draft EIS/EIR, as presented in Appendix L. Portions of the Draft EIS/EIR were also revised for the purposes of clarifications, typographical corrections, and other editorial adjustments.

ES.2 Overview of the Proposed Project

The SLTP would consist of:

- a new 500-kilovolt (kV) transmission line about 65 miles in length between the new Tracy East and Los Banos West Substations;
- a new 230-kV transmission line about 3 miles in length between the new Los Banos West Substation and Western's existing San Luis Substation;
- a new 230-kV transmission line about 20 miles in length between Western's existing San Luis Substation and Western's existing Dos Amigos Substation or a new 230-kV transmission line about 18 miles in length between the new Los Banos West Substation and Western's existing Dos Amigos Substation;
- an interconnection with the existing Western 500-kV Los Banos-Gates No. 3 transmission line just south of Pacific Gas & Electric's (PG&E) existing Los Banos Substation into the new Los Banos West Substation; and
- a new 70-kV transmission line about 7 miles in length between the existing San Luis and O'Neill Substations.

Western would construct, own, maintain, and operate the lines, which would be located mostly adjacent to existing transmission lines in Alameda, San Joaquin, Stanislaus, and Merced Counties in California.

Additional components of the SLTP would include new 230-kV line terminal bays at Western's San Luis and Dos Amigos Substations, as well as a new 230/70-kV transformer bank and interconnection facilities at the San Luis Substation.

The SLTP would also include ancillary facilities, such as communication facilities, improvements to existing access roads, new permanent access roads, and temporary access roads to facilitate construction activities. Western would acquire the necessary easements and fee land for the Proposed Project.

Operational Voltage Options

The operational voltage needed for the Project is dependent on the participation of Duke American Transmission Company (DATC). If DATC declines to participate, one of the following operational voltage options may be selected by Western and the Authority.

- **500-kV Transmission Line operated at 230-kV.** This voltage option would consist of a 500-kV transmission line constructed between the Tracy and San Luis Substations. However, it would be operated at 230-kV. The proposed Tracy East and Los Banos West Substations would not be constructed.
- **230-kV Transmission Line.** This voltage option would consist of a 230-kV line constructed between the Tracy and San Luis Substations. The proposed Tracy East and Los Banos West Substations would not be constructed.

Depending on final operational needs, one of these operational voltage options would be implemented within the scope of the alternatives analyzed in this EIS/EIR.

ES.3 Purpose and Need and Project Objectives

Federal Purpose and Need

Reclamation entered into a contract with PG&E in 1965 for power transmission service between Western's Tracy Substation and Reclamation's San Luis Unit (SLU) facilities near Santa Nella, California and Los Banos, California. The contract provides for transmission and distribution service between the ~~including the Gianelli Pump-Generating Plant, Dos Amigos Pumping Plant and the O'Neill Pump-Generating Plant for delivery of~~ Central Valley Project (CVP) and the SLU including the Gianelli Pump-Generating Plant, Dos Amigos Pumping Plant, and the O'Neill Pump-Generating Plant~~water supply to its federal water service contractors. The SLU is part of the CVP and is owned by the United States.~~ On an annual basis, ~~T~~these SLU facilities pump up to 1.25 million acre-feet of federal water out of the California Aqueduct and the Delta-Mendota Canal into the San Luis Reservoir for later use, including irrigation supply to about 600,000 acres of farmlands located in western Fresno, Kings, and Merced Counties. The SLU is part of the CVP and is owned by the United States. However, the SLU is a Joint Use Facility (JUF) between Reclamation and DWR. DWR operates the JUF as provided in the 1961 Agreement between the United States of America and the Department of Water Resources of the State of California for the Construction and Operation of the Joint Use Facilities of the San Luis Unit and supplemented in 1972. Pursuant to this Agreement, DWR and Reclamation share the costs of construction, operation, and maintenance related to the SLU. DWR has operation and maintenance responsibility of the JUF including the substations necessary for the proposed SLTP.

As part of the original PG&E contract, the Federal Government paid PG&E $2.6 million to provide 50 years of ~~230-kV~~ transmission and distribution service to deliver federal power to and from ~~Reclamation's Gianelli and Dos Amigos facilities~~the SLU. The existing transmission contract with PG&E expires on March 31, 2016, and PG&E has stated it will not renew the existing contract. Without the contract or a federal transmission line to serve the ~~primary~~ SLU facilities, the Federal Government will have to take transmission service under the California Independent System Operator (CAISO) Tariff ~~between Tracy Substation and the SLU facilities~~ using the same PG&E transmission and distribution lines that have served

the SLU for 50 years. Under the CAISO Tariff, the estimated cost increase to Reclamation for the first year is expected to be $8 million. Reclamation's operating costs are paid by its water service contractors.

In anticipation of PG&E's contract expiring and the substantial increase in transmission costs associated with scheduling federal power to and from these facilities under the CAISO Tariff, Reclamation submitted a transmission service request to Western to consider various transmission service arrangements, including the construction of new federal transmission lines for Reclamation's continued delivery of federal water after the PG&E contract expires. Western responded to Reclamation's request for transmission service consistent with Western's Open Access Transmission Tariff (OATT) and existing laws. Reclamation, on behalf of its water contractors, is evaluating options to pump, store, convey, and deliver federal water via the SLU at reasonable costs. ~~The increase in costs incurred by Reclamation under the CAISO Tariff are so great that reasonable prudence requires the agencies to pursue and evaluate the proposed SLTP.~~

In October 2013, ~~an eligible Western transmission customer[1]~~DATC submitted a transmission service request in accordance with Western's OATT for transmission service within the same corridor as requested by Reclamation. Western is evaluating both requests jointly in order to determine if it can satisfy Reclamation's need and ~~the eligible customer~~DATC's request with a single project. This Project would require at least a single-circuit 500-kV transmission line between the Tracy and Los Banos areas. This EIS/EIR evaluates a 500-kV transmission line with ~~an~~ design voltage options to construct at 230-kV should ~~the eligible transmission customer~~DATC decide not to ~~not~~ participate. It is anticipated ~~that the eligible Western transmission customer~~DATC will decide whether to participate by spring 2016.

Project Objectives

The Project objectives for the SLTP are to:

- Obtain durable, long-term, cost-certain, and efficient transmission delivery of CVP power to and from federal power generation sites to the major pumping stations of the SLU to reliably deliver water to Reclamation and the Authority's member agencies (federal water service contractors);
- Locate and install transmission facilities in a safe, efficient, and cost effective manner that meets Project needs while minimizing environmental impacts;
- Locate facilities to minimize the potential of environmental impacts resulting from damage by external sources;
- Maximize the use of existing transmission corridors and rights-of-way in order to minimize effects on previously undisturbed land and resources; and
- Obtain stable and reliable transmission that meets Project needs in a cost-effective and timely manner.

ES.4 Summary of Public Involvement Activities

Public Notification and Scoping Process

Western and the Authority held public open-house meetings to answer questions and receive comments on the scope of the environmental analysis for the SLTP. These meetings were held on January 8, 2014, in Tracy, California, and on January 9, 2014, in Santa Nella, California. The 60-day public scoping comment

~~[1] Pending its decision to participate in the Project, the identity of this customer is confidential. Details on the interconnection request are available at: http://www.oasis.oati.com/wasn/index.html (see Transmission Queue page for updates)~~

period began on November 22, 2013, when the Notice of Intent was published in the *Federal Register* and the Notice of Preparation was filed with the California State Clearinghouse. The 60-day public scoping comment period ended on January 21, 2014.

Western distributed notices to 75 local agencies, 8 state agencies, 6 federal agencies, 21 organizations, and 39 elected officials. Western also sent postcards announcing the public scoping meetings and comment period to all property owners within or adjacent to the Proposed Project or alternative routes, and published advertisements on the meetings and comment period in five local newspapers. The postcards and advertisements also provided an overview map of the Project area, a brief summary of the SLTP, how to provide scoping comments, and where to find additional information on the Proposed Project. Nine agencies, four organizations, and eight individuals submitted scoping comments.

Additionally, ~~two~~ three newsletters have been distributed to affected and interested landowners, organizations, and agencies. The first newsletter, distributed May 2014, announced the availability of the Scoping Report and the Alternatives Screening Report on the SLTP website.[~~2~~1] The second newsletter, distributed February 2015, announced that a new alternative corridor (the Billy Wright Road Alternative) and two new proposed substations (the Tracy East and Los Banos West Substations) would be evaluated in the Draft EIS/EIR. It also announced the availability of an updated Alternatives Screening Report on the SLTP website. The third newsletter was distributed in August 2015. It announced the availability of the Draft EIS/EIR, described how to comment on the Draft EIS/EIR, and provided the dates, times, and locations of the Draft EIS/EIR public meetings.

Agency Coordination and Native American Consultation

Western and the Authority ~~have~~ had several meetings with various agencies to discuss the proposed SLTP and consider their comments and concerns. The agencies include the U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, and the California Department of Parks and Recreation.

In a March 3, 2014 letter, Western contacted all Native American groups on the list provided by Native American Heritage Commission (NAHC). Western received a response from the California Valley Miwok Tribe. Western will continue to keep all of the Tribal contacts informed of any changes to the SLTP and will continue to be responsive to any future requests for consultation. The SLTP does not cross tribal reservations or Native American Trust territories.

Areas of Controversy / Public Scoping Issues

Issues raised during the public scoping process are described in detail in the Scoping Report (available on the SLTP website), and are summarized below.

- **Air Quality.** Recommendations for air quality-related discussions to be included in the Draft EIS/EIR.
- **Coordination with Local Agencies.** Requests for appropriate coordination and consultation with affected local agencies.
- **Land Use Conflicts.** Concern regarding the potential for the proposed route to conflict with existing and proposed land uses (e.g., solar projects, residential developments, PG&E transmission lines and pipelines, and the Crow's Landing Airport).
- **Adequacy of Project Notices.** Concern regarding the adequacy and clarity of the Project Description presented in the Notice of Intent and Notice of Preparation.

[~~2~~1] http://www.sltpeis-eir.com/

- **Special-Status Species.** Concern regarding the potential effects of the Proposed Project on special-status species and supporting habitat.
- **Permitting.** Suggestions for permits that may be required for approval and implementation of the Proposed Project.
- **Alternative Routes.** Suggestions for alternative routes to minimize significant impacts including increasing the distance of the proposed route from adjacent residences and the avoidance of land parcels identified for proposed land use projects.
- **Property values.** Concern regarding a decrease of property value attributable to the presence of transmission lines.
- **Electromagnetic Fields (EMF).** Concern regarding the potential for health risks associated with EMF emitted from transmission lines.
- **Public Scoping Process.** Concern regarding the timeframe provided for public comment and the adequacy of information provided to the public.

Public Review of the Draft EIS/EIR

The Notice of Availability (NOA) of the Draft EIS/EIR was published in the *Federal Register*, filed with the State Clearinghouse, and mailed to interested parties on July 17, 2015. The NOA included information on how to access the Draft EIS/EIR; the dates, times, and locations of the Draft EIS/EIR public meetings; and how to comment on the Draft EIS/EIR. Its distribution started a 45-day public comment period that ended on August 31, 2015.

Public hearings on the Draft EIS/EIR were held in Tracy, California, on August 10, 2015 and Los Banos, California, on August 11, 2015. These consisted of an open house where Project information was shared, followed by an opportunity to record verbal comments from the public. Notice of the public meetings was published in the Tracy Press and Los Banos Enterprise newspapers.

Four people provided verbal comments at the Los Banos meeting; no verbal comments were provided at the Tracy meeting. An additional 26 comment letters and emails were received during the 45-day public comment period (refer to Appendix L for a detailed list of commenters and copies of all comment correspondence).

ES.5 Design and Engineering Issues

The exact locations and quantities of Project components (e.g., transmission structures, access roads, conductor pulling sites, and construction staging areas) cannot be determined until final Project design and engineering. For purposes of the EIS/EIR, it has been assumed that disturbances from transmission structures could occur anywhere within the preferred corridor. Other Project components may occur anywhere within the Project study area, which extends up to one mile from the corridors. Western's and DWR's standard construction practices, Project-specific environmental protection measures, and mitigation measures would be applied in the design of Project components. During the planning and implementation of the Project, additional environmental review, analysis, and technical studies may be necessary and will be conducted depending on site-specific conditions including potential environmental impacts within easements, including DWR easements that are not associated with the San Luis joint use facilities. If any Project components are sited outside of the geographic area considered in this EIS/EIR, additional surveys and consultation for biological and cultural resources and/or environmental review would be conducted prior to Project implementation.

Construction of the proposed Los Banos West Substation would result in the loss of up to 50 acres of the 150-acre Jasper Sears off-highway vehicle (OHV) Use Area. As stated in Section ES.6, this impact is considered significant and unavoidable. The exact size and location of the substation footprint cannot be determined until final Project design and engineering. Pursuant to the mitigation measures in this EIS/EIR (i.e., Mitigation Measures REC-1 and REC-2), Western, the Authority, and Reclamation, would coordinate closely with the California Department of Parks and Recreation (CDPR) to minimize impacts to the OHV Use Area. However, because the land is under lease to CDPR from Reclamation, actual implementation of the mitigation is not within the authority of the lead agencies (Western and the Authority). Reclamation and CDPR are in consultation to resolve this issue.

Existing JUF infrastructure or modifications thereto, all transmission work, communication system maintenance, facility outages, upgrade and replacement work, regulatory coordination, and maintenance of access roads will be conducted in accordance with the Agreement between the United States of America and the Department of Water Resources of the State of California for the Construction and Operation of the Joint-Use Facilities of the San Luis Unit (dated December 30, 1961).

ES.6~~5~~ Impacts of the Proposed Project

As required by CEQA Section 15126.2, this section presents the significant and unavoidable impacts of the Proposed Project. The Proposed Project would result in significant and unavoidable impacts (and contribute to cumulatively considerable impacts) to the following resource areas. Refer to Section ES.~~8~~ 9 for a summary of all impacts of the Proposed Project.

- **Noise.** Construction would temporarily result in more than a 5-decibel increase intermittently at sensitive receptors near the Project, which would exceed local noise standards near residences throughout the Project area. This would be a temporary, short-term impact that would occur intermittently during construction activities.
- **Recreation.** Construction of the proposed Los Banos West Substation would result in conflicts with, physical alterations of, and decreased accessibility to the Jasper Sears ~~off-highway vehicle (~~OHV~~)~~ Use Area in the San Luis segment.
- **Land Use.** Construction of the proposed Los Banos West Substation would result in conflicts with the San Luis Reservoir State Recreation Area Resource Management Plan/General Plan as it pertains to the Jasper Sears OHV Use Area and conflicts with this established special use area in the San Luis segment.

ES.7~~6~~ Alternatives to the Proposed Project

The determination of whether to retain an alternative for analysis in the EIS/EIR was based, in part, on the following NEPA/CEQA criteria: (a) meeting the purpose and need and most project objectives, (b) reducing significant effects of the Proposed Project, and (c) being potentially feasible in terms of possible legal, regulatory, or technical constraints.

Alternatives Retained for Analysis in the EIS/EIR

The EIS/EIR considers seven alternatives to the Proposed Project, including the No Action/No Project Alternative, as listed below. To facilitate a fair or equal comparison between the impacts of the alternatives and the Proposed Project, the Project area was divided at common points of the corridors into four segments (North, Central, San Luis, South).

No Action/No Project

North Segment

There are no alternative corridors in the North Segment.

Central Segment

- Patterson Pass Road Alternative

San Luis Segment – 500-kV

- Butts Road Alternative
- West of Cemetery Alternative

San Luis Segment – 70-kV

- West of O'Neill Forebay 70-kV Alternative

South Segment

- San Luis to Dos Amigos Alternative
- Billy Wright Road Alternative

Alternatives Considered and Eliminated

An additional seven alternatives were considered in a screening process and eliminated from further review, as documented in the Alternatives Screening Report (available on the SLTP website).

ES.8~~7~~ Summary of ~~Draft~~ EIS/EIR Conclusions~~: Environmentally Preferred Alternative~~

The Authority has identified the Environmentally Superior Alternative, as required by CEQA Guidelines 15126.6(e)2. In this EIS/EIR, it is called the Environmentally Preferred Alternative. The following section summarizes the results of the alternatives comparison for each Project segment and identifies the Environmentally Preferred Alternative. Western's Agency Preferred Alternative is also identified in this EIS/EIR. ~~Western's Agency Preferred Alternative will be identified in the Final EIS/EIR following analysis of public comments on the Draft EIS/EIR and further internal review of the Draft EIS/EIR.~~

Environmentally Preferred Alternative

No Action/No Project Alternative

Under the No Action/No Project Alternative, construction of the San Luis Transmission Project would not occur. Western would arrange for transmission service for the SLU from the CAISO using existing electric infrastructure. As there would be no adverse direct, indirect, or cumulative environmental impacts under this alternative, it is the environmentally preferred alternative.

However, Reclamation's estimated transmission costs under the No Action/No Project Alternative (i.e., the CAISO Tariff) would increase by more than $8 million per year. As detailed in Section 1.2 and Appendix K, which address Reclamation's estimated transmission costs under the No Action/No Project Alternative (i.e., the CAISO Tariff) over a 50-year period, the No Action/No Project Alternative is not cost effective and involves substantial cost uncertainties. Further, the No Action/No Project Alternative would not achieve the purpose and need or basic Project objectives.

Environmentally Preferred Action Alternative

CEQA Guidelines Section 15126.6(e)(2) requires that if the environmentally preferred alternative is the No Action/No Project Alternative, an EIR shall identify the environmentally preferred alternative among the other (i.e., action) alternatives. The corridor segments that comprise the environmentally preferred action alternative are presented below.

North Segment

The Proposed Project is the environmentally preferred corridor in this segment as there are no alternatives.

Central Segment

The Patterson Pass Road Alternative is the environmentally preferred corridor in this segment because it is 1,000 feet farther from residences than the Proposed Project. Therefore, it would have fewer noise and visual resources impacts. Agricultural impacts would also be slightly less than the Proposed Project in the Central Segment.

San Luis Segment – 500-kV

The Proposed Project is the environmentally preferred corridor in this segment because it is the shortest route with the least ground disturbance. Therefore, it would result in fewer impacts to air quality, geology, paleontological resources, and water resources. The Proposed Project is furthest from the San Joaquin Valley National Cemetery and would avoid construction noise and visual impacts to this sensitive resource. Additionally, it would impact the least amount of habitat for the federally and State endangered and State fully protected blunt-nosed leopard lizard.

San Luis Segment 70-kV

In the San Luis Segment (70-kV), the Proposed Project is the environmentally preferred corridor. The Proposed Project and West of O'Neill Forebay 70-kV Alternative are the same length, have the same length of new access roads, and have the same number of support structures. Therefore, impacts are similar and there is no preference between corridors for most issue areas. However, the Proposed Project would result in fewer impacts to habitat for federally and State-listed species including San Joaquin kit fox, California tiger salamander, and blunt-nosed leopard lizard. Additionally, the Proposed Project would be farther from the San Joaquin Valley National Cemetery, thereby resulting in fewer land use, noise, and visual resources impacts than the West of O'Neill Forebay 70-kV Alternative.

South Segment

In the South Segment, the San Luis to Dos Amigos Alternative is the environmentally preferred corridor. The Proposed Project and the San Luis to Dos Amigos Alternative are adjacent, are the same length, have the same length of new access roads, and have the same number of support structures. Therefore, impacts are similar and there is no preference between corridors for most issue areas. However, the San Luis to Dos Amigos Alternative would have slightly fewer impacts to agricultural land. It would also be farther from more residences than the Proposed Project, thereby resulting in less construction noise impacts.

In summary, the Environmentally Preferred Alternative is composed of:

- North Segment – Proposed Project
- Central Segment – Patterson Pass Road Alternative

- San Luis Segment (500-kV) – Proposed Project
- San Luis Segment (70-kV) – Proposed Project
- South Segment – San Luis to Dos Amigos Alternative

~~No Action/No Project Alternative~~

~~Under the No Action/No Project Alternative, construction of the San Luis Transmission Project would not occur. Western would arrange for transmission service for the SLU from the CAISO using existing electric infrastructure. As there would be no adverse direct, indirect, or cumulative environmental impacts under this alternative, it would bepreferable to the Environmentally Preferred Corridor Alternative. However, Reclamation's estimated transmission costs under the No Action/No Project Alternative (i.e., the CAISO Tariff) would increase by more than $8 million per year. Reclamation's estimated transmission costs under the No Action/No Project Alternative (i.e., the CAISO Tariff) would be so expensive as to render this alternative infeasible. Further, the No Action/No Project Alternative is considered infeasible because it would not achieve the purpose and need or basic project objectives.~~

Agency Preferred Alternative

Determining the Agency Preferred Alternative requires that Western balance many factors with the Project's purpose and need. It is the alternative that Western believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. As described above, the No Action/No Project Alternative is the Environmentally Preferred Alternative because it would avoid any adverse direct, indirect, or cumulative environmental impacts; however, it would not achieve the purpose and need or basic Project objectives. The Environmentally Preferred Action Alternative is composed of several segments, as listed in the preceding section. After analysis of public comments and further internal review of the EIS/EIR, Western has determined that its Agency Preferred Alternative is the same as the Environmentally Preferred Action Alternative in the Northern and San Luis (500-kV and 70-kV) segments.

In the Central Segment, the Proposed Project is the agency preferred corridor. Although it would be closer to residences and have sight increases in the associated visual and temporary noise impacts, it would have less of an impact on biological resources. In particular, it would impact fewer special-status plant species. Additionally, it would require fewer crossings of the existing high voltage transmission lines, which would increase reliability by providing more space between circuits.

In the Southern Segment, the Billy Wright Road Alternative is the agency preferred corridor. Although it would have greater recreation impacts by crossing the Path of the Padres Trail and slightly greater soil disturbance due to its longer length, it would avoid conflicts with the Wright Solar Park. When the Notice of Preparation and Notice of Intent for this EIS/EIR were published in November 2013, which set the baseline for analysis of environmental impacts, the Wright Solar Park was still early in its entitlement phase (the Project's NOP was issued in October 2013). Western is aware that the Project is now fully permitted and expected to begin construction in 2016.

In summary, the Agency Preferred Alternative is composed of:

- North Segment – Proposed Project
- Central Segment – Proposed Project
- San Luis Segment (500-kV) – Proposed Project

- San Luis Segment (70-kV) – Proposed Project
- South Segment – Billy Wright Road Alternative

ES.9~~8~~ Impact Summary Tables

Levels of significance in this EIS/EIR are defined by classification as follows:

- Significant; cannot be mitigated to a level that is less than significant
- Significant; can be mitigated to a level that is less than significant
- Less than significant; no mitigation required

Under NEPA, beneficial impacts of a proposed action are also relevant considerations in the environmental analysis.

The tables on the following pages summarize all significant impacts of the Proposed Project. In addition, there are several impacts that were determined to be less than significant and would not require mitigation.

Table ES-1. Significant and Unmitigable Impacts of the Proposed Project

Impact	Mitigation Measures (if any)
Impact NOISE-1 – Result in a substantial temporary or periodic increase in ambient noise levels (above 5 dBA Leq) at sensitive receptor locations above levels existing without the Project	NOISE-1 – Provide construction notification. NOISE-2 – Implement Best Management Practices for construction noise.
Impact NOISE-3 – Result in noise levels that exceed local or federal noise regulations or guidelines	NOISE-1 – Provide construction notification. NOISE-2 – Implement Best Management Practices for construction noise.
Impact REC-1 – Conflict with established, designated, or planned recreation areas or activities	NOISE-1 – Provide construction notification. NOISE-2 – Implement Best Management Practices for construction noise. AQ-1 – Reduce or offset construction equipment emissions. REC-1 – Coordinate with local agencies to identify tower locations. REC-2 – Modify existing facilities within and relocate, if necessary, the entrance to the Jasper Sears OHV Use Area.
Impact REC-2 – Result in changes that alter or otherwise physically affect established, designated, or planned recreation areas or activities	REC-2 – Modify existing facilities within and relocate, if necessary, the entrance to the Jasper Sears OHV Use Area.
Impact REC-3 – Decrease accessibility to areas established, designated, or planned for recreation	REC-2 – Modify existing facilities within and relocate, if necessary, the entrance to the Jasper Sears OHV Use Area.
Impact LU-4 – Conflict with State or federally established, designated or reasonably foreseeable planned special use areas (e.g., recreation, wildlife management area, game management areas, waterfowl production areas, scientific and natural areas, wilderness areas, areas of critical environmental concern, etc.)	REC-2 – Modify existing facilities within and relocate, if necessary, the entrance to the Jasper Sears OHV Use Area.

Table ES-2. Significant but Mitigable Impacts of the Proposed Project

Impact	Mitigation Measures
Impact AQ-1 – Violate ambient federal and/or State air quality or emissions standards applicable to the study area, or increase the frequency of severity of any existing violation of State and/or federal ambient air quality standard	AQ-1 – Reduce or offset construction equipment emissions.
Impact AQ-2 – Expose sensitive receptors to detrimental pollution concentrations	AQ-1 – Reduce or offset construction equipment emissions.
Impact AQ-3 – Contribute to a collective or combined air quality effect, including existing and foreseeable other projects, that leads to violation of air quality standards, even if the individual effect of the project/activity is relatively minor compared with other sources	AQ-1 – Reduce or offset construction equipment emissions.
Impact AQ-6 – Emissions exceed conformity de minimis thresholds set by the applicable Air District	AQ-1 – Reduce or offset construction equipment emissions.
Impact BIO-1 – Adversely affect a listed endangered, threatened or proposed species or designated critical habitat, or a non-listed special-status plant or animal species either directly or through habitat loss or modification	BIO-1 – Conduct surveys for special-status plants and sensitive habitats. BIO-2 – Avoidance and minimization measures for special-status plants and vegetation communities. BIO-3 – Provide compensatory mitigation for impacts to special-status plants. BIO-4 – Provide compensatory mitigation for impacts to federally listed branchiopod habitat. BIO-5 – Avoidance and minimization measures for valley elderberry longhorn beetle. BIO-6 – Provide compensatory mitigation for impacts to elderberry plants. BIO-7 – Avoidance and minimization measures for Alameda whipsnake. BIO-8 – Avoidance and minimization measures for blunt-nosed leopard lizard. BIO-9 – Avoidance and minimization measures for special-status reptiles. BIO-10 – Avoidance and minimization measures for giant garter snake. BIO-11 – Avoidance and minimization measures for western pond turtle. BIO-12 – Provide compensatory mitigation for impacts to special-status reptiles. BIO-13 – Avoidance and minimization measures for California red-legged frog. BIO-14 – Avoidance and minimization measures for California tiger salamander and western spadefoot. BIO-15 – Provide compensatory mitigation for impacts to listed amphibians. BIO-16 – Avoidance and minimization measures for burrowing owl. BIO-17 – Provide compensatory mitigation for impacts to occupied burrowing owl habitat. BIO-18 – Avoidance and minimization measures for California fully protected birds. BIO-19 – Avoidance and minimization measures for least Bell's vireo. BIO-20 – Avoidance and minimization measures for Swainson's hawk. BIO-21 – Provide compensatory mitigation for impacts to Swainson's hawk foraging habitat. BIO-22 – Avoidance and minimization measures for tricolored blackbird. BIO-23 – Avoidance and minimization measures for other special-status and native birds. BIO-24 – Avoidance and minimization measures for American badger. BIO-25 – Avoidance and minimization measures for special-status bats. BIO-26 – Avoidance and minimization measures for special-status kangaroo rats. BIO-27 – Avoidance and minimization measures for San Joaquin kit fox. BIO-28 – Provide compensatory mitigation for impacts to San Joaquin kit fox.

Table ES-2. Significant but Mitigable Impacts of the Proposed Project

Impact	Mitigation Measures
Impact BIO-2 – Adversely and substantially affect native plant communities, including riparian areas or other sensitive communities	BIO-1 – Conduct surveys for special-status plants and sensitive habitats. BIO-2 – Avoidance and minimization measures for special-status plants and vegetation communities. BIO-29 – Avoidance and minimization measures for vernal pool and seasonal wetland habitats. BIO-30 – Avoidance and minimization measures for sensitive wetland habitats. BIO-31 – Provide compensatory mitigation for impacts to sensitive plant communities.
Impact BIO-4 – Have substantial adverse effects on wetlands and Waters of the U.S. and State	BIO-29 – Avoidance and minimization measures for vernal pool and seasonal wetland habitats. BIO-30 – Avoidance and minimization measures for sensitive wetland habitats. BIO-32 – Provide compensatory mitigation for impacts to wetlands and waters.
Impact BIO-6 – Conflict with the provisions of an adopted local, regional, State, or federal habitat conservation plan	BIO-2 – Avoidance and minimization measures for special-status plants and vegetation communities. BIO-28 – Provide compensatory mitigation for impacts to San Joaquin kit fox. BIO-31 – Provide compensatory mitigation for impacts to sensitive plant communities. BIO-33 – Minimization measures for conservation easements.
Impact CUL-1 – Cause damage, degradation to, or loss of a unique archaeological resource as defined by CEQA or a resource of archaeological, tribal, or historical value that is listed, or eligible for listing, on the National Register or California Register	CUL-1 – Prepare and implement Archaeological Resource Management and Treatment Plan for unique archaeological resources.
Impact CUL-7 – Disturb any human remains, including those interred outside of formal cemeteries	CUL-2 – Treatment of inadvertent discovery of human remains.
Impact GEO-1 – Expose people or structures to potential substantial adverse effects due to slope instability, effects of earthquake (fault rupture, ground shaking, liquefaction, landslide), slumps, rockfalls, or adverse soil conditions such as compressible, expansive, or corrosive soils	GEO-1 – Conduct geotechnical investigations and implement Project design recommendations.
Impact GEO-5 – Place a structure on unstable soils, which would result in exposure to landslide, lateral spreading, subsidence, liquefaction, or collapse	GEO-1 – Conduct geotechnical investigations and implement Project design recommendations.
Impact LU-4 – Conflict with State or federally established, designated, or reasonably foreseeable planned special use areas (e.g., recreation, wildlife management area, game management areas, waterfowl production areas, scientific and natural areas, wilderness areas, areas of critical environmental concern, etc.).	LU-1 – Minimize impacts within conservation easements and/or amend conservation easements.
Impact PALEO-1 – Result in the loss of or inaccessibility to scientifically important paleontological resources	PALEO-1 – Conduct pre-construction survey. PALEO-2 – Document all finds. PALEO-3 – Conduct Worker's Environmental Awareness Training. PALEO-4 – Conduct paleontological mitigation monitoring. PALEO-5 – Procedures for fossil preparation, curation, and reporting.

Table ES-2. Significant but Mitigable Impacts of the Proposed Project

Impact	Mitigation Measures
Impact H&S-3 – Inflict serious injuries to workers, visitors to the area, or area land users.	H&S-1 – Prepare a fire plan.
Impact SE-4 – Permanent displacement of existing residences or businesses	SE-1 – Acquire land rights.
Impact TRAFFIC-2 – Cause delays on a primary transportation corridor	TRAFFIC-1 – Prepare and submit Traffic Control Plans.

Chapter 1
Introduction

1.1 Project Overview

The Western Area Power Administration (Western), a power marketing administration within the U.S. Department of Energy (DOE), and the San Luis & Delta-Mendota Water Authority (Authority), a California joint powers agency, have prepared this joint Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) for the San Luis Transmission Project (SLTP or Proposed Project). In conformance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), this EIS/EIR is intended to inform decision makers, other agencies, and the public regarding the environmental and public safety effects that could result from the proposed construction, operation, maintenance, and decommissioning of the SLTP. Western is the federal lead agency under NEPA, and the Authority is the State lead agency under CEQA. The Bureau of Reclamation (Reclamation) is a NEPA Cooperating Agency. The California Department of Water Resources (DWR) is a CEQA Responsible Agency.

The SLTP would consist of:

- a new 500-kilovolt (kV) transmission line about 65 miles in length between the new Tracy East and Los Banos West Substations;
- a new 230-kV transmission line about 3 miles in length between the new Los Banos West Substation and Western's existing San Luis Substation;
- a new 230-kV transmission line about 20 miles in length between Western's existing San Luis Substation and Western's existing Dos Amigos Substation or a new 230-kV transmission line about 18 miles in length between the new Los Banos West Substation and Western's existing Dos Amigos Substation;
- an interconnection with the existing Western 500-kV Los Banos-Gates No. 3 transmission line just south of Pacific Gas & Electric's (PG&E) existing Los Banos Substation into the new Los Banos West Substation; and
- a new 70-kV transmission line about 7 miles in length between the existing San Luis and O'Neill Substations.

Western would construct, own, maintain, and operate the lines, which would be located mostly adjacent to existing transmission lines in Alameda, San Joaquin, Stanislaus, and Merced Counties in California.

Additional components of the SLTP would include new 230-kV line terminal bays at Western's San Luis and Dos Amigos Substations, which would be operated and maintained by DWR, as well as a new 230/70-kV transformer bank and interconnection facilities at the San Luis Substation.

1.2 Purpose and Need

~~The United States Department of Interior, Bureau of Reclamation (~~Reclamation~~)~~ entered into a contract with Pacific Gas and Electric (PG&E) in 1965 for power transmission and distribution service between Western's Tracy Substation and Reclamation's San Luis Unit (SLU) facilities near Santa Nella, California and Los Banos, California including the Gianelli Pump-Generating Plant, Dos Amigos Pumping Plant, and the O'Neill Pump-Generating Plant. ~~for delivery of Central Project Valley (CVP) water supply to its Federal water service contractors.~~ The San Luis Unit is part of the Central Valley Project (CVP) ~~CVP~~ and is owned by the United States. On an annual basis, these ~~These~~ SLU facilities pump up to 1.25 million acre-feet of

federal water out of the California Aqueduct and the Delta-Mendota Canal into the San Luis Reservoir for later use, including irrigation supply to about 600,000 acres of farmlands located in western Fresno, Kings, and Merced Counties. The SLU is a Joint Use Facility (JUF) between Reclamation and DWR. DWR operates the JUF as provided in the 1961 Agreement between the United States of America and the Department of Water Resources of the State of California for the Construction and Operation of the Joint Use Facilities of the San Luis Unit. Pursuant to this agreement, DWR and Reclamation share the costs of construction, operation, and maintenance related to the SLU. Under the agreement, DWR operates and maintains the JUF including the substations necessary for the SLTP.

As part of the original PG&E contract, the Federal Government paid PG&E $2.6 million to provide 50 years of ~~230-kV~~ transmission and distribution service to deliver federal power to and from the SLU~~Reclamation's Gianelli and Dos Amigos facilities~~. The existing transmission contract with PG&E expires on March 31, 2016, and PG&E has stated it will not renew the existing contract. Without the contract or a federal transmission line to serve the primary SLU facilities, the Federal Government will have to take transmission service under the California Independent System Operator (CAISO) Tariff between Western's Tracy Substation and the SLU facilities using the same PG&E transmission and distribution lines that served the SLU for 50 years. The estimated increased cost to Reclamation in the first year by taking service under the CAISO Tariff is expected to be $8,000,000 and to steadily increase each subsequent year. Reclamation's operating costs are paid by its water service contractors.

Currently, the CAISO Tariff includes high-voltage and low-voltage Transmission Access Charges (TAC). As of ~~March 1,~~August 2015, the rate for the high-voltage TAC (which provides for regional transmission service across the CAISO system) was $9.79 ~~$10.16~~ per megawatt-hour (MWh) and the PG&E low-voltage TAC (which provides for service across PG&E's local transmission facilities) was $7.64 per MWh. There are also other supplementary CAISO Tariff charges that average approximately $6.00 per MWh. The following bullets provide a summary of Reclamation's estimated transmission costs under the CAISO Tariff:

- Assuming federal pumping load at Gianelli, O'Neill, and Dos Amigos range from 300,000 to 500,000 MWh per year, the high-voltage TAC cost estimate for these facilities ~~is~~ starts at $~~3,048,000~~2,940,000 to $~~5,080,000~~ 4,900,000 per year, and will escalate thereafter.
- The O'Neill facility will incur both the CAISO high-voltage and low-voltage TAC~~s~~. Assuming a federal pumping load at O'Neill ranges from 60,000 to 90,000 MWh per year, the low-voltage TAC cost estimate for this facility ~~is~~ starts at $458,400 to $687,600 per year, and will escalate thereafter.
- In addition to the high-voltage and low-voltage TAC charges listed above, Gianelli, O'Neill, and Dos Amigos will incur CAISO Tariff charges for other services such as scheduling, management, and ancillary services. The cost estimate for these services is estimated at $1,800,000 to $3,000,000 per year. The cost of providing capacity to meet CAISO Resource Adequacy requirements for the federal load in the CAISO BA is estimated to cost approximately $850,000 per year.
- The total estimated range of CAISO Tariff service costs (sum~~mation~~ of the ~~three bullet elements~~ above) to be incurred by the Federal Government for these SLU facilities (Gianelli, O'Neill, and Dos Amigos) upon termination of the PG&E contract will range from $~~5,306,400~~6,000,000 to $~~8,767,~~9,437,600 per year beginning April 2016.
- CAISO grid transmission users may also incur congestion charges when the scheduling capacity of existing transmission lines is exceeded, and customers must pay to mitigate for congestion. These costs have the potential to be negligible or several million dollars per year; there is currently no effective means to estimate future congestion costs.

In anticipation of PG&E's contract expiring and the substantial increase and uncertainty in transmission costs associated with scheduling federal power to these facilities under the CAISO Tariff, Reclamation submitted a transmission service request to Western. Under this request, Western is considering various transmission service arrangements, including the construction of new federal transmission lines (not part of~~to be included in~~ the CAISO grid). Reclamation must continue to deliver federal water after the PG&E contract expires. Western must respond to Reclamation's request for transmission service consistent with Western's Open Access Transmission Tariff (OATT) and existing laws. Reclamation, on behalf of its water contractors, is evaluating options to pump, store, convey, and deliver federal water via the SLU at reasonable cost. While Western was exploring different options for meeting Reclamation's load, Western received a separate transmission service request from Duke American Transmission Company (DATC) under Western's OATT for between 1080 and 1600 megawatts (MW) of transmission service between the Tracy and Los Banos Substations. Western determined it could satisfy both requests by building a single 500-kV project.

Reclamation has determined that paying the cost of constructing, operating, and maintaining a new 230-kV transmission line outside of the CAISO grid over a 50-year analysis is more cost effective than paying the estimated cost of the CAISO Tariff charges that are likely to occur over the same period. Refer to the Appendix K (Cost Analysis) for details of this analysis. Furthermore, the federal transmission line will provide more cost certainty, in that it will continue to be used after that period of analysis where the capital cost of the Project would have been repaid and with just O&M costs as the only continuing cost, whereas costs of transmission service from the CAISO grid would ~~be uncertain.~~ continue to include additional new facilities and at rates that will be higher and uncertain. Having Western own and operate the transmission facilities provides Reclamation and its water customers with cost certainty that is not available under the CAISO. SLTP as a 500-kV Project provides additional economic savings compared to a federal-only 230-kV project.

The preliminary cost estimate to construct the Proposed Project in 2015 dollars, based on comparative cost estimates and a 25 percent contingency, would be approximately $400 million. Reclamation would be responsible for a 25 percent share of the Proposed Project (500-kV) to accomplish their purposes and needs. This 25 percent share ~~amount~~ would be included in the Balancing Authority of Northern California. As such, its costs would be substantially below the anticipated costs that Reclamation would incur under the CAISO Tariff for the same 50-year period.

In addition to being more cost effective, the construction of a new transmission line by the Federal Government would provide more "cost certainty" for delivering federal power to the primary SLU loads.

CAISO cost recovery methodology is used to determine the high-voltage and low-voltage TAC. For instance, in January 2013, the CAISO high-voltage TAC was $7.73 per MWh. In January 2015, the CAISO high-voltage TAC had increased to $9.42 per MWh, and by March 2015, the CAISO high-voltage TAC was $10.16 per MWh. It has since decreased to $9.7986 in August 2015. In contrast, constructing the Proposed Project would limit any future cost increases to those necessary for operation, maintenance, and replacement of the Proposed Project instead of the entire CAISO grid.

In October 2013, ~~an eligible Western transmission customer[1]~~DATC submitted a transmission service request in accordance with Western's OATT for transmission service within the same corridor as

~~[1] Pending its decision to participate in the Project, the identity of this customer is confidential. Details on the interconnection request are available at: http://www.oasis.oati.com/wasn/index.html (see Transmission Queue page for updates)~~

requested by Reclamation. Western ~~is evaluating both requests jointly in order to~~ determined ~~if~~ it ~~can~~ could satisfy ~~Reclamation's need and the eligible customer's~~both requests ~~with~~ by building a single project. This Project would require at least a single-circuit 500-kV transmission line between the Tracy and Los Banos areas. Therefore, this EIS/EIR evaluates a 500-kV transmission line with ~~an~~ design voltage options to construct at 230-kV should ~~the eligible transmission customer~~DATC decide not to participate. It is anticipated that ~~the eligible Western transmission customer~~DATC will decide whether to participate by spring 2016.

If Western constructs the Proposed Project (500-kV) with DATC, 1200 MW of this 1600-MW line would be included in the CAISO Balancing Authority Area, where it would strengthen the capacity of the primary north-south extra high voltage transmission path in California, reduce congestion on that line, and facilitate export of renewable generation from the San Joaquin Valley to loads in urban areas of California. DATC would invest 75 percent of the capital cost of the Project, and receive a transmission payment from the CAISO as approved by the Federal Energy Regulatory Commission.

1.3 Project Objectives

The Project objectives for the SLTP are to:

- obtain durable, long-term, cost certain, and efficient transmission delivery of CVP power from federal power generation sites to the major pumping stations of the SLU to reliably deliver water to Reclamation and the Authority's member agencies (federal water service contractors);
- reinforce a critical link in the California transmission grid to reduce congestion, increase reliability, and facilitate the deliverability of renewable resources from the San Joaquin Valley to loads in urban areas of California;
- locate and install transmission facilities in a safe, efficient, and cost-effective manner that meets Project needs while minimizing environmental impacts;
- locate facilities to minimize the potential of environmental impacts resulting from damage by external sources;
- maximize the use of existing transmission corridors and rights-of-way in order to minimize effects on previously undisturbed land and resources; and
- obtain stable and reliable transmission that meets Project needs in a cost-effective and timely manner.

1.4 Agency Background

1.4.1 Western Area Power Administration

Western markets and delivers reliable, cost-based hydroelectric power and related services within the central and western United States. Western is one of four power marketing administrations within DOE that markets and transmits electricity from multi-use water projects, primarily to statutorily defined preference customers~~consumer-owned utilities~~. Western's mission is to market and deliver clean, renewable, reliable, cost-based federal hydroelectric power and related services within 15 central and western states. Western's 17,000-mile, high-voltage transmission system carries electricity from power plants operated by Reclamation, U.S. Army Corps of Engineers (USACE), and the International Boundary and Water Commission.

The SLTP is located within Western's Sierra Nevada Region (SNR). SNR maintains and operates numerous substations and more than 1,500 circuit miles of transmission lines in five geographic regions to ~~nearly 700~~ approximately 80 preference customers~~non-profit utilities~~. By law, Western markets power that is in excess of federal project requirements to preference customers, such as federal and State agencies, Native American tribes, electric cooperatives, municipal utilities, public utility districts, irrigation districts, and water districts. Western sells wholesale electricity to more than 70 customers in central and northern California and Nevada from the CVP and Washoe Project.

As described in Section 1.1, Western is the lead federal agency under NEPA. Under Western's OATT, Western must respond to requests for transmission services. The~~is~~ Draft EIS/EIR, together with this~~e~~ Final EIS/EIR and other permitting requirements, is the means by which Western will comply with NEPA. Findings from the EIS/EIR and all comments received will become part of the administrative record and will be used to make decisions on whether and how to proceed on the SLTP.

Portions of the Proposed Project may affect floodplains and wetlands. In accordance with DOE floodplain and wetland environmental review requirements (10 CFR part 1022), this EIS/EIR includes a floodplain and wetlands assessment (see the "Water Resources and Floodplains" section in chapters 3 and 4). A floodplain statement of findings will be included in the Record of Decision (ROD) (10 CFR 1022.14(c)).

1.4.2 San Luis & Delta-Mendota Water Authority

The Authority consists of 28 federal and San Joaquin River exchange water service contractors that provide water to more than 2.1 million acres of service territory within the western San Joaquin Valley, as well as San Benito and Santa Clara Counties. The Authority was established in 1992 and assumed the operation and maintenance (O&M) responsibilities of certain CVP facilities. The Authority operates and maintains the Delta-Mendota Canal, which delivers approximately 3 million acre-feet of water within the Authority's service area, the C.W. "Bill" Jones Pumping Plant (formerly Tracy Pumping Plant), O'Neill Pumping/Generating Plant, Tracy O&M Facilities, the San Luis Drain, and several other components of the CVP.

As described in Section 1.1, the Authority is the CEQA lead agency. This EIS/EIR is intended to inform the public, other agencies, and the Authority's 19-member governing board of directors of potential environmental impacts, mitigation measures, and alternatives prior to the Authority's decision to approve or disapprove the Project.

1.4.3 Bureau of Reclamation

Reclamation is the largest wholesaler of water in the United States, supplying more than 31 million people and providing irrigation water for 10 million acres of farmland. Reclamation is also the second largest producer of hydroelectric power in the western United States with 53 power plants that provide more than 40 billion kilowatt-hours annually and generate nearly a billion dollars in power sales revenue. Reclamation's mission is to assist in meeting the increasing water demands of the western United States while protecting the environment and the public's investments in these structures. Reclamation emphasizes fulfilling its water delivery obligations, water conservation, water recycling, and reuse goals; developing partnerships with customers, states, and Native American tribes; and finding ways to address the competing needs for limited water resources.

Reclamation owns, operates, and manages the dams, power plants, and canals of the CVP. The SLTP also passes through lands managed by the Reclamation. Under NEPA regulations, Reclamation is a cooperating agency involved in the preparation of the EIS/EIR for the SLTP.

1.4.4 California Department of Water Resources

DWR, established in 1956 by the California State Legislature, plays an important role in sustaining California's economy, environment, and quality of life. DWR's major responsibilities include overseeing the statewide-process of developing and updating the California Water Plan (Bulletin 160 series); protecting and restoring the Sacramento–San Joaquin Delta; regulating dams, providing flood protection, assisting in emergency management, educating the public about the importance of water and its proper use; providing technical assistance to service local water needs; and planning, designing, constructing, operating, and maintaining California's State Water Project (SWP).

SWP is the largest State-built multi-purpose, water project in the United States. In addition to supplying water to California's cities, industries, and farms, the SWP also provides flood control, hydroelectric power generation, recreation, and enhancement and protection of fish and wildlife habitat. The SWP provides water supply for an estimated 25 million Californians and about 750,000 acres of farmland, and includes 34 storage facilities, 20 pumping plants, five hydroelectric power plants, four pumping-generating plants, and approximately 700 miles of canals, tunnels, and pipelines. The JUF is an essential component of the SWP. Pursuant to the 1961 Agreement between the U.S. Bureau of Reclamation and DWR, DWR has a contractual obligation for operations and maintenance (O&M) of the JUF including the San Luis and Dos Amigos Substations. The SLTP interconnects to the facilities that are operated and maintained by the DWR. The SLTP would necessitate consultation with DWR and DWR concurrence related to interconnection design, protection, operations, maintenance, communications, and NERC/WECC compliance responsibilities. Under CEQA, DWR is considered a responsible agency for the SLTP based on its jurisdiction over certain facilities that may be affected by the Project, the approval authority it holds for interconnection at SWP-operated and maintained facilities, and approval of encroachment permits.

1.5 Public Participation

Public involvement is a vital part of the environmental review process under NEPA and CEQA. Western provided multiple opportunities for public involvement during the development of the ~~Draft Western~~ EIS/EIR. These opportunities intend to establish a collaborative, systematic, and inclusive process to gather and share information and identify public concerns and issues regarding the Project.

1.5.1 Scoping

Western and the Authority held public open-house meetings to answer questions and receive comments on the scope of the environmental analysis for the SLTP. These meetings were held on January 8, 2014, in Tracy, California and on January 9, 2014, in Santa Nella, California. The 60-day public scoping comment period began on November 22, 2013 when the Notice of Intent was published in the *Federal Register*, and the Notice of Preparation was filed with the California State Clearinghouse. The 60-day public scoping comment period ended on January 21, 2014.

Western distributed notices to 75 local agencies, 8 state agencies, 6 federal agencies, 21 organizations, and 39 elected officials. Western also sent postcards announcing the public scoping meetings and comment period to all property owners within or adjacent to the Proposed Project or alternative routes, and published advertisements on the meetings and comment period in five local newspapers. The postcards and advertisements also provided an overview map of the Project area, a brief summary of the SLTP, how to provide scoping comments, and where to find additional information on the Proposed Project.

A total of 21 unique commenters (8 individuals, 4 organizations, and 9 agencies) submitted 21 comment documents (letters, emails, faxes, and comment cards). Within these comment documents, a total of 81 individual scoping comments were submitted. These comments are summarized in the Scoping Report (Appendix B).

1.5.2 Public Review of the Draft EIS/EIR

The Notice of Availability (NOA) of the Draft EIS/EIR was published in the Federal Register, filed with the State Clearinghouse, and mailed to interested parties on July 17, 2015. The NOA included information on how to access the Draft EIS/EIR, the dates, times, and locations of the Draft EIS/EIR public meetings, and how to comment on the Draft EIS/EIR. Its distribution started a 45-day public comment period that ended on August 31, 2015.

Public hearings on the Draft EIS/EIR were held in Tracy on August 10, 2015 and Los Banos on August 11, 2015. These consisted of an open house where Project information was shared, followed by an opportunity to record verbal comments from the public. Notice of the public meetings was published in the Tracy Press and Los Banos Enterprise newspapers.

Four people provided verbal comments at the Los Banos meeting; no verbal comments were provided at the Tracy meeting. An additional 26 comment letters and emails were received during the 45-day public comment period (refer to Appendix L for a detailed list of commenters and copies of all comment correspondence).

1.5.3 Other Public Participation Efforts

Additionally, ~~two~~ three newsletters have been distributed to affected and interested landowners, organizations, and agencies. The first newsletter, distributed May 2014, announced the availability of the Scoping Report and the Alternatives Screening Report on the SLTP website.[1] It also provided a summary of the alternatives considered and eliminated in the Draft EIS/EIR. The second newsletter, distributed February 2015, announced that a new alternative corridor (the Billy Wright Road Alternative) and two proposed new substations (the Tracy East and Los Banos West Substations) would be evaluated in the Draft EIS/EIR. It also announced the availability of an updated Alternatives Screening Report on the SLTP website. The third newsletter was distributed in August 2015. It announced the availability of the Draft EIS/EIR, described how to comment on the Draft EIS/EIR, and provided the dates, times and locations of the Draft EIS/EIR public meetings.

Information about the project is available on two websites: http://www.sltpeis-eir.com and https://www.wapa.gov/regions/SN/environment/Pages/san-Luis-transmission-project.aspx. These websites provide general information about the Project and electronic versions of Project documents, including the Scoping Report, Alternatives Screening Report, public meeting materials, Project maps, newsletters, and the Draft and Final EIS/EIR.

1.6 Revisions to the Draft EIS/EIR

The Draft EIS/EIR, as revised in this document, comments received during the public comment period, and written responses collectively comprise the Final EIS/EIR. Where the Draft EIS/EIR has been revised,

[1] ~~http://www.sltpeis-eir.com/~~

the text has been marked in ~~strikethrough~~ for deletions and underline for additions.[2] These revisions have been made in response to comments received on the Draft EIS/EIR, as presented in Appendix L. Portions of the Draft EIS/EIR were also revised for the purposes of clarifications, typographical corrections, and other editorial adjustments.

[2] Appendix J (Disclosure Statements), Appendix K (Cost Analysis), Appendix L (Draft EIS/EIR Comments and Responses), and Appendix M (Draft Conformity Determination) are new sections of the Final EIS/EIR that expand and clarify the information in the Draft EIS/EIR, but are not presented as underlined text. Appendix I (Air Quality Emission Calculations) has been updated in the Final EIS/EIR without strikethrough and underlined text.

Chapter 2
Description of the Proposed Project and Alternatives

This chapter describes the Proposed Project and alternatives; proposed construction, operation, maintenance, and decommissioning activities; the Environmental Protection Measures (EPMs); and standard construction, operation, and maintenance practices that would be implemented as part of the Project. It also identifies the Environmentally Preferred Alternative.

At this time, the exact locations and quantities of Project components (e.g., access roads, staging areas, pulling sites) are unknown and, in some cases, quantities of Project components are conservatively estimated (see Appendix E). To provide flexibility in siting Project components, particularly access roads that may extend outside of the proposed easements, a one-mile buffer was added on the west side of the Proposed Project and alternative corridors. The buffer was extended up to I-5 on the east side of the Proposed Project and alternative corridors, except where the Project would be located east of I-5 near the Dos Amigos Substation. The area within this buffer is referred to as the *study area*, unless otherwise defined in Chapter 3 for a specific resource. This EIS/EIR uses the term *Project area* to collectively describe the area within which Project components could be located. A *corridor* is a linear area within which the easements (also known as rights-of-way) would be located; proposed corridors are part of the Project area.

2.1 Proposed Project

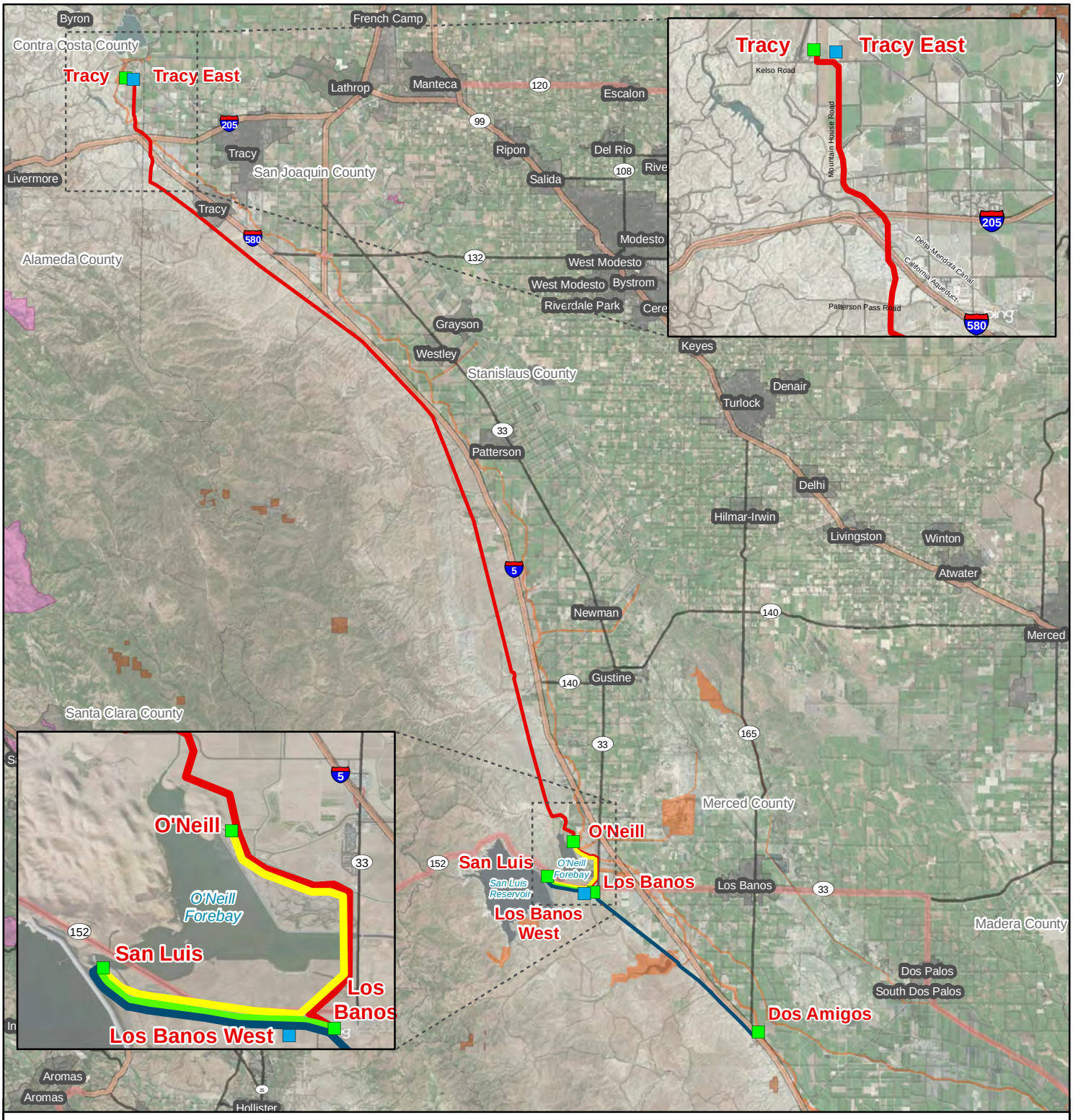
Western proposes to construct, own, operate, and maintain about 95 miles of new transmission lines within easements ranging from 125 to 250 feet wide through Alameda, San Joaquin, Stanislaus, and Merced Counties along the foothills of the Diablo Range in the western San Joaquin Valley. Western also would upgrade or expand its existing substations, make the necessary arrangements to upgrade or expand existing PG&E substations, or construct new substations to accommodate the interconnections of these new transmission lines. An overview of the Proposed Project is illustrated in Figure 2-1.

2.1.1 Overview

The Proposed Project consists of:

- **A 500-kV transmission line.** A single-circuit 500-kV transmission line, about 65 miles long, terminating at the existing, expanded, or new substations in the Tracy and Los Banos areas.
- **230-kV transmission lines.** A single-circuit 230-kV transmission line (called the "tie-line"), about 3 miles long, connecting the San Luis Substation and the existing Los Banos Substation or new Los Banos West Substation; and a single-circuit 230-kV transmission line, about 20 miles long, connecting the San Luis and Dos Amigos Substations or a single-circuit 230-kV transmission line, about 18 miles long, connecting the new Los Banos West and existing Dos Amigos Substations.
- **A 70-kV transmission line.** A single-circuit 70-kV transmission line, about 7 miles long connecting the San Luis and O'Neill Substations.

Much of the Proposed Project would be located adjacent to existing high-voltage transmission line easements along the foothills west of Interstate 5 (I-5).



Existing Substations
Proposed New Substations
Streets
City Boundary
Counties

Land Ownership
Bureau of Land Management
Local Government
Bureau of Reclamation

Proposed Project
500-kV Corridor
230-kV Corridor (tie-line)
230-kV Corridor
70-kV Corridor

0 6 12 Miles

Figure 2-1

Proposed Project Overview

Western is proposing to construct two new 500-kV substations: Tracy East Substation and Los Banos West Substation. The Tracy East Substation would be adjacent to and east of the existing Tracy Substation with a footprint of up to 50 acres (see Figure 2-6a). The Los Banos West Substation would be adjacent to and west of the existing Los Banos Substation with a footprint of up to 50 acres (see Figure 2-6c). Western may also interconnect the existing Western 500-kV Los Banos-Gates No. 3 transmission line just south of PG&E's existing Los Banos Substation into this new Los Banos West Substation. The existing Tracy, Los Banos, San Luis, and/or Dos Amigos Substations may be expanded to add new or modify existing 230-kV terminal bays. Western would also construct a 230/70-kV transformer bank and associated facilities at the San Luis Substation.

The Proposed Project also would include ancillary facilities, such as communication facilities, improvements to existing access roads, new permanent access roads, and temporary access roads to facilitate construction activities. Western would acquire the necessary easements and fee land for the Proposed Project.

2.1.1.1 500-kV Transmission Line

As shown in Figure 2-1, the proposed single-circuit 500-kV transmission line corridor would begin at the new Tracy East Substation, located at the intersection of Mountain House Road and Kelso Road, about 6 miles northwest of the City of Tracy in Alameda County. From the substation, the proposed corridor heads east along Kelso Road and turns south, adjacent to an existing 230-kV transmission line through agricultural fields. The proposed corridor then continues south and crosses the Delta-Mendota Canal (Canal) and a 69-kV transmission line. Then, it turns southeast to cross these features again and continues along the northeastern side of the canal and into San Joaquin County, crossing Interstate 205 (I-205) and a 230-kV transmission line. The proposed corridor then turns south, and continues adjacent to two existing 230-kV and 500-kV transmission lines to an area just east of PG&E's Tesla Substation, south of Patterson Pass Road.

Next, the proposed corridor turns south and runs adjacent to the east side of the existing transmission line corridor, which contains up to five high-voltage transmission lines. Along this section, the existing easements adjacent to the proposed corridor contain several 500-, 230-, and 115-kV transmission lines in various configurations. The proposed corridor would run adjacent to these transmission lines, with minor deviations to avoid existing infrastructure, south to the O'Neill Forebay.

Just north of the O'Neill Forebay, the proposed corridor would turn southeast, around the east side of the O'Neill Forebay and would terminate into the existing Los Banos Substation or the new Los Banos West Substation.

2.1.1.2 230-kV Transmission Lines

There are two new proposed single-circuit 230-kV transmission line corridors. The first 230-kV transmission line corridor would be between the existing San Luis Substation and new Los Banos West Substation; this transmission line corridor is on the south side of Highway 152 and is referred to as a "tie-line." The second proposed new 230-kV transmission line would connect the San Luis and Dos Amigos Substations or the new Los Banos West Substation and Dos Amigos Substation. This corridor heads southeast from the Los Banos area adjacent to and east of the existing PG&E transmission line. Just south of the Los Banos Reservoir, it crosses to the west of the existing PG&E transmission line corridor and continues southeast for about 7 miles until it crosses I-5 to the Dos Amigos Substation. These proposed corridors are shown in Figure 2-1.

2.1.1.3 70-kV Transmission Line

The proposed single-circuit 70-kV transmission line connects the San Luis and O'Neill Substations around the east side of the O'Neill Forebay. This component of the Proposed Project is located within the proposed 230-kV and 500-kV corridors described above (see Figure 2-1).

2.1.1.4 Operational Voltage Options

As described in Section 1.2, the operational voltage needed for the Project is dependent on the participation of ~~an eligible transmission customer~~DATC. The Proposed Project described herein assumes participation by ~~the customer~~DATC. If ~~the customer~~DATC declines to participate, one of the following operational voltage options may be selected by Western and the Authority in their decision-making processes pursuant to NEPA and CEQA.

500-kV Transmission Line operated at 230-kV

This voltage option would consist of a 500-kV transmission line constructed between the Tracy and ~~Los Banos~~ San Luis Substations. However, it would be operated at 230-kV. The proposed Tracy East and Los Banos West Substations would not be constructed. The 230-kV transmission line between the San Luis and Dos Amigos Substations, as well as the 70-kV transmission line between the San Luis and O'Neill Substations, are the same as the Proposed Project.

230-kV Transmission Line

This voltage option would consist of a 230-kV line constructed between the Tracy and San Luis Substations. The proposed Tracy East and Los Banos West Substations would not be constructed. The 230-kV transmission line between the San Luis and Dos Amigos Substations, as well as the 70-kV transmission line between the San Luis and O'Neill Substations, are the same as the Proposed Project.

2.1.2 Project Components

2.1.2.1 Easements

Western does not have existing transmission line easements within the Project area for the Proposed Project, and therefore, would need to acquire easements for the entire Project. Western would locate lines adjacent to existing easements or transmission lines wherever feasible. Generally, easements would be 125 to 175 feet wide for a 230-kV transmission line and 200 to 250 feet wide for a 500-kV transmission line. The actual width and location of the proposed easement within the corridor may vary depending on engineering considerations, as well as constraints identified during environmental surveys.

2.1.2.2 Access Roads

Improvements to existing access roads, new permanent access roads, and temporary access roads would be needed for construction and maintenance of the transmission line. Typically, upgrading existing roads and constructing temporary and permanent new access roads requires a construction width of 14 feet along straightaways and 16 to 20 feet around corners to facilitate safe movement of equipment and vehicles. However, all temporary roads will be restored to pre-existing conditions when they are no longer needed, and all upgraded existing roads and new permanent roads will be restored to a width of 12 feet.

Although specific locations have not been determined, new access roads for the Project would be located to minimize environmental impacts and to accommodate engineering constraints. Access roads would be occasionally graded for maintenance purposes and culverts would be added, as needed. Appendix E quantifies the estimated area of disturbance for proposed new and existing access roads

2.1.2.3 Structures

Tubular steel monopoles or lattice steel structures would be used to support the 500-kV and 230-kV lines of the Proposed Project, and smaller wood or steel monopoles would be used for the 70-kV line. Typical dimensions of the proposed structures are shown in Figures 2-2 through 2-4 and summarized in Table 2-1.

Table 2-1. Typical Structure Dimensions

Structure Type	Height (feet)	Structures Per Mile
500-kV single-circuit lattice	100-170	4 to 5
500-kV single-circuit steel pole	140-170	4 to 5
230-kV single- or double-circuit lattice	100-150	4 to 5
230-kV single- or double-circuit steel pole	125-140	4 to 5
70-kV wood or steel pole	50-70	10 to 15

Ancillary Facilities

Communication facilities, including fiber optic overhead ground wires would be installed on the transmission line structures for control and protection. Construction, expansion, and maintenance of these facilities would occur within the corridors.

2.1.3 Construction

2.1.3.1 Construction Schedule

Construction would commence after securing all required permits and land rights. Multiple crews would work simultaneously on different Project components. Table 2-2 presents Western's proposed schedule for constructing the SLTP.

Table 2-2. SLTP Proposed Construction Schedule

Construction Phases	Estimated Days	Estimated Schedule
Engineering and Design	430	Begin in Fall 2017
Construction	525	Begin in Summer 2018
Final Testing/Operation	135	2021

Construction generally would take place between 7:00 a.m. and 7:00 p.m., 6 days per week, except for those areas where local ordinances and traffic considerations dictate otherwise, in which case working hours would be consistent with local requirements.

2.1.3.2 Ground Disturbance

Ground disturbance would occur from grading construction staging areas, grading and drilling holes for new structure foundations, constructing and improving roads for vehicle and equipment access, establishing pull sites for conductor installation, as well as expanding existing and/or construction of new substations. The typical ground disturbance area for each of these activities is shown in Table 2-3. Proposed construction methods are described in the following sections.

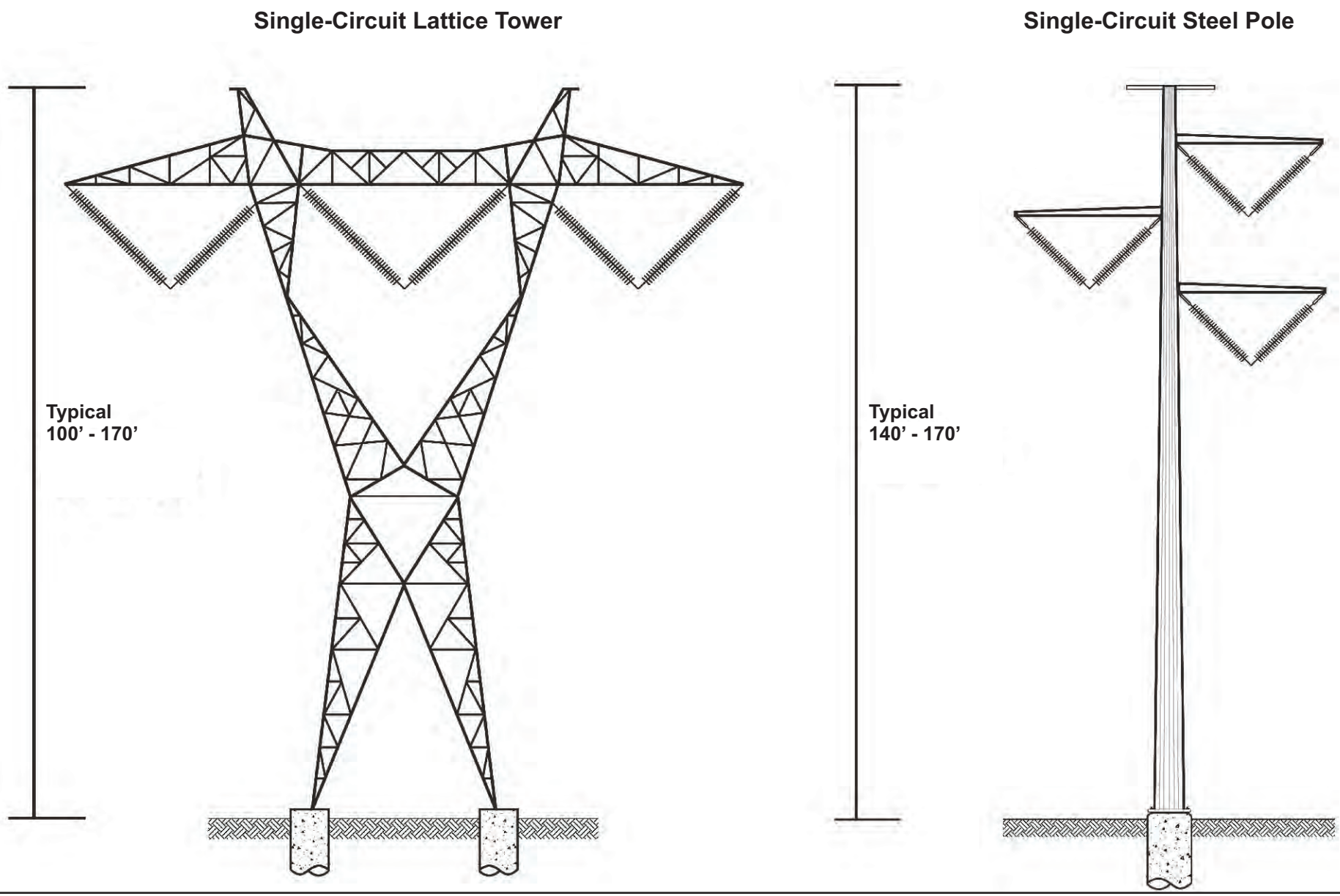


Figure 2-2

SLTP Representative 500-kV Structure Types

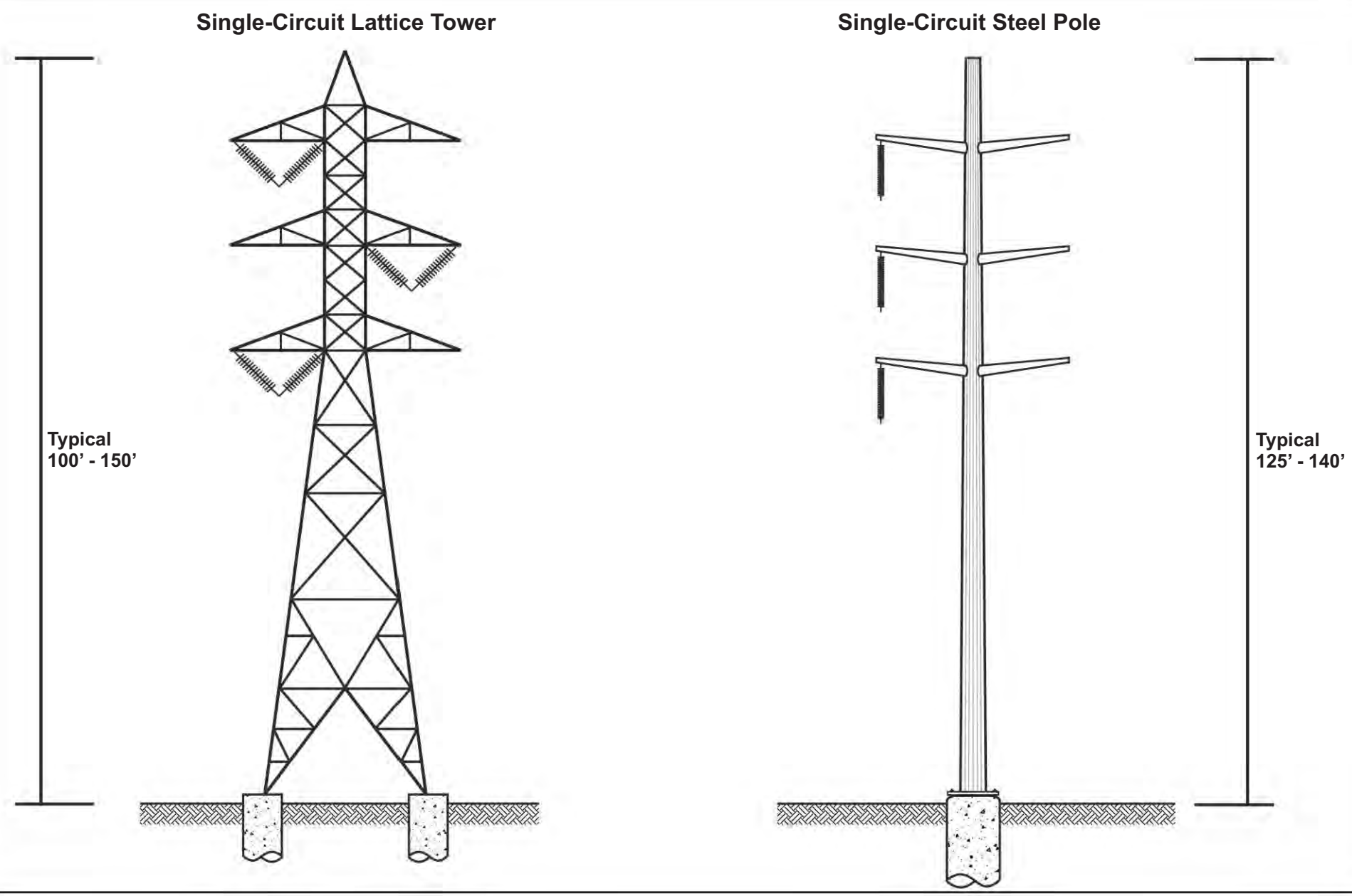


Figure 2-3

SLTP Representative 230-kV Structure Types

Single-Circuit Steel or Wood Pole

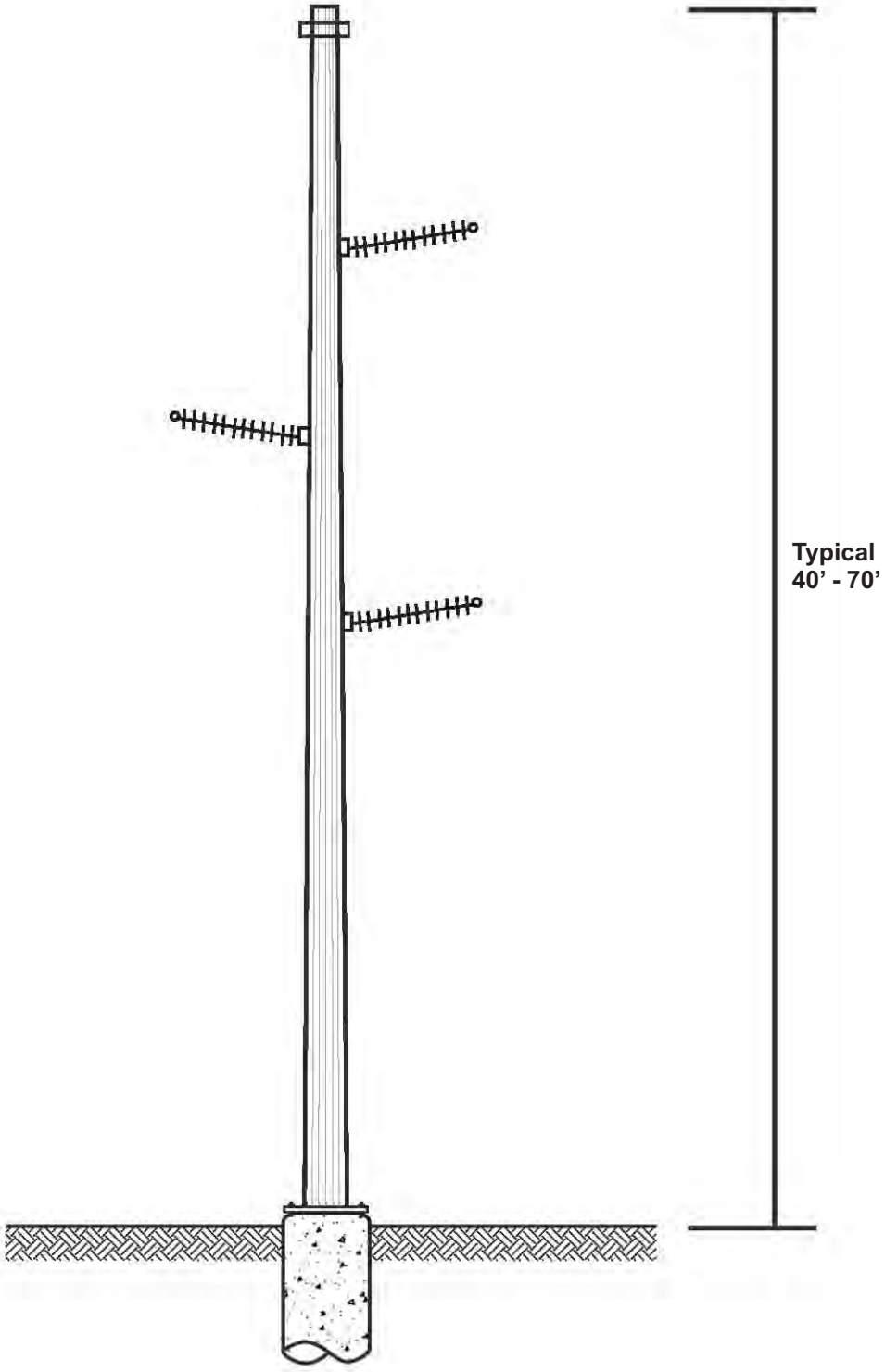


Figure 2-4

SLTP Representative 70-kV Structure Types

Table 2-3. Typical Ground Disturbance for Construction Activities[1]

Activity		Temporary Disturbance	Permanent Disturbance
Staging area		5 acres every 15 miles	0 acres
Structure footing	500-kV lattice	up to 0.9 acres	up to 0.1 acres
	500-kV steel pole	up to 0.9 acres	up to 0.1 acres
	230-kV lattice	up to 0.6 acres	up to 0.1 acres
	230-kV steel pole	up to 0.6 acres	up to 0.1 acres
	70-kV wood or steel pole	up to 0.1115 acres	up to 0.0001 acres
Foundation excavation	500-kV and 230-kV lattice and steel poles	40 feet deep,12 feet in diameter	0 acres[2]
	70-kV wood or steel pole	8 to 10 feet deep, 4 feet in diameter	0 acres[2]
Conductor pull site		0.4 acres	0 acres
Access road construction/improvement		Up to 30 feet wide	12 feet wide
Tracy, Los Banos, San Luis, and Dos Amigos Substation expansion		up to 0.1 acres within existing substation	up to 0.1 acres within existing substation
Tracy East Substation		0 acres	up to 50 acres
Los Banos West Substation		0 acres	up to 50 acres

1 - These dimensions represent worst-case and are used in the impact analysis of Chapter 4, but could be reduced during final engineering design or consultation with resources agencies. Note that these dimensions will be influenced by topography, location, easement width, etc. Also see Appendix E for details on disturbance assumptions.

2 - Included in structure footings

2.1.3.3 Construction Equipment and Workforce

Typical quantities of personnel and equipment needed for proposed construction activities are shown in Table 2-4. The tasks would be conducted in stages; therefore, personnel and equipment would not be working on all tasks simultaneously at a given location, but there would be some overlap in tasks.

Table 2-4. Typical Personnel and Equipment

Activity	Personnel	Equipment	
Right-of-Way (access roads and vegetation clearing)	2 to 4 equipment operators	▪ 1 motor grader ▪ 2 pickup/trucks	▪ 2 bulldozers ▪ 1 backhoe
Excavation for foundations	4 to 8 laborers/equipment operators	▪ 2 augers ▪ 2 backhoes	▪ 2 pickup trucks ▪ 2 compressors
Foundation installation (anchor bolt/rebar cages)	4 to 6 laborers/equipment operators 3 to 5 ironworkers	▪ 2 flat-bed trucks ▪ 2 pickup trucks ▪ 2 air compressors ▪ 2 hydro lifts ▪ 2 welders	▪ 2 to 3 mixer trucks per structure for direct-embedded foundations ▪ 10 to 12 mixer trucks per structure anchor bolt foundations
Structure assembly and erection	4 to 6 linemen/laborers and crane operators	▪ 2 hydro-cranes ▪ 2 tractors	▪ 2 manlifts ▪ 2 pickup trucks
Helicopter use	1 pilot 1 ground person fueler	▪ Helicopter Hughes 500 ▪ fuel truck	
Conductor stringing	20 to 25 linemen/groundmen	▪ 2 pullers ▪ 2 tensioners ▪ 2 bulldozers ▪ 4 reel trailers	▪ 1 materials truck ▪ 2 manlifts ▪ 5 to 6 pickup trucks ▪ 1 light truck

Table 2-4. Typical Personnel and Equipment

Activity	Personnel	Equipment	
Disturbance area restoration (Cleanup and Revegetation)	3 to 6 laborers	▪ 1 bulldozer w/ripper ▪ 1 blader ▪ 1 front-end loader	▪ 1 tractor/harrow/disc ▪ 1 light truck
Substation improvement and expansion	20-25 electricians, linemen, laborers, equipment, operators, and ironworkers	▪ 2 flatbed trucks ▪ 2 bulldozers ▪ 2 cranes ▪ 2 excavators ▪ 5 pickup trucks ▪ 1 fuel truck ▪ 1 puller	▪ 1 tensioner ▪ 2 reel trailers ▪ 1 tractor ▪ 2 materials trucks ▪ 1 blader ▪ 2 mixer trucks ▪ 1 front end loader
Substation construction (Tracy East and Los Banos West)	20-40 electricians, linemen, laborers, equipment, operators, and ironworkers	▪ 2 flatbed trucks ▪ 2 bulldozers ▪ 2 cranes ▪ 2 excavators ▪ 5 pickup trucks ▪ 1 fuel truck ▪ 1 puller	▪ 1 tensioner ▪ 2 reel trailers ▪ 1 tractor ▪ 2 materials trucks ▪ 1 blader ▪ 2 mixer trucks ▪ 1 front end loader

2.1.3.4 Construction Staging

Temporary construction staging areas would be needed to store and stage materials, construction equipment, and vehicles. Although the exact locations have not been determined, locations would be selected that minimize ground disturbance.

2.1.3.5 Right-of-Way Access and Improvements

Construction of a new transmission line requires access to each tower site for construction crews, materials, and equipment. Access to each site would be on an existing road where feasible or on new roads. Existing roads may need to be improved.

Improving existing access roads would involve brush clearing, grading, erosion control and the installation of culverts or rip-rap to maintain stormwater flows within ephemeral wash areas. Lost surface material would be replaced and the road would be graded and shaped. A motor grader is the primary equipment type used to conduct this work, but bulldozers may be used in some areas. Watering may be required to control dust and to retain fine surface rock.

In determining the final location of new roads, large trees or other natural features will be avoided. New access roads would be constructed using a bulldozer or grader, followed by a roller to compact and smooth the ground. Front-end loaders would be used to move the soil locally or off site.

After Project construction, existing and new permanent access roads would be used by maintenance crews and vehicles for inspection and maintenance activities. Temporary construction roads not required for future maintenance access would be removed and restored to pre-construction condition to the extent feasible.

2.1.3.6 Excavation and Foundation Installation for Transmission Line Structures

Installation of structure foundations may require grading and vegetation removal. Where grading is needed, topsoil would be removed and stockpiled for use in site restoration. Temporary topsoil stockpiles would be protected from erosion during construction. Excavating transmission structure

foundations is typically done with a backhoe, front-end loader, or pressure auger. Excavation to bedrock or other suitable base material would be required. A rock drill may be used if rock is encountered during excavation. Four holes would be excavated for each lattice structure and one for each tubular steel or wood pole.

Reinforced concrete foundations would be used for most structures. After the foundation concrete is placed, a mechanical tamp would be used to re-compact soil around the foundation. The disturbed area would be re-graded so that surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate re-vegetation or re-seeding, provide for proper drainage, and prevent erosion.

2.1.3.7 Structure Assembly and Erection

Structure components would typically be transported to installation sites by truck or helicopter. Structures would be erected with cranes. Structure assembly equipment may include cranes (ground or helicopter), augers, bulldozers, bucket trucks, backhoes, air compressors, electric generators, pickup trucks and other vehicles, machinery, and equipment. Structures would be assembled, erected, and attached to the foundations (see Figure 2-5).

2.1.3.8 Conductor Stringing

Conductor stringing would occur at designated pull and tensioning sites (see Figure 2-5). Generally the pull sites would be located within the easement. Angle-structure pull sites would require temporary easement rights if located outside the easement to pull the conductor on a straight line. The locations of pull sites depend on environmental constraints, conductor length, and equipment access. Pull sites would be located within the study area.

Large reels of conductor would be transported to the staging areas or pulling sites on flatbed trucks. Other equipment would include stringing trailers, tensioning machines, pullers, bulldozers, and several trucks including a bucket truck.

Temporary stringing sheaves or travelers (pulleys) would be attached on the cross-arms of each structure at the bottom of the insulator strings. A sock line (rope or lightweight wire) would then be strung from structure to structure through the stringing sheaves. This may be completed using a helicopter. A pulling line would then be attached to the end of the sock line and pulled back through the sheaves between pull site locations. Conductor would then be strung using the pulling line.

Powered pulling equipment would be used at one end and tensioning equipment would be used at the other end to establish the proper tension and sag for crews to permanently “clip” conductors onto structure hardware, and to maintain the proper ground clearance for the conductors. After conductors are clipped in, the stringing sheaves would be removed and the new conductor would be connected to the insulators hanging from the cross-arms. Ground wire would be installed last and would be attached to the top of the structures using a pulling technique similar to that used for the conductors.

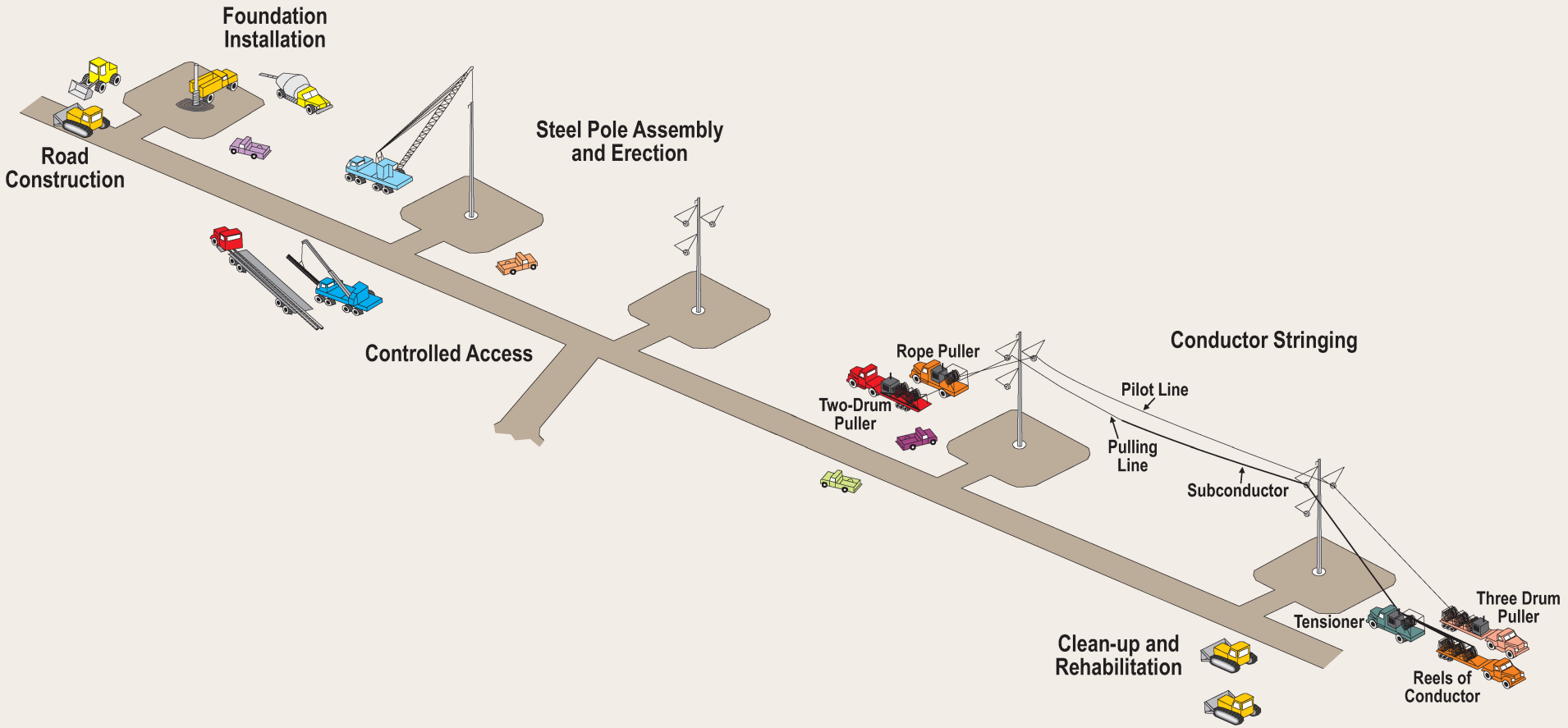


Figure 2-5
Typical Tower Construction and Wire Conductoring Activities and Equipment

2.1.3.9 Substations

Existing Substations

Modifications to and/or expansion of existing substations would be needed to interconnect SLTP facilities. Modifications may include constructing new 230-kV line terminal bay facilities at the Tracy, San Luis, Los Banos and/or Dos Amigos Substations. Expansion of existing substations may be required if the existing substations are unable to accommodate a new terminal bay. Western also would construct a new 230/70-kV transformer bank bay and interconnection facility at the San Luis Substation. To accommodate these modifications, the existing substations may be expanded within the limits of the Project area.

Proposed New Substations

Generally, substation construction would include site grading, property and substation fencing, and installation of electrical facilities. The site would be excavated and graded to accommodate the required construction and permanent facility buildings, equipment, and electrical structures. A fence would be erected around the substation perimeter. Up to 50 acres would be graded for each new substation. Area lighting would be provided by multiple 300-watt tungsten-quartz lamps mounted near major electrical equipment. Additionally, downward-oriented 100-watt yellow flood lamps would be placed near entrances and the substation gate for night entry and would remain on throughout the night.

The electrical facilities proposed for the new Tracy East Substation would accommodate the termination of one 500-kV transmission line. These facilities would include a 500-kV terminal bay, associated breakers, disconnect switches, protective relays, metering and Supervisory Control and Data Acquisition (SCADA) system equipment, and associated features.

The electrical facilities proposed for the new Los Banos West Substation would accommodate the termination of three 500-kV transmission lines and one 230-kV transmission line. These facilities would include three 500-kV terminal bays, a 230-kV terminal bay, a 500/230-kV transformer bay and associated breakers, disconnect switches, protective relays, metering and SCADA system equipment, and associated features.

2.1.3.10 Disturbance Area Restoration

Areas temporarily disturbed by construction would be restored to pre-construction conditions, to the extent feasible. Western would re-grade disturbed areas to establish original contours, and redistribute topsoil. All disturbed soil, other than surfaces intended for permanent access roads, would be seeded with native species free of invasive seeds. Where necessary, water diversions (i.e., waterbars) would be constructed along access roads to control surface water drainage and erosion. See Appendix E for SLTP ground disturbance assumptions.

2.1.4 Operation and Maintenance

Western must comply with North American Electric Reliability Corporation and Western Electricity Coordinating Council standards and requirements for transmission system reliability, including maintenance and vegetation management. In order to comply with these requirements, Western has a comprehensive O&M program for all of its property and facilities including transmission lines, substations, communication facilities, and legal access roads. This O&M program ensures reliability of the transmission systems and safe, all-weather access to the transmission line structures and other Western facilities. The O&M activities proposed for the SLTP would be consistent with Western's O&M program, which is presented in Appendix D.

2.1.5 Decommissioning

If no longer needed, facilities ~~any one of the transmission lines~~ would be removed. Removed facilities would include wires, insulators, hardware, structures, and foundations from the easements. All decommissioning activities would occur within the same disturbance area identified for construction.

Material would be disposed of in accordance with applicable regulations, and may be salvaged or sold. The equipment required to safely remove the wires and structures would be nearly the same as that required for installation. Following removal, any areas disturbed during line dismantling would be restored and rehabilitated. Disturbed surfaces would be restored to the original contour. All disturbed soil, other than surfaces intended for permanent access roads, would be seeded with native species free of invasive seeds.

Western would reclaim temporary service roads following abandonment in accordance with land management agency or landowner agreements. Equipment and personnel for restoration operations would be similar to that required at the end of construction. Where required by the land management agency or landowner, compacted areas would be ripped (with a dozer) and sediment control measures (e.g., revegetation) would be implemented.

2.1.6 Environmental Protection Measures and Construction Standards

Western implements Environmental Protection Measures (EPMs) and Construction Standards to reduce environmental consequences associated with its construction and maintenance activities. The analysis of environmental consequences (Chapter 4) accounts for the EPMs listed in Table 2-5 and the Construction Standards presented in Appendix F, which would be implemented as part of the Project.

Table 2-5. Environmental Protection Measures

Resource	EPM
Air Quality	Project participants will comply with applicable federal, State, and local rules and regulations regarding air quality.
Air Quality	Equipment and vehicles will be operated in compliance with applicable federal, State, and local rules and regulations regarding air quality.
Air Quality	Vehicles and equipment used in construction and maintenance of the Proposed Project or alternatives will maintain appropriate emissions control equipment and be appropriately permitted.
Air Quality	Regular watering of exposed soils and unpaved access roads will be conducted during the construction period.
Air Quality	Engine idling will be in accordance with an idling policy compliant with applicable ~~the~~ California State regulations.
Air Quality	If new sulfur hexafluoride equipment is installed as part of the Project, Western will include this information in their annual reports to California Air Resources Board and the Environmental Protection Agency. Best management practices will be followed to eliminate sulfur hexafluoride emissions during installation and commissioning.
Biological Resources	All Western and contract crews will complete biological awareness training to ensure they are familiar with sensitive biological resources and the associated EPMs and mitigation measures. All supervisors and field personnel will have on file a signed agreement that they have completed the training, and understood and agreed to the terms. EPMs and applicable mitigation measures will be written into the contract for construction and O&M work, and contractors will be held responsible for compliance.
Biological Resources	Vehicle traffic will be restricted to designated access routes and the immediate vicinity of construction and O&M sites. Vehicle speeds will not exceed 15 mph on nonpublic access and maintenance roads and 10 mph on unimproved access routes. Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas, to the extent feasible.

Table 2-5. Environmental Protection Measures

Resource	EPM
Biological Resources	No pets or firearms will be permitted at Project sites.
Biological Resources	At the end of each work day, construction and O&M workers will leave work areas and adjacent habitats to minimize disturbance to actively foraging animals, and remove food-related trash from the work site in closed containers for disposal. Workers will not deliberately or inadvertently feed wildlife.
Biological Resources	Nighttime construction and O&M activities will be minimized to emergency situations. If nighttime construction and O&M work is required, lights will be directed to the minimum area needed to illuminate Project work areas. If night time work is required, a speed limit of 10 mph will be enforced on all nonpublic access roads.
Biological Resources	Mortalities or injuries to any wildlife that occur as a result of Project- or maintenance-related actions will be reported immediately to the Western Natural Resources Department or other designated point of contact, who will instruct construction and O&M personnel on the appropriate action, and who will contact the appropriate agency if the species is listed. The phone number for the Western Natural Resources Department or designated point of contact will be provided to the construction contractors, maintenance supervisors and to the appropriate agencies.
Biological Resources	Caves, mine tunnels, and rock outcrops will never be entered, climbed upon, or otherwise disturbed.
Biological Resources	If a pesticide label stipulates a buffer zone width for protection of natural resources that differs from that specified in a Project mitigation measure or EPM, the buffer zone width that offers the greatest protection will be applied.
Biological Resources	At completion of work and at the request of the landowner/manager, all work areas except access roads will be scarified or left in a condition that will facilitate natural or appropriate vegetation, provide for proper drainage, and prevent erosion.
Biological Resources	Prior to any application of herbicide, Western will query the California Department of Pesticide Regulation PRESCRIBE database, entering location information by county, township, range, and section, entering both the commercial name and the formulation of the desired pesticide, and will follow all use limitations provided to ensure compliance with applicable pesticide standards. This database is currently located at http://www.cdpr.ca.gov/docs/endspec/prescint.htm. The measures generated by the PRESCRIBE database will supersede those in the Project EPMs where they are different.
Biological Resources	Seed mixtures applied for erosion control and restoration will be certified as free of noxious weed seed, and will be composed of native species or sterile nonnative species.
Biological Resources	Equipment will be washed prior to entering sensitive areas within the Project area to control noxious weeds. The rinse water will be disposed of through the sanitary sewage system or other appropriate disposal method that minimizes the spread of noxious weeds.
Biological Resources	Measures described in the Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (Avian Power Line Interaction Committee 2006 or more current version) and Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (Avian Power Line Interaction Committee 2012 or more current version) will be implemented during O&M activities to minimize bird mortality and injury. At such time when Western finalizes an Avian Protection Plan, Western will adhere to the guidance in that document.
Biological Resources	Construction and O&M excavations greater than 3 feet deep will be fenced, covered, or filled at the end of each working day, or have escape ramps provided to prevent the entrapment of wildlife. Trenches and holes will be inspected for entrapped wildlife before being filled. Any entrapped animals will be allowed to escape voluntarily before construction and O&M activities resume, or they may be removed by qualified personnel, with an appropriate handling permit if necessary.

Table 2-5. Environmental Protection Measures

Resource	EPM
Biological Resources	A hazardous-spill plan will be developed prior to construction and will remain in effect for all O&M activities. The plan will describe what actions will be taken in the event of a spill of toxic or hazardous materials. The plan will incorporate preventive measures to be implemented for vehicle and equipment staging, cleaning, maintenance, and refueling, and for containment management and storage of hazardous materials, including fuel. In the event of a contaminant spill, work at the site will immediately cease until the contractor has contained and mitigated the spill. The contractor will immediately prevent further contamination, notify appropriate authorities, notify Western's regional environmental manager, and will mitigate damage as appropriate. Adequate spill containment materials, such as oil diaper mats and hydrocarbon cleanup kits, will be available on site at all times, as will containers for storage, transportation, and disposal of contaminated absorbent materials.
Cultural Resources, Paleontological Resources	Before construction, all construction personnel will be instructed by Western on the protection of cultural and paleontological resources and that cultural and paleontological resources might be present in the study area. To assist in this effort, the construction contract will address applicable federal and State laws regarding cultural and paleontological resources, including historic and prehistoric resources, and fossils. Construction personnel will be informed of the penalties for collection and removal of such resources, as well as the importance of these resources and the purpose and necessity of protecting them. Contractors will be trained to stop work near any discovery and notify Western's regional environmental manager immediately, who will ensure that the resource is evaluated and avoided. Known cultural and paleontological resources will be flagged for avoidance and a minimum distance maintained for work disturbances.
Cultural Resources	Western will have qualified archaeological monitors on site during ground disturbing construction activities. Archaeological monitors will look for any inadvertent cultural resource discoveries or other sensitive resources that may be important to tribes. Archaeologists will stop work in the immediate area should any such resources be uncovered until an assessment of the find can be made by Western.
Cultural Resources	Cultural resources would be considered during post-EIS/EIR phases of Project implementation. Surveys would be completed prior to any ground disturbing activities or Project construction activities in order to inventory and evaluate cultural resources of the Project, or of any components that might be added to the Project, or any existing components that would be modified. These surveys and any resulting historic property evaluation and analysis of effects would be conducted in accordance with Section 106 of the National Historic Preservation Act (NHPA) and in consultation with the State Historic Preservation Officer (SHPO). If adverse effects to historic properties cannot be avoided, Western would develop a Programmatic Agreement (PA) or Memorandum of Agreement (MOA) in consultation with the SHPO to determine appropriate mitigation to avoid lessen any adverse effects to cultural resources.
Geology, Soils, and Mineral Resources	Erosion control measures will be implemented to prevent loss of soil. Construction will be in conformance with Western's Integrated Vegetation Management Environmental Guidance Manual.
Land Use and Agriculture	Post proper signage in areas within the easement that will require temporary closure or limited access to accommodate certain land uses. Where feasible, construction activities would be scheduled to minimize impacts to agricultural activities. If this is not feasible and damage occurs, the landowner may be compensated.
Land Use and Agriculture	On completion of the work, all work areas except permanent access roads will be returned to pre-construction conditions unless otherwise specified by the landowner/manager.
Land Use and Agriculture	During construction, movement will be limited (to the greatest extent feasible) to the access roads and within a designated area in the easement to minimize damage to agricultural land.
Land Use and Agriculture	Damaged fences and gates will be repaired or replaced to restore them to their pre-construction condition.
Land Use	Construction and operations will be conducted in a manner that prevents unnecessary destruction, scarring, or defacing of the natural surroundings and to preserve the natural landscape to the extent practicable.
Land Use	No permanent discoloring agents will be applied to rocks or vegetation to indicate limits of survey.
Noise	All vehicles and equipment will be equipped with required exhaust noise abatement suppression devices.

Table 2-5. Environmental Protection Measures

Resource	EPM
Traffic and Transportation	Western will restrict all necessary lane closures or obstructions on major roadways associated with construction activities to off-peak periods to avoid substantial traffic congestion and delays.
Traffic and Transportation	Western will ensure that roads or sidewalks damaged by construction activities will be properly restored to their pre-construction condition.
Traffic and Transportation	Conform with applicable safety requirements for maintaining the flow of public traffic and conduct construction and operations to minimize obstruction and inconvenience to public transportation.
Traffic and Transportation	Mark structures and/or shield wire with highly visible devices for identified locations, as required by applicable laws and regulations (for example, Federal Aviation Administration regulations).
Water Resources, Wetlands	Runoff from the construction and O&M sites will be controlled and meet applicable RWQCB stormwater requirements and the conditions of a construction stormwater discharge permit. A stormwater pollution prevention plan will be prepared and implemented.
Water Resources and Floodplains	All contaminated discharge water created by construction and O&M activities (e.g., concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) will be contained and disposed of in accordance with applicable federal, State, and local regulations.
Water Resources and Floodplains	All fill or rip-rap placed within a stream or river channel will be limited to the minimum area required for access or protection of existing Western facilities.
Water Resources and Floodplains	All equipment will be stored, fueled, and maintained in vehicle staging areas 300 feet or the maximum feasible distance from any aquatic habitat (vernal pool, vernal pool grassland, seasonal wetland, seep, spring, pond, lake, river, stream, or marsh) and no closer than 200 feet unless a bermed (no ground disturbance) and lined refueling area is constructed and hazardous-material absorbent pads are available in the event of a spill. Vehicles and construction equipment will be inspected daily for fluid leaks before leaving staging areas during construction and O&M activities. Fluid leaks will be repaired before equipment is moved from staging areas.
Water Resources and Floodplains	All instream work, such as culvert replacement or installation, bank recontouring, or placement of bank protection below the high-water line, will be conducted during no-flow or low-flow conditions and in a manner to avoid impacts to water flow, and will be restricted to the minimum area necessary for completion of the work.
Water Resources and Floodplains	All equipment used below the ordinary high-water mark will be free of exterior contamination.
Water Resources and Floodplains	Excavated material or other construction materials will not be stockpiled or deposited near or on stream banks, lake shorelines, or other watercourse perimeters.
Water Resources and Floodplains	Non-biodegradable debris will be collected and removed from the easement daily and taken to a disposal facility. Slash and other biodegradable debris will be left in place or disposed of.
Water Resources and Floodplains	All soil excavated for structure foundations will be backfilled and tamped around the foundations, and used to provide positive drainage around the structure foundations. Excess soil will be removed from the site and disposed of appropriately. Areas around structure footings will be reseeded with native plants.
Water Resources and Floodplains	Wherever feasible, new structures and access roads will be sited out of floodplains. Bridges will be used at new stream crossings wherever feasible. If avoidance is infeasible, Western will consult with USACE and obtain permits as required.
Water Resources and Floodplains	If wet areas cannot be avoided, Western will use vehicles, ground mats, and equipment that minimize ground impacts.
Water Resources and Floodplains	Construction vehicle movement outside of the easement will be restricted (to the extent feasible) to approved access or public roads.
Water Resources and Floodplains	Where feasible, all construction activities will be rerouted around wet areas while ensuring that the route does not cross sensitive resource areas.

2.2 Alternatives Development

One of the most important aspects of the NEPA and CEQA processes is the identification and assessment of reasonable alternatives that have the potential for avoiding or minimizing the impacts of a Proposed Project. This EIS/EIR presents a range of alternatives based on whether or not the alternatives meet (1) most of the project objectives/purpose and need; (2) are considered potentially feasible; and (3) would avoid or substantially lessen any potential significant effects of the Proposed Project. For additional information on the alternatives development process refer to the Alternatives Screening Report (ASR) in Appendix A.

2.2.1 Corridor Alternatives

The alternatives presented below have been chosen for detailed analysis in the EIS/EIR through the alternative screening process. Alternative corridors begin and end at points in common with the Proposed Project and other alternatives. The Project area was divided at the common points into four segments in order to facilitate a fair or equal comparison between the impacts of the alternatives and the Proposed Project. Table 2-6 and Figures 2-6a through 2-6e present the segments and the alternatives retained for analysis within each segment.

Table 2-6. Alternatives by Segment

Segments	Number of Alternatives	Alternative Name(s)
North Segment	0	None
Central Segment	1	Patterson Pass Alternative
San Luis Segment	2	Butts Road Alternative West of Cemetery Alternative
	1 (70-kV)	West of O'Neill Forebay Alternative
South Segment	2	San Luis to Dos Amigos Alternative Billy Wright Road Alternative

2.2.1.1 Patterson Pass Road Alternative

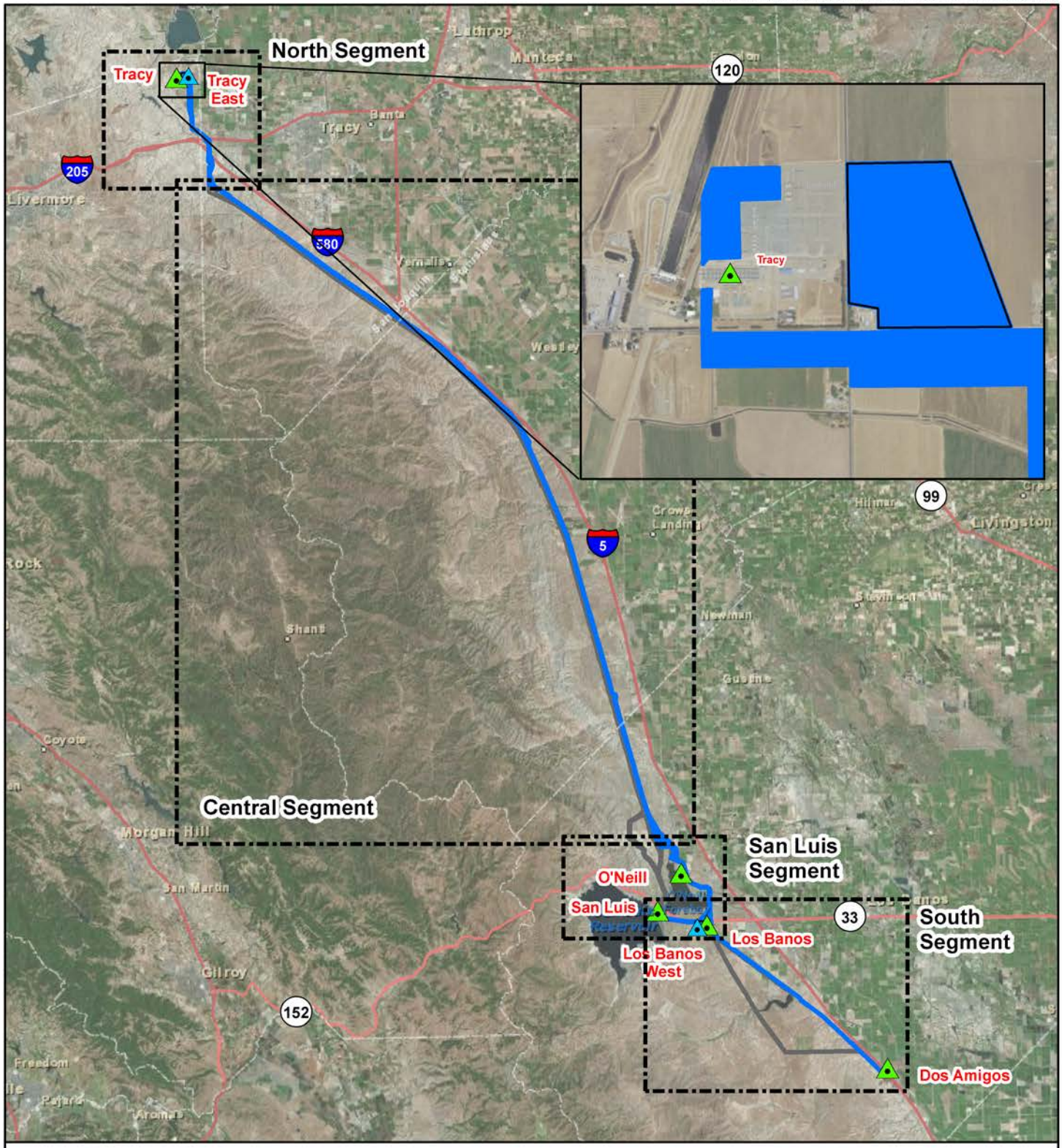
An alternative corridor would extend from a point near Patterson Pass Road in the north to a point near Butts Road in the south. It would run parallel to the Proposed Project, but on the western side of the existing high-voltage transmission lines, further from I-5 for approximately 48 miles.

2.2.1.2 Butts Road Alternative

At Butts Road, this alternative corridor would continue south on the west side of the existing transmission corridor for approximately 2.2 miles. At about McCabe Road, this alternative would turn southwest for about 4.0 miles, crossing State Route (SR) 152 and bypassing the existing San Luis Substation. This alternative would then head east paralleling SR 152 to the south for 2.8 miles where it would interconnect with the Los Banos Substation or new Los Banos West Substation, using the same corridor as tie-line. This alternative would be about 10 miles in length.

2.2.1.3 West of Cemetery Alternative

At Butts Road, this alternative would head west and then south from the existing transmission corridor and then extend around the west side of the San Joaquin Valley National Cemetery (Cemetery) for approximately 2.6 miles. At this point, it would begin to follow an existing PG&E 500-kV corridor for about 1.4 miles until it turns southwest, crossing SR 152 and bypassing the existing San Luis Substation. This alternative would then head east paralleling SR 152 to the south for 2.8 miles where it would interconnect with either the existing Los Banos Substation or new Los Banos West Substation, using the same corridor as the tie-line. This alternative would be about 10 miles in length.



Western AREA POWER ADMINISTRATION

Proposed New Substations
Existing Substations
Tracy East Substation Area*
Proposed Project Corridor
Corridor Alternatives

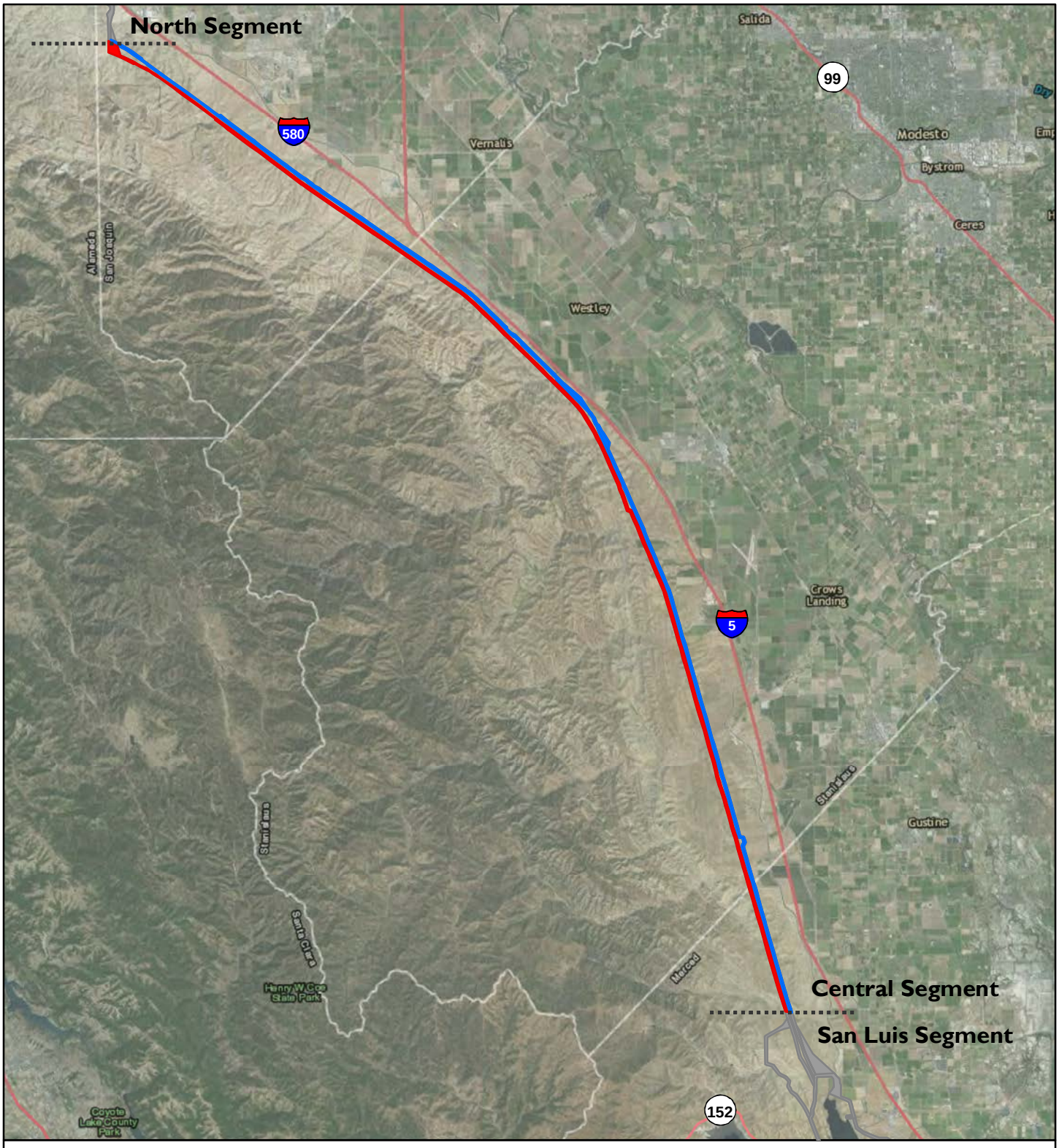
Figure 2-6a.

Proposed Project Segments

* Proposed new Tracy East Substation would occupy up to 50 acres within this area

0 5 10 Miles

Source: WAPA SNR, Aspen EG, ESRI



Western AREA POWER ADMINISTRATION

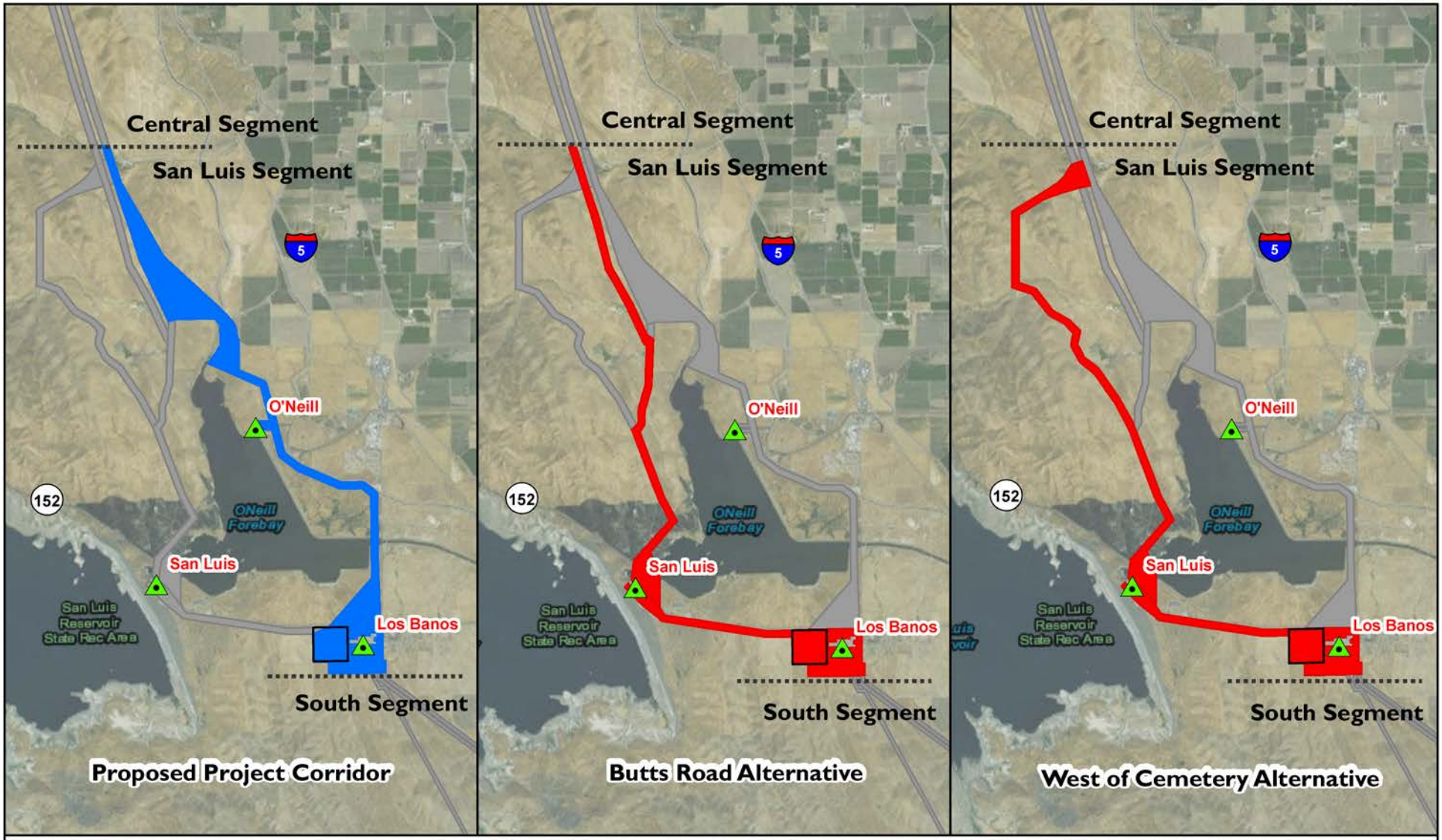
Figure 2-6b.

Corridor Alternatives
Central Segment

Patterson Pass Road Alternative
Proposed Project
Other Corridors

0 3 6 Miles

Source: WAPA SNR, Aspen EG, ESRI



Western Area Power Administration

Existing Substations
Los Banos West Substation Area*
Corridor Alternative
Proposed Project
Other Corridors

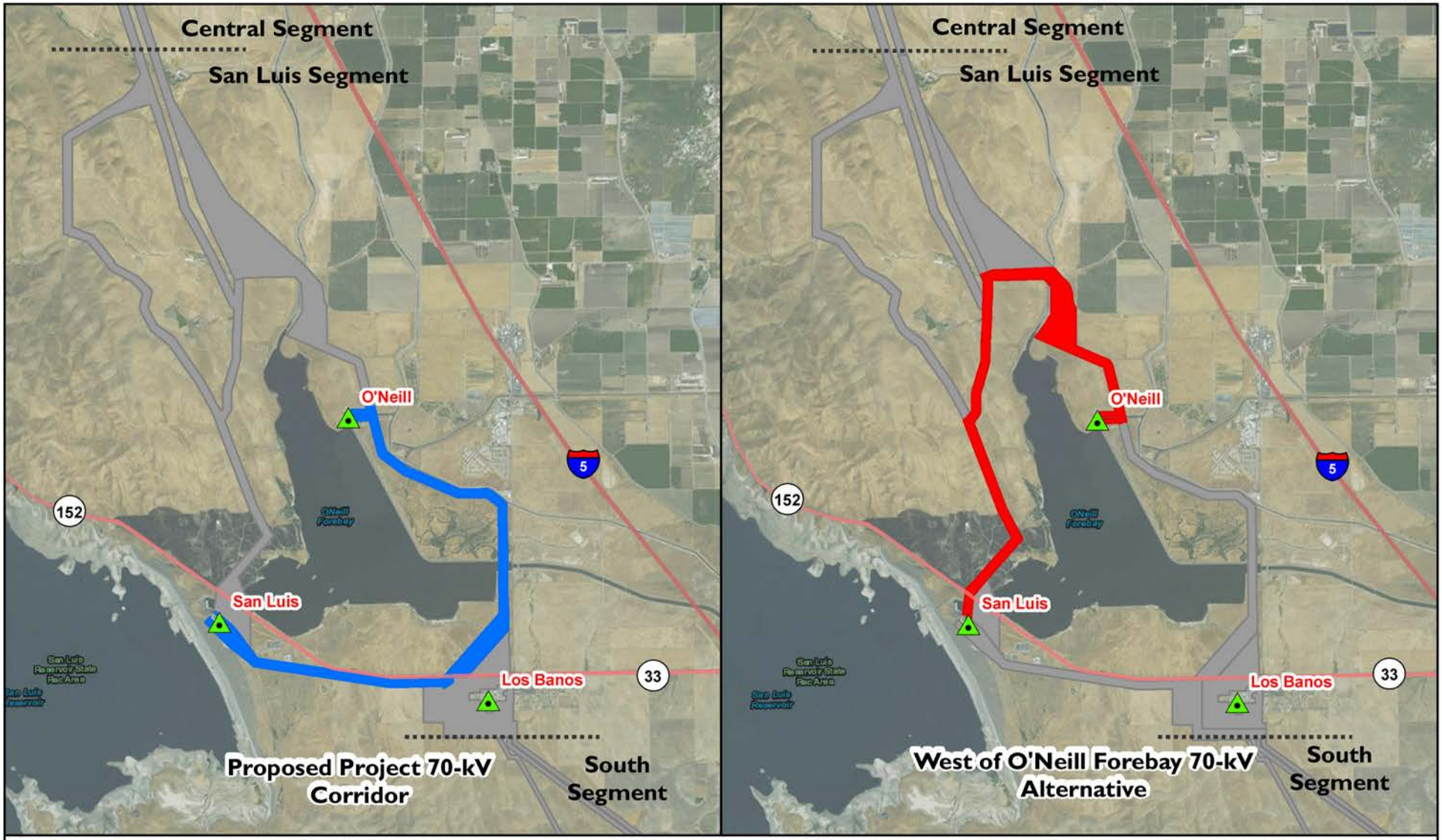
Figure 2-6c.

Corridor Alternatives
San Luis Segment

0 1 2 Miles

Source: WAPA SNR, Aspen EG, ESRI

* Proposed new Los Banos West Substation would occupy up to 50 acres within this area



Western AREA POWER ADMINISTRATION

Existing Substations
Corridor Alternative
Proposed Project
Other Corridors

Figure 2-6d.

70-kV Corridor Alternatives
San Luis Segment

0 1 2 Miles

Source: WAPA SNR, Aspen EG, ESRI

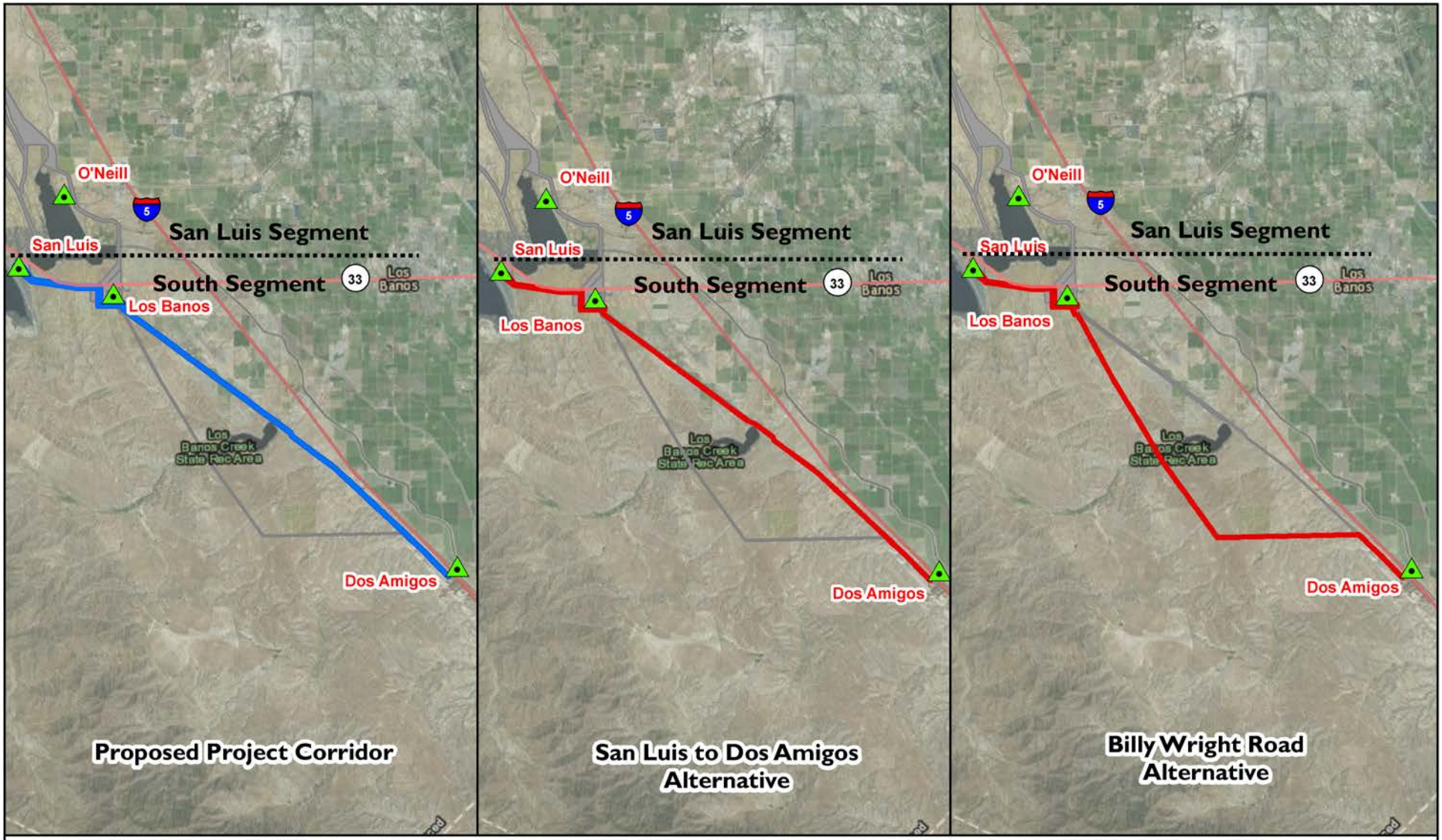


Figure 2-6e.

Corridor Alternatives
South Segment

Source: WAPA SNR, Aspen EG, ESRI

2.2.1.4 West of O'Neill Forebay 70-kV Alternative

This alternative corridor would extend from the San Luis Substation, cross SR 152, and run northeast for about 1 mile. At this point, it would begin to follow an existing PG&E transmission corridor for about 2.6 miles around the west side of the O'Neill Forebay to a point just north of McCabe Road. At that point, it would turn east and then turn to the southeast, in the preferred corridor, around the northeast side of the Forebay, following another PG&E high-voltage transmission corridor, to a point where it would terminate at the O'Neill Substation.

2.2.1.5 San Luis to Dos Amigos Alternative

This alternative would start at San Luis Substation and would run parallel to SR 152 heading east for approximately 2.8 miles, using the same corridor as the tie-line, to a point near the Los Banos Substation; no interconnection with the Los Banos or the new Los Banos West Substations would occur. At this point, this alternative corridor would extend approximately 6 miles south along the western side of the existing high-voltage transmission lines. Just north of the Los Banos Creek Reservoir, this alternative would cross the existing high-voltage transmission lines and would join the Proposed Project corridor as it extends to the Dos Amigos Substation.

2.2.1.6 Billy Wright Road Alternative

This alternative would start at San Luis Substation and would run parallel to SR 152 heading east for approximately 2.8 miles, using the same corridor as the tie-line, to a point near the Los Banos Substation; no interconnection with the Los Banos or new Los Banos West Substations would occur. At this point, the alternative corridor would head south adjacent to and east of the existing PG&E 500-kV transmission lines for approximately 9 miles, before turning due east for approximately 4.5 miles to join the Proposed Project corridor as it extends to the Dos Amigos Substation.

2.2.2 Alternatives Considered and Eliminated

The alternatives listed in Table 2-7 were eliminated from consideration in the EIS/EIR. Detailed descriptions of these alternatives and the reasons for their elimination are presented in the ASR (Appendix A).

2.3 No Action/No Project Alternative

Under the No Action/No Project Alternative, construction of the SLTP would not occur. Western would arrange for transmission service for the SLU from the CAISO through the use of existing electric infrastructure. The estimated increase cost to Reclamation the first full year by taking service under the CAISO Tariff is expected to be at least $8 million~~.~~ (and could potentially be significantly higher). Reclamation's operating costs associated with delivering federal energy from Tracy to the SLU pumping facilities are paid by its water service contractors. Reclamation has studied and compared the total cost of CAISO service with the estimated costs of constructing, operating, and maintaining the SLTP over the life of the Project. The total estimated range of CAISO Tariff service costs to be incurred by the Federal Government for the Gianelli, O'Neill, and Dos Amigos facilities upon termination of the PG&E contract will range from $5,306,400 to $8,767,600 per year beginning April 2016, and are expected to increase in the future. The uncertainty ~~disparity~~ in these costs going forward, and the potential for achieving cost certainty and cost savings over the life of a replacement transmission line, ~~is so great that reasonable prudence~~ requires Reclamation and the Authority to ~~pursue and~~ evaluate and pursue the proposed SLTP. Refer to Section 1.2 and Appendix K (Cost Analysis) for additional information on the economic analysis.)

Table 2-7. Alternatives Considered and Eliminated

Alternative	Description
Mountain House Road 500-kV Corridor	Western developed this alternative to minimize the length of the Proposed Project and reduce impacts to houses in the Mountain House Developments. This alternative corridor would exit the Tracy Substation and extend due south for about 0.9 mile along Mountain House Road, then turn southeast for approximately 0.8 mile through agricultural fields before intersecting the Proposed Project at the existing transmission corridor. In comparison to the Proposed Project, however, it would result in greater agricultural and visual impacts and construction disturbance to nearby school and residents. This alternative would reduce some potential impacts of the Proposed Project, but create other impacts that are potentially more severe; therefore; it was eliminated from consideration.
Grant Line Road 500-kV Corridor	Western developed this alternative corridor to minimize canal crossings. It would deviate from the Proposed Project and the existing transmission line corridor to remain along the east side of the Delta-Mendota Canal for about 0.7 mile. This short alternative segment would be about the same length as the Proposed Project. However, it would be about 0.25 mile closer to a new residential community along Grant Line Road in unincorporated Tracy, and therefore result in greater visual impacts. This alternative would reduce some potential impacts of the Proposed Project, but create other impacts that are potentially more severe; therefore; it was eliminated from consideration.
Delta-Mendota Canal/Interstate 580 500-kV Corridor	Western developed this alternative in response to comments requesting an alternative that uses the corridor between the Delta-Mendota Canal and Interstate 580, to avoid houses west of the Proposed Project near Patterson Pass Road. The California Aqueduct runs down the center of this corridor, and therefore, more specifically, the route would be located between the California Aqueduct and Interstate 580. This alternative also avoids impacts to the Tracy Hills conservation easements located west of Interstate 580. This corridor would deviate from the Proposed Project just south of the California Aqueduct and would continue south for about 7.3 miles between the California Aqueduct and Interstate 580 until it turns southwest, across Interstate 580, to rejoin the Proposed Project. In comparison to the Proposed Project, it would reduce land use and biological resource impacts. However, this alternative would increase visual impacts in comparison to the Proposed Project as it would introduce new transmission infrastructure to an area previously without transmission lines. Furthermore, It would be technically infeasible as certain locations between the California Aqueduct and Interstate 580 are too narrow to allow for construction, operation, and maintenance of a transmission line.
East of Delta-Mendota Canal 500-kV Corridor	Western developed this alternative corridor to address public comments about the proximity of the Proposed Project to houses near Patterson Pass Road. It would provide another option to the Delta-Mendota Canal/Interstate 580 Alternative. It would deviate from the Proposed Project 0.1 mile south of Interstate 205 and continue southeast on the east side of the Delta-Mendota Canal for about 3 miles. It would then cross the California Aqueduct and extend southeast, traversing agricultural fields, between the Delta-Mendota Canal and the California Aqueduct for about 1.3 miles before crossing the California Aqueduct to join the Delta-Mendota Canal/Interstate 580 Alternative. In comparison to the Proposed Project, this alternative would potentially reduce land use and biological resource impacts, but would potentially increase visual and agricultural impacts. Furthermore, this alternative is technically infeasible as certain locations between the Delta-Mendota Canal and existing cell towers are too narrow to allow for construction, operation, and maintenance of a transmission line.
West of Cemetery 2 500-kV Corridor	Western developed this alternative corridor to avoid approved solar development and to reduce visual impacts to visitors of the San Joaquin National Cemetery. It would provide another option to the West of Cemetery Alternative that is further from the San Joaquin Valley National Cemetery. This alternative would extend south from the West of Cemetery Alternative Corridor at about 1.4 miles northeast of the Cemetery. This corridor would follow a valley, behind a ridgeline, until it turns east to rejoin the West of Cemetery Alternative about 1 mile southeast of the Cemetery. In comparison to the Proposed Project, this alternative would reduce potential land use conflicts and visual impacts. However, due to the ruggedness of the terrain this alternative would potentially cause soil erosion and water quality impacts, and may be technically infeasible.

Table 2-7. Alternatives Considered and Eliminated

Alternative	Description
Forebay 500-kV Corridor	Western developed this alternative corridor to shorten the length of the Project and maximize use of existing transmission corridors. This alternative would provide another option to the West of O'Neill Forebay Alternative. This alternative would deviate from the West of O'Neill Forebay Alternative where that alternative turns southwest towards the San Luis Substation. This alternative would continue southeast following two existing PG&E 500-kV transmission lines across the southeastern portion of the O'Neill Forebay to the Los Banos Substation. A 0.7-mile segment of this alternative would cross the O'Neill Forebay in the existing transmission corridor. This alternative would maximize the use of existing transmission line easements. However, construction in the Forebay would result in potential water quality, soil erosion, and recreation impacts This alternative would not reduce the potential impacts of the Proposed Project; therefore; it was eliminated from consideration.
Jasper Sears Road Alternative	Western developed this alternative in response to scoping comments about potential land use conflicts of the Proposed Project with proposed solar development (Wright Solar Park), and current and proposed residential development (The Villages of Laguna San Luis), south of the Los Banos Substation. Scoping comments suggested an alternative alignment along Jasper Sears Road to minimize conflicts to The Villages of Laguna San Luis. This alternative corridor would exit the Los Banos Substation from the south and follow Jasper Sears Road and Western's existing 500-kV transmission line for about 9 miles before turning due east for about 5.3 miles to join the Proposed Project. This alternative would avoid proposed solar development; however, it would conflict with the planned Agua Fria development. It would result in more ground disturbance than the Proposed Project. This alternative would reduce some potential impacts of the Proposed Project, but create other impacts that are potentially more severe; therefore, it was eliminated from consideration.

2.4 Comparison of Alternatives

This section identifies the environmentally preferred alternative (i.e., CEQA's environmentally superior alternative) and the agency preferred alternative and presents detailed information regardi~~ng its t~~heir selection pursuant to the requirements of NEPA and CEQA.

2.4.1 Regulatory Requirements for Alternatives Comparison

National Environmental Policy Act

Under NEPA, the ~~Draft~~ EIS/EIR should identify the environmentally preferable or superior alternative from a range of alternatives considered if one exists at the draft stage. Commenters from other agencies and the public also are encouraged to address this question. ~~However, in all situations, t~~The environmentally preferable alternative must be identified in the Record of Decision on the Final EIS/EIR [Forty Questions No. 6(a) and 6(b)]. The answer to Forty Questions No. 6(a) states:

> *a. Section 1505.2(b) requires that, in cases where an EIS has been prepared, the Record of Decision (ROD) must identify all alternatives that were considered, "...specifying the alternative or alternatives which were considered to be environmentally preferable." The environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.*
>
> *The Council recognizes that the identification of the environmentally preferable alternative may involve difficult judgments, particularly when one environmental value must be balanced against another. The public and other agencies reviewing a Draft EIS can assist the lead agency to develop*

and determine environmentally preferable alternatives by providing their views in comments on the Draft EIS. Through the identification of the environmentally preferable alternative, the decision-maker is clearly faced with a choice between that alternative and others, and must consider whether the decision accords with the Congressionally declared policies of the Act.

California Environmental Quality Act

CEQA requires the following for alternatives analysis and comparison:

The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the Proposed Project. A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed. Guidelines Section 15126.6(d)

If the environmentally superior alternative is the No Project Alternative, CEQA requires identification of an environmentally superior action alternative among the other alternatives [CEQA Guidelines Section 15126.6(e)(2)]. In this EIS/EIR, the NEPA term "environmentally preferred alternative" is used to describe CEQA's environmentally superior alternative.

2.4.2 Alternatives Comparison Methods

~~To evaluate the various corridor alternatives, the Project area was divided into segments, as described in Section 2.2.1. The alternatives within each segment were compared to the analogous portion of the Proposed Project to identify the environmentally preferred corridor within each segment. The environmentally preferred corridor within the North, Central, San Luis and South segments were combined to comprise the Environmentally Preferred Action Alternative. Finally, the Environmentally Preferred Action Alternative was compared to the No Action Alternative to identify the Overall Environmentally Preferred Alternative.~~

Under the No Action/No Project Alternative, construction of the SLTP would not occur. Western would arrange for transmission service for the SLU from the CAISO using existing electric infrastructure. As there would be no new adverse direct environmental impacts under this alternative, it is the **Environmentally Preferred Alternative.**

However, as detailed in Section 1.2 and Appendix K, which address Reclamation's estimated transmission costs under the No Action/No Project Alternative (i.e., the CAISO Tariff) over a 50-year period, the No Action/No Project Alternative is not cost effective and involves substantial cost uncertainties. Further, the No Action/No Project Alternative would not achieve the purpose and need or basic project objectives.

CEQA Guidelines Section 15126.6(e)(2) requires that if the environmentally preferred alternative is the No Action/No Project Alternative, an EIR shall identify the environmentally preferred alternative among the action alternatives.

~~Determining an environmentally preferred alternative requires balancing many environmental factors.~~ In order to identify the environmentally preferred action alternative, the most important impacts in each issue area were identified and compared in Tables 2-8 through 2-11. Each of these tables presents a preference ranking and a brief explanation of the ranking for each environmental issue area. ~~Although this Draft EIS/EIR identifies an Environmentally Preferred Alternative, it is possible that the decision-~~

~~makers could balance the importance of each impact area differently and reach different conclusions when identifying the Agency Preferred Alternative in the Final EIS/EIR.~~

2.4.3 Comparison Among ~~Corridor~~ Action Alternatives

For each area of the Proposed Project where an alternative is considered, the comparison begins with a summary of the significant impacts that cannot be mitigated. Significant and unavoidable impacts of the Proposed Project and any significant and unavoidable impacts either created or eliminated by each alternative are listed under each segment. Highlighting these areas of significant impacts identified which alternatives would be capable of eliminating significant unavoidable environmental effects of the Proposed Project, and which alternatives would create new significant impacts. This comparison helps identify the environmentally preferred alternative while considering all environmental resource areas.

2.4.3.1 Summary of Significant and Unavoidable Impacts

Noise

The Proposed Project and every alternative in every segment would result in similar significant and unavoidable noise impacts during construction activities (listed below). These impacts would be short-term (occurring intermittently for up to 1 to 2 weeks) at several isolated rural residences within approximately 500 feet of the Proposed Project and alternative corridors.

- **Impact NOISE-1.** Result in a substantial temporary or periodic increase in ambient noise levels (above 5 dBA Leq) at sensitive receptor locations above levels existing without the Project.
- **Impact NOISE-3.** Result in noise levels that exceed local or federal noise regulations or guidelines.

Neither the Proposed Project nor any alternatives would result in significant and unavoidable impacts for resource areas other than noise within the North, Central, or South segments.

Significant and unavoidable impacts have been identified for Visual Resources (West of Cemetery Alternative only), Recreation (Proposed Project and alternatives), and Land Use (Proposed Project and alternatives) in the San Luis Segment, as described below.

Visual Resources

The Proposed Project would not result in significant and unavoidable impacts to visual resources in the San Luis Segment. However, the West of Cemetery Alternative would be prominently visible from a scenic overlook at the San Joaquin Valley National Cemetery, thereby resulting in the following significant and unavoidable impacts to Visual Resources:

- **Impact VIS-1.** Cause degradation of the foreground character or scenic quality of a visually important landscape.
- **Impact VIS-2.** Introduce dominant visual changes in the landscape that are seen by highly sensitive viewer locations such as community enhancement areas or locations with special scenic, historic, recreational, cultural, and/or natural qualities that have been recognized as such through legislation or some other official declaration.
- **Impact VIS-3.** Cause visual interruption that would dominate a unique viewshed or scenic view.

Recreation

The Proposed Project in the San Luis Segment would include construction of the new Los Banos West Substation, which would occupy up to 50 acres within the 150-acre Jasper Sears OHV Use Area. This would result in the following significant and unavoidable impacts to Recreation:

- **Impact REC-1.** Conflict with established, designated, or planned recreation areas or activities.
- **Impact REC-2.** Result in changes that alter or otherwise physically affect established, designated, or planned recreation areas or activities.
- **Impact REC-3.** Decrease accessibility to areas established, designated, or planned for recreation.

Each San Luis Segment alternative corridor would interconnect with the new Los Banos West Substation, thereby resulting in the same significant and unavoidable impacts as the Proposed Project.

Land Use

The Proposed Project in the San Luis Segment would include construction of the new Los Banos West Substation, which would occupy up to 50 acres within the 150-acre Jasper Sears OHV Use Area. This would result in the following significant and unavoidable impacts to Land Use:

- **Impact LU-1.** Conflict with applicable land use plans, policies, goals, or regulations.
- **Impact LU-4.** Conflict with State or federally established, designated, or reasonably foreseeable planned special use areas (e.g., recreation, wildlife management area, game management areas, waterfowl production areas, scientific and natural areas, wilderness areas, areas of critical environmental concern, etc.).

Each San Luis Segment alternative corridor would interconnect with the new Los Banos West Substation, thereby resulting in the same significant and unavoidable impacts as the Proposed Project.

2.4.3.2 Alternatives Comparison

Tables 2-8 through 2-11 present a comparison of the Proposed Project and ~~corridor~~ action alternatives in consideration of the most important impacts for every issue area within each corridor segment. The information in these tables is based on the conclusions presented in Chapter 4. Refer to the specific resource area analyses in Chapter 4 for additional information on affected resources, impact assessment methods, or the impacts.

North Segment (500-kV)

There are no alternatives to the Proposed Project in the North Segment. Therefore, the Proposed Project would be the environmentally preferred corridor.

Central Segment (500-kV)

In the Central Segment, the Patterson Pass Alternative would be the environmentally preferred corridor. The Proposed Project is approximately 1,000 feet closer to residences in this segment than the alternative Patterson Pass Alternative corridor; therefore, the Proposed Project would result in greater noise and visual resources impacts (refer to Table 2-8). Agricultural impacts also would be slightly greater than the Patterson Pass Alternative corridor. The Patterson Pass Road Alternative would result in greater impacts to biological resources than the Proposed Project.

Table 2-8. Comparison of the Proposed Project to Alternatives: Central Segment

Issue Area	Proposed Project	Patterson Pass Alternative
Agriculture	▪ Rank = 2 ▪ Permanent farmland impacts: 51.5 acres[1] ▪ Temporary farmland impacts: 34.8 acres	▪ **Preferred** ▪ Permanent farmland impacts: 46.9 acres ▪ Temporary farmland impacts: 29.3 acres
Air Quality and Climate Change	▪ No preference[2]	▪ No preference
Biological Resources	▪ **Preferred** ▪ Impacts fewer special-status plants ▪ Impacts more ephemeral creeks, freshwater marsh, and vernal pools	▪ Rank = 2 ▪ Impacts more special-status plants ▪ Impacts more wildflower fields, Great Valley riparian forest, intermittent creeks, and seasonal wetlands
Cultural Resources and Native American Consultation	▪ No preference	▪ No preference
Environmental Justice	▪ No preference	▪ No preference
Geology, Minerals, and Soils	▪ No preference	▪ No preference
Land Use	▪ No preference	▪ No preference
Noise	▪ Rank = 2 ▪ Closer to residences	▪ **Preferred** ▪ Farther from residences
Paleontological Resources	▪ No preference	▪ No preference
Public Health and Safety	▪ No preference	▪ No preference
Recreation	▪ No preference	▪ No preference
Socioeconomics	▪ No preference	▪ No preference
Traffic and Transportation	▪ No preference	▪ No preference
Visual Resources	▪ Rank = 2 ▪ Closer to residences	▪ **Preferred** ▪ Farther from residences and scenic highway (I-5)
Water Resources and Floodplains	▪ No preference	▪ No preference

1 - Farmland impacts are the sum of acreage potentially impacted within the Project study area and the Project corridor.
2 - No preference = impacts are similar or with negligible differences in intensity

San Luis Segment (500-kV)

In the San Luis Segment (500-kV), the Proposed Project would be the environmentally preferred corridor. The Proposed Project is the shortest route with the least ground disturbance. Therefore, it would result in fewer impacts to air quality, geology, paleontological resources, and water resources. The Proposed Project is furthest from the San Joaquin Valley National Cemetery, and therefore, would avoid noise and visual impacts to this sensitive resource. Additionally, it would impact the least amount of habitat for the federally and State endangered and State fully protected blunt-nosed leopard lizard.

Table 2-9. Comparison of the Proposed Project to Alternatives: San Luis Segment (500-kV)

Issue Area	Proposed Project	Butts Road Alternative	West of Cemetery Alternative
Agriculture	▪ Rank = 2 ▪ Permanent farmland impacts: 17.6 acres[1] ▪ Temporary farmland impacts: 7.2 acres	▪ **Preferred** ▪ Permanent farmland impacts: 12.5 acres ▪ Temporary farmland impacts: 4.6 acres	▪ Rank=3 ▪ Permanent farmland impacts: 19.8 acres ▪ Temporary farmland impacts: 3.6 acres

Table 2-9. Comparison of the Proposed Project to Alternatives: San Luis Segment (500-kV)

Issue Area	Proposed Project	Butts Road Alternative	West of Cemetery Alternative
Air Quality and Climate Change	▪ **Preferred** ▪ Least emissions and dust ▪ Shortest route requiring the use of construction equipment for the shortest duration	▪ Rank = 2 ▪ More emissions and dust than the Proposed Project ▪ Longer route than the Proposed Project requiring the use of construction equipment for longer duration	▪ Rank = 3 ▪ Most emissions and dust ▪ Longest route requiring the use of construction equipment for the longest duration
Biological Resources	▪ **Preferred** ▪ Least impacts to blunt-nosed leopard lizard habitat (federally endangered, State endangered, State fully protected) ▪ Most impacts to sensitive plant communities and jurisdictional resources ▪ Crosses two conservation easements	▪ Rank = 2 ▪ Greater impacts to blunt-nosed leopard lizard habitat ▪ Least impacts to sensitive plant communities and jurisdictional resources ▪ Crosses one conservation easement	▪ Rank = 3 ▪ Greater impacts to blunt-nosed leopard lizard habitat ▪ Less impacts to sensitive plant communities and jurisdictional resources ▪ Crosses one conservation easement
Cultural Resources and Native American Consultation	▪ No preference	▪ No preference	▪ No preference
Environmental Justice	▪ No preference	▪ No preference	▪ No preference
Geology, Minerals, and Soils	▪ **Preferred** ▪ Shortest route would result in the least soil disturbance	▪ Rank = 2 ▪ Longer route would result in more soil disturbance than the Proposed Project	▪ Rank = 3 ▪ Longest route would result in the most soil disturbance ▪ Steeper terrain would increase the potential for erosion and landslide
Land Use	▪ Rank = 2/No preference ▪ Impacts are the same as the Butts Road Alternative	▪ Rank = 2/No preference ▪ Impacts are the same as the Proposed Project	▪ **Preferred** ▪ Would avoid residences, recreation areas, and wildlife preserve lands
Noise	▪ **Preferred** ▪ Would expose the fewest sensitive receptors (residences, recreation areas) to construction noise	▪ Rank = 2 ▪ Would expose more sensitive receptors (residences, recreation areas, San Joaquin Valley National Cemetery) to construction noise	▪ Rank = 3 ▪ Would expose more sensitive receptors to construction noise ▪ Closest to San Joaquin Valley National Cemetery
Paleontological Resources	▪ **Preferred** ▪ Would require the least ground disturbance, and therefore, has the lowest potential for impacts to paleontological resources	▪ Rank = 2 ▪ Would require more ground disturbance, and therefore, has higher potential for impacts to paleontological resources than the Proposed Project	▪ Rank = 3 ▪ Would require the most ground disturbance, and therefore, has the highest potential for impacts to paleontological resources
Public Health and Safety	▪ No preference	▪ No preference	▪ No preference
Recreation	▪ **Preferred**	▪ Rank = 2/no preference ▪ Would overlap a greater portion of the Lower Cottonwood Creek Wildlife Area and the San Luis Reservoir State Recreation Area in comparison to the Proposed Project	▪ Rank = 2/no preference ▪ Impacts to recreation are the same as Butts Road Alternative
Socioeconomics	▪ No preference	▪ No preference	▪ No preference

Table 2-9. Comparison of the Proposed Project to Alternatives: San Luis Segment (500-kV)

Issue Area	Proposed Project	Butts Road Alternative	West of Cemetery Alternative
Traffic and Transportation	▪ No preference	▪ No preference	▪ No preference
Visual Resources	▪ **Preferred**	▪ Rank = 2 ▪ Would be more visible (closer) to the San Joaquin Valley National Cemetery and to recreation areas on the west side of the O'Neill Forebay than the Proposed Project	▪ Rank = 3 ▪ Would result in a significant and unavoidable (Class I) impact to viewers at the San Joaquin Valley National Cemetery & residences in this area
Water Resources and Floodplains	▪ **Preferred**	▪ Rank = 2 ▪ Longer route would result in more soil disturbance than the Proposed Project	▪ Rank = 3 ▪ Longest route would result in most soil disturbance ▪ Steeper terrain would increase the potential for erosion and potentially result in greater impacts to water quality

1 - Farmland impacts are the sum of acreage potentially impacted within the Project study area and the Project corridor.

San Luis Segment (70-kV)

In the San Luis Segment (70-kV), the Proposed Project would be the environmentally preferred corridor. The Proposed Project and alternative are the same length, have the same length of new access roads, and have the same number of support structures. Therefore, impacts are similar and there is no preference between corridors for most issue areas. However, the Proposed Project would result in fewer impacts to habitat for federally and State-listed species including San Joaquin kit fox, California tiger salamander, and blunt-nosed leopard lizard. Additionally, the Proposed Project would be farther from the San Joaquin Valley National Cemetery, thereby resulting in fewer land use, noise, and visual resources impacts than the West of O'Neill Forebay 70-kV Alternative.

Table 2-10. Comparison of the Proposed Project to Alternatives: San Luis Segment (70-kV)

Issue Area	Proposed Project	West of O'Neill Forebay 70-kV Alternative
Agriculture	▪ No preference ▪ Permanent farmland impacts: 0.3 acre[1] ▪ Temporary farmland impacts: 3.3 acres	▪ No preference ▪ Permanent farmland impacts: 0.3 acre ▪ Temporary farmland impacts: 8.0 acres
Air Quality and Climate Change	▪ No preference	▪ No preference
Biological Resources	▪ **Preferred** ▪ Fewer impacts to habitat for federally and State-listed species including San Joaquin kit fox, California tiger salamander, and blunt-nosed leopard lizard ▪ Fewer impacts to non-native grassland, seasonal wetland, and northern claypan vernal pool habitat ▪ Greater impacts to Great Valley cottonwood riparian forest and coastal and valley freshwater marsh habitat ▪ Would be located in the O'Neill Forebay Wildlife Area ▪ Not likely to cross conservation easements	▪ Rank = 2 ▪ Greater impacts to habitat for federally and State-listed species including San Joaquin kit fox, California tiger salamander, and blunt-nosed leopard lizard ▪ Greater impacts to non-native grassland, seasonal wetland, and northern claypan vernal pool habitat ▪ Fewer impacts to Great Valley cottonwood riparian forest and coastal and valley freshwater marsh habitat ▪ Would be located in the Lower Cottonwood Creek Wildlife Area ▪ Crosses two conservation easements
Cultural Resources and Native American Consultation	▪ No preference	▪ No preference

Table 2-10. Comparison of the Proposed Project to Alternatives: San Luis Segment (70-kV)

Issue Area	Proposed Project	West of O'Neill Forebay 70-kV Alternative
Environmental Justice	▪ No preference	▪ No preference
Geology, Minerals, and Soils	▪ No preference	▪ No preference
Land Use	▪ **Preferred** ▪ Would encroach into the Village of Santa Nella and the O'Neill Forebay Wildlife Area	▪ Rank = 2 ▪ Would encroach into recreation areas and the San Joaquin Valley National Cemetery
Noise	▪ **Preferred**	▪ Rank = 2 ▪ Would be closer to, and therefore result in, greater exposure of sensitive receptors (San Luis Reservoir State Recreation Area, San Joaquin Valley National Cemetery) to construction noise
Paleontological Resources	▪ No preference	▪ No preference
Public Health and Safety	▪ No preference	▪ No preference
Recreation	▪ **Preferred**	▪ Rank = 2 ▪ Would overlap a greater portion of the Lower Cottonwood Creek Wildlife Area and the San Luis Reservoir State Recreation Area
Socioeconomics	▪ No preference	▪ No preference
Traffic and Transportation	▪ No preference	▪ No preference
Visual Resources	▪ **Preferred**	▪ Rank = 2 ▪ Would be more visible (closer) to the San Joaquin Valley National Cemetery and to recreation areas on the west side of the O'Neill Forebay
Water Resources and Floodplains	▪ No preference	▪ No preference

1 - Farmland impacts are the sum of acreage potentially impacted within the Project study area and the Project corridor.

South Segment

In the South Segment, the San Luis to Dos Amigos Alternative would be the environmentally preferred corridor. The Proposed Project and the San Luis to Dos Amigos Alternative are adjacent, have the same length of easements and new access roads, and have the same number of support structures. Therefore, impacts are similar and there is no preference between corridors for most issue areas. However, the San Luis to Dos Amigos Alternative would have slightly fewer impacts to agricultural land. It would also be farther from more residences than the Proposed Project, thereby resulting in less construction noise impacts.

The Billy Wright Road Alternative would be the least environmentally preferred alternative in this segment because it is the longest and would result in the most ground disturbance. Additionally, it would cross the Path of the Padres Trail, resulting in greater recreation impacts than the Proposed Project or the San Luis to Dos Amigos Alternative.

Table 2-11. Comparison of the Proposed Project to Alternatives: South Segment

Issue Area	Proposed Project	San Luis to Dos Amigos Alternative	Billy Wright Road Alternative
Agriculture	▪ Rank = 3 ▪ Permanent farmland impacts: 31.2 acres[1] ▪ Temporary farmland impacts: 20.6 acres	▪ **Preferred** ▪ Permanent farmland impacts: 13.4 acres ▪ Temporary farmland impacts: 18.3 acres	▪ Rank=2 ▪ Permanent farmland impacts: 19.1 acres ▪ Temporary farmland impacts: 8.2 acres

Table 2-11. Comparison of the Proposed Project to Alternatives: South Segment

Issue Area	Proposed Project	San Luis to Dos Amigos Alternative	Billy Wright Road Alternative
Air Quality and Climate Change	▪ **Preferred**/no preference	▪ **Preferred**/no preference ▪ Impacts are the same as the Proposed Project	▪ **Preferred**/no preference ▪ Impacts are the same as the Proposed Project
Biological Resources	▪ **Preferred**/no preference	▪ **Preferred**/no preference ▪ Impacts are the same as the Proposed Project	▪ Rank = 2 ▪ Greater impacts to blunt-nosed leopard lizard habitat ▪ Greater impacts to jurisdictional resources
Cultural Resources and Native American Consultation	▪ No preference	▪ No preference	▪ No preference
Environmental Justice	▪ No preference	▪ No preference	▪ No preference
Geology, Minerals, and Soils	▪ **Preferred**/no preference	▪ **Preferred**/no preference ▪ Impacts are the same as the Proposed Project	▪ Rank = 2 ▪ Longer route would result in more soil disturbance than the Proposed Project
Land Use	▪ No preference	▪ No preference	▪ No preference
Noise	▪ Rank = 3 ▪ Would result in noise impacts to the most residences	▪ Rank = 2 ▪ Would reduce noise impacts for 2-3 residences and increase impacts at one residence in comparison to the Proposed Project	▪ **Preferred**/no preference
Paleontological Resources	▪ **Preferred**/no preference	▪ **Preferred**/no preference ▪ Impacts are the same as the Proposed Project	▪ **Preferred**/no preference ▪ Impacts are the same as the Proposed Project
Public Health and Safety	▪ No preference	▪ No preference	▪ No preference
Recreation	▪ **Preferred**/no preference	▪ **Preferred**/no preference ▪ Impacts are the same as the Proposed Project	▪ Rank=2 ▪ Overlaps the Path of the Padres Trail and a greater portion of the Los Banos Creek Reservoir
Socioeconomics	▪ No preference	▪ No preference	▪ No preference
Traffic and Transportation	▪ No preference	▪ No preference	▪ No preference
Visual Resources	▪ **Preferred**/no preference	▪ **Preferred**/no preference ▪ Impacts are the same as the Proposed Project	▪ Rank = 2 ▪ 8 more structures, 4 more acres of land disturbed
Water Resources and Floodplains	▪ **Preferred**/no preference	▪ **Preferred**/no preference ▪ Impacts are the same as the Proposed Project	▪ Rank = 2 ▪ Longer route would result in more soil disturbance than the Proposed Project

1 - Farmland impacts are the sum of acreage potentially impacted within the Project study area and the Project corridor.

Conclusion

Based on the conclusions of Chapter 4, as summarized in Tables 2-8 through 2-11 above, the **Environmentally Preferred ~~Corridor~~ Action Alternative** is composed of (refer to Figure 2-7):

- North Segment – ~~Preferred Corridor~~ Proposed Project
- Central Segment – Patterson Pass Road Alternative
- San Luis Segment (500-kV) – ~~Preferred Corridor~~ Proposed Project
- San Luis Segment (70-kV) – ~~Preferred Corridor~~ Proposed Project
- South Segment – San Luis to Dos Amigos Alternative

~~2.4.4 Environmentally Preferred Corridor Alternative vs. No Action/No Project Alternative~~

~~Under the No Action/No Project Alternative, construction of the San Luis Transmission Project would not occur. Western would arrange for transmission service for the San Luis Unit from the CAISO using existing electric infrastructure.~~

~~As there would be no new adverse direct environmental impacts under this alternative, it would be preferable to the Environmentally Preferred Corridor Alternative. Therefore, the No Action/No Project Alternative is the **Environmentally Preferred Alternative.**~~

~~As detailed in Section 1.2, Reclamation's estimated transmission costs under the No Action/No Project Alternative (i.e., the CAISO Tariff) would be so expensive as to render this alternative infeasible. Further, the No Action/No Project Alternative is considered infeasible because it would not achieve the purpose and need or basic project objectives.~~

~~2.4.5 Environmentally Preferred Action Alternative~~

~~If the environmentally preferred alternative is the No Action/No Project Alternative, CEQA requires identification of an environmentally preferred action alternative among the other alternatives. The **Environmentally Preferred Action Alternative** is the Environmentally Preferred Corridor Alternative as described in Section 2.4.4 and illustrated in Figure 2-7.~~

2.4.4 Agency Preferred Alternative

Determining the Agency Preferred Alternative requires that Western balance many factors with the Project's purpose and need. It is the alternative that Western believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. As described above, the No Project/No Action Alternative is the Environmentally Preferred Alternative because it would avoid any adverse direct, indirect, or cumulative environmental impacts; however, it would not achieve the purpose and need or basic Project objectives. The Environmentally Preferred Action Alternative is composed of several segments, as listed in the preceding section. After analysis of public comments and further internal review of the EIS/EIR, Western has determined that its Agency Preferred Alternative is the same as the Environmentally Preferred Action Alternative in the Northern and San Luis (500-kV and 70-kV) segments.

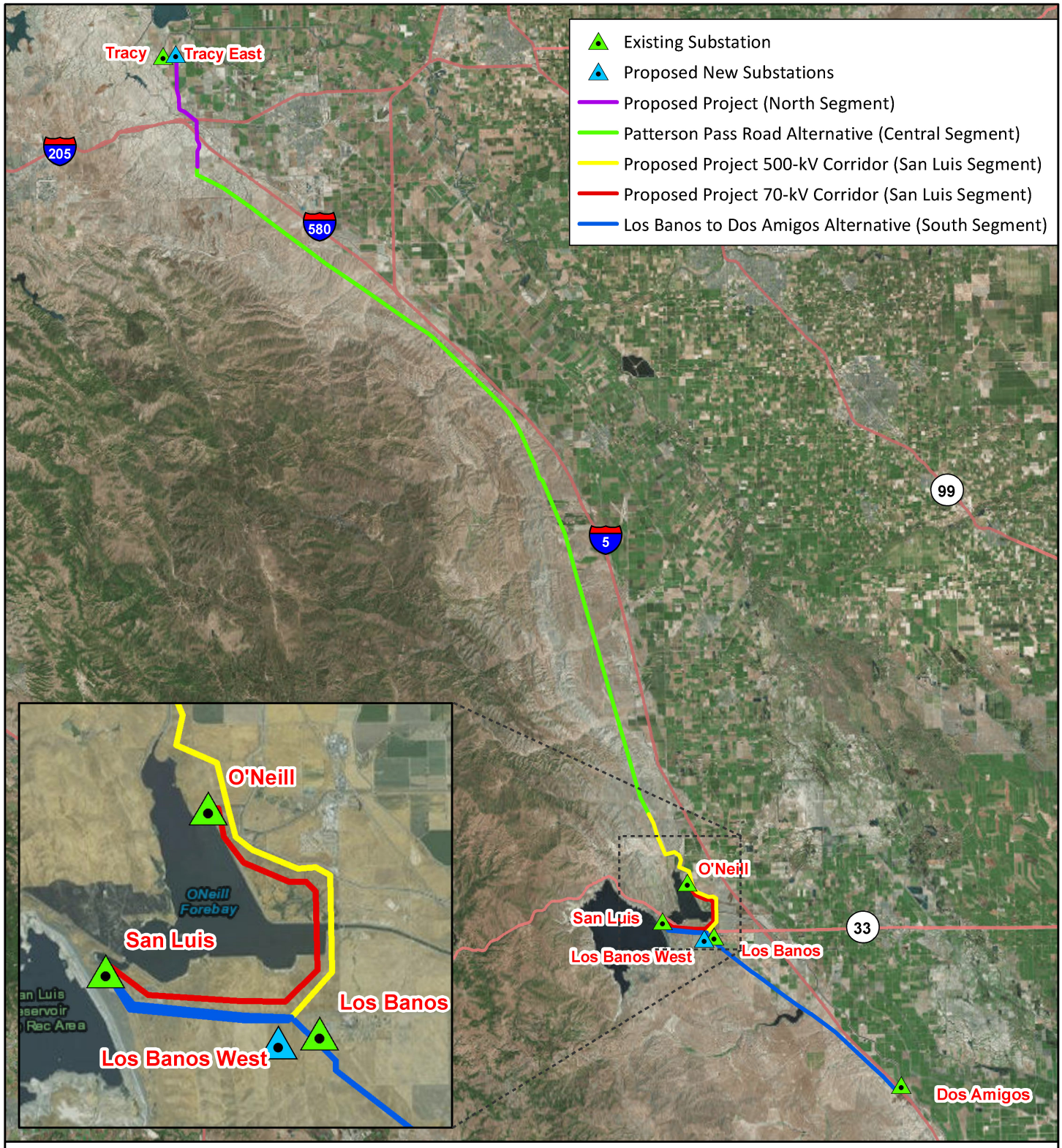


Figure 2-7

Environmentally Preferred ~~Corridor~~ Action Alternative

Source: WAPA SNR, Aspen EG, ESRI

0 5 10 Miles

In the Central Segment, the Proposed Project is the agency preferred corridor. Although it would be closer to residences and have sight increases in the associated visual and temporary noise impacts, it would have less of an impact on biological resources. In particular, it would impact fewer special-status plant species. Additionally, it would require fewer crossings of the existing high voltage transmission lines, which would increase reliability by providing more space between circuits.

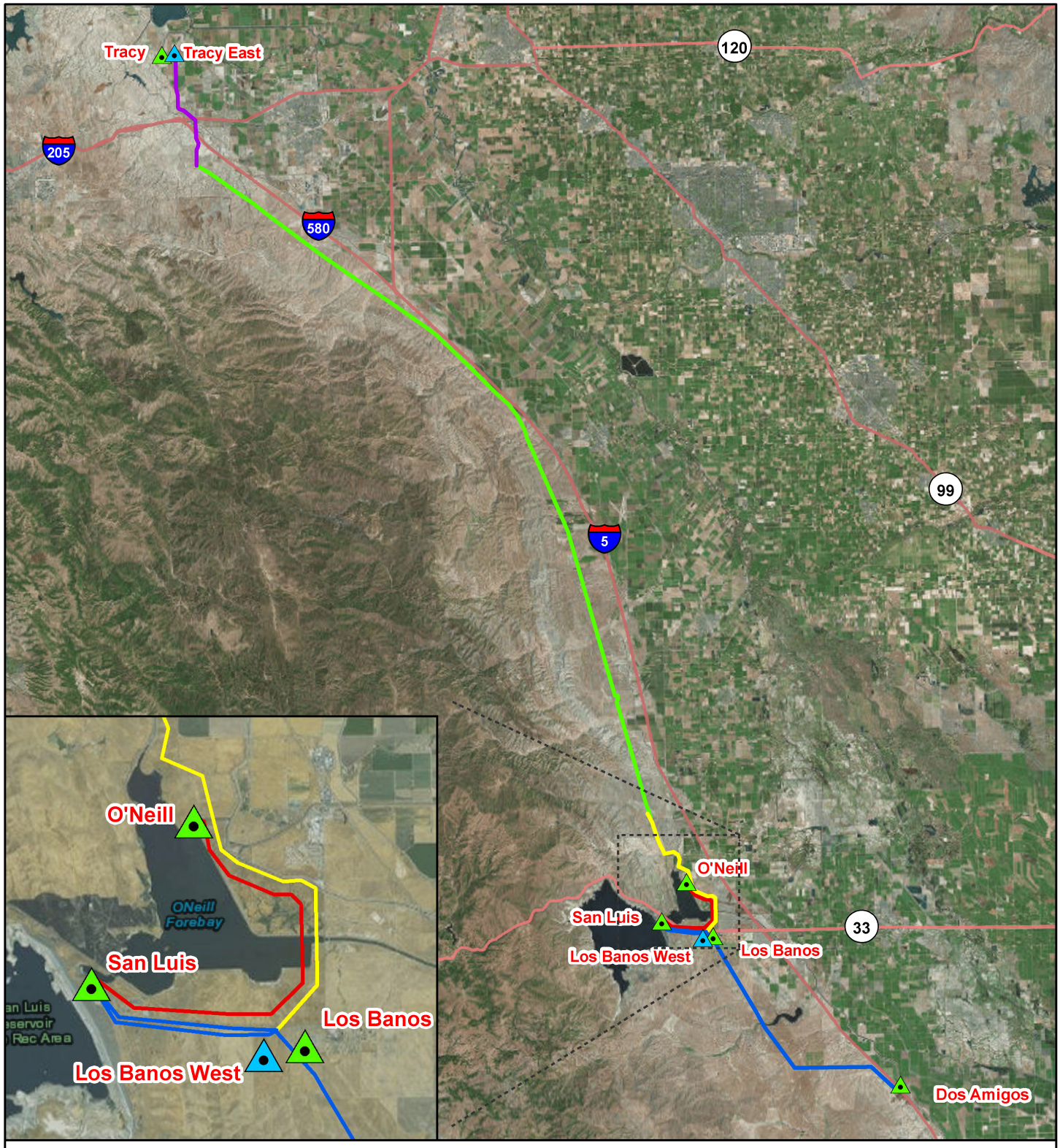
In the Southern Segment, the Billy Wright Road Alternative is the agency preferred corridor. Although it would have greater recreation impacts by crossing the Path of the Padres Trail and slightly greater soil disturbance due to its longer length, it would avoid conflicts with the Wright Solar Park. At the time the Notice of Preparation and Notice of Intent for this EIS/EIR were published in November 2013, which set the baseline for analysis of environmental impacts in the Draft EIS/EIR, the Wright Solar Park was still early in its entitlement phase (the Project's NOP was issued in October 2013). Western is aware that the Project is now fully permitted and expected to begin construction in 2016.

In summary, the Agency Preferred Alternative is composed of (refer to Figure 2-8):

- North Segment – Proposed Project
- Central Segment – Proposed Project
- San Luis Segment (500-kV) – Proposed Project
- San Luis Segment (70-kV) – Proposed Project
- South Segment – Billy Wright Road Alternative

Table 2-12. Alternatives Comparison Summary

Environmentally Preferred Alternative	No Action/No Project Alternative
Environmentally Preferred Action Alternative (Figure 2-7)	■ North Segment – Proposed Project ■ Central Segment – Patterson Pass Road Alternative ■ San Luis Segment (500-kV) – Proposed Project ■ San Luis Segment (70-kV) – Proposed Project ■ South Segment – San Luis to Dos Amigos Alternative
Agency Preferred Alternative (Figure 2-8)	■ North Segment – Proposed Project ■ Central Segment – Proposed Project ■ San Luis Segment (500-kV) – Proposed Project ■ San Luis Segment (70-kV) – Proposed Project ■ South Segment – Billy Wright Road Alternative



Western AREA POWER ADMINISTRATION

- Existing Substation
- Proposed New Substations
- Proposed Project (North Segment)
- Proposed Project (Central Segment)
- Proposed Project 500-kV Corridor (San Luis Segment)
- Proposed Project 70-kV Corridor (San Luis Segment)
- Billy Wright Road Alternative (South Segment)

0 5 10 Miles

Figure 2-8

Agency Preferred Alternative

Source: WAPA SNR, Aspen EG, ESRI

Chapter 3
Affected Environment

3.1 Introduction

This chapter describes the existing conditions in the Project study area at the time of NOI and NOP publication. At this time, the exact locations and quantities of Project components (e.g., access roads, staging areas, pulling sites) are unknown and, in some cases, quantities of Project components are conservatively estimated (see Appendix E). To provide flexibility in siting Project components, particularly access roads that may extend outside of the proposed easement, a one-mile buffer was added on the west side of the Proposed Project and alternative corridors. The buffer was extended up to I-5 on the east side of the Proposed Project and alternative corridors, except where the Project would be located east of I-5 near the Dos Amigos Substation. The affected environment sections below describe the resources within this buffer, which is referred to as the *study area*, unless otherwise defined for a specific resource. This EIS/EIR uses the term *Project area* to collectively describe the area within which Project components (transmission lines, access roads, and temporary construction areas) could be located. A *corridor* is a linear area within which the easements would be located; proposed corridors are part of the Project area.

3.1.1 Resources Considered and Eliminated

Through internal and external scoping, Western and the Authority identified a number of issues of concern, which are evaluated in detail in Sections 3.2 through 3.16. Certain issue areas, presented below, were not further evaluated because they are not present in the study area or no measurable impacts would occur.

Utilities and Service Systems

The Proposed Project would not create significant adverse demands on local water, sanitary sewer, electricity, or natural gas systems. Water requirements for construction would be negligible. Given the number of workers and temporary duration of construction, there are no potentially significant impacts on local water, sewer systems, and electric service systems and the Project would not change the ability of the water and electricity suppliers to serve area demands. Therefore, utilities and service systems are not further evaluated.

Public Services

The temporary influx of construction personnel would not substantially increase demands on schools or hospitals, lower the level of service for fire protection or police protection, nor would it require the construction or expansion of facilities or services. There are no potentially significant impacts to public services associated with the Project; therefore, they are not further evaluated.

3.2 Agriculture

3.2.1 Proposed Project

3.2.1.1 Affected Environment

The information used to describe the existing conditions was compiled primarily from maps and information published by the California Department of Conservation (DOC), U.S. Department of Agriculture (USDA) – National Agricultural Statistics Service (NASS), and the California Department of Finance.

In this section, agricultural resources are described within the Project study area as defined in Section 3.1. Quantitative data are provided for both the study area and the corridors to facilitate the impact analysis in Section 4.2 (Agriculture).

Overview

The Proposed Project lies entirely within the San Joaquin Valley (Valley), which is California's top agricultural producing region, growing more than 250 unique crops. California is the nation's leading dairy State, with three-quarters of its dairy cows located in the Valley. The annual gross value of agricultural production in the Valley is more than $25 billion (EPA, 2014).

The Proposed Project crosses large portions of San Joaquin, Stanislaus, and Merced Counties. These counties are ranked fifth, sixth, and seventh highest counties in total value of production within the State of California, respectively (CDFA, 2013). Eastern Alameda County is not typically a highly productive agricultural region, with the exception of the area along the northeastern edge of the county, which is traversed by the Proposed Project. This portion of Alameda County is part of the San Joaquin Valley, and therefore, is more similar in terms of agricultural land use and characteristics to San Joaquin County than to the remainder of Alameda County.

Table 3.2-1 shows the total number of farms, amount of land in farms, average size of farms, and total harvested cropland for each county traversed by the Proposed Project based on the California Department of Finance Statistical Abstract (2009).

Table 3.2-1. Number, Land Area, Average Size, and Harvested Crops of Farms by County

County	Number of Farms	Land in Farms (acres)	Average Size of Farms (acres)	Harvested Cropland (acres)
Alameda	424	218,094	514	7,926
San Joaquin	4,026	812,629	202	517,267
Stanislaus	4,267	789,853	185	347,750
Merced	2,964	1,006,127	339	479,156
Total of Counties (subtotal)	11,681	2,826,703	310	1,352,099
State	79,631	27,589,027	346	8,466,321

Source: California Department of Finance, Statistical Abstract, 2009

As shown, Stanislaus County had the greatest number of farms (4,267), Merced County had the greatest amount of land in farms (1,006,127 acres), and San Joaquin County had the greatest amount of harvested cropland (517,267 acres). Alameda County had the smallest number of farms (424), amount of land in farms (218,094 acres), and amount of harvested cropland (7,926 acres); however, it did have the largest average size of farms (514 acres). In total, all four counties contained 11,681 farms, which represents over 14 percent of the statewide total and the average farm size is slightly less than the statewide average. The total harvested cropland within the four counties was over 1.3 million acres, which represented over 15 percent of the total harvested cropland in the State.

Characteristics

Table 3.2-2 presents the primary cropland classification types (and total acres), as defined by the USDA NASS, of agricultural land within the study area. Grassland/Pasture is the largest single crop group grown in the study area (by acres), covering nearly 4,500 acres and accounting for about 4 percent of total farmland in the study area, followed by Other Hay/Non Alfalfa, Winter Wheat, and Alfalfa.

Table 3.2-2. Cropland Classification Types within the Study Area

Cropland Classification	Study Area (Acres)
Grassland/Pasture	4494.09
Other Hay/Non Alfalfa	236.41
Winter Wheat	224.65
Alfalfa	132.21
Fallow/Idle Cropland	93.03
Oats	57.60
Double Crop (Oats/Corn)	44.45
Grapes	18.47
Cherries	16.64

Source: USDA National Agriculture Statistics Service, 2014

The Farmland Mapping and Monitoring Program (FMMP) is a non-regulatory program administered by the California Department of Conservation, which provides an ongoing data set of agricultural land use and land use changes throughout California. The FMMP classifies land into a range of agricultural land use categories based on technical soil ratings and current land use. Important Farmland consists of four farmland designations: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. Table 3.2-3 defines these farmland categories and Table 3.2-4 provides for each category the number of acres and percentage of the total area within the study area and the Proposed Project corridor respectively.

Table 3.2-3. California Department of Conservation Farmland Categories

Farmland Category	Definition
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.
Farmland of Statewide Importance	Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture.
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 non-irrigated orchards or vineyards as found in some climatic zones in California.
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.

Source: California Department of Conservation, Division of Land Resource Protection, 2012

Table 3.2-4. Important Farmland Acreages – Proposed Project

Important Farmland Category	Study Area (acres)	Percent of Total Study Area (acres)	Corridor (acres)	Percent of Total Corridor (acres)
Prime Farmland	14,205	4.4	495	3.7
Farmland of Statewide Importance	618	0.2	0	0.0
Unique Farmland	779	0.2	31	0.2
Farmland of Local Importance	57,035	17.4	1,561	11.6
Total	72,637	22.2	2,087	15.5

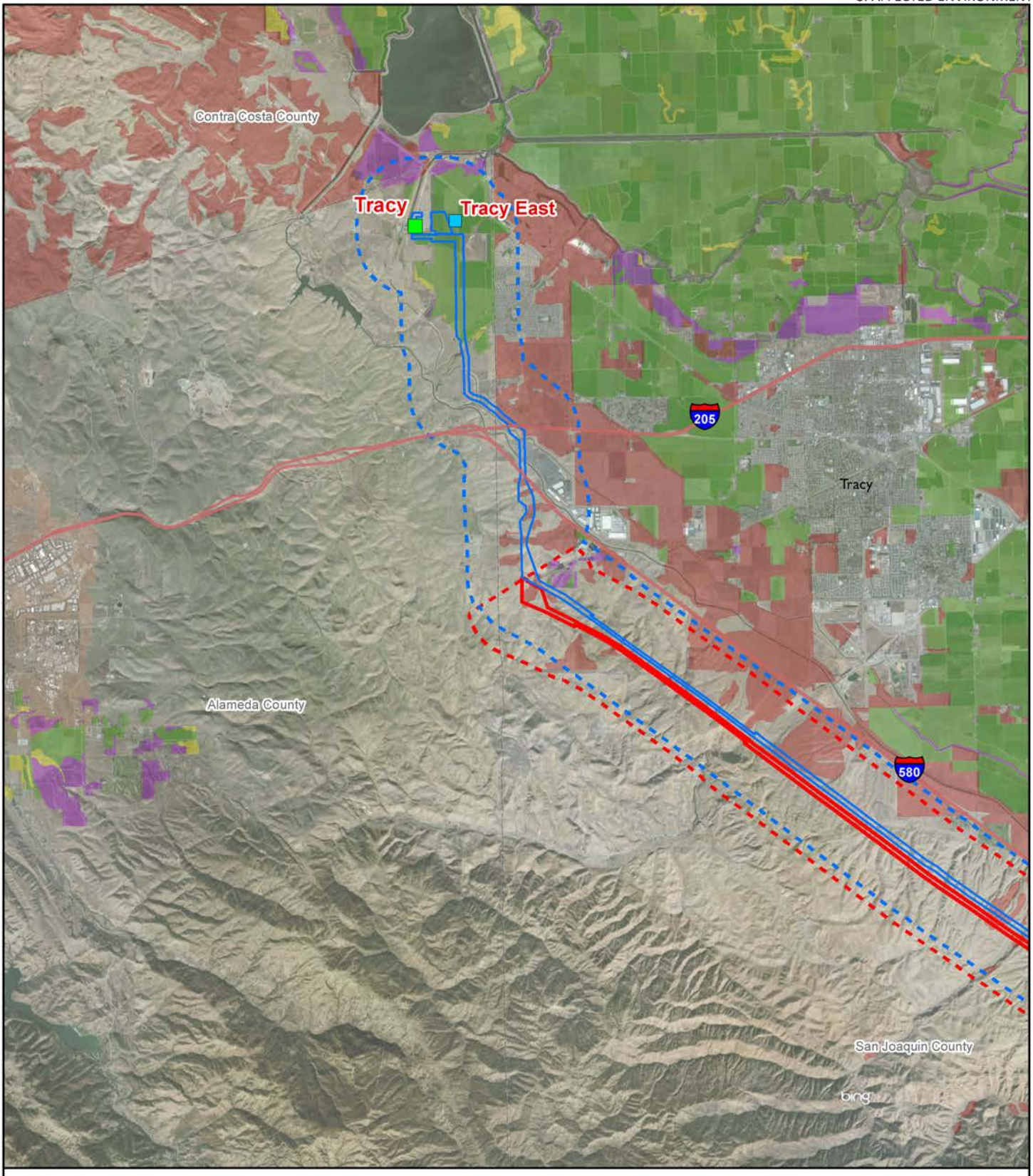
Source: California Department of Conservation, Division of Land Resource Protection, 2012; Aspen calculations

As shown in Figures 3.2-1a through 3.2-1d, the study area contains substantial amounts of Important Farmland (72,637 acres), which is consistent with the region's highly productive agricultural land base. The greatest amount of land is designated as Farmland of Local Importance (57,035 acres) and Prime Farmland (14,205 acres). Farmland of Local Importance within the study area is primarily located south of the Patterson Pass Road. Prime Farmland within the study area is primarily located between the Tracy Substation and Patterson Pass Road with the exception of various parcels scattered throughout the corridor south of Patterson Pass Road. Within the Proposed Project corridors, the greatest amounts of agricultural land are designated as Farmland of Local Importance (1,561 acres) and Prime Farmland (495 acres).

3.2.1.2 Regulations, Plans, and Standards

Farmland Protection Policy Act (FPPA). The Farmland Protection Policy Act, 7 U.S.C. §§ 4201, *et seq*., was enacted in 1981 to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It ensures that to the extent possible, federal programs are administered to be compatible with State, local units of government, and private programs and policies to protect farmland. Federal agencies are required to develop and review their policies and procedures to implement the FPPA every two years. The FPPA does not authorize the Federal Government to regulate the use of private or non-federal land or, in any way, affect the property rights of owners. Projects are subject to FPPA requirements if they will irreversibly convert farmland (directly or indirectly) to nonagricultural use; and are either completed by a federal agency or with assistance from a federal agency. For the purpose of FPPA, farmland includes Prime Farmland, Unique Farmland, and Land of Statewide or Local Importance (defined in Table 3.2-3 above). Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land. Compliance is to be coordinated with the USDA, Natural Resources Conservation Service (NRCS).

The California Land Conservation Act (Williamson Act). The California Land Conservation Act of 1965, more commonly referred to as the Williamson Act, established a program to allow local governments to enter into 10-year contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax adjustments. The property tax assessments are determined based on the agricultural or open space land uses rather than the land's full market value. Therefore, tax assessments for land parcels under the Williamson Act are much lower than normal. Utility corridors, including transmission line easements, are accepted as a compatible use under Williamson Act contracts.



Western AREA POWER ADMINISTRATION

- Substation
- Proposed New Substations
- Proposed Project Corridor
- Corridor Alternatives
- Proposed Project Study Area
- Alternatives Study Area

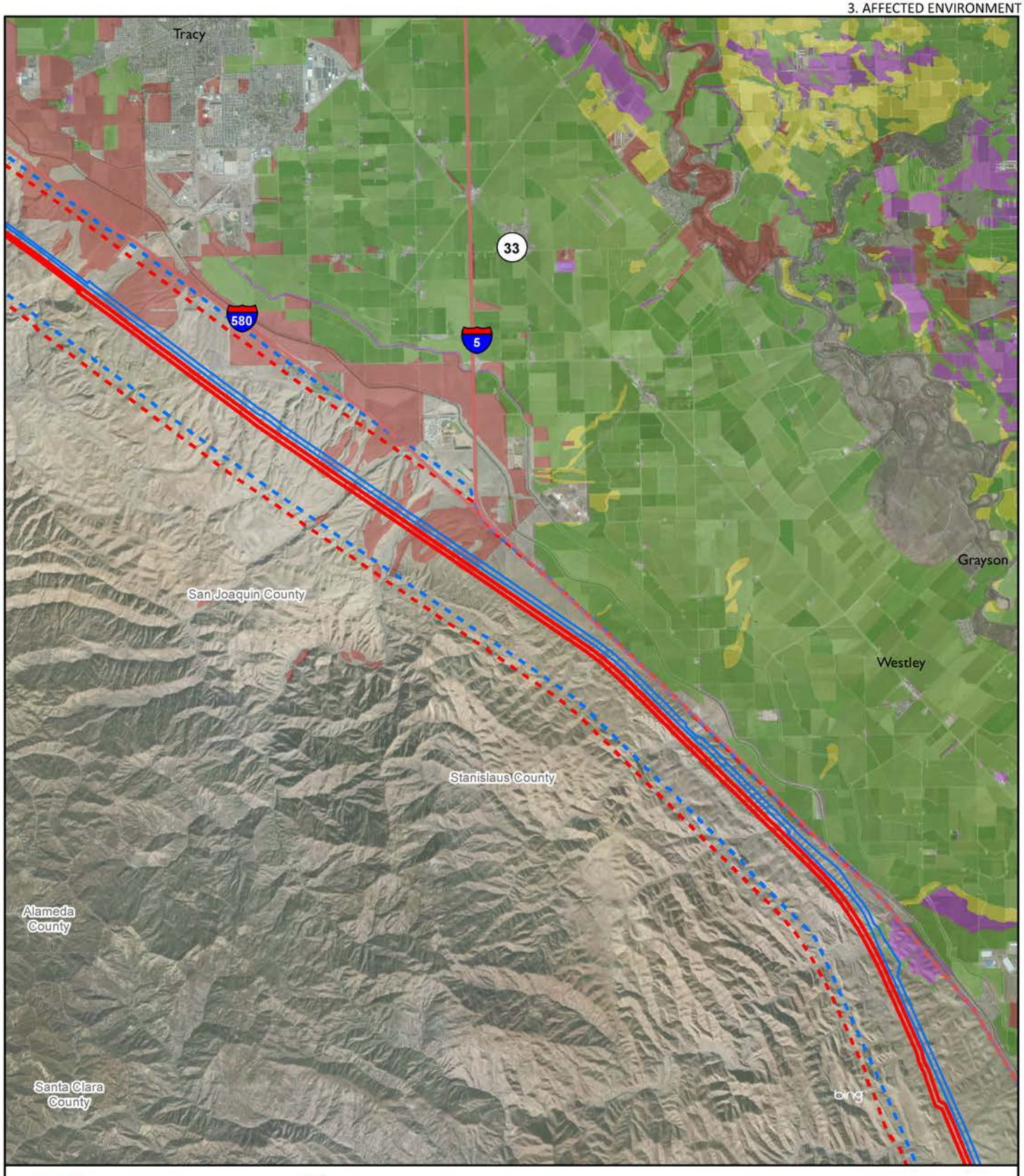
Farmland Class (FMMP)
- Prime Farmland
- Farmland of Statewide Importance
- Unique Farmland
- Farmland of Local Importance

Figure 3.2-1a

Important Farmlands

0 1.5 3 Miles

Source: WAPA SNR, Aspen EG, California Department of Conservation



Western AREA POWER ADMINISTRATION

Substation
Proposed New Substations
Proposed Project Corridor
Corridor Alternatives
Proposed Project Study Area
Alternatives Study Area

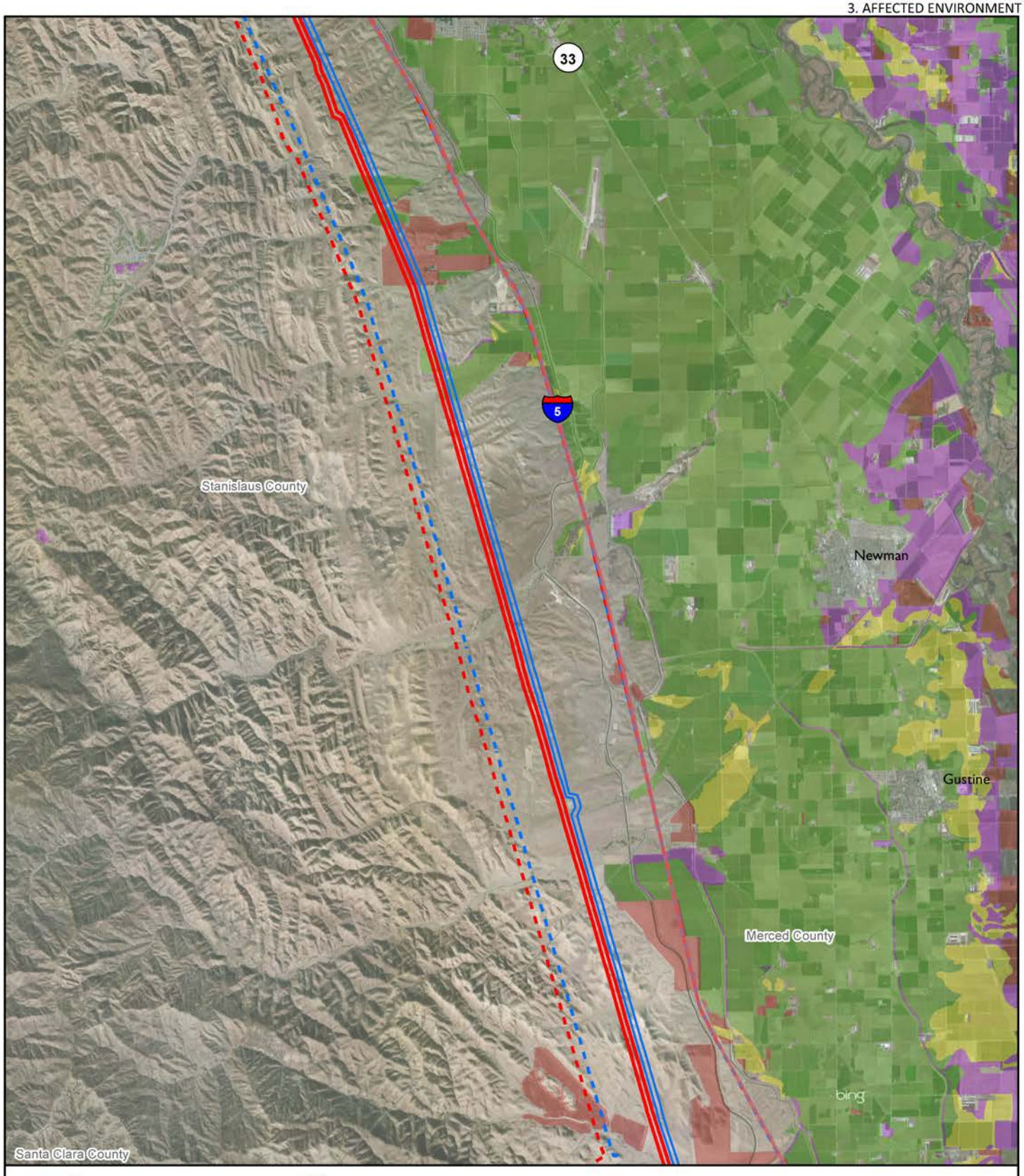
Farmland Class (FMMP)
Prime Farmland
Farmland of Statewide Importance
Unique Farmland
Farmland of Local Importance

Figure 3.2-1b

Important Farmlands

0 1.5 3 Miles

Source: WAPA SNR, Aspen EG, California Department of Conservation



Western AREA POWER ADMINISTRATION

Substation
Proposed New Substations
Proposed Project Corridor
Corridor Alternatives
Proposed Project Study Area
Alternatives Study Area

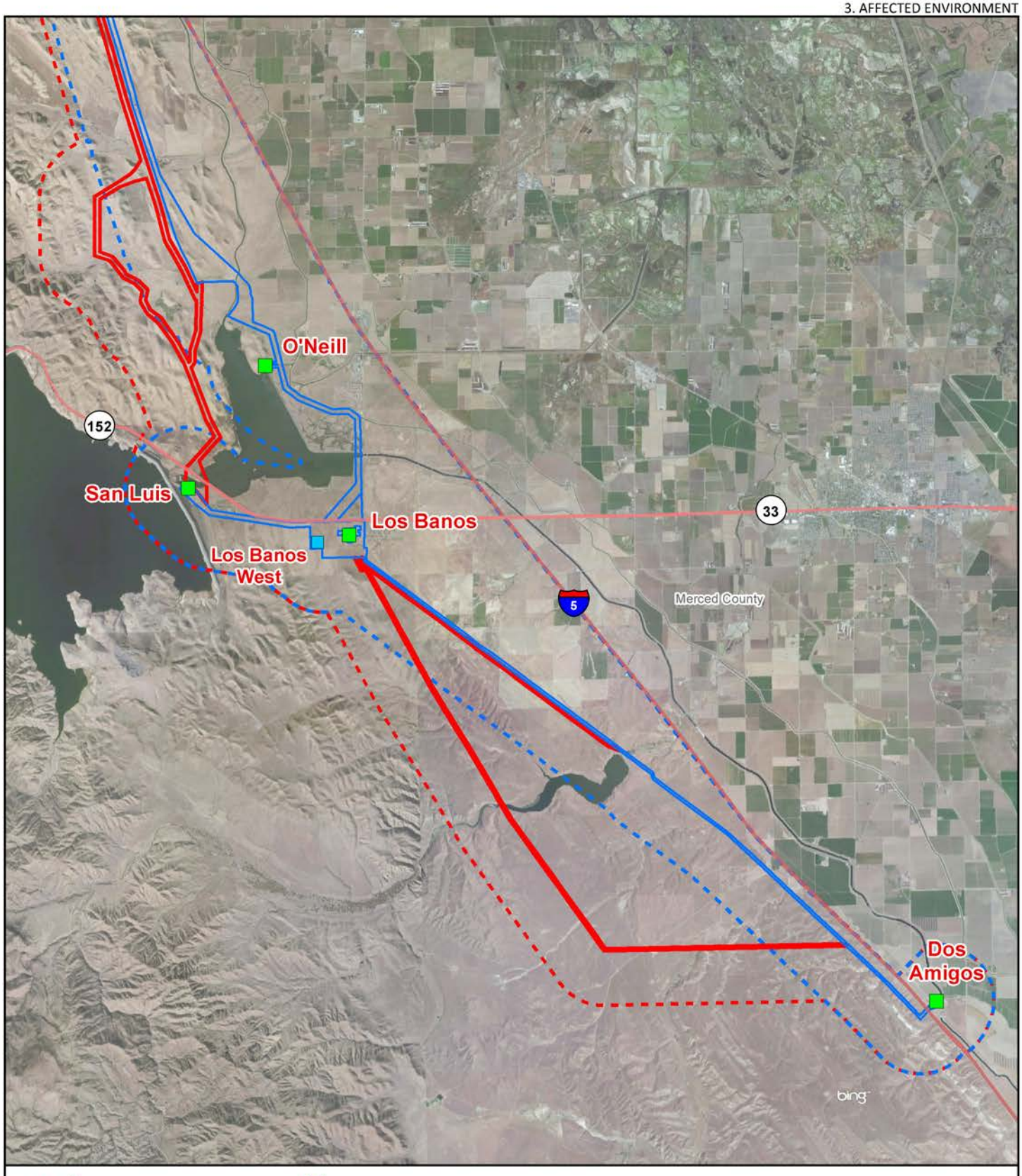
Farmland Class (FMMP)
Prime Farmland
Farmland of Statewide Importance
Unique Farmland
Farmland of Local Importance

Figure 3.2-1c

Important Farmlands

0 1.5 3 Miles

Source: WAPA SNR, Aspen EG, California Department of Conservation



Western AREA POWER ADMINISTRATION

Substation
Proposed New Substations
Proposed Project Corridor
Corridor Alternatives
Proposed Project Study Area
Alternatives Study Area

Farmland Class (FMMP)
Prime Farmland
Farmland of Statewide Importance
Unique Farmland
Farmland of Local Importance

Figure 3.2-1d

Important Farmlands

0 1.5 3 Miles

Source: WAPA SNR, Aspen EG, California Department of Conservation

Alameda General Plan. The East County Area Plan (ECAP), designated under the Alameda County General Plan, identifies a portion of the Proposed Project study area considered for expansion as "Large Parcel Agriculture (LPA)." Under the ECAP, the LPA designation is described as follows:

> *"…this designation permits agriculture uses, agriculture processing facilities, limited agricultural support service uses, secondary residential units, visitor-servicing commercial facilities, recreational uses, public and quasi-public uses, solid waste landfills and related waste management facilities, quarries, windfarms and related facilities, utility corridors, and similar uses compatible with agriculture."*

The Merced General Plan. The Merced County General Plan describes and maps a potential Agricultural Services Center (ASC) zone to the west of San Luis Reservoir. An ASC would provide a location for agricultural services, farm support operations, and convenience commercial services for the rural population. The General Plan also describes and maps potential Planned Agricultural Industrial Development (PAID) zones to the north and to the southeast of San Luis Reservoir.

3.2.2 Corridor Alternatives

3.2.2.1 Patterson Pass Road Alternative

As illustrated in Figures 3.2-1a through 3.2-1d, ~~T~~the alternative study area largely overlaps the Proposed Project. Therefore, the existing conditions in this segment will be similar to those described above and quantified in Table 3.2-4 for the Proposed Project. Existing agricultural resources include a significant amount of land parcels designated as Important Farmland and agricultural cropland. The alternative study area contains much of the Farmland of Local Importance found within the study area for the Proposed Project. However, in contrast to that of the Proposed Project, the alternative study area contains only a small portion of Prime Farmland.

3.2.2.2 Butts Road Alternative

As illustrated in Figure 3.2-1d, ~~T~~the alternative study area lies farther to the west in comparison to the Proposed Project between Butts Road and the Los Banos Substation. Existing agricultural resources in the alternative study area include several parcels of Farmland of Local Importance to the north and south of the Forebay.

3.2.2.3 West of Cemetery Alternative

As illustrated in Figure 3.2-1d, ~~T~~the alternative study area overlaps the Proposed Project between Butts Road and the San Luis Substation. However, much of the alternative study area lies farther west of the Proposed Project and traverses more varied terrain. This terrain tends to be less suitable for agricultural land use; therefore, the alternative study area contains only a few parcels designated as Important Farmland and less land under current agricultural production in comparison to the Proposed Project.

3.2.2.4 West of O'Neill Forebay 70-kV Alternative

As illustrated in Figure 3.2-1d, ~~M~~much of the alternative study area overlaps the Proposed Project with the exception of a portion on the west side of the O'Neill Forebay. Where it overlaps, the existing agricultural resources are similar to those described for the Proposed Project. Existing agricultural resources include several land parcels designated Important Farmland as well as land under current agricultural production.

The portion of the alternative study area that lies outside of the Proposed Project traverses varying terrain on mostly federal and State land. There are no lands under current agricultural use or designated as Important Farmlands.

3.2.2.5 San Luis to Dos Amigos Alternative

As illustrated in Figure 3.2-1d, ~~T~~the alternative study area largely overlaps the Proposed Project between the San Luis Substation and the Dos Amigos Substation. Therefore, the existing agricultural resources will be similar to those described for the Proposed Project and quantified in Table 3.2-4. Existing agricultural resources include a significant amount of land parcels designated as Important Farmland, as well as land under current agricultural production.

3.2.2.6 Billy Wright Road Alternative

As illustrated in Figure 3.2-1d, ~~I~~in the vicinity of the Los Banos Substation, the alternative study area largely overlaps the Proposed Project~~,~~, A~~a~~s a result, the existing agricultural resources will be similar to those described for the Proposed Project and quantified in Table 3.2-4. South of the Los Banos Substation, the alternative study area lies farther west of the Proposed Project and traverses more rugged terrain. This terrain tends to be less suitable for agricultural land use. Therefore, the alternative study area contains only a few parcels designated as Important Farmland and less land under current agricultural production.

3.3 Air Quality and Climate Change

3.3.1 Proposed Project

This section describes the existing air quality conditions in the study area, which is defined primarily as the San Joaquin Valley Air Basin (SJVAB).

3.3.1.1 Affected Environment

Climate and Meteorology

Air quality in a study area location is affected by the locations of air pollutant sources, the amount of pollutants emitted, and meteorological and topographical conditions affecting their dispersion. Atmospheric conditions, including wind speed, wind direction, and air temperature gradients, interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. The climate in the San Joaquin Valley (Valley) is Mediterranean, with mild wet winters and warm dry summers. The local climate is most affected by the Pacific High Pressure System over the eastern Pacific Ocean, and local topography. During winter months, a persistent high-pressure area over the Great Basin Region to the east of the Sierra Nevada also affects the meteorology in the Valley. The geophysical boundaries of the Valley are the Sierra Nevada mountains to the east (8,000 to 14,000 feet in elevation), the Southern Coast Ranges to the west (averaging 3,000 feet), and the Tehachapi mountains in the south (6,000 to 8,000 feet). These topographic features restrict air movement through the Valley, and the generally high barometric pressure over the basin prevents movement vertically, thus preventing air pollutants from escaping (Western Regional Climate Center [WRCC], 2014).

Wind direction and speed also play a substantial role in air quality. During summer, winds in the Valley are primarily from the north, ultimately flowing south with partial flow through Tehachapi Pass. During winter, the prevailing winds may be from the north or, less frequently, from the south, but are often stagnate. High atmospheric stability, calm winds, and cold temperatures during winter can trap pollutants in the Valley, especially carbon monoxide and particulate matter. Inversion layers during summer months trap pollutants during the day. As a result, the Valley is highly susceptible to pollutant accumulation over time (WRCC, 2014).

Existing Air Quality

Air quality is regulated by federal (U.S. Environmental Protection Agency [EPA]), state (California Air Resources Board [ARB]), and local agencies (air districts). The federal Clean Air Act (CAA) of 1970, 42 U.S.C. §§ 7401-7671, established National Ambient Air Quality Standards (NAAQS) in 40 CFR Part 50. The NAAQS include both primary (protective of human health) and secondary (protective of property and natural ecosystems) standards for "criteria" pollutants such as: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM10), and particulate matter less than 2.5 microns in diameter (PM2.5). Regions with air quality levels that exceed NAAQS are designated as "nonattainment" and regions with air quality levels that are less than or equal to NAAQS are designated as "attainment."

Air quality designations are determined for each criteria pollutant through ambient air quality monitoring. The 1990 CAA Amendments established attainment deadlines for all areas designated as nonattainment. The State of California has adopted standards known as the California Ambient Air Quality Standards (CAAQS) that are typically more stringent than NAAQS. A comparison of federal and state standards is presented in Table 3.3-1.

Table 3.3-1. National and California Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS	NAAQS	Health Effects
Ozone (O_3)	1-hour 8-hour	0.09 ppm 0.070 ppm	— ~~0.075~~0.070 ppm	Breathing difficulties, lung tissue damage
Respirable particulate matter (PM10)	24-hour Annual	50 µg/m^3 20 µg/m^3	150 µg/m^3 —	Respiratory disease, lung damage, cancer, premature death
Fine particulate matter (PM2.5)	24-hour Annual	— 12 µg/m^3	35 µg/m^3 ~~15~~ 12.0 µg/m^3	Respiratory disease, lung damage, cancer, premature death
Carbon monoxide (CO)	1-hour 8-hour	20 µg/m^3 9.0 ppm	35 ppm 9.0 ppm	Chest pain in heart patients, headaches, reduced mental alertness
Nitrogen dioxide (NO_2)	1-hour Annual	0.18 ppm 0.030 ppm	0.100 ppm 0.053 ppm	Lung irritation and damage
Sulfur dioxide (SO_2)	1-hour 3-hour 24-hour Annual	0.25 ppm — 0.04 ppm —	0.075 ppm 0.5 ppm 0.14 ppm 0.03 ppm	Lung disease and breathing problems in asthmatics

Notes:
ppm = parts per million
µg/m^3 = micrograms per cubic meter

The ARB divided California into regional air basins according to topographic air drainage features. From a geophysical standpoint, the Proposed Project and all alternatives are located within the SJVAB. Project components within the North Segment and activities of the Proposed Project that take place in Alameda County are located in the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). All other components and activities are in the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD).

Table 3.3-2 provides the attainment status of the SJVAB in SJVAPCD jurisdiction with regard to the NAAQS and CAAQS identified in Table 3.3-1. Table 3.3-3 provides the attainment status of San Joaquin Valley portion (far eastern Alameda County) of the BAAQMD jurisdiction. Table 3.3-4 shows the maximum measurements and days over air quality standards for several criteria pollutants in the SJVAB.

Table 3.3-2. San Joaquin Valley Attainment Status

Pollutant	NAAQS[1]	CAAQS[2]
Ozone – One hour	No federal standard[3]	Nonattainment
Ozone – Eight hour	Nonattainment/Extreme[4]	Nonattainment
PM10	Attainment[5]	Nonattainment
PM2.5	Nonattainment[6]	Nonattainment
Carbon monoxide	Attainment/Unclassified	Attainment/Unclassified
Nitrogen dioxide	Attainment/Unclassified	Attainment
Sulfur dioxide	Attainment/Unclassified	Attainment
Lead (particulate)	No designation/classification	Attainment
Hydrogen sulfide	No federal standard	Unclassified
Sulfates	No federal standard	Attainment
Visibility reducing particles	No federal standard	Unclassified
Vinyl Chloride	No federal standard	Attainment

1 - See 40 CFR Part 81
2 - See CCR Title 17 Sections 60200-60210
3 - Effective June 15, 2005, the U.S. Environmental Protection Agency (EPA) revoked the Federal 1-hour ozone standard, including associated designations and classifications. EPA had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). 75 Fed. Reg. 10420 (2010) Many applicable requirements for extreme 1-hour ozone nonattainment areas continue to apply to the SJVAB.
4 - Though the Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, EPA approved Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010). 75 Fed. Reg. 24409 (2010).
5 - On November 12, 2008, EPA redesignated the San Joaquin Valley to attainment for the PM10 National Ambient Air Quality Standard (NAAQS) and approved the PM10 Maintenance Plan. 73 Fed. Reg. 66759 (2008).
6 - The Valley is designated serious nonattainment for the 1997 PM2.5 NAAQS. EPA designated the Valley as serious nonattainment for the 2006 PM2.5 NAAQS on ~~November 13, 2009~~December 22, 2015 ~~(effective December 14, 2009). 74 Fed. Reg. 58688 (2009).~~

For the activities within Alameda County and BAAQMD, Table 3.3-3 provides the attainment status of the BAAQMD jurisdiction.

Table 3.3-3. BAAQMD Attainment Status for BAAQMD

Pollutant	NAAQS[1]	CAAQS[2]
Ozone – One hour	No federal standard	Nonattainment
Ozone – Eight hour	Nonattainment	Nonattainment
PM10	Attainment/Unclassified	Nonattainment
PM2.5	Nonattainment	Nonattainment
Carbon Monoxide	Attainment	Attainment
Nitrogen Dioxide	Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
Lead (Particulate)	No designation/classification	Attainment
Hydrogen Sulfide	No federal standard	Unclassified
Sulfates	No federal standard	Attainment
Visibility Reducing Particles	No federal standard	Unclassified
Vinyl Chloride	No federal standard	Unclassified

Source: BAAQMD; http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm.
1 - See 40 CFR Part 81
2 - See CCR Title 17 Sections 60200-60210

Table 3.3-4. SJVAB Criteria Pollutant Data, 2011-2013

Parameter	2011	2012	2013[1]
8-Hour Ozone			
Maximum	0.105 [2]	0.116 [2]	0.106 [2]
Days above National Standard	109 [2]	105 [2]	89 [2]
Days above State Standard	131 [2]	134 [2]	112 [2]
Hourly Ozone			
Maximum	0.134	0.135	0.123 [2]
Days above National Standard	71	72	41
Days above State Standard	3 [2]	3 [2]	0
Daily PM2.5			
Maximum	80.3	93.4	167.3
Average	18.1	17.9	18.7
Daily PM10			
Maximum	151.8	138.6	350.7 [2]
Average	44.8	45.1	65.2 [2]
Days above National Standard	0	0	4.8 [2]

Table 3.3-4. SJVAB Criteria Pollutant Data, 2011-2013

Parameter	2011	2012	2013[1]
8-Hour CO			
Maximum	2.71	2.22	NA
Days above Standard	0	0	0
Hourly NO_2			
Maximum	69	78	118 [2]
Average	16	15	15
Days above Standard	0	0	1 [2]

1 - Values in 2013 were substantially affected by several wildfire and structure fires occurring simultaneously
2 - Indicates exceedance of State or Federal Standards
All measurements in parts per million (ppm)
Source: ARB

Climate Change and Greenhouse Gases

Climate scientists make global-scale observations and reconstructions of the climate system. For the period 1950 onwards, relatively comprehensive data sets of observations are available. Consensus expressed by the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) shows that: "*warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased*" (IPCC, 2013).

Specifically, within the San Joaquin Valley, water availability is projected to decline and increases in peak temperatures are expected to drive higher peak period electricity demands for cooling. Between 2001 and 2010, streamflow totals in the Sacramento-San Joaquin river basin were at least 5 percent lower than the 20th century average annual flows (ICF, 2014).

The Third U.S. National Climate Assessment, released on May 6, 2014, provides an authoritative and comprehensive source of scientific information to date about climate-change impacts across all U.S. regions and on critical sectors of the economy. For the Southwest United States, including the project area, the National Climate Assessment emphasizes the risks to scarce water resources and states:

> *Climate changes pose challenges for an already parched region that is expected to get hotter and, in its southern half, significantly drier. Increased heat and changes to rain and snowpack will send ripple effects throughout the region's critical agriculture sector, affecting the lives and economies of 56 million people—a population that is expected to increase 68 percent by 2050, to 94 million. Severe and sustained drought will stress water sources, already over-utilized in many areas, forcing increasing competition among farmers, energy producers, urban dwellers, and plant and animal life for the region's most precious resource.*

Man-made emissions of CO_2 are largely from combustion of fossil fuels. The major categories of fossil fuel combustion CO_2 sources can be broken into sectors for residential, commercial, industrial, transportation, and electricity generation. The transportation sector includes all motor gasoline and diesel fuel combustion, and the GHG emissions of this sector are not split into activities or uses (i.e., there is no separate estimate for the level of GHG emissions caused by gasoline or diesel fuel combustion-related to statewide construction activities). Other GHG emissions such as methane (CH_4) and nitrous oxide (N_2O) are also tracked by state inventories but occur in much smaller quantities. The global warming potential

of methane is about 21 times that of CO_2. When quantifying GHG emissions, the different global warming potentials of GHG pollutants are usually taken into account by normalizing their rates to an equivalent CO_2 emission rate (CO_2 Eq.).

California's greenhouse gas emissions are large in a world-scale context and growing (CEC, 2007). The state emits approximately 500 million metric tons of CO_2 equivalent ($MMTCO_2$ Eq.) or more than one percent of the 49,000 MMTCO2 Eq. emitted globally (IPCC, 2007). Electricity generation within California emits about 50 million metric tons of CO_2 (with yearly variations) or 15 percent of the total statewide CO_2 emissions and about one percent of statewide methane emissions.

Toxic Air Contaminants

Toxic air contaminants (TACs) are a category of air pollutants, separate from criteria pollutants, that pose a present or potential hazard to human health, but which tend to be emitted on a localized and source-specific basis and cause impacts that are typically more localized than those created by criteria air pollutants. More than 900 toxic air contaminants are recognized by different regulatory agencies. Although there are no ambient air quality standards for these pollutants, sources are regulated with emission- and risk-based requirements at the federal, state, and local levels.

3.3.1.2 Regulations, Plans, and Standards

The federal CAA, as amended, and the California Clean Air Act both require that air quality management plans be prepared by the air districts to demonstrate how the ambient air quality standards will be achieved in nonattainment areas.

Federal Air Quality Regulations, Plans and Standards

- U.S. Environmental Protection Agency (USEPA) Emission Standards for Non-Road Diesel Engines. The USEPA has established a series of cleaner emission standards for new off-road diesel engines culminating in the Tier 4 Final Rule of June 2004. Tier 4 or Interim Tier 4 standards apply to all off-road diesel engines model year 2012 or newer.
- USEPA Non-Road Diesel Fuel Rule. In May 2004, the USEPA set sulfur limits for non-road diesel fuel. Under this rule, sulfur levels in non-road diesel fuel are now limited to 15 ppm (USEPA, 2004).
- USEPA Emission Standards for On-Road Trucks. To reduce emissions from on-road, heavy-duty diesel trucks, the USEPA established a series of cleaner emission standards for new engines, starting in 1988.
- USEPA General Conformity Rule. Western must make a determination of whether approval of the Project (i.e., a federal action) would cause or contribute to a violation of the NAAQS or interfere with attainment planning (40 CFR Part 93 et seq.).

State Air Quality Regulations, Plans and Standards

- California ARB California Diesel Risk Reduction Plan. ARB has adopted several regulations that are meant to reduce the health risk associated with on- and off-road and stationary diesel engine operation. This plan recommends many control measures with the goal of an 85 percent reduction in diesel particulate matter (DPM) emissions by 2020.
- California ARB Emission Standards for On-Road and Off-Road Diesel Engines. The ARB, similar to the USEPA on-road and off-road emissions standards, regulations described above, has established emission standards for new on-road and off-road diesel engines. These regulations have model year–based emissions standards for NO_x, hydrocarbons, CO, and particulate matter.

- California ARB Emission Standards for Off-Road Large Spark-Ignition Engines. The ARB has established emission standards for off-road equipment using large spark-ignition (e.g., gasoline-powered 25 horsepower and greater) engines produced in 2001 or later. These regulations have model year–based emissions standards for NO_x, hydrocarbons, and CO.
- California ARB In-Use Off-Road Vehicle Regulations. The state has also enacted a regulation for the reduction of diesel particulate matter (DPM) and criteria pollutant emissions from in-use off-road diesel-fueled vehicles.
- California ARB Heavy Duty Diesel Truck Idling Regulation. This ARB rule became effective February 1, 2005, and prohibits heavy-duty diesel trucks from idling for longer than five minutes at a time, unless they are queuing, and provided the queue is located beyond 100 feet from any homes or schools.
- California ARB In-Use On-Road Heavy Duty Vehicle Regulation. This is the ARB regulation for the reduction of DPM and criteria pollutants from in-use on-road heavy duty diesel trucks.
- California ARB California Diesel Fuel Regulations. In 2004, the ARB set limits on the sulfur content of diesel fuel sold in California for use in on-road and off-road motor vehicles.
- California ARB Statewide Portable Equipment Regulation Program. The PERP establishes a uniform program to regulate portable engines and portable engine–driven equipment units.

Local Air Quality Regulations, Plans and Standards

- San Joaquin Valley Air Pollution Control District rules and regulations including: Rule 4101 (Visible Emissions), Rule 4102 (Nuisances), and Regulation VIII (Fugitive PM10 Prohibitions).
- San Joaquin Valley Air Pollution Control District Guidance for Assessing and Mitigating Air Quality Impacts (March 2015). The Guidance defines the thresholds that the air district has adopted for determining the significance of criteria air pollutant emissions, toxic air contaminants, and odors.

Climate Change Plans, Policies, and Regulations

- The Council on Environmental Quality (CEQ) Revised Draft NEPA Guidance on Consideration of the Effects of Climate Change Impacts and Greenhouse Gas Emissions (December 2014). This guidance indicates that GHG from a federal action usually warrant quantitative disclosure if likely to exceed a level of 25,000 MTCO2e annually.
- The California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) mandates that certain state agencies approving a project analyze the project's potential to contribute to climate change through emissions of greenhouse gases (GHG).
- ~~Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act (January 2010).~~
- California ARB Regulation for Reducing Sulfur Hexafluoride (SF_6) Emissions from Gas Insulated Switchgear (17 CCR 95350 to 95359). This regulation for reducing SF_6 emissions from electric power system gas insulated switchgear requires jurisdictional owners of such switchgear to: (1) annually report their SF_6 emissions; (2) determine the emission rate relative to the SF_6 capacity of the switchgear; (3) provide a complete inventory of all gas insulated switchgears and their SF_6 capacities; (4) produce a SF_6 gas container inventory; and (5) keep all information current for CARB enforcement staff inspection and verification.

3.3.2 Corridor Alternatives

The study areas for the corridor alternatives are entirely within the San Joaquin Valley Air Basin and the study area for the Proposed Project. Therefore, existing air quality is the same as described for the Proposed Project and the alternatives are subject to the same standards.

3.4 Biological Resources

The information presented in this section is summarized from the *San Luis Transmission Project Biological Survey Report*, Appendix C of this ~~Draft~~ EIS/EIR. Refer to that document for more detailed information on the affected environment for the Proposed Project and alternatives.

This section describes existing biological resources and the regulatory environment pertinent to this resource. Impacts to biological resources, including impacts to special-status plants, animals, and sensitive habitats as well as conflicts with planning documents pertaining to biological resources are analyzed in Section 4.4 (Biological Resources).

3.4.1 Proposed Project

The *study area* for biological resources includes a buffer area surrounding the Proposed Project and its alternatives, as described in Section 3.1. The *Project area* is the area within which Project components (transmission lines, access roads, and temporary construction areas) could be located. The broader study area is used to identify biological resources in areas within and near the Project that could be subject to indirect effects, while direct effects would be limited to the Project area. Plant communities, wetlands and waters of the U.S. and State, and special-status species occurrences were surveyed only in the Project area, but their potential for occurrence has been extrapolated to the entire study area based on information obtained from the California Natural Diversity Database (CNDDB), California Native Plant Society (CNPS) online electronic inventory of rare and endangered plants of California; review of aerial imagery; the online eBird database of bird sightings; local biological resources reports and conservation plans; literature review regarding regionally occurring special-status species; and consultation with the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and other local species experts.

3.4.1.1 Affected Environment

Baseline data for the study area were collected from several sources, including the CNDDB; CNPS online electronic inventory of rare and endangered plants of California, 8th edition; review of aerial imagery; the online eBird database of bird sightings; local biological resources reports and conservation plans; literature review regarding regionally occurring special-status species; and consultation with the USFWS, CDFW (formerly CDFG), and other local species experts. The area covered by the CNDDB search included the USGS 7.5-minute series quadrangles through which the Project passes, as well as the surrounding quadrangles. Habitat-level reconnaissance surveys and vegetation mapping were conducted in spring of 2014. Portions of the Project area were not visited due to right-of-entry restrictions on several land-holdings, and most of the unvisited areas were not visible from public access points. Refer to Appendix C for more information on surveys and background research.

The study area is in the western San Joaquin Valley along the foothills of the Diablo Range. The study area encompasses primarily open space with varying terrain and sparse vegetation. Steep terrain in the western portion gives way to flat agricultural lands to the east. The study area roughly parallels I-5, the Delta-Mendota Canal, and the California Aqueduct. It also abuts the O'Neill Forebay and the east side of the San Luis Reservoir. This portion of the study area is primarily open space designated for recreational use and wildlife conservation. Several areas of residential and commercial development and scattered agricultural lands lie to the east near the Forebay. South of the Forebay, the study area crosses the Los Banos Creek Reservoir, then continues through rural and undeveloped private lands, with scattered

development and agricultural lands to the east, before crossing over I-5 and terminating at the Dos Amigos Substation. Climate in the region is temperate, with mild winters and hot, dry summers.

Plant Communities

Plant communities were mapped only within the actual Project area; these are shown on Figure 3 of the Biological Survey Report in Appendix C and summarized below. See Appendix C for detailed vegetation descriptions.

Sensitive Plant Communities

The following plant communities are designated as sensitive by the CDFW.

- **Freshwater Marsh.** This vegetation corresponds to the coastal and valley freshwater marsh described in Holland (1986). It is dominated by perennial, emergent monocots up to 4-5 meters tall, often forming completely closed canopies. *Schoenoplectus* spp. and *Typha* spp. dominate. It occurs in sites that lack significant water currents and that are permanently flooded by freshwater. In the Project area, freshwater marsh was mapped in various drainages including Patterson Run, Corral Hollow Creek, Mountain House Creek, Del Puerto Creek, Lone Tree Creek, and Salado Creek.
- **Riparian Great Valley Forest.** This vegetation corresponds to the great valley cottonwood riparian forest and sycamore alluvial woodland described in Holland (1986). It is a dense, broad-leafed, winter-deciduous riparian forest dominated by cottonwood (*Populus fremontii*) and willow (*Salix* spp.) that occurs on fine-grained alluvial soils near perennial or nearly perennial streams. In sycamore alluvial woodland, sycamores (*Platanus racemosa*) are dominant and mostly well-spaced. Understory vegetation is mulefat (*Baccharis salicifolia*), willows, California sagebrush (*Artemisia californica*), and non-native grasses. In the Project area, riparian great valley forest was mapped along major drainages, including Corral Hollow, Lone Tree, and Salado creeks. Sycamore alluvial woodland was mapped along Orestimba creek.
- **Vernal Pool.** This corresponds to the northern claypan vernal pool described in Holland (1986). It occurs in depressions in grassland with vernal pool plants such as *Eryngium* spp*., Plagiobothrys* spp*., Lasthenia* spp*., Psilocarphus* spp., etc. Often more or less saline. Vernal pools were mapped in grasslands in the central and southern portions of the Project area.
- **Grassland, Native Perennial.** This vegetation corresponds to the valley needlegrass grassland and valley wildrye grassland described in Holland (1986). Valley needlegrass grassland has at least 5 percent absolute cover or 10 percent relative cover of purple needle grass (*Nasella pulchra*); other species include non-native grasses such as red brome (*Bromus rubens*), wild oats (*Avena* spp.), hare barley (*Hordeum murinum* ssp. *leporinum*), and native and non-native forbs. Valley wildrye grassland has at least 50 percent relative cover of creeping wildrye (*Elymus triticoides*). It typically occurs along creeks and drainages and can also be a seasonal wetland type. In the Project area, native grasslands were mapped in small areas near O'Neill Forebay and San Luis Reservoir.

Other Plant Communities and Land Cover Types

- **Riparian Great Valley Scrub.** This vegetation corresponds to the great valley willow scrub described in Holland (1986). It is dominated by shrubby willows such as arroyo willow (*Salix lasiolepis*) and narrow-leaved willow (*Salix exigua*), with few to no cottonwood trees. Understory species include mulefat, Himalayan blackberry (*Rubus armeniacus*), and herbaceous species such as rabbit's-foot grass (*Polypogon monspeliensis*), nut sedge (*Cyperus eragrostis*), rushes (*Juncus* spp.), sedges (*Carex* spp.), curly dock (*Rumex crispus*), and brass buttons (*Cotula coronopifolia*). In the Project area, riparian

great valley scrub was mapped along several unnamed intermittent drainages and also in isolated patches along Mountain House Creek.

- **Elderberry, Isolated.** Elderberry shrubs (*Sambucus nigra* ssp. *caerulea*) were mapped because they can support the federally listed valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). Elderberry shrubs occur within the great valley cottonwood riparian forest in one area along Salado Creek.
- **Grassland, Non-native Annual.** This vegetation corresponds to the non-native grassland described in Holland (1986). It is dominated by nonnative grasses and forbs. Native forbs occur at low density and include fiddleneck (*Amsinckia menziesii*), blow wives (*Achyrachaena mollis*), tall stephanomeria (*Stephanomeria virgata*), Ithuriel's spear (*Triteleja laxa*), red maids (*Calandrinia ciliata*), purple owl's clover (*Castilleja exserta*), small-headed matchweed (*Gutierrezia microcephala*), California poppy (*Eschscholzia californica*), vinegar weed (*Trichostema lanceolatum*), and sacred datura (*Datura wrightii*). Many of the non-native grasslands in the Project area were grazed and some had been disked. It is the most common and widespread vegetation type in the Project area.
- **Wildflower Fields.** This vegetation corresponds to the wildflower fields described in Holland (1986). It is an herb-dominated type with conspicuous annual wildflower displays; species' dominance varies from site to site and year to year. Wildflower fields are typically found on dry sites low in nutrients, and are associated with grasslands or oak woodlands. In most areas vegetation is relatively sparse with bare ground comprising up to 50 percent of the overall ground cover. Wildflower fields were mapped in small inclusions within non-native grasslands in the northern and central portions of the Project area.
- **Coyote Bush Scrub.** This vegetation corresponds to the coyote bush scrub described in Holland (1986). It is a shrubland dominated by coyote brush (*Baccharis pilularis*), with a few mesquites (*Prosopis glandulosa* var. *torreyana*) and big saltbush (*Atriplex lentiformis*). Other species include ripgut brome, gum plant (*Grindelia* sp.), perennial pepperweed (*Lepidium latifolium*), fiddleneck, small melilot (*Melilotus indicus*), winecup clarkia (*Clarkia purpurea* ssp. *quadrivulnera*), seaside heliotrope (*Heliotropium curassavicum*), horehound (*Marrubium vulgare*), and field bindweed (*Convolvulus arvensis*). In the Project area, coyote bush scrub was mapped in small areas near O'Neill Forebay and San Luis Reservoir; and the west side of Los Banos Creek Reservoir.
- **Agricultural Fields.** Areas planted in orchards, irrigated pastures, grain fields planted with hay or alfalfa, and vineyards were mapped as agricultural fields. Agricultural fields were mapped primarily in the North Segment of the Project area.
- **Other.** Areas that did not conform to the other vegetation types described above were mapped as "other." These include eucalyptus groves and areas with planted trees. One area was a presumed mitigation site. Small areas of native California sagebrush (*Artemisia californica*) that occurs within and adjacent to the cottonwood riparian forest community at Corral Hollow Creek were also mapped as "other." In the Project area, it was mapped at Corral Hollow Creek, near Garzas Creek, near Mustang Creek, and near Los Banos.
- **Barren.** Barren areas generally consist of roads, road shoulders, dirt parking lots, and areas that were predominantly paved, rock, gravel, bare soils, or sand. It includes some bare areas from grazing. Vegetation is typically absent, although sparse cover of weedy species such as English plantain (*Plantago lanceolata*), filarees, prickly lettuce (*Lactuca serriola*), oats, soft brome, and ryegrass may be present. Some native plants may also occur such as sticky tarweed, gum plant, and foothill plantain. Barren areas are scattered throughout the Project area.

- **Commercial.** Buildings and paved parking lots or other developed areas were mapped as "commercial." This type is devoid of vegetation with the exception of some landscaped, ornamental plants. In the Project area, commercial areas comprise various roads and developments.

Common Wildlife

Common wildlife habitats in the Project area can be combined into a few distinct categories. Grassland and brush habitats comprise native and non-native grassland, wildflower fields, coyote brush scrub, and most "other" types. These habitats may feature ephemeral and intermittent drainages. Wildlife commonly associated with these habitats include western fence lizard (*Sceloporis occidentalis*), northern Pacific rattlesnake (*Crotalus oreganus oreganus*), gopher snake (*Pituophis catenifer*), California toad (*Anaxyrus boreas halophilus*), California horned lark (*Eremophila alpestris actia*), western meadowlark (*Sturnella neglecta*), common raven (*Corvus corax*), Say's phoebe (*Sayornis saya*), western kingbird (*Tyrannus verticalis*), black-tailed hare (*Lepus californicus*), striped skunk (*Mephitis mephitis*), non-native red fox (*Vulpes vulpes*), and coyote (*Canis latrans*).

Riparian habitats in the Project area comprise a few narrow stands of riparian forest, including a stand of sycamore alluvial woodland in Orestimba Creek, and riparian scrub. These habitats support species including the ash-throated flycatcher (*Myiarchus cinerascens*), American kestrel (*Falco sparverius*), black phoebe (*Sayornis nigricans*), great horned owl (*Bubo virginianus*), Bullock's oriole (*Icterus bullockii*), brown-headed cowbird (*Molothrus ater*), and house finch (*Carpodacus mexicanus*). Freshwater marshes support Sierran treefrog (*Pseudacris sierra*), marsh wren (*Cistothorus palustris*), great blue heron (*Ardea herodias*), Virginia rail (*Rallus limicola*), and red-winged blackbird (*Agelaius phoeniceus*); and mallard (*Anas platyrhynchos*), American coot (*Fulica americana*), and common muskrat (*Ondatra zibethicus*) in areas with open water.

Lake habitats in and near the Project area include O'Neill Forebay, San Luis Reservoir, and Los Banos Creek Reservoir. Wildlife include fishes such as bluegill (*Lepomis macrochirus*), common carp (*Cyprinus carpio*), largemouth bass (*Micropteris salmoides*), and white crappie (*Pomoxis annularis*); and birds such as American wigeon (*Anas americana*), bufflehead (*Bucephala albeola*), Canada goose (*Anser canadensis*), and mallard. Drainages with drying pockets of standing water during Project surveys were Corral Hollow Creek, Salado Creek, and Del Puerto Creek. These supported California toad larvae, American bullfrog (*Lithobates catesbeiana*) adults and larvae, and western pond turtle (*Emys marmorata*).

American bullfrogs were observed in irrigation canals. The Delta-Mendota Canal and California Aqueduct are often used by mallard, coot, and double-crested cormorant (*Phalacrocorax auritus*), and bridges over these canals support nesting cliff swallows (*Petrochelidon pyrrhonota*) and nesting rock pigeons (*Columba livia*). Banks of these large canals often support higher densities of small mammals than surrounding habitats (USFWS, 2010c).

Agricultural areas in the Project area include grain fields, pasture, orchard, and vineyard. Red-winged blackbird, Brewer's blackbird (*Euphagus cyanocephalus*), western meadowlark, and foraging barn swallow (*Hirundo rustica*) were observed. Raccoon (*Procyon lotor*) and striped skunk commonly forage in agricultural areas.

Woodland habitats are limited in the Project area to two eucalyptus groves that also contain scattered ornamental pines (*Pinus* spp.). Eurasian collared dove (*Streptopelia decaocto*), great horned owl, Say's phoebe, American kestrel, house finch, mourning dove (*Zenaida macroura*), and other birds were observed. One small grove supported at least 10 different species of nesting birds during spring 2014 surveys.

Special-Status Species

Special-status species are those plants and animals that are classified in one or more of the following categories:

- **Federal Endangered Species Act (FESA), 16 U.S.C. §§ 1531, *et seq*.** Listed as endangered or threatened; candidate for federal listing; or proposed for federal listing.
- **Bald and Golden Eagle Protection Act (BGEPA), 16 U.S.C. §§ 668-668d.** Bald and golden eagles are protected under the federal BGEPA.
- **California Endangered Species Act (CESA).** Listed as endangered or threatened; candidate for State listing; or designated as a rare plant.
- **Fully protected species** under the California Fish and Game Code.
- **California Species of Special Concern (SSC).** Designated by CDFW.
- **California Rare Plant Rank (CRPR).** List of plants of conservation priority; maintained by the CNPS in coordination with CDFW.
  - CRPR 1A: Plants presumed to be extinct in California.
  - CRPR 1B: Plants rare or endangered in California and elsewhere.
  - CRPR 2: Plants rare or endangered in California but more common elsewhere.
  - CRPR 3: Plants about which more information is needed – a review list.
  - CRPR 4: Plants of limited distribution – a watch list.

Critical Habitat

Critical habitat is defined under the FESA as "the specific areas within the geographic area currently occupied by a species, at the time it is listed in accordance with Section 1533 of this title, on which are found those physical or biological features essential (I) to the conservation of the species and (II) which may require special management considerations or protection." 16 U.S.C. § 1532(5). Either the USFWS or the National Marine Fisheries Service (NMFS) may designate critical habitat for species listed as threatened or endangered under FESA. Designated critical habitat for 12 species or subspecies occurs within or near the study area: south central coast steelhead, central coast steelhead, Delta smelt, California tiger salamander, California red-legged frog, Alameda whipsnake, longhorn fairy shrimp, vernal pool fairy shrimp, Contra Costa goldfields, large-flowered fiddleneck, Greene's tuctoria, and Hoover's spurge (Figure 5 of Appendix C).

Special-Status Plants

Table 3.4-1 presents special-status plants that potentially occur in the study area, or that were observed during surveys of the Project area. It also identifies designated critical habitat for listed plants in and near the study area. See Appendix C for a full discussion of all species considered, including those determined to have low potential or are unlikely to occur in the study area.

Table 3.4-1. Special-Status Plants and Critical Habitat[1] that Occur or May Occur in the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status Federal[2]/State[3]/ CRPR[4]	Habitat Type/General Geographic Range	Likelihood of Occurrence and Rationale[5]
Amsinckia grandiflora Large flowered fiddleneck and critical habitat	FE/SE/1B	Cismontane woodland and valley and foothill grassland. Blooms April to May. Elevation: 275–550m. Known from Alameda, Contra Costa, and San Joaquin Counties.	**Low.** Potential grassland habitat in Project area. Known from fewer than 5 natural occurrences. Nearest critical habitat is less than 3 miles from the Tracy Substation.
Astragalus tener var. *tener* Alkali milk-vetch	—/—/1B	Playas, valley and foothill grassland (alkaline clay), vernal pools in alkaline areas. Blooms March to June. Elevation: 1–60m. Known from Alameda, Contra Costa, San Joaquin, and other counties.	**Moderate.** Potential grassland and vernal pool habitat in Project area. Recorded in Byron/Livermore and Clifton Court Forebay.
Atriplex cordulata var. *cordulata* *Heartscale*	—/—/1B	Chenopod scrub, meadows and seeps, valley and foothill grasslands (sandy) in saline or alkaline areas. Blooms April to October. Elevation: 0–560m. Known from Alameda, Contra Costa, San Joaquin, and other counties.	**Moderate.** Potential grassland habitat in Project area. Records from Clifton Court Forebay.
Atriplex joaquiniana San Joaquin *spearscale*	—/—/1B	Chenopod scrub, meadows and seeps, valley and foothill grasslands. Blooms April to October. Elevation: 1–835m. Known from Alameda, Contra Costa, San Joaquin, and other counties.	**Moderate.** Potential grassland habitat in Project area. Records from Byron, Bryon Hot Springs, Mountain House Rd, and Clifton Court Forebay.
Blepharizonia plumosa Big *tarplant*	—/—/1B	Valley and foothill grassland, usually on clay soils. Blooms July to October. Elevation: 30–505m. Known from Alameda, Contra Costa, and San Joaquin, Solano, and Stanislaus Counties.	**High.** Potential grassland habitat in Project area. Records from Tracy, Tesla, Corral Hollow, and many other locations near Project area.
California macrophylla Round-*leaved* filaree	—/—/1B	Cismontane woodland, valley and foothill grassland on clay soils. Blooms March to May. Elevation: 15–1200m. Known from many counties including Alameda, Contra Costa, Fresno, Merced, and San Joaquin Counties.	**Present.** Habitat in Project area. Observed in the Project area (Central Segment, and Patterson Pass Road Alternative) along with *Convolvulus simulans* and *Hesperevax caulescens*.
Caulanthus lemmonii Lemmon's *jewelflower*	—/—/1B	Pinyon and juniper woodland, valley and foothill grassland. Blooms March to May. Elevation: 80–1220m. Known from Alameda, Fresno, Merced, San Joaquin, and other counties.	**High.** Potential grassland habitat in Project area. Records from between Tesla and Corral Hollow, Corral Hollow and Los Banos.
Chamaesyce hooveri Hoover's spurge and critical habitat	FT/-/1B	Vernal pools on volcanic mudflow or clay substrate. Blooms July to October. Elevation 25–250m. Known from Butte, Colusa, Glenn, Merced, Stanislaus, Tehama, and Tulare Counties.	**Low.** Potential vernal pool habitat in Project area on clay substrate but no volcanic mudflow vernal pools observed. There are no records for this species within the CNDDB search for the Project. Nearest critical habitat is about 15.5 miles north of the O'Neill Forebay.

Table 3.4-1. Special-Status Plants and Critical Habitat[1] that Occur or May Occur in the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status Federal[2]/State[3]/ CRPR[4]	Habitat Type/General Geographic Range	Likelihood of Occurrence and Rationale[5]
Clarkia rostrata Beaked clarkia	—/—/1B	Cismontane woodland, valley and foothill grassland on north-facing slopes, sometimes on sandstone. Blooms April to May. Elevation 60–500m. Known from Merced, Mariposa, Stanislaus, and Tuolumne Counties.	**Low.** Potential grassland habitat in Project area. There are no records for this species within the CNDDB search for the Project.
Convolvulus simulans Small-flowered morning-glory	—/—/4	Chaparral (openings), coastal scrub, valley and foothill grassland on clay soils or serpentinite seeps. Blooms March to July. Elevation: 30–700m. Known from Contra Costa, San Joaquin, Stanislaus, and other counties.	**Present.** Grassland habitat in Project area. This species was found along with *California macrophylla* within the Project area.
Delphinium californicum ssp. *interius* Hospital Canyon larkspur	—/—/1B	Chaparral, cismontane woodland (mesic), coastal scrub in wet boggy meadows, openings in chaparral and in canyons. Blooms April to June. Elevation: 195–1095m. Known from Alameda, Contra Costa, San Joaquin, and other counties.	**Not Likely to Occur.** No potential habitat in Project area. CNDDB record from a 1938 collection.
Delphinium recurvatum Recurved larkspur	—/—/1B	Chenopod scrub, cismontane woodland, valley and foothill grassland in alkaline soils. Blooms March to June. Elevation: 3–790m. Known from Alameda, Contra Costa, Fresno, Merced, San Joaquin, and other counties.	**Moderate.** Potential grassland habitat in Project area but limited to areas with alkaline soils. Multiple records in the region.
Eryngium racemosum Delta button-celery	—/SE/1B	Riparian scrub in vernally mesic clay depressions. Blooms June to October. Elevation: 3–30m. Known from Contra Costa, Merced, San Joaquin, and other counties.	**Moderate.** Potential riparian habitat in Project area. Recorded near Grayson, 2 miles east of Westley.
Eryngium spinosepalum Spiny-*sepaled* button celery	—/—/1B	Valley and foothill grassland, vernal pools. Blooms April to May. Elevation: 80–255m. Known from Contra Costa, Merced, and other counties.	**Moderate.** Potential grassland and vernal pool habitat in Project area. Recorded at Byron Airport.
Eschscholzia rhombipetala *Diamond*-petaled California poppy	—/—/1B	Valley and foothill grassland on alkaline and clay soils. Blooms March to April. Elevation: 0–975m. Known from Alameda, Contra Costa, Colusa, San Joaquin, San Luis Obispo, and Stanislaus Counties.	**High.** Potential grassland habitat in Project area but limited to alkaline and clay soils. Records from Corral Hollow near Castle Rock, Lawrence Livermore National Laboratory, and hills south of Byron.
Hesperevax caulescens Hogwallow starfish	—/—/4	Valley and foothill grassland in mesic sites and on clay soils, shallow vernal pools. Blooms March to June. Elevation: 0–505m. Known from Alameda, Contra Costa, San Joaquin, Fresno, Merced, and other counties.	**Present.** Grassland habitat in Project area. Observed within the Project area in same areas as *California macrophylla* (Central Segment, and Patterson Pass Road Alternative).
Hibiscus lasiocarpos var. occidentalis Woolly *rose* mallow	—/—/1B	Freshwater marshes and swamps, often in riprap on sides of levees. Blooms June to September. Elevation: 0–120m. Known from Contra Costa, San Joaquin, and other counties.	**Low.** Limited potential habitat in Project area. Recorded occurrences from Clifton Court Forebay.

Table 3.4-1. Special-Status Plants and Critical Habitat[1] that Occur or May Occur in the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status Federal[2]/State[3]/ CRPR[4]	Habitat Type/General Geographic Range	Likelihood of Occurrence and Rationale[5]
Lasthenia conjugens Contra Costa goldfields and critical habitat	FE/—/1B	Cismontane woodland, alkaline playas, valley and foothill grassland, vernal pools in mesic sites. Microhabitat is vernal pools, swales and low depressions in open grassy areas. Blooms March to June. Elevation: 0–470m. Known from Alameda, Contra Costa, Mendocino, Monterey, Marin, Napa, Santa Barbara, Santa Clara, Solano, and Sonoma Counties.	**Moderate.** Potential grassland and marginal vernal pool habitat in Project area and limited areas with alkaline soils. No records in vicinity. Nearest critical habitat is less than 2 miles from Tracy Substation.
Layia munzii Munz's *tidy*-tips	—/—/1B	Chenopod scrub, valley and foothill grassland on hillsides in white-grey alkaline soils. Blooms March to April. Elevation 150–700m. Known from Fresno, Kern, San Benito, and San Luis Obispo Counties.	**Low.** Limited potential habitat in Project area based on microhabitat of white-grey alkaline soils.
Lepidium jaredii ssp. *album* Panoche pepper-grass	—/—/1B	Valley and foothill grassland on white or grey clay lenses on steep slopes, incidental in alluvial fans and washes, prefers clay and gypsum soils. Blooms February to June. Elevation 185–275m. Known from Fresno, San Benito, and San Luis Obispo Counties.	**Low.** Limited potential habitat in Project area based on microhabitat preference.
Leptosyne hamiltonii Mt. Hamilton *coreopsis*	—/—/1B	Cismontane woodland in rocky areas. Blooms March to May. Elevation: 550–1300m. Known from Alameda and other counties.	**Not Likely to Occur.** No habitat in Project area. Known from Mt. Hamilton Range.
Lilaeopsis masonii *Mason's* lilaeopsis	—/SR/1B	Brackish or freshwater marshes and swamps, riparian scrub. Blooms April to November. Elevation: 0–10m. Known from Alameda, Contra Costa, San Joaquin, and other counties.	**Low.** Typical habitat lacking in Project area. Recorded occurrences from Clifton Court Forebay and other areas.
Limosella australis Delta mudwort	—/—/2B	Freshwater or brackish marshes and swamps, riparian scrub usually on mud banks. Blooms May to August. Elevation: 0–3m. Known from Contra Costa, San Joaquin, and other counties.	**Low.** Limited habitat in Project area. Known from Victoria Canal.
Madia radiata Showy golden madia	—/—/1B	Cismontane woodland, valley and foothill grassland mostly on adobe clay in grassland or around shrubs. Blooms March to May. Elevation: 25–1215m. Known from Contra Costa, Fresno, Kings, Kern, Monterey, San Joaquin, and other counties.	**Moderate.** Potential grassland habitat in Project area but limited to adobe clay soils. Records from lower Hospital Canyon, mouth of Big Panoche Canyon, Corral Hollow, and Tumey Hills.
Malacothamnus hallii Hall's bush-mallow	—/—/1B	Chaparral, coastal scrub. Blooms May to October. Elevation: 10–760m. Known from Contra Costa, Merced, Stanislaus, and other counties.	**Not Likely to Occur.** No habitat in Project area.
Monardella leucocephala Merced monardella	—/—/1A	Valley and foothill grassland; requires moist subalkaline sands associated with low elevation grassland. Blooms May to August. Elevation 35–100m.	**Not Likely to Occur.** This species is presumed extinct. The microhabitat requirements for this species area lacking in Project area. No recorded occurrences in CNDDB search.

Table 3.4-1. Special-Status Plants and Critical Habitat[1] that Occur or May Occur in the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status Federal[2]/State[3]/ CRPR[4]	Habitat Type/General Geographic Range	Likelihood of Occurrence and Rationale[5]
Navarretia nigelliformis ssp. *radians* Shining *navarretia*	—/—/1B	Cismontane woodland, valley and foothill grassland, vernal pools, sometimes clay. Blooms April to July. Elevation: 76–1000m. Known from Alameda, Contra Costa, San Joaquin, and other counties.	**Moderate.** Potential grassland and vernal pool habitat in Project area. Recorded at Billie Wright Rd northeast of Los Banos Valley.
Navarretia myersii ssp. *myersii* Pincushion navarretia	—/—/1B	Vernal pools, often acidic. Blooms April to May. Elevation 20–330m. Known from Amador, Calaveras, Merced, Placer, and Sacramento Counties.	**Low.** Vernal pool habitat in Project area but not acidic soils. No records in CNDDB search.
Phacelia ciliata var. *opaca* Merced *phacelia*	—/—/3	Valley and foothill grassland on adobe or clay soils of valley floors, open hills or alkaline flats. Blooms February to May. Elevation: 60–100m. Known from Merced County.	**Very low.** Limited potential grassland habitat in Project area. No known occurrences within CNDDB search area.
Phacelia phacelioides Mt. Diablo phacelia	—/—/1B	Chaparral, cismontane woodland, on rock outcrops and talus slopes, sometimes on serpentinite. Blooms April to May. Elevation: 500–1370m. Known from Contra Costa, Stanislaus, and other counties.	**Not Likely to Occur.** No habitat in Project area.
Pseudobahia bahiifolia Hartweg's golden *sunburst*	FE/SE/1B	Cismontane woodland, valley and foothill grassland on acidic clay soils. Blooms March to April. Elevation 15–150m. Known from Fresno, Madera, Merced, Stanislaus, Tuolumne, and Yuba Counties.	**Low.** No acidic clay soils in Project area. No recorded occurrences in CNDDB search area.
Sidalcea keckii Keck's checkerbloom	FE/—/1B	Cismontane woodland, valley and foothill grassland — occurs on grassy slopes in blue oak woodland. Blooms April to June. Elevation: 75–650m. Known from Fresno and Merced Counties.	**Not Likely to Occur.** No blue oak woodland in Project area. No recorded occurrences in CNDDB search area.
Senecio aphanactis Chaparral ragwort	—/—/2B	Chaparral, cismontane woodland, coastal scrub, sometimes in alkaline soils. Blooms January to April. Elevation: 15–800m. Known from Alameda, Contra Costa, Fresno, Merced, and other counties.	**Not Likely to Occur.** No habitat in Project area.
Strepthanthus insignis ssp. *lyonii* Arburua *Ranch* jewel-flower	—/—/1B	Coastal scrub, sometimes serpentinite. Blooms March to May. Elevation: 230–855m. Known from Merced County.	**Not Likely to Occur.** No habitat in Project area.
Symphyotrichum lentum Suisun *Marsh* aster	—/—/1B	Brackish and freshwater marshes and swamps. Blooms May to November. Elevation: 0–3m. Known from Contra Costa, San Joaquin, and other counties.	**Low.** Limited habitat in Project area. No known occurrences within 1 mile of Project area.
Trichocoronis wrightii var. *wrightii* Wright's *trichocoronis*	—/—/2B	Meadows and seeps, marshes and swamps, riparian forest, vernal pools. Microhabitat is mud flats of vernal lakes, drying river beds, alkali meadows. Blooms May to September. Elevation: 5–435m. Known from Merced County and presumed extirpated from San Joaquin County.	**Low.** Microhabitat not present or very limited in Project area.

Table 3.4-1. Special-Status Plants and Critical Habitat[1] that Occur or May Occur in the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status Federal[2]/State[3]/ CRPR[4]	Habitat Type/General Geographic Range	Likelihood of Occurrence and Rationale[5]
Tropidocarpum capparideum Caper-fruited tropidocarpum	—/—/1B	Valley and foothill grassland, alkaline hills on alkaline clay soils. Blooms March to April. Elevation: 1–455m. Known from Alameda, Contra Costa, Fresno, San Joaquin, and other counties.	**Moderate.** Potential grassland habitat in Project area but limited to alkaline clay soils. Records from Mountain House, Byron, Livermore, and Tracy.
Tuctoria greenei Green's tuctoria and critical habitat	FE/CR/1B	Vernal pools. Blooms May to September. Elevation 30–1070m. Known from Merced County. Presumed extirpated from Fresno, Madera, San Joaquin, and Stanislaus Counties.	**Very Low.** Limited potential vernal pool habitat in Project area but no known occurrences within CNDDB search area. Nearest critical habitat is 29 miles northeast of the Project area.

1 - See Appendix C for locations of critical habitat.

2 - Federal Status:
FE = Endangered – FESA
FT = Threatened – FESA

3 - State Status:
SE = Endangered – CESA
ST = Threatened – CESA
SR = State-designated Rare

4 - California Rare Plant Rank:
1A = CRPR Rank 1A: Plants presumed extirpated in California and either rare or extinct elsewhere.
1B = CRPR Rank 1B: Plants that are rare, threatened or endangered in California and elsewhere.
2B = CRPR Rank 2B: Plants that are rare, threatened or endangered in California but more common elsewhere.
3 = CRPR Rank 3: Plants about which more information is needed – a review list.
4 = CRPR Rank 4 Plants with a limited distribution – a watch list.

5 - Likelihood of occurrence determined by habitat presence and quality, regional species occurrence records, and geographic range.

Special-Status Wildlife and Fish

Table 3.4-2 presents special-status wildlife and fish that potentially occur in the Project area, or that were observed during Project surveys. It also identifies designated critical habitat for listed wildlife and fish in and near the study area. See Appendix C for a full discussion of all species considered, including those unlikely to occur in the study area.

Table 3.4-2. Special-Status Wildlife Species and Critical Habitat[1] that Occur or May Occur in or Near the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status		Habitat Type and General California Range	Potential to Occur in Project Area[4]
	Fed[2]	State[3]		
INVERTEBRATES				
Conservancy fairy shrimp *Branchinecta conservatio*	FE	*	Inhabits relatively large, turbid cool-water vernal pools in the Central Valley. Occurs primarily in six disjunct populations in Tehama, Butte, Solano, Glenn, Merced, and northern Ventura Counties.	**Low.** Project area outside of current known range, but potential habitat occurs.

Table 3.4-2. Special-Status Wildlife Species and Critical Habitat[1] that Occur or May Occur in or Near the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status		Habitat Type and General California Range	Potential to Occur in Project Area[4]
	Fed[2]	State[3]		
Longhorn fairy shrimp and critical habitat *Branchinecta longiantenna*	FE	*	Found in clear to highly turbid clay or grass-bottomed vernal pools, pools in swales, clear pools in sandstone depressions, and roadside ditches. Known occurrences highly disjunct: 8–10 locations in Merced, Contra Costa, Alameda, and San Luis Obispo Counties, including Altamont Pass and other locations near the Project.	**Moderate.** Potential habitat in vernal and other seasonal pools and swales within Project area. Nearest critical habitat is more than 6 miles from the Proposed Project.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	*	Dependent on elderberry shrubs, which are generally found along waterways and in floodplains.	**Moderate.** Potentially occurs in elderberries found along Salado Creek; elderberry shrubs may occur in other locations not yet surveyed.
Vernal pool fairy shrimp and critical habitat *Branchinecta lynchi*	FT	*	Found in pools ranging from small, clear sandstone rock pools to large, turbid, alkaline grassland valley-floor pools. Disjunct populations found in the Central Valley from Shasta County to Tulare County, and in the coast ranges from northern Solano County to Ventura County.	**Moderate.** Potential habitat in vernal and other temporary pools within Project area. Nearest critical habitat is less than 2 miles from the Proposed Project.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	*	Inhabits vernal pools and swales ranging from clear to highly turbid and from small to large. Inhabits sites in the Central Valley from Shasta County to northern Tulare County and in the central coast range from Solano County to Alameda County.	**Moderate.** Potential habitat in vernal pools within Project area.
FISHES				
Green sturgeon *Acipenser medirostris*	FT	SSC	Found in fresh and saltwater habitats, including deep pools in large, turbulent, freshwater rivers. Spawns in deep, fast water. Occurs in Sacramento River and tributaries, the Delta, and San Francisco, Suisun, and San Pablo bays. The Project does not overlap with critical habitat.	**Not Likely to Occur.** Project is not near suitable or occupied aquatic habitat.
Delta smelt and critical habitat *Hypomesus transpacificus*	FT	SE	Found in the Sacramento–San Joaquin Delta in brackish waters, also in Sacramento and San Joaquin rivers. Spawns in shallow waters. Critical habitat overlaps with the northernmost ~3 miles of the Project area.	**Low.** While critical habitat overlaps with a small portion of the northern Project area, the Project is not near suitable or occupied aquatic habitat.
Chinook–Central Valley spring-run ESU *Onchorhynchus tshawytscha*	FT	ST	This ESU migrates through estuaries and spawns in spring in cold, clean, fast-flowing rivers with gravel bottoms. Occurs in Sacramento River and its tributaries.	**Not Likely to Occur.** Project area does not overlap with the range of this ESU.
Chinook–Sacramento River winter-run ESU *Onchorhynchus tshawytscha*	FE	SE	This ESU migrates through estuaries and spawns in winter in cold, clean, fast-flowing rivers with gravel bottoms. Occurs in Sacramento River and its tributaries.	**Not Likely to Occur.** Project area does not overlap with the range of this ESU.

Table 3.4-2. Special-Status Wildlife Species and Critical Habitat[1] that Occur or May Occur in or Near the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status		Habitat Type and General California Range	Potential to Occur in Project Area[4]
	Fed[2]	State[3]		
Steelhead–Central Coast DPS and South Central Coast DPS and critical habitat *Oncorhynchus mykiss*	FT	*	Anadromous form of rainbow trout found in Sacramento and San Joaquin rivers and their tributaries. Spawns in shallow, swift riffles with small gravel and cobble. The western boundary of this DPS encompasses most of the Project area.	**High.** Steelhead are often rescued from fish facilities south of Clifton Court Forebay near the north end of Project. Critical habitat for the Central Coast DPS occurs east of Project area; critical habitat for South Central Coast DPS is west of Project area. Nearest critical habitat is less than 2 miles from the Project area.
REPTILES				
Alameda whipsnake and critical habitat *Masticophis lateralis euryxanthus*	FT	ST	Found in chaparral, valley-foothill riparian, and valley-foothill woodlands on south-facing slopes and ravines where shrubs form a mosaic with trees, grasslands, and rocky outcrops; may also use adjacent grasslands. Current range (2011): throughout Contra Costa County, most of Alameda County, and small portions of northern Santa Clara and western San Joaquin Counties.	**Moderate.** Records from Corral Hollow area; however, suitable mosaic habitats and riparian are limited within and near Project area. Nearest critical habitat is approx. 2 miles from the Project area.
Blunt-nosed leopard lizard *Gambelia sila*	FE	SE, CFP	Occurs in semiarid grasslands, alkali flats, and washes; prefers flat areas with open space; avoids dense vegetation. Range extends from northwestern Santa Barbara County and western Kern Co north to central Merced County, but historic range extends northward to Stanislaus/ Alameda County line.	**High.** Occurrence records in the southern portion of study area. From Dos Amigos Substation north to Santa Nella.
California legless lizard *Anniella pulchra (sensu stricto)*[5]	*	SSC	Found in sandy and loamy sand soils in saltbush scrub, chaparral, and woodland habitats on Valley floor and adjacent inner coast range foothills. Range extends discontinuously throughout Project area, depending on soil type and vegetation.	**High.** Multiple records throughout study area.
Coast horned lizard *Phrynosoma blainvillii*	*	SSC	Most common in lowlands along sandy washes with scattered low bushes, open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant ant and insect prey. Coast ranges from Contra Costa County south to Baja, including Sierra foothills; absent from Central Valley floor.	**High.** Occurrence records in Project area. Potential habitat in sandy washes associated with creeks and drainages.
Giant garter snake *Thamnophis gigas*	FT	ST	Found in sloughs, canals, and other small waterways with prey base of small fish and amphibians on the floor of the Central Valley. Requires grassy banks and emergent vegetation for basking, and areas of high ground protected from flooding during winter. Range extends from Chico in Butte County south to Mendota Wildlife Area in Fresno County. Known from Los Banos Creek, but no known records from closer than ~6 miles from Project area.	**Moderate.** No records from within ~6 miles of Project area but known from Los Banos Creek.

Table 3.4-2. Special-Status Wildlife Species and Critical Habitat[1] that Occur or May Occur in or Near the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status		Habitat Type and General California Range	Potential to Occur in Project Area[4]
	Fed[2]	State[3]		
Pacific pond turtle *Emys marmorata*	*	SSC	Permanent or nearly permanent lakes, ponds, marshes, rivers, streams, & irrigation ditches with aquatic veg. Needs basking sites such as partially submerged logs, vegetation mats, or open mud banks. Nests in suitable uplands, such as sandy banks or grassy, open fields on unshaded, south-facing slopes with less than 25% slope.	**Present.** Multiple records within 1 mile, and observed in Del Puerto Creek.
San Joaquin whipsnake *Masticophis flagellum ruddocki*	*	SSC	Occurs in open, dry vegetative associations with little or no tree cover. Found in the coast ranges and southern San Joaquin Valley from Contra Costa south to San Luis Obispo and Kern Counties.	**High.** Recorded within 1 mile of Project area, with suitable habitat available through much of Project area.
AMPHIBIANS				
California red-legged frog and critical habitat *Rana draytonii*	FT	SSC	Found ponds, streams, and wetlands. Highly aquatic and prefers permanent, quiet pools and streams with dense vegetation. May travel in a direct route between habitats regardless of cover. In coast ranges from southern Monterey County south to Baja.	**High.** Multiple records within 1 mile of Project from Corral Hollow north, and from Los Banos Creek. Project overlaps with critical habitat for about 5 miles (Figure 5 of Appendix C).
California tiger salamander–central California DPS *Ambystoma californiense*	FT	ST, SSC	Annual grasslands and grassy understory of valley-foothill hardwood habitats in central and northern Calif. Needs vernal pools or other aquatic habitats for breeding near uplands with underground burrow. Range from eastern foothills of Sierra west to outer coast range, from Sonoma and Yolo Counties south to Santa Barbara County.	**High.** Records in northern Project area. Potential habitat in creeks, stock ponds, and vernal or other temporary pools adjacent to suitable uplands. Nearest critical habitat is approximately 2 miles from the Project area.
Foothill yellow-legged frog *Rana boylii*	*	SSC	Partly shaded streams and riffles with a rocky substrate. Basks on large rocks, dives into water when disturbed. Coast ranges from Oregon border south to Transverse Mountains of Los Angeles County, as well as Sierra and Cascades foothills.	**Moderate.** Historic records from Corral Hollow and Los Banos Creek. Low potential in other drainages in Project area.
Western spadefoot *Spea hammondii*	*	SSC	Primarily found in grasslands but will occasionally use valley-foothill hardwood woodlands. Breeds in temporary rain pools without bullfrogs, fish, or crayfish; uses uplands when not breeding. Ranges throughout Central Valley and surrounding foothills from Redding south to southern California.	**High.** Recorded at Salado Creek; potential habitat in Del Puerto Creek, other creeks, and vernal and other temporary pools in Project area.
BIRDS				
Bald eagle *Haliaeetus leucocephalus* (nesting and wintering)	BGEPA	SE, CFP	Nests on cliffs or in large trees in mountain and foothill forests and woodlands near reservoirs, lakes, and rivers where it feeds on fish and waterfowl. In winter, also takes hares and other mammals. Resident in suitable nesting areas; winters through much of the rest of the State.	**High.** No nesting habitat in Project area, but multiple winter and spring eBird reports from San Luis Reservoir and O'Neill Forebay.

Table 3.4-2. Special-Status Wildlife Species and Critical Habitat[1] that Occur or May Occur in or Near the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status		Habitat Type and General California Range	Potential to Occur in Project Area[4]
	Fed[2]	State[3]		
Burrowing owl *Athene cunicularia* (burrow and wintering sites)	*	SSC	Grasslands, deserts, and along roads, canals, and edges of agricultural areas; rarely in vicinity of shrubs and trees; dens in underground burrows typically created by other animals, but also in culverts and debris piles. Found primarily in the Central Valley and other open, flat areas of the State; absent from steep terrain, foothill habitats, and higher elevations.	**Present.** Potential habitat occurs throughout Project area. Low potential in deeply incised foothills between Corral Hollow and Highway 152. Multiple records in or near Project north of Corral Hollow Creek, an historic record near Del Puerto Creek, and recent records south of O'Neill Forebay. One owl and several active burrows were observed during Project surveys.
California condor *Gymnogyps californianus*	FE	SE, CFP	Permanent resident of semi-arid mountain ranges surrounding the southern Central Valley. Nests in caves, crevices, behind rock slabs, or on large ledges on high cliffs; roosts on cliffs and in large trees and snags. Forages over large areas of open rangeland; obligate carrion eater.	**Low.** No occupied or suitable nesting areas within or near Project area. Some potential for foraging individuals from Pinnacles NP 40 mi southwest of south end of Project area. Nearest eBird record is 20 mi W of Los Banos Creek Reservoir, and nearest CNDDB record is more than 35 miles southwest of Dos Amigos Pumping Plant.
Golden eagle *Aquila chrysaetos* (nesting and wintering)	BGEPA	CFP	Rolling foothill or coast-range terrain where open grassland turns to scattered oaks, sycamores, or large digger pines. Nests primarily in cliffs and large trees, but also transmission towers and nest platforms in open areas. Resident through much of the State, winter-only in Central Valley.	**Present.** Multiple records, and observed during spring 2014 surveys; suitable foraging habitat through much of Project area.
Short-eared owl *Asio flammeus* (nesting)	*	SSC	Require open country with high density of rodent prey, and herbaceous cover at least 12–15 inches tall.	**Moderate.** Could nest in dense grasslands, open fields, and freshwater marshes, especially around Mountain House Creek and O'Neill Forebay.
Long-eared owl *Asio otus* (nesting)	*	SSC	Scarce over most of its range. Nests in conifer, oak, riparian, pinyon-juniper, and desert woodlands that are either open or are adjacent to grasslands, meadows, or shrublands. Prefers dense cover.	**Moderate.** Could nest around O'Neil Forebay and Salado Creek.
Least Bell's vireo *Vireo bellii pusillus* (nesting)	FE	SE	Found in lowland riparian with willows and dense understory. Nests in a variety of plants that provide concealment with dense foliage. Current range primarily southern Calif but expanding back into historic range, which included Central Valley north to Red Bluff. 2005-2007 nest records at San Joaquin River NWR, Stanislaus County; no recent nesting there.	**High.** Could occur in any of the dense riparian habitats within the Project area.

Table 3.4-2. Special-Status Wildlife Species and Critical Habitat[1] that Occur or May Occur in or Near the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status		Habitat Type and General California Range	Potential to Occur in Project Area[4]
	Fed[2]	State[3]		
Loggerhead shrike *Lanius ludovicianus* (nesting)	*	SSC	Prefers open, thinly wooded land or scrub savanna with clearings, including meadows, pastures, old orchards. Nests in dense shrubs or small trees with thick foliage, sometimes isolated trees. Found in suitable habitats throughout the State; absent from Sierra and Cascades and primarily forested areas.	**Present.** Recorded in multiple areas including Corral Hollow, Del Puerto Canyon, O'Neill Forebay, and from Patterson Pass Road north to Clifton Court Forebay. Observed in Project area during surveys, and likely to nest wherever trees and shrubs are found.
Modesto song sparrow *Melospiza melodia heermanni (nesting)*	*	SSC	Nests in low, dense vegetation in riparian areas and freshwater marshes. Modesto population occurs east of Suisun Marsh, north to Butte and Glenn Counties, south of the greater Bay Area down to northwest Baja.	**Moderate.** Could nest in dense riparian and freshwater marshes within Project area.
Mountain plover *Charadrius montanus* (wintering)	*[6]	SSC	Winter resident on plowed fields, open grasslands with short vegetation, and open sagebrush areas in Central Valley, generally below 1000 feet and rarely near water. Avoids high, dense cover. Found in Central Valley from Sutter/Yuba County south, foothill valleys west of San Joaquin Valley, and Imperial Valley.	**Moderate.** No known occurrences or other reports within several miles, and most observations are from lower elevations than the Project, but there is potential habitat on grazed grasslands and other open areas with minimal vegetative cover.
Northern harrier *Circus cyaneus* (nesting)	*	SSC	Nests in a variety of open habitats, especially meadows, grasslands, and open rangelands in dense grasses and shrubs. Resident through much of the Central Valley and Bay Area as well as other parts of the State; may winter where it is not resident.	**Present.** Observed in Project area during spring 2014 surveys. Recorded around O'Neill Forebay. Suitably dense nesting habitat is limited; nesting potential highest around San Luis Reservoir/O'Neill Forebay.
Swainson's hawk *Buteo swainsoni* (nesting)	*	ST	Nests in riparian areas and isolated tree stands in open desert, grassland, and cropland. Forages in grasslands, pastures, and suitable grain or alfalfa fields. Primarily a summer resident of the Central Valley and northeastern California; small year-round population in the Delta.	**Present.** Multiple observations in Project area during 2014 surveys. Recently recorded nesting at Orestimba Creek, and observed there during Project surveys; recent nest records near O'Neill Forebay and observed there during Project surveys. Potential to nest in multiple locations throughout Project area.

Table 3.4-2. Special-Status Wildlife Species and Critical Habitat[1] that Occur or May Occur in or Near the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status		Habitat Type and General California Range	Potential to Occur in Project Area[4]
	Fed[2]	State[3]		
Tricolored blackbird *Agelaius tricolor* (nesting colony)	*	SE	Nests in large colonies near open water in cattail, bulrush, willow, blackberry, wild rose, nettle, and thistle, with open foraging habitat nearby. Endemic and highly colonial. Most numerous in Central Valley. In December 2014, was emergency-listed as endangered for an initial term of 6 months (expires June 29, 2015). CDFW determined in March 2015 that a listing action may be warranted.	**Present.** Recent records east of O'Neill Forebay, within Proposed Project corridor south of Gonzaga Rd, and around the western edge of San Luis Reservoir; slightly older records farther north. Suitable nesting habitat in a few locations and males heard singing (nesting not detected) at Mountain House Creek. Observed in the Proposed Project North Segment and the Butts Road and West of O'Neill Forebay alternatives during surveys.
White-tailed kite *Elanus leucurus* (nesting)	*	CFP	Low rolling foothills/valley margins with scattered oaks; open grasslands, meadows, or marshes near isolated dense-topped trees for nesting and perching. Found throughout coastal and interior California; absent from higher elevations and heavily wooded areas.	**Moderate.** Historic record near Tracy Substation; few other reports in or near Project area. Suitable foraging habitat in shrublands, grasslands, and marshes; potential nesting habitat in riparian woodlands or non-native trees.
Yellow-headed blackbird *Xanthocephalus xanthocephalus* (nesting)	*	SSC	Nests in freshwater marshes near open water. Found in Central Valley, northeastern and eastern California, and patchily distributed in southern California. Scarce breeder in Central Valley.	**Moderate.** Historic records from Project vicinity. Potential habitat in freshwater marshes around O'Neill Forebay.
Migratory birds	MBTA	Cal FGC	Nesting migratory birds and their eggs and nests are protected by State and federal statute.	**Present.** Nests of a few species of migratory birds found in 2014 and others likely.
MAMMALS				
American badger *Taxidea taxus*	*	SSC	Most abundant in drier, open stages of most habitats; uses underground dens. Resident in suitable habitat throughout the State.	**Present.** Presumed present throughout Project area.
Fresno kangaroo rat *Dipodomys nitratoides exilis*	FE	SE	Occurs in alkali sink and open grassland habitats on the floor of the San Joaquin Valley. Not known to occur west of I-5.	**Not Likely to Occur.** Range of this species does not overlap with Project area.
Giant kangaroo rat *Dipodomys ingens*	FE	SE	Inhabits grassland and shrub communities on flat to gently sloping (10–22%) terrain. Historic range included Merced County; current range includes Fresno and San Benito Counties. Not currently known to occur in Merced County.	**Low.** Project is outside of current known range, but suitable habitat is present.

Table 3.4-2. Special-Status Wildlife Species and Critical Habitat[1] that Occur or May Occur in or Near the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status		Habitat Type and General California Range	Potential to Occur in Project Area[4]
	Fed[2]	State[3]		
Short-nosed kangaroo rat *Dipodomys nitratoides brevinasus*	*	SSC	Occupy grasslands with scattered shrubs and desert-shrub associations on friable soils on flats and gently rolling terrain; generally more numerous in lighter, friable soils. Not known to occur in the Project area; general range and habitat overlap with giant kangaroo rat.	**Moderate.** Unlikely in most of Project area, but potential in grasslands south of O'Neill Forebay.
Riparian (=San Joaquin) woodrat *Neotoma fuscipes riparia*	FE	SSC	Found in riparian areas supporting trees and brush. Nests in trees, snags, or logs, talus, or lodges in downed woody material. Known only from a single population on San Joaquin River in Caswell Memorial State Park.	**Not Likely to Occur.** Range does not overlap with Project area and suitable habitat not present.
Riparian brush rabbit *Sylvilagus bachmani riparius*	FE	SE	Typically inhabits dense thickets of wild rose, blackberry, coyote bush, and wild grape. Rarely ventures far from dense cover. Very restricted distribution; known only from in and around Caswell Memorial State Park in San Joaquin County and introduced to San Joaquin River NWR in Stanislaus County.	**Not Likely to Occur.** Range does not overlap with Project area and suitable habitat not present.
Pallid bat *Antrozous pallidus*	*	SSC	Roosts in rocky outcrops, cliffs, caves, mines, trees (including orchards), bridges, barns, porches, bat boxes, occupied and vacant buildings, and even on or near the ground. Forages over open grasslands, oak savanna grasslands, open pine forests, talus slopes, gravel roads, orchards, and vineyards. Range includes all of California.	**Moderate.** Potential roosting habitat occurs in rocky areas, orchards, and riparian or other trees throughout Project area.
Townsend's big-eared bat *Corynorhinus townsendii*	*	Cand	Found in a variety of habitats. Roosts in caves, mines, tunnels, and buildings, preferring sites with caves and cavernous features; also roosts in old-growth sycamore. Most common in mesic areas. Found in suitable habitats throughout California.	**High.** Recorded just south of Corral Hollow Road ~3 miles west of Project area. No known maternity or hibernating habitat within or near Project area. Roosting unlikely, but potential for foraging individuals.
Western mastiff bat *Eumops perotis*	*	SSC	Roosts primarily in cliffs high above the ground; may also use crevices in buildings, bridges, or boulders. Most common in broad, open areas in habitats from deserts to woodlands to alpine meadows. Range principally desert southwest regions, but extends through coast ranges to SF Bay and elsewhere in California to the Oregon border.	**Moderate.** Suitable cliff habitat for roosting occurs in two locations in the study area.
Western red bat *Lasiurus blossevillii*	*	SSC	Roosts primarily in foliage of mature trees, especially willows, cottonwoods, sycamores, and walnuts, in edge habitats adjacent to streams, open fields, orchards, and sometimes urban areas. Females riparian-dependent. Prefers edges or habitat mosaics with trees for roosting and open areas for foraging. Found throughout California from Sierra/Cascade foothills west to the coast; absent from northern California.	**Moderate.** Potential habitat in mature riparian forest throughout Project area.

Table 3.4-2. Special-Status Wildlife Species and Critical Habitat[1] that Occur or May Occur in or Near the San Luis Transmission Project Biological Study Area

Scientific Name / Common Name	Listing Status		Habitat Type and General California Range	Potential to Occur in Project Area[4]
	Fed[2]	State[3]		
San Joaquin kit fox *Vulpes macrotis mutica*	FE	ST	Dens and forages in grassland, shrubland, alkali meadow, playa, valley oak savanna, and agricultural edges with loose soils. Endemic to Central Valley; current range is San Joaquin Valley and surrounding foothills from southern Kern County north to Contra Costa, Alameda, and San Joaquin Counties.	**Present.** Recorded in Project area, and a carcass was observed in Project area during spring 2014 surveys. Presumed present but rare throughout Project area.

1 - See Appendix C for locations of critical habitat.

2 - Federal Status:
FE = Endangered – FESA
FT = Threatened – FESA
BGEPA = Bald and Golden Eagle Protection Act
MBTA = Migratory Bird Treaty Act
* = no federal status

3 - State Status:
SE = Endangered – CESA
ST = Threatened – CESA
Cand = candidate for listing as threatened or endangered under the CESA
SSC = California species of special concern
CFP = California fully protected. Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.
Cal FGC = species protected by California Fish and Game Code
* = no state status

4 - Likelihood of occurrence determined by habitat presence and quality, regional species occurrence records, and geographic range. See Appendix C for additional species considered unlikely to occur, and rationale for each.

5 - Recent genetic work suggests that the former single species, *Anniella pulchra,* comprises multiple species-level taxa (Papenfuss and Parham, 2013). Likely form that occurs in Project area is *A. pulchra*, but geographical limits of proposed species are unknown at this time.

6 - Mountain plover was formerly proposed for listing as threatened under the FESA but the proposed rule was withdrawn in May 2011.

Wetlands and Waters of the U.S. and State

Wetlands and waters that are potentially subject to the USACE and Regional Water Quality Control Board (RWQCB) jurisdiction under the Federal Clean Water Act (CWA), and CDFW jurisdiction under Fish and Game Code Section 1602 were identified throughout the Project study area and are described in detail in Appendix C. A formal jurisdictional delineation is currently in preparation, and will be used by Western to support applicable permitting requirements in compliance with the CWA and other applicable regulations. The following summarizes the potential wetlands and waters of the U.S. and State identified in the study area.

Creeks and Drainages. Large perennial or intermittent creeks and drainages include Mountain House Creek, Patterson Run, Corral Hollow Creek, Lone Tree Creek, Hospital Creek, Del Puerto Creek, Salado Creek, Crow Creek, Orestimba Creek, Garzas Creek, Romero Creek, San Luis Creek, Los Banos Creek, and Ortigalita Creek. Corral Hollow Creek, Mountain House Creek, Del Puerto Creek, Lone Tree Creek, and Salado Creek had some water within the channel at the time of Project surveys. These creeks also supported freshwater marsh communities within the channel and a cottonwood-willow riparian tree and shrub community along the banks. Smaller, named intermittent drainages within the study area include Martin Creek, Arkansas Creek, Mustang Creek, Ingram Creek, Ortigalita Creek, and Little Salado Creek.

The perennial and intermittent creeks and drainages in the study area are subject to federal and State regulation. Some of the ephemeral drainages may not be jurisdictional under the USACE but would be considered by the State agencies as waters of the State and subject to regulation by the RWQCB and possibly by CDFW.

Aqueducts and Irrigation Ditches and Canals. The Project area crosses the Delta-Mendota Canal and the California Aqueduct near the intersection of I-205 and I-580, and crosses the Aqueduct again south of the O'Neill Forebay. These canals are man-made, concrete-lined channels and although water levels may fluctuate seasonally, the channels are never dry. These aqueducts do not support riparian tree and shrub cover or emergent wetland vegetation, and they are strictly open-water channels. The waters of the Delta-Mendota and California Aqueducts are not jurisdictional since they were constructed in uplands and are not natural drainages.

The Proposed Project and alternative corridors also cross several irrigation ditches and canals for hay and alfalfa fields. These are either vegetated or unvegetated and some are concrete lined while others are constructed earthen channels. The irrigation ditches and canals are located mostly in the vicinity of Tracy in the northern portion of the Project study area. Although man-made and constructed primarily in uplands, these features could be considered jurisdictional by the USACE if they support wetland vegetation and if they connect hydrologically to a natural creek or navigable waters. The RWQCB could exert jurisdiction over irrigation ditches and canals as waters of the State. However, CDFW likely would not exert jurisdiction as they are not natural channels.

Lakes, Ponds, and Impoundments. Lakes in the study area are large and greater than 6 feet (1.8 m) in depth. Ponds are small and less than 6 feet (1.8 m) deep. Ponds that were created as a result of impounding water within a drainage, such as stock ponds and man-made ponding features, are considered impoundments. Three areas were identified as lakes, the O'Neill Forebay, the San Luis Reservoir, and the Los Banos Creek Reservoir; these are located in the southern portion of the study area. These areas lack wetland vegetation and portions of the banks are concrete-lined. Many of the ponds in the study area have some emergent wetland vegetation around the pond edge.

Lakes, ponds, and impoundments likely qualify as waters of the U.S. and State and may~~would~~ be under the jurisdiction of the USACE, RWQCB, and CDFW. Ponds that are not associated with a natural drainage, and are therefore not hydrologically connected to waters of the U.S., may not have any federal jurisdiction as defined by the USACE.

Freshwater Marsh. Freshwater marshes in the study area occur as a fringe of permanently flooded emergent marsh at and below the ordinary high water of Corral Hollow, Mountain House, Lone Pine, and Salado creeks and flooded portions of roadside ditches and in some of the irrigation ditches. There are also some isolated freshwater marsh areas that may be remnant portions of drainages that have been filled. Portions of this habitat may be seasonally or infrequently exposed during low water or in drought years.

Freshwater marsh is a wetland type and all wetlands are potentially subject to federal and State regulation. If they are hydrologically isolated then there is no federal jurisdiction, but ~~would still~~ may qualify as waters of the State under the RWQCB's jurisdiction.

Vernal Pools and Swales. These are seasonal wetlands that occur as depressions within grassland habitat and typically have a restrictive layer such as a hard pan or clay pan in the lower soil profile that creates water ponding for a sufficient length of time to support wetland vegetation, and specifically, plant species associated with vernal pools. Vernal pools are a wetland type and all wetlands are potentially subject to federal and State regulation. ~~If they are hydrologically isolated then there is no federal jurisdiction~~Vernal pools and swales adjacent to a jurisdictional tributary or with a significant nexus to a TNW may be federally regulated, ~~but would still~~and may qualify as waters of the State under the RWQCB's jurisdiction.

Seasonal Wetlands. Areas identified as seasonal wetlands, but not as vernal pools, occur as shallow to deep depressions, in ditches or intermittent drainages, or above man-made levees, and can include wetlands adjacent to ponds. Some seasonal wetlands were mapped along and within the major creek drainages such as at Patterson Run, Corral Hollow Creek, and Del Puerto Creek. All wetlands are potentially subject to federal and State regulation. Any seasonal wetlands adjacent to a jurisdictional tributary or with a significant nexus to a TNW may be federally regulated, and may~~If they are hydrologically isolated then there is no federal jurisdiction, but would still~~ qualify as waters of the State under the RWQCB's jurisdiction.

Invasive Species

Invasive weeds include plants designated as federal noxious weeds by the USDA, species listed by the California Department of Food and Agriculture, and other exotic pest plants designated by the California Invasive Plant Council. Roads, highways, railways, utility corridors, and related construction Projects are some of the principal dispersal pathways for invasive weeds. The introduction and spread of pest plants adversely affect natural plant communities by displacing native plant species that provide shelter and forage for wildlife species.

A number of invasive species were observed in the Project area. The primary invasive weeds include giant reed (*Arundo donax*), perennial pepperweed, Italian thistle (*Carduus pycnocephalus*), winged thistle (*Carduus tenuiflorus*), tocalote (*Centaurea melitensis*), yellow star thistle, bull thistle (*Cirsium vulgare*), stinkwort (*Dittrichia graveolens*), and milk thistle. One very invasive grass species, medusa-head grass (*Elymus caput-medusae*), was also observed in some of the non-native grassland areas. Additional lower priority non-native, invasive species were observed as well; see Appendix C for more discussion of invasive weeds in the Project area.

Giant reed and perennial pepperweed are associated with wetland areas, and perennial pepperweed was observed in many locations throughout the Project area. Perennial pepperweed was observed in multiple locations including, but not limited to, Corral Hollow, Mountain House, Del Puerto, and Lone Tree Creeks. Giant reed was observed only at Corral Hollow Creek.

Wildlife Movement Corridors

Wildlife movement includes migration (usually one direction per season), inter-population movement (long-term genetic exchange), and small travel pathways (daily movement corridors within an animal's territory). While small travel pathways usually facilitate movement for daily home range activities such as foraging or escape from predators, they also provide connection between outlying populations and the main corridor, permitting an increase in gene flow between populations (Zuidema et al., 1997).

Linkages between habitat types can extend for miles between primary habitat areas and occur on a large scale throughout California. They facilitate movement between populations located in discrete areas and those located within larger areas. Even where patches of pristine habitat are fragmented,

such as occurs with coastal scrub and many other California habitats, movement between wildlife populations is facilitated through habitat linkages, such as migration corridors and movement corridors (Zuidema et al., 1997).

The Project study area is primarily open space, and existing barriers to wildlife movement include roads, highways, reservoirs, and canals. The area from the Los Banos Creek Reservoir to the north of San Luis Reservoir is a critical migration corridor for San Joaquin kit fox, and the San Luis Reservoir and O'Neill Forebay are substantial barriers to kit fox movement. Busy highways such as State Routes 152 and 33 and I-5, as well as existing urban development, are additional major barriers to movement for this species.

Conservation Easements

Several conservation easements for biological resources exist within the Project area and the study area, as shown in Table 3.4-3.

Table 3.4-3. Conservation Easements

Segment	Within Project Area (Corridors)	Within Study Area (Outside Project Corridors)
North Segment		
Proposed Project	• None	• Haera
Central Segment		
Proposed Project	• Simon Newman Ranch • Tracy 580 Business Park Preserve • CCWD Corral Hollow (pending) • Cubiburu Preserve • USFWS South Preserve	• Simon Newman Ranch • Tracy 580 Business Park Preserve • CCWD Corral Hollow (pending) • Cubiburu Preserve • USFWS South Preserve
Patterson Pass Road Alternative	• Simon Newman Ranch • Tracy 580 Business Park Preserve	• Simon Newman Ranch • Tracy 580 Business Park Preserve
San Luis Segment (500-kV)		
Proposed Project	• Romero Ranch • San Joaquin kit fox easement	• Romero Ranch • San Joaquin kit fox easement • Aqua Fria Phase I
Butts Road Alternative	• Romero Ranch	• Romero Ranch • Aqua Fria Phase I
West of Cemetery Alternative	• Romero Ranch	• Romero Ranch • Aqua Fria Phase I
San Luis Segment (70-kV)		
Proposed Project	• None	• Aqua Fria Phase I
West of O'Neill Forebay 70-kV Alternative	• Romero Ranch • San Joaquin kit fox easement	• Romero Ranch • San Joaquin kit fox easement
South Segment		
Proposed Project	• None	• Aqua Fria Phase I
San Luis to Dos Amigos Alternative	• None	• Aqua Fria Phase I
Billy Wright Road Alternative	• None	• Aqua Fria Phase I

3.4.1.2 Regulations, Plans, and Standards

Biological resources regulations, plans, and standards include the following. See Appendix C for details.

- **Federal Endangered Species Act (FESA), 16 U.S.C. §§ 1531, *et seq.*** Protects plants and wildlife that are listed as endangered or threatened by the USFWS and NMFS. Section 9 of FESA prohibits the "take" of endangered wildlife, which is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" 16 U.S.C. § 1532(19). For plants, this statute governs removing, possessing, maliciously damaging, or destroying any listed plant on federal land and removing, cutting, digging up, damaging, or destroying any listed plant on non-federal land in knowing violation of State law (16 USC § 1538). Under section 7 of FESA, federal agencies are required to consult with the USFWS if their actions, including permit approvals or funding, could adversely affect a listed species (including plants) or its critical habitat. Through consultation and preparation of a biological opinion, the USFWS may issue an incidental take statement allowing take of the species that is incidental to another authorized activity, provided the action will not jeopardize the continued existence of the species. Section 10 of FESA provides for issuance of incidental take permits to private parties provided a habitat conservation plan is developed.
- **Migratory Bird Treaty Act (MBTA), 16 U.S.C.§§ 703-712.** Under the MBTA it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg or any such bird, unless authorized under a permit issued by the Secretary of the Interior. Some regulatory exceptions apply. Take is defined in regulations as: "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." The MBTA protects more than 1,000 bird species, more than 800 of which occur in the U.S.
- **Federal Clean Water Act (CWA), 33 U.S.C. §§ 1251-1387.** The objective of the CWA is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." 33 U.S.C. § 1251. Section 404 of the CWA prohibits the discharge of dredged or fill material into "waters of the United States" without a permit from the USACE. 33 U.S.C. § 1344. Waters of the U.S. may include rivers, streams, estuaries, territorial seas, ponds, lakes, and wetlands. Wetlands are defined as those areas "that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3 7b). The U.S. Environmental Protection Agency also may have~~has~~ authority over wetlands and may override a USACE permit. Substantial impacts to wetlands may require an individual permit. Projects that only minimally affect wetlands may meet the conditions of one of the existing nationwide permits. A water-quality certification or waiver pursuant to section 401 of the CWA is required for section 404 permit actions; in California this certification or waiver is issued by one of nine RWQCBs.
- **Plant Protection Act of 2000, 7 U.S.C. §§ 7701, *et seq*.** Prevents importation, exportation, and spread of pests that are injurious to plants, and provides for the certification of plants and the control and eradication of plant pests. The Act consolidates requirements previously contained within multiple federal regulations including the Federal Noxious Weed Act, the Plant Quarantine Act, and the Federal Plant Pest Act.
- **Executive Order 13112, Invasive Species, 64 Fed. Reg. 6183 (1999).** Requires federal agencies to: "prevent the introduction of invasive species"; "detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner"; "monitor invasive species populations accurately and reliably, provide for restoration of native species and habitat conditions in ecosystems that have been invaded"; "conduct research on invasive species and develop technologies

to prevent introduction and provide for environmentally sound control of invasive species"; and "promote public education on invasive species and the means to address them."

- **Non-Indigenous Aquatic Nuisance Prevention and Control Act of 1990, Pub. L. No. 101-646, as amended by National Invasive Species Act of 1996, Pub. L. No. 104-332.** Establishes a program to prevent the introduction of, and to control the spread of, introduced aquatic nuisance species.
- **California Endangered Species Act (CESA).** Prohibits the take, possession, purchase, sale, import or export of endangered, threatened, or candidate species unless otherwise authorized by permit or in the regulations. Take is defined as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful actions. State lead agencies are required to consult with the CDFW to ensure that any action they undertake is not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse modification of essential habitat.
- **California Fish and Game Code sections 3511, 4700, 5050, and 5515 – Fully Protected Species.** Species designated as fully protected under California Fish and Game Code may not be taken or possessed at any time. Prohibits any State agency from issuing incidental take permits for fully protected species, except for scientific research.
- **Native Plant Protection Act (NPPA) of 1977 (California Fish and Game Code sections 1900-1913).** Created with the intent to "preserve, protect and enhance rare and endangered plants in this state." The NPPA is administered by the CDFW. The Fish and Game Commission has the authority to designate native plants as "endangered" or "rare" and to protect endangered and rare plants from take. The CESA provided further protection for rare and endangered plant species, but the NPPA remains part of Fish and Game Code.
- C**alifornia Fish and Game Code Section 1602 – Lake and Streambed Alteration Program.** Requires a that streambed alteration application be submitted to the CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." Often, Projects that require a streambed alteration agreement also require a permit from the USACE under section 404 of the Clean Water Act. In these instances, the conditions of the section 404 permit and the streambed alteration agreement may overlap.
- **California Food and Agriculture Code regulations governing noxious weeds.** The California Food and Agricultural Code contains several laws related to noxious and invasive weeds. These include laws related to insect pest control, rodent and weed control and seed inspection, weed-free areas and weed eradication areas, a list of noxious weed species, prohibitions on exotic species introductions, plant quarantine and pest control, and laws targeting specific weed species such as tamarisk.

3.4.2 Corridor Alternatives

The study area for biological resources includes the Project area (the area within which Project components could be located) and a buffer area, as described in Section 3.1. Plant communities, wetlands and waters of the U.S. and State, and special-status species occurrences were surveyed for and mapped only within the Project area, including alternative corridors, but their potential for occurrence has been extrapolated to the entire study area in this description of existing conditions to account for resources that could occur in adjacent areas and could be indirectly affected by the Project or could move in to the Project area prior to Project implementation. See Appendix C for more details on the biological resources in the alternative corridors.

3.4.2.1 Patterson Pass Road Alternative

The alternative corridor largely overlaps the Proposed Project, and most of the affected environment for biological resources would be similar. Sensitive habitats and potentially jurisdictional waters in the Patterson Pass Road Alternative include ephemeral creek, intermittent creek, freshwater marsh, pond, vernal pool, wildflower fields, Great Valley cottonwood riparian forest, and seasonal wetlands. There are 2,525 acres of annual grasslands. Three special-status plants were observed during surveys: round-leaved filaree, small-flowered morning glory, and hogwallow starfish. The alternative corridor also has a eucalyptus grove at Lone Tree Creek that supports a variety of nesting birds, and elderberry shrubs that could support the Valley elderberry longhorn beetle. This alternative overlaps designated critical habitat for the California red-legged frog in the northern portion.

3.4.2.2 Butts Road Alternative

The alternative corridor lies farther to the west in comparison to the Proposed Project between Butts Road and the San Luis Substation. Sensitive habitats and potentially jurisdictional waters in the Butts Road Alternative include ephemeral creek, intermittent creek, other drainages and impoundments, irrigation ditches, freshwater marsh, lake, pond, vernal pool, native perennial grasslands, coyote brush scrub, and seasonal wetlands. There are 903 acres of annual grasslands. Tricolored blackbird was observed during surveys. This alternative has potential blunt-nosed leopard lizard habitat.

3.4.2.3 West of Cemetery Alternative

This alternative corridor lies farther west of the Proposed Project and traverses more varying terrain. Sensitive habitats and potentially jurisdictional waters in the West of Cemetery Alternative include ephemeral creek, intermittent creek, irrigation ditches, other drainages, freshwater marsh, lake, pond, vernal pool, native perennial grasslands, seasonal wetlands, and coyote brush scrub. There are 995 acres of annual grasslands. This alternative has potential blunt-nosed leopard lizard habitat.

3.4.2.4 West of O'Neill Forebay 70-kV Alternative

A great portion of this alternative corridor overlaps with the Butts Road Alternative and the Proposed Project. Therefore, where they overlap, the existing biological resources would be similar to that described for the Proposed Project and alternative. Sensitive habitats and potentially jurisdictional waters in the West of O'Neill Forebay 70-kV alternative include ephemeral creek, irrigation ditches, other drainages and impoundments, freshwater marsh, lake, vernal pool, seasonal wetlands, and coyote brush scrub. There are 472 acres of annual grasslands. Tricolored blackbird was observed during surveys. This alternative has potential habitat for several special-status species, including San Joaquin kit fox, burrowing owl, California tiger salamander, and blunt-nosed leopard lizard.

3.4.2.5 San Luis to Dos Amigos Alternative

The alternative corridor largely overlaps with that of the Proposed Project between the San Luis and the Dos Amigos Substations. Therefore, the existing biological resources would be similar to that described for the Proposed Project. However, this alternative corridor has no seasonal wetlands. The alternative corridor has 611 acres of annual grasslands, and San Joaquin kit fox was detected during Project surveys.

3.4.2.6 Billy Wright Road Alternative

The Billy Wright Road Alternative corridor largely overlaps with that of the Proposed Project in the vicinity of the San Luis Substation. The alternative corridor deviates west from the Proposed Project

corridor just south of the Los Banos Substation. From that point, the alternative corridor lies farther west of the Proposed Project and traverses more rugged terrain. The alternative corridor rejoins with the Proposed Project corridor approximately 2 miles from the Dos Amigos Substation, and biological resources in this southernmost portion of the alternative would be the same as the Proposed Project. This alternative is a total of 1.5 miles longer than the Proposed Project in the southern segment. Sensitive habitats and potentially jurisdictional waters in the Billy Wright Road Alternative include ephemeral creek, intermittent creek, freshwater marsh, irrigation ditches, other drainages, and vernal pool. In addition, this alternative corridor contains approximately 17.5 acres of wildflower fields, a habitat that can support several special-status plants. The Proposed Project corridor does not contain any mapped wildflower fields in the southern segment. There are approximately 685 acres of annual grasslands mapped in this alternative corridor, and San Joaquin kit fox sign was detected near this corridor during surveys. This alternative has potential habitat for the blunt-nosed leopard lizard.

3.5 Cultural Resources

This section describes the existing cultural resources in the study area, which is defined as the Proposed Project and alternative corridors plus a one-quarter-mile buffer surrounding them. The primary focus is on the cultural resources present and potentially encountered within the Proposed Project and alternative corridors. Impacts to cultural resources, including destruction, disturbance, degradation, or other adverse effects to resources, are analyzed in Section 4.5 (Cultural Resources).

Cultural resources reflect the history, diversity, and culture of the region and people who created them. They can be natural or built, purposeful or accidental, physical or intangible. They encompass archaeological, traditional, and built-environment resources, including but not necessarily limited to buildings, structures, objects, districts, and sites. Cultural resources include sites of important events, traditional cultural places and sacred sites, and places associated with an important person. This section is primarily based on three documents produced in support of this EIS/EIR and the regulatory responsibility of Western and the Authority: *Cultural Resources Background and Field Strategy Report for the San Luis Transmission Project (SLTP), Alameda, San Joaquin, Stanislaus, and Merced Counties, California* (Holm et al., 2014a), the *Cultural Resources Inventory for the San Luis Transmission Project (SLTP), Alameda, San Joaquin, Stanislaus, and Merced Counties, California* (Holm et al., 2014b), and the *Cultural Resources Addendum Inventory for the San Luis Transmission Project (SLTP), Alameda and Merced Counties, California* (Ballard et al., 2015).

The analysis presented here and in Section 4 seeks to fulfill the responsibilities of Western under NEPA and Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. § 470, and the Authority's responsibilities under CEQA.

Under Section 106 of NHPA, Western is responsible for considering the impact of any project on cultural resources that are listed on or eligible for listing on the National Register of Historic Places (36 CFR Part 800). To fulfill this responsibility, Western must, in consultation with the California State Historical Preservation Officer (SHPO) and any interested Native American Tribes, identify the area of potential effect of the undertaking, identify any National Register eligible resources within the area of potential effect, and assess the potential effects to the identified resources. To resolve any adverse effects, Western must prepare a MOA or PA with the SHPO setting out the measures that Western will take to avoid, minimize, or mitigate the adverse effects (ACHP, 2013). For further description of Section 106 and the NHPA, refer to Section 3.5.1.2.

As the State lead agency, the Authority is tasked with carrying out the environmental impact analysis pursuant to CEQA. This includes identifying the environmental impacts of proposed projects, determining if the impacts will be significant, and identifying alternatives and mitigation measures that will substantially reduce or eliminate significant impacts to the environment. Any cultural resources within a project area must be identified, evaluated for their eligibility for listing on the California Register of Historical Resources, and any impacts to eligible resources must be identified and mitigation designed to reduce those impacts (OHP, 2013). For further description of CEQA, refer to Section 3.5.1.2.

Methods

Cultural resources specialists conducted a study consisting of a detailed Class I records review and an intensive Class III pedestrian survey. These efforts are detailed in Holm et al., 2014a; Holm et al., 2014b; and Ballard et al., 2015; the following discussion is based on those documents.

Records Search and Archival Research

The Class I inventory is a summary of literature, records, and other documents that describe the cultural resources within the Project study area. The Class I inventory study area encompassed a one-quarter-mile buffer surrounding the Proposed Project and alternative corridors. The Proposed Project and alternative corridors are between 300 to 500 feet wide, but reach a maximum width of more than 3,500 feet in some locations. The first inventory was performed in March and April 2014. A second inventory of areas not covered by the first inventory was performed in April 2015 (Ballard et al., 2015; Holm et al., 2014a).

Pedestrian Survey

Cultural resources surveys of the accessible portions of the Proposed Project and alternative corridors were conducted in May and June 2014 and in April 2015. A total of 2,842 acres of the Proposed Project corridor were subject to intensive, full coverage pedestrian surveys and an additional 441 acres were subject to opportunistic survey (survey conducted to the greatest extent feasible given topographic constraints). Within the alternative corridors, 2,724 acres were subject to full-coverage surveys and an additional 369 acres were subject to opportunistic survey. A total of 3,749 acres were not surveyed due to issues accessing particular parcels within the Proposed Project and alternative corridors.

Cultural Resources Categories

Four broad types of resources are considered in this EIS/EIR: prehistoric archaeological resources, historic period archaeological resources, built-environmental resources, and ethnographic resources. Two numbering systems for cultural resources are used in California: the trinomial system featuring the State abbreviation followed by a three letter abbreviation of the county and a sequential number (e.g., CA-MER-94) and the P-number system, composed of a P followed by a numerical county indicator and then a sequential number (e.g., P-24-001931). Most archaeological and some built-environment resources have identifiers assigned in both numbering systems.

Prehistoric archaeological resources are places that have preserved the signs of Native American life before contact with Europeans and Euro-Americans in the 1770s. The activities preserved in these resources are broad and may include rituals, food acquisition and preparation, quarrying stone, and building shelter. Prehistoric resources can consist of lithic scatters/workshops, groundstone scatters, habitation sites or temporary camps, prehistoric trails, stone quarries, bedrock milling features, rock art, architectural features, and rock features. Additionally, they may contain human remains in the form of burials, cairns, or cremations.

Historic period archaeological resources are places that have preserved the signs of the lives and activity of people who lived in America between 1769 AD and 50 years before the present. Like prehistoric archaeological resources, historic period archaeological resources often occur around where people lived, but also include the remains of industrial, agricultural, recreational, and waste management activities. These can be surface features, subsurface features, or the byproducts of activities such as food preparation or mining.

Built-environment resources were constructed at least 50 years before the present. The most obvious are historic-era buildings, but also include structures and objects.

Ethnographic resources are those places that have importance within a particular culture or are tied to important historical events. Generally these places are of importance to people in the present even though they reflect aspects of local, State, or national history, are tied to particular people, or to the

mythology and traditions of particular cultures. One type of ethnographic resource is the Traditional Cultural Property (TCP). They are most commonly associated with Native American cultures but also include areas important to other social groups.

Environmental and Cultural Settings

Environmental Setting

The SLTP study area crosses through several physiographic provinces and biotic communities. The two main provinces are the San Joaquin Valley, a vast alluvial plain that is drained by the San Joaquin River, and the Diablo Range Foothills. This range is the portion of the California Coast Ranges that extends from the Carquinez Strait in the north to Orchard Peak in the south. It is bordered by the San Joaquin Valley to the east and the Santa Clara Valley to the west. The northern end of the San Joaquin Valley contains part of the San Joaquin–Sacramento Delta, a large inland delta formed by the confluence of the San Joaquin and Sacramento Rivers. The portion of the San Joaquin Valley surrounding the SLTP study area is primarily characterized by the Valley grassland vegetation community that consists of an open area covered with bunchgrasses and with occasional oak trees. It also includes limited areas near streams and rivers featuring riparian woodlands and freshwater marshes. Like the adjacent portions of the San Joaquin Valley, the Diablo Range Foothills are dominated by Valley grassland, with occasional riparian woodlands.

Prehistoric Setting

Prehistoric archaeologists use many different terms to categorize and interpret units of past cultural, technological, or functional diversity. Terms for interpretive units in the prehistoric era are used inconsistently across California and in many cases overlap. Three common terms are used in this analysis to refer to these units of the prehistoric past: period, pattern, and complex. A "period" is a span of time that has a beginning and an end defined by significant changes in the archaeological record (Society for California Archaeology, 2014). A "pattern" is a cultural trait shared by a number of different cultures within a geographic region that exists over an appreciable period of time. It is characterized by the use of similar technologies, economies, and burial practices (Bennyhoff and Fredrickson, 1994). A "complex" is a unit that has distinct types of artifacts and is found within a certain area during a particular time (Society for California Archaeology, 2014). In this document, a complex can be understood to be a local expression or regional variation of a larger pattern.

Californian Native Americans within the Central Valley developed a sophisticated material culture, became central figures within an extensive trade system incorporating distant and neighboring regions, and achieved population densities equaled only by agricultural societies in the American Southwest and Southeast. In this area, prehistory is generally broken up into five periods: the Paleo-Indian Period (13,500–10,500 before present [BP]), the Lower Archaic Period (10,500-7,500 BP), the Middle Archaic Period (7,500-2,500 BP), the Upper Archaic Period (2,500-850 BP), and the Emergent Period (850-150 BP).

Paleo-Indian Period (13,500–10,500 BP)

The best available archaeological evidence indicates that the earliest inhabitants of North America arrived sometime around 13,500 years ago. Evidence for Paleo-Indian occupation of the San Joaquin Valley comes primarily from isolated finds of fluted projectile points, including one point collected from Merced County (CA-MER-215, the Wolfsen Mound) near Newman several miles east outside of the SLTP project area. Evidence for early human occupation within the San Joaquin Valley remains sparse, though recent studies have highlighted the potential to encounter Paleo-Indian sites in buried Late

Pleistocene deposits that have been subject to repeated episodes of deposition and erosion. No Paleo-Indian period resources were identified in the SLTP study area.

Lower Archaic Period (10,500-7,500 BP)

A change in the climate towards wetter, warmer weather at the end of the Pleistocene caused a period of increased runoff and higher water flows from storms and glacial melting. This runoff accelerated erosion in the foothills, producing alluvial fans, cone-shaped depositions of sediment at the base of streams, and floodplains, large accumulations of sediment from streams and river flows in the San Joaquin Valley, beginning around 11,000 BP. These formations resulted in a large amount of soil accumulating over the original ground surfaces of the late Pleistocene and early Holocene. A second episode of fan and floodplain deposition occurred at the beginning of the middle Holocene, around 7500 years B.P., presumably covering the majority of earlier Lower Archaic archaeological resources in the San Joaquin Valley. This made evidence for the Lower Archaic Period occupation of the San Joaquin Valley relatively sparse and mostly represented by isolated finds such as stemmed projectile points, flaked stone crescents, and steep-edged, flaked stone tools found along the shores of Tulare Lake in Tulare County. Although little evidence for milling or plant processing tools has been recovered from Lower Archaic Period valley basin assemblages, investigations in the eastern Diablo Range foothills have revealed extensive signs of early plant processing. Lower Archaic Period sites in the Diablo Range foothills were seasonally occupied and contain abundant groundstone milling tools such as handstones and milling slabs. The distinct foothill and valley basin cultural traditions and adaptations seen in Middle Archaic Period sites emerged during the Lower Archaic Period. No Lower Archaic period resources were identified in the SLTP study area.

Middle Archaic Period (7,500-2,500 BP)

The Middle Archaic Period was generally a time of warmer, drier climatic conditions and many of the large, rain-fed lakes that hunter-gatherers relied on gradually receded or disappeared. At the same time, alluvial fans and floodplains stabilized, and the extensive wetland habitat of the Sacramento–San Joaquin River Delta formed as rising sea levels pushed inland. During the Middle Archaic Period, the patterns of settlement and the reliance on different foods became distinct between foothill and valley floor populations. Foothill sites generally contain abundant groundstone tools for chopping, scraping, and pounding along with plant remains dominated by acorns and pine nuts. Projectile points included notched, stemmed, thick-leaf, and narrow concave base darts with a high degree of local and regional variability.

In contrast to the eastern foothills of the Diablo Range, comparatively few Middle Archaic Period sites within the San Joaquin Valley basin have been discovered, largely because of more recent soil deposition and urban and agricultural development. Sites associated with the later part of the Middle Archaic Period (ca. 4,500 BP) are more common. These sites have yielded elaborate and diverse assemblages of artifacts that reflect complex societies focused on resources available along rivers and in marshes, called the Windmiller Pattern. One of the important markers of Windmiller Pattern sites is burials where people are in an extended position facing west. This pattern has been identified near the SLTP study area at sites including the Menjoulet Site (CA-MER-3), located between the Proposed Project and the Billy Wright Road Alternative corridors, in the Los Banos Reservoir.

In the area surrounding the SLTP corridors, two cultural complexes have been identified: the Positas Complex (5,250-4,550 BP) and the Pacheco Complex (4,550-1,650 BP). The Positas Complex was distinguished by small mortars and short, cylindrical pestles, as well as millingslabs, perforated flat cobbles, and beads made by removing the tip of the *Olivella* shell. The beginning of the Pacheco Complex, referred to as Pacheco A (4,550-3,550 BP) is marked by leaf-shaped projectile points, rectangular *Haliotis* pendants, and thick beads from the wall of *Olivella* shells. The latter part, Pacheco B (3,550-1,650 BP),

was characterized by a large number of *Olivella* shell beads, bone awls, stemmed and side-notched projectile points; and abundant millingslabs, mortars, and pestles. Both the Positas and the Pacheco complexes were first identified at the Grayson Site (CA-MER-94), located approximately 5 miles west of the SLTP under the San Luis Reservoir. Resources identified within the SLTP study area may date to the Middle Archaic period.

Upper Archaic (2,500-850 BP)

Climatic conditions became cooler and wetter during the early Upper Archaic Period. The lakes that had receded during the Middle Archaic Period returned to their former levels. Increased soil deposition and formation also occurred, capping many earlier soils and land surfaces. The Upper Archaic Period was complex, with many social and political groups that developed their own variations of burial and artifact styles. These included bone tools and ornaments, widespread manufacture and distribution of *Olivella* beads and *Haliotis* ornaments, obsidian stone tool blanks produced from eastern Sierra Nevada Mountain obsidian sources, ceremonial blades, and charmstones. In the Delta and portions of the Sacramento and San Joaquin valleys, mortars and pestles became more common in the archaeological record, indicating a heavier reliance on acorns, while along the valley margins handstones and millingslabs appear in larger numbers, indicating that people were eating a mix of plant foods. Hunting and fishing focused on bulk processing of salmon, shellfish, rabbits, and deer or elk. A new cultural pattern, the Berkeley Pattern, appeared in the Delta and adjacent Diablo Range foothills. The Berkeley Pattern included new projectile point styles, flexed burial positions, and extensive accumulations of habitation debris reflecting long-term occupation of the same villages, built on mounds. In addition to the differences in burials and artifact styles, the people of the Berkeley Pattern appear to have been more focused on eating acorns and terrestrial hunting, compared to the wetland, river, and stream focus of the Windmiller diet. The appearance of the Berkeley Pattern may indicate the arrival of new populations into the area, likely speaking different languages than the Windmiller Pattern populations.

In some areas, the Windmiller Pattern was replaced by the Berkeley Pattern, but persisted within the San Joaquin Valley along the western and southern edges of the Delta and along the streams and marshes of Merced County. Representative sites include CA-MER-3 and CA-MER-215, located within several miles of the SLTP in Merced County. The western margins of the San Joaquin Valley appear to have been a transitional area, featuring cemeteries with flexed burials at CA-MER-94 (under the western portion of the San Luis Reservoir) or extended burials at CA-MER-3 (near the San Luis Dam), indicating the area was alternatively occupied by groups originating in the Valley and the Diablo Range. The local Upper Archaic Period sequence in the general area through which the SLTP passes is called the Gonzaga Complex (1,650-950 BP), first identified at the Grayson Site (CA-MER-94), located approximately 5 miles west of the SLTP under the San Luis Reservoir. The Gonzaga Complex is primarily known from funerary sites and was marked by a mix of extended and flexed human burials; bowl mortars; squared and tapered-stem projectile points; grass saws; circular, oval, or teardrop shaped *Haliotis* ornaments; and thin rectangular, split-punched, and oval *Olivella* beads. Resources identified within the SLTP study area may date to the Upper Archaic period.

The Emergent Period (850-150 BP)

The climatic conditions of the Emergent Period were generally similar to those of the present, but there were also periods of flooding, drought, and increased soil deposition. By the Emergent Period, California Native Americans living within the San Joaquin Valley had developed the cultural traditions that would be noted at the time of European contact. These traditions included technological adaptations such as the bow and arrow and the fish weir. Native trade networks also changed during the Emergent Period, as shell beads filled the role of currency throughout much of the region. Large, populous villages

developed along river courses to access seasonally abundant salmon runs, while smaller villages and residential communities continued to grow along the many side streams of the foothills and along the river channels and sloughs of the San Joaquin Valley floor.

In the region surrounding the SLTP, the Panoche Complex (450-100 BP) is the cultural system associated with the Emergent Period. This complex was first identified at the Grayson Site (CA-MER-94), located approximately 5 miles west of the SLTP under the San Luis Reservoir. Although the Panoche and Gonzaga complexes have been documented through a number of sites, there appears to have been a hiatus of approximately 500 years between them both. That lapse may be due to a period of unfavorable climatic conditions that could not support oaks and the people who depended on acorns for food. The Panoche Complex is linked with the wider Augustine Pattern that appears across much of Northern California in the Emergent Period. This pattern is essentially the way of life observed in the contact period, with people living in a system of large central villages that housed most of the population and local leaders surrounded by smaller villages and areas for particular hunting, gathering, and other activities. Characteristics of the Panoche Complex include the remains of large, circular dance houses; flexed burials and cremations; milling slabs; varied mortar and pestle types; bone awls, saws, whistles, and tubes; side-notched projectile points; clamshell disk beads; *Haliotis* disk beads; and *Olivella* lipped, side-ground, and rough disk beads.

Early accounts suggest that Pacheco Pass and the area around the San Luis Reservoir had been largely abandoned by local California Native Americans by the early 19th century, likely due to increased Spanish, Mexican, and American use of the pass. Bands of cattle and horse thieves frequently used Pacheco Pass and Spanish military expeditions also made incursions into the area in search of runaway mission neophytes. Collectively, these pressures proved too much for the local Native inhabitants who largely fled the vicinity by the 1840s and early 1850s. Resources identified within the SLTP study area may date to the Emergent period.

Ethnographic Setting

The SLTP falls within the traditional territory of the Northern Valley Yokuts. The Northern Valley Yokuts generally inhabited the territory extending from the crest of the Diablo Range in the west to the foothills of the Sierra Nevada Mountains in the east and from the San Joaquin River near Mendota in the south to the area midway between the Calaveras and Mokelumne rivers in the north. The San Joaquin Valley contained a population of over 40,000 people at the time of European contact.

The Yokuts were hunter-gatherers who divided themselves into kin and language-based groups, known as tribelets. The headman or chief of each tribelet lived in a centrally located village while most of the other members of the tribe lived in smaller, surrounding villages. Most of the Northern Valley Yokuts lived in the center or eastern parts of the San Joaquin Valley, with the SLTP vicinity less densely occupied. Villages were located along watercourses such as Los Banos and Panoche creeks. Settlements consisted of large, semi-subterranean round or oval dwellings with hard-packed floors, typically on high ground or piled earthen mounds constructed along water courses. Ceremonial sweat houses and assembly chambers were present in large central villages. These villages could hold over 200 inhabitants who lived there most of the year, with short periods of seasonal resource collecting trips.

The main foods for the Northern Valley Yokuts were local plants and animals typically found near water, as well as acorns and grass seeds. Freshwater fish available year-round and seasonal runs of spawning ocean fish were caught using weirs, nets, basketry fish traps, and bone- and antler-tipped harpoons. Birds following the Pacific Flyway were commonly hunted. Although elk, deer, rabbits, and other mammals were hunted, these animals appear not to have been an important part of the diet. In addition to

acorns, an array of seeds, roots, and corms were collected, processed, and consumed or stored. The Yokuts systematically tended the landscapes through routine pruning, brush clearance, and prescribed burns that improved the quality and quantity of plant yields.

Although the Northern Valley Yokuts were the predominant group in the region, there was interaction with neighboring hunter-gatherer groups, including Mutsun Ohlone-speaking groups of the Diablo Range and Monterey Bay and the Miwok-speaking groups of the northern Delta and Sierra Nevada foothills. This gave access to materials that do not occur naturally in the region, including shell from the Pacific Coast and obsidian from the Sierra Nevada and North Coast Ranges. The Pacheco Pass and the San Joaquin River were both corridors where this trade and contact regularly happened.

During the Mission Period (ca. 1776-1830s), large numbers of Northern Valley Yokuts were removed to Spanish missions in the San Francisco Bay Area, although many actively resisted the missions, fleeing into the tule marshes or raiding mission property. Like most Native Californian communities, Northern Valley Yokuts populations declined dramatically as they were decimated by epidemic diseases and missionization in the late 18th and early 19th century and again by the influx of American settlers in the mid-19th and 20th centuries. Today, however, several Yokuts communities persist and several have been federally recognized as extant, sovereign tribes. Six federally recognized tribes include Yokuts people in their modern membership: the Tule River Indian Tribe, the Santa Rosa Rancheria, the Picayune Rancheria of Chukchansi Indians, the Table Mountain Rancheria, the Tejon Indian Tribe of California, and the Tuolumne Band of Me-Wuk Indians. None of these tribes currently possess land in any of the four counties that SLTP runs through. However, any of them may have members who trace their ancestry back to the area and the Northern Valley Yokuts.

Historic Setting

Spanish Period (AD 1542-1821)

The historic period within Central California began when the Spanish expanded their frontier northward into California. A number of expeditions took place, largely aimed at identifying sites for the establishment of missions. Using a tripartite system of military forts called presidios, Catholic missions, and secular towns called pueblos, the Spanish government rapidly established a network of settlements from San Diego to San Francisco. In 1777, Misión Santa Clara de Asís and El Pueblo de San José were established in the southern San Francisco Bay, the largest Spanish period settlements near the SLTP. Exploration of the northern San Joaquin Valley only began with the Gabriel Moraga expeditions of 1806 and 1808. The 1806 expedition started in San Juan Bautista, explored portions of the San Joaquin River, and headed north, crossing the Merced and Stanislaus rivers before proceeding to the Mokelumne River. The 1808 expedition started from San José, carried out further explorations of the San Joaquin River, and then veered south to the Merced River. In 1811, Father Ramon Abella explored the San Joaquin River north into modern San Joaquin County.

Two main north-south travel routes linked Spanish Period missions and settlements. The coastal route, El Camino Real, eventually linked the chain of missions from San Diego to San Francisco. The interior route, El Camino Viejo, ran north from Los Angeles along the western edge of the San Joaquin Valley to the Patterson Pass near the present Tracy before turning west to Oakland. El Camino Viejo was used to transport livestock during the Spanish Period and during the Mexican Period. It passes through all four counties encompassing the SLTP project area. The El Camino Viejo likely paralleled the Proposed Project corridor and may have overlapped with the SLTP study area near the San Luis Reservoir in Merced County. The 1806 Moraga expedition also marked the historic period use of Pacheco Pass, an east-west

trending Native Californian trail that became an important historic period transportation route connecting the San Joaquin Valley to the coast via the town of San José.

Perhaps 30 land grants were issued to individual settlers during the Spanish Period, mainly located along the coast and in coastal valleys. Settlement within the Central Valley was sparse during the Spanish Period, generally associated with water locations along El Camino Viejo. One of the stopping points for water along El Camino Viejo was at El Arroyo de San Luis Gonzaga at Rancho Centinela just east of what is now the San Luis Reservoir in Merced County. Rancho Panocha de San Juan y los Carrisalitos, located in southwestern Merced County, also may have been occupied during the Spanish Period. Present day San Joaquin County apparently remained unsettled by the Spanish, though several 18th century expeditions documented contact with Native Californian villages.

The mild Mediterranean climate, abundant grasslands, and numerous creeks and rivers provided excellent conditions for ranching Spanish breeds of cattle, sheep, and horses. As a result, livestock and the hide and tallow trade became central to the economy of Alta California under Spanish and later Mexican rule. As livestock herds grew, they were parceled out to mission ranches and presidio pastures. Rangelands were not fenced and, as the herds grew, some of the unfenced livestock would scatter and turn feral. Wild herds of cattle and horses spread over large areas of the Diablo Ranges and the San Joaquin Valley. The western edge of the San Joaquin Valley, including those lands in the SLTP vicinity, would have been used mainly as grazing land during the Spanish Period.

Mexican Period (1821-1848)

Mexico gained independence from Spain in 1822, and Alta California became a part of the Mexican frontier. By the 1830s, the Mexican Government began to colonize their northern frontier. Mission lands were granted as ranchos to citizens of Alta California as a reward for loyal service. Beginning with the Jedediah Smith expedition in 1827, groups of American and British Canadian trappers and explorers began to cross over the Sierra Nevada and Cascade Mountains into the interior Central Valley to explore the region. One of these groups was likely the source of an 1831-1833 disease outbreak that killed over 60,000 Native Californians in the Central Valley. The 1844 Frémont expedition passed close to the SLTP vicinity as they travelled south across the Stanislaus and Merced rivers.

American forays into Mexican territory occurred in tandem with livestock raids conducted by Central Valley Miwok and Yokuts tribes during the 1830s and 1840s. These raids led to counter expeditions on the part of Mexican colonists. With increasing raids and territorial unrest, the Mexican Government sought to consolidate their hold over Alta California by granting a string of land grants along the San Joaquin River in present day San Joaquin, Stanislaus, and Merced Counties. These land grants included five near the SLTP study area: Orestimba Rancho, Rancho del Puerto, El Pescador, San Luis Gonzaga, and Panocha de San Juan y Los Carrisalitos. These grants represented an effort to increase the Mexican population with the region and thus solidify their hold over a somewhat unstable portion of their territory. The only rancho that intersected SLTP study area was Rancho San Luis Gonzaga, consisting of 48,000 acres surrounding Pacheco Pass that were granted to Juan Pérez Pacheco and José María Mejía in 1843. This rancho was devoted to cattle grazing and, to a lesser extent, agriculture. An adobe and rancho complex was constructed on the property in 1844 near San Luis Creek, now under the reservoir. During the American Period, the ranch became San Luis Ranch and continued to be held by the Pacheco family until 1962. The adobe served as a stage stop, café, and gas station before it was moved and largely destroyed in advance of construction of the San Luis Reservoir in 1962.

The Mexican Period economy focused on livestock ranching with little irrigated farming. The Mexican settlers received large land grants and appropriated existing mission irrigated fields, livestock, fences,

corrals, irrigation ditches, outbuildings, and other improvements. They tended to plant smaller fields near their adobe homes with subsistence crops, resulting in the decline of large-scale water system features. The emphasis on livestock ranching activities became known as the "hide and tallow trade." By the 1840s, there were an estimated 150,000 to 200,000 cattle hides exported annually from Alta California. Fences and ditches were used primarily to keep livestock out of rancho vegetable gardens, orchards, and grain fields, but not to mark rancho boundaries. Instead, livestock brands were used to separate herds. Fence types included prickly pear cactus hedges and walls made from stone or adobe. During this period, the western edge of the San Joaquin Valley, including those lands in the SLTP vicinity, continued to be used mainly as grazing land.

The Mexican-American War of 1846-1848 ended with the signing of the Treaty of Guadalupe Hidalgo, under which the U.S. annexed California and granted full American citizenship to Mexican citizens.

American Period (1848–Present)

In 1848, James Marshall discovered gold on the American River and the California Gold Rush began. The discovery of gold brought tens of thousands of gold-seekers from around the world, and those prospectors pushed further into the California interior than the Mexican Period settlers who preceded them. The wealth and expanding population of California spurred its speedy ratification as a State in 1850. Due to the rapid influx of settlers into California, legal determination of ownership of lands awarded by Spanish or Mexican authorities was often disputed. The U.S. Government passed the Land Act of 1851, placing the burden of proof-of-ownership on the grantees. As a result, the few California Native Americans who had received grants lost their titles, as did many Hispanic landowners.

The Gold Rush also shaped the course of California's agricultural landscape and settlement patterns. Not only did the Gold Rush almost instantly create a demand for a wide variety of agricultural foodstuffs, but it also set in motion a wave of settlement aimed at producing commercial food products. In the 1850s, intensive settlement occurred first in San Francisco and Sacramento and extended into the hinterlands as miners flocked to the gold fields. Early settlement in the San Joaquin Valley occurred along streams and rivers. Many of California's American settlers turned to agriculture as a way to profit due to the high demand for fresh foods.

As the period progressed, land use along the western edge of the San Joaquin Valley in the SLTP vicinity changed. Ranching continued to be important, but less for hides and more for beef and dairy production. With the construction of water systems, irrigated agriculture became common, first in areas of level land, then expanding into hillier areas with orchard crops. Mining and quarrying, while never major industries, did occur within the Diablo Range.

Early Settlements and County Histories. San Joaquin County was one of the initial counties established at statehood. The settlement of Stockton was established in 1847 prior to the Gold Rush and soon became a major transportation hub, serving as a transition point between steamer traffic on the San Joaquin River and mule and wagon traffic to the mines. As grain production within the San Joaquin Valley increased, Stockton became a major shipping hub for farms within the region. Tracy was established (near the SLTP study area) in 1878 when the Southern Pacific Railroad built a branch road to San Francisco by way of Martinez. The road was extended along the west side of Fresno, creating a junction at Tracy. Tracy soon became a terminal railroad point and the laying off place for hundreds of Southern Pacific employees, thus establishing a permanent settlement base. Newman was founded in 1888 around a Southern Pacific railroad station.

The other counties that encompass the SLTP study areas — Alameda, Stanislaus, and Merced Counties — were not among the original 27 counties. Alameda County was created in 1853 from portions of Contra

Costa and Santa Clara Counties. The area has long been a transportation corridor between the San Francisco Bay and the San Joaquin Valley. By the 1870s, Vallecitos Road followed the Livermore (now Altamont) Pass through the Diablo Range. An 1878 map of Alameda County shows the small community of Altamont about 5 miles west of the SLTP study area along the Livermore Pass as a railroad stopping point for the Western Pacific Railroad connection with the Transcontinental Railroad. Stanislaus County was established in 1854 and early settlement occurred primarily along the Tuolumne, Stanislaus, and San Joaquin rivers to the east of the SLTP study areas. Those early settlements functioned mainly as mining support towns, but evolved into agricultural communities during the 1870s. Merced County was organized in 1855 and early settlement was concentrated along the eastern side of the San Joaquin River then gradually extended to the west, ultimately encompassing the 19th and early 20th century settlements of Los Banos, Volta, and Gustine, all within 10 miles of the SLTP study area. Los Banos originated as an 1858 stage stop and was moved 5 miles to the east to the current location in 1889 to intersect with the railroad. Volta was established in 1890 along the north-south oriented San Pablo and Tulare Extension Railroad. Gustine, located approximately 5 miles east of the SLTP study area, began as a 1906 subdivision that was meant to rival the town of Newman in neighboring Stanislaus County. Development and industry along the SLTP study area mainly spread from these communities.

The Rise of Agriculture. Agricultural activity during the American Period was characterized by three types of pursuits: cattle and sheep ranching, grain farming, and irrigation agriculture. Cattle and sheep ranching remained dominant until the 1880s. During the 1850s and 1870s, free-ranging Spanish cattle were replaced by American breeds of livestock and dairy cows. Initially, in the 1850s, fences were built around agricultural fields to protect them from livestock and to define property and field lines. During the 1850s and 1860s, grain farmers gradually became more dominant in numbers and in agricultural politics. In 1866, a "No Fence" Act was passed to force ranchers to enclose their livestock pasturage, and by the early 1870s it became a statewide requirement.

During the late19th century, agricultural development in California was pushed by the spread of irrigation, improved transportation, the availability of agricultural labor, and increased mechanization. With the completion of the Transcontinental Railroad in 1869, farmers were able to ship fresh produce to markets in the East, encouraging a shift toward irrigated crops such as fruits, nuts, and vegetables in the 1870s. The transformation in the late 19th century from expansive grain fields and grazing lands to irrigated crops occurred relatively quickly and had profound consequences on the State's agriculture. The crusade to irrigate much of California played an important role in the expansion of mechanized farming and in the establishment of small farming communities.

Agriculture and ranching remained a substantial element of Alameda, San Joaquin, Stanislaus, and Merced Counties' economies during the early American Period and into the early 20th century. Large-scale viticulture and wine production were established during the late 1870s and 1880s. By 1893, there were 156 vineyards in the Livermore Valley area. On the west side of San Joaquin County, spanning the cities of Tracy and Patterson, farmers developed large-scale grain agriculture. Initially, grain crops were shipped from San Joaquin City, but with the establishment of railroads, trains quickly became the preferred mode of transport. The dairy industry became established in the area in the 1870s. By the 1930s, the production of dairy products had become more focused on cheese, butter, and condensed (rather than liquid) milk. Other major crops grown in the area included flax, peas, celery, and lettuce. Patterson, located roughly 3 miles east of the SLTP study area, was a planned agricultural colony settled by Midwestern Scandinavian farmers who primarily pursued dairying and orchard cultivation of apricots, peaches, and nuts.

In Merced County, the San Luis Gonzaga Rancho, held by the Pacheco family since the Mexican Period, transitioned to San Luis Ranch when Juan Perez Pacheco successfully received an American land patent in 1871.

By the late 19th century, the largest cattle ranching concern in Merced County was owned by Henry Miller and Charles Lux. Miller and Lux acquired the Rancho Sanjón de Santa Rita grant, which is located just east of the SLTP study areas. They also leased land from Juan Perez Pacheco to the northwest.

The Development of Water Conveyance Systems. The aridity of the western San Joaquin Valley began to pose problems for American Period agriculture during the late 19th century. Wells were initially used for irrigation, but as groundwater was depleted, canal projects were undertaken to move water from the San Joaquin River to the west. Henry Miller built a canal in 1871 from the San Joaquin River to the town of Los Banos and extended it to Los Banos Creek and Newman in subsequent years. The canals provided much of the irrigation for Miller's properties and for local agriculture. In 1887, the California Legislature passed the Wright Act, which formed irrigation districts across California. The Merced Irrigation District was established during the 1870s and 1880s for the eastern side of Merced County and developed many miles of canals.

By the 1920s, the depletion of groundwater reservoirs was a widely recognized problem within the western San Joaquin Valley. During the 1930s, the Federal Government began the CVP, a massive irrigation scheme that involved building dams throughout California. By the 1950s, the west side of the Central Valley had become the focus of both the federal CVP and a newly formed SWP. The area along Pacheco Pass in the Diablo Mountains was identified as the ideal site for the San Luis Reservoir. To avoid the unnecessary expense of parallel aqueducts, California agreed to partner with the Federal Government in the creation of the San Luis Unit in 1961. The San Luis Reservoir in the Diablo Range west of Los Banos would be filled with water supplied by the federal Delta-Mendota Canal and the State's California Aqueduct; both intersect with the SLTP study area. The Delta-Mendota Canal is part of a federal project that was completed in 1951. The Delta-Mendota Canal was built by the Bureau of Reclamation to replace the diverted water with water from the Sacramento River. The canal spans roughly 117 miles in length and ends at the Mendota Pool. In 1963, construction began on the California Aqueduct, a series of canals, tunnels, and pipelines. Construction of the aqueduct's main line was completed by 1971, with subsequent branches or extensions completed as late at 1997. The SLTP study area begins roughly one mile away from the north end of the California Aqueduct at Clifton Court Forebay. The California Aqueduct weaves in and out of the SLTP study areas in San Joaquin, Stanislaus, and Merced Counties.

Transportation Development. Driven largely by local topography, several transportation corridors developed within the SLTP vicinity over time. One such corridor ran roughly north-south along the western side of the San Joaquin Valley. This route was originally the Spanish El Camino Viejo; it became the Southern Pacific Railroad in the 19th century and I-5 freeway in the 20th century. Two east-west trending transportation corridors also cross the SLTP study areas and pass through the Diablo Range. The first is the Livermore Pass (now the Altamont Pass), located towards the northern end of the SLTP study areas in Alameda and San Joaquin Counties, and the second is the Pacheco Pass, located near the southern end in Merced County.

In Alameda and San Joaquin Counties, several attempts were made to establish a stage line bridging Stockton and Oakland by way of the Livermore Pass. The first short-lived attempt was made by Alonzo McCloud in 1854, a route that would have crossed the SLTP study area somewhere near Tracy. A second stage line that followed roughly the same route was established by Alvin and Samuel Fisher in 1859. Both failed due to competition with steamship lines from Stockton.

Pacheco Pass also served as a main transportation corridor connecting the southern San Francisco Bay Area with the San Joaquin Valley. Although the trail was used prehistorically long before the Mexican Period, it eventually took its name from Juan Pérez Pacheco. In 1857, Andrew Firebaugh built a toll road

across the pass from San José and by 1858 the San Luis Ranch house was acting as a stage station along Firebaugh's toll road. Pacheco Pass also served as a part of the route used by the Butterfield Overland Mail Company, which ran stage lines from San Francisco to St. Louis beginning in 1858. This route is being considered by the National Parks System as a National Historic Trail. The route followed the El Camino Viejo corridor to Pacheco Pass, where it crosses the Project area near San Luis Dam. Stage stations in Merced County near the SLTP included the San Luis Ranch near San Luis Dam and Lone Willow Stage Station near Los Banos.

The development of railroads transformed transportation in the San Joaquin Valley. Railroad routes in the San Joaquin Valley followed roughly the same transportation corridors that were established during the Spanish and Mexican periods. The two main railroads that competed within the region were the Southern Pacific Company and Western Pacific Railroad. In 1876, the first through train from San Francisco arrived in Los Angeles. By 1900, the Southern Pacific Company had become a major railroad with a rail system. The original Western Pacific Railroad was established in 1862 to construct the westernmost portion of the Transcontinental Railroad between the present day cities of Oakland and Sacramento. The route crossed Niles Canyon to Livermore Pass before proceeding. In 1870, the Western Pacific Railroad was absorbed by the Central Pacific Railroad. In 1903, a second company was founded under the name Western Pacific Railroad. This new company acquired the Alameda and San Joaquin Railroad. Western Pacific constructed a route that ran from Oakland southeast to Niles Canyon before turning northeast towards Carbona and proceeding from there to Sacramento. A 1930 Denver and Rio Grande Western route map also depicted a Tesla branch line extending south from Carbona.

Early 20th century topographic maps depicted three rail line segments crossing the SLTP study area. One of those railroad segments was the Niles and Sacramento line of the Southern Pacific Railroad while the second segment was the Tesla branch line of the Western Pacific Railroad. The third railroad segment was the Patterson and Western Railroad Company line that connected to the Southern Pacific main line at Patterson. The main Southern Pacific Railroad line runs parallel to the SLTP study area, but lies outside to the east.

The Mining Industry. California has been extensively mined for many different ores and minerals throughout its history. The New Almaden mercury deposits and the Tesla coal deposits are located closest to the SLTP study area, but lie outside of it to the west. The western portions of San Joaquin, Stanislaus, and Merced Counties were never major mining regions. There were several small-scale mines of manganese, mercury, gypsum, and gravel or sand. Nine small-scale mines intersected or were located near the SLTP study area. Most of these were either located outside the SLTP study area or were recent mines. The only historic period mining operation that overlapped the SLTP study area was a gypsum anhydrite and diatomite mine operated between 1946 and 1951. The mine lies roughly one-quarter mile southwest of the southern segment of the Proposed Project corridor.

3.5.1 Proposed Project

The following section identifies and describes specific cultural resources that could be affected by the Proposed Project. It describes the cultural resources within the Class I and Class III study areas, as defined above, under "Methods." Additional subsurface cultural resources may be present that were not identified through surface survey and additional surface resources will likely be present in areas that were not surveyed for this Project. Additionally, future consultation with Native American tribes and other interested groups may identify ethnographic resources such as TCPs and sacred sites.

3.5.1.1 Affected Environment

Resources Present

During the 2014 and 2015 field inventories, 2,842 acres of the Proposed Project corridor were subject to intensive, full coverage survey and a further 441 acres were subject to opportunistic survey. This survey located a total of 15 cultural resources within the corridors for the Proposed Project.

These included portions of three historic period water conveyance systems, three transportation resources, one homestead ranch complex, one utility line resource, and seven livestock related resources. Two previously recorded resources could not be located during the field survey: a bedrock milling feature (P-39-000121) and the buried San Joaquin Pipelines No. 1-3 (P-39-004860) that are present but not observed at the surface. In addition, the route of the proposed Butterfield Overland National Historic Trail passes through the Proposed Project corridor; however, no physical evidence of the trail or associated features have been identified.

Six of the resources identified during the field survey had previously been recorded, all of which are historic period infrastructural or agricultural elements. These six resources are:

- the California Aqueduct (P-24-001931),
- the Delta-Mendota Canal (P-39-000089),
- the Byron Bethany Irrigation District Main Canal (No. 9) and associated irrigation ditches (P-01-001445),
- Grant Line Road (P-01-010613),
- the McCabe Road Bridge (P-24-001934), and
- a historic period ranch complex featuring ditches and poured concrete structures (P-50-000427).

None of these six resources are listed on the National Register or California Register, but four have been previously recommended as eligible for listing.

The Byron Bethany Irrigation District Main Canal and associated irrigation ditches (P-01-001445), was found ineligible for listing through survey evaluation in 2001. The three newly recorded segments of this resource appear to retain integrity of location, and also may retain integrity of design, materials, and workmanship. However, it seems likely that these segments also are ineligible for the National Register and the California Register for the same reasons identified in the previous evaluation.

Grant Line Road (P-01-010613) previously was recommended eligible for the California Register; however, the segment examined for this project does not appear to retain integrity of design or workmanship of previously recorded segments. This segment is not recommended as eligible to the National or California registers.

The California Aqueduct (P-24-001931) and the Delta-Mendota Canal (P-39-000089) have been recommended as eligible for listing due to their place in the development of California's water infrastructure.

The McCabe Road Bridge (P-24-001934) was recommended as eligible as a contributing element of the California Aqueduct.

Field evaluation for the historic ranch complex (P-50-000427) recommended the resource as not eligible for listing on the National or California registers.

The buried San Joaquin Pipelines No. 1-3 (P-39-004860) were identified through a records search as being present in the Central Segment of the Proposed Project corridor but were not observed during the 2014 field inventory. All the visible, above surface portions of the pipelines lie outside the SLTP study area. This resource has been recommended as eligible for listing on the National Register and the California Register.

The 11 resources newly identified during the survey of the Proposed Project corridor all date to the historic period and represent infrastructure and agricultural activities. Based on field evaluations, none are recommended as eligible for listing on the National Register and the California Register.

Table 3.5-1. Resources within Proposed Project and National/California Register Status

Corridor	Listed on National or California Registers	Determined Eligible	Determined Not Eligible	Recommended Eligible	Recommended Not Eligible	Not Evaluated
North Segment	0	0	0	2	3	0
Central Segment	0	0	0	1	11	0
San Luis Segment	0	0	0	2	1	0
San Luis Segment 70-kV	0	0	0	1	1	0
South Segment	0	0	0	0	0	0

3.5.1.2 Regulations, Plans, and Standards

Federal

Antiquities Act of 1906 (16 U.S.C. §§ 431-433) authorizes the president to designate national monuments historic landmarks, as well as governing permitting for archaeological work and penalties for violations.

National Historic Preservation Act of 1966 As Amended (NHPA) (16 U.S.C. § 470) requires each state to appoint a SHPO) created the Advisory Council on Historic Preservation (ACHP), and established the National Register of Historic Places (National Register). Sections 106 and 110 of this act have specific bearing on federal agency historic preservation activities and the management of historic properties.

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on properties eligible for listing on the National Register, referred to as "historic properties," and to afford the ACHP and SHPO a reasonable opportunity to comment on those undertakings. For the purposes of Section 106, an undertaking collectively refers to all projects, activities, or programs funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency, those carried out by federal financial assistance, those requiring a federal permit, license, or approval, or those carried out on federal property.

Federal agencies must meet their Section 106 responsibilities as set forth in the regulations (36 CFR Part 800). Federal agencies must conduct the necessary studies and consultations to identify cultural resources that may be affected by an undertaking, evaluate cultural resources that may be affected to determine if they are eligible for the National Register (that is, whether identified resources constitute historic properties), and assess whether such historic properties would be adversely affected. Historic properties are resources listed on or eligible for listing on the National Register (36 CFR 800.16[l][1]). A property may be listed in the National Register if it meets criteria provided in the National Register regulations (36 CFR 60.4). Typically such properties must also be 50 years or older (36 CFR 60.4[d]).

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, or association and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of persons significant in our past; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded, or may be likely to yield, information important in prehistory or history.

Section 110 of the NHPA generally provides that all federal agencies assume responsibility for the preservation and use of historic properties owned or controlled by such agencies. Under Section 110, federal agencies must establish a preservation program for the identification, evaluation, and nomination to the National Register and for protection of historic properties.

Archaeological Resources Protection Act of 1979 (**16 U.S.C. §§ 470aa-mm)** protects archaeological resources on public and Indian lands. This act applies when a project may involve archaeological resources located on federal or tribal land and requires permitting of archaeological excavation and notification of Indian tribes when sites of cultural or religious importance could be harmed.

Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. §§ 3001-3013) establishes requirements for the treatment of Native American human remains, associated and unassociated funerary objects, sacred objects, and objects of cultural patrimony on federal and tribal land.

Executive Order 11593 Protection and Enhancement of the Cultural Environment (1971) established that federal agencies shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the nation.

Executive Order 13007 Indian Sacred Sites (1996) sets forth that in managing federal lands, executive branch agencies shall accommodate Indian religious practitioners' access to and ceremonial use of sacred sites.

Executive Order 13287 Preserve America (2003) established that agencies shall provide leadership in preserving America's heritage by actively advancing the protection, enhancement, and contemporary use of the historic properties owned by the Federal Government.

Department of Energy Regulations

DOE Policy 141.1: **Management of Cultural Resources** was implemented to ensure that DOE programs and field elements integrate cultural resources management into their missions and activities and to raise the level of awareness and accountability among DOE contractors concerning the importance of the Department's cultural resource-related legal and trust responsibilities.

DOE Order 144.1: **American Indian Tribal Government Interactions and Policy** provides direction to officials, staff, and contractors regarding fulfillment of trust obligations and other responsibilities arising from Departmental actions which may potentially impact American Indian traditional, cultural, and religious values and practices; natural resources; and treaty rights and other federally recognized and reserved rights.

State

California Environmental Quality Act (Public Resources Code § 21000, *et seq*.) (1970). Historical and archaeological resources are afforded consideration and protection by the California Environmental Quality Act (CEQA) (14 CCR Section 21083.2, 14 CCR Section 15064). CEQA Guidelines define significant cultural resources under two regulatory designations: historical resources and unique archaeological resources.

A *historical resource* is defined as a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR"; or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code"; or "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record" (14 CCR Section 15064.5[a][3]). While TCPs and cultural landscapes are not directly called out in the State definitions of historical resources, TCPS are places and cultural landscapes are areas, and places and areas are included as types of historical resources. Historical resources that are automatically listed in the California Register include California historical resources listed in or formally determined eligible for the National Register and California Registered Historical Landmarks from No. 770 onward (PRC 5024.1[d]). Locally listed resources are entitled to a presumption of significance unless a preponderance of evidence in the record indicates otherwise.

Under CEQA, a resource is generally considered historically significant if it meets the criteria for listing in the California Register. A resource must meet at least one of the following four criteria (PRC 5024.1; 14 CCR Section 15064.5[a][3]):

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;
2. It is associated with the lives of persons important to local, California or national history;
3. It embodies the distinctive characteristics of type, period, region or method of construction, or represents the work of a master or possesses high artistic values;
4. It has yielded or has the potential to yield information important to the prehistory or history of the local area, California or nation.

Historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association (14 CCR 4852[c]).

An archaeological artifact, object, or site can meet CEQA's definition of a *unique archaeological resource*, even if it does not qualify as a historical resource (14 CCR 15064.5[c][3]). An archaeological artifact, object, or site is considered a unique archaeological resource if "it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria (PRC 21083.2[g]):

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person."

Within California State law, cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance. All resources nominated for listing in the California Register of Historic Resources (California Register) must have integrity; the authenticity of a historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Therefore, resources must retain enough of their historical character or appearance to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and/or association. It must also be judged with reference to the particular criteria under which a resource is proposed for nomination (Calif. PRC §5024.1).

CEQA Guidelines, California Code of Regulations Title 14, Section 15064.5. When an initial study identifies the existence of, or the probable likelihood of, Native American human remains within the project, a lead agency shall work with the appropriate Native Americans as identified by the Native American Heritage Commission (NAHC). The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains and any items associated with Native American burials with the appropriate Native Americans identified as the Most Likely Descendant (MLD) by the NAHC.

Public Resources Code (PRC), Section 5024, et seq. requires that each State agency develop policies for the preservation and maintenance of all State-owned historical resources or historic properties under its jurisdiction. Each State agency is required to submit updates to their an inventory of all State-owned structures over 50 years of age under its jurisdiction listed in or which may be eligible for inclusion in the National Register or registered or which may be eligible for registration as a State historical landmark. These inventories are used to create a master list maintained by the State Office of Historic Preservation (OHP).

Public Resources Code (PRC), Section 5097.9, et seq. (1982) establishes that both public agencies and private entities using, occupying, or operating on State property under public permit, shall not interfere with the free expression or exercise of Native American religion and shall not cause severe or irreparable damage to Native American sacred sites. This section also creates the NAHC, charged with identifying and cataloging places of special religious or social significance to Native Americans, identifying and cataloging known graves and cemeteries on private lands, and performing other duties regarding the preservation and accessibility of sacred sites and burials. This section also includes requirements for landowners to limit further development activity on property where Native American human remains are found until that landowner confers with NAHC-identified most likely descendants to consider treatment options. It enables those descendants, within 48 hours of notification by the NAHC, to inspect the discovery site and recommend to the landowner or the person responsible for the excavation the means to treat or dispose of the human remains and any associate grave goods with dignity. In the absence of most likely descendants, or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location that will not be disturbed. Finally, this section makes it a felony to remove Native American artifacts or human remains from a Native American grave or cairn, as well as to acquire, possess, sell, or dissect Native American remains, funerary objects, or artifacts from a Native American grave or cairn and establishes the repatriation of these remains, funerary objects, and associated grave artifacts as State policy (PRC, Section 5097.9, et seq.).

Local

Alameda County

Alameda County General Plan. The East County Area Plan portion states that it is a goal of the County to protect cultural resources from development and establishes policies and an implementation program to further that goal. This includes identifying cultural resources and avoiding or mitigating impacts to them during development. (Alameda County, 2000).

Alameda County's Historic Preservation Ordinance. This ordinance sets forth Alameda County's policies and procedures for the identification, protection, and preservation of significant architectural, historic, prehistoric and cultural structures, sites, resources and properties in the County. (Alameda County, 2012).

San Joaquin County

San Joaquin County General Plan, Volume I, Section IV.H. This section establishes the County's objective for the protection of the architectural, historical, archaeological, and cultural resources of San Joaquin County.

Historic Resource Preservation (San Joaquin County Development Title 9-1053). The intent of this chapter is to establish regulations for the preservation of historic resources, such as cultural, archaeological, architectural, aesthetic, and environmental resources, within San Joaquin County.

Stanislaus County

Goal Eight of the General Plan sets forth the county's goal of preserving areas of national, State, regional and local historical importance. To do this, Policy Twenty-Four includes measures that state that the county will use the CEQA process to protect archaeological and historical resources and cooperate with local historical societies and archaeological organizations as well as with the SHPO and OHP.

Merced County

The Merced 2030 General Plan contains a number of policies that apply to Cultural Resource impacts in conjunction with ultimate build-out of the City in accordance with the General Plan. The specific policies listed below contained in the Sustainable Development of the General Plan are designed to ensure that cultural resource impacts are minimized as development occurs in accordance with the Merced Vision 2030 General Plan.

3.5.2 Corridor Alternatives

The following section identifies and describes specific cultural resources that could be affected by the alternatives. It describes the cultural resources within the Class I and Class III study areas, as defined above under Methods. Additional subsurface cultural resources may be present that were not identified through surface survey and additional surface resources will likely be present in areas that were not surveyed for this Project. Additionally, future consultation with Native American tribes and other interested groups may identify ethnographic resources such as TCPs and sacred sites. Some cultural resources are located within multiple corridors, thus the total resources identified during survey are not an additive total of those in the Proposed Project and the alternatives.

Table 3.5-2 summarizes the number of resources encountered within the alternatives study area and presents their National/California register eligibility status. Note that these numbers are not additive, as single resources were recorded in multiple alternatives. It was not possible to survey the entire area within the alternative corridors due to issues related to access and topography. Additional detail on these resources is provided in the following sections.

Table 3.5-2. Resources within Project Alternatives and National/California Register Status

Corridor	Listed on National or California Registers	Determined Eligible	Determined Not Eligible	Recommended Eligible	Recommended Not Eligible	Not Evaluated
Patterson Pass Road	0	0	0	1	9	2
Butts Road Alternative	0	0	0	1	0	0
West of Cemetery	0	0	0	0	0	0
West of O'Neill Forebay 70-kV	0	0	0	2	0	0
San Luis to Dos Amigos	0	0	0	0	0	0
Billy Wright Road	0	0	0	0	1	0

3.5.2.1 Patterson Pass Road Alternative

The affected environment for the Patterson Pass Road Alternative is similar to that of the Proposed Project. It differs only in the resources present. As of September 2014, one resource eligible for listing on the National Register and California Register has been identified as present in the Patterson Pass Road Alternative corridor: the San Joaquin Pipelines No. 1-3 (P-39-004860). This resource was not observed on the surface, but is known to be present. Two resources have not been evaluated for eligibility to the National Register and California Register: a multicomponent site consisting of both prehistoric and historic period elements and a prehistoric site. An additional nine cultural resources were newly identified by surveys within the Patterson Pass Road corridor and were recommended not eligible for the National Register and California Register based on field evaluation. Within this alternative corridor, a total of 2046.3 acres was surveyed for SLTP for the presence of cultural resources, or 72 percent of the total 2858.8 acres.

3.5.2.2 Butts Road Alternative

The affected environment for the Butts Road Alternative is similar to that of the Proposed Project. It differs only in the resources present. As of September 2014, one resource eligible for listing on the National Register and California Register has been identified: the California Aqueduct (P-24-001931). This resource was also present in the Proposed Project corridor. Within this alternative corridor, a total of 477.9 acres was surveyed for SLTP for the presence of cultural resources, or 43 percent of the total 1006.8 acres.

3.5.2.3 West of Cemetery Alternative

The affected environment for the West of Cemetery Alternative is similar to that of the Proposed Project. It differs only in the resources present. As of September 2014, no resources have been identified in the West of Cemetery Alternative corridor. Within this alternative corridor, a total of 424.8 acres was surveyed for SLTP for the presence of cultural resources, or 36 percent of the total 1166.2 acres.

3.5.2.4 West of O'Neill Forebay 70-kV Corridor Alternative

The affected environment for the West of O'Neill Forebay 70-kV Alternative is similar to that of the Proposed Project. It differs only in the resources present. As of September 2014, two resources eligible for listing on the National Register and California Register have been identified as present in the San Luis to O'Neill 70-kV Alternative corridor: the California Aqueduct (P-24-001931) and the McCabe Road

(P-24-001934). Within this alternative corridor, a total of 271.5 acres was surveyed for SLTP for the presence of cultural resources, or 51 percent of the total 536.1 acres.

3.5.2.5 San Luis to Dos Amigos Alternative

The affected environment for the San Luis to Dos Amigos Alternative is similar to that of the Proposed Project. It differs only in the resources present. As of September 2014, no resources were identified in the San Luis to Dos Amigos Alternative. Within this alternative corridor, a total of 394.1 acres was surveyed for SLTP for the presence of cultural resources, or 55 percent of the total 710.0 acres.

3.5.2.6 Billy Wright Road Alternative

The affected environment for the Billy Wright Road Alternative is similar to that of the Proposed Project. It differs only in the resources present. As of April 2015, two cultural resources were newly identified by surveys within the Billy Wright Road corridor and were recommended not eligible for the National Register and California Register based on field evaluation. Within this alternative corridor, a total of 159.0 acres have been surveyed for the presence of cultural resources, or 40 percent of the total 394.3 acres.

3.6 Environmental Justice

This section describes the minority and low-income populations in the study area and the regulatory environment pertinent to environmental justice. Environmental Justice impacts (i.e., the disproportionate distribution of impacts on minority and low-income populations) are analyzed in Section 4.6 (Environmental Justice).

3.6.1 Proposed Project

3.6.1.1 Affected Environment

On February 11, 1994, President Bill Clinton issued Executive Order 12898 titled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (59 Fed. Reg. 7629). This Executive Order 12898 was designed to focus attention on environmental and human health conditions in areas of high-minority populations and low-income communities and to promote non-discrimination in programs and projects substantially affecting human health and the environment. Executive Order 12898 requires agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

In response to Executive Order 12898, DOE prepared and issued its Environmental Justice Strategy in 1995. Since then, the agency has conducted a series of activities to implement the Strategy. Both the Executive Order and the Strategy require that DOE establish and maintain an integrated approach for identifying, tracking, and monitoring environmental justice. DOE defines environmental justice as "fair treatment and meaningful involvement of all people, regardless of race, ethnicity, culture, income, or education level with respect to development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that racial, ethnic, or socioeconomic groups should not bear a disproportionate share of negative environmental consequences resulting from industrial, municipal, and commercial operations, or from the execution of federal, State, and local laws, regulations, and policies" (DOE, 2008).

According to the Council on Environmental Quality (CEQ) Environmental Justice Guidance Under the National Environmental Policy Act (CEQ, 1997), "minority populations should be identified where either: (a) the minority population of the affected region exceeds 50 percent or (b) the minority population percentage of the affected region is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis." The same document advises the use of Census poverty thresholds to identify low-income populations.

Additionally, the CEQ (CEQ, 1997) guidance advises that "In order to determine whether a proposed action is likely to have disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes, agencies should identify a geographic scale, obtain demographic information on the potential impact area, and determine if there is a disproportionately high and adverse effect to these populations. Agencies may use demographic data available from the Bureau of the Census to identify the composition of the potentially affected population."

Environmental Justice Overview in the Study Area

The study area for the Environmental Justice analysis includes census block groups traversed by the Proposed Project corridor. Census block groups are statistical divisions of census tracts, and are generally defined to contain between 600 and 3,000 people. On average, the population density within the study area is low. Therefore, the census block groups included in the analysis tend to cover larger areas in comparison to surrounding higher population density areas.

Minority Populations

For the purposes of this analysis, 2007-2012 American Community Survey (U.S. Census Bureau) minority population data are presented by census block groups to characterize the ethnic makeup of the study area. The U.S. Census Bureau defines minorities as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander, Black not of Hispanic origin, or Hispanic. Table 3.6-1 provides population percentages for the minority populations within the census block groups presented in Figure 3.6-1.

Table 3.6-1. Study Area Minority Population Profile by Census Block Group

Figure 3.6-1 Identifier #	Census Block Group	Total Population	Minority Population	Percent Minority
1	304002-1	1,241	177	14.3
2	451101-3	983	11	1.1
3	5206-3	10,542	6,316	59.9
4	5207-1	2,258	671	29.7
5	5502-1	886	355	40.1
6	3300-2	2,439	248	10.2
7	3400-1	1,162	472	40.6
8	2000-2	1,727	258	14.9
9	2100-3	999	182	18.2
10	2100-1	1,445	153	10.6
11	2100-2	1,105	169	15.3
Totals		**24,787**	**9,012**	**36.4**

Note: Population data are based on the number of census survey takers who provided their race. Therefore, the total population presented in this table does not equal the actual total population.
Source: U.S. Census Bureau, 2007-2012 American Community Survey

One census block group, located on the east side between the Tracy Substation and Patterson Pass Road, contains a minority population greater than 50 percent. Two census block groups fall between 40 and 50 percent minority population. Overall, the study area has a 36.4 percent minority population. On average, the study area tends to have a similar minority population distribution compared to the region as a whole.

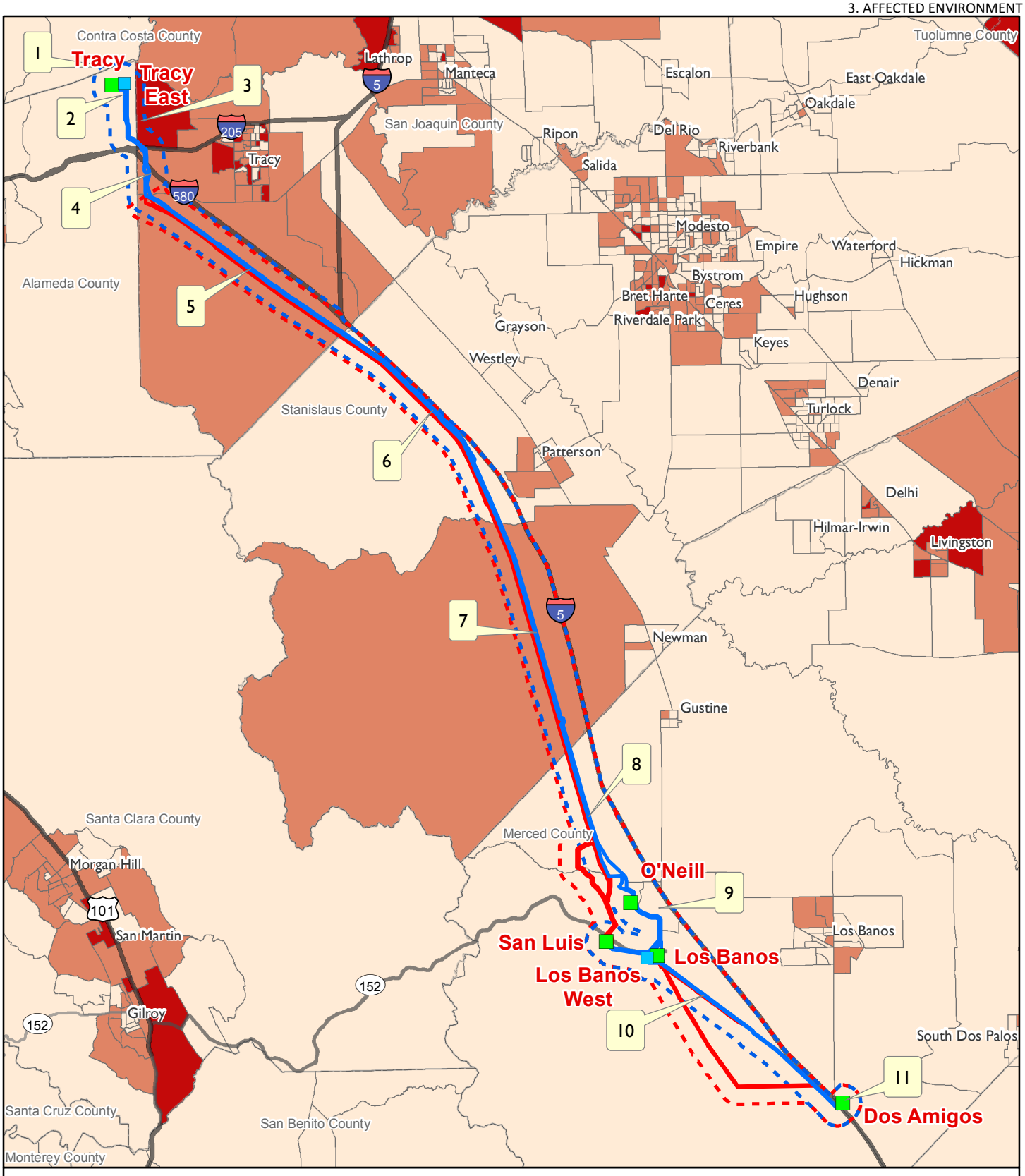
Low-Income Populations

The U.S. Census Bureau defines low-income populations by comparing the household income of a given area to that same area's weighted poverty thresholds established by the U.S. Department of Finance (U.S. Census, 2010). Table 3.6-2 presents the low-income population profile for the census block groups presented in Figure 3.6-2.

None of the study area census block groups contain a majority low-income population. One census block group contains a low-income population slightly greater than 35 percent; however, the remainder of the census block groups fall below 25 percent. In total, the study area has a 9.2 percent low-income population. On average, the study area tends to have a lower percentage of low-income population in comparison to the region as a whole.

3.6.1.2 Regulations, Plans, and Standards

The introduction to Section 3.6.1.1 above describes the regulations, plans, and standards applicable to environmental justice.



Substation
Proposed New Substations
Proposed Project Corridor
Corridor Alternatives
Proposed Project Study Area
Alternatives Study Area

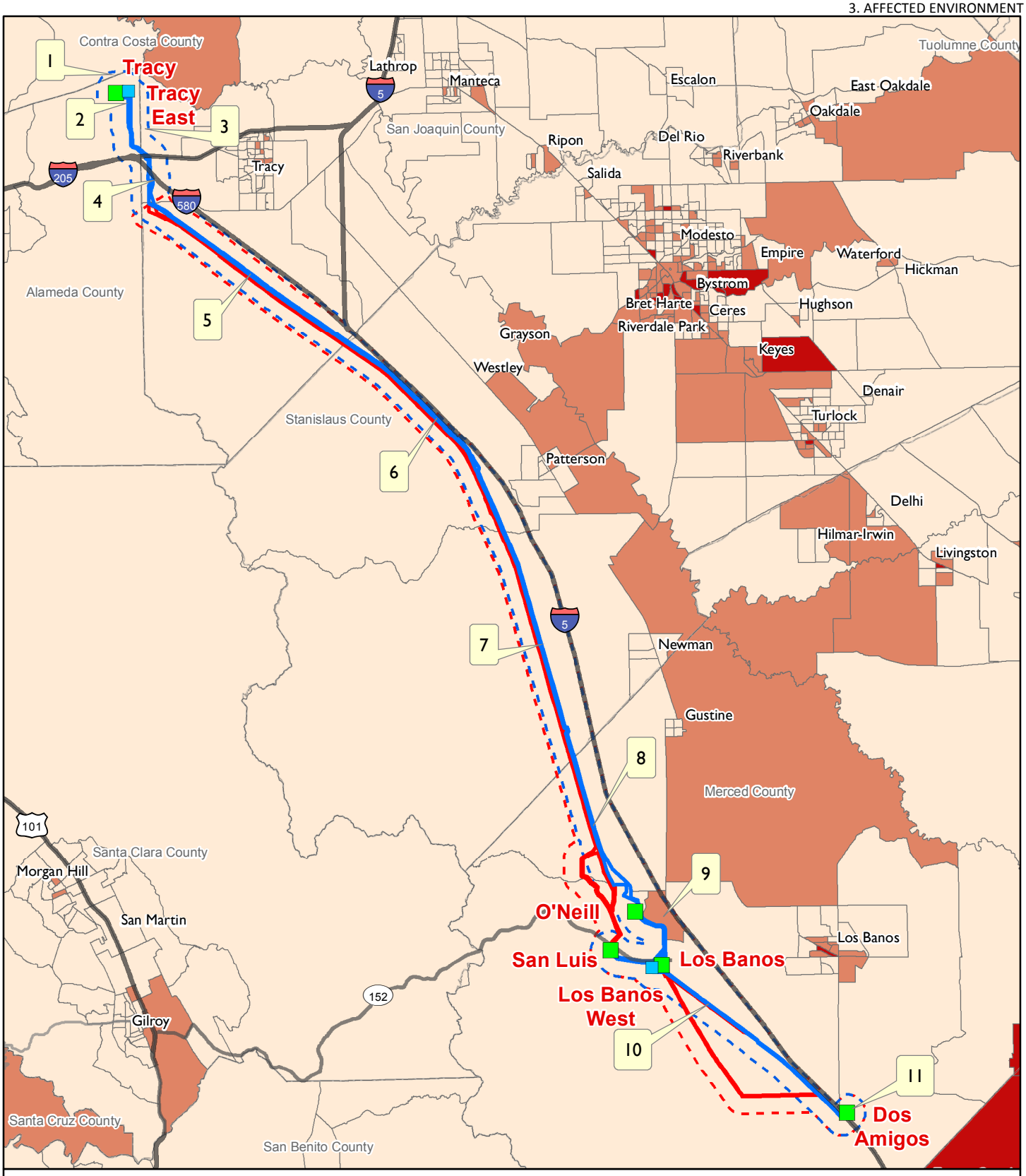
Percent of Minority Population
Less than 25%
25 - 50%
Greater than 50%
Census Block Group Identifier

Figure 3.6-1

Minority Population Distribution

0 5.5 11 Miles

Source: WAPA SNR, Aspen EG, California Dept. of Community Surveys (US Census Bureau 2012)



Substation
Proposed New Substations
Proposed Project Corridor
Corridor Alternatives

Percent of Population Below Poverty Level
Less than - 25%
25% - 50%
Greater than 50%
Census Block Group Identifier

Figure 3.6-2

Low-Income Population Distribution

0 5.5 11 Miles

Source:: WAPA SNR, Aspen EG, California Dept. of Community Surveys (US Census Bureau 2012)

Table 3.6-2. Study Area Low-Income Population Profile by Census Block

Figure 3.6-2 Identifier #	Census Block Group	Total Population	Low-Income Population	Percent Low-Income
1	304002-1	1,142	138	12.1
2	451101-3	981	11	1.1
3	5206-3	10,522	557	5.3
4	5207-1	2,258	166	7.4
5	5502-1	886	14	1.6
6	3300-2	2,351	454	19.4
7	3400-1	1,128	227	20.1
8	2000-2	1,727	297	17.2
9	2100-3	999	352	35.2
10	2100-1	1,445	97	6.7
11	2100-2	1,105	164	14.8
Totals		**24,544**	**2477**	**10.1**

Note: Population data are based on the number of census survey takers who provided their income status. Therefore, the total population presented in this table does not equal the actual total population.
Source: U.S. Census Bureau, 2007-2012 American Community Survey

3.6.2 Corridor Alternatives

3.6.2.1 Patterson Pass Road Alternative

The study area for this alternative overlaps the Proposed Project study area between Patterson Pass Road and Butts Road. The alternative study area does not cross additional census block groups. Similar to the Proposed Project in this segment, this alternative does not contain any census block groups with a minority or low-income population greater than 50 percent.

3.6.2.2 Butts Road Alternative

The study area for this alternative is west of the Proposed Project between Butts Road and the San Luis Substation. The alternative study area does not cross additional census block groups and does not contain any census block groups with a minority or low-income population greater than 50 percent.

3.6.2.3 West of Cemetery Alternative

The study area for this alternative is west of the Proposed Project between Butts Road and the San Luis Substation. The alternative study area does not traverse any additional census block groups and does not contain census block groups with a minority or low-income population greater than 50 percent.

3.6.2.4 West of O'Neill Forebay 70-kV Alternative

Much of the alternative study area overlaps the Proposed Project with the exception of a portion on the west side of the O'Neill Forebay, which follows the Butts Road and West of Cemetery Alternatives. The alternative study area does not cross additional census block groups. Similar to the Proposed Project in this segment, the alternative study area does not contain census block groups with a minority or low-income population greater than 50 percent.

3.6.2.5 San Luis to Dos Amigos Alternative

The study area for this alternative overlaps the Proposed Project study area between the San Luis Substation and the Dos Amigos Substation. The alternative study area does not cross additional census block groups and does not contain census block group with a minority or low-income population greater than 50 percent.

3.6.2.6 Billy Wright Road Alternative

Much of the study area for this alternative lies west of the Proposed Project between the San Luis Substation and the Dos Amigos Substation. The alternative study area does not cross additional census block groups and does not contain census block groups with a minority or low-income population greater than 50 percent.

3.7 Geology, Soils, and Mineral Resources

This section describes the geology, soils, and mineral resources in the study area, which is defined in Section 3.1. Impacts to geology, soils, and mineral resources, including adverse effects from unstable or eroded soils, damage to soils, or loss of minerals, are analyzed in Section 4.7 (Geology, Soils, and Mineral Resources).

3.7.1 Proposed Project

3.7.1.1 Affected Environment

Geology

Most of the study area is situated in an alluvial valley underlain by Quaternary Deposits. In the southern portion of the study area, along the foothills of the Diablo Range, the underlying geology includes Mesozoic Sedimentary and Metasedimentary Rocks, and Tertiary Sedimentary Rocks (USGS, 2005). Figures 3.7-1a through 3.7-1d depict the underlying geology within the study area.

Six geologic units underlie the Proposed Project study area:

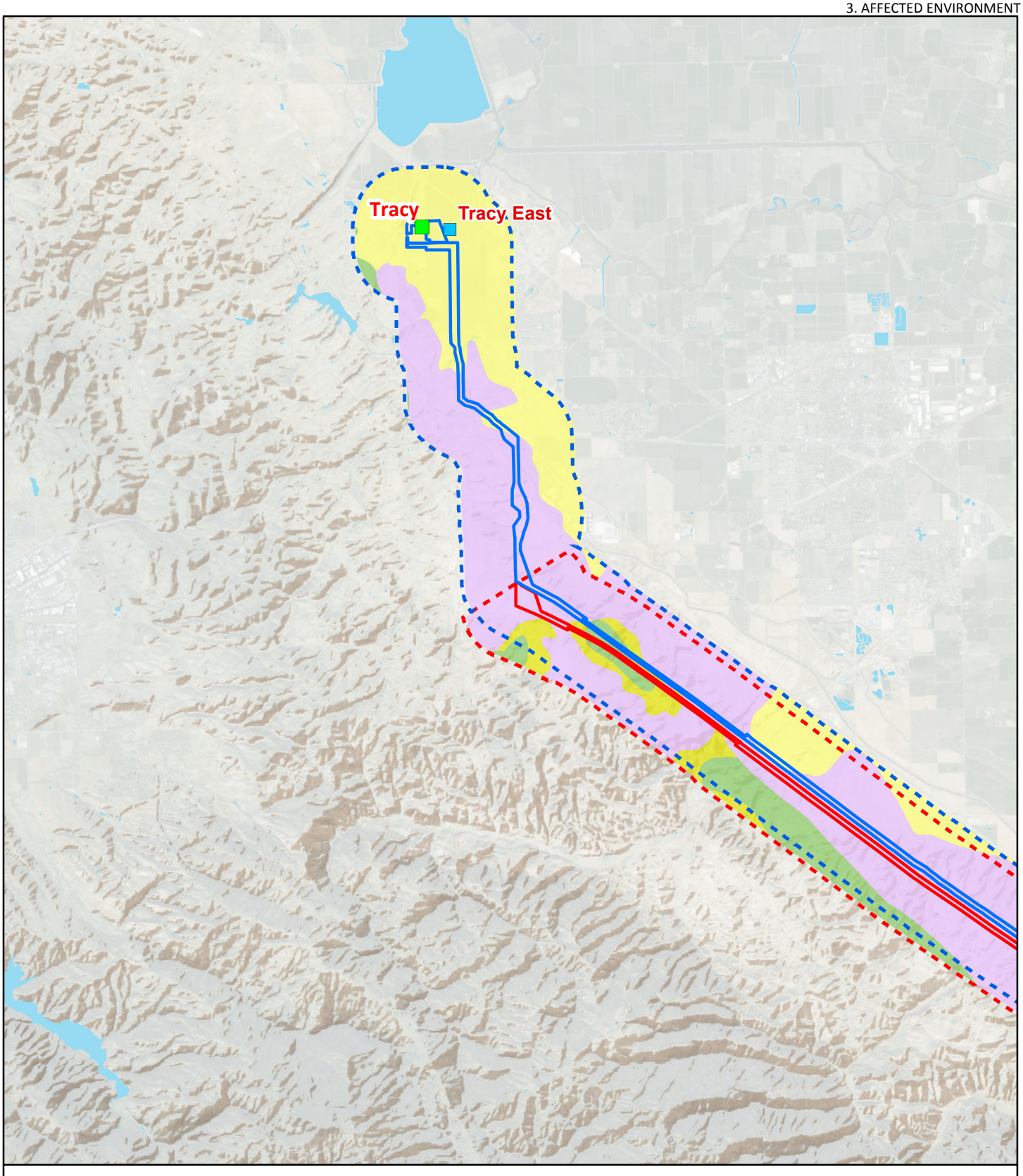
- **Q,** Alluvium (mostly Holocene) found near the Tracy Substation; Quaternary nonmarine and marine. This unit underlies most of the area around the Tracy Substation, I-5, and portions of the Proposed Project as it travels close to the Interstate.
- **QPc,** Plio-Pleistocene nonmarine; Pliocene nonmarine; Pliocene and/or Pleistocene sandstone, shale, and gravel deposits; in part Miocene.
- **Ku,** Upper Cretaceous marine, which are thick, extensive sequences of shale, siltstone, sandstone, and conglomerate primarily of deep-marine (turbidite) facies.
- **E,** Eocene marine, consisting of shale, sandstone, conglomerate, and minor limestone; in part Oligocene and Paleocene.
- **Ep,** Paleocene marine, consisting of sandstone, shale, and conglomerate; mostly well consolidated.
- **M,** – Moderately to well-consolidated Miocene marine sedimentary rocks, including sandstone, shale, siltstone, conglomerate, and breccia.

Seismicity

The study area crosses numerous Quaternary and Late Quaternary faults. None of these fault zones are considered to be active. Several active earthquake fault zones parallel the study area to the west, along the foothills of the Diablo Range, but the Project would not cross these active earthquake fault zones. In addition, there are no mapped landslide or liquefaction zones within the study area (CGS, 2014).

Soils

The southern portion of the study area is dominated by alfisols, entisols, and mollisols soil types. Inceptisols are dominant on the western side of the San Luis Reservoir. The northern portion of the study area contains mainly inceptisols and vertisols on the valley floor, with entisols and mollisols along the foothills of the Diablo Range (NRCS, 2014). Figures 3.7-2a through 3.7.2d depict the soil resources within the Proposed Project study area.



Western AREA POWER ADMINISTRATION

Substation
Proposed New Substations
Proposed Project Corridor
Corridor Alternatives
Proposed Project Study Area
Alternatives Study Area
Waterbody

Geologic Formation
E
Ep
Ku
M
Q
QPc

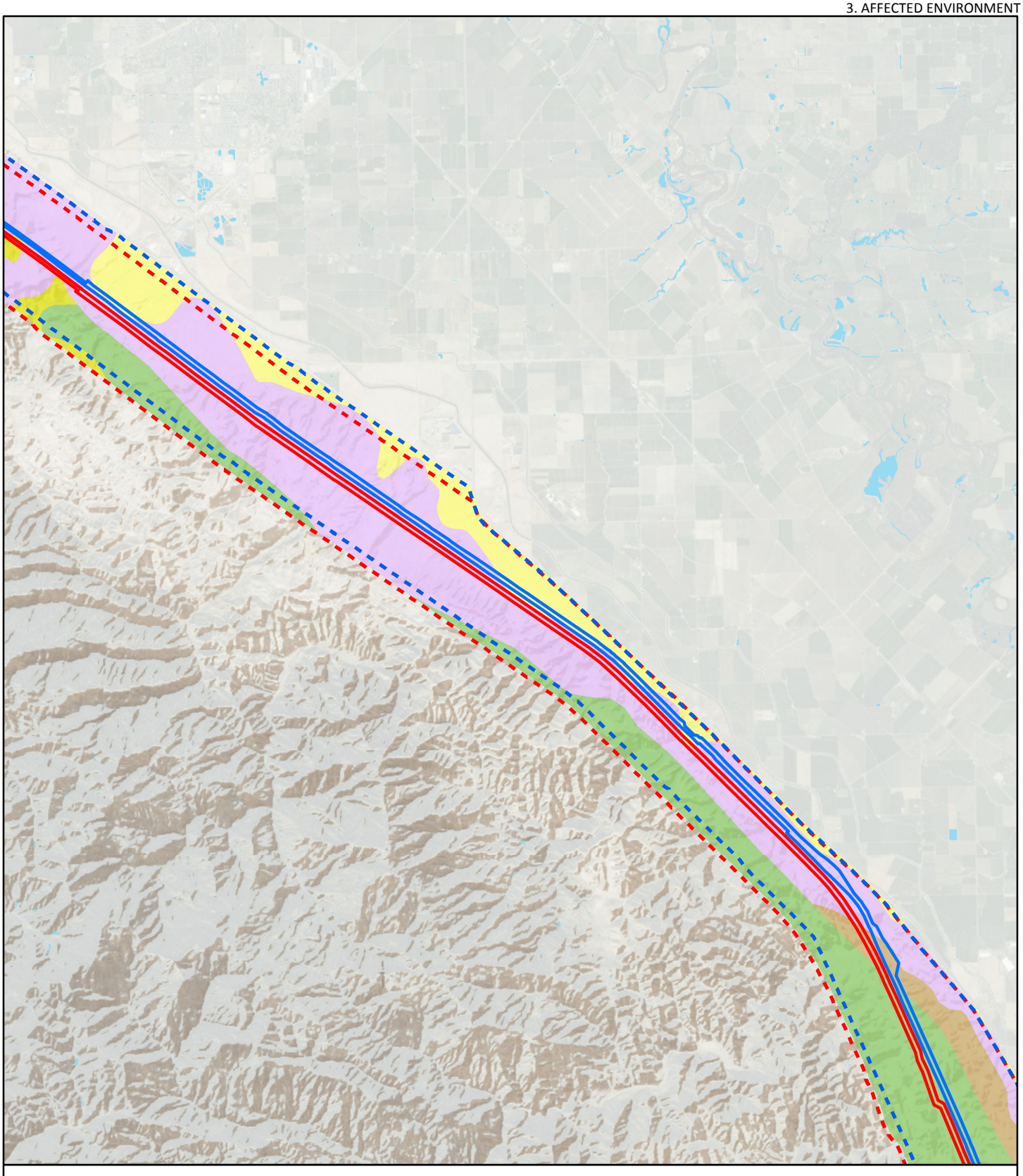
Water

Figure 3.7-1a

Geologic Formations

0 1.5 3 Miles

Source: WAPA SNR, Aspen EG, US Geological Survey

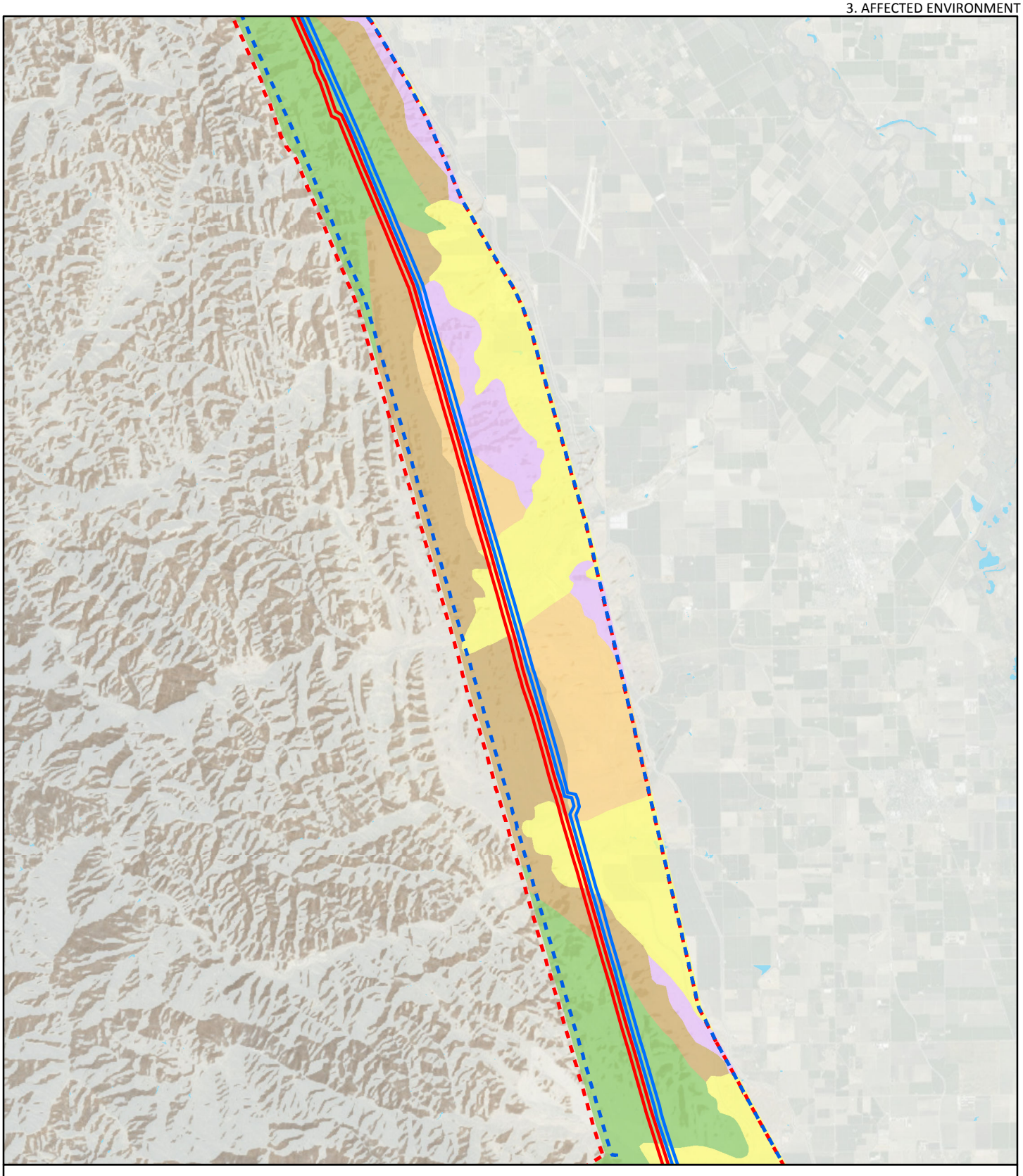


Western AREA POWER ADMINISTRATION

Figure 3.7-1b

Geologic Formations

Source: WAPA SNR, Aspen EG, US Geological Survey

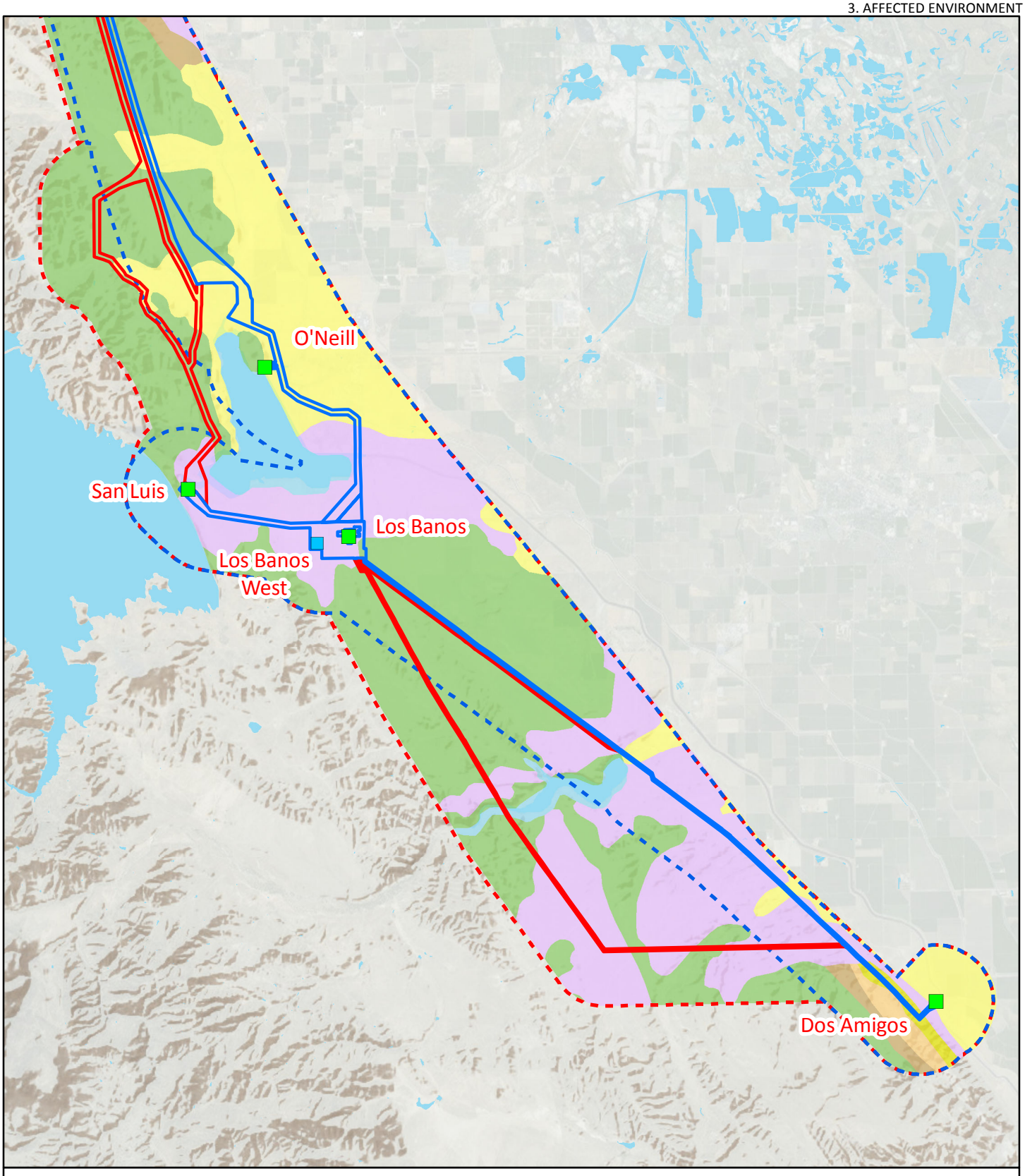


Western AREA POWER ADMINISTRATION

Figure 3.7-1c

Geologic Formations

Source: WAPA SNR, Aspen EG, US Geological Survey



Western Area Power Administration

Substation
Proposed New Substations
Proposed Project Corridor
Corridor Alternatives
Proposed Project Study Area
Alternatives Study Area
Waterbody

Geologic Formation
E
Ep
Ku
M
Q
QPc

Water

Figure 3.7-1d

Geologic Formations

0 1.5 3 Miles

Source: WAPA SNR, Aspen EG, US Geological Survey

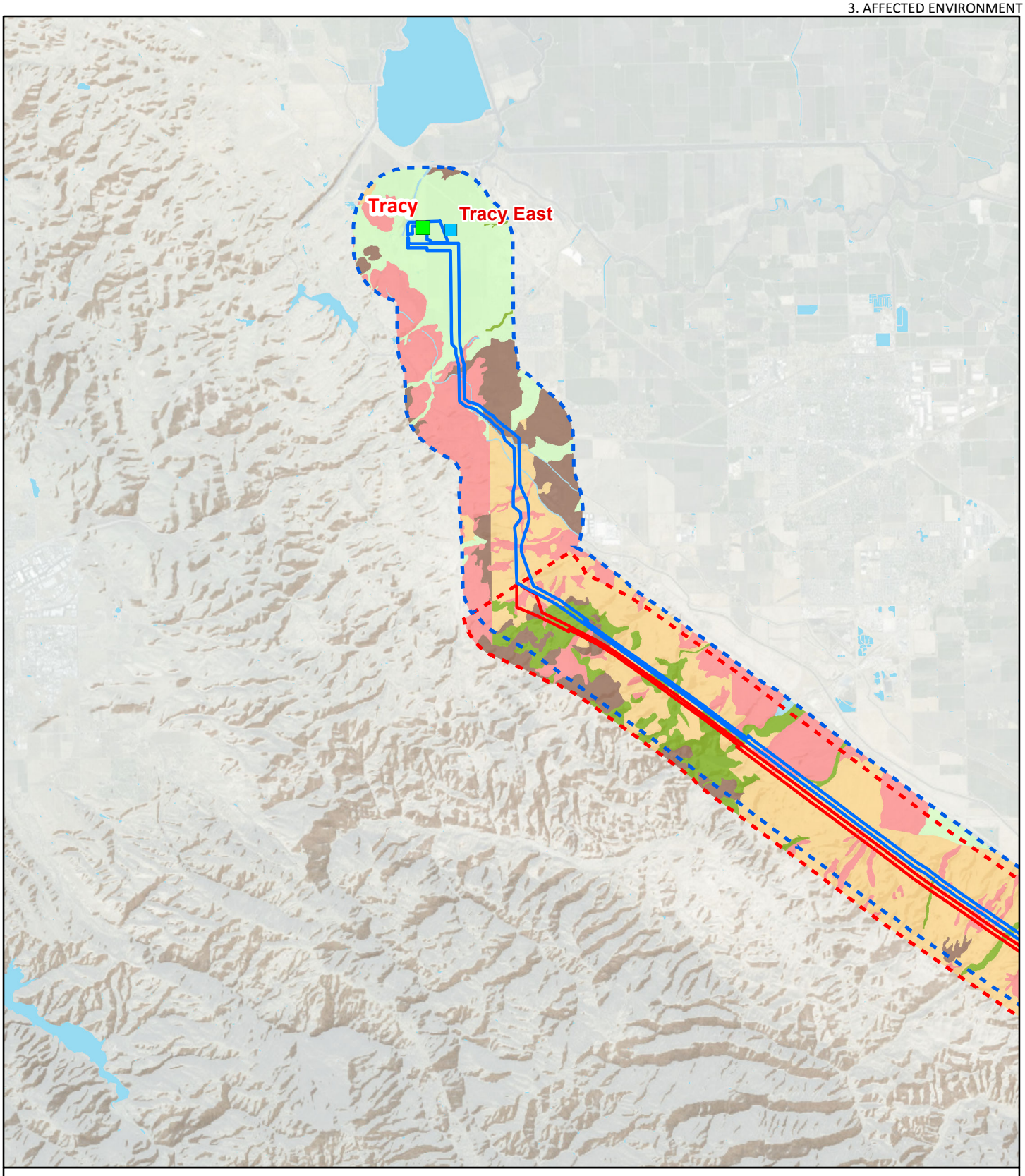
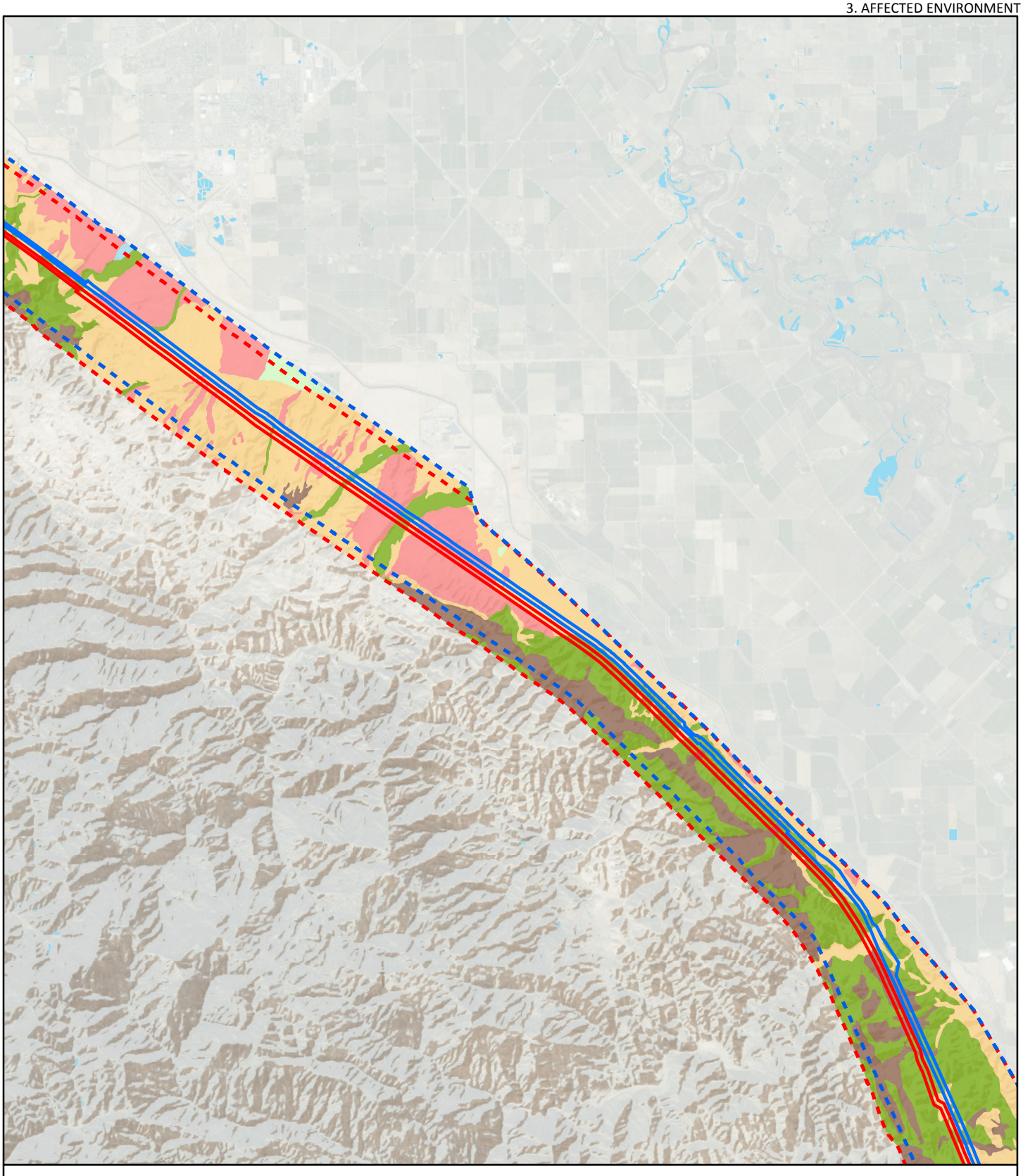


Figure 3.7-2a

Soil Orders

Source: WAPA SNR, Aspen EG, US Geological Survey

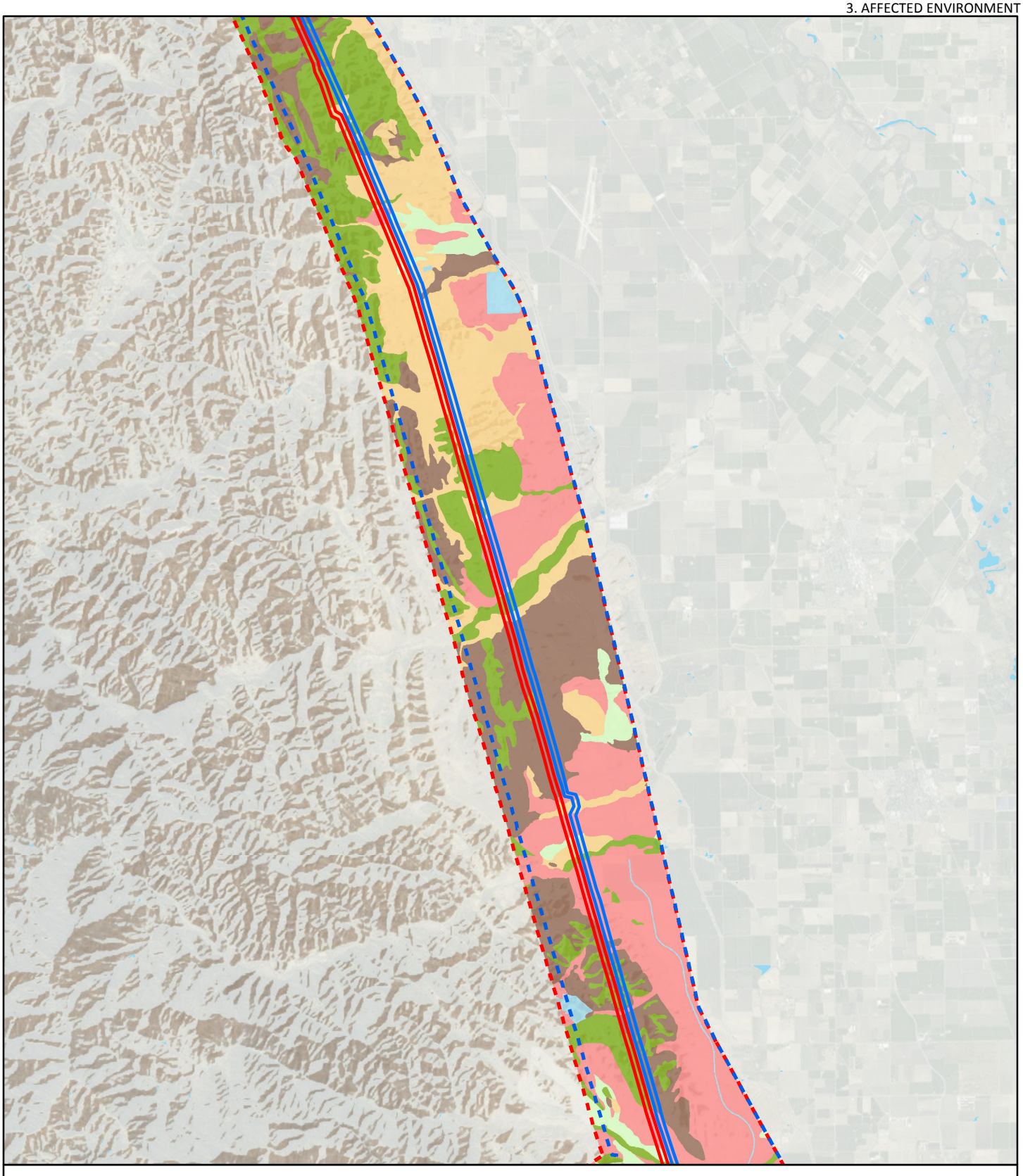


Western AREA POWER ADMINISTRATION

Figure 3.7-2b

Soil Orders

Source: WAPA SNR, Aspen EG, US Geological Survey

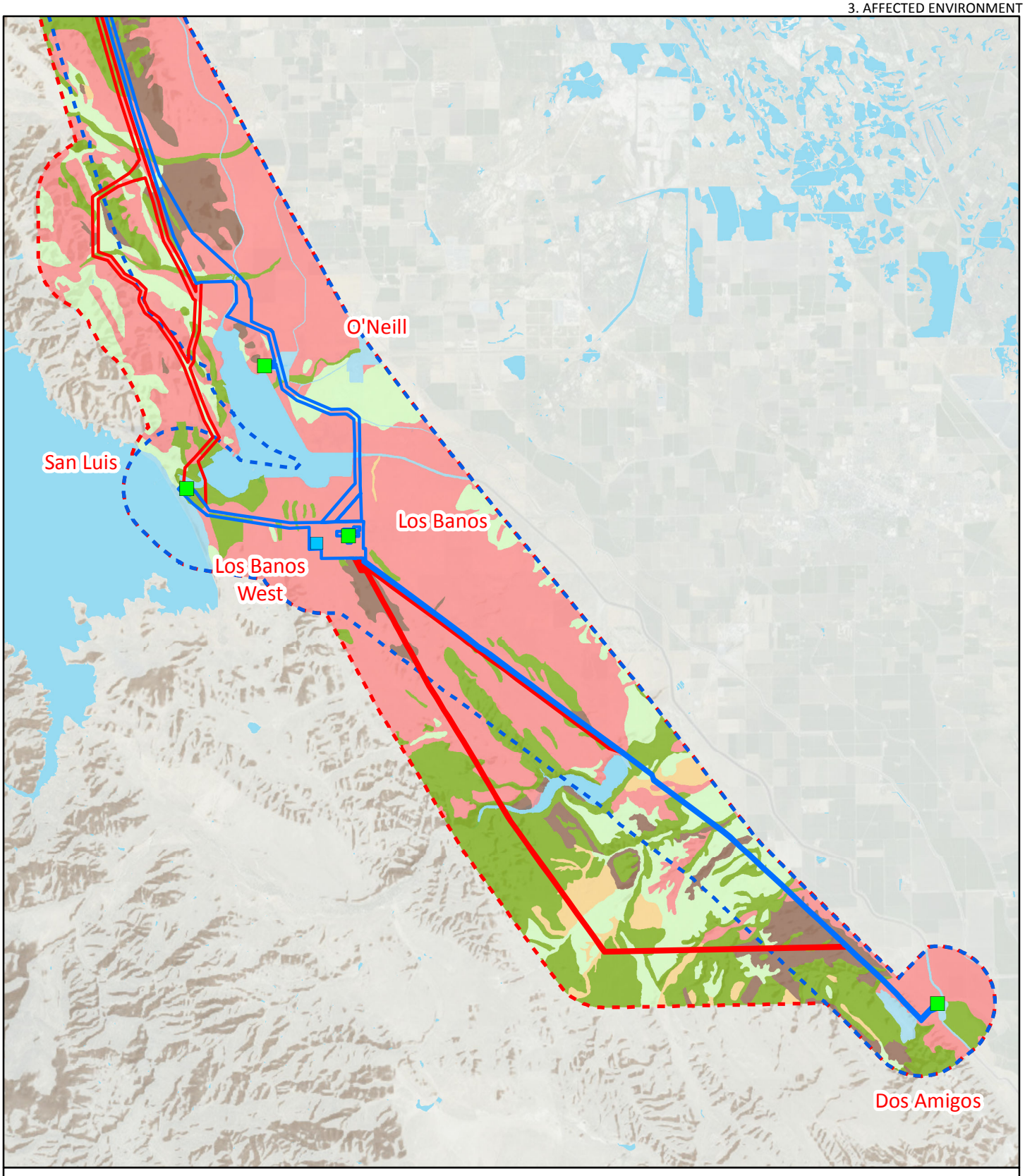


Western AREA POWER ADMINISTRATION

Figure 3.7-2c

Soil Orders

Source: WAPA SNR, Aspen EG, US Geological Survey



Western Area Power Administration

Substation
Proposed New Substations
Proposed Project Corridor
Corridor Alternatives
Proposed Project Study Area
Alternatives Study Area

Soil Order
Water
Alfisols
Entisols
Inceptisols
Mollisols
Vertisols

Figure 3.7-2d

Soil Orders

0 1.5 3 Miles

Source: WAPA SNR, Aspen EG, US Geological Survey

Mineral Resources

Most of the study area contains sand and gravel that can be used by the construction industry. Additionally, salt and gypsum are mined in Alameda County. There are several small deposits of minerals of regional significance (classified by CGS as MRZ-2) within the study area. All of these regionally significant mineral deposits contain concrete aggregate that is important to the construction industry. Two areas are found in the Central Segment, one near the intersection of I-5 and I-580 (south of the City of Tracy), and the second in the southwestern part of Stanislaus County, west of the City of Newman. Another area of concrete aggregate deposits is found in the South Segment, along Los Banos Creek and its alluvial fan. (CGS, 1993, 1999, 2012; USGS, 2009)

3.7.1.2 Regulations, Plans, and Standards

- The Institute of Electrical and Electronics Engineers (IEEE) 693-2005: "Recommended Practices for Seismic Design of Substations." IEEE Std 693 is designed as an integrated set of requirements for the seismic qualification of electrical power equipment.
- Alquist–Priolo Earthquake Fault Zoning Act of 1972 and the Seismic Hazards Mapping Act of 1990. The Alquist-Priolo Earthquake Fault Zoning Act of 1972 was developed to minimize the likelihood that structures used for human occupancy would be built over active faults by requiring a geological investigation for new development within designated active earthquake fault zones.
- The California Building Code (CBC, 2001) is based on the 1997 Uniform Building Code, with the addition of more extensive structural seismic provisions. The purpose of the California Building Code is to establish minimum requirements to protect life or limb, health, and property by regulating and controlling the design, construction, and quality of materials for all structural components of the built environment.
- The California Surface Mining and Reclamation Act of 1975 (SMARA). SMARA encourages the production, conservation, and protection of the State's mineral resources.

3.7.2 Corridor Alternatives

3.7.2.1 Patterson Pass Road Alternative

The alternative study area largely overlaps the Proposed Project and traverses the exact same soil orders and geologic formations. Therefore, the existing conditions in this segment will be nearly identical to those described above for the Proposed Project.

3.7.2.2 Butts Road Alternative

The alternative study area lies farther to the west in comparison to the Proposed Project between Butts Road and the San Luis Substation. The affected environment for this alternative is very similar to the Proposed Project. The alternative study area traverses mainly alfisols and mollisols, as well as small areas of entisols and vertisols. The underlying geology for this alternative is composed of Upper Cretaceous marine sequences of shale, siltstone, sandstone, and conglomerate as well as Holocene alluvium and a small area of Pliocene and/or Pleistocene sandstone, shale, and gravel. In comparison to the Proposed Project, there are no new geologic hazards or changes to the mineral resources along this alternative.

3.7.2.3 West of Cemetery Alternative

The alternative study area overlaps with that of the Proposed Project between Butts Road and the San Luis Substation. However, much of the alternative study area lies farther west of the Proposed Project

and traverses more varying terrain. This alternative traverses primarily alfisols and mollisols, along with a small area of entisols. The underlying geology is composed almost entirely of Upper Cretaceous marine sequences of shale, siltstone, sandstone, and conglomerate, as well as small areas of Holocene alluvium and Pliocene and/or Pleistocene sandstone, shale, and gravel. In comparison to the Proposed Project, there are no new geologic hazards or changes to the mineral resources along this alternative.

3.7.2.4 West of O'Neill Forebay 70-kV Alternative

The alternative study area runs from San Luis Substation to O'Neill Substation along the west and north sides of the O'Neill Forebay, and traverses primarily mollisols, along with small areas of alfisols and entisols. The underlying geology is composed almost entirely of Upper Cretaceous marine sequences of shale, siltstone, sandstone, and conglomerate and Holocene alluvium, as well as a very small area of Pliocene and/or Pleistocene sandstone, shale, and gravel. In comparison to the Proposed Project, there are no new geologic hazards or changes to the mineral resources along this alternative.

3.7.2.5 San Luis to Dos Amigos Alternative

The alternative study area largely overlaps with that of the Proposed Project between the San Luis Substation and the Dos Amigos Substation and traverses the exact same soil orders and geologic formations. Therefore, the existing conditions in this segment will be nearly identical to those described for the Proposed Project. In comparison to the Proposed Project, there are no new geologic hazards or changes to the mineral resources along this alternative.

3.7.2.6 Billy Wright Road Alternative

In the vicinity of the San Luis and Los Banos Substation, the alternative study area largely overlaps with that of the Proposed Project. Therefore, the existing geology will be similar to that described for the Proposed Project. South of the Los Banos Substation, the alternative study area lies farther west of the Proposed Project and traverses more rugged terrain. This alternative traverses primarily entisols and mollisols, as well as small areas of alfisols, inceptisols, and vertisols. The underlying geology is composed entirely of Upper Cretaceous marine sequences of shale, siltstone, sandstone, and conglomerate and Pliocene and/or Pleistocene sandstone, shale, and gravel. In comparison to the Proposed Project, there are no new geologic hazards or changes to the mineral resources along this alternative.

3.8 Land Use

This section describes the land uses in the study area, which is defined in Section 3.1. Land use impacts, including conflict with or conversion of existing land uses as well as any associated nuisance impacts, are analyzed in Section 4.8 (Land Use).

3.8.1 Proposed Project

3.8.1.1 Affected Environment

Western's Tracy Substation is located immediately to the east of the C.W. "Bill" Jones Pumping Plant. Western also owns a triangular shaped lot approximately 180 acres in size immediately to the north of the substation. The substation area is otherwise surrounded by agricultural fields. From the substation, the Proposed Project corridor heads south through open agricultural fields, paralleling an existing transmission corridor. It passes within 0.4 mile of the Mountain House Elementary School District, which is a single-site school district serving kindergarten through 8th grade, with an average annual enrollment of approximately 50 students (mtnhouse.k12.ca.us, 2014). The corridor crosses the Delta Mendota Canal near one of many wind farms located to the west, then turns southeast and crosses the canal again; a cluster of residences are located approximately 0.5 mile to the northeast here, and the San Joaquin Delta College South Campus at Mountain House is located approximately 0.25 mile to the east-northeast. As it crosses into San Joaquin County, the Proposed Project corridor turns south again, crossing I-205 near the west edge of the City of Tracy, where it crosses the Delta-Mendota Canal, the California Aqueduct, and I-580. The corridor here crosses a large parking lot at the west end of a large industrial park that is covered by the City of Tracy's Cordes Ranch Specific Plan, and then a narrow strip of agricultural land, between the Aqueduct and I-580. A small portion of the project corridor is within the City Limits of the City of Tracy, to the south and east of where I-205 crosses over the Delta-Mendota Canal. The corridor is within the City's Sphere of Influence between the Delta-Mendota Canal and I-580.

From I-580, the landscape becomes rural, consisting of rolling hills used primarily for grazing, though several existing transmission lines and a Shell Oil pipeline station are nearby. Zoning for this area is AG-160, extending to the Stanislaus County border. There are several conservation easements managed by the San Joaquin Council of Governments within the study area just west of I-580, including the Tracy Business Park Preserve. In addition, a proposed conservation easement covers 3,000 acres of land near Corral Hollow Road that was purchased by the Contra Costa Water District as part of mitigation for impacts to endangered species related to the expansion of the Los Vaqueros Reservoir (CWCB, 2012). A 2.65-mile segment of the Proposed Project would cross these lands to the southeast of Corral Hollow Road. This easement as proposed would prohibit almost all types of ground disturbance, including off-road vehicle use, vegetation removal, excavation, or construction of any structure. The Biological Opinion for the reservoir expansion project specifies cattle grazing as the primary means for managing the conservation value of the property, and it is currently under lease for grazing by Cubiburu Livestock, Inc. (CCWD, 2015).

As the Proposed Project corridor turns southeast, it passes within 0.2 mile of the northeast corner of Lawrence Livermore National Laboratory's 7,000-acre Site 300 testing center. From this point all the way to the O'Neill Forebay, the corridor passes through the rolling hills of the Diablo Range. Livestock grazing is the dominant land use throughout this segment, although the corridor also traverses active agricultural fields at Oak Flat Road and near Davis Road in Stanislaus County, and near Sullivan Road at the Stanislaus/Merced County border.

Two large ranches near the study area at the Stanislaus/Merced County border are also under conservation easement: the Simon Newman Ranch and the Romero Ranch. The Simon Newman Ranch is administered by the Nature Conservancy. It would be crossed by the Proposed Project and the Patterson Pass Road Alternative. The Romero Ranch is under easement to a private conservation organization. The Romero Ranch would be crossed by the Proposed Project and all alternative routes in the San Luis Segment. The Simon Newman Ranch easement restricts many types of development, with the objective to protect the rare sycamore alluvial woodland, oak woodlands, and grasslands on the ranch, which are important foraging and nesting areas for many species of birds. Transmission line development is not listed as a prohibited land use on the ranch. The Romero Ranch is under a similar easement with similar restrictions. The ranches were placed in conservancy in part with funding by Reclamation as part of an effort to protect habitat values to mitigate impacts related to the delivery of CVP water (BOR, 2010b).

From the Butts Road crossing in western Merced County, the Proposed Project corridor is located on the east side of O'Neill Forebay before interconnecting at Los Banos Substation and then to San Luis Substation. The Project would travel adjacent to the approved but not yet constructed Quinto Solar Project near McCabe Road, then cross land on the eastern side of O'Neill Forebay that is under conservation easement administered by the CDFW for the protection of San Joaquin kit fox. Between San Luis and Dos Amigos Substations, the Proposed Project corridor crosses private ranchlands up to the crossing of I-5, where it would interconnect into the Dos Amigos Substation. It would also cross through the proposed but not yet approved Wright Solar Park just north of the Los Banos Reservoir. Short segments within lands administered by the California Department of Parks and Recreation on either end of Los Banos Creek Reservoir, and an area to the north of the reservoir administered by DWR, are also crossed. Another area administered by DWR is just to the east of the Dos Amigos Substation.

3.8.1.2 Regulations, Plans, and Standards

Alameda County

The portions of the Proposed Project in Alameda County are covered by the East County Specific Plan (ECSP), which states that the county shall preserve the applicable area for intensive agricultural use. The plan also includes guidelines that incorporate the setbacks recommended by the California Department of Education for the siting of new schools near high-voltage electrical transmission lines for all sensitive land uses.

San Joaquin County

The Proposed Project and Patterson Pass Road Alternative routes travel through the same zoning areas in San Joaquin County. Near the border with Alameda County, the Project area is zoned AG-40 (Agricultural, with a minimum parcel size of 40 acres). The Proposed Project Route crosses a parcel zoned as I-L (Limited Industrial) and a small strip of AG-40 land in a large parcel south of I-205 between the Delta-Mendota Canal and the California Aqueduct. From I-580 all the way to the Stanislaus County border, the land is zoned as AG-160 (Agricultural, with a minimum parcel size of 160 acres). San Joaquin County's General Plan contains several objectives and policies addressing development of energy-related infrastructure, including to "protect the scenic values of the County landscape from inappropriately located overhead utility lines (SJC, 1992). It calls for siting new transmission lines adjacent to existing lines, except in the case of 500-kV transmission lines, which "for safety reasons shall be separate from existing corridors by at least 500 yards." It also calls for developing the joint use of utility corridors for recreation and trail uses, and to coordinate development of transmission lines so they do not interfere with agricultural operations.

Stanislaus County

The entire Proposed Project corridor in Stanislaus County runs through just two agricultural zones: A-2-160 and A-2-40. The latter numbers (160 and 40) refer to the minimum size for a subdivided parcel; otherwise, the two zones are identical in land use and requirements. The first approximately 3.5 miles of the study area starting from the San Joaquin County border is A-2-160, with the remainder A-2-40. Public utility facilities are allowed in these zones with a conditional use permit. The General Plan Policy Two states that lands designated as Agriculture "shall be restricted to uses that are compatible with agricultural practices, including natural resources management, open space, outdoor recreation and enjoyment of scenic beauty."

Section 201.08.020(C) of the County's zoning ordinance requires that the routes of all proposed electric transmission lines be submitted to the County Planning Commission for review and recommendation prior to acquisition of right-of-way when the lines are not within the right-of-way for public streets and highways.

Merced County

In Merced County, the Proposed Project would pass through several general zones. In the rural areas, all lands are either Agricultural (A), or Foothill Pasture (FP) zones. The FP designation provides for non-cultivated agricultural practices that typically require larger areas of land due to poor soil quality, limited water availability, and steeper slopes. It is typically applied to areas in the Diablo Range on the west side of the County. The A designation provides for cultivated agricultural practices that rely on good soil quality, adequate water availability, and minimal slopes. This is the largest County land use designation by area in the County and is typically applied to areas on the valley floor. Both these zones allow for energy production and transmission facilities in rural parts of the County.

The County has prepared a Community Plan for the Villages of Laguna San Luis near the intersection of SR 33 and SR 152. The Proposed Project would cross through two designated areas within the community planning area. The Open Space (OS) area, which includes the Los Banos Substation, applies to lands that contain opportunities for biological conservation, reflect an agricultural heritage, provide recreational opportunities, promote general public education, have an important scenic or utility value, or provide critical open space linkages within the community. Starting approximately one mile south of SR 152, the Project would enter an Urban Reserve (UR) area, which are lands "considered appropriate for intensive urban land use activities at some future date." This UR area is considered to be a logical location for in-fill development, as it is surrounded on three sides by urban designated uses. Specific uses may be proposed and approved within the UR area concurrent with an amendment to the Villages Community Plan, which typically requires an assessment of existing community vacant land availability. All areas within the community plan area that would be affected by the Proposed Project are currently zoned as A-2, for large agricultural operations, and the plan notes that, "The Villages CP does not propose any changes to the Agricultural Zoning designations."

Merced County's General Plan includes several polices addressing transmission projects:

- LU-1.11, Infrastructure Equity: Ensure that new development does not erode current levels of County service and that demands on public facilities and services from new development do not result in an unreasonable and inequitable burden on existing residents and property owners.
- LU-1.12, Hillside Development Standards: Prepare and adopt hillside development standards and illustrated design guidelines addressing viewshed protection for all hillside development.

- CIR-4.6, Multi-Use Trails: Encourage the development of multi-use corridors (such as hiking, equestrian, and mountain biking) in open space areas, along power line transmission corridors, utility easements, rivers, creeks, abandoned railways, and irrigation canals.
- CIR-6.8, Transmission Tower and Lines: Review all proposed radio, television, power, or related transmission towers and lines for appropriate location and possible air travel conflicts during the discretionary application process.
- PFS-5.3, New Transmission and Distribution Lines: Encourage new transmission and distribution lines to be sited within existing utility easements and rights-of-way or utilize joint-use of easements among different utilities to avoid impacting existing communities.
- PFS-5.4, Electrical Interference: Require mitigation of electrical interference to adjacent land uses in the placement of electrical and other transmission facilities.
- PFS-5.6, Underground Power Transmission: Require power transmission and distribution facilities to be located underground within urban communities and residential centers.
- PFS-5.7, Utility System Expansion: Coordinate with local gas and electric utility 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.

San Luis Reservoir State Recreation Area Resource Management Plan and General Plan

The San Luis Reservoir State Recreation Area Resource Management Plan and General Plan (SLRSRA RMP/GP) provides goals and guidelines for management of the San Luis Reservoir State Recreation Area and adjacent lands. The Plan Area consists of two geographically separate areas totaling over 27,000 acres in the vicinity of Los Banos, California. The Plan Area includes the water surfaces of San Luis Reservoir, O'Neill Forebay, and Los Banos Creek Reservoir, as well as adjacent recreation lands. Refer to Section 3.12 (Recreation) for additional information on the SLRSRA.

State Water Project Encroachment Permit Process

The California Department of Water Resources, in coordination with Reclamation, administers the State's process for issuing encroachment permits for activities at the joint use facilities as described in the joint Guidelines for Handling Right-of-Way Applications for Use of San Luis Rights-of-Way (1979).

3.8.2 Corridor Alternatives

3.8.2.1 Patterson Pass Alternative

This alternative route travels adjacent to the Proposed Project route in San Joaquin, Stanislaus, and Merced Counties. The land use designations and planning documents for this alternative are the same as those portions of the Proposed Project.

3.8.2.2 Butts Road Alternative

This alternative corridor would travel around O'Neill Forebay on the west, including through portions of the SLRSRA, though lands are zoned by the County as either Agricultural or Foothill Pasture. The Proposed Project corridor runs on the east side of the Forebay, also through Agricultural and Foothill Pasture lands, with small differences in the amounts of each. Therefore, the land use designations and planning documents for this alternative are the same as the Proposed Project, described above.

3.8.2.3 West of Cemetery Alternative

This alternative travels entirely through lands zoned as Foothill Pasture. This route travels near the San Joaquin Valley National Cemetery and the recreation areas along the western side of O'Neill Forebay. All of which are within the FP zone in Merced County.

3.8.2.4 West of O'Neill Forebay 70-kV Alternative

This alternative travels in the same corridor as the Butts Road Alternative corridor from the San Luis Substation to McCabe Road, then travels in the Proposed Project corridor from McCabe Road to the O'Neill Substation. Zoning for the entire corridor is either Foothill Pasture or Agricultural, as described above. This route travels near the San Joaquin Valley National Cemetery and the recreation areas along the western side of O'Neill Forebay, and near the O'Neill Forebay Wildlife Area and Santa Nella Village in the eastern side of the Forebay. The entire route is within the FP or A zones, but it is adjacent to lands zoned for light density urban development near Santa Nella Village and the Villages at Laguna San Luis.

3.8.2.5 San Luis to Dos Amigos Alternative

This alternative route would be adjacent to the Proposed Project route between the Los Banos and Dos Amigos Substations in Merced County. The land use designations and planning documents for this alternative are the same as that segment of the Proposed Project.

3.8.2.6 Billy Wright Road Alternative

This alternative corridor would be west of the Proposed Project between the Los Banos and Dos Amigos Substations. It would travel through an A2 zone (Exclusive Agriculture) within the Villages at Laguna San Luis for about one mile near the Los Banos Substation; this area is currently designated as open space, but also as Urban Reserve, meaning that Merced County could expand residential or commercial uses into this area in the future by changing the zoning of the area, though no changes are currently proposed. It otherwise would travel through private lands zoned as Foothill Pasture, including over the western end of the Los Banos Creek Reservoir, which is within the SLRSRA.

3.9 Noise and Vibration

This section describes existing conditions as they relate to potential noise and vibration impacts. Noise and vibration impacts, including excessive increases or conflict with noise regulations or guidelines, are analyzed in Section 4.9 (Noise and Vibration).

3.9.1 Proposed Project

3.9.1.1 Affected Environment

~~This section describes existing conditions as they relate to potential noise impacts of the Proposed Project corridor.~~ Noise is generally described as unwanted sound that rises to the level of annoyance. Sound is mechanical radiant energy that is transmitted by longitudinal pressure waves in a material medium, such as air, to a receiver. Noise can interfere with hearing, and therefore communication. At high levels, it can damage hearing temporarily or permanently. Noise perception depends on the nature and intensity of the sound, relative location, meteorological conditions, terrain, and background noise levels. The sound of a waterfall, for instance, is generally considered more pleasant than that of a jackhammer at the same sound intensity. Sound can have physical effects, such as interfering with sleep or damaging the eardrum at high levels, and also psychological effects, which can be cumulative over time. A sound that is tolerable when in a relaxed state can become intolerable when the recipient is under pressure, such as when needing to perform a complex task in a given time frame.

Sound is measured in decibels (dB) based on the amplitude of the pressure wave as it strikes the detecting microphone. The human ear can hear sounds between 20 hertz (Hz) and 20,000 Hz, although the ability to hear very low and very high frequencies falls off with age and with hearing damage caused by exposure to high noise levels. Humans are more sensitive to certain frequencies than others, and therefore, a weighted level measurement (dBA) is used to characterize the effect of noise on humans. Table 3.9-1 provides definitions for the terms commonly used to describe and measure noise.

Table 3.9-1. Summary of Acoustical Terms

Term	Definition
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
A-Weighted Sound Level (dBA)	The sound level in decibels as measured on a sound level meter using the A weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
Ambient Noise Level	The composite noise from all sources resulting in the normal, existing level of environmental noise at a given location. The Leq, as defined below, typically defines the ambient level.
Community Noise Equivalent Level (CNEL)	A measurement used to characterize average noise levels over a 24-hour period, with weighting factors included for evening and nighttime noise levels. Leq values for the evening period (7:00 p.m.–10:00 p.m.) are increased by 5 dB, while Leq values for the nighttime period (10:00 p.m.–7:00 a.m.) are increased by 10 dB.
Equivalent Noise Level (Leq)	The average A-weighted dB level, on an equal energy basis, during the measurement period.
Maximum Noise Level (Lmax)	The maximum noise level during a sound measurement period.
Minimum Noise Level (Lmin)	The minimum noise level during a sound measurement period.
Peak Level	The peak is not the same as the Lmax. The peak level is the maximum value reached by the sound pressure. There is no time-constant applied.
Acoustical Use Factor	The percentage of time per hour that the equipment typically would be operated at maximum power.

Hazards of exposure to noise can include hearing loss, which can occur with exposure as low as 85 dBA for 8 hours per day (Berglund, 1995), and sleep disruption. These can cause depression, impaired speech discrimination, impaired school and job performance, limited job opportunities, and a sense of isolation (Suter, 1991). Figure 3.9-1 lists the sound level in dBA for common outdoor noise sources.

Ground-borne vibration generated by construction vehicles, equipment, and related activities may also affect people living or working near construction areas. Some construction activities such as blasting, pile-driving, and operating heavy earth-moving equipment can cause ground-borne vibration that results in perceptible movement of building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. Typically, ground-borne vibration attenuates rapidly with distance from the source of vibration. Man-made vibration issues are therefore usually confined to short distances (i.e., 500 feet or less) from the source (FTA, 1995).

Noise Environment in the Project Area

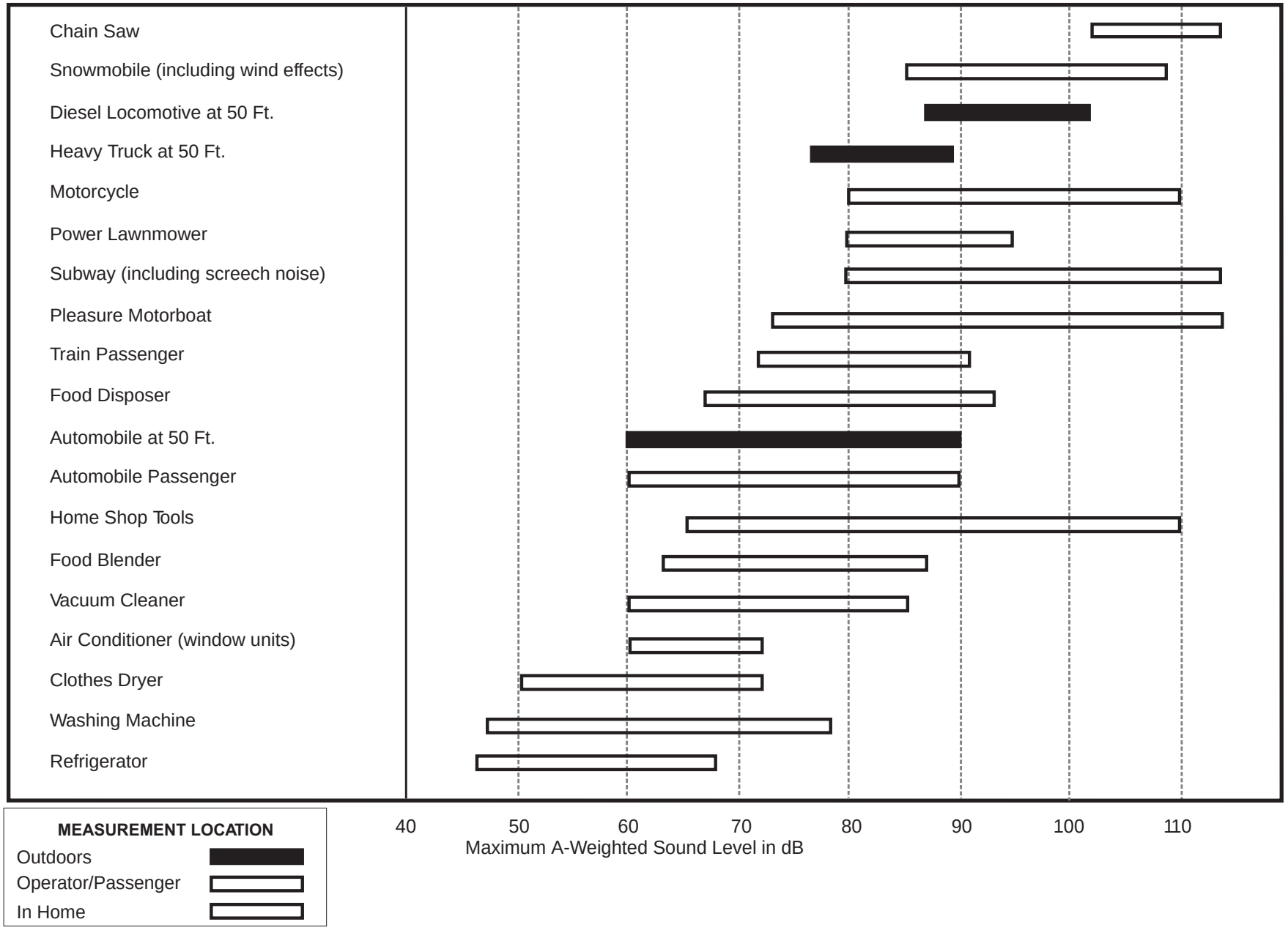
Noise-sensitive land uses include residences, schools, hospitals, and workplaces. The people within these places are often called "sensitive receptors." The region surrounding the Proposed Project corridor is largely rural, with some isolated farmhouses, occasional groups of residences, and a few commercial businesses. Groups of residences and other noise-sensitive areas located within one mile of the Proposed Project corridor are listed below with distance of receptor to the corridor edge in parentheses:

North Segment

- The community of Mountain House (0.5 mile)
- Mountain House Elementary School (0.5 mile)
- A group of residences near the intersection of W. Grantline Road and S. Central Parkway south of Mountain House (0.2 mile)
- The San Joaquin Delta College South Campus at Mountain House (0.2 mile)
- A group of residences near the intersection of W. Patterson Pass Road and Midway Road (0.25 mile)

Central Segment

- A group of residences off the southern end of S. Tracy Boulevard (0.2 mile)
- A group of residences off Vernalis Road near the San Francisco Public Utilities Commission's Tesla Water Treatment Facility (0.3 mile)
- A single residence approximately 1 mile west of South Bird Road (0.2 mile)
- A single residence at the end of Gaffery Road (0.3 mile)
- A single residence on Khalsa Road (0.2 mile)
- Two residences at the end of Ingram Creek Road (0.1 mile)
- A single residence adjacent to southbound I-5 near Sperry Avenue (0.9 mile)
- One to two residences on Oak Flat Road, one of which may have been converted to another use (0.7 to 1 mile)
- A single residence off the end of Fink Road (0.3 mile)
- Two residences at Sullivan Road (0.1 mile)



Source: USEPA, 1978.

Protective Noise Levels Condensed Version of EPA Levels Document

Figure 3.9-1
Typical Range of Common Sounds Heard in the Environment

San Luis Segment

- Two residences at Butts Road (0.1 and 0.9 mile, respectively)
- A group of residences and the San Joaquin Valley National Cemetery at McCabe Road (0.1 mile)
- Recreation areas located at San Luis Reservoir, O'Neill Forebay, and Los Banos Creek Reservoir, including campgrounds and picnic areas (0.2 mile to the San Luis Creek Campground)
- A group of residences and a commercial campground east of the Los Banos Substation (0.1 mile)

South Segment

- A group of residences near Billy Wright Road (0.07 mile)
- A single residence near Canyon Road (0.1 mile)
- A group of residences off Arburua Road (0.1 mile)

Existing Noise Sources

Existing sources of ambient noise in the study area include the following:

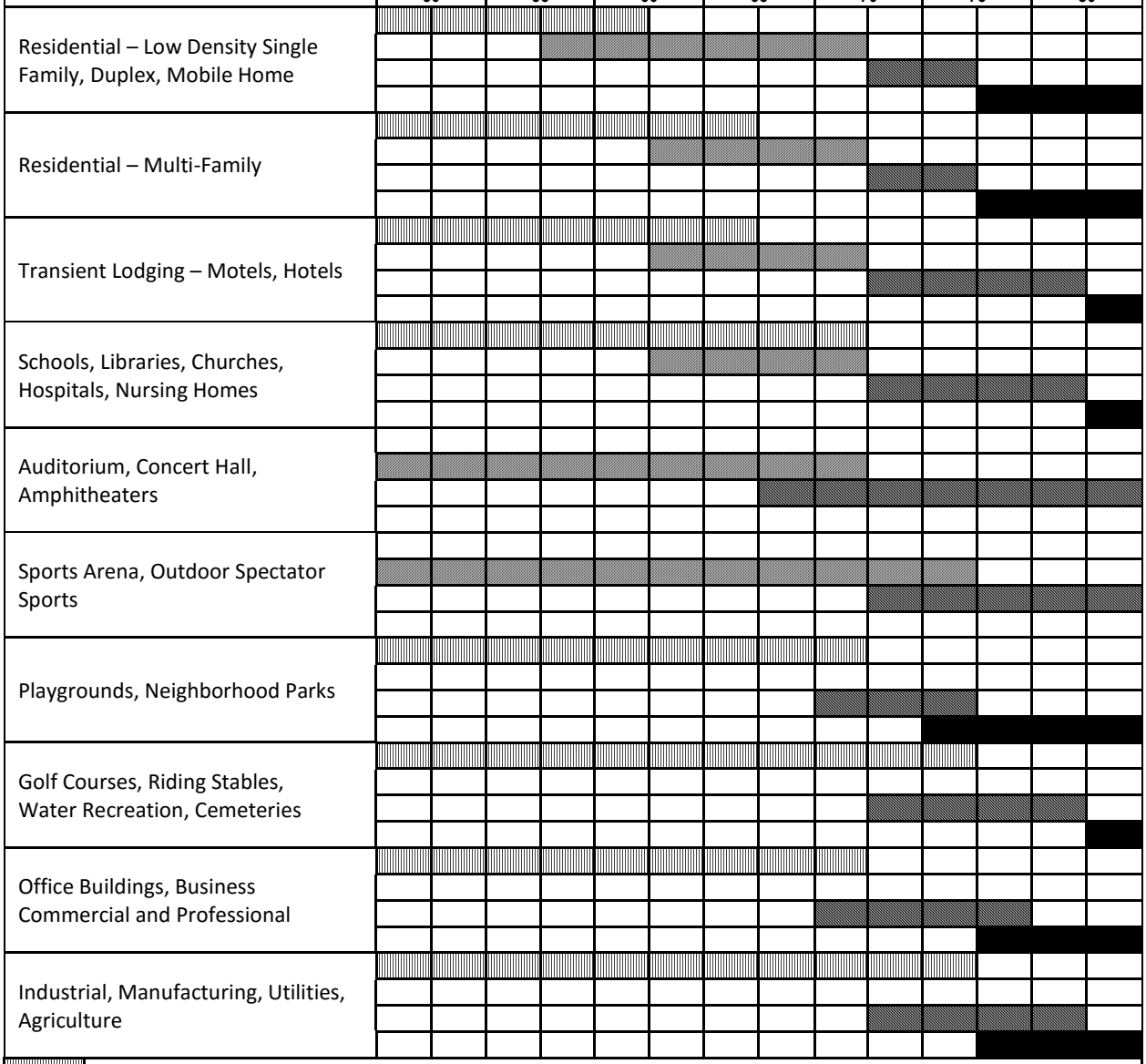
- traffic on I-5, I-580, I-205, SR 152, SR 33 and local roadways;
- machinery at industrial and commercial facilities along the route, including the pumping/generating facilities at the Tracy (C.W. "Bill" Jones), San Luis (William R. Gianelli), and O'Neill facilities;
- wind turbines of the wind farms along the Diablo Range; and
- occasional farm machinery.

3.9.1.2 Regulations, Plans, and Standards

Federal and State Standards

The Occupational Safety and Health Administration (OSHA) and the California Noise Control Act (California Health and Safety Code Sections 46000-46080) regulate the generation of and exposure to noise. County and local governments also set noise regulations to protect communities against nuisance noises. The EPA has published an outdoor noise level guideline of 55 dBA averaged over 24 hours. Table 3.9-2 shows California guidelines for evaluating the compatibility of various land uses as a function of noise exposure.

Table 3.9-2. Land Use Compatibility for Community Noise Environment



	Normally Acceptable. Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable. New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
	Normally Unacceptable. New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
	Clearly Unacceptable. New construction or development should generally not be undertaken.

Source: OPR, 2003

Local Noise Ordinances and Policies

Each local government aims to protect its residents from intrusive noise. Most communities specifically restrict disturbing noises at night. Table 3.9-3 shows the noise standards that the counties in the Proposed Project area consider compatible with residential land uses.

Table 3.9-3. Residential Noise Limits by County

County	Day (7 am to 10 pm)	Night (10 pm to 7 am)	L_{max}
Alameda	50-70 dBA, depending on duration	45-65 dBA, depending on duration	NA
Merced	background plus 10 dBA, or 55 dBA L_{50}	background plus 5 dBA, not to exceed 65 dBA Ldn or 50 dBA L_{50}	75 dBA day 79 dBA night
San Joaquin	55 dBA Leq (at the property line of the receiving land use)	45 dBA Leq	70 dBA day 65 dBA night
Stanislaus	50 dBA Lmax	45 dBA Lmax	NA

Alameda County's East County Area Plan has several policies addressing noise impacts, including Policy 289 which states that "The County shall limit or appropriately mitigate new noise-sensitive development in areas exposed to projected noise levels exceeding 60 dBA based on the California Office of Noise Control Land Use Compatibility Guidelines." Policy 290 requires noise studies for projects located "adjacent to existing residential or other sensitive land uses," and that when noise exceeds the State's guidelines, developers must contribute to the cost of noise mitigation measures.

The San Joaquin County General Plan Noise Element states that traffic is the prevalent noise source in the county. The Noise Element focuses on measures to reduce noise, including proper planning (to avoid impacts) and architectural design, use of shielding, and acoustical construction.

The Stanislaus County General Plan Noise Element focuses on areas that exceed current noise guidelines, and notes that "New development of industrial, commercial or other noise generating land uses will not be permitted if the resulting noise levels will exceed 60 Ldn (or CNEL) in noise-sensitive areas."

Merced County requires that all new developments meet the standards noted in Table 3.9-3 through design or other noise mitigation techniques, and limit construction activities to daytime hours.

3.9.2 Corridor Alternatives

3.9.2.1 Patterson Pass Alternative

This corridor is adjacent and parallel to the Proposed Project corridor from Patterson Pass Road to Butts Road in San Joaquin, Stanislaus, and Merced Counties, and has the same noise characteristics and sensitivity as the Proposed Project for that segment. This alternative has roughly the same number of sensitive receptors as the Proposed Project corridor for the Central Segment, described above; it would be farther away from the residences on the east side of the Proposed Project corridor, but closer to the five residences off of McCabe Road north of the San Joaquin Valley National Cemetery.

3.9.2.2 Butts Road Alternative

The noise characteristics and sensitivity for this alternative are similar to that of the Proposed Project, as it is parallel and adjacent to the Proposed Project corridor up to McCabe Road, where it splits and goes around the west side of O'Neill Forebay rather than the east side. It would travel closer to the San Joaquin Valley National Cemetery, the developed recreation areas on the west side of the O'Neill Forebay, and

several residences off of McCabe Road near the point where the Proposed Project and this alternative corridor cross the road.

3.9.2.3 West of Cemetery Alternative

The noise characteristics and sensitivity for this alternative would be less than the Proposed Project corridor because it is farther away from the group of homes off McCabe Road, and further away from the San Luis Creek Campground on O'Neill Forebay. However, this alternative is closer to and just west of the San Joaquin Valley National Cemetery, considered a sensitive noise area.

3.9.2.4 West of O'Neill Forebay 70-kV Alternative

This alternative travels in the same corridor as the Butts Road Alternative corridor from the San Luis Substation to McCabe Road, then travels in the Proposed Project corridor from McCabe Road to the O'Neill Substation. The noise characteristics and sensitivity of this alternative would be the same as those segments described above.

3.9.2.5 San Luis to Dos Amigos Alternative

This alternative travels adjacent to the Proposed Project, on the west side of the existing transmission lines, rather than on the east, until it meets and joins the Proposed Project at Los Banos Creek Reservoir. The noise characteristics and sensitivity along this corridor would be the same as for the Proposed Project corridor.

3.9.2.6 Billy Wright Road Alternative

This alternative lies to the west of the Proposed Project south of the Los Banos Substation. This alternative corridor would travel on the west side of Los Banos Creek Reservoir, and would avoid the group of homes at Arburua Road. Noise characteristics would be similar to the Proposed Project corridor, but sensitivity would be lower due to the fewer residences along the corridor.

3.10 Paleontological Resources

This section describes the paleontological resources in the study area, which is defined in Section 3.1. The information presented in this section is summarized from the *Paleontological Resource Overview of the San Luis Transmission Project*, Appendix G of this EIS/EIR. Refer to that document for more detailed information on the affected environment for the Proposed Project and alternatives.

Impacts to paleontological resources, including loss of or inaccessibility to paleontological resources, are analyzed in Section 4.10 (Paleontological Resources).

3.10.1 Proposed Project

3.10.1.1 Affected Environment

Paleontological resources are defined in law as fossilized remains or imprints of multi-cellular animals and plants. A fossil is the remnant or trace of an organism of the past, such as a skeleton or leaf imprint. The importance of paleontological resources is subjectively ranked based on the current scientific value of the fossil or imprint. Vertebrate fossils, which include all animals with skeletal backbones such as mammals, birds, reptiles, amphibians, and fishes, are typically less abundant than invertebrate fossils, such as insects and snails. Vertebrates are therefore generally rated more important. However, well-preserved, soft-bodied organisms, including worms, insects, spiders, or rare invertebrate fossils, may be considered highly important.

Soils and Paleontological Resources

Paleontological resources are defined by the geologic units in which they are found. Fossils are found in sedimentary rocks, which are typically classified into lithostratigraphic units based on lithology (the physical characteristics of the rocks as an outcrop) rather than biologic characteristics or age. The Diablo Range is underlain by uplifted and intensely deformed Upper Jurassic (150 million years old) and younger rocks of the Franciscan ophiolite complex and the Salinian metamorphic and granitic complex. The Coast Ranges were created by the movements of the major faults in the area, including the nearby San Andreas Fault. They are characterized by elongated topographic and lithologic strips underlain by discrete basement blocks separated by major structural discontinuities (Wakabayashi, 1994). Refer to Section 3.7 (Geology, Soils, and Mineral Resources) for a discussion of the geologic units in the study area, and the Paleontological Resource Report in Appendix G for details on the rock formations found in the study area.

Paleontological Resources in the Study Area

Significant fossil-bearing deposits occur in the Diablo Range along the west side of the San Joaquin Valley. The San Joaquin Valley was part of the Pacific Ocean as recently as 65 million years ago, and the Coast Ranges were a series of islands that isolated whole groups of organisms. These island residents included many rare and unique animals of the Cretaceous Period and of the Oligocene and Miocene Epochs of the Tertiary Period. Some of the fossils recovered from and/or documented in the Diablo Range include mollusks, sharks, bony fish, turtles, sea lions, coral, deer, oysters, horses, weasels, whales, rhinoceros, sponges, bears, and dinosaurs.

Section 3.7 identifies six geologic units along the Proposed Project (see Figures 3.7-1a through 3.7-1d). The portions of the Proposed Project that are underlain by the Q, Alluvium Geological Unit have low paleontological sensitivity, which are in general highly disturbed agricultural or developed areas. All other geographic units underlying the Proposed Project have moderate to high paleontological sensitivity (E, Eocene marine, high; Ep, Paleocene marine, moderate; Ku, Upper Cretaceous Marine, high; M, Miocene marine sedimentary rocks, high; and QPc, Plio-Pleistocene nonmarine, high).

3.10.1.2 Regulations, Plans, and Standards

Activities affecting paleontological resources on federal lands are subject to the Federal Land Policy and Management Act of 1976 (43 U.S.C. §§ 1701, *et seq*.), which requires public lands to be managed in a manner that protects "scientific qualities" and other values of resources. The Antiquities Act of 1906 (16 U.S.C. §§ 431-433) also requires federal protection for significant paleontological resources on federally owned lands. Additionally, the Paleontological Resources Preservation Act (PRPA) (16 U.S.C. §§ 470aaa, *et seq.)* was recently enacted as a result of the passage of the Omnibus Public Lands Management Act of 2009. The PRPA requires federal land management agencies to manage and protect paleontological resources and affirms the authority of existing policies already in place. Portions of the Proposed Project area traverse lands managed by Reclamation and other federal agencies; therefore, federal laws will apply.

Treatment of paleontological resources under CEQA requires evaluation of resources in the Project area; assessment of potential impacts on significant or unique resources; and development of mitigation measures for potentially significant impacts, which may include avoidance, monitoring, or data recovery excavation. Additionally, Public Resource Code (PRC) Section 5097.5 affirms that no person shall willingly or knowingly excavate, remove, or otherwise destroy a vertebrate paleontological site or paleontological feature without the express permission of the overseeing public land agency. The code further states under PRC Section 30244 that any development that would adversely impact paleontological resources shall require reasonable mitigation. These regulations apply to projects located on land owned by or under the jurisdiction of the State or any city, county, district, or other public agency.

3.10.2 Corridor Alternatives

3.10.2.1 Patterson Pass Alternative

The geology of this alternative is nearly identical to that of the Proposed Project, passing through M, Ku, and QPc units, and would have the same moderate to high paleontological sensitivity, depending on the level of past disturbance.

3.10.2.2 Butts Road Alternative

The portions of this alternative within the Ku Upper Cretaceous marine unit have high paleontological sensitivity.

3.10.2.3 West of Cemetery Alternative

The portions of this alternative within the Ku Upper Cretaceous marine unit have high paleontological sensitivity.

3.10.2.4 West of O'Neill Forebay 70-kV Alternative

The portions of this alternative within the Ku Upper Cretaceous marine and QPc, Plio-Pleistocene nonmarine units have high paleontological sensitivity.

3.10.2.5 San Luis to Dos Amigos Alternative

This alternative parallels the Proposed Project route from the Los Banos Substation to Los Banos Creek Reservoir. The portions of this alternative within the Ku Upper Cretaceous marine and QPc, Plio-Pleistocene nonmarine units have high paleontological sensitivity.

3.10.2.6 Billy Wright Road Alternative

The entire length of this alternative route is underlain by Upper Cretaceous marine rocks, and therefore, would have a high paleontological sensitivity.

3.11 Public Health and Safety

3.11.1 Proposed Project

This section describes the Public Health and Safety conditions within the study area, which is defined in Section 3.1. Potential hazards to Public Health and Safety that could be caused by the Project include accidents such as worker falls, intentional acts of destruction, wildfires, electrical contact (burns and electrocutions), and Valley Fever (a fungal infection caused by inhaling coccidioides organisms present in the soil). Also addressed in this section are electromagnetic fields (EMF), emergency response, spills, or mishandling of hazardous materials or hazardous waste, and use of herbicides. Impacts to public health and safety resulting from these hazards are analyzed in Section 4.11 (Public Health and Safety).

3.11.1.1 Affected Environment

The Proposed Project corridor is located primarily in open space with limited public access. Where appropriate, structures would be on hilltops or ridges, with the conductors spanning the gullies below. Access to most of the Project is limited to private roads, either within the easement of existing transmission corridors, or on adjacent private farm and ranchlands. In Alameda and San Joaquin Counties, there are generally no access roads within existing transmission line easements on farmland because the entire widths of all the existing transmission line easements are actively farmed. From a point approximately 2 miles south of Kelso Road, the Proposed Project corridor enters grazing lands, which have very limited access for the entire remainder of its route. This is also the case for the alternative routes farther south.

Access roads from the few public paved roads that cross the study area (see Section 3.14, Traffic and Transportation) are generally gated and locked, and often marked with no trespassing signs. Where public roads cross the Proposed Project corridors, adjoining lots are generally fenced to contain grazing animals. Access is restricted into the substations that are interconnected by the Project, and to the portions of the Project that are on State-owned or managed lands near the Los Banos Creek Reservoir, San Luis Reservoir, and O'Neill Forebay. The public, in general, would not be expected to travel within the Project area at any time.

Hazards to health and safety would primarily affect workers within the transmission line easement, and people who live, work, or recreate near the Project area. Hazards to the general public include dust from Project construction or maintenance activities; handling of hazardous materials and waste; wildfires; and congestion or road closures due to construction-related traffic, which could, for example, block emergency vehicle travel. Also discussed in this section are intentional acts of destruction and potential exposure to electric and magnetic fields. Hazards to workers include all those applicable to the public, plus falls, burns, electrocutions, and other accidents.

Emergency Response

Emergency response access is discussed in Traffic and Transportation (sections 3.14 and 4.14). Fires in the Project vicinity would be responded to by local, regional, and State firefighting units, many of which are also equipped to provide emergency medical assistance. Local, regional, and State fire stations near the Project area are listed below by county in Table 3.11-1.

Medical and police facilities near the Project are located in Tracy, Livermore, Patterson, Gustine, and Los Banos. The public roads in the area are patrolled by the applicable county sheriff and the California Highway Patrol.

Table 3.11-1. Fire Stations in the Project Area

Fire Station	Straight-line Distance from Project Area
Alameda County	
Alameda County Fire Department Station 20, Livermore	12 miles
Livermore – Pleasanton Fire Department Station 8, Livermore	12 miles
Lawrence Livermore National Laboratory Fire Department, Livermore	8.6 miles
San Joaquin County	
Cal Fire Castle Rock Station (Station 26), Tracy	2 miles
City of Tracy Fire Department Station 94 (adjacent to the Cal Fire Station 26), Tracy	2 miles
Stanislaus County:	
West Stanislaus County Fire Protection District Station 4, Vernalis	4.4 miles
West Stanislaus County Fire Protection District Station 3, Westley	3.3 miles
West Stanislaus County Fire Protection District Station 7, Diablo Grande	4.8 miles
West Stanislaus County Fire Protection District Stations 1 and 2, Patterson	3.6 miles
West Stanislaus County Fire Protection District Station 6, Crows Landing	4.9 miles
West Stanislaus County Fire Protection District Station 5, Newman	6.2 miles
Cal Fire Del Puerto Station, Patterson	2 miles
Merced County:	
Gustine Volunteer Fire Department, Gustine	6.3 miles
Cal Fire Station 72, Santa Nella	0.5 miles
Cal Fire Seasonal Station, Los Banos	1 mile
Cal Fire Station 71, Los Banos	8.5 miles
Los Banos Fire Department Station 2, Los Banos	10 miles

Wildfires

The Project area is naturally susceptible to wildfire as a result of the dominant vegetation types and climatic conditions. Fires in the region are generally started either by lightning strikes, accidental ignition such as from campfires, or vandalism. Very few trees exist near the existing or proposed transmission facilities in the Project area, so wildfire would generally burn dried grasses. Grassfires tend to be less intense than forest fires, but they can still generate enormous amounts of radiant heat. Within the Project area, typical fire hazards include ignition of nearby fuel sources (primarily vegetation) caused by sparks from vehicles, tools, or personnel during construction or maintenance activities.

Hazardous Materials and Hazardous Waste

Hazardous materials hazards could arise from spills of gasoline, diesel fuel, oil, solvents, herbicides, or other materials from containers or vehicles. Spills could contaminate soils or leach into ground or surface water, and could be toxic, caustic, or acidic. Known storage locations include existing substations (Tracy, San Luis, O'Neill, Los Banos, and Dos Amigos). California-designated hazardous waste has been stored at the Tracy Substation. The other substations may store hazardous waste for short periods as allowed by regulations. Western and PG&E apply herbicides along their existing transmission line easements in the region where vegetation threatens the safe operation of the transmission line and related facilities. Herbicide misuse, over-spray, or drift could adversely affect humans, wildlife, vegetation, or water.

Electrical Hazards

Electrical hazards could include vegetation or equipment fires, electrical burns, or electrocutions to humans or animals. Electrical hazards could occur anywhere near energized conductors or facilities. These hazards are primarily a concern for construction and maintenance workers.

Fall Hazards

Fall hazards could affect individuals working at heights. Elevated work is essential for assembly of transmission structures and for line stringing. Workers typically perform this work from bucket trucks or by climbing structures.

Acts of Intentional Destruction

Electric power transmission facilities are part of the nation's critical infrastructure and are considered to be possible targets of intentional acts of destruction. If targeted, potential threats to the Project could include bombs, aircraft collisions, sabotage of electrical systems by gunshot or other methods, attacks on personnel, or cyber-attack of the facilities' control system.

EMF

Electric power consists of two components: voltage and current. Current, which is a flow of electrical charge measured in amperes, creates a magnetic field. Voltage, which is the force or pressure that causes the current to flow and is measured in units of volts or kV, creates an electric field. Electric fields and magnetic fields considered together are referred to as "EMF." Both fields occur together whenever electricity flows, hence the general practice of considering both as EMF exposure.

Transmission lines, like all electrical devices and equipment, produce EMFs. Electric field strength is usually constant with a given voltage, while magnetic field strength can vary depending on the electrical load, design of the transmission line, and configuration and height of conductors. Both the magnetic field and the electric field decrease rapidly, or attenuate, with distance from the source.

Over the past 25 years, research has not proven that power frequency EMF exposure causes adverse health effects (NIEHS, 2002). However, some non-governmental organizations have set advisory limits as a precautionary measure, based on the knowledge that high field levels (more than 1,000 times the EMF found in typical environments) may induce currents in cells or nerve stimulation. The International Commission on Non-Ionizing Radiation Protection has established a continuous, magnetic field exposure limit of 0.833 Gauss (or 833 milliGauss [mG]) and a continuous electric field exposure limit of 4.2 kilovolts per meter (kV/m) for members of the general public. The American Council of Governmental Industrial Hygienists publishes Threshold Limit Values (TLVs) for various physical agents. The TLV for occupational exposure to 60-Hertz (Hz) magnetic fields has been set as 10 Gauss (10,000 mG) and 25 kV/m for electric fields. Transmission and distribution lines in the United States operate at a frequency of 60 Hz, as do household wiring and appliances.

In the home, EMF exposure comes from circuit breaker and meter boxes, electrical appliances, electric blankets, and any cord or wire that carries electricity. The fields are greatest closest to the surface of the cord or appliance and drop rapidly in just a short distance. Table 3.11-2 shows typical magnetic fields from common household electrical devices.

Sources of existing EMF in the vicinity of the Project area include existing transmission and distribution lines, distribution feeds to homes and businesses, commercial wiring and equipment, and common household wiring and appliances for residences and communities in the area. EMF levels in homes and businesses vary widely with wiring configurations, the types of equipment and appliances in use, and proximity to these sources.

Table 3.11-2. Typical 60 Hertz Magnetic Field Values from Common Electrical Devices

Appliance	Magnetic Field 6 Inches from Device (mG)	Magnetic Field 2 Feet from Device (mG)
Washing machine	20	1
Vacuum cleaner	300	10
Electric oven	9	—
Dishwasher	20	4
Microwave oven	200	10
Hair dryer	300	—
Computer desktop	14	2
Fluorescent light	40	2

Source: NIEHS 2002

3.11.1.2 Regulations, Plans, and Standards

Occupational Safety and Health Act of 1970

Under authority granted in the Occupational Safety and Health Act of 1970, the OSHA assures safe and healthful working conditions by setting and enforcing standards and by providing training, outreach, education, and assistance. OSHA has set standards for all facets of work conditions, including for safety-related personnel protective equipment, heat exposure, toxic chemical handling and exposure, noise exposure, and working at heights. The California Department of Industrial Relations administers the California State Plan, commonly referred to as Cal/OSHA, which ~~is identical to~~has adopted many of the Federal OSHA regulations. Cal/OSHA regulations apply to all public and private sector places of employment in the State with the exception of Federal Government employees, private-sector workers on federal enclaves~~government~~ and Native American lands, and employers that require federal security clearances. Cal/OSHA would not be applicable to work done by Western employees~~within a Western easement~~, but would be applicable for work done by non-federal employees at facilities of investor-owned utilities in California.

Title 49 of the Code of Federal Regulations (49 CFR), Section 171.8

Transportation, handling, storage and cleanup of hazardous materials is covered under Title 49 of the Code of Federal Regulations (49 CFR), Section 171.8. Any substance or material that is capable of causing an unreasonable risk to human health or safety or the environment when transported by vehicle, used incorrectly, or not properly stored or contained, is a hazardous material. Examples include explosives, flammables, corrosives, radioactive materials, and poisons. Regulations pertaining to transportation of such materials are enforced by the CHP and DOT.

Resource Conservation and Recovery Act

Federal regulations governing handling, storage, disposal, and cleanup of hazardous wastes are primarily authorized by Resource Conservation and Recovery Act (RCRA) 42 U.S.C. § 6901, *et seq*. The hazardous waste program, under RCRA Subtitle C, establishes a system for controlling hazardous waste from the time it is generated until its ultimate disposal. EPA has delegated enforcement of hazardous waste laws in California to the California Department of Toxic Substances Control (DTSC), which regulates the handling, storage, disposal, and cleanup of hazardous wastes; DTSC in turn has delegated this authority to local Certified Unified Planning Agencies.

Hazardous Waste Control Law, California Health and Safety Code Section 25100 et seq./22 CCR)

DTSC has primary regulatory responsibility, with delegation of enforcement to local jurisdictions that enter into agreements with the State agency, for the generation, transport, and disposal of hazardous wastes under the authority of the Hazardous Waste Control Law (HWCL). Regulations implementing the HWCL list 791 hazardous chemicals and 20 or 30 more common substances that may be hazardous; establish criteria for identifying, packaging and labeling hazardous substances; prescribe management of hazardous substances; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be deposited in landfills. HWCL requires that the generator of a hazardous waste must complete a manifest that accompanies the waste from the point of generation to the ultimate treatment, storage, or disposal location. The manifest describes the waste, its intended destination, and other regulatory information about the waste. Copies must be filed with the DTSC. Generators must also match copies of waste manifests with receipts from the treatment, storage, or disposal facility to which it sends waste.

EMF Standards

No federal regulations have established environmental limits on the strengths of fields from power lines. However, the Federal Government continues to conduct and encourage research on the EMF issue. The State of California Department of Education enacted regulations that require minimum distances between a new school and the edge of a transmission line easement. The setback distances are 100 feet from the edge of the transmission line easement for 50-kV to 133-kV lines, 150 feet from the edge of the transmission line easement for 220-kV to 230-kV lines, and 350 feet from the edge of the transmission line easement for 500-kV to 550-kV lines. These distances were not based on specific biological evidence, but on the known fact that fields from power lines drop to near background levels at those distances. Western follows field-reducing guidelines for designing new and upgraded transmission lines. California has no other rules governing EMF.

3.11.2 Corridor Alternatives

All corridor alternatives have the same affected environment as the Proposed Project.

3.12 Recreation

This section describes existing recreational resources and the regulatory environment pertinent to this resource. Impacts to recreation, including conflicts with or adverse changes to recreation areas or activities are analyzed in Section 4.12 (Recreation).

3.12.1 Proposed Project

3.12.1.1 Affected Environment

Overview

The recreation study area includes the Project study area (see definition of Project study area in Section 3.1) as well as any established recreation areas adjacent to the Project study area. The recreation study area includes primarily unincorporated areas within Alameda, San Joaquin, Stanislaus, and Merced Counties with the exception of federal and State land surrounding the O'Neill Forebay, San Luis Reservoir, and Los Banos Creek Reservoir.

The study area lies to the west of I-5. Several secondary roads extend from the I-5 corridor and provide primary access points to recreation areas located in the foothills to the west of the Proposed Project. Recreation areas accessed from the I-5 corridor include the Frank Raines Off-Highway Vehicle (OHV) Park, Carnegie State Vehicular Recreation Area, and Corral Hollow Ecological Preserve.

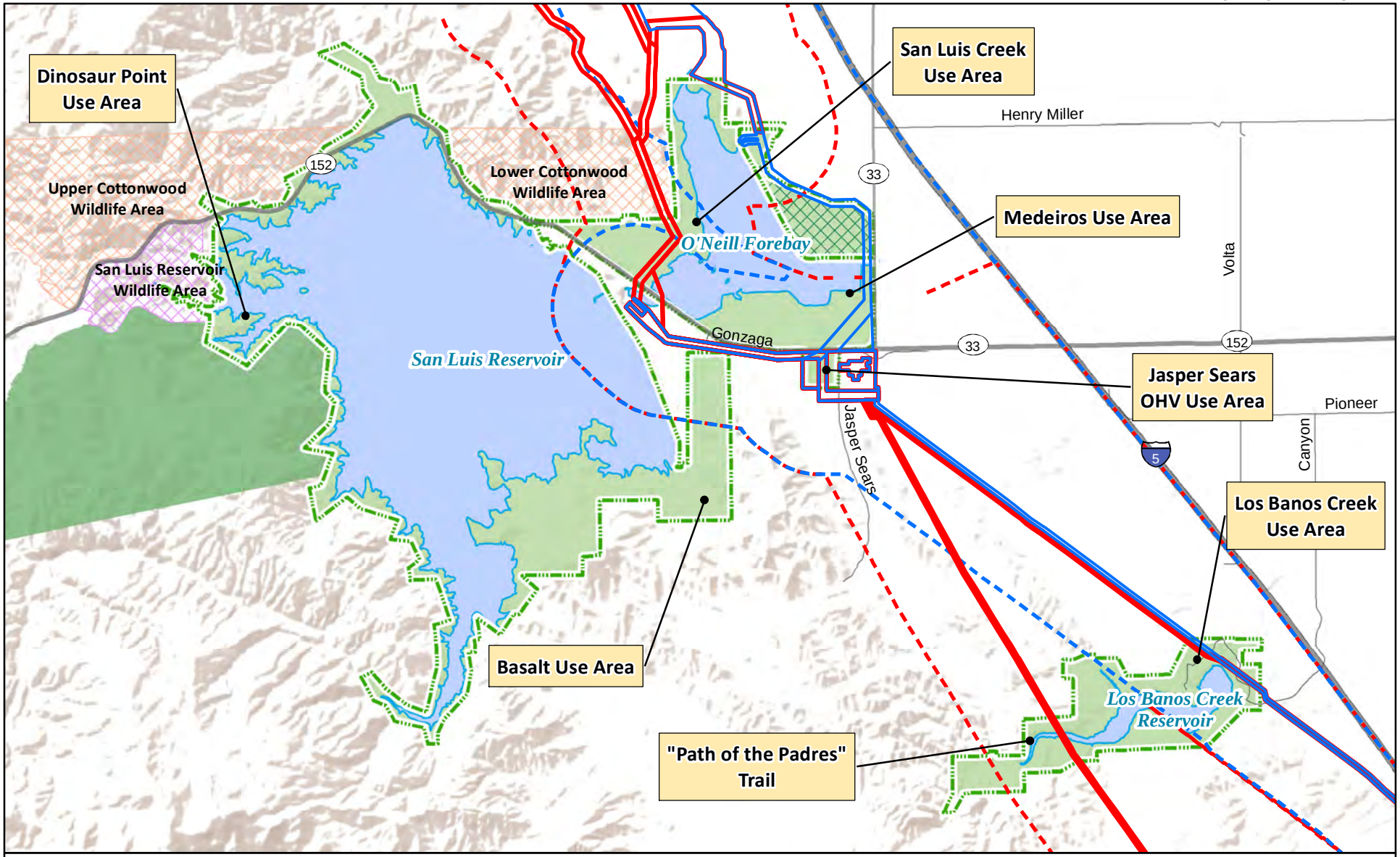
Dispersed recreational activities may occur on private land or local jurisdiction lands within the study area. However, there are no county or other local jurisdiction designated recreation areas located within the study area. Most recreation use in the study area occurs on federal and State land as discussed below.

Federal and State recreation areas within the study area are the San Luis Reservoir State Recreation Area (SRA) (including facilities at San Luis Reservoir, O'Neill Forebay, and Los Banos Creek Reservoir) and CDFW wildlife areas (the Lower Cottonwood Wildlife Area and the O'Neill Forebay Wildlife Area). There are no federally or State-designated wilderness areas within the study area. Figure 3.12-1 was adapted from the San Luis Reservoir State Recreation Area Resource Management Plan and General Plan (SLRSRA RMP/GP) and provides an overview of the study area and recreation resources on federal and State land.

San Luis Reservoir State Recreation Area

The San Luis Reservoir SRA is the largest recreation area within the study area. The SRA consists of two geographically separate areas, one surrounding San Luis Reservoir and O'Neill Forebay, and the other around Los Banos Creek Reservoir (see Figure 3.12-1). The total area is over 27,000 acres, of which 15,395 acres are surface waters of the San Luis Reservoir, O'Neill Forebay, and Los Banos Creek Reservoir.

Reclamation owns most of the land within the SRA. However, these lands are managed by the CDPR, CDFW, and DWR. The O'Neill Forebay Wildlife Area and San Luis Wildlife Area were set aside by Reclamation for wildlife preservation and mitigation. These wildlife areas are on Reclamation land and fall within the SRA boundary, but are managed by CDFW. The designated recreation areas within the SRA are under the management of CDPR and discussed below. Figure 3.12-1 illustrates land management and ownership.



Western Area Power Administration

Proposed Project Corridor
Corridor Alternatives
Proposed Project Study Area
Alternatives Study Area
San Luis Reservoir State Recreation Area
Pacheco State Park
Waterbody
CDFW Owned and Operated Lands
Cottonwood Creek Wildlife Area
O'Neill Forebay Wildlife Area
San Luis Reservoir Wildlife Area

0 1 2 Miles

Source: WAPA SNR, Aspen EG, CDFW, California State Parks

Figure 3.12-1

Recreation Study Area

The SLRSRA RMP/GP was prepared by CDPR and Reclamation in June 2013. The RMP/GP anticipates increased future visitation to the SLRSRA by providing for physical additions and visitor use modifications concentrated in and around existing developed areas. Campsites would be added in Basalt, San Luis Creek, Medeiros, and Los Banos Creek use areas, and the variety of camping opportunities would be increased. Campsites would also be added at the Jasper Sears OHV Use Area and Dinosaur Point (where none currently exist). The RMP/GP also identifies new trails and trailside facilities that would accommodate a greater variety of recreational opportunities.

Most recreation visits to the SRA occur between April and September of each year. The average attendance between fiscal year 2005-2006 and fiscal year 2010-2011 was just over 327,000 people. The highest frequency of visitors occurs on weekends and holidays between April and September, during which public use areas often reach their maximum capacity (BOR, 2013).

The existing SRA provides recreational opportunities including but not limited to fishing, boating, camping, hiking, OHV use, windsurfing, horseback riding, day use, and guided tours. Fishing is the most popular recreation activity within the SRA. Water-based recreation is allowed on all three waterbodies within the SRA in accordance with speed limits and access restrictions. Boating is permitted from 6 a.m. to sunset. Land-based recreation is provided in five waterside use areas: San Luis Creek, Medeiros, Basalt, Dinosaur Point, and Los Banos Creek. A sixth use area, the Jasper Sears OHV Use Area, is designated for OHV use. San Luis Creek and Basalt are the most popular use areas. There are up to 40,000 visitors a month to the San Luis Creek Use Area during peak use (California State Parks, 2004).

Table 3.12-1 lists the primary recreational opportunities within each use area designated within the San Luis Reservoir SRA. Locations of the recreational use areas listed below are shown in Figure 3.12-1.

Table 3.12-1. Designated Use Areas Within the San Luis Reservoir SRA

Use Area	Primary Activities
San Luis Creek Use Area	Fishing, windsurfing, swimming, boating, camping, day use, group activities
Medeiros Use Area	Fishing, windsurfing, camping, day use
Basalt Use Area	Fishing, camping, hiking, boating, day use
Los Banos Creek Use Area	Fishing, boating, camping, hiking, horseback riding
Dinosaur Point Use Area	Fishing, boating, day use
Jasper Sears OHV Use Area	OHV use

Source: San Luis Reservoir State Recreation Area Resource Management Plan, 2013

Jasper Sears OHV Use Area. The Jasper Sears OHV Use Area is located south of SR 152 and the Medeiros Use Area, adjacent to the Los Banos Substation. The OHV Use Area is an open, flat, partially vegetated 150-acre parcel with several OHV tracks consisting of unpaved trails. The use area also has two picnic tables with shade ramadas, a parking lot with two vehicle loading ramps, and chemical toilets. In accordance with emission standards regulations for OHVs, Red Sticker OHVs (non-compliant vehicles designated by the California Air Resources Board) are seasonally restricted at the Jasper Sears OHV Use Area. The main entrance to the OHV Use Area is off of Jasper Sears Road and includes an open, unpaved parking area. With fairly flat terrain in comparison to other nearby OHV areas, this track provides an ideal location for beginner riders. Therefore, the Jasper Sears OHV Use Area provides a unique, regionally important resource. Visitors are typically from the San Joaquin Valley or from the greater San Francisco Bay Area.

The SLRSRA GP/RMP provides for minor additions to existing facilities such as shade ramadas, vault toilets, and minor infrastructure at the OHV Use Area. The GP/RMP also provides for the potential for future expansion of the OHV Use Area yet notes a current lack of available land for expansion.

Medeiros Use Area. The Medeiros Use Area is located on the southeastern shore of O'Neill Forebay. The area provides 50 campsites with shade ramadas, picnic tables, and barbecues; approximately 300 informal parking spaces; and approximately 350 primitive campsites for tents and RVs. The day use and camping areas have potable water from four portable water tanks, and chemical toilets. The boat launch at the Medeiros Use Area was closed in 2001 for security reasons. Although security is no longer a concern, the boat launch remains closed because shallow water in the area prevents year-round launching. However, the SLRSRA RMP/GP provides for possible enhancements to allow reopening/ relocating the boat ramp as well as adding a parking lot and restrooms near the boat launch. An additional 200 new tent and RV sites and 100 primitive campsites would be added to the campground as well as and a restroom shelter with parking. The RMP/GP also provides for a conversion of the existing recreation zoning designation to accommodate additional visitation to this use area.

Access Points. SR 152 and SR 33 are the main access roads into the SRA in the area around the San Luis Reservoir and the O'Neill Forebay. Canyon Road, which extends from the I-5 corridor, is the main access road into the SRA in the area around the Los Banos Reservoir. Four vehicular access points, including gated entrance stations, are located at the edge of the Basalt, Los Banos Creek, Medeiros, and San Luis Creek use areas. Entrance stations are staffed during the peak season when funding is available. Self-registration is used to collect fees at other times.

Visitor Center. A visitor center at the Romero Overlook provides educational information on the local reservoirs and dams, and statewide water projects through audio-visual and printed materials. The Romero Visitor Center is administered by DWR and is located on joint DWR and CDPR managed land within the SLRSRA.

Campgrounds. The SLRSRA has four developed campgrounds open year-round for public use. Table 3.12-2 provides the name, location, and characteristics of each developed campground.

Table 3.12-2. Developed Campgrounds Within the San Luis Reservoir SRA

Campground	Location (Use Area)	Number of Campsites	Amenities
Basalt Campground	Basalt Use Area	79 developed sites	▪ Restrooms ▪ Fire Ring ▪ Picnic Table
San Luis Creek Campground	San Luis Creek Use Area	53 developed sites	▪ Restrooms ▪ Electric and Water Hookup ▪ Level Pad ▪ Fire Ring ▪ Picnic Table ▪ Waste Disposal
Medeiros Campground	Medeiros Use Area	50 developed sites 350 primitive sites	▪ Potable water ▪ Chemical Toilets ▪ Boat Launch
Los Banos Creek Campground	Los Banos Creek Use Area	20 primitive sites	▪ Barbeque ▪ Picnic Table ▪ Boat Launch

Source: http://www.parks.ca.gov/

Path of the Padres. The Path of the Padres is a popular trail along Los Banos Creek above the Los Banos Creek Reservoir. CDPR staff conducts guided hikes during weekends in March and April. The boat tour and 5-mile hike retraces part of the trail taken by Spanish missionaries in the early 1800s to travel between the Central Valley and the mission San Juan Bautista. The route follows a lakeshore trail that runs around Salt Springs Cove at the northeast end of the Los Banos Creek Reservoir and follows the edge of the Reservoir. Due to its recreational and cultural significance, the Path of the Padres has been established as a locally important resource attracting numerous visitors every year.

Other Designated Trails. The Lone Oak Bay Trail is a 3-mile trail that follows the southeastern edge of the San Luis Reservoir in the Basalt Use Area. It is a popular trail that provides year-round opportunity for sight-seeing, bird-watching, and nature study. In the spring and summer months the trail is often used for wildflower viewing.

The Basalt Campground Trail is a 1.5-mile loop trail that begins and ends at the Basalt Campground. The trail provides access to a viewpoint that overlooks the San Luis Reservoir, San Joaquin Valley, and Basalt Hill. An interpretive exhibit displays a map that points out the highlights visible from the viewpoint.

CDFW Wildlife Areas

There are two CDFW-managed wildlife areas within the study area. The wildlife areas are primarily designated for wildlife management although they also provide a variety of year-round recreational opportunities (described below). Access to these areas is limited to foot travel. Special restrictions on recreation use within the wildlife areas are subject to change and published in CDFW's annual informational memorandum, *Hunting and Other Public Uses on State and Federal Lands*. The locations of the wildlife areas are shown in Figure 3.12-1.

O'Neill Forebay Wildlife Area. The O'Neill Forebay Wildlife Area consists of 700 acres along the east side of the O'Neill Forebay. The wildlife area is accessible from a parking area off SR 33. Recreation activities in this area include hunting, nature study, and hiking. Hunting is limited to waterfowl, pheasants, quail, doves, rabbits, and crows.

Lower Cottonwood Wildlife Area. The Lower Cottonwood Wildlife Area consists of 2,000 acres located on the north side of SR 152 adjacent to the SLRSRA. The main access point to the wildlife area is from SR 152 through the San Luis Creek Use Area. Year-round recreational activities include bird-watching, sightseeing, picnicking, and nature study. Hunting is permitted during daylight hours from the start of the deer season, designated by CDFW and subject to change based on current conditions, through the last Sunday in January. Outside of the designated hunting season, all firearms are prohibited. Camping is prohibited within the Wildlife Area.

3.12.1.2 Regulations, Plans, and Standards

Regulations, plans, and standards include the following:

- San Luis Reservoir State Recreation Area Resource Management Plan and General Plan (June 2013) provides goals and guidelines for management of the SLRSRA and adjacent lands. The Plan Area consists of two geographically separate areas totaling over 27,000 acres in the vicinity of Los Banos, California. The Plan Area includes the water surfaces of San Luis Reservoir, O'Neill Forebay, and Los Banos Creek Reservoir, as well as adjacent recreation lands.
- California Outdoor Recreation Plan (CORP) 2008 is the statewide master plan for parks, outdoor recreation, and open space for California. The CORP is also the primary tool for prioritizing Land and Water Conservation Fund grant allocations to local governments.

3.12.2 Corridor Alternatives

3.12.2.1 Patterson Pass Road Alternative

The recreation resources within this study area will be similar to that of the Central Segment of the Proposed Project. There are no federal or State designated recreation areas in this area.

3.12.2.2 Butts Road Alternative

Major recreation areas in this alternative study area are the SLRSRA and the Lower Cottonwood Wildlife Area as described in 3.12.1.1.

3.12.2.3 West of Cemetery Alternative

The major recreation areas in this alternative study area are the SLRSRA and the Lower Cottonwood Wildlife Area as described in 3.12.1.1.

3.12.2.4 West of O'Neill Forebay 70-kV Alternative

Recreation areas within this alternative study area are the SLRSRA and the Lower Cottonwood Wildlife Area as described in 3.12.1.1.

3.12.2.5 Los Banos to Dos Amigos Alternative

Recreation areas within this alternative study area are the SLRSRA, as described in Section 3.12.1.1.

3.12.2.6 Billy Wright Road Alternative

Recreation areas within this alternative study area are the SLRSRA, including the Path of the Padres Trail, as described in Section 3.12.1.1.

3.13 Socioeconomics

This section describes the demographics of the study area as they pertain to socioeconomics. Socioeconomic impacts, including displacement of residences or businesses, loss of work, housing shortages, increases in need for services and infrastructure, and economic benefits, are analyzed in Section 4.13 (Socioeconomics).

3.13.1 Proposed Project

3.13.1.1 Affected Environment

Study Area

Socioeconomic analysis is considered on a county level to reflect regional social and economic trends. The study area for socioeconomics consists of counties traversed by the Proposed Project corridor including Alameda, San Joaquin, Stanislaus, and Merced. The Proposed Project corridor primarily traverses sparsely populated, unincorporated areas of the four counties with the exception of moderate density development in the North Segment of the Proposed Project near the Tracy Substation and a small area northeast of the O'Neill Substation.

Overview

Alameda County. The Project area covers about 4 linear miles within Alameda County along its northeasternmost edge. This portion of Alameda County falls within the San Joaquin Valley and is geographically separated by the Diablo Range and Altamont Pass from the more densely populated western portion of the county. As a result, the socioeconomic characteristics of this portion of Alameda County are more similar to San Joaquin County than to the remainder of Alameda County. Overall, Alameda County includes 14 incorporated cities and six unincorporated communities and rural areas throughout its 813 square miles. The incorporated cities are Alameda, Albany, Berkeley, Dublin, Emeryville, Fremont, Hayward, Livermore, Newark, Oakland, Piedmont, Pleasanton, San Leandro, and Union City, located primarily in western Alameda County. The unincorporated communities are Ashland, Castro Valley, Cherryland, Fairview, San Lorenzo, and Sunol.

San Joaquin County. The Proposed Project corridor crosses central San Joaquin County. San Joaquin County covers 1,400 square miles and has seven incorporated cities: Escalon, Lathrop, Lodi, Manteca, Ripon, Stockton, and Tracy. Census data indicate that 146,146 people live in unincorporated communities within San Joaquin County. Stockton is the largest city, with a population of 300,899.

Stanislaus County. Stanislaus County covers 1,494 square miles and has nine incorporated cities: Ceres, Hughson, Modesto, Newman, Oakdale, Patterson, Riverbank, Turlock, and Waterford. Additionally, 13 unincorporated communities are within Stanislaus County. Modesto is the largest city, with a population of 211,536.

Merced County. Merced County covers 1,980 square miles and includes six incorporated cities: Atwater, Livingston, Los Banos, Merced, Gustine, and Dos Palos; and 11 unincorporated communities: Castle, Delhi, Franklin/Beachwood, Fox Hills, Hilmar, Le Grand, Planada, Santa Nella, University, the Villages of Laguna San Luis, and Winton. Merced is the largest city, with a population of 80,793.

Characterization

Population, housing, labor force, and employment characteristics within the study area are described below to provide a baseline for determining the impacts of the temporary workforce associated with the Proposed Project on the regional socioeconomic conditions.

Population. Table 3.13-1 presents the total population and demographic make-up of each county in the study area based on the U.S. Census Survey from 2000 and 2010. Alameda County has the highest population; however as noted above, much of the population is concentrated in the western portion of the County, distant from the Proposed Project corridor. Overall, Merced County has the smallest population, but it has had the highest percent increase in population between 2000 and 2010. The percent increase in population of San Joaquin County and Stanislaus County is also well above that of the State of California.

Table 3.13-1. Population Characteristics

Geography	California	Alameda County	San Joaquin County	Stanislaus County	Merced County
Total Population (2000)	33,871,653	1,443,741	563,598	446,997	210,554
Total Population (2010)	37,253,956	1,510,271	685,306	514,453	255,793
Population Change	10.0%	4.6%	21.6%	15.1%	21.5%

Source: U.S. Census Bureau

Housing. Table 3.13-2 presents housing unit and vacancy rate data from the 2010 U.S. Census for Alameda, San Joaquin, Stanislaus, and Merced Counties. Merced County has the lowest number of housing units and the highest vacancy rate. Alameda County has the highest number of housing units and the lowest vacancy rate.

Table 3.13-2. Housing Characteristics

County	2010 Housing Units	2010 Occupied Housing Units	Vacancy Rate	Persons Per Household
Alameda	588,948	551,150	6.4%	2.78
San Joaquin	236,943	217,956	8.0%	3.20
Stanislaus	180,165	165,790	8.0%	3.14
Merced	84,298	76,190	9.6%	3.39

Source: California Department of Finance, 2010

Labor Force. Table 3.13-3 presents the labor force characteristics within Alameda, San Joaquin, Stanislaus, and Merced Counties including the civilian labor force and unemployment rate obtained from the California Employment Development Department (EDD).

The terms in Table 3.13-3 are defined as follows by the California EDD:

- Civilian Labor Force: The sum of civilian employment and civilian unemployment.
- Civilian Employment: All individuals who worked during the week including the 12th of the month.
- Civilian Unemployment: Individuals who were not working but were able, available, and actively looking for work.
- Unemployment Rate: The percent of those unemployed out of the total labor force.

Table 3.13-3. Employment Characteristics

Labor Force	Alameda County	San Joaquin County	Stanislaus County	Merced County
Civilian Labor Force	778,300	299,900	239,000	111,400
Civilian Employment	708,600	254,900	208,700	95,400
Civilian Unemployment	69,700	45,100	30,300	16,000
Civilian Unemployment Rate	9.0%	15.0%	12.7%	14.4%

Note: Individuals who have more than one job are counted only once.
Source: California Employment Development Department, 2013

As shown in Table 3.13-3, Alameda County has the largest civilian workforce along with the lowest unemployment rate (9.0 percent). In contrast, San Joaquin County has the second largest civilian workforce and the highest unemployment rate (15.0 percent).

3.13.1.2 Regulations, Plans, and Standards

NEPA requires that potential socioeconomic impacts be identified for projects that have a federal component (i.e., either a Federal Agency action or funding).

3.13.2 Corridor Alternatives

3.13.2.1 Patterson Pass Road Alternative

This study area includes Alameda, San Joaquin, Stanislaus, and Merced Counties. The regional trends and characteristics in terms of population, housing, and employment are similar to that described for the Proposed Project.

3.13.2.2 Butts Road Alternative

This alternative is located in Merced County. Existing conditions for this alternative reflect only the socioeconomic characteristics described for Merced County.

3.13.2.3 West of Cemetery Alternative

This alternative is located in Merced County and does not cross Alameda, Stanislaus, or San Joaquin Counties. Therefore, the existing conditions for this alternative reflect only the socioeconomic characteristics described for Merced County.

3.13.2.4 West of O'Neill Forebay 70-kV Alternative

This alternative is located in Merced County and does not cross Alameda, Stanislaus, or San Joaquin Counties. Therefore, the existing conditions for this alternative reflect only the socioeconomic characteristics described for Merced County.

3.13.2.5 San Luis to Dos Amigos Alternative

This alternative is located in Merced County and does not cross Alameda, Stanislaus, or San Joaquin Counties. Therefore, the existing conditions for this alternative reflect only the socioeconomic characteristics described for Merced County.

3.13.2.6 Billy Wright Road Alternative

This alternative is located in Merced County and does not cross Alameda, Stanislaus, or San Joaquin Counties. Therefore, the existing conditions for this alternative reflect only the socioeconomic characteristics described for Merced County.

3.14 Traffic and Transportation

This section describes existing traffic and transportation and the regulatory environment pertinent to this resource. Impacts to traffic and transportation, including increased traffic, disruptions, hazards to motorists or pedestrians, and conflicts with plans pertinent to this resource, are analyzed in Section 4.14 (Traffic and Transportation).

3.14.1 Proposed Project

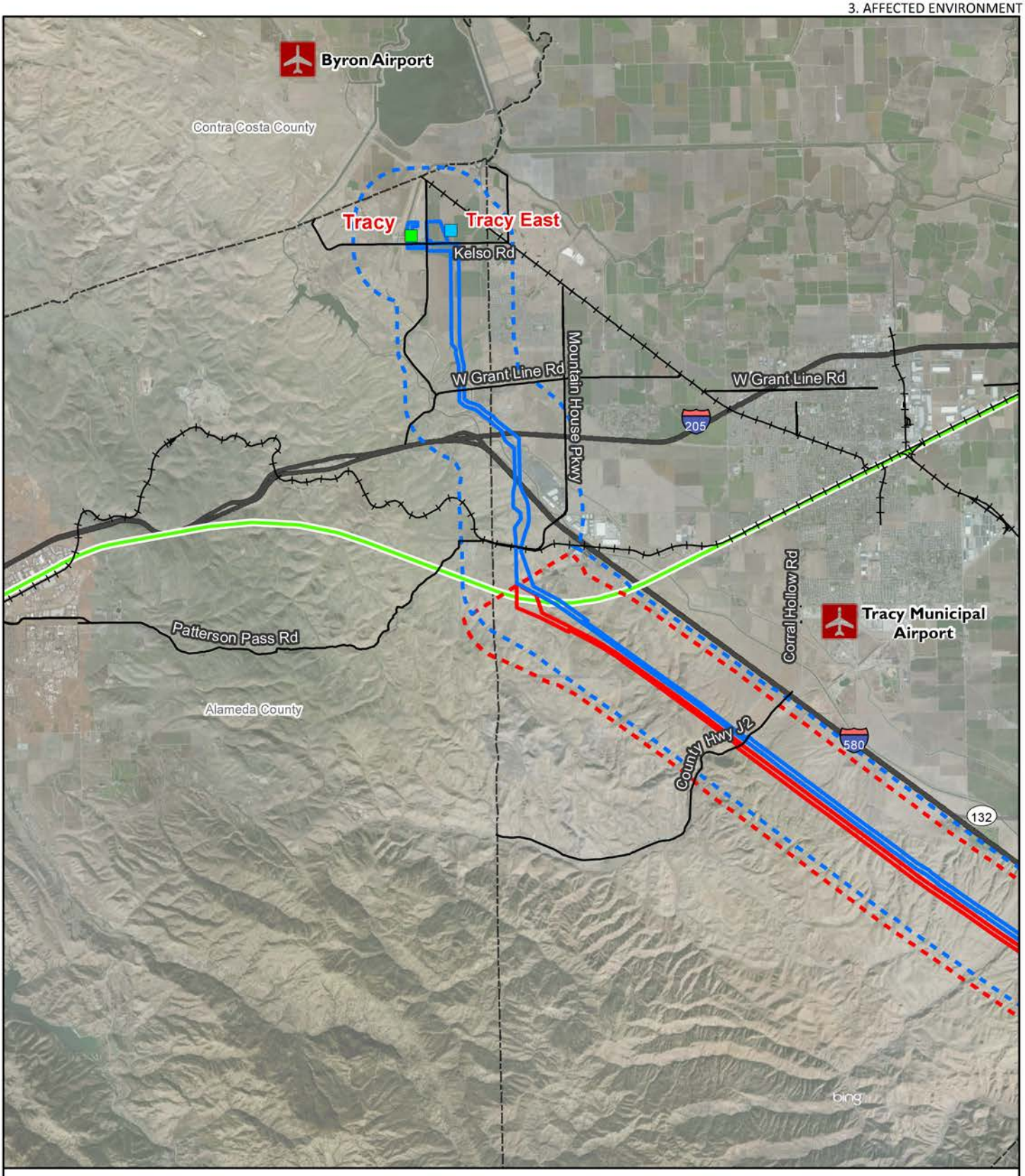
3.14.1.1 Affected Environment

The Proposed Project corridor is located primarily in open space with limited access. The corridor roughly parallels segments of two interstate highways, I-580 and I-5, which generally border the eastern edge of the study area (refer to Section 3.1 for a definition of the study area). I-5 runs the entire length of the State, from Oregon border to the Mexico border, and I-580 provides a major interconnection from I-5 into the greater San Francisco Bay region. Several county roads run east-west through the Proposed Project study area, as does SR 152, which connects the San Joaquin Valley region with the South San Francisco Bay and Monterey Bay regions. From east to west, SR 152 travels from SR 99 through Los Banos, intersecting with I-5 near the O'Neill Forebay, and then on to intersect with U.S. 101 in Gilroy, and Highway 1 in Watsonville. SR 152 provides access to important recreation areas in the Coast Ranges, and interconnects Fresno, Modesto, Hollister, Monterey, Santa Cruz, Castroville, and surrounding areas. SR 33 (Santa Nella Road) is a well-used road that provides a shorter route for southbound I-5 travelers onto westbound SR 152. SR 152 crosses over O'Neill Forebay at the O'Neill Dam.

The Proposed Project corridor would cross over several major highways and many smaller roads, as shown in Figures 3.14-1a through 3.14-1d. From the Tracy Substation, the corridor would parallel two major existing transmission lines, and the Delta Mendota Canal and California Aqueduct. It would cross over Kelso, Mountain House, and W. Grant Line roads, which are the only roads crossed in Alameda County. In San Joaquin County, the corridors cross I-205 and I-580 near the intersection of those two highways, then West Patterson Pass Road, the Union Pacific Railroad tracks, Corral Hollow Road (County Highway J2), and numerous private access roads to area wind farms and cattle ranches, such as South Bird Road.

In Stanislaus County, the Proposed Project would cross Ingram Creek Road, Del Puerto Canyon Road, Diablo Grande Parkway, Oak Flat Road, Orestimba Road, Pete Miller Road, Sullivan Road, Butts Road, McCabe Road (which provides access to the San Joaquin Valley National Cemetery), and several private ranch access roads. The Proposed Project corridor traverses the east side of O'Neill Forebay, and crosses the access road to the O'Neill Pumping-Generating Plant and Substation. It then turns eastward for a short distance paralleling the Delta-Mendota Canal, and then turns south, paralleling Santa Nella Road (SR 33) in a corridor about 300 feet to the west of the road. It then crosses SR 152 and enters the Los Banos Substation area.

The Proposed Project corridor then runs to the west, crossing Jasper Sears Road, Los Banos CDF Road, Basalt Road, two roads used to access the various facilities located between the O'Neill Forebay and the San Luis Reservoir, and into the San Luis Substation. The proposed corridor then goes back to a point near the Los Banos Substation, and then turns southeast towards the Dos Amigos Substation. It crosses Billy Wright Road and twice crosses Canyon Road (which is used to access the Los Banos Creek Reservoir recreation areas), continues southeast for another 7 miles and then turns northeast to cross I-5 into the Dos Amigos Substation. The condition of the paved public roadways that the Proposed Project would cross is shown in Table 3.14-1.



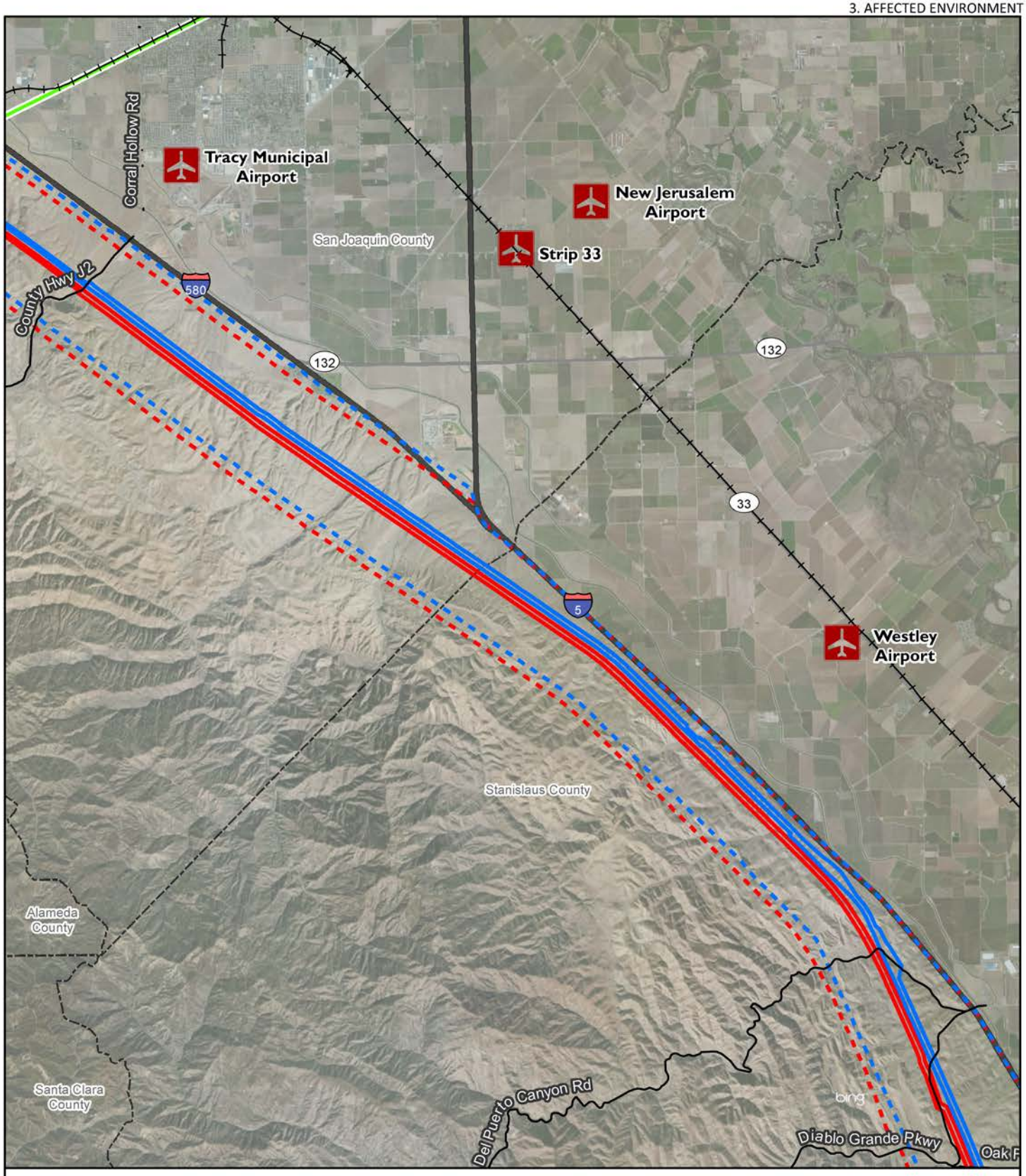
Western Area Power Administration

- Substations
- Proposed New Substations
- Proposed Project Corridor
- Corridor Alternatives
- Proposed Project Study Area
- Alternatives Study Area
- Union Pacific Railroad
- Major Highways
- Major Roads
- California High Speed Train Alignment
- Airport

Figure 3.14-1a
Regional Transportation Network

0 1.5 3 Miles

Source: WAPA SNR, Aspen EG, California High Speed Rail Authority



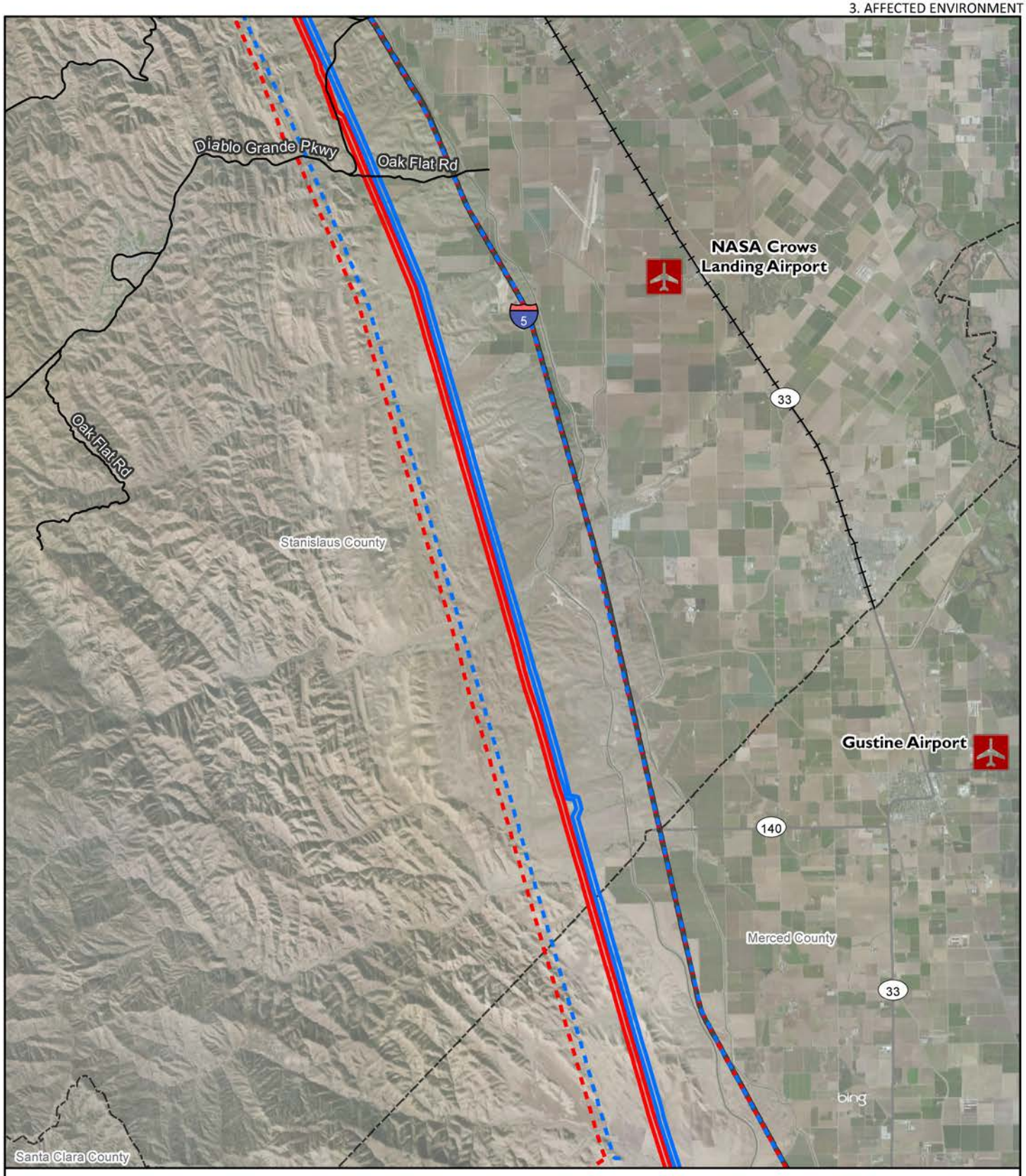
Western Area Power Administration

- Substations
- Proposed New Substations
- Proposed Project Corridor
- Corridor Alternatives
- Proposed Project Study Area
- Alternatives Study Area
- Union Pacific Railroad
- Major Highways
- Major Roads
- California High Speed Train Alignment
- Airport

Figure 3.14-1b
Regional Transportation Network

0 1.5 3 Miles

Source: WAPA SNR, Aspen EG, California High Speed Rail Authority



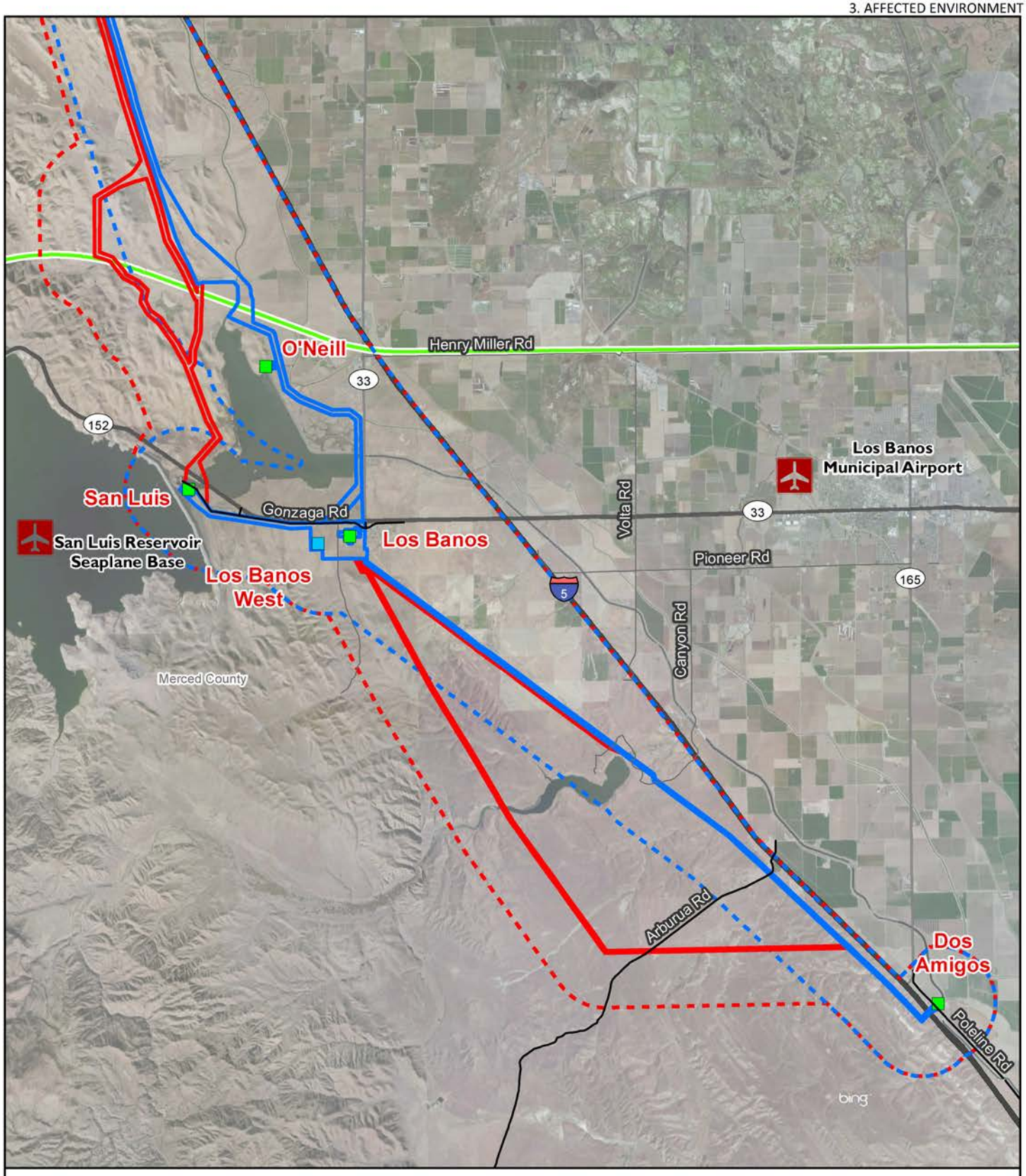
Western Area Power Administration

- Substations
- Proposed New Substations
- Proposed Project Corridor
- Corridor Alternatives
- Proposed Project Study Area
- Alternatives Study Area
- Union Pacific Railroad
- Major Highways
- Major Roads
- California High Speed Train Alignment
- Airport

Figure 3.14-1c Regional Transportation Network

0 1.5 3 Miles

Source: WAPA SNR, Aspen EG, California High Speed Rail Authority



Substations
Proposed New Substations
Proposed Project Corridor
Corridor Alternatives
Proposed Project Study Area
Alternatives Study Area
Union Pacific Railroad
Major Highways
Major Roads
California High Speed Train Alignment
Airport

Figure 3.14-1d
Regional Transportation Network

0 1.5 3 Miles

Source: WAPA SNR, Aspen EG, California High Speed Rail Authority

Table 3.14-1. Public Paved Roads Crossed by the Proposed Project

Roadway	Number of Lanes	Shoulders	Existing Road Condition[1]
North Segment			
Kelso Road	2	Yes	Good
Mountain House Road	2	Yes	Excellent
W. Grant Line Road	2	Yes	Good/Excellent
Interstate 205	4–6	Yes	Excellent
Interstate 580	8	Yes	Excellent
W. Patterson Pass Road	2	No	Good
Central Segment			
Corral Hollow Road (Rte. J2)	2	No	Good
Del Puerto Canyon Road	2	No	Good
Diablo Grande Parkway	2	Yes	Excellent
Oak Flat Road	2	No	Fair
San Luis Segment			
McCabe Road	2	No	Good
SR 152	4	Yes	Excellent
Gonzaga Road	2	No	Good
Basalt Road	2	No	Good
South Segment			
Canyon Road	2	No	Good
Arburua Road	2	No	Good
Interstate 5	6–10	Yes	Excellent
Poleline Road	2	No	Good

1 - Roadway Condition Ratings:
Excellent – pavement in good condition, exhibits good geometrics (i.e., the road is straight and it has large curves to allow cars to maintain their speed while going around the curves), and it has good shoulders.
Good – pavement in pretty good shape, some patching of the roadway, shoulders not well maintained, road able to handle project traffic.
Fair – very patched road is starting to deteriorate, could potentially be affected by the project.
Poor – many visible potholes and would definitely be adversely affected by the project.

Many if not all these roads would be used to access the corridors for preconstruction, construction, and maintenance activities. An encroachment permit would be needed where proposed power lines cross interstate, State, and county highways, and easements may be needed for use of private roads.

Existing Roadway Conditions

Existing and potential future deficiencies in a regional road network are defined in terms of Level of Service (LOS) ranked from A through F. LOS describes existing or predicted traffic flow conditions at a given location in relation to the capacity of the roadway in terms of speed and travel time, volume and capacity, traffic interruptions, and safety. LOS A designates a segment where traffic flows completely unimpaired, and LOS F designates areas with persistent traffic jams. Caltrans sets the LOS standard for individual State and interstate highways roads throughout the State, while counties and cities set LOS standards for local roads in any given region.

Because of their importance in connecting the major commerce centers of the State, I-5 and I-580 are both part of the State's Interregional Road System. Caltrans generally sets acceptable LOS levels for interstate highways as LOS D for rural areas and LOS E for urban areas. But for Interregional Road

System highways, Caltrans sets LOS C as the standard or "concept" LOS for rural areas, and LOS D for urban areas. Caltrans has set the thresholds at LOS C for SR 152 and LOS D for SR 33.

No State or interstate highways in Alameda County would be affected by the Proposed Project corridor. The State and interstate highways in the other three counties are administered by Caltrans Region 10. Region 10 has designated several segments of I-5 in the study area as deficient, including portions in the northern part of Stanislaus and Merced Counties, and has predicted that future LOS for all but one rural segment will exceed the concept LOS by 2030. Portions of I-580 are currently deficient, and all portions are predicted to get worse without improvements. However, planned improvements are predicted to improve or at least stabilize present LOS levels in 2035 (SJCOG, 2011b).

Existing LOS data for SR 152 and SR 33 near the study area are not available. According to the Route 152 Trade Corridor Study Summary Report, SR 152 east of Gilroy and on the eastbound ascent to Pacheco Pass is nearing capacity and will exceed capacity by 2015 (VTA, 2010). The Merced County Association of Governments forecasts in its 2011 Regional Transportation Plan that by 2035, both SR 152 and SR 33 in the study area vicinity will operate at LOS F (MCAG, 2011).

Existing Rail Conditions

Near Patterson Pass Road, the Union Pacific tracks handle 8 to 10 freight trains per day and accommodate the Altamont Corridor Express (ACE), which currently runs eight commuter trains per day (four each way) between Tracy and Livermore through Altamont Pass. An additional rail corridor in this area is under consideration by the San Joaquin Regional Rail Commission, which owns and manages the ACE, for construction of a high-speed rail spur to connect the San Francisco Bay Area with the Central Valley high-speed rail line. Another high-speed rail spur corridor is under consideration through Pacheco Pass, passing through the study area just to the north of O'Neill Forebay. See Figures 3.14-1a through 3.14-1d for the alignment of the high-speed rail spurs.

Air Transportation Conditions

There are several active airports in the Proposed Project vicinity. The Byron Airport is a general aviation airport owned by Contra Costa County located approximately 3 miles northwest of the Tracy Substation and 3 miles south of the Town of Byron. It is located on a 1,307-acre plot, 814 acres of which are currently under a conservation easement for the preservation and enhancement of the San Joaquin kit fox. It offers two runways, one 4,500 feet long and the other 3,000 feet, and is a popular base for skydivers, gliders, and other recreational flight activities. Approximately 116 aircrafts are based at the airport, which averaged 164 flights per day in 2013.

The Tracy Municipal Airport is located on 310 acres approximately 2.5 miles from the Proposed Project area near the intersection of I-580 and Corral Hallow Road. The airport operates two runways for private aircraft, including single and twin-engine, propeller-driven airplanes, business jets, crop dusters, helicopters, ultra-light aircraft, and hot air balloons. The facility does not allow pesticide loading on crop dusters at the airport, and does not store jet fuel for refueling jet aircrafts. The City of Tracy produced an airport management plan and EIR in 1998 for a planned expansion. At that time the airport consistently had more than 50,000 operations per year, averaging approximately 140 operations per day in the 1990s. About 110 aircrafts were based at the airport at that time, with 200 predicted by 2016. The New Jerusalem Airport, also owned by the City of Tracy, is a single, 3,500-foot runway on a 394-acre site approximately 6.5 miles northeast of the closest location of the Proposed Project, near the intersection of South Kasson Road and Durham Ferry Road. It is used for transient aircraft operations and averaged 77 flights per week in 2013.

The City of Gustine operates a single runway airport on a 45-acre site next to Highway 140 about 1.5 miles east of the City, approximately 8 miles from the Proposed Project corridor. The City owns 15 hangers, and an additional four hangers are privately owned. It can handle turbo-prop and small jet aircrafts, though only during daylight hours, and jet fuel is not offered for sale. It averages approximately 22 operations per day, with 19 aircrafts based at the field (airnav.com, 2014b).

The Los Banos Municipal Airport operates a single runway on a 101-acre site on the west side of the City of Los Banos for general aviation, including small jets. The airport is open to the general public and offers jet fuel for refueling, but does not allow pesticide handling for crop dusters. It averages 44 operations per day, with 17 planes based on site (airnav.com, 2014a). The closest point from the airport to the Proposed Project is approximately 5.8 miles to the southwest, near the Los Banos Creek Reservoir.

Also in the Project vicinity are several small, private airfields, including crop dusting operations near Westley that is 3 miles from the Proposed Project, and there is another airfield near the intersection of I-5 and I-205 that is approximately 8 miles from the Proposed Project. In addition, there are fields supporting an aircraft museum near Firebaugh, about 8 miles southeast of the Dos Amigos Substation. Seaplane operations are also allowed on San Luis Reservoir, though overnight moorage is not allowed and all landings must be at least 500 feet from shore; only 25 landings on the reservoir were recorded in 2013 (airnav.com, 2014a).

There is also an inactive airport about 3 miles from the Proposed Project corridor at its closest point near the community of Crows Landing that was used for training by the Navy in WWII, and by other branches of the military in the 1970s and 1980s. The National Aeronautics and Space Administration (NASA) Ames Research Center, located at Moffett Field, took over operation of the facility in 1994 and ceased operations in 1997. Stanislaus County has pursued potential development of an industrial park at the airport, and re-opening the airport for private aircrafts, leading to development of the Crows Landing Airport Land Use Compatibility Plan in June 2013. The County has not yet produced an airport master plan for the facility, and no construction has occurred at the abandoned field since NASA transferred ownership of the facility to the County in 2004. However, the County has made improvements to one of the runways at the Crows Landing facility, which is now suitable for limited aircraft operations such as air ambulance service. It has also removed some blighted structures and is continuing remediation of contaminated soils. Another closed airport, formerly used for crop duster operations, is located near the City of Patterson.

Bicycle Lanes

Because it is a low-volume road with 4-foot-wide shoulders, West Patterson Pass Road in Alameda and San Joaquin Counties within the Proposed Project study area are currently designated as Class III bikeways. Class III bikeways are those with shared use of lanes with pedestrian or motor vehicle traffic, typically at the right edge of the traveled way without a bike lane stripe. The shoulder of the road in both directions is marked off with a white stripe, but otherwise has no signage or other way to indicate it is an official bikeway. This bikeway is on San Joaquin County's South East Livermore Bicycle Improvement Project List, with an estimate of $2.9 million in improvements planned for a 5-mile section of the road that includes the crossing of the Proposed Project route. Patterson Pass Road is used yearly for an organized bicycle race held in August.

The California Aqueduct at one time was open to bicyclists for its entire length, and there are conflicting reports on whether it is still open. The California Department of Parks and Recreation reports on its web site that the entire 70-mile length of the aqueduct is open to bicyclists (CDPR, 2014). However, while not prohibiting bicycles on the aqueduct maintenance roads, the Department of Water Resources has stated that such use is not encouraged for safety and security reasons.

No existing bikeways are in the Proposed Project study area in Stanislaus County, but the Stanislaus Council of Governments has identified Del Puerto Canyon Road as a Proposed Class II Bikeway in its 2013 Non-Motorized Transportation Master Plan (SCOG, 2013). There are no existing or proposed bikeways in the study area within Merced County.

3.14.1.2 Regulations, Plans, and Standards

There are no specific regulations, plans, or standards directly related to the effect of the Project on Traffic and Transportation. Caltrans requires a permit for electric transmission lines that cross any Caltrans right-of-way, and specifies setbacks and height requirements for the support towers and conductors. Support structures are not allowed within the right-of-way of State and interstate highways, but lines are allowed to cross over (supported by towers) outside the Caltrans right-of-way. Local jurisdictions also require permits for utility crossing of roads, and have similar setback requirements.

Each of the four counties affected by the Project has organizations that plan improvements to the local transportation network, including roads, railways, bikeways and pedestrian paths. Each produces a long-range Regional Transportation Plan (RTP) that establishes the county's transportation goals, objectives, and policies; identifies appropriate transportation projects; and describes funding strategies and options. The RTPs in the Project Area are:

- Merced County Association of Governments Regional Transportation Plan
- San Joaquin Council of Governments 2014-2040 Regional Transportation Plan and Sustainable Communities Strategy
- Stanislaus Council of Governments 2011 Regional Transportation Plan
- Alameda County Wide Transportation Plan 2012

3.14.2 Corridor Alternatives

3.14.2.1 Patterson Pass Road Alternative

This corridor parallels the Proposed Project between Patterson Pass Road and Butts Road in San Joaquin, Stanislaus, and Merced Counties. The local and regional roadway conditions for this alternative are described for the Proposed Project above for this segment.

3.14.2.2 Butts Road Alternative

This alternative corridor splits off from the Proposed Project corridor at McCabe Road, very near where a high-speed rail line is under study, and travels on the west side of O'Neill Forebay. This alternative crosses no roads between McCabe Road and the intersection with the West of Cemetery Alternative corridor, though a private agricultural access road is inside the corridor for approximately one mile. From there this corridor would cross several roads used to access the recreation facilities on the west side of O'Neill Forebay, SR 152, then interconnect with the Los Banos and San Luis Substations.

3.14.2.3 West of Cemetery Alternative

The West of Cemetery alternative corridor splits at Butts Road, going around the cemetery to the west, crossing and then paralleling McCabe Road and Horseshoe Road, and the planned high-speed rail route. From there this corridor would cross several roads used to access the recreation facilities on the west side of O'Neill Forebay, SR 152, and then interconnect with the Los Banos and San Luis Substations.

3.14.2.4 West of O'Neill Forebay 70-kV Alternative

This alternative would cross access roads to facilities within the State Recreation Area, local farm and ranch access roads, McCabe Road, and possibly access roads to the facilities near the O'Neill Substation.

3.14.2.5 San Luis to Dos Amigos Alternative

This corridor is adjacent to a segment of the Proposed Project between the San Luis Substation and Los Banos Creek Reservoir in Merced County. It would have similar local and regional roadway conditions as those described above for the Proposed Project for this segment.

3.14.2.6 Billy Wright Road Alternative

This alternative corridor crosses Billy Wright Road approximately 3 miles south of Los Banos Substation. The corridor then crosses Arburua Road approximately 2.8 miles west of Highway 5 and the Proposed Project corridor. This alternative corridor would travel on the west side of Los Banos Creek Reservoir, largely through an unpopulated region accessed by foot, horse, or off-highway vehicles. Trails are used primarily for ranch access and are generally closed to the public.

3.15 Visual Resources

The study area for visual resources is defined in Section 3.1 and also includes areas from which the study area would be visible. Impacts to visual resources are analyzed in Section 4.15 (Visual Resources).

The analysis of visual resources uses the following terms:

- **Key Observation Point (KOP):** One or a series of points on a transportation corridor or at a public/ private use area, where the view of a proposed activity would be most revealing or sensitive.
- **Viewshed:** The landscape that can be directly seen under favorable atmospheric conditions, from a KOP or along a transportation corridor.
  - Foreground View: 0–1 mile.
  - Middleground View: 1–3 miles.
  - Background View: 3–5 miles.
- **Visual Quality:** The relative worth of the overall impression or appeal of an area created by the physical features of the landscape, such as natural features (landforms, vegetation, water, color, adjacent scenery, and scarcity), and built features (roads, buildings, railroads, agricultural patterns, and utility lines). These features create the distinguishable form, line, color, and texture of the landscape composition that can be judged for scenic quality using criteria such as contrast.

  Within this analysis, visual quality at KOPs and viewsheds are discussed and qualitatively rated as follows:

  - High: Where the valued natural landscape character is intact with only minute, if any, visual deviations. The existing natural landscape character is expressed at the highest possible level.
  - Moderate: Where the valued natural landscape character appears slightly altered. Noticeable deviations must remain visually subordinate to the natural landscape character being viewed.
  - Low: Where the valued natural landscape character appears moderately to heavily altered. Visual deviations (human-made structures) primarily dominate the valued landscape character being viewed with their attributes such as size, shape, color, edge effect, and pattern having overwhelmed the natural landscape being viewed.
- **Visual Sensitivity:** the concern by viewers toward change to visual quality. Visual sensitivity is generally higher in natural or unmodified landscapes than those with structures of high architectural value.
- **Visual Contrast:** Opposition or unlikeness of different forms, lines, colors, or textures in a landscape. Generally, increased visual contrast within foreground distances would be more noticeable to viewers than increased visual contrast within middle-ground and background view distances.

3.15.1 Proposed Project

3.15.1.1 Affected Environment

This section identifies the level of visual quality and sensitivity of valued views in the region surrounding the Proposed Project corridor. Visual quality is generally defined as the degree of contrast and variety within a landscape. Assessment of visual quality includes analysis of contrast, colors, textures, and composition of the view, and is generally an estimate of the degree to which humans enjoy an existing view. Pleasant landscapes generally have high visual quality. Natural landscapes of high visual quality may contain distinctive landforms, vegetation patterns, and/or water forms, whereas high visual quality

views with human-made elements generally consist of structures of high architectural value, such as the Golden Gate Bridge or the Transamerica Pyramid. Visual sensitivity is the concern by viewers toward change to visual quality. Visual sensitivity is generally higher in natural or unmodified landscapes than those with structures of high architectural value.

The Proposed Project could obstruct or modify present views in the landscape. The importance of viewpoints, the places from which people value the aesthetics of a landscape, is related to the visual quality of the view, the number of people who regularly experience and appreciate the view, and whether the experience is short- or long-term. Views from residences and recreation areas, for example, are often considered more important than views from a moving car, since the latter is a short-term experience. Similarly, recreation areas and established scenic overlooks are generally considered more important viewpoints than places with similar quality but more limited access, and therefore fewer viewers.

Approximately half of the Proposed Project area is located on private lands in remote areas of the Diablo Range. These areas are not accessible by the general public; therefore, very few people would see the Proposed Project structures in these areas. However, a large portion of the Project area is viewable from residences, recreation areas, and local roads and highways. This includes:

- residents and travelers in the area from the Tracy Substation to the crossing over I-580;
- travelers along a 10-mile segment of I-5 starting at the border of San Joaquin/Stanislaus County border extending south;
- residents, travelers, and visitors in the area surrounding the San Luis Reservoir, O'Neill Forebay and Los Banos Creek Reservoir; and
- travelers along a 5-mile segment of I-5 in Merced County.

Views from these places towards the Diablo Range generally are open, scenic vistas of undeveloped land with several waterways and waterbodies, though man-made structures such as windmills and transmission line towers can be seen from some viewpoints as well. The Diablo Range is a distinctive landform in itself, though it is similar to the hills in many other areas of the State, and therefore is not rare. Views to the east from I-5 often include the California Aqueduct, Delta Mendota Canal, and green farmlands beyond.

Visual quality of accessible views throughout the Proposed Project study area is moderate to very high, as shown in Table 3.15-1. Visual sensitivity is moderate in agricultural areas, such as near the Tracy Substation, in areas where man-made structures are visible, such as along I-580 from I-205 to the crossing of the Union Pacific Railroad (UPRR) tracks at Hanson Road, and in the areas surrounding the substations. Otherwise, visual quality in the study area is high to very high, especially towards the open areas to the west, which offer expansive views of the Diablo Range, with interesting landscapes in the foreground, middleground, and background; and a variety in textures, colors, and features. Evidence supporting this assessment includes the official designation as scenic highways of I-5 from SR 152 to I-580, and all of I-580 within San Joaquin County. This is also true for SR 152 from I-5 to the Santa Clara County line. Figure 3.15-1 illustrates the Scenic Highway segments in the study area. Viewer sensitivity along these highway segments is moderate to high, depending on the viewpoint and the ability to access longer-term viewpoints along the way.

Table 3.15-1. Visual Quality and Sensitivity of the Proposed Project

Segment	Location	Quality	Sensitivity
North	Tracy Substation to Patterson Pass Road	Moderate due to disturbed agricultural fields, wind farms, transmission line structures, substation, pumping plant, highways and canals.	Moderate to High due to presence of many residences and a college campus.
Central	Patterson Pass Road to Butts Road	High due to natural landscape of the Diablo Range, marked by rolling hills with steep canyons	Moderate on private lands with no public access, high on portions visible from I-5
San Luis	San Luis Reservoir State Recreation Area	High due to natural landscapes in the background with San Luis Reservoir and O'Neill Forebay in the foreground	High to Very High in the recreation areas around O'Neill Forebay, moderate near the three substations in the area
South	Los Banos to Dos Amigos Substation	High due to natural landscape of the Diablo Range, marked by rolling hills with steep canyons	Moderate on private lands with no public access, High on portions visible from I-5, and from recreation areas at Los Banos Creek Reservoir

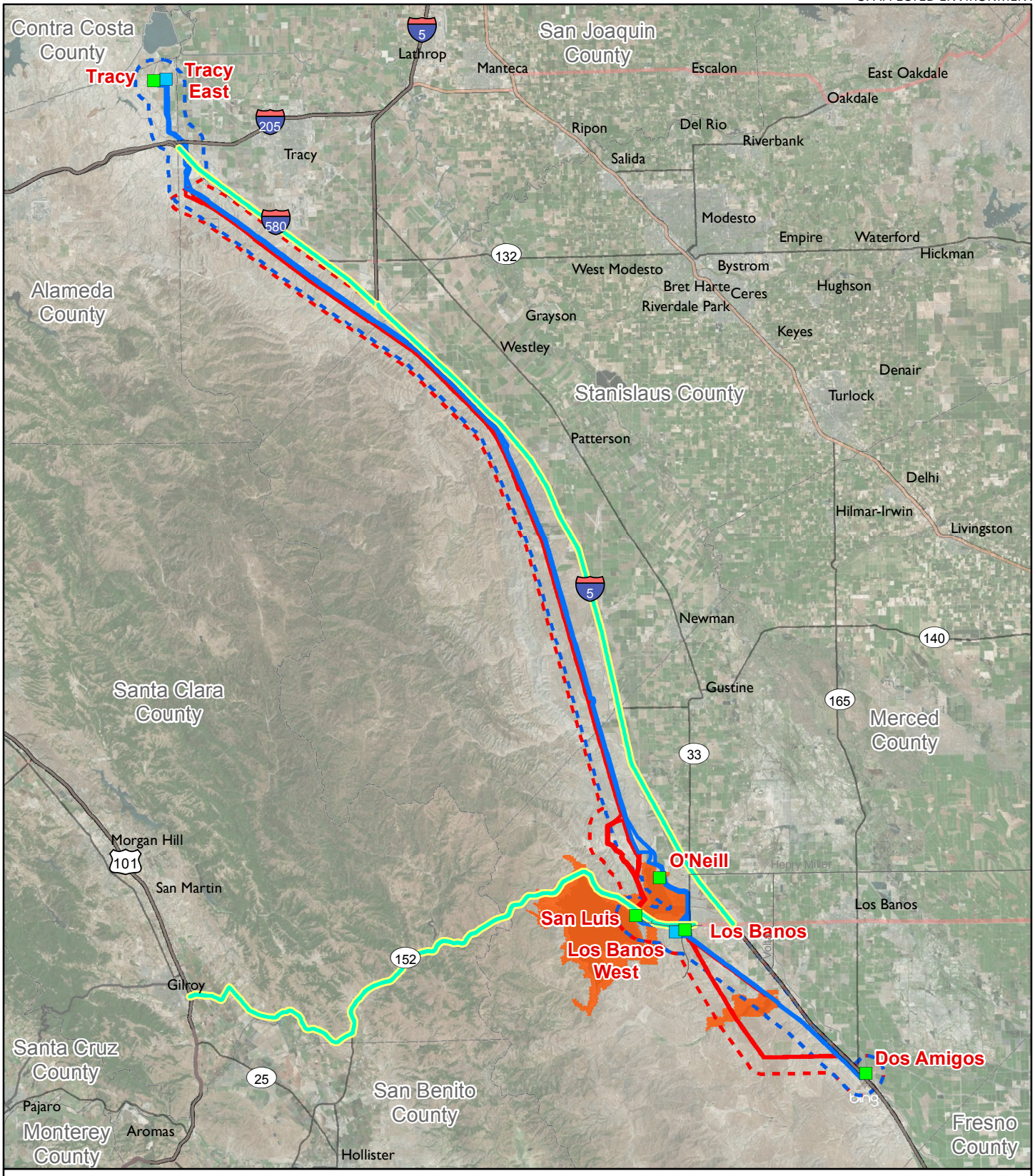
Areas farther away from the highways have similar aesthetics as the hills seen from the scenic highway segments. They would also be characterized as high to very high visual quality, with the exception of the few areas with views of past or present mining operations, or views of man-made structures, such as the existing transmission lines, which have poor to moderate view quality. These areas are not generally accessible and have very few visitors beyond the landowners and their employees and guests. Roadless areas generally have more reduced viewer sensitivity than other areas of the same quality because of the lack of access. Exceptions to this are places that are difficult to access but are highly valued for their scenic and other values.

The portions of the San Luis Reservoir State Recreation Area within the Los Banos Creek canyon upstream from Los Banos Creek Reservoir, for example, offer valued experiences for visitors. They are valued because of the scenic resources of the canyon and the historical significance as part of the "Path of the Padres" used by Spanish priests and others for traveling between mission San Juan Bautista and the Central Valley. The recreation area organizes a very popular Path of the Padres Hike on several weekends every spring. The sell-out experience includes a 5-mile boat ride and another 5-mile hike along the creek. Because access without a boat means a 10-mile hike, few people experience the canyon through much of the year; yet because of its historical and scenic values, viewer sensitivity is very high.

The other units of the San Luis Reservoir Recreation Area also have very high viewer sensitivity and very high visual quality in the area because of the views across the three waterbodies in the area to the landscapes beyond.

3.15.1.2 Regulations, Plans, and Standards

Regulations, plans, and standards for visual resources would be reflected in the goals, objectives, policies, and implementation strategies of State and local adopted plans. Caltrans' Scenic Highway program is authorized by State Streets and Highway Code (Sections 260 through 263) to establish special conservation treatment to protect and enhance the natural scenic beauty of California highways and adjacent corridors. Any city or county may propose adding routes with outstanding scenic elements to the list of eligible State highways, but additions are made through legislative action. Once designated, the city or county also must adopt a Corridor Protection Program consisting of ordinances, zoning, and/or planning policies to preserve the scenic quality of the corridor, or document such regulations that already exist in various portions of local codes.



Western AREA POWER ADMINISTRATION

Figure 3.15-1

Scenic Resources

- Substation
- Proposed New Substations
- Proposed Project Corridor
- Corridor Alternatives
- Scenic Highway Segments
- San Luis Reservoir State Recreation Area

0 5 10 Miles

Source: WAPA SNR, Aspen EG, California State Parks

The local jurisdictions responsible for planning in the study area include Alameda, San Joaquin, Stanislaus, and Merced Counties. The consistency of the Project with the adopted plans and policies of these jurisdictions is discussed in Section 3.8 (Land Use). Alameda County's East County Specific Plan includes a goal of preserving unique visual resources and protecting sensitive viewsheds, and a policy (Policy 120) stating that the County "shall require that utility lines be placed underground whenever feasible. When located above ground, utility lines and supporting structures shall be sited to minimize their visual impact."

San Joaquin County's General Plan lists transmission line development as a "concern" due to the potential visual or aesthetics effects related to the "appearance of areas with transmission lines." In the Infrastructure Element the County lists a primary objective of protecting "the scenic value of the County landscape from inappropriately located overhead utility lines."

The primary goal stated in the Stanislaus County General Plan Conservation/Open Space Element is to "Encourage the protection and preservation of natural and scenic areas throughout the County." One of the stated purposes of the element is to preserve "open space lands for outdoor recreation including scenic, historic and cultural areas."

Merced County's General Plan has a Scenic Resources element with a goal of protecting scenic resources and vistas through preservation of agricultural land, ranch land, and other open space areas. It also includes a policy (NR-4.2) to "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."

Reclamation, in conjunction with the CDPR, developed a Resource Management Plan and General Plan (RMP/GP) for the San Luis State Recreation Area that includes several provisions applicable to visual resources. The RMP/GP, which was approved in 2013, includes a goal to "ensure that large expanses of open space are left in their natural state, and that existing open vistas are uninterrupted," and another to "Preserve scenic vistas that overlook open land and water through the identification and definition of significant viewpoints and viewsheds." The RMP/GP also includes a guideline that, "Where feasible, avoid placement of new structures or other obstructions near identified scenic vista points and along uninterrupted shorelines and landscapes." (USBOR, 2013).

3.15.2 Corridor Alternatives

3.15.2.1 Patterson Pass Road Alternative

This alternative corridor would parallel the Proposed Project on the west side of the existing transmission circuits, rather than on the east side. Visual quality is high for this alternative because of its location on private grazing lands in the Diablo Range, marked by rolling hills and steep canyons. Visual sensitivity is low for much of the corridor because it is not accessible by the general public. Visual sensitivity is high from the portions of this segment visible from I-5.

3.15.2.2 Butts Road Alternative

This alternative corridor study area would be between Butts Road and the Los Banos Substation. Visual quality in this area is moderate because the terrain is relatively flat and is dominated by the existing transmission circuit towers that the route would parallel. However, the rolling hills of the Diablo Range can be seen in the background from many viewpoints. Visual sensitivity is high from the recreation facilities around O'Neill Forebay, but is lower from the roads in the region due to the dominating presence of the existing transmission lines.

3.15.2.3 West of Cemetery Alternative

This alternative corridor study area is on the west side of the San Joaquin Valley National Cemetery from Butts Road to the Los Banos Substation. There are no existing structures on the western side of the San Joaquin Valley National Cemetery. Therefore, visual quality is very high for this alternative due to its location in the rolling hills of the Diablo Range, the lack of any artificial structures in most of the viewshed, and the relatively high architectural value of the landscaping and buildings at the cemetery. The study area south of the San Joaquin Valley National Cemetery would be moderate because the terrain is relatively flat and is dominated by the existing transmission circuit towers that the corridor would parallel near the Los Banos and San Luis Substations.

3.15.2.4 West of O'Neill Forebay 70-kV Alternative

This alternative travels in the same corridor as the Butts Road Alternative corridor from the San Luis Substation to McCabe Road, and then travels in the Proposed Project corridor from McCabe Road to the O'Neill Substation. Visual quality is moderate in those areas dominated by existing transmission lines, and high for the recreation facilities near O'Neill Forebay.

3.15.2.5 San Luis to Dos Amigos Alternative

This alternative corridor is adjacent to the Proposed Project, on the west side of the existing transmission lines rather than on the east. Visual quality is similar to the Proposed Project (refer to Table 3.15-1). Though the new line would be farther from viewers driving along I-5, the new line in combination with the existing line would look very nearly identical from the highway. Visual sensitivity is similar to that of the Proposed Project (refer to Table 3.15-1).

3.15.2.6 Billy Wright Road Alternative

This alternative lies to the west of the Proposed Project south of the Los Banos Substation. This alternative would travel over the west end of the Los Banos Creek Reservoir, near the trailhead of the Path of the Padres hiking trail that heads westward upstream of the reservoir. Visual quality is moderate to high due to the presence of existing transmission lines in the region, contrasted against the rolling hills and steep ravines of the Diablo Range. Visual sensitivity is moderate for most of this alternative due to the lack of public access to private grazing lands, though sensitivity is high to very high along the Path of the Padres trail.

3.16 Water Resources and Floodplains

3.16.1 Proposed Project

This section describes the existing hydrology and water resources that could be affected by the Proposed Project. The study area for this analysis is defined in Section 3.1 and includes all surface and groundwater resources, with the exception of wetlands, which are addressed in Section 3.4, Biological Resources. Additionally, due to the potential for downstream or down-gradient transport of pollutants, sensitive downstream receiving waters outside of the study area are included in this analysis. Impacts are analyzed in Section 4.16 (Water Resources and Floodplains).

3.16.1.1 Affected Environment

Baseline data were collected from several sources, including: ESRI, U.S. Geological Survey (USGS), Central Valley Regional Water Quality Control Board (CVRWQCB), State Water Resources Control Board (SWRCB), DWR, Federal Emergency Management Agency (FEMA), USACE, and Western.

Water Resources Overview

The Proposed Project runs generally from north to south on private land along the foothills of the Diablo Range section of the Coast Range Mountains to the west of the San Joaquin Valley, roughly parallel to I-5 and the California Aqueduct. Notable areas of public land include the San Luis Reservoir State Recreation Area and the land surrounding the Los Banos Creek Reservoir. The study area begins roughly 6 miles northwest of the City of Tracy and ends roughly 8 miles south of the City of Los Banos. The study area is located within the San Joaquin River Hydrologic Region (HR), one of ten hydrologic regions in California established by the DWR for management purposes. The Proposed Project is subject to the objectives and limits of the Basin Plan for the Sacramento River and San Joaquin River Basins, under the jurisdiction of the CVRWQCB (USGS, 2014; USACE, 2008).

Climate in the region is temperate, with mild winters and hot, dry summers. Average temperatures near the City of Patterson (located roughly at the mid-point of the study area) include winter lows in the mid-30 degrees Fahrenheit to summer highs in the mid-90 degrees Fahrenheit. Rainfall is greatest during the months of November through March, with an average annual precipitation total of 11.45 inches (city-data.com, 2014; idcide.com, 2014; USACE, 2008).

Hydrologic Regions

Hydrologic regions are divided into watersheds, which are areas of land within which all water drains to one point. The National Hydrography Dataset (NHD) defines nested hydrologic units, beginning with Regions that are subdivided into subregions, basins, subbasins, and watersheds. The study area is underlain by the San Joaquin Subregion. Within that Subregion, the study area traverses three Subbasins: the San Joaquin Delta, the Lower San Joaquin River, and the Middle San Joaquin–Lower Chowchilla. Within these Subbasins, the study area intersects 13 Watersheds, including: Corral Hollow Creek, Crow Creek–San Joaquin River, Del Puerto Creek, Ingram Creek–San Joaquin River, Lone Tree Creek–San Joaquin River, Lower Los Banos Creek, Mud Slough, Mud Slough–San Joaquin River, Old River, Orestimba Creek, Salado Creek–San Joaquin River, San Luis Creek, and Upper Los Banos Creek. Figure 3.16-1 shows the NHD-defined hydrologic units traversed by the study area.

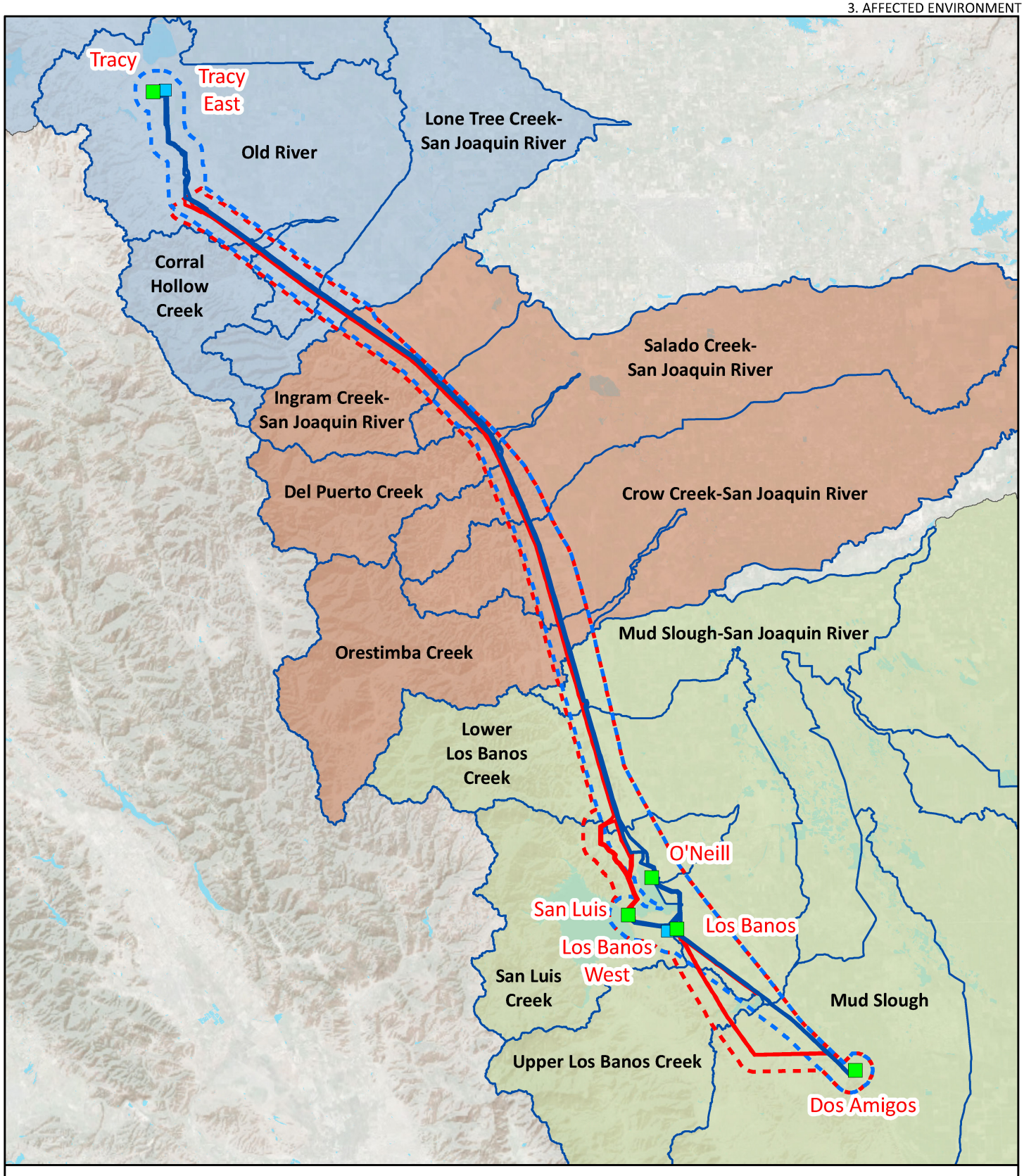


Figure 3.16-1
Hydrologic Subbasins and Watersheds

Source: WAPA SNR, Aspen EG, US Geological Survey

Numerous small, unnamed streams flow down from the Diablo Range, across the study area, and towards the San Joaquin River and valley floor. Named streams that cross or run immediately downstream of the study area include: Arkansas Creek, Corral Hollow Creek, Crow Creek, Del Puerto Creek, Garzas Creek, Hospital Creek, Ingram Creek, Little Salado Creek, Lone Tree Creek, Los Banos Creek, Martin Creek, Mountain House Creek, Mustang Creek, Orestimba Creek, Ortigalita Creek, Patterson Run, Quinto Creek, Salado Creek, Salt Creek, and San Luis Creek. In addition to the named streams listed above, named surface water features within the study area include the Delta-Mendota Canal, the Governor Edmund G. Brown California Aqueduct, the Los Banos Creek Reservoir, the O'Neill Forebay, the San Luis Reservoir, and the San Luis Wasteway. With the exception of the canals, most streams that cross the study area are ephemeral and run from the southwest to the northeast as they leave the foothills and terminate in alluvial fans that flow into the San Joaquin Valley. Surface water features within the study area are shown on Figures 3.16-2a through 3.16-2d (USGS, 2014; USACE, 2008).

Surface Water Quality

The CVRWQCB defines beneficial uses for all surface and groundwater within the study area. Beneficial uses are protected or enhanced through water quality objectives, which are defined as "…the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." (CVRWQCB, 2011) Table 3.16-1 lists the beneficial uses for surface water within the study area. Each beneficial use is accompanied by a water quality objective as defined in the Basin Plan. In addition to water quality objectives, the Basin Plan defines total maximum daily load (TMDL) requirements to protect water quality from non-point source pollution.

Section 303(d) of the Clean Water Act requires the identification of waterbodies that do not meet, or are not expected to meet, water quality standards. 33 U.S.C. § 1313(d). These impaired waterbodies are prioritized in the 303(d) list and the development of a TMDL is required. No TMDLs have been developed within the study area. However, several waterbodies within the study area do not meet water quality standards and a TMDL is required but not yet complete. These impaired waterbodies include: Delta Waterways (near the northern boundary of the study area), Hospital Creek, Los Banos Creek, Mountain House Creek, O'Neill Forebay, Salado Creek, and San Luis Creek Reservoir (SWRCB, 2010).

Floodplains

The study area for the Proposed Project is almost entirely devoid of flood hazard areas. Detailed studies identify only two very small 100-year floodplains within the study area: a floodplain associated with the Delta-Mendota Canal at the northern boundary of the study area, and a floodplain associated with Corral Hollow Creek, approximately 5 miles south of Patterson Pass Road. Additionally, three very small 100-year floodplains (Zone A designated) that are not based on detailed studies lie within the study area: one at the northern boundary, one associated with Del Puerto Creek, and one associated with Orestimba Creek. Extensive 100-year floodplains exist along the valley floor to the north and east of the Proposed Project, but they lie outside of the study area (FEMA, 2014).

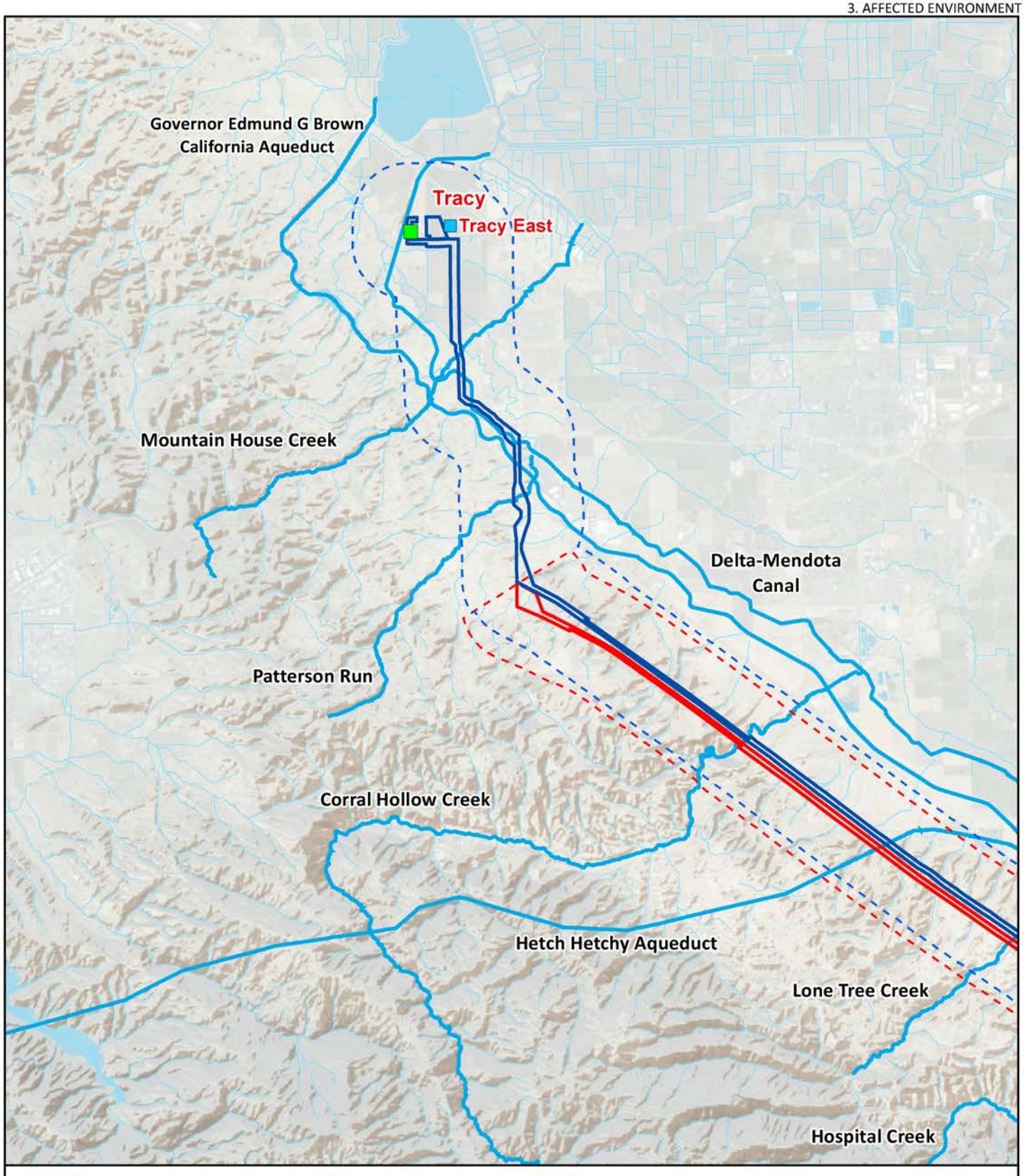


Figure 3.16-2a

Waterbodies in the Study Area

Source: WAPA SNR, Aspen EG, US Geological Survey

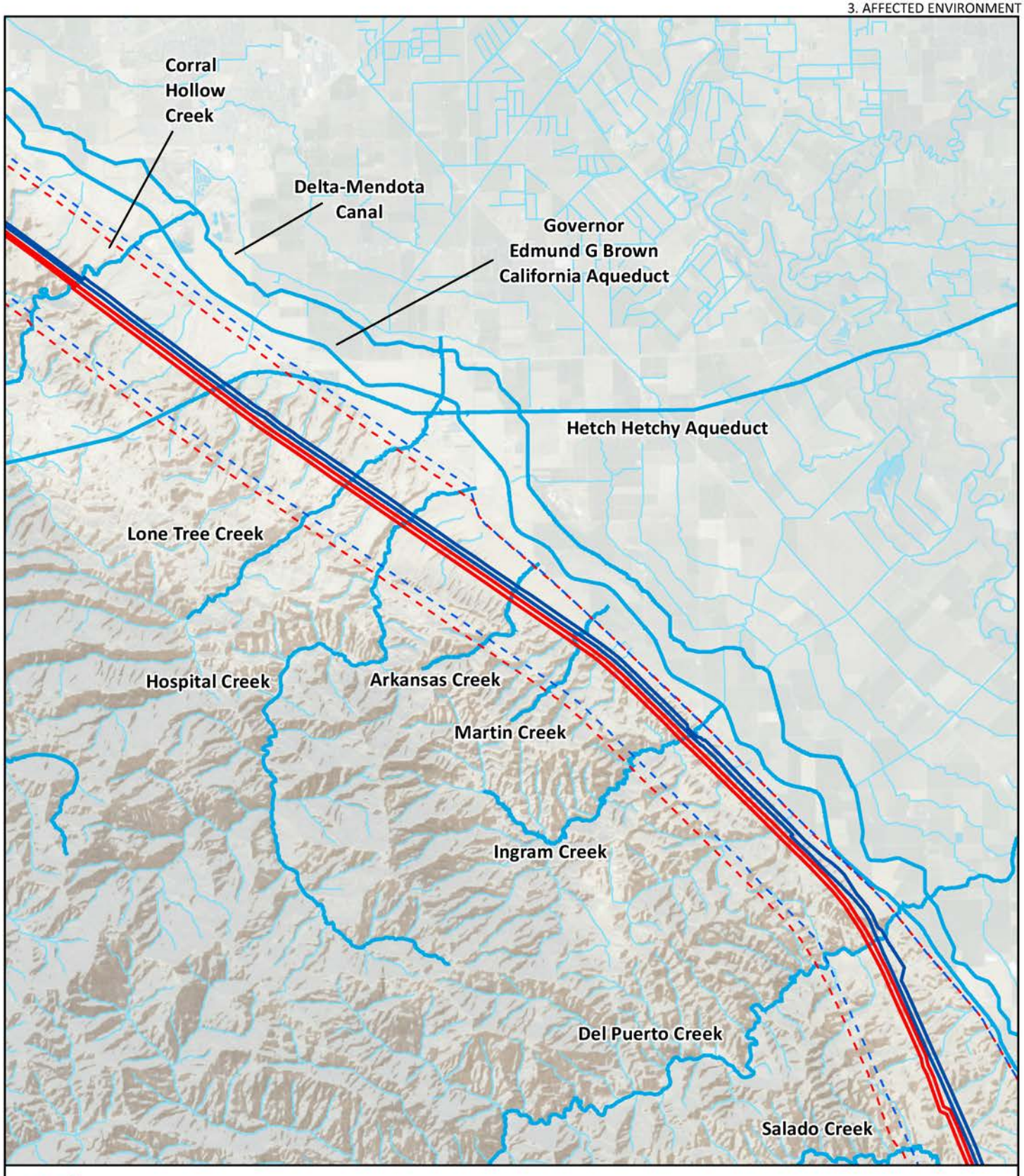


Figure 3.16-2b

Waterbodies in the Study Area

Source: WAPA SNR, Aspen EG, US Geological Survey

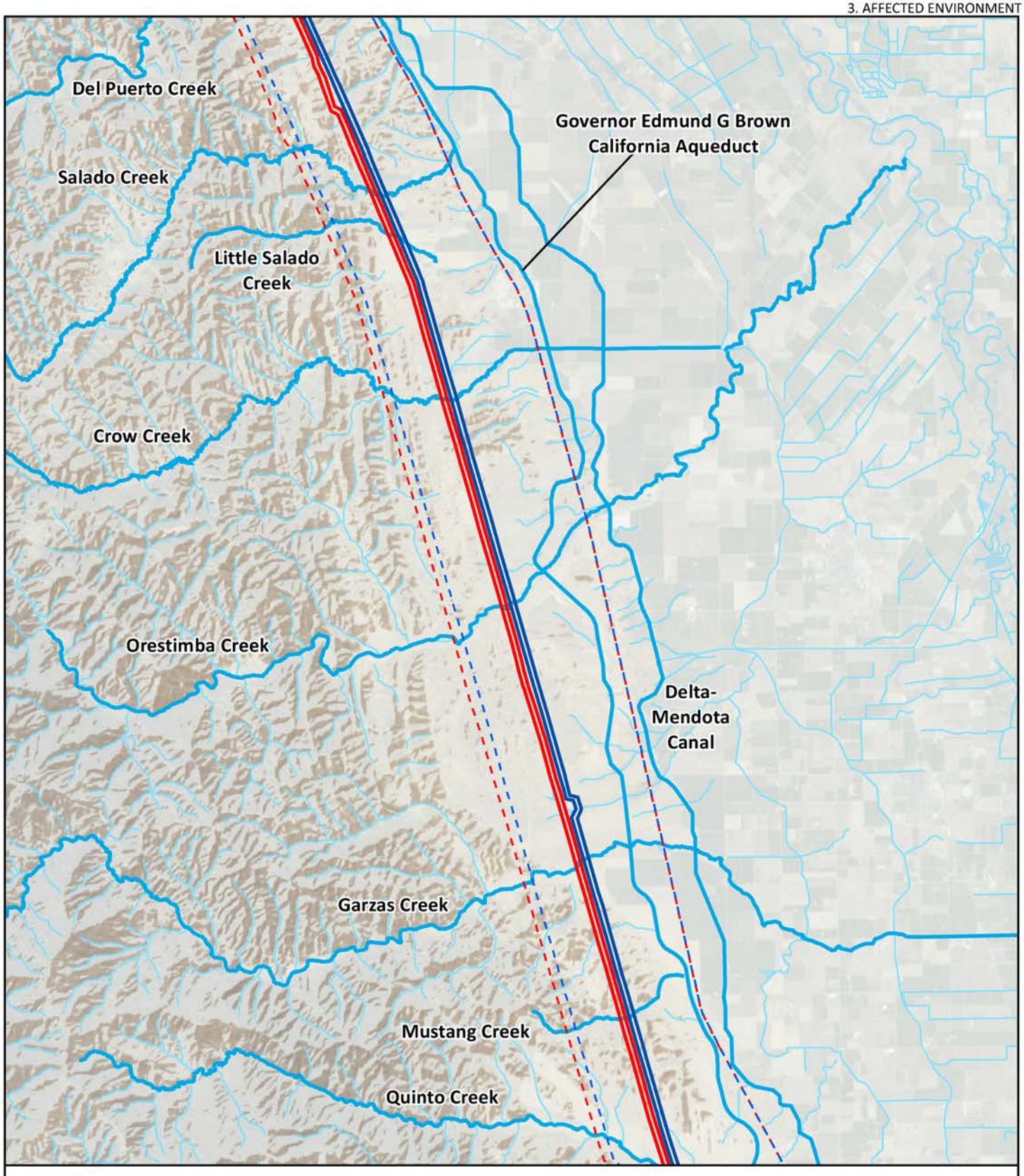


Figure 3.16-2c

Waterbodies in the Study Area

Source: WAPA SNR, Aspen EG, US Geological Survey

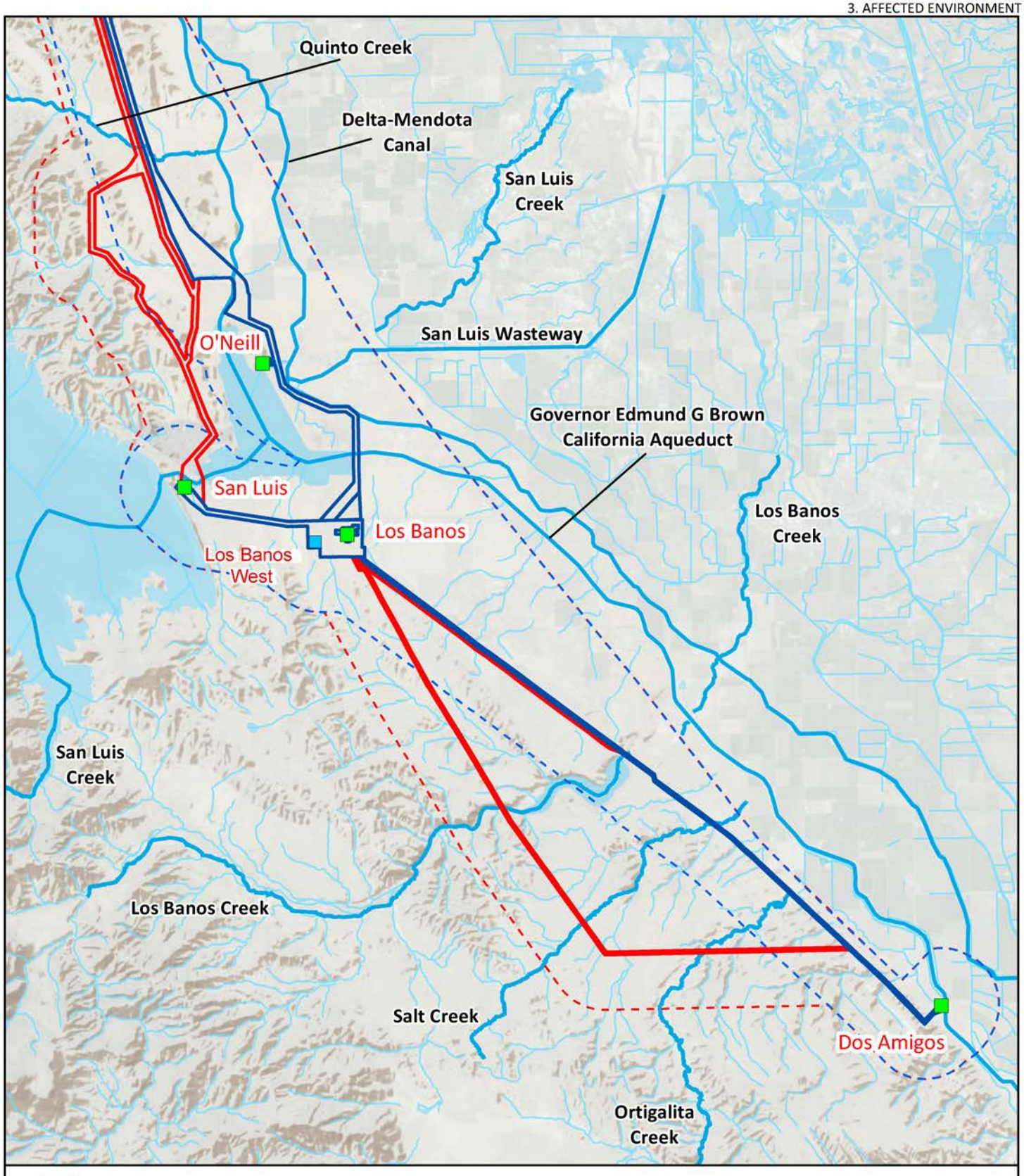


Figure 3.16-2d

Waterbodies in the Study Area

Source: WAPA SNR, Aspen EG, US Geological Survey

Table 3.16-1. Designated Beneficial Uses for Surface Waters in the Proposed Project Study Area

	Beneficial Use*										
Waterbody	**MUN**	**AGR**	**PRO**	**IND**	**POW**	**REC-1**	**REC-2**	**WARM**	**COLD**	**SPWN**	**WILD**
San Luis Reservoir	E	E		E	E	E	E	E			E
O'Neill Reservoir	E	E				E	E	E			
Other Lakes and Reservoirs in San Joaquin River Basin	E				E	E	E	E	E	E	E
California Aqueduct	E	E	E	E	E	E	E				E
Delta-Mendota Canal	E	E				E	E	E			

*Key to Symbols:

E Existing Beneficial Use

MUN Municipal and Domestic Supply – Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

AGR Agricultural Supply – Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing.

PRO Industrial Process Supply – Uses of water for industrial activities that depend primarily on water quality.

IND Industrial Service Supply – Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.

POW Hydropower Generation – Uses of water for hydropower generation.

REC-1 Water Contact Recreation – Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

REC-2 Non-contact Water Recreation – Uses of water for recreational activities involving proximity to water but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

WARM Warm Freshwater Habitat – Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

COLD Cold Freshwater Habitat – Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

SPWN Spawning, Reproduction, and/or Early Development – Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

WILD Wildlife Habitat – Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Groundwater

The study area for the Proposed Project runs along the western border of the very large San Joaquin Valley Groundwater Basin. This basin is subdivided into numerous subbasins, two of which lie beneath the study area: the Delta-Mendota Subbasin and the Tracy Subbasin. Figure 3.16-3 identifies the groundwater basins in the study area.

The Delta-Mendota Subbasin is bounded on the west by the Tertiary and older marine sediments of the Coast Ranges. Groundwater in the Delta-Mendota Subbasin occurs in three water-bearing zones. These include the lower zone, which contains confined fresh water in the lower section of the Tulare Formation, an upper zone which contains confined, semi-confined, and unconfined water in the upper section of the Tulare Formation and younger deposits, and a shallow zone which contains unconfined water within about 25 feet of the land surface. The total storage capacity of this subbasin is estimated to be 30,400,000 acre-feet (af) to a depth of 300 feet and 81,800,000 af to the base of fresh groundwater. The groundwater in this subbasin is characterized by mixed sulfate to bicarbonate types in the northern and central portion with areas of sodium chloride and sodium sulfate waters in the central and southern portion. Total dissolved solids (TDS) values range from 400 to 1,600 milligram per liter (mg/L) in the northern portion of the subbasin. Shallow, saline groundwater occurs within about 10 feet of the ground surface over a large portion of the subbasin. There are also localized areas of high iron, fluoride, nitrate, and boron in the subbasin (DWR, 2003).

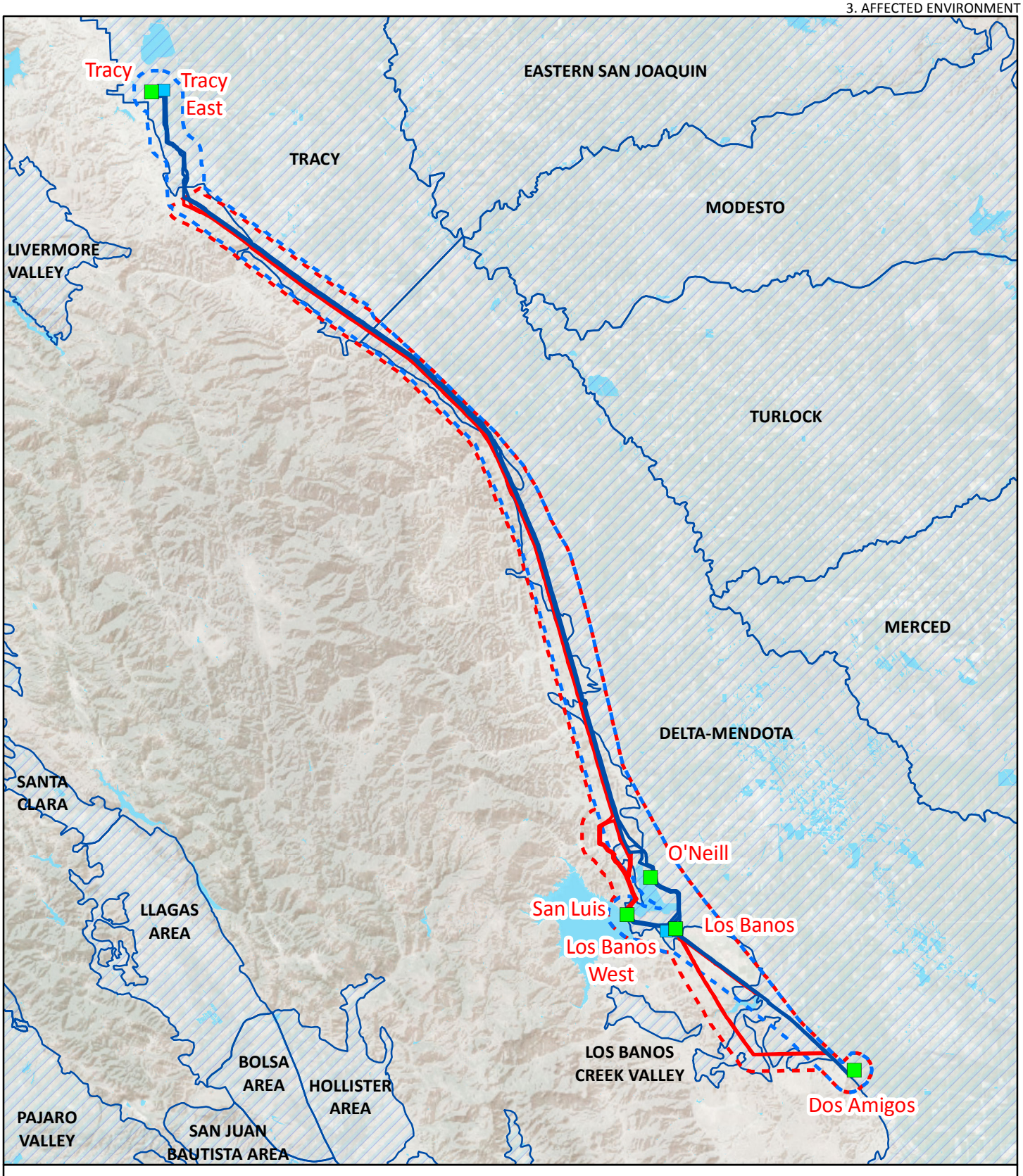


Figure 3.16-3

Groundwater Basins

Source: WAPA SNR, Aspen EG, US Geological Survey

The Tracy Subbasin is defined by the extent of unconsolidated to semiconsolidated sedimentary deposits that are bounded by the Diablo Range on the west; the Mokelumne and San Joaquin Rivers on the north; the San Joaquin River to the east; and the San Joaquin–Stanislaus County line on the south. The Tracy Subbasin is comprised of continental deposits of Late Tertiary to Quaternary age. The cumulative thickness of these deposits increases from a few hundred feet near the Coast Range foothills on the west to about 3,000 feet along the eastern margin of the basin. The storage capacity of the southern portion of the currently defined Tracy Subbasin is approximately 1,300,000 af. The southern part of the subbasin is characterized by calcium-sodium type water. TDS ranges from 210 to 7,800 mg/L and averages about 1,190 mg/L. Areas of poor water quality exist throughout the subbasin. Areas of elevated chloride occur in several areas including: along the western side of the subbasin; in the vicinity of the City of Tracy; and along the San Joaquin River. Areas of elevated nitrate occur in the northwestern part of the subbasin and in the vicinity of the City of Tracy. Areas of elevated boron occur over a large portion of the subbasin from a point south of Tracy and extending to the northwest side of the subbasin (DWR, 2003).

3.16.1.2 Regulations, Plans, and Standards

- The Clean Water Act, 33 U.S.C. §§ 1251, *et seq*., establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.
- The Oil Pollution Act, 33 U.S.C. §§ 2701, *et seq*., streamlined and strengthened the EPA's ability to prevent and respond to catastrophic oil spills. This Act requires oil storage facilities and vessels to submit to the Federal Government plans detailing how they will respond to large discharges.
- The National Flood Insurance Program (NFIP). The NFIP offers flood insurance to homeowners, renters, and business owners if their community participates in the NFIP. Participating communities agree to adopt and enforce ordinances that meet or exceed FEMA requirements to reduce the risk of flooding.
- U.S. Safe Drinking Water Act Section, 42 U.S.C. §§ 300f-300j. The Safe Drinking Water Act (SDWA) is the main federal law that ensures the quality of Americans' drinking water. Under SDWA, EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards.
- The Porter-Cologne Water Quality Control Act. This act established the State Water Resources Control Board and nine Regional Water Quality Control Boards, assigning these agencies the responsibility for regulating water quality in California. This act created a water quality policy, enforced standards for water quality, and regulated the discharge of pollutants from point and non-point sources.
- The California Fish and Game Code Section 1602. This Section requires an entity to notify CDFW of any proposed activity that may substantially modify a river, stream, or lake. This includes ephemeral streams, desert washes, and watercourses with a subsurface flow.
- The California Water Code Section 13260. This Section requires notification of the appropriate Regional Board for any discharge of waste that could affect the quality of waters of the State.

3.16.2 Corridor Alternatives

3.16.2.1 Patterson Pass Road Alternative

The alternative study area largely overlaps the Proposed Project. The existing conditions in this segment will be similar to those described above for the Proposed Project. This study area intersects 10 Watersheds, including: Corral Hollow Creek, Crow Creek–San Joaquin River, Del Puerto Creek, Ingram Creek–San Joaquin River, Lone Tree Creek–San Joaquin River, Lower Los Banos Creek, Mud Slough–San Joaquin River, Old River, Orestimba Creek, and Salado Creek–San Joaquin River. Numerous small, unnamed streams flow down from the Diablo Range, across this alternative study area, and towards the San Joaquin River and

valley floor. Named streams that cross or run immediately downstream of the study area include: Arkansas Creek, Corral Hollow Creek, Crow Creek, Del Puerto Creek, Garzas Creek, Hospital Creek, Ingram Creek, Little Salado Creek, Lone Tree Creek, Martin Creek, Mustang Creek, Orestimba Creek, Quinto Creek, and Salado Creek. In addition to the named streams listed above, named surface water features within the study area include the Hetch Hetchy Aqueduct and the Governor Edmund G. Brown California Aqueduct. This alternative study area is underlain by both the Tracy and Delta-Mendota groundwater Subbasins.

3.16.2.2 Butts Road Alternative

The alternative study area lies farther to the west between Butts Road and the San Luis Substation in comparison to the Proposed Project. The affected environment for this alternative is very similar to the Proposed Project. This study area intersects two Watersheds, including: Lower Los Banos Creek and San Luis Creek. This alternative study area is crossed by one named stream and three canals: Quinto Creek, the Delta-Mendota Canal, the San Luis Wasteway, and the Governor Edmund G. Brown California Aqueduct. This alternative study area is underlain by the Delta-Mendota groundwater Subbasin, and does not cross any 100-year floodplains.

3.16.2.3 West of Cemetery Alternative

The alternative study area overlaps the Proposed Project between Butts Road and the San Luis Substation. However, much of the alternative study area lies farther west of the Proposed Project and traverses more varying terrain. This study area intersects two Watersheds, including: Lower Los Banos Creek and San Luis Creek. This alternative study area is crossed by two named streams and three canals: Quinto Creek, Romero Creek, San Luis Wasteway, the Delta-Mendota Canal and the Governor Edmund G. Brown California Aqueduct. This alternative study area is underlain by the Delta-Mendota Groundwater Subbasin, and does not cross any 100-year floodplains.

3.16.2.4 West of O'Neill Forebay 70-kV Alternative

The alternative study area lies within the San Luis Creek Watershed. This alternative study area is crossed by three canals: the Delta-Mendota Canal, the Governor Edmund G. Brown California Aqueduct, and the San Luis Wasteway. This alternative study area is underlain by the Delta-Mendota Groundwater Subbasin, and does not cross any 100-year floodplains.

3.16.2.5 San Luis to Dos Amigos Alternative

The alternative study area largely overlaps the Proposed Project between the San Luis Substation and the Dos Amigos Substation. This study area intersects two Watersheds, including: Lower Los Banos Creek and Upper Los Banos Creek. This alternative study area is crossed by three named streams and two canals: Los Banos Creek, Ortigalita Creek, Salt Creek, the Delta-Mendota Canal, and the Governor Edmund G. Brown California Aqueduct. This alternative study area is underlain by the Delta-Mendota Groundwater Subbasin, and does not cross any 100-year floodplains.

3.16.2.6 Billy Wright Road Alternative

In the vicinity of the Los Banos Substation, the alternative study area largely overlaps the Proposed Project study area. South of the Los Banos Substation, the alternative study area lies farther west of the Proposed Project and traverses more rugged terrain. This study area intersects four Watersheds, including: Lower Los Banos Creek, Mud Sough, San Luis Creek, and Upper Los Banos Creek. This alternative study area is crossed by three named streams and two canals, including: Los Banos Creek, Ortigalita Creek, Salt Creek, the Delta-Mendota Canal, and the Governor Edmund G. Brown California Aqueduct. This alternative study area is underlain by the Delta-Mendota Groundwater Subbasin, and does not cross any 100-year floodplains.