San Luis
Low Point Improvement Project

Draft Environmental Impact Statement/ Environmental Impact Report

Estimated NEPA Lead Agency Costs Associated with Developing and Producing this Draft EIS/EIR: $3,080,000

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
Sacramento, California

Santa Clara Valley Water District

Santa Clara Valley Water District
San Jose, California

July 2019

San Luis Low Point Improvement Project Draft Environmental Impact Statement/ Environmental Impact Report

Public Draft

Estimated Lead Agency Total Costs Associated with Developing and Producing this EIS/EIR is $3,000,080

U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
Sacramento, California

Santa Clara Valley Water District
San Jose, California

July 2019

Mission Statements

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

San Luis Low Point Improvement Project
Draft Environmental Impact Statement/Environmental Impact Report

Lead Agencies: U.S. Department of the Interior, Bureau of Reclamation (Reclamation) and the Santa Clara Valley Water District (SCVWD)

State Clearning House #

ABSTRACT

Reclamation and SCVWD have made available for public review and comment the San Luis Low Point Improvement Project (SLLPIP) Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR). Investigations determined that several sections of B.F. Sisk Dam sit above liquefiable and soft soils. During the summer, high temperatures and declining water levels in San Luis Reservoir create conditions that foster algae growth. The water quality within the algal blooms is not suitable for municipal and industrial water users relying on existing water treatment facilities in Santa Clara County. The Draft EIS/EIR evaluates the potential impacts of alternatives to help maintain a high-quality, reliable, and cost-effective water supply for SCVWD and would ensure SCVWD receives its annual Central Valley Project contract allocations at the time and at the level of quality needed to meet its existing water supply commitments and avoid water supply interruptions. The alternatives evaluated in this EIS/EIR include construction of a new, lower San Felipe Intake, development of new technology retrofits at SCVWD's Santa Teresa Water Treatment Plant, the placement of additional fill material on the dam embankment to raise the dam crest to increase San Luis Reservoir storage capacity, and the development of an expanded Pacheco Reservoir and a new earthern dam and spillway constructed on the North Fork of Pacheco Creek.

This Draft EIS/EIR has been prepared according to requirements of the National Environmental Policy Act and the California Environmental Quality Act. Direct, indirect, and cumulative impacts resulting from the project alternatives on the environment of the region are addressed.

FOR FURTHER INFORMATION CONTACT:

Nicole Johnson
Bureau of Reclamation
2800 Cottage Way, MP-1740
Sacramento, CA 95825
Phone: (916) 978-5085
Email: njohnson@usbr.gov

Melih Ozbilgin, Ph.D.
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Phone: (408) 630-2725
Email: MOzbilgin@valleywater.org

This page left blank intentionally.

Contents

Tables

Figures

Appendices

List of Acronyms

AADT	annual average daily traffic
AB	assembly bill
ABAG	Association of Bay Area Governments
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
AF	acre-feet
APE	area of potential effects
ATF	U.S. Bureau of Alcohol, Tobacco, Firearms, and Explosives
BAAQMD	Bay Area Air Quality Management District
Banks Pumping Plant	Harvey O. Banks Pumping Plant
BDCP	Bay Delta Conservation Plan
BMP	best management practice
BOs	Biological Opinions
CAAQS	California Ambient Air Quality Standards
CAL FIRE	California Department of Forestry and Fire Protection
CalSim II	California Simulation Model II
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEC	California Energy Commission
CEQ	Council of Environmental Quality
CEQA	California Environmental Quality Act
CCIC	Central California Information Center
CCR	California Code of Regulations
CDPR	California Department of Parks and Recreation
CDFW	California Department of Fish and Wildlife
CDL	commercial driver license
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CH_4	methane
CHL	California Historical Landmark
CHRIS	California Historical Resources Information System
CHSRA	California High Speed Rail Authority
CNDDB	California Natural Diversity Database
CO_2	carbon dioxide
CRHR	California Register of Historical Resources

CRLF	California red-legged frog
VHM	Central Valley Hydrologic Model
CVP	Central Valley Project
CWA	Clean Water Act
DSM2	Delta Simulation Model-2
dBA	A-weighted decibels
DBH	diameter at breast height
Delta	Sacramento-San Joaquin Delta
DMC	Delta-Mendota Canal
DO	dissolved oxygen
DOC	California Department of Conservation
DOF	California Department of Finance
DOGGR	Division of Oil, Gas, and Geothermal Resources
DOI	United States Department of Interior
DOSS	Delta Operations for Salmonids and Sturgeon
DOT	Department of Transportation
DPM	diesel particulate matter
DSOD	Division of Safety of Dams
DWR	California Department of Water Resources
EA	Environmental Assessment
EC	electrical conductivity
EIS/EIR	Environmental Impact Statement/ Environmental Impact Report
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GGERP	GHG Emissions Reduction Plan
GHG	greenhouse gas
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HCP	Habitat Conservation Plan
hp	horsepower
I	Interstate
I-O	input-output
IAIR	Initial Alternatives Information Report
IMPLAN	Impact Planning and Analysis
ITA	Indian Trust Asset
ITP	incidental take permit
IRP	Integrated Resource Plan
Jones Pumping Plant	C.W. “Bill” Jones Pumping Plant

kV	kilovolt
kW	kilowatts
L_{eq}	unmitigated noise level
L_{dn}	day-night average level
LAFCO	Local Area Formation Commission
LOS	Level of Service
LOX	liquid oxygen
LSZ	low salinity zone
LUST	leaking underground storage tank
MAF	million acre-feet
M&I	municipal and industrial
$MTCO_2e$/yr	metric tons CO_2e per year
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NCCP	Natural Communities Conservation Plan
NCP	Noise Control Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOD	Notice of Determination
NOP	Notice to Proceed
NOTAM	Notices to Airmen
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWIC	Northwest Information Center
O&M	operation and maintenance
OEHHA	Office of Environmental Health Hazard Assessment
OES	Office of Emergency Services
OHP	Office of Historic Preservation
OHV	off-highway vehicle
OSHA	Federal Occupational Safety and Health Administration

PFR	Plant Formulation Report
PG&E	Pacific Gas and Electric
ppm	parts per million
PPV	peak particle velocity
PPWD	Pacheco Pass Water District
PR&Gs	Principles and Guidelines
PRC	Public Resources Code
PVWMA	Pajaro Valley Water Management Agency
PWRPA	Power and Water Resource Pooling Authority
PCDSCC	Resource Conservation District of Santa Cruz County
Reclamation	United States Department of the Interior, Bureau of Reclamation
REL	reference exposure level
RMP/GP	Resource Management Plan/ General Plan
ROD	Record of Decision
RPA	Reasonable and Prudent Alternative
RV	recreational vehicle
RWQCB	Regional Water Quality Control Board
RWSP	Refuge Water Supply Program
SBA	South Bay Aqueduct
SBCWD	San Benito County Water District
SCCC	South-Central California Coast
SCVWD	Santa Clara Valley Water District
SDWA	Federal Safe Drinking Water Act
SFBAAB	San Francisco Bay Area Air Basin
SGMA	Sustainable Groundwater Management Act
SHPO	State Historic Preservation Officer
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLDMWA	San Luis & Delta-Mendota Water Authority
SLLPIP	San Luis Low Point Improvement Project
SMS	Scenery Management System
SOD	Safety of Dams
SP	State Park
SR	State Route
SRA	State Recreation Area
SVS	south valley section
SWAP	Statewide Agricultural Production
SWP	State Water Project

SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TAF	thousand acre-feet
TBM	Tunnel Boring Machine
UN	United Nations
U.S.	United States
U.S.C	United States Code
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USD	Unified School District
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
VELB	Valley Elderberry Longhorn Beetle
VOC	volatile organic compound
VTA	Valley Transportation Authority
WAPA	Western Area Power Administration
WEAP	Water Evaluation and Planning
WSP	Water Shortage Policy
WTP	Water Treatment Plant
X2	low salinity zone

Executive Summary

ES.1 Purpose of this Environmental Impact Statement/Environmental Impact Report

The United States Department of the Interior, Bureau of Reclamation (Reclamation) and the Santa Clara Valley Water District (SCVWD) are proposing the San Luis Low Point Improvement Project (SLLPIP) to address water supply reliability and schedule certainty issues for SCVWD associated with low water levels in San Luis Reservoir. The SLLPIP alternatives would help to maintain a high quality, reliable, and cost-effective water supply for SCVWD, and would ensure that they receive their annual Central Valley Project (CVP) contract allocations at the time and at the level of quality needed to meet their existing water supply commitments.

Reclamation, the National Environmental Policy Act (NEPA) Lead Agency, and SCVWD, the California Environmental Quality Act (CEQA) Lead Agency have prepared this joint Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) to comply with NEPA and CEQA. This Draft EIS/EIR analyzes the direct, indirect, and cumulative effects of implementing the SLLPIP. Along with the environmental documentation process, Reclamation and SCVWD have completed a feasibility study to identify and analyze alternatives. The Feasibility Report documenting the study findings has been released for review concurrently with this Draft EIS/EIR.

ES.2 Project Background

Reclamation owns and jointly operates San Luis Reservoir with the California Department of Water Resources to provide seasonal storage for the CVP and the State Water Project (SWP). San Luis Reservoir is capable of receiving water from both the Delta-Mendota Canal (DMC) and the California Aqueduct. This enables the CVP and SWP to pump water into the reservoir during the wet season (October through March) and release water into the conveyance facilities during the dry season (April through September) when demands are higher. Deliveries from San Luis Reservoir to the San Felipe Division of the CVP, which includes SCVWD, flow west through Pacheco Pumping Plant and Conduit.

During the summer, high temperatures and declining water levels in San Luis Reservoir create conditions that foster algae growth. The thickness of the algae blooms vary, but typically average about 35 feet in depth. The water quality within the algal blooms is not suitable for municipal and industrial (M&I) water users relying on existing water treatment facilities in Santa Clara County.

Figure ES-1 shows the intake and outlet facilities associated with the reservoir. As water levels decline to the point that the algae is in the vicinity of the Upper Intake, that intake is no longer used. The low point problem occurs when the water levels decline to the point that the algae blooms are near the Lower Intake.

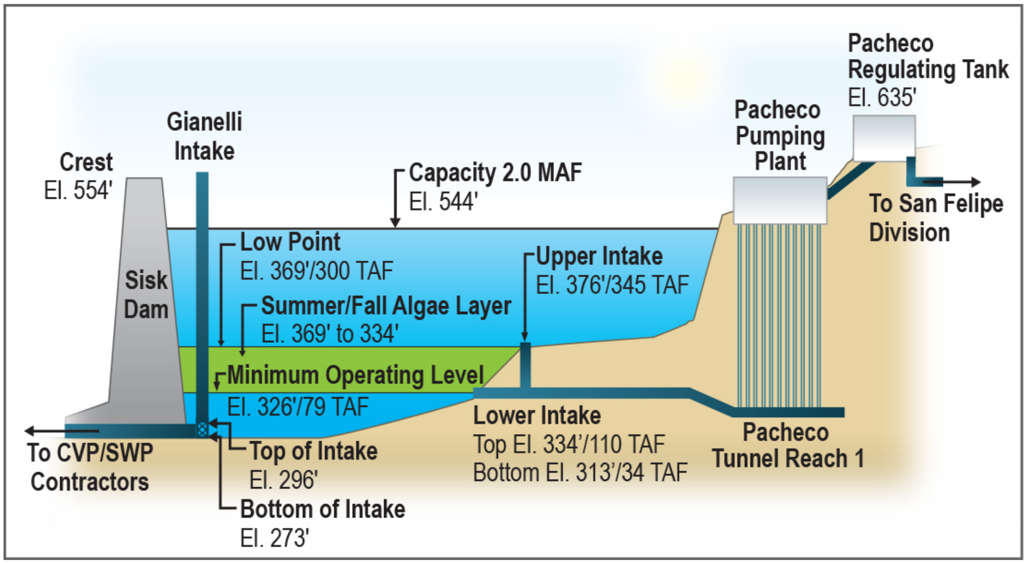


Figure ES-1. Reservoir Intake and Outlet Facilities

If water levels fall below an elevation of 369 feet above mean sea level (MSL) (300 thousand acre-feet [TAF]), SCVWD cannot withdraw water from San Luis Reservoir for M&I purposes because of water quality issues. San Luis Reservoir is the only delivery route for SCVWD's CVP supplies; therefore, SCVWD cannot access CVP supplies for M&I purposes during low-point events.

ES.3 Purpose and Need/Project Objectives

The Lead Agencies are proposing the SLLPIP for the purpose of optimizing the water supply benefit of San Luis Reservoir while reducing additional risks to water users by:

ES.3.1 Primary Objectives

- Avoiding supply interruptions when water is needed by increasing the certainty of meeting the requested delivery schedule throughout the year to South-of-Delta contractors, including SCVWD, dependent on San Luis Reservoir.

- Increasing the reliability and quantity of yearly allocations to South-of-Delta contractors, including SCVWD, dependent on San Luis Reservoir.

ES.3.2 Secondary Objective

- Provide opportunities for ecosystem restoration.

ES.4 Study Area

The study area for this EIS/EIR (Figure ES-2) includes San Luis Reservoir and its related water infrastructure (including the San Felipe Division's water intakes and associated infrastructure); Sacramento-San Joaquin River Delta (Delta); California Aqueduct; South-of-Delta CVP and SWP contractors; SCVWD service area, including the Santa Teresa Water Treatment Plant (WTP) in San Jose; and Pacheco Reservoir and the surrounding vicinity, Pacheco Creek, Pajaro River, San Felipe Lake and Miller Canal.

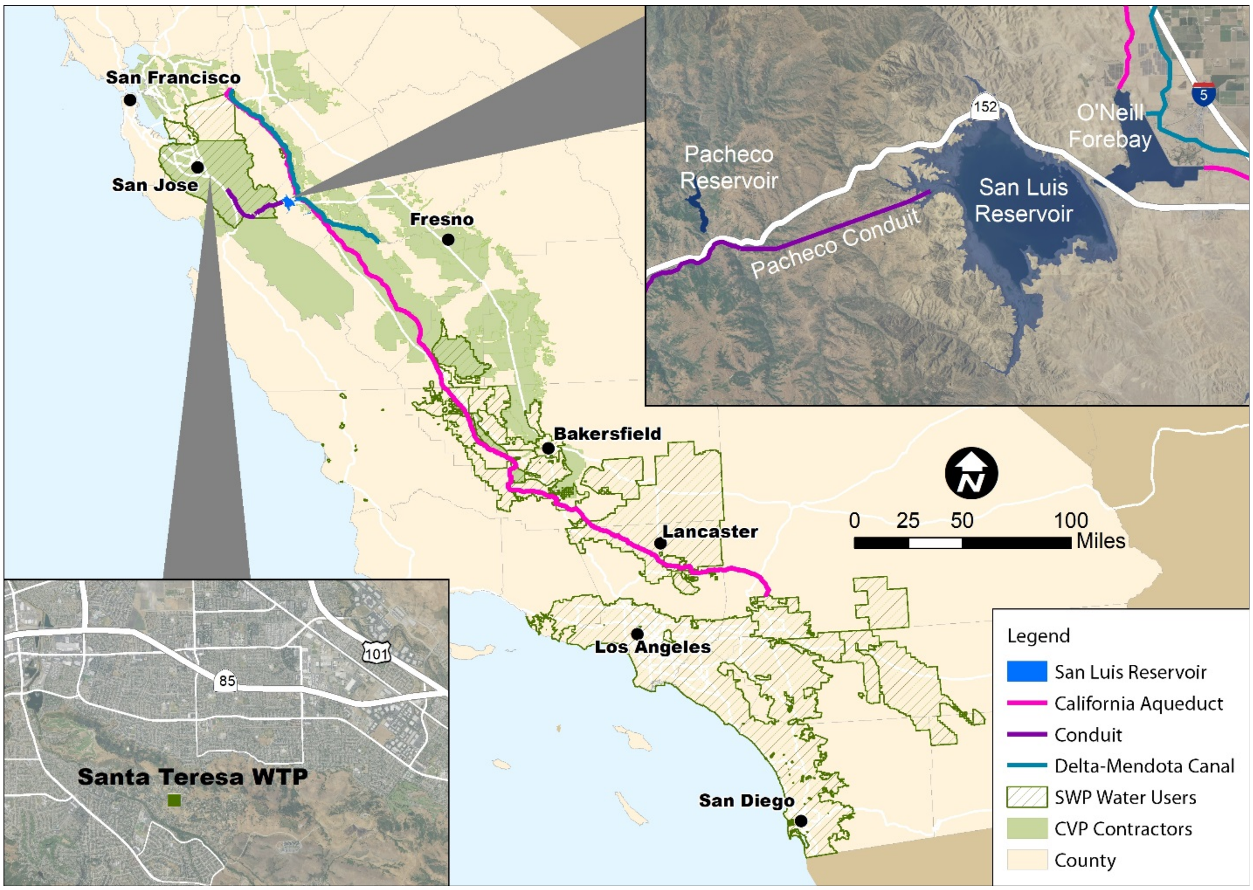


Figure ES-2. San Luis Low Point Improvement Project Study Area

ES.5 Alternatives Evaluated in this EIS/EIR

ES.5.1 Alternative 1 - No Action/No Project Alternative

Both NEPA and CEQA require the evaluation of a No Action or No Project Alternative, which presents the reasonably foreseeable future conditions in the absence of the proposed project. The purpose of the No Action or No Project Alternative is to allow decision makers to compare the impacts of approving the project to the impacts of not approving the project. The No Action/No Project Alternative would leave the current operations at San Luis Reservoir unchanged.

SCVWD would continue annual operations planning to anticipate curtailment of CVP supply, and would cope with its uses and sources of imported and local water supplies. CVP agricultural contractors would continue to rely on the current water supply allocation process.

ES.5.2 Alternative 2 - Lower San Felipe Intake Alternative

Alternative 2 includes construction of a new, lower San Felipe Intake to allow reservoir drawdown to its minimum operating level without algae reaching the San Felipe Intake. Moving the San Felipe Intake to an elevation equal to that of the Gianelli Intake would allow operation of San Luis Reservoir below the 300 TAF level without creating the potential for a water supply interruption to SCVWD. As part of this alternative, a new intake would be constructed and connected to the existing San Felipe Division Intake via approximately 20,000 feet of new pipeline or tunnel. The lower intake facility would allow the San Felipe Division to receive water from the lower reservoir levels that do not contain high concentrations of algae. A hypolimnetic aeration facility would also be constructed to increase dissolved oxygen levels in lower reservoir levels to prevent taste and odor issues.

ES.5.3 Alternative 3 - Treatment Alternative

Alternative 3 would implement technology retrofits at SCVWD’s Santa Teresa WTP. The WTP is supplied with water from San Luis Reservoir, which during low point conditions can contain high concentrations of algae. Alternative 3 would develop new treatment technology at the WTP to address some of the negative impacts associated with increased algae during low point events. The proposed improvements evaluated under this alternative would add a raw water ozonation process to the Santa Teresa WTP. Implementation of a raw water ozonation process at the Santa Teresa WTP will require installation of a new ozone contactor, new ozone generation equipment housed in a new building, and new liquid oxygen storage facilities.

ES.5.4 Alternative 4 - San Luis Reservoir Expansion Alternative

Alternative 4 would be completed by placing additional fill material on the dam embankment to raise the dam crest to increase storage capacity. The alternative would build upon the dam embankment expansion and foundation modifications to address the seismic concerns. The seismic modifications to B.F. Sisk Dam under Reclamation’s Safety of Dams (SOD) Act, as amended, that the San Luis Reservoir Expansion Alternative would build on are included in this alternative as connected actions as defined under NEPA. Alternative 4 would allocate the increased capacity to the CVP only. This expanded capacity would be operated in the same way as the current CVP portion of San Luis Reservoir, with the reservoir used for seasonal storage.

ES.5.5 Alternative 5 - Pacheco Reservoir Expansion Alternative

Alternative 5 includes construction and operation of a new dam and reservoir, pump station, conveyance facilities, and related miscellaneous infrastructure. The new dam and reservoir would be constructed on Pacheco Creek 0.5 mile upstream from the existing North Fork Dam and would inundate most of the existing Pacheco Reservoir. The proposed total storage for the new reservoir is 141,600 acre-feet (AF), with an active storage of 140,800 AF. The full pool elevation would be 694 feet and would inundate an additional 1,245 acres, for a total of 1,385 total acres inundated. Water would be collected in the new reservoir during the winter months from runoff from the local watershed area, and diversion of CVP supplies from the Pacheco Conduit. Alternative 5 would be operated by SCVWD to both improve habitat conditions for steelhead in Pacheco Creek and improve SCVWD water supply reliability, including during drought periods and emergencies. In addition, SCVWD will transfer 2,000 AF of its CVP water contract supplies (in below normal water years), directly or through transfer and exchanges, in perpetuity to Reclamation and U.S. Fish and Wildlife Services' Refuge Water Supply Program (RWSP), for use in the Incremental Level 4 water supply pool for wildlife refuges.

ES.6 Impact Summary

This section summarizes significant impacts generated by the action alternatives evaluated in this EIS/EIR and the mitigation measures identified to address those impacts. These significant impacts and mitigation measures are listed in Table ES-1 and described in further detail in Chapter 4 of the EIS/EIR. Areas of controversy and issues to be resolved (CEQA Guidelines Section 15123) are discussed in Chapter 6 of the EIS/EIR.

Table ES-1. Significance Effect Analysis Summary

Significance Criteria	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Water Quality				
Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on or off-site or provide substantial additional sources of polluted runoff.	2	Construction - S, LTS	WQ-1	Section 4.1.4
	3	Construction - S, LTS	WQ-1	Section 4.1.5
	4	Construction - S, LTS	WQ-1	Section 4.1.6
	5	Construction - S, LTS	WQ-1	Section 4.1.7
Conflict with or obstruct implementation of a water quality control plan.	2	S, LTS	WQ-1	Section 4.1.4
	3	S, LTS	WQ-1	Section 4.1.5
	4	S, LTS	WQ-1	Section 4.1.6
	5	S, LTS	WQ-1	Section 4.1.7
Result in effects on water quality related beneficial uses.	1	S, SU	--	Section 4.1.3
Surface Water Supply				
Substantially reduce the annual supply of water available to the CVP, SWP, or other water users.	1	S, SU	--	Section 4.2.3, Appendix B, Appendix N
	4	S, SU (Short-term, with shear key)	None	Section 4.2.6, Appendix B, Appendix N

Significance Criteria	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Geology and Soils				
Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	2	S, LTS	PR-1	Section 4.5.4
	4	S, LTS	PR-1	Section 4.5.6
	5	S, LTS	PR-1	Section 4.5.7
Air Quality				
Conflict with or obstruct implementation of the applicable air quality plan	2	Tunnel Option Constr. - S, LTS Pipeline Option Constr. – S, LTS	Tunnel - AQ-1, AQ-2, AQ-3 Pipeline - AQ-1, AQ-2, AQ-3, AQ-4, AQ-5	Section 4.5.4 Appendix O
	4	Constr. – S, SU	AQ-1, AQ-2, AQ-6	Section 4.5.6 Appendix O
	5	Constr. – S, SU	AQ-1, AQ-2	Section 4.5.7 Appendix O
Greenhouse Gas				
Generate greenhouse gas emissions, either directly or indirectly, that could have a significant impact on the environment.	2	S, LTS	GHG- 1	Section 4.8.4 Appendix P
	4	S, LTS	GHG- 1	Section 4.8.6 Appendix P
	5	S, LTS	GHG- 1	Section 4.8.7 Appendix P
Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	2	S, LTS	GHG- 1	Section 4.8.4 Appendix P
	4	S, LTS	GHG- 1	Section 4.8.6 Appendix P
	5	S, LTS	GHG- 1 Carbon Offsets	Section 4.8.7 Appendix P
Visual Resources				
Have a substantial adverse effect on a scenic vista (areas with Scenic Attractiveness Class A or Class B classifications are considered scenic vistas)	2	Operation - S, LTS	VIS-1, VIS-3	Section 4.9.4
Substantially damage scenic resources within a State scenic highway corridor.	2	S, LTS	VIS-4	Section 4.9.4
	4	S, LTS	VIS-4	Section 4.9.6
Substantially degrade the existing visual character or quality of public views of the site and its surroundings or conflict with applicable regulations governing scenic quality.	2	S, LTS	VIS-2	Section 4.9.4
Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.	2	S, LTS	VIS-1	Section 4.9.4
	4	S, LTS	VIS-1	Section 4.9.6
	5	S, LTS	VIS-1	Section 4.9.7

Significance Criteria	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Noise and Vibration				
Expose sensitive receptors to noise levels in excess of standards established in the local general plan or noise ordinance.	4	Construction – S, SU	NOISE-1, NOISE-2, HAZ-5	Section 4.10.6 Appendix E1
	5	Construction – S, SU Operation – S, LTS	NOISE-1, NOISE-2, NOISE-3, HAZ-5	Section 4.10.7 Appendix E1
Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.	2	Tunnel Option – S, SU	NOISE-1	Section 4.10.4 Appendix E1
	3	S, LTS	NOISE-1	Section 4.10.5 Appendix E1
	4	S, SU	NOISE-1, NOISE-2, HAZ-5	Section 4.10.6 Appendix E1
	5	S, SU	NOISE-1	Section 4.10.7 Appendix E1
Traffic and Transportation				
Substantially increase traffic hazards due to a geometric design feature or incompatible use.	2	S, LTS	TR-1	Section 4.11.4
	3	S, LTS	TR-1	Section 4.11.5
	4	S, LTS	TR-1	Section 4.11.6
	5	S, LTS	TR-1	Section 4.11.7
Result in inadequate emergency access.	2	S, LTS	TR-1	Section 4.11.4
	3	S, LTS	TR-1	Section 4.11.5
	4	S, LTS	TR-1	Section 4.11.6
	5	S, LTS	TR-1	Section 4.11.7
Hazards and Hazardous Materials				
Increase the risk of exposure from hazardous materials to the public and construction workers during alternative construction onsite, during the transport, use or disposal of hazardous materials offsite, and during long-term operations and maintenance activities.	4	Construction – S, LTS	HAZ-5	Section 4.12.6
	5	Construction – S, LTS	HAZ-5	Section 4.12.7
Interfere with an active remediation site which could create a hazard to the public or the environment if contaminated soil and/or groundwater is encountered and released to the environment.	2	S, LTS	HAZ-1	Section 4.12.4
	4	S, LTS	HAZ-6	Section 4.12.6
Conflict with activities and operations at airports near or within the project area during construction, resulting in safety hazards for pilots or people working and residing in the area.	2	S, LTS	HAZ-3, HAZ-4	Section 4.12.4
	4	S, LTS	HAZ-3, HAZ-4	Section 4.12.6

Significance Criteria	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Temporarily interfere with an emergency response plan or emergency evacuation plan for the project vicinity as a result of construction traffic and traffic controls impacting local roads.	2	S, LTS	TR-1	Section 4.12.4
	4	S, LTS	TR-1	Section 4.12.6 Section 4.11.8
	5	S, LTS	TR-1	Section 4.12.7 Section 4.11.8
Increase the risk of wildfire within the vicinity of the project area through the use of mechanical equipment during construction	2	S, LTS	HAZ-2	Section 4.12.4
	4	S, LTS	HAZ-2	Section 4.12.6
	5	S, LTS	HAZ-2	Section 4.12.7
Aquatic Resources				
Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations	5	Construction – S, LTS Operation (Pacheco Creek/Pajaro River) – S, LTS	BIO-1, BIO-2	Section 4.13.7 Appendix L2
Terrestrial Resources				
Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as an endangered, threatened, candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW, NMFS, or USFWS	2	Construction – S, LTS	BIO-1, TERR-1 through TERR-15	Section 4.14.4
	3	Construction –S, LTS	BIO-1 TERR-6	Section 4.14.5
	4	Construction –S, LTS Operation – S, LTS	BIO-1, TERR-1 through TERR-15	Section 4.14.6
	5	Construction – S, LTS Operation – S, LTS	BIO-1, BIO-2 TERR-1 through TERR-15	Section 4.14.7
Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW, NMFS, or USFWS	2	S, LTS	TERR-1, TERR-3, TERR-4, TERR-14, TERR-15, TERR-16, TERR-17	Section 4.14.4
	4	S, LTS	TERR-1, TERR-3, TERR-4, TERR-14, TERR-15, TERR-16	Section 4.14.6
	5	S, LTS	TERR-1, TERR-16, TERR-18	Section 4.14.7
Have a substantial adverse effect on Federally or State protected wetlands (including, but not limited to, marsh, vernal pool, coast, etc.) through direct removal, filling, hydrological interruption, or other means	2	S, LTS	TERR-14, TERR-16	Section 4.14.4
	4	S, LTS	TERR-14, TERR-16	Section 4.14.6
	5	S, LTS	TERR-16	Section 4.14.7

Significance Criteria	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites	4	S, LTS	TERR-12, TERR-13, TERR-15	Section 4.14.6
	5	S, LTS	TERR-12, TERR-15	Section 4.14.7
Conflict with any local policies or ordinances protecting biological resources, or adopted HCP, NCCP, or other approved local, regional, or State conservation plan	2	S, LTS	TERR-1 through TERR-17	Section 4.14.4
	3	S, LTS	BIO-1, TERR-18	Section 4.14.5
	4	S, LTS	TERR-1 through TERR-14, TERR-17	Section 4.14.6
	5	S, LTS	TERR-1, TERR-18	Section 4.14.7
Land Use and Agricultural Resources				
Conflict with existing zoning for agricultural use or a Williamson Act contract	5	SU, LTS	LU-1	Section 4.12.7
Recreation				
Substantially reduce access to or close recreation areas as a result of project construction	2	S, LTS	REC-1	Section 4.17.4, Section 4.17.8
	4	S, LTS	REC-1	Section 4.17.6, Section 4.17.8
Reduce access to recreation uses through long-term operational changes to water levels in recreational water bodies	4	S, LTS (trail closures)	REC-2	Section 4.17.6, Section 4.17.8, Appendix N
Cultural Resources				
Result in adverse effects to historic properties listed or eligible for listing in the NRHP, and/or substantial adverse changes to historical resources, unique archaeological resources, or tribal cultural resources listed or eligible for listing in the CRHR or result in the disturbance of human remains	2	S, SU	CR-1, CR-2, CR-3	Section 4.20.4 Appendix K
	4	S, SU	CR-1, CR-2, CR-3	Section 4.20.6 Appendix K
	5	S, SU	CR-1, CR-2, CR-3	Section 4.20.7 Appendix K

Key: Alt = alternative; CDFW = California Department of Fish and Wildlife; CRHR = California Register of Historical Resources; HCP = Habitat Conservation Plan; LTS = less than significant; NCCP = Natural Communities Conservation Plan; NI = no impact; NMFS = National Marine Fisheries Service; NRHP = National Register of Historic Places; S = Significant; SU = significant and unavoidable; USFWS = United States Fish and Wildlife Service; W = with; WO = without

ES.6.1 Alternative 2 - Lower San Felipe Intake Alternative

Impacts across the study area associated with the development and long-term operation of a new, lower San Felipe Intake through either the pipeline or tunnel option would be generated during construction of the new intake infrastructure followed by long-term changes in the operation of

San Luis Reservoir with the avoidance of low point event water supply interruptions to SCVWD deliveries.

Construction of the new lower intake facility infrastructure would generate impacts on surface water quality resulting both from the disturbance of soils in construction and staging areas and the associated potential for increases in erosion along with subsurface construction activity in San Luis Reservoir and potential for increases in turbidity from reservoir floor disturbance. Construction activities would also result in air quality and greenhouse gas emissions with the potential to exceed significance thresholds. Implementation of mitigation including the installation of diesel oxidation catalysts on all off-road construction equipment, the selection of marine propulsion and auxiliary engines with selective catalytic reduction capable of achieving an 85 percent reduction in nitrogen oxides (NOx), and the purchase of carbon offsets would reduce these impacts to a less than significant level. Modifications to the study area's visual setting during the construction of Alternative 2 through the introduction of construction equipment and the disturbance of areas where construction is underway could generate impacts to visual resource experiences for visitors to the San Luis Recreation Area and viewers passing by the reservoir on nearby State Route (SR) 152. These impacts on visual setting would be mitigated to less than significant levels through the shielding of construction lighting used during nighttime construction, the strategic use of locations out of sight of major nearby viewing points including SR 152 for spoils storage and disposal, and design requirements for new infrastructure in the viewshed to minimize any new visual contrast or distraction they could generate. Noise generated by construction of the tunnel option under Alternative 2 would result in a significant and unavoidable impact, temporarily increasing the noise level on local roads. The use of area roadways by trucks and construction workers accessing the construction areas at San Luis Reservoir could cause temporary impacts to traffic safety on those roadways. This impact would be mitigated to a less than significant level with the installation of signage along impacted roadways warning motorists of slow-moving construction traffic and lane closures, and the use of traffic controls like flaggers or temporary traffic lights where construction equipment will be entering roadways. Construction activities could also generate significant impacts on sensitive terrestrial habitats including wetland and riparian vegetation communities, disturb terrestrial wildlife, nesting birds, adversely impact special status plant species and conflict with local policies or ordinances protecting biological resources. Mitigation measures including pre-construction surveys, establishment of buffers, construction monitoring, compensatory mitigation where impacts could not be avoided would reduce all of these potential impacts to a less than significant level. Finally, impacts to historic properties and/or historical resources associated with Alternative 2 could be significant given the area's rich cultural history. CEQA mitigation measures including avoidance of known resources, training of construction personnel on the cultural sensitivity in the area, monitoring for inadvertent discovery of new resources by a qualified archaeologist, and coordination with culturally associated Native American tribes would be implemented to reduce the potential for significant impacts. Under Section 106 of the National Historic Preservation Act (NHPA) for NEPA, adverse effects to historic properties will be resolved (i.e., avoided, minimized, or mitigated) through the completion of the Section 106 process and the execution of an agreement document (Memorandum of Agreement or Programmatic Agreement). No feasible measures have been identified to offset potential impacts to previously identified cultural resources in areas that will remain inundated during construction.

Once constructed, Alternative 2 would allow for the continued delivery of CVP water supplies from San Luis Reservoir to SCVWD in periods when the reservoir is drawn below the 300 TAF low point level by diverting the water from lower levels below the reservoir surface to depths that do not contain concentrations of algae. Alternative 2 would support the uninterrupted delivery of SCVWD CVP deliveries from San Luis Reservoir in all low point years.

ES.6.2 Alternative 3 - Treatment Alternative

Alternative 3 would implement new technology retrofits at SCVWD's Santa Teresa WTP. In comparison to Alternative 2, the construction actions required to implement Alternative 3 would result in fewer significant impacts requiring mitigation given the smaller construction area, implementation at the existing WTP at an area already disturbed, and shorter overall construction schedule.

Following the completion of construction, Alternative 3 would be similar to Alternative 2 by allowing for the continued delivery of CVP water supplies from San Luis Reservoir to SCVWD in periods when the reservoir is drawn below the 300 TAF low point level by making that water treatable the WTP and would support the uninterrupted delivery of SCVWD CVP deliveries from San Luis Reservoir in all low point years.

ES.6.3 Alternative 4 - San Luis Reservoir Expansion Alternative

Alternative 4 would complete major construction actions at San Luis Reservoir to raise the B.F. Sisk Dam embankment and increase storage capacity in the reservoir. The construction generated significant effects on water quality, paleontological resources, air quality, greenhouse gas emissions, visual resources, noise, traffic conditions, hazards, terrestrial resources, and cultural resources would be similar in type to those in Alternative 2 but given the longer construction schedule required for implementation of this alternative these impacts are larger in total magnitude over the full course of the alternative's development. The mitigation measures identified to address the impacts described above under Alternative 2 would also be implemented under Alternative 4 to help reduce the severity of these potential impacts.

By increasing total storage capacity in the reservoir and allowing it to fill above its current maximum operating level, Alternative 4 would support the delivery of additional water supply to SCVWD in some years with low point conditions when compared to the No Action/No Project Alternative, partially reducing SCVWD unmet demand in those years. Operation of the expanded San Luis Reservoir would not result in significant operational changes and would not require significant additional water diversions from the Delta.

ES.6.4 Alternative 5 - Pacheco Reservoir Expansion Alternative

Alternative 5 would, much like Alternative 2 and Alternative 4, implement a major construction action over multiple years, with similar significant water quality, paleontological resources, air quality, greenhouse gas emissions, visual resources, noise, traffic conditions, hazards, terrestrial resources, and cultural resources impacts. This project would also result in altered streamflow downstream of the dam along Pacheco Creek. Also, Alternative 5 would have a significant impact on land use and aquatic resources. Alternative 5 would also implement mitigation measures to help reduce the severity of those impacts.

Following the completion of construction, Alternative 5 would support the diverting of SCVWD's CVP supply in San Luis Reservoir earlier in the year prior to the summer months when the reservoir is typically drawn down to the 300 TAF level. CVP water stored in Pacheco Reservoir could then be released through the summer while supplies from San Luis Reservoir would be inaccessible to SCVWD. In addition, given the expanded Pacheco Reservoir's proposed size it would be able to support the storage of local inflow from the watershed that would further support the reservoir's use in support of downstream ecosystem benefits on Pacheco Creek and as an emergency supply for SCVWD to respond to potential CVP and SWP water supply interruptions.

ES.7 CEQA Proposed Project

For the purpose of CEQA, SCVWD has identified Alternative 5 as the Proposed Project. SCVWD's identification of a Proposed Project does not foreclose any alternatives or mitigation measures. All of the alternatives have been analyzed at a comparable level in this Draft EIS/EIR. Reclamation has not identified a preferred alternative in this Draft EIS/EIR for NEPA purposes. Consistent with Council of Environmental Quality (CEQ) Regulations 40 Code of Federal Regulations (CFR) Part 46.425, the Final EIS/EIR will identify a NEPA preferred alternative for implementation (or alternatives if more than one exists).

SCVWD and Reclamation are seeking input on the alternatives and their environmental effects during the public review of this Draft EIS/EIR. SCVWD and Reclamation will consider feedback received during the public review on the Draft EIS/EIR and the environmental impacts associated with each alternative when developing the Final EIS/EIR and selecting an alternative for implementation. Any alternative could be selected by the lead agencies following the conclusion of environmental review. SCVWD has identified Alternative 5 as the Proposed Project for CEQA because of the wide range of public and non-public benefits. Benefits identified include ecosystem improvements at Pacheco Creek and San Joaquin River watershed, flood control, emergency water supplies, groundwater recharge and M&I water supply, and M&I water quality (SCVWD 2017).

ES.8 Environmentally Preferable/Superior Alternative

CEQ Regulations Section 1505.2(b) require identification of an environmentally preferable alternative, and CEQA Guidelines Section 15126.6(e)(2) requires an EIR to identify an environmentally superior alternative. However, the CEQ regulations and CEQA Guidelines do not require adoption of the environmentally preferable/superior alternative as the preferred alternative for implementation. The identification of the preferred alternative is independent of the identification of the environmentally preferable/superior alternative, although the identification of both will be based on the information presented in this EIS/EIR.

Section 1505.2(b) of the CEQ Regulations requires the NEPA lead agency to identify the environmentally preferable alternative in a Record of Decision (ROD). The CEQ Regulations define the environmentally preferable alternative as "…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."

This Draft EIS/EIR provides a substantive portion of the environmental information necessary for Reclamation to determine the environmentally preferable alternative and for SCVWD to determine the environmentally superior alternative. However, the public and other agencies reviewing a Draft EIS/EIR can assist the lead agency to develop and determine the environmentally preferable/superior alternative by providing their views in comments on the Draft EIS/EIR. In this Draft EIS/EIR, Reclamation and SCVWD have identified Alternative 5 as the environmentally preferable/environmentally superior alternative because of the ecosystem benefits to the Pacheco Creek and San Joaquin River watersheds it provides. Reclamation and SCVWD will consider feedback during the public review phase of the Draft EIS/EIR on the environmental benefits and impacts of each alternative when developing the Final EIS/EIR and ROD.

This page left blank intentionally.

Chapter 1 Introduction

The United States Department of the Interior, Bureau of Reclamation (Reclamation) and the Santa Clara Valley Water District (SCVWD) are proposing the San Luis Low Point Improvement Project (SLLPIP) to address water supply reliability and schedule certainty issues for SCVWD associated with low water levels in San Luis Reservoir. The SLLPIP alternatives analyzed in this joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) would help maintain a high-quality, reliable, and cost-effective water supply for SCVWD and would ensure SCVWD receives its annual Central Valley Project (CVP) contract allocations at the time and at the level of quality needed to meet its existing water supply commitments and avoid water supply interruptions.

Reclamation, the National Environmental Policy Act (NEPA) Lead Agency, and SCVWD, the California Environmental Quality Act (CEQA) Lead Agency, have prepared this joint EIS/EIR to comply with NEPA and CEQA. This EIS/EIR analyzes the direct, indirect, and cumulative effects of implementing the SLLPIP. Along with the environmental documentation process, Reclamation and SCVWD have completed a feasibility study to identify and analyze alternatives (Reclamation and SCVWD 2019).

1.1 Project Background

Reclamation owns and jointly operates San Luis Reservoir with the California Department of Water Resources to provide seasonal storage for the CVP and the State Water Project (SWP). San Luis Reservoir is capable of receiving water from both the Delta-Mendota Canal (DMC) and the California Aqueduct (see Figure 1-1). This enables the CVP and SWP to pump water into the reservoir during the wet season (November through April) and release water into the conveyance facilities during the dry season (April through October) when demands are higher. Deliveries from San Luis Reservoir also flow west through Pacheco Pumping Plant and Conduit to the San Felipe Division of the CVP, which includes SCVWD and the San Benito County Water District (SBCWD).

During the summer, high temperatures and declining water levels create conditions that foster algae growth. The thickness of the algae blooms vary, but typically average about 35 feet in depth. The water quality within the algal blooms is not suitable for municipal and industrial (M&I) water users relying on existing water treatment facilities in Santa Clara County.

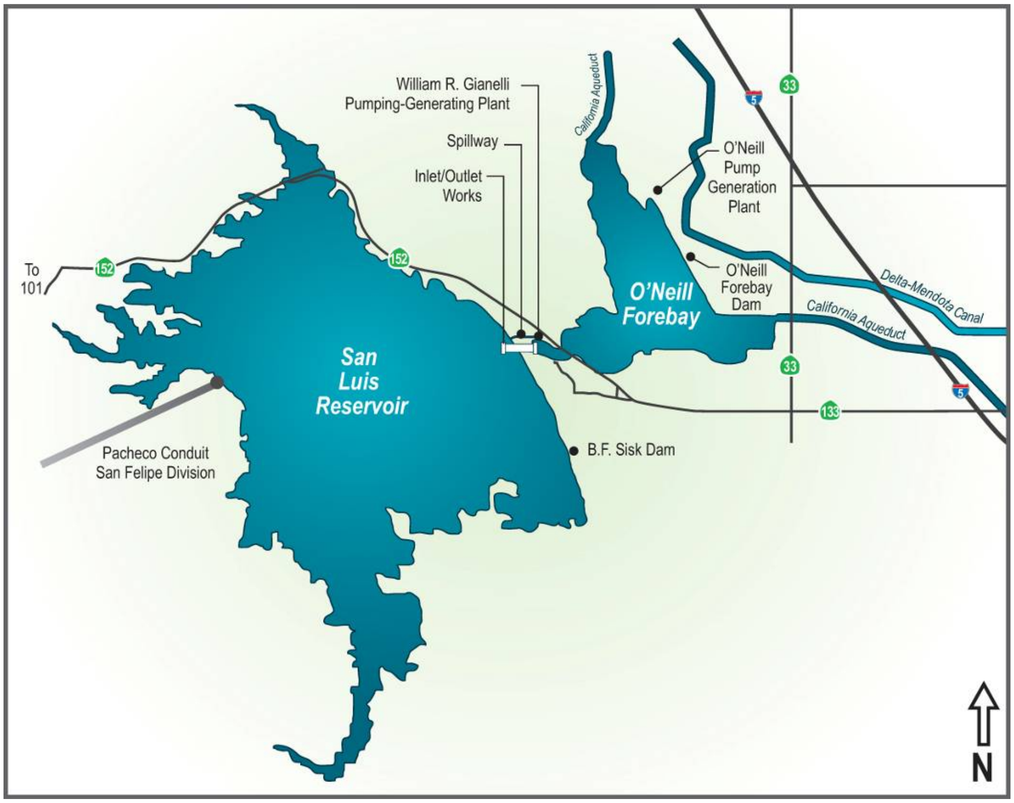


Figure 1-1. San Luis Reservoir and Associated Facilities

Figure 1-2 shows the intake and outlet facilities associated with the reservoir. As water levels decline to the point that the algae is in the vicinity of the Upper Intake, that intake is no longer used. The low point problem occurs when the water levels decline to the point that the algae blooms are near the Lower Intake. Typically, this point occurs when water levels reach an elevation of 369 feet above mean sea level (MSL) or at 300 thousand acre-feet (TAF) capacity in the reservoir, when the water is approximately 35 feet above the top of the Lower Intake (334 feet above MSL or 110 TAF). The reservoir's minimum operating level is about 30 feet above the top of the Gianelli Intake; therefore, algae does not typically enter the Delta-Mendota Canal or California Aqueduct.

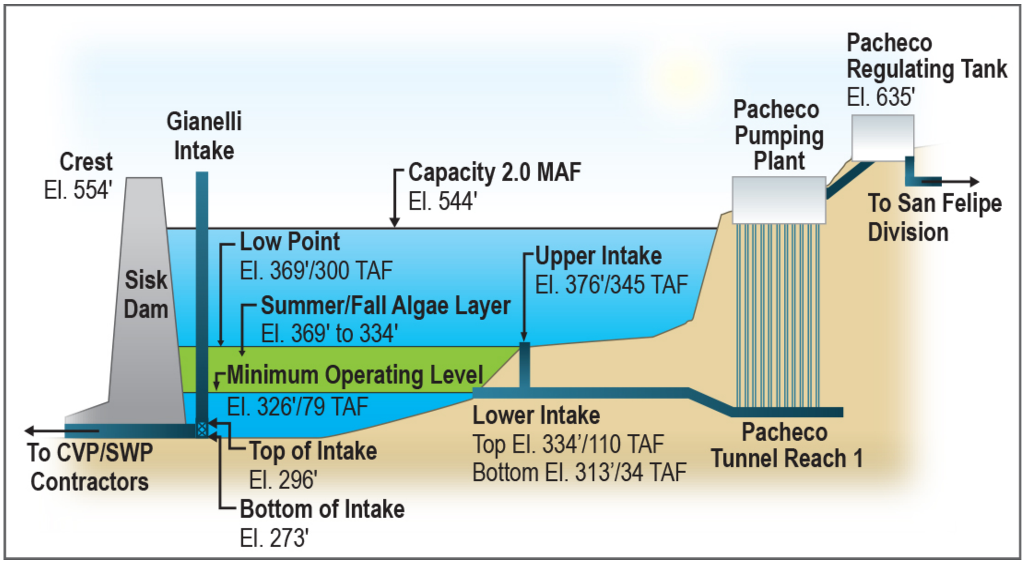


Figure 1-2. Reservoir Intake and Outlet Facilities

If water levels fall below 369 feet above MSL (300 TAF), SCVWD cannot receive water from San Luis Reservoir for M&I purposes because of water quality issues. San Luis Reservoir is the only delivery route for SCVWD's CVP supplies; therefore, SCVWD cannot access CVP supplies for M&I purposes during low-point events. The CVP operators allocate water based on the minimum operating level of 326 feet above MSL (79 TAF), and predict water levels below 369 feet above MSL (300 TAF) in most years. Even the prediction of a low point problem can cause water supply concerns for SCVWD because it must secure alternative water supplies in case disruptions occur, from sources including local groundwater supplies, District supplies stored in the Semitropic Water Storage District groundwater bank, and surface water transfers from willing sellers. In recent years, Reclamation has been implementing exchanges to deliver a portion of CVP supplies when there is a low point problem in San Luis Reservoir.

1.2 Purpose and Need/Project Objectives

The Lead Agencies are proposing the SLLPIP for the purpose of optimizing the water supply benefit of San Luis Reservoir while reducing additional risks to water users by:

- Avoiding supply interruptions when water is needed by increasing the certainty of meeting the requested delivery schedule throughout the year to South-of-Delta contractors, including SCVWD, dependent on San Luis Reservoir.
- Increasing the reliability and quantity of yearly allocations to South-of-Delta contractors, including SCVWD, dependent on San Luis Reservoir.

In addition to these primary objectives, the SLLPIP may also support a secondary objective to provide opportunities for ecosystem enhancement. The primary objectives distinguish between certainty of meeting delivery schedules and the reliability of supplies. More specifically, the first objective is related to predictably meeting contractors' delivery schedules throughout the year as opposed to the second objective, which strives to increase yearly allocations to more closely match the contractual terms.

The objectives for predictably meeting delivery schedules and increased annual allocations could lead to conflicts regarding San Luis Reservoir operations. These issues are relevant to South-of-Delta contractors dependent on San Luis Reservoir, including SCVWD. San Luis Reservoir serves as a storage facility to increase the annual reliability of deliveries to CVP and SWP contractors in the Central Valley. CVP contractors rely on both direct diversions from the Jones Pumping Plant and stored water from San Luis Reservoir to meet summer demands. Full exercise of the reservoir helps to maximize CVP supplies, but the low point constraint in the release of water from San Luis Reservoir could limit M&I supplies. The Jones Pumping Plant does not have enough pumping capacity to fully meet demands alone and CVP operators store additional water in San Luis Reservoir during the winter, when demands are low, to help meet summertime needs.

SCVWD is more impacted by conditions in San Luis Reservoir due to its position between the Sacramento-San Joaquin River Delta (Delta) and the San Felipe Unit. When SCVWD is unable to treat its CVP supply due to algae, then it must rely on other sources of water for M&I purposes which may not be reliable each year. In the future, increased demand and the potential for further regulatory constraints on availability of supplies may cause CVP and SWP contractors to maximize use of their water stored in San Luis Reservoir, increasing the frequency of the low point problem and the risk of supply interruptions to SCVWD.

SCVWD water supply interruptions have historically been avoided because SWP contractors have left water in storage, thus maintaining water levels in San Luis Reservoir above 300 TAF. However, in 2008 and again in 2016, San Luis Reservoir was drawn down below 300 TAF which created treatment performance issues at SCVWD water treatment plants (WTPs) and resulted in an interruption of deliveries from San Luis Reservoir (California Data Exchange Center [CDEC] 2018). Future CVP water supply reliability for SCVWD requires the full use of the CVP water from San Luis Reservoir; therefore, SCVWD desires a solution that resolves the low point problem in San Luis Reservoir that can impair the Districts ability to utilize contractual supplies.

1.3 Responsibilities of Lead and Cooperating Agencies

Reclamation and SCVWD are the NEPA/CEQA Lead Agencies in preparing this EIS/EIR. As the Lead Agencies, Reclamation and SCVWD will be responsible for finalizing the alternatives and selecting a reasonable range of alternatives for analysis in this EIS/EIR, completing the Draft and Final EIS/EIR documents, completing the Record of Decision/Notice of Determination (ROD/NOD) selecting an alternative for implementation, implementing the selected alternative, and ensuring all environmental commitments have been completed.

1.4 Public Involvement

1.4.1 Public Scoping

Public scoping is required by NEPA and CEQA for environmental documents that would have significant environmental impacts (EISs or EIRs). The purpose of public scoping is to obtain feedback from agencies, the public, and other interested parties on significant issues associated with a project. This information helps guide an agency's environmental review of a project. Reclamation and SCVWD considered scoping comments received as a part of both the alternatives formulation process and to support the evaluation of potential environmental effects (SCVWD 2002, Reclamation 2008).

In August 2002, the SCVWD conducted two public scoping meetings for the SLLPIP. The SCVWD prepared the "Low Point Improvement Project Scoping Summary Report" (dated October 2002), which summarized the comments received. The key areas of concern raised in the 2002 meetings and in comment letters submitted in response to SCVWD's Notice of Preparation (NOP) include:

- Potential impacts of the build alternatives on residential property, agriculture, and grazing lands in the project area if the build alternatives are implemented.
- Loss of wildlife habitat for sensitive and/or special-status species from new inundation.
- Safety issues related to flooding and earthquake hazards if new dams were constructed.
- Impacts to recreational and visual resources.

In August 2008, Reclamation issued a NEPA Notice of Intent (NOI) and SCVWD issued a CEQA NOP for the SLLPIP EIS/EIR. In September 2008, Reclamation and SCVWD held three public scoping meetings in San Jose, Sacramento, and Los Banos to provide information on the development of the SLLPIP EIS/EIR and to obtain feedback on significant issues. The results of these scoping meetings, including comments and concerns raised during the meetings and written comments received during the public comment period are presented in the *San Luis Low Point Improvement Project Environmental Scoping Report*, *December 2008*. Major issues raised the public meetings and in comment letters submitted in response to the NOI/NOP:

- Water supply effects of the alternatives;
- Clarifying the Federal interest in the project;
- The range of proposed alternatives; and
- Effects of the alternatives on power generation, water quality, fishing, and recreation in San Luis Reservoir.

1.4.2 Draft EIS/EIR Review

The Draft EIS/EIR will be released to the public for 60 days of review and comment, as required by NEPA and CEQA. Public meetings will be held for the Draft EIS/EIR and comments on the Draft EIS/EIR will be accepted at the meetings as well as throughout the public comment period.

1.4.3 Final EIS/EIR Development

Consistent with 40 Code of Federal Regulations (CFR) Part 46.425, the Final EIS/EIR will identify a preferred alternative (also known as the proposed project for CEQA) for implementation (or alternatives, if more than one exists). The preferred alternative will be identified in the Final EIS/EIR based on the information presented in this Draft EIS/EIR, in light of any potential revisions made in response to comments received on this Draft EIS/EIR. After the Final EIS/EIR is published, Reclamation and SCVWD will prepare a ROD/NOD to implement a selected alternative. Agencies with regulatory authority issuing permits or other types of approvals for the SLLPIP may adopt this EIS/EIR, consistent with their own policies and regulations, or use information included as the basis for their own environmental compliance.

Chapter 2
Project Description

This section summarizes the alternatives development process for the SLLPIP and describes the alternatives analyzed in this EIS/EIR.

2.1 Alternatives Formulation Process

The Lead Agencies used a comprehensive process to develop initial alternatives that included review of existing material, public input, and comparison and evaluation of initial alternatives using the Federal planning criteria and the purpose and need/project objectives. To meet the study objectives, the planning process follows the structured six-step planning approach outlined in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*[1] (PR&Gs) (U.S. Water Resources Council 1983). The first step in the development of initial alternatives was the identification of potential management measures, which could include programs, projects, or policies, that would help achieve the project objectives. A total of 26 initial alternatives were developed from the management measures, which were screened down to 17 alternatives in the February 2008 *SLLPIP Initial Alternatives Information Report* (IAIR). These 17 alternatives were re-evaluated in the *SLLPIP Plan Formulation Report* (PFR), which screened out 14 of the 17 alternatives. Three alternatives, the Lower San Felipe Intake Alternative, the Combination Alternative and the Pacheco Reservoir Alternative, remained for further analysis in the Feasibility Report and EIS/EIR.

During the feasibility phase of the alternatives evaluation, the Lead Agencies reconsidered the alternatives recommended for consideration in the EIS/EIR. The PFR considered but eliminated the Treatment Alternatives; however, new treatment methods suggested during the feasibility phase resulted in this alternative being recommended for consideration in the EIS/EIR. The PFR also recommended consideration of the Combination Alternative; however, detailed review of the alternative by SCVWD during development of the Feasibility Report and this EIS/EIR identified issues with the feasibility of the alternative and it was eliminated from detailed consideration. Due to limitations associated with the reoperation of Anderson Reservoir and conflicts to operations of existing SCVWD wells, the Combination Alternative would be unable to adequately address low point generated water supply interruptions (SCVWD 2017a). The IAIR considered but eliminated the Expansion of San Luis Reservoir Alternative given its higher cost and similar benefits to the other storage alternatives that were identified in the IAIR.

[1] The SLLPIP Feasibility Study was initiated by Reclamation in 2004 and as such, has been developed consistent with the guidelines presented in the P&Gs. In 2015, the Department of the Interior released the *Department of Interior Agency Specific Procedures for implementing the Council on Environmental Quality's Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G)* (United States Department of the Interior 2015). These new PR&Gs are being used to provide input on the SLLPIP Feasibility Study process but are not required.

However, results from the 2013 appraisal study indicated that inclusion of the Expansion of San Luis Reservoir Alternative in the SLLPIP Feasibility Report and EIS/EIR was warranted (Reclamation 2013). The Pacheco Reservoir Alternative was previously eliminated based on the acceptability and effectiveness criteria, because it had more potential for environmental effects and the greatest costs. However, in August 2017, SCVWD submitted an application for funding for the expansion of Pacheco Reservoir under the Water Storage Investment Program (WSIP). Based on the public and non-public benefits identified from the evaluation conducted for the WSIP application and the stakeholder support for the project, in response to SCVWD's request Reclamation has reevaluated the Pacheco Reservoir Expansion Alternative in the SLLPIP Feasibility Report and EIS/EIR. The feasibility report includes further evaluation of the completeness, effectiveness, acceptability, and efficiency of all the alternatives.

As was noted above, 26 initial alternatives were screened down to 17 in the IAIR of which 14 were screened out in the PFR. Table 2-1 displays the alternatives screened in the IAIR and PFR and the reason that they were screened.

Table 2-1. Alternative Screening Results

Category	IAIR Screening		PFR Screening		Feasibility Report
	Alternative	Screening Result	Alternative	Screening Result	
Institutional	Institutional Alternative	Retained	Institutional Alternative	Screened out as a standalone plan under the completeness criterion	
Source Water Quality Control	Algae Harvesting Alternative	Eliminated because it had similar benefits to algaecide and was economically infeasible when compared to algaecide			
	Algaecide Alternative	Retained	Algaecide Alternative	Screened out under the effectiveness and acceptability criteria given concerns over potential capacity to treat SLR algae and the difficulty permitting the application of algaecide on a drinking water reservoir at this scale	
	Managed Stratification Alternative	Eliminated because it had similar benefits to algaecide and was economically infeasible when compared to algaecide			

Table 2-1. Alternative Screening Results

Category	IAIR Screening		PFR Screening		Feasibility Report
	Alternative	Screening Result	Alternative	Screening Result	
Treatment	Treatment at San Felipe Intake Alternative	Retained	Treatment at San Felipe Intake Alternative	Screened out under the acceptability criterion given SCVWD's determination that DAF treatment is not an acceptable remedy to the low point issue because evaluation during previous WTP upgrades indicated DAF is less effective and more difficult to operate than current treatment methods	
	Treatment at WTPs Alternative	Retained	Treatment at WTPs Alternative		Treatment Alternative – carried forward following further analysis of developing Raw Water Ozonation at the Santa Teresa WTP.
	Treatment at Pumping Plant Alternative	Retained	Treatment at Pumping Plant Alternative		
Conveyance	Lower San Felipe Intake Alternative	Retained	Lower San Felipe Intake Alternative	Retained	Lower San Felipe Intake
	Holladay Aqueduct Alternative	Eliminated because it had similar benefits to the Lower San Felipe Intake and Southerly Bypass Alternatives and was economically infeasible when compared to those options			
	Northerly Bypass Corridor Alternative	Eliminated because it had similar benefits to the Lower San Felipe Intake and Southerly Bypass Alternatives and was economically infeasible when compared to those options			
	Southerly Bypass Corridor Alternative	Retained	Southerly Bypass Corridor Alternative	Screened out under the efficiency criterion given the alternative's economic infeasibility when compared to the Lower San Felipe Intake Alternative	
Storage	Anderson Reservoir Expansion Alternative	Retained	Anderson Reservoir Expansion Alternative	Screened out under the efficiency criterion given the alternative's economic infeasibility when compared to the Pacheco B Alternative	
	Chesbro Reservoir Expansion Alternative	Retained	Chesbro Reservoir Expansion Alternative	Screened out because additional engineering, geotechnical, geological and hydraulic analysis determined that an alternate site between the Pacheco A and Pacheco B locations was the most efficient storage site available	
	Lower Pacheco Reservoir Alternative	Retained	Lower Pacheco Reservoir Alternative		

Table 2-1. Alternative Screening Results

Category	IAIR Screening		PFR Screening		Feasibility Report
	Alternative	Screening Result	Alternative	Screening Result	
	Pacheco A Reservoir Alternative	Retained	Pacheco A Reservoir Alternative	Retained as a single alternative with two storage capacity configurations and a final site to be determined during development of the Feasibility Report	Pacheco Reservoir Expansion Alternative
	Pacheco B Reservoir Alternative	Retained	Pacheco B Reservoir Alternative		
	San Benito Canyon Reservoir Alternative	Retained	San Benito Canyon Reservoir Alternative	Screened out because small size made reservoir less efficient than other options	
	San Luis Reservoir Expansion Alternative	Eliminated because it had similar benefits to the other storage alternatives and was economically infeasible when compared to those options			San Luis Reservoir Expansion Alternative - multiple configurations of a reservoir expansion alternative considered by analysis of the potential combination with the connected CAS action. The CVP only dedication of the expanded 120 TAF reservoir was selected to move forward in the feasibility process for further evaluation.
	Del Puerto Canyon Reservoir Alternative	Retained	Del Puerto Canyon Reservoir Alternative	Screened out under the efficiency criterion given the alternative's economic infeasibility when compared to the Pacheco Alternative	
	Ingram Canyon Reservoir Alternative	Retained	Ingram Canyon Reservoir Alternative		
	Quinto Creek Reservoir Alternative	Retained	Quinto Creek Reservoir Alternative		
Alternate Water Supplies	Monterey Bay Desalination Alternative	Eliminated because it was economically infeasible when compared to any of the other alternatives under consideration in the IAIR			
	San Francisco Bay Desalination Alternative	Eliminated because it was economically infeasible when compared to any of the other alternatives under consideration in the IAIR			
	Combined Desalination Alternative	Eliminated because it was economically infeasible when compared to any of the other alternatives under consideration in the IAIR			

Table 2-1. Alternative Screening Results

Category	IAIR Screening		PFR Screening		Feasibility Report
	Alternative	Screening Result	Alternative	Screening Result	
	Enlarged SBA/Los Vaqueros Expansion Alternative	Expansion of the SBA was screened out but enlarging Los Vaqueros Reservoir was retained	Los Vaqueros Expansion Alternative	Screened out under the completeness criterion given the ongoing development of the project in the Los Vaqueros Expansion Project Feasibility Study	
	Los Vaqueros Expansion Alternative	Retained			
Combination	Combination Alternative	Retained	Combination Alternative	Retained	Eliminated related to the acceptability criterion given the identification of issues with the feasibility of the Anderson Reservoir reoperation and groundwater components.

Key: CAS = Safety of Dams Corrective Action Study; DAF = Dissolved Air Floatation; IAIR = Initial Alternatives Information Report; PFR = Plan Formulation Report; SBA = South Bay Aqueduct; SCVWD = Santa Clara Valley Water District; SLR = San Luis Reservoir; WTP = water treatment plant

More detail on this process is included in Appendix A1, which details the alternatives screening criteria, initial alternatives identification and screening, plan formulation, scoping of alternative measures and pre-screening process, and additional alternatives considered and eliminated from further evaluation.

2.2 Project Alternatives

The SLLPIP alternatives are described below, including the No Action/No Project Alternative and four action alternatives. Appendix A2 includes more detail on each alternative.

2.2.1 Alternative 1 – No Action/No Project Alternative

Both NEPA and CEQA require the evaluation of a No Action/No Project Alternative, which presents the reasonably foreseeable future conditions in the absence of the proposed project. The purpose of the No Action/No Project Alternative is to allow decision-makers to compare the impacts of approving the project to the impacts of not approving the project. Under NEPA, the No Action Alternative also serves as the baseline to which action alternatives are compared to determine potential impacts. This differs from CEQA, where existing conditions serve as the baseline to determine potential impacts of the alternatives. The No Action/No Project Alternative may differ from the Affected Environment/Existing Conditions if there are actions that could occur in the project area that 1) currently do not exist and 2) do not rely on approval or implementation of the proposed project. However, because substantive changes in the area of analysis are not expected, the No Action Alternative would be the same as existing conditions/No Project Alternative. The No Action/No Project Alternative reflects existing and expected future conditions in the project area if no action is taken.

The No Action/No Project Alternative would leave the current operations at San Luis Reservoir unchanged. SCVWD would continue annual operations planning to anticipate curtailment of CVP supply and would manage its uses and sources of imported and local water supplies.

SCVWD relies upon a stable supply of CVP surface water as a part of its larger water supply portfolio that includes imported surface water supplies from the CVP and SWP, local groundwater, and local surface water supplies. Low point supply interruptions reduce the reliability of the CVP supply, which could jeopardize the short- and long-term reliability of other supplies intended for other uses. For instance, groundwater normally reserved for drought or emergency use may be relied upon during a low point event. A low point supply interruption—and even the threat of an interruption—can result in the immediate reduction of the amount of treated water available for delivery by the contractors, because it requires the re-operation of SCVWD's surface and groundwater systems and requires the use of alternative water supplies that would otherwise be dedicated to other uses. The effects resulting from delivery reductions and/or curtailments due to a low point would continue to pose a significant threat to the contractors' short- and long-term water supply reliability.

Under this alternative, water supply modeling results have predicted that there would be 17 years (out of the 82 modeled years)[2] where the San Luis Reservoir would be drawn below 300 TAF of storage, i.e. low point years.

2.2.2 Alternative 2 – Lower San Felipe Intake Alternative

Alternative 2, the Lower San Felipe Intake Alternative, includes construction of a new, lower San Felipe Intake to allow reservoir drawdown to its minimum operating level without algae reaching the San Felipe Intake. Moving the San Felipe Intake to an elevation equal to that of the Gianelli Intake would allow operation of San Luis Reservoir below the 300 TAF level without creating the potential for a water supply interruption to SCVWD.

As part of this alternative, a new intake (see Figure 2-1 for a schematic) would be constructed and connected to the existing San Felipe Division Intake via approximately 20,000 feet of new pipeline or tunnel. The top of the San Felipe Intake is currently at elevation 334 feet, and algae-laden water can reach the intake when reservoir levels reach approximately 369 feet (approximately 300 TAF in storage). Because the Gianelli Intake Facility is at elevation 296 feet (approximately 30 feet lower than the minimum operating pool), algae-laden water does not typically reach the Gianelli Intake. The new intake in this alternative would be at elevation 296 feet, the same elevation as the Gianelli Intake. The lower intake facility would allow the San Felipe Division to receive water from the lower reservoir levels that do not contain high concentrations of algae. A hypolimnetic aeration facility would also be constructed to increase dissolved oxygen levels in lower reservoir levels to prevent taste and odor issues.

[2] Appendix B presents in detail the modeling assumptions and methods used to estimate water supply effects from the No Action/No Project Alternative and the action alternatives.

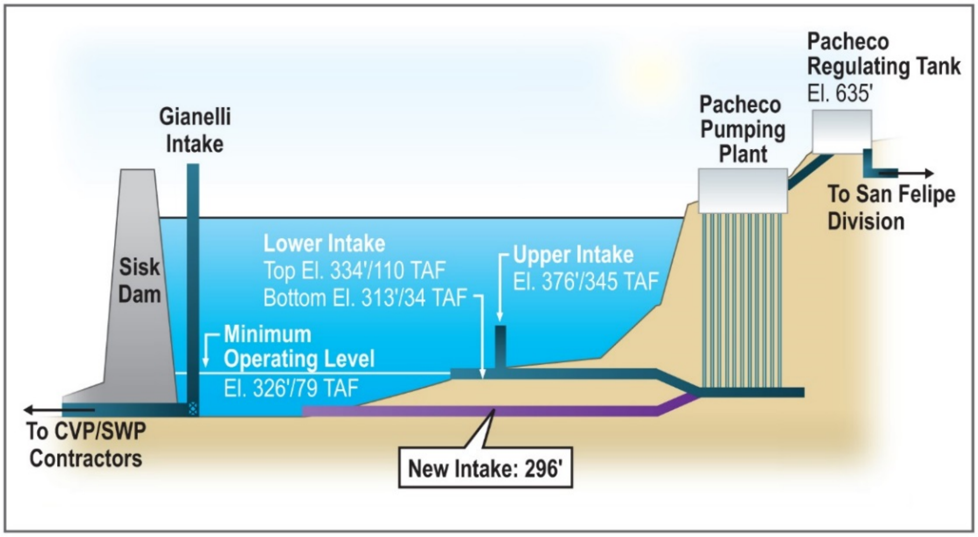


Figure 2-1. Lower San Felipe Intake Alternative

2.2.2.1 Project Facilities

Lowering the San Felipe Intake would also require an extension of the intake for the Pacheco Pumping Plant because the reservoir is higher on the west side than at the site of the Gianelli Intake. The conveyance structure from the new intake to the existing intake would be either a submerged pipeline along the bottom of the reservoir or a tunnel beneath the bottom of the reservoir. Two options, a tunnel option and a pipeline option, are being considered for the intake extension.

- **Tunnel Option –** This option would consist of a tunnel constructed beneath the reservoir floor. This option also includes a new vertical shaft on Gate Shaft Island to tie into the existing intake. The tunnel would be about 20,000 feet long and 15 feet in diameter, and the liner would have an inner diameter of 13 feet.

- **Pipeline Option –** Under this option, a new 13-foot diameter reinforced concrete cylinder pipe would be laid along the bottom of San Luis Reservoir. The pipeline would be about 20,000 feet. The pipe would have a constant slope upward from the new intake and tie into the invert of the existing lower intake at elevation 313 feet. An existing intake channel is graded along the bottom of the reservoir. To reduce the amount of dredging required, the pipeline’s alignment would match the alignment of the existing intake channel.

2.2.2.2 Construction Methods and Equipment

The new intake structure would be constructed on shore in 10 foot segments. The segments would be transported to the permanent intake location on a barge, and then lowered into the reservoir using a crane. Intake segments would be stacked on top of each other to achieve the full intake height, and welded by divers to join and seal the segments. The tunnel option would be constructed using an Earth Pressure Balance Tunnel Boring Machine (TBM). Dewatering and blasting during construction would not be necessary and hazardous materials are not expected to be encountered. For the pipeline option, dredges would be used to modify the existing intake channel which would serve as a trench for the underwater pipeline. Pipe segments of 50 foot lengths would be transported by tug boats from the staging area to a barge, then lowered into the reservoir with a crane. Connection of pipe segments would be made by divers. Construction of the pipeline would not cause any changes to the CVP or SWP operations in the reservoir.

Construction of a new permanent access shaft on Gate Shaft Island would only be necessary for the tunnel option. Construction of temporary cofferdam structures is anticipated for both the tunnel and pipeline options in order to complete intake connections within the reservoir.

Equipment in the staging areas would include trailers, equipment to be used, and stockpiled materials. Construction staging and stockpile areas would include: (1) Dinosaur Point Use Area for both the tunnel and pipeline options. Dinosaur Point Use Area consists of 10 acres; (2) Basalt Use Area for the new intake structure construction. Basalt Use Area consists of 10 acres; (3) Area south of Gianelli Pumping Plant off of Gonzaga Road, for the transporting materials to the new intake location. The area proposed for use consists of 5 acres. Dinosaur Point and Basalt use areas would be needed for stockpiling materials and recreational use of these areas would be closed for the full construction duration.

The main staging area access route would be State Route (SR) 152 to Dinosaur Point Road. Most of the traffic to the site would come from the east. Improved road access from SR 152 to the Dinosaur Point and Basalt staging areas may be needed to accommodate the high volume of trucks and other heavy equipment anticipated during construction. Road reinforcement would be necessary at the intersections of SR 152 and the access roads to Dinosaur Point and Basalt use areas. Construction related traffic would likely begin 1 to 2 months after Notice to Proceed. Approximately 6 to 12 large deliveries per day could be expected, the transport and disposal of approximately 1,200 cubic yards of material to local landfills, along with the regular commuting of construction personnel.

The closest concrete batch plants are located in Los Banos, approximately 30 to 40 minutes driving time from reservoir access locations. Materials from local batch plants would be used for road improvement work and construction of the new intake structure. It is assumed that an on-site concrete batch plant would not be needed.

Since San Luis Reservoir is a drinking water source and specialized construction methods would be utilized for installation of the new intake and conduit, the following special safety measures would be implemented during construction within the reservoir: (1) Use of food grade oil for equipment lubricants; (2) Installation of turbidity curtains surrounding existing intakes, if operational; (3) Certified professional divers (for the pipeline option).

Equipment used in the reservoir for the tunnel option would include:

- 1 Barge
- 1-2 Boats
- 2 Water trucks
- 2 Graders
- 4 Cranes
- 1 Drill rig
- 2 Large excavators
- 2-3 Chiller plants
- 7 Portable Diesel Generators
- 2 Bulldozers
- 2 Loaders
- 1 Excavator
- 2 Concrete Pumpers
- 2 Dump trucks
- 1 Scraper
- 3 Flatbed Trucks
- Tunnel boring machine

Between 163,000 and 184,000 cubic yards of excavated material would be generated by the tunneling option. This quantity accounts for the expansion of excavated materials, and an increase due to soil conditioners used by a TBM. Excavated materials would be disposed of at Dinosaur Point and used to increase the boat ramp area.

For the pipeline option, anticipated equipment would include:

- 3-4 Boats
- Dump truck
- 2 Loaders
- 1 Concrete Pumper
- 3 Cranes
- Barge
- 1 Scraper
- Dredging barge or boat
- Loader
- 1 Excavator
- 2 Bulldozers
- 4 Portable Diesel Generators
- 2 Water Trucks
- 3 Flatbed Trucks
- 2 Graders

It is assumed for the purpose of this EIS/EIR, that construction would start in 2020. Construction of the tunnel option is expected to last approximately 47 months. The construction duration is based on 30-50 total anticipated workers on site, 12 of which would be working within the tunnel. Work would be performed 24 hours per day, 7 days a week. Construction of the pipeline option would last 33 months, and would focus on installing as much of the pipeline as possible during low water periods. Twenty workers are estimated to be on site for construction. Work would be performed for 10 hours per day from 7:00 a.m. to 5:00 p.m., 5 days a week.

2.2.2.3 Operations

The Lower San Felipe Intake Alternative would allow the San Felipe Division to draw water from San Luis Reservoir at the same elevation as the Gianelli Intake, which serves other CVP South-of-Delta contractors. This new lower intake would allow reservoir drawdown to its minimum operating level without algae reaching the San Felipe Intake. By allowing the delivery of imported CVP supply during low point periods, SCVWD would need to rely less heavily on locally stored surface and groundwater supplies.

2.2.3 Alternative 3 – Treatment Alternative

Alternative 3, the Treatment Alternative, would develop new technology retrofits at SCVWD’s Santa Teresa WTP. The WTP is supplied with water from San Luis Reservoir, which during low point conditions can contain high concentrations of algae.

2.2.3.1 Project Facilities

Alternative 3 would install new treatment technology at the SCVWD WTP to address some of the negative impacts associated with increased algae during low point events. The proposed improvements evaluated under this alternative would add a raw water ozonation process to the Santa Teresa WTP.

In a raw water ozonation process, ozone is added to the raw water entering the treatment plant before the water is treated by any other processes. Ozone oxidizes taste and odor causing compounds and other dissolved organic material released by algae. Ozone also improves clarification and filtration processes when used as a pre-oxidant. Implementation of a raw water ozonation process at the Santa Teresa WTP would require installation of a new ozone contactor, new ozone generation equipment housed in a new building, and new liquid oxygen storage facilities.

Figure 2-2 shows the conceptual site plan for the Santa Teresa WTP treatment technology upgrades.

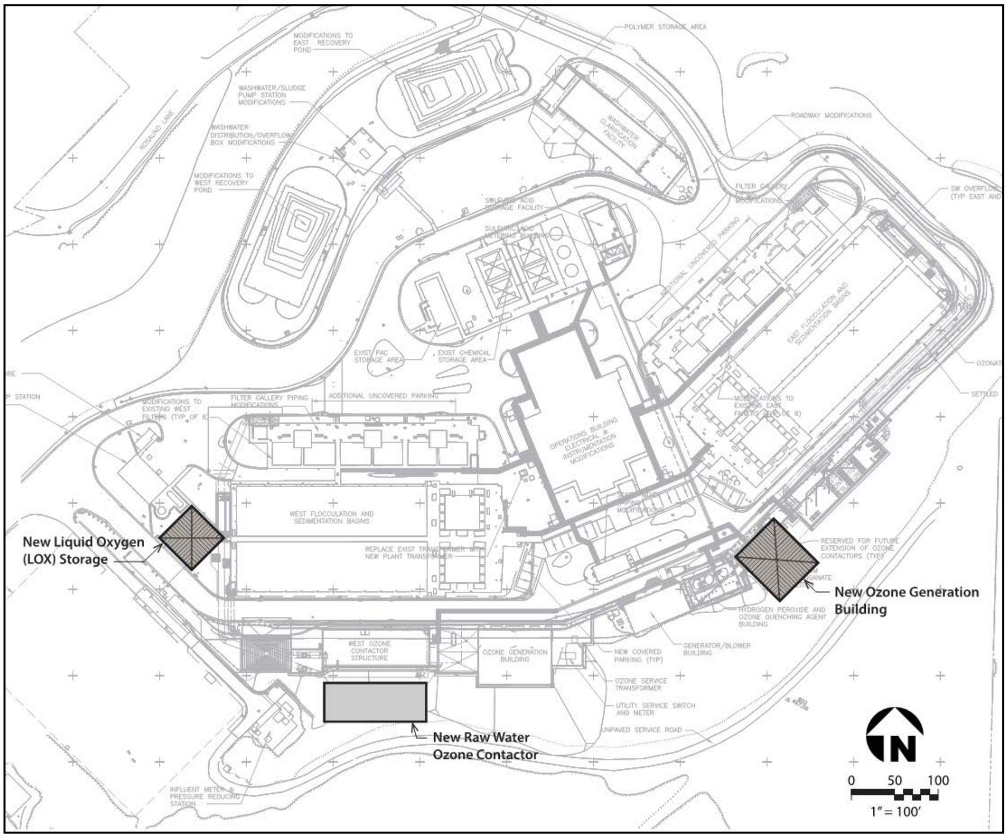


Figure 2-2. Santa Teresa WTP Conceptual Site Plan – Raw Water Ozonation

2.2.3.2 Construction Methods

Construction of the Treatment Alternative retrofits at the SCVWD WTP would be completed in compliance with existing SCVWD design standards. Replacement of the ozone generation equipment at the Santa Teresa WTP would require a plant shutdown. According to SCVWD staff, the plant can be shut down for up to 4 months. So, this work would need to be completed in a 4-month period. A plant shutdown would also be required for relocation of the existing duct bank. It is estimated that this work can be completed in a 1-month period. All other structures, equipment, and piping can be installed with the plant in operation. However, tie-in of all new piping, electrical feeders, and instrumentation and control system feeders would need to take place during the 4-month shutdown period described previously. Installation of the new equipment adjacent to existing facilities in operation would need to be closely coordinated with plant operations for safety purposes.

Equipment in the staging areas would include trailers and equipment to be used. Construction staging areas would be set up during the period of construction. It is anticipated that construction staging areas would be established at the WTP. The staging areas would be located on site and would not encroach on neighboring parcels. Construction equipment would include cranes, excavators, bulldozers, loaders, backhoes, ready mix concrete trucks, concrete pumpers, dump trucks, water trucks, flatbed trucks, and gravel, air compressors, concrete saw cutters, demolition equipment, and portable diesel generators. The Treatment Alternative would also require the transport and disposal of approximately 7,000 cubic yards of material at local landfills.

Construction work would be performed for 10 hours per day from 7:00 a.m. to 5:00 p.m., 5 days a week. The construction, testing and startup of the Treatment Alternative is anticipated to be approximately 3 years. It is assumed for the purpose of this EIS/EIR, that construction would start in 2020.

2.2.3.3 Operation of the Treatment Alternative

The Treatment Alternative would leave current SCVWD operations largely unchanged with the exception of periods with low point conditions in San Luis Reservoir (typically August and September) when SCVWD operators would be able to continue to take delivery of water supply from the reservoir while maintaining WTP performance. By allowing the delivery of imported CVP supply during these low point periods, SCVWD would be able to rely less heavily on locally stored surface and groundwater supplies.

2.2.4 Alternative 4 – San Luis Reservoir Expansion Alternative

Alternative 4, the San Luis Reservoir Expansion Alternative, would be completed by placing additional fill material on the dam embankment to raise the dam crest to increase storage capacity. The alternative would build upon the dam embankment expansion and foundation modifications to address the seismic concerns. The seismic modifications to B.F. Sisk Dam under Reclamation’s Safety of Dams (SOD) Act, as amended, that Alternative 4 would build on are included in this alternative as connected actions as defined under NEPA. The San Luis Reservoir Expansion Alternative would allocate the increased capacity to the CVP only. This expanded capacity would be operated in the same way as the current CVP portion of San Luis Reservoir, with the reservoir used for seasonal storage.

Alternative 4 would build on the physical SOD modifications currently under final design and raise the dam crest an additional 10 feet to a new crest elevation of 576 feet. This additional 10 feet in embankment height would support a new water surface elevation of 554 feet and an additional 120 TAF in storage capacity. In addition to the new embankment height added by the reservoir enlargement, the existing outlet works intake towers, access bridge, and spillway intake would need to be raised by 10 feet. Figure 2-3 shows the project footprint of Alternative 4, including the construction site boundary and change in reservoir water levels.

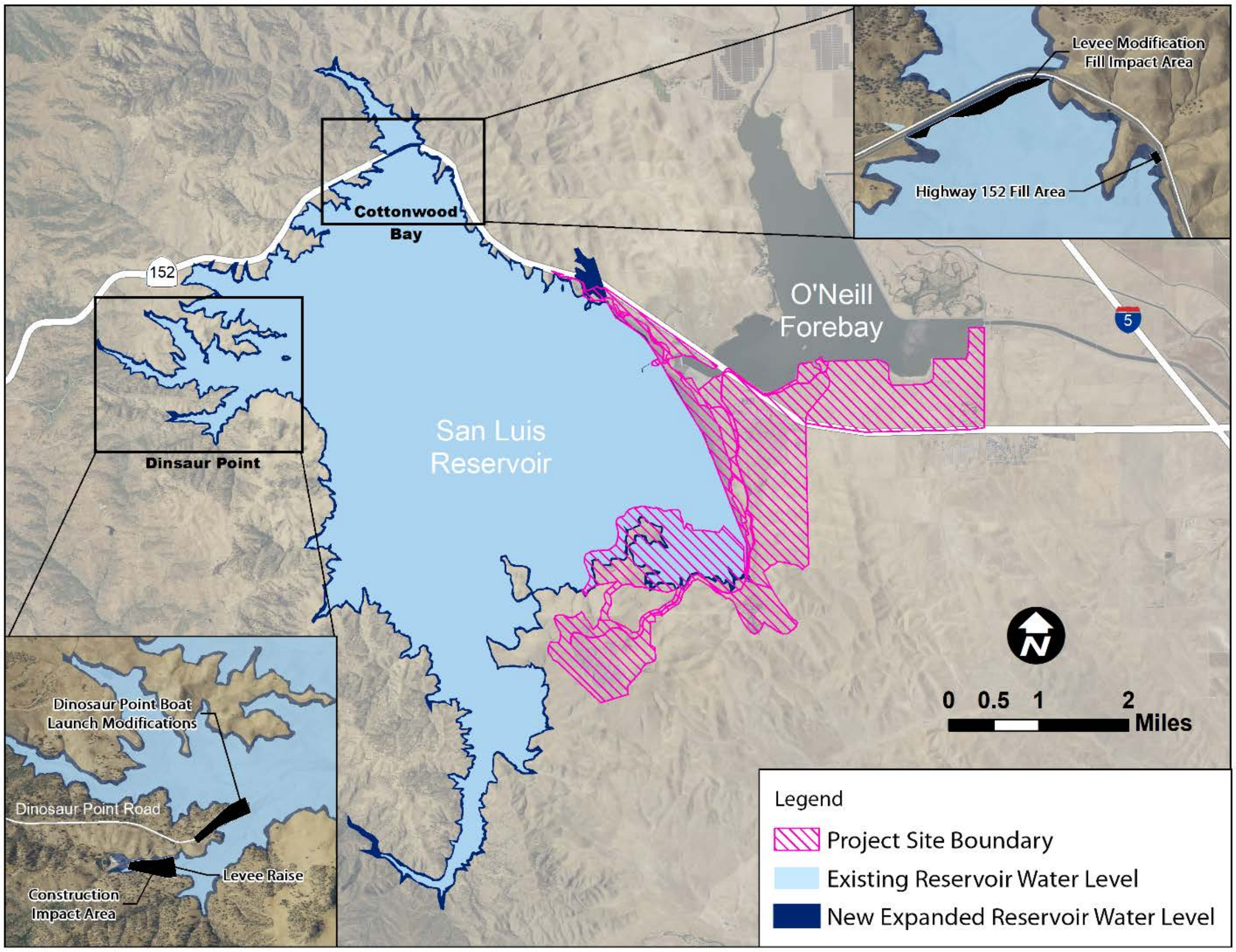


Figure 2-3. San Luis Reservoir Expansion Footprint

2.2.4.1 Project Facilities

As part of this alternative, the dam crest would be raised by adding additional embankment material (see Figure 2-4 for a schematic), and downstream stability berms and crack filters would be installed. The existing saddle dike, known as the East Dike, located approximately 1,300 feet north of the main embankment would be modified by adding a downstream filter. With increased reservoir surface elevations, modifications would be made at multiple locations along Highway 152 to prevent inundation of the roadway when the enlarged reservoir is filled to capacity, and modifications to the Dinosaur Point Boat Launch and the Goosehead Point Boat Launch would be made to increase the ramps operating elevation by 10 feet. The existing berm developed during construction of the Pacheco Pumping Plant would be reconstructed with a higher crest elevation to protect the plant at high storage levels (see Figure 2-5).

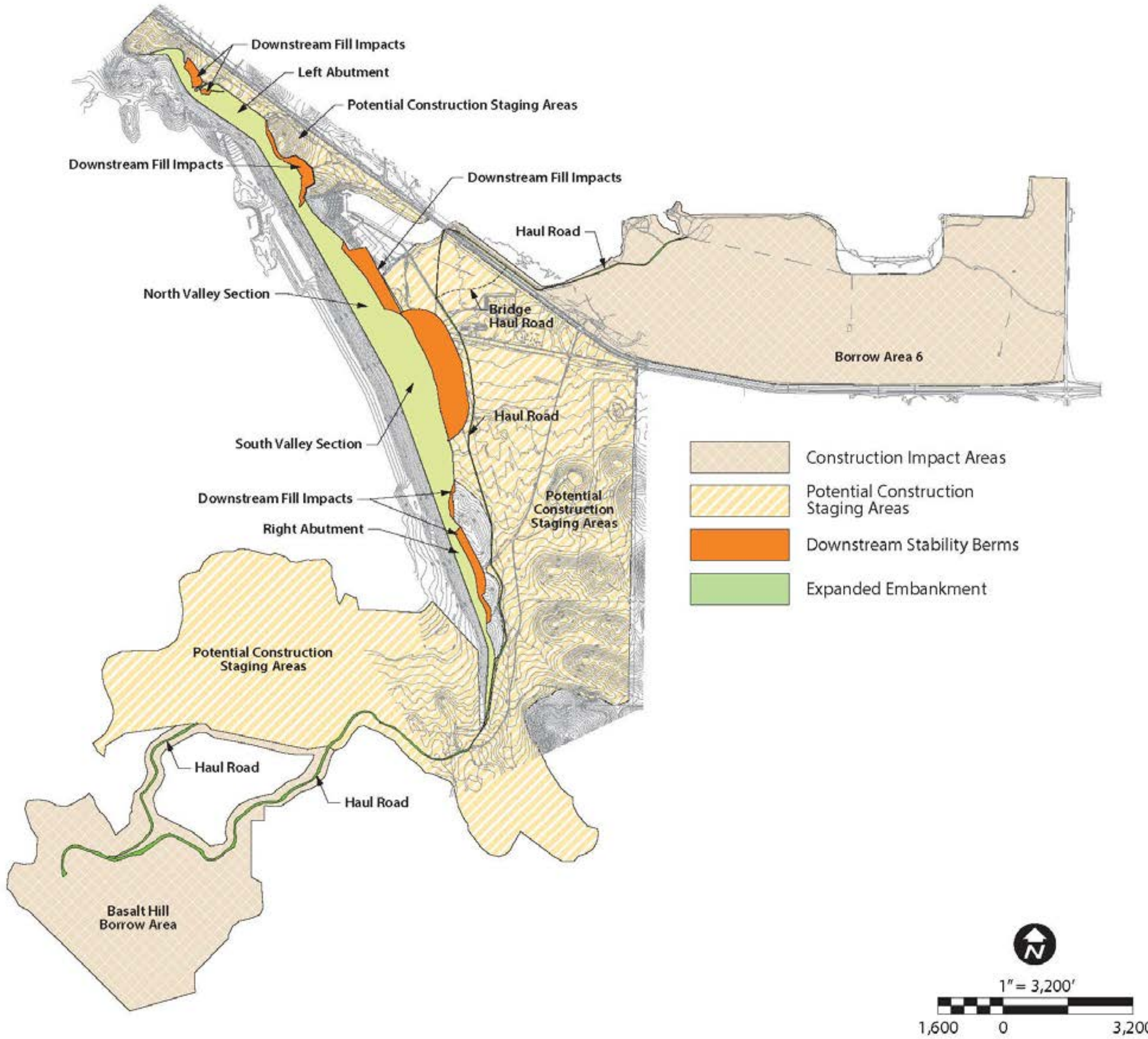


Figure 2-4. San Luis Reservoir Expansion Construction and Staging Areas

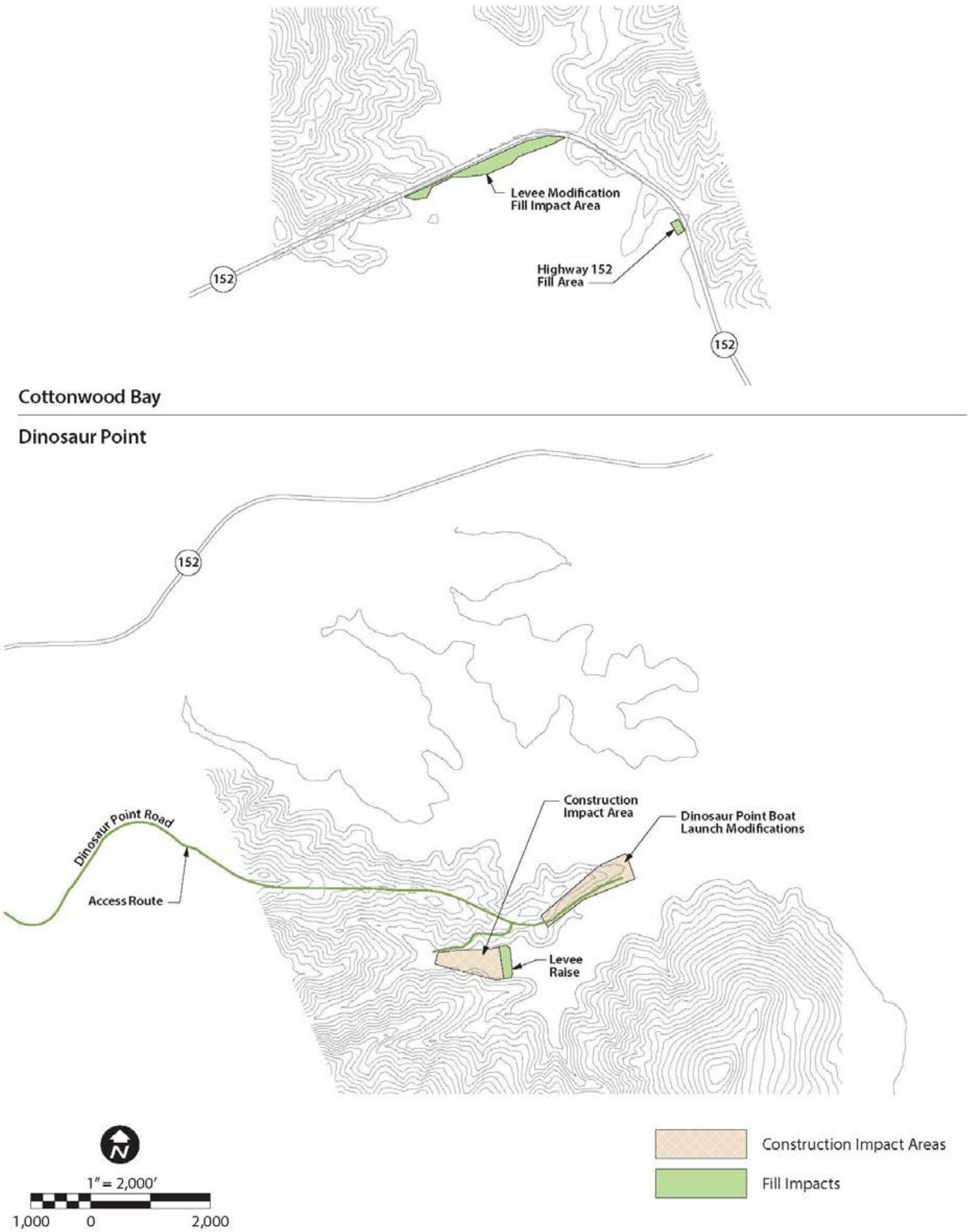


Figure 2-5. San Luis Reservoir Expansion Actions along Highway 152 and at Pacheco Pumping Plant

San Luis Reservoir seasonally operates in most years with an approximately 6-month period that CVP and SWP supplies are pumped into the reservoir followed by an approximately 6-month period where the reservoir is drawn down as those stored supplies are delivered to water users. Any work that would reduce the reservoir embankment strength, such as foundation or embankment excavation, would be timed seasonally and would occur during periods of the year when the reservoir is drawn down to lower elevations. As the reservoir is drawn down as a part of regular operations, construction would start after the reservoir is drawn below an elevation sufficient to ensure slope stability during any work that would impact embankment strength. This work would then be scheduled for completion prior to the subsequent refill of San Luis Reservoir back above that level to protect embankment stability, while allowing for uninterrupted water supply deliveries. Delays to refill could potentially occur if the construction schedule is delayed, but the division of specific modification actions scheduled to occur in one drawdown season would be structured to minimize this risk. In addition, contract requirements established by Reclamation and SCVWD would require use of the second construction shift on this particular component of the overall project in the event that work becomes delayed.

Implementation of the optional SVS shear key action would require limits on the maximum surface elevation in San Luis Reservoir for two fill and drawdown seasons, during the period that the berm foundation would be excavated. This reduction in surface elevation would reduce storage capacity in the reservoir and could limit CVP and SWP deliveries during this construction period. The shear key reservoir restriction would consist of a 55-foot reduction in the maximum water surface elevation of San Luis Reservoir from the current elevation of 544 feet to 489 feet. Excavation activities for the shear key would initiate when the reservoir is drawn down to 489 feet as a part of regular reservoir operations and would continue through two refill periods during which the reservoir would not be allowed to refill above that level. Reclamation and SCVWD would also target initiation of the shear key modification if possible, in a year where initial water supply forecasts are projecting dry or critically dry conditions to lessen the magnitude of this reservoir restriction’s impact in at least the first year of its two-year implementation window.

2.2.4.2 Construction

The shear keys and downstream stability berms would be constructed by first excavating the existing liquefiable and soft foundation soils. The rock blanket or slope protection would also be removed to the top elevation of the embankment and stockpiled downstream of the toe. Next, the existing toe drain would be removed by excavation. After completion of the excavations, the existing filters/drains located at the downstream toe would be re-established and a new toe drain seepage collection system would be installed, similar to the one currently in place. Stronger material would then be placed as backfill and compacted. At 480 feet, a two-stage downstream crack filter would be constructed. Above an elevation of 550 feet, the raised crest would be developed by simultaneously placing riprap and bedding, core, a two-stage chimney filter and the downstream shell. Materials used would be stockpiled downstream of the toe and in Borrow Area 6. After fill placement is completed, road base and paving of the dam crest complete the overlay raise.

Equipment in the staging areas would include trailers, equipment to be used, and stockpiled materials. Construction staging and stockpile areas would include area south of Gianelli

Pumping Plant off of Basalt Road, area north of Gianelli Pumping Plant off of Gonzaga Road, and Dinosaur Point. The access route to the two main staging areas would be SR 152 to Basalt Road. Temporary traffic signals would be installed at the current left turn crossing on SR 152 at Basalt Road and at the access road to Romero Visitor Center for the duration of the project. Up to 240 large deliveries or waste material transports offsite per day could be expected, the transport and disposal of material to local landfills, along with the regular commuting of construction personnel.

Aside from areas dedicated to construction staging and transportation, all remaining available space at the areas next to B.F. Sisk Dam would be needed for stockpiling materials. These areas around the dam would be used as a staging area of the full duration of construction. These areas would be returned to pre-construction condition after the project is completed. Equipment used to construct the alternative would include:

- 3 Excavators
- 4 Bulldozers
- 5 Cranes/Lifts
- 5 Compactors
- 1 Grader
- 2 Scrapers
- 13 Dump trucks
- 5 Water trucks
- 4 Flatbed Trucks
- 2 Wheel Trenchers
- 1 Barge
- 2 Concrete Pumpers
- 2 Concrete Saw Cutters
- 5 Loaders (2 small, 3 large)

Recreational activities would be suspended for safety reasons during the entire construction schedule at Basalt Use Area and Medeiros Use Area, and during active construction at Dinosaur Point Use Area (approximately 1 year). Recreational use for boating would be suspended for the full year that both the Basalt and Dinosaur Point use areas are closed and would be limited to areas away from B.F. Sisk Dam for the full construction schedule. The closed Basalt Campground would be utilized as a temporary camping area for construction workers.

Final design of the dam raise would include the development of a construction schedule that times the completion work in the direct path of potential flood flows or on infrastructure specifically designed to direct flood flows to occur in periods of the year when rain is unlikely and reservoir levels are lower. In addition, the contractor would be required to develop a health and safety plan that includes a response plan to flood forecasts that would require the suspension of construction activities and the movement of construction equipment to higher ground.

Construction is expected to last approximately 8 to 10 years. With the addition of the SVS shear key option, construction is expected to last approximately 10 to 12 years. Both with and without the SVS shear key option, construction duration is based on 130 anticipated workers on site during the day shift and 87 workers on site during the night shift. Work would be performed 24 hours per day, seven days per week, 12 months per year. The 24 hour work day would consist of two 10 hour work shifts, with a half hour for lunch each shift, plus a 3 hour maintenance period. Blasting operations at Basalt Hill would be limited to the hours between 6:00 a.m. to 6:00 p.m. It is assumed for the purpose of this EIS/EIR, that construction would start in 2020.

This 8 to 12 year construction schedule is based on the assumption of no funding constraints and is used to analyze the impacts in this EIS/EIR. However, with potential funding constraints, the construction schedule could extend up to 20 years. Impacts under an extended 20 year schedule would result in impacts equal to or potentially smaller in a single year of construction that cumulatively over the full 20 year schedule would be the same in total magnitude as the unconstrained schedule. An extended schedule would not change the impact determination of any of the resources analyzed in this EIS/EIR.

2.2.4.3 Operations

Increasing storage capacity in San Luis Reservoir would potentially increase the yield of the CVP in years that surplus supplies in excess of the reservoir's existing storage capacity are available. This increased yield could increase SCVWD's capacity to access their CVP supply prior to the reservoir being drawn below the 300 TAF level and allow the District to avoid the potential for a water supply interruption from low point conditions.

Alternative 4 would allocate the increased capacity to the CVP only. This expanded capacity would be operated in the same way as the current CVP portion of San Luis Reservoir, with the reservoir used for seasonal storage. The new capacity would fill after the existing capacity is filled, which would result in increased CVP yield during wetter years. Alternative 4 has the potential to decrease SWP deliveries by reducing SWP exports from the Delta through Banks Pumping Plant. Banks Pumping Plant exports can be reduced as compared to Alternative 1 because the additional CVP storage capacity under the alternative allows the CVP to export more of the water they are entitled to under the Coordinated Operations Agreement. Under Alternative 1, the SWP is able to export this water when the CVP portion of San Luis Reservoir fills and CVP South-of-Delta demands are being met.

2.2.5 Alternative 5 – Pacheco Reservoir Expansion Alternative

Alternative 5, the Pacheco Reservoir Expansion Alternative, includes the removal of the existing dam, development of a new reservoir, a new earthen dam and spillway, new pipelines and tunnels, a new pump station, and associated channel modifications, a new regulating tank at Pacheco Pumping Plant, and access improvements. The new dam and expanded reservoir would be constructed on the North Fork of Pacheco Creek 0.5 mile upstream from the existing North Fork Dam and would inundate most of the existing Pacheco Reservoir. The proposed total storage for the new reservoir is 141,600 acre-feet (AF), with an active storage of 140,800 AF. The full pool elevation would be 694 feet and would inundate a total of 1,385 total acres. Figure 2-6 shows the expanded Pacheco Reservoir footprint. Additional figures associated with Alternative 5 are included in Attachment A of Appendix A2 and show proposed project component layouts, borrow areas, and construction access and staging areas from SCVWD's application for funding under WSIP.

2.2.5.1 Project Facilities

The new embankment dam would be a zoned earthfill structure consisting of an impervious core, flanked by an outer shell of random fill. A system of filters and drains would be provided to control seepage through the dam and foundation. An uncontrolled side channel spillway with a trapezoidal cross section would be located adjacent to the right (west) abutment of the proposed dam. Alternative 5 would construct an inlet/outlet facility consisting of a sloping intake/outlet structure and a low-level inlet/outlet designed to provide deliveries to the reservoir from Pacheco Conduit and withdrawals from the reservoir to the conduit and the North Fork of Pacheco Creek. The Pacheco Reservoir Pump Station would serve as a two-way pump station that both delivers water to and withdraws water from the Pacheco Reservoir. A pipeline would be constructed to connect the new pump station located immediately downstream of the new dam and the existing Pacheco Conduit.

2.2.5.2 Construction

The North Fork Dam is currently being operated under the terms of a DWR Division of Safety of Dams order requiring that the upstream and downstream outlet controls be maintained in the fully open position to maximize releases and maintain the lowest possible surface elevation in Pacheco Reservoir given the current condition of its spillway (DWR 2018). Construction of the Pacheco Reservoir Expansion Alternative would initiate with demolition of the existing North Fork Dam. Removal of the existing dam would proceed from the top down to prevent steep slopes and to minimize the potential for slope failure. A temporary cofferdam would be constructed at the upstream toe of the new dam footprint with a crest elevation of 500 feet. The cofferdam would be developed with a bypass structure to ensure that flows in Pacheco Creek are maintained during construction. The cofferdam and bypass would be designed to regulate at a minimum, a 20-year flood event. Fill material for the new dam embankment would be sourced from six borrow areas. Embankment construction activities would include processing, excavating, loading, hauling, placing, and compacting of impervious core, adding earth fill, and draining and filtering of materials from borrow areas. Figure 2-7 shows the construction access and staging areas.

Alternative 5 would also require an upgrade to an existing 16-mile Pacific Gas and Electric (PG&E) transmission line in order to support the new reservoir pump station. Approximately 5.75 miles of 25 feet-wide haul road would be required to access the reservoir borrow areas upstream of the embankment location. Construction access roads totaling 4 miles and 25 feet wide would need to be constructed across the stream, downstream of the embankment, to access the spillway area.

Equipment used to construct the alternative would include:

- 2 Aerial Lifts
- 3 Boomtrucks
- 6 Bulldozer
- 1 Cement Mixer
- 4 Truck Mounted Drill Rig (Wells)
- 1 Excavator
- 3 Flatbed Trucks
- 2 Graders
- 12 Loaders
- 4 Portable Diesel Generators
- 2 Pressure Washers
- 5 Pumps
- 7 Rollers
- 1 Scraper
- 23 Maintenance Trucks
- 3 Skidders
- 10 Dump Trucks
- 12 Signal Boards
- 6 Water Trucks
- 4 Welders
- 7 Cranes

It is assumed for the purpose of this EIS/EIR, that construction would start in 2024. Construction is expected to last approximately 5 years. The construction duration is based on a maximum of 350 anticipated workers on site during the day shift and a maximum of 125 workers on site during the night shift. Work would be performed 24 hours per day, seven days per week, 12 months per year. Blasting would occur infrequently, and would only take place during daytime hours.

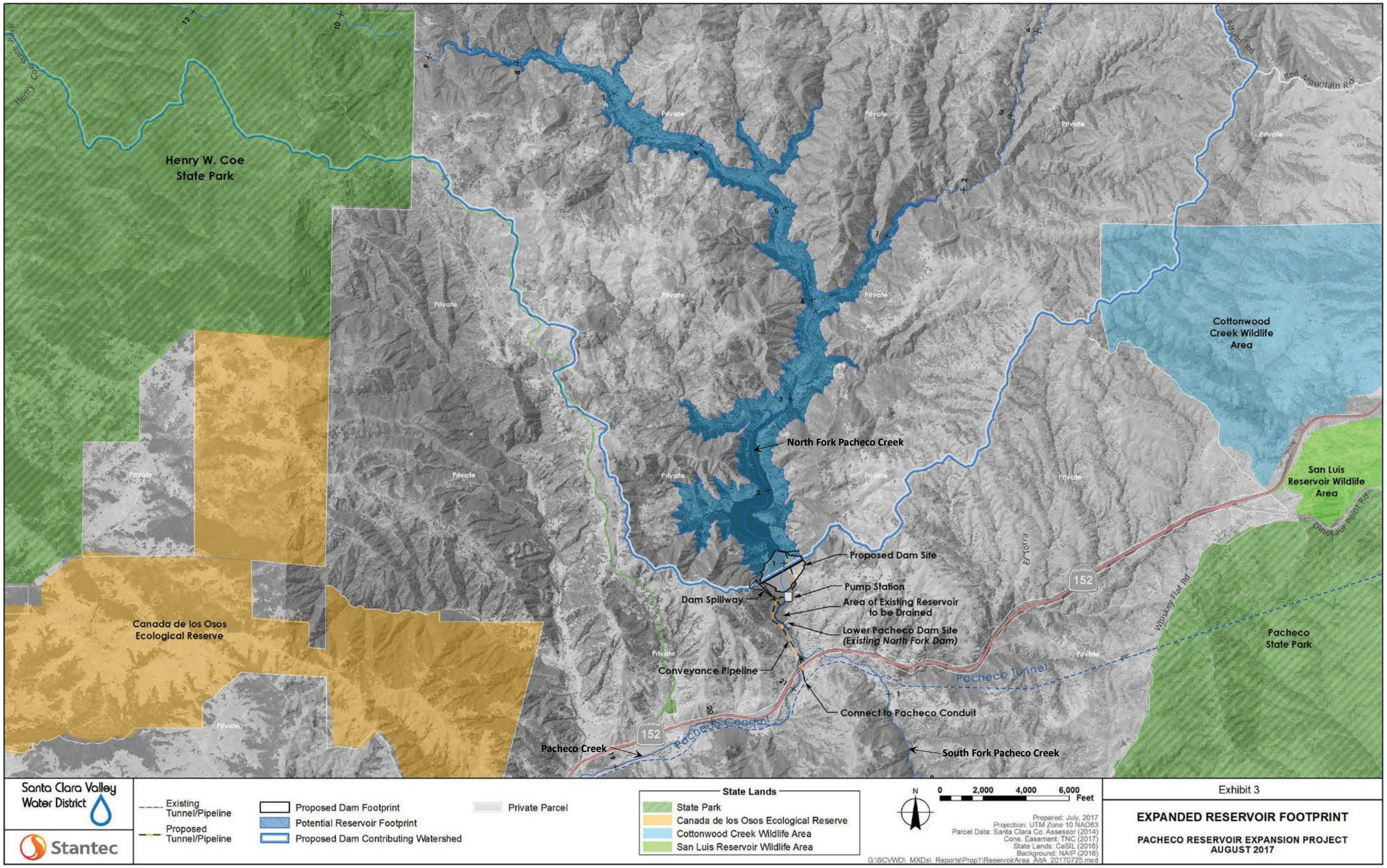


Figure 2-6. Pacheco Reservoir Expansion Footprint

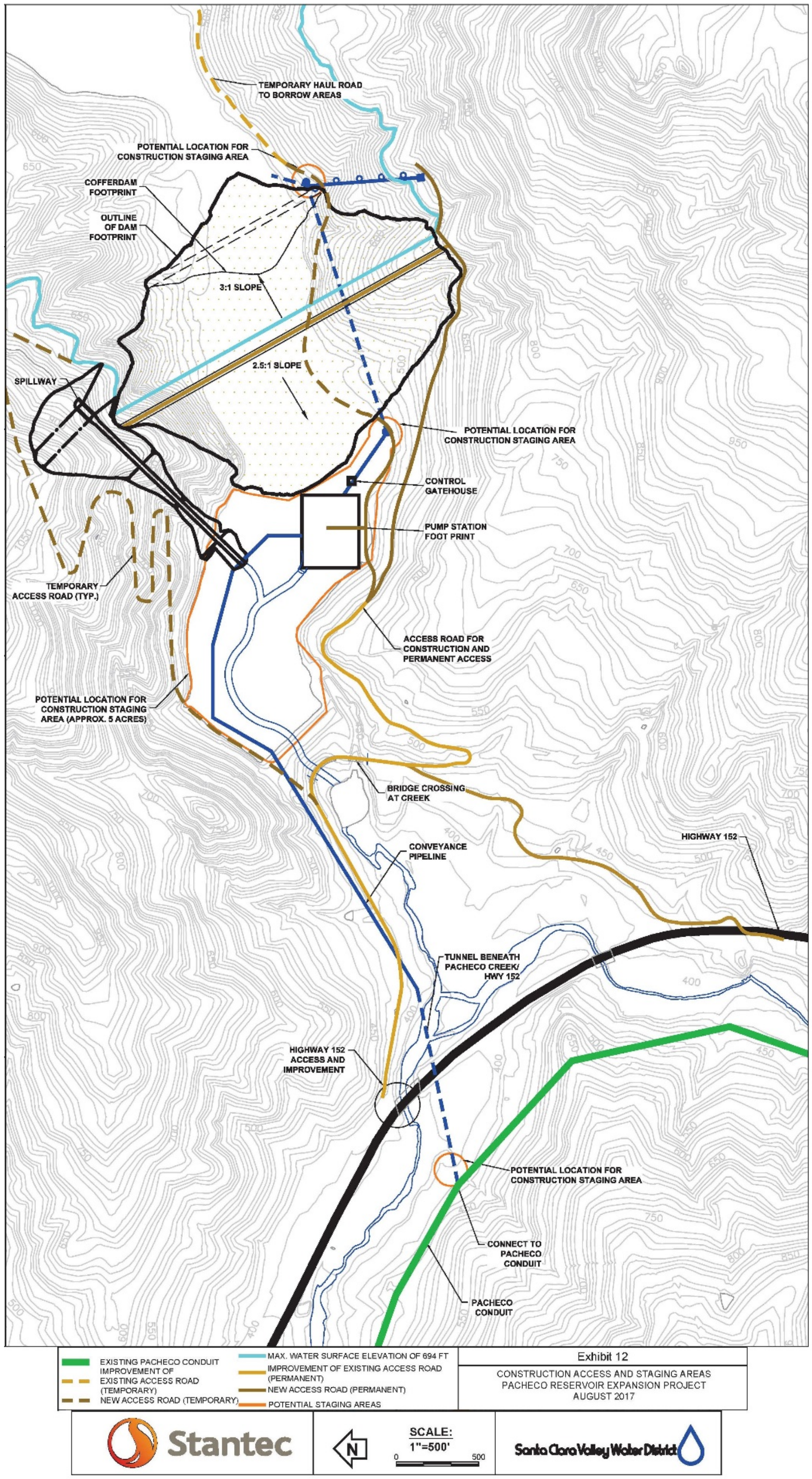


Figure 2-7. Pacheco Reservoir Construction Access and Staging Areas

2.2.5.3 Operations

The expanded Pacheco Reservoir would be primarily filled using natural inflows from the North and East Forks of Pacheco Creek. These inflows are typically realized from December through March. Supplemental flows to the expanded reservoir would arrive from SCVWD's share of contracted CVP pumped water from San Luis Reservoir. This would include allocated CVP water supplies that otherwise could not be delivered to or stored by SCVWD. This CVP water supply would be pumped from the Pacheco Conduit up to the expanded Pacheco Reservoir earlier in the year prior to the summer months when the San Luis Reservoir is typically drawn down to the 300 TAF level. The rate at which these transfers are made between San Luis Reservoir and Pacheco Reservoir would depend upon water rights, supply allocations, water demands, availability of other water supplies, and conveyance limitations of Pacheco Conduit. Conveyance and storage of these CVP supplies is anticipated to occur primarily in wet years. CVP water stored in Pacheco Reservoir could then be released through the summer while supplies from San Luis Reservoir would be inaccessible to SCVWD.

Alternative 5 would be operated by SCVWD to improve habitat conditions for steelhead in Pacheco Creek, improve SCVWD water supply reliability, including during drought periods and emergencies, and meet the groundwater recharge objectives of Pacheco Pass Water District (PPWD). Average monthly target flows ranging from 10 to 30 cubic feet per second (cfs) in Pacheco Creek would support the biological needs of South-Central California Coast (SCCC) steelhead, which are listed as threatened under the Federal Endangered Species Act (ESA), for higher flows for outmigration. The average monthly release targets are shown in Table 2-2[3]. During heavy precipitation events, releases from the expanded reservoir would be reduced to minimize flooding risks along Pacheco Creek and the Pajaro River. Winter releases of stored supply would be discontinued when it is estimated that there will be sufficient inflow passed through the reservoir downstream onto Pacheco Creek to provide for aquatic habitat going forward into the spring. The thresholds for discontinuing these winter releases are shown in Table 2-2. Operation of the expanded Pacheco Reservoir would not change the existing operations of the CVP.

To ensure that flows and water temperatures in Pacheco Creek are maintained in consecutive dry years, releases to Pacheco Conduit—to meet SCVWD water demands—would be discontinued in the event that reservoir storage volumes fall below 55,000 AF. This flow regime may however be altered in the event of an emergency declaration by SCVWD for health and safety purposes. These habitat flows would be secured by operations requirements expected in the biological opinion(s) that would be developed for the expanded Pacheco Reservoir, as well as the contract between California Department of Water Resources (DWR) and SCVWD for the provision of grant funding through the WSIP, and in the contract between and DWR and SCVWD for the provision of grant funding through the WSIP, and in the multi-agency operations agreement between Reclamation and SCVWD for Pacheco Reservoir that would be developed during the pre-construction design phase for this alternative if it is selected for implementation.

[3] These average monthly release targets shown in Table 2-2 incorporate the biological needs of the SCCC steelhead and include a 15-day pulse flow of 30 cfs, followed by a 15-day release schedule of 10 cfs. This pulse flow is anticipated to occur in March and April for outmigration.

Table 2-2. Average Monthly Release Targets to Pacheco Creek from Expanded Pacheco Reservoir

Month	Average Monthly Release Targets to Pacheco Creek (cfs)[1]	Inflow into Pacheco Reservoir Needed to Discontinue Winter Releases (cfs)
January	10	11.2
February	10	11.2
March	20	22.4
April	20	22.4
May	12	13.4
June	13	NA
July	14	NA
August	14	NA
September	14	NA
October	14	NA
November	10	11.2
December	10	11.2

Notes:
[1] Releases from Pacheco Reservoir are reduced during high flows in the south fork of Pacheco Creek.
Key: CFS = cubic feet per second

In addition, SCVWD would transfer 2,000 AF of its CVP water contract allocation (in below normal water years), directly or through transfer and exchanges, in perpetuity to Reclamation and U.S. Fish and Wildlife Services' Refuge Water Supply Program (RWSP), for use in the Incremental Level 4 water supply pool for wildlife refuges. This long-term voluntary reallocation of CVP yield by SCVWD would be secured by an agreement between the U.S. Fish and Wildlife Service (USFWS) and SCVWD detailing the mechanisms and timing for delivery of this supply, a contract between DWR and SCVWD for the provision of grant funding through the WSIP specific to this refuge water supply that would require the provision of these supplies in perpetuity, and a multi-agency operations agreement between Reclamation and SCVWD for Pacheco Reservoir to deliver and store SCVWD's CVP supply in this new facility that would also include the requirements for this transfer.

2.3 CEQA Proposed Project

For the purpose of CEQA, SCVWD has identified Alternative 5 as the Proposed Project. SCVWD's identification of a Proposed Project does not foreclose any alternatives or mitigation measures. All of the alternatives have been analyzed at a comparable level in this Draft EIS/EIR. Reclamation has not identified a preferred alternative in this Draft EIS/EIR for NEPA purposes. Consistent with Council on Environmental Quality (CEQ) Regulations 40 Code of Federal Regulations (CFR) Part 46.425, the Final EIS/EIR will identify a NEPA preferred alternative for implementation (or alternatives if more than one exists).

SCVWD and Reclamation are seeking input on the alternatives and their environmental effects during the public review of this Draft EIS/EIR. SCVWD and Reclamation will consider feedback received during the public review on the Draft EIS/EIR and the environmental impacts associated with each alternative when developing the Final EIS/EIR and selecting an alternative for implementation. Any alternative could be selected by the lead agencies following the conclusion of environmental review.

SCVWD has identified Alternative 5 as the Proposed Project for CEQA because of the wide range of public and non-public benefits. Benefits identified include ecosystem enhancements at Pacheco Creek and San Joaquin River watersheds, flood control, emergency water supplies, groundwater recharge and M&I water supply, and M&I water quality (SCVWD 2017b).

2.4 Environmentally Preferable/Superior Alternative

CEQ Regulations Section 1505.2(b) require identification of an environmentally preferable alternative, and CEQA Guidelines Section 15126.6(e)(2) requires an EIR to identify an environmentally superior alternative. However, the CEQ regulations and CEQA Guidelines do not require adoption of the environmentally preferable/superior alternative as the preferred alternative for implementation. The identification of the preferred alternative is independent of the identification of the environmentally preferable/superior alternative, although the identification of both will be based on the information presented in this EIS/EIR.

Section 1505.2(b) of the CEQ Regulations requires the NEPA lead agency to identify the environmentally preferable alternative in a Record of Decision (ROD). The CEQ Regulations define the environmentally preferable alternative as "…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."

This Draft EIS/EIR provides a substantive portion of the environmental information necessary for Reclamation to determine the environmentally preferable alternative and for SCVWD to determine the environmentally superior alternative. However, the public and other agencies reviewing a Draft EIS/EIR can assist the lead agency to develop and determine the environmentally preferable/superior alternative by providing their views in comments on the Draft EIS/EIR. In this Draft EIS/EIR, Reclamation and SCVWD have identified Alternative 5 as the environmentally preferable/environmentally superior alternative because of the ecosystem benefits to the Pacheco Creek and San Joaquin River watersheds it provides. Reclamation and SCVWD will consider feedback during the public review phase of the Draft EIS/EIR on the environmental benefits and impacts of each alternative when developing the Final EIS/EIR and ROD.

2.5 Uses of this Document

In addition to the decision described above, Reclamation and SCVWD will use this EIS/EIR to obtain required environmental permits and approvals and use alongside the Feasibility Report to obtain funding.

Table 2-3 indicates the permits or approvals anticipated for the construction and operation of the SLLPIP Alternatives. This EIS/EIR has been developed to cover the environmental review and consultation requirements required by federal, state, regional or local laws, regulations, or policies listed in Table 2-3, as required by CEQA Guidelines Section 15124(d)(1). This coverage will allow the agencies responsible for implementing these permits or approval to rely on information in this EIS/EIR during the permitting or approval process.

Table 2-3. Permits or Approvals Required for SLLPIP Implementation

Permit or Approval	Applying Agency	Permitting or Approval Agency(s)
Federal Endangered Species Act Section 7 Compliance	Reclamation	USFWS and NMFS
Clean Water Act Section 401 Certification	Reclamation/SCVWD	SFRWQCB, CVRWQCB
Clean Water Act Section 404 Permit	Reclamation	USACE
California Endangered Species Act Section 2081 Permit	Reclamation/SCVWD	CDFW
California Fish and Game Code section 1602 Lake and Streambed Alteration Agreement	Reclamation/SCVWD	CDFW
NHPA Section 106 Compliance	Reclamation	SHPO and/or ACHP
NPDES Permit for General Construction	Reclamation/SCVWD	SFRWQCB, CVRWQCB
NPDES/WDR Individual Permit for Discharge	Reclamation/SCVWD	SFRWQCB, CVRWQCB
Petition to change CVP and SWP water rights	Reclamation/DWR	SWRCB
Clean Air Conformity	Reclamation/SCVWD	USEPA
Clean Air Act Fugitive Dust Control Plan & Indirect Source Review Air Impact Assessment	Reclamation/SCVWD	SJVAPCD
Clean Air Act Authority to Construct/Permit to Operate	Reclamation/SCVWD	BAAQMD
Encroachment Permit	Reclamation/DWR/SCVWD	California Department of Parks and Recreation, Santa Clara County, City of San Jose
Pacheco Reservoir Operation Agreement for the Reallocation of CVP Water Supply	SCVWD	USFWS
Pacheco Reservoir Multi-Agency Operations Agreement	SCVWD	Reclamation
WSIP Grant Funding Contract	SCVWD	DWR

Key: ACHP= Advisory Council on Historic Preservation; BAAQMD= Bay Area Air Quality Management District; CDFW= California Department of Fish and Wildlife; CVRWQCB= Central Valley Regional Water Quality Control Board; NHPA= National Historic Preservation Act; NMFS= National Marine Fisheries Service; NPDES= National Pollutant Discharge Elimination System; SFRWQCB= San Francisco Bay Regional Water Quality Control Board; SHPO=State Historic Preservation Office; SJVAPCD= San Joaquin Valley Air Pollution Control District; SWRCB= State Water Resources Control Board; USACE= United States Army Corps of Engineers; USEPA = United States

Chapter 3
Affected Environment / Environmental Setting

This chapter presents an overview of the affected environment for the SLLPIP EIS/EIR. Appendix C presents the Federal, State, and local laws, regulations, policies, and plans that are relevant and applicable to the affected environment, area of analysis, and analysis of impacts. The study area for this EIS/EIR (Figure 3-1) includes San Luis Reservoir and its related water infrastructure (including the San Felipe Division's water intakes and associated infrastructure); Sacramento-San Joaquin River Delta; California Aqueduct; South Bay Aqueduct (SBA); South-of-Delta CVP and SWP contractors; SCVWD service area, including the Santa Teresa WTP in San Jose; and Pacheco Reservoir and the surrounding vicinity, Pacheco Creek, Pajaro River, San Felipe Lake and Miller Canal. Regional and local environmental settings are described in the below sections.

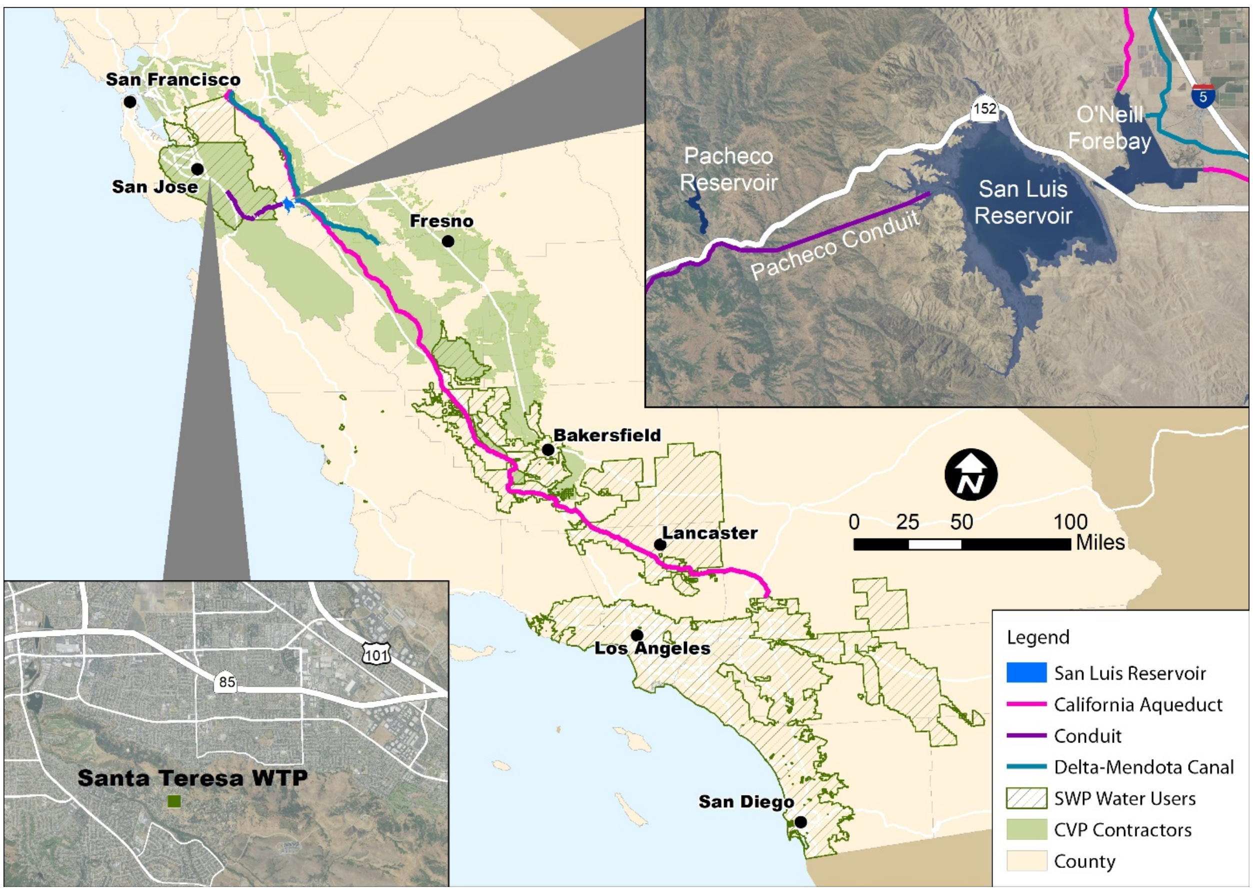


Figure 3-1. San Luis Low Point Improvement Project Study Area

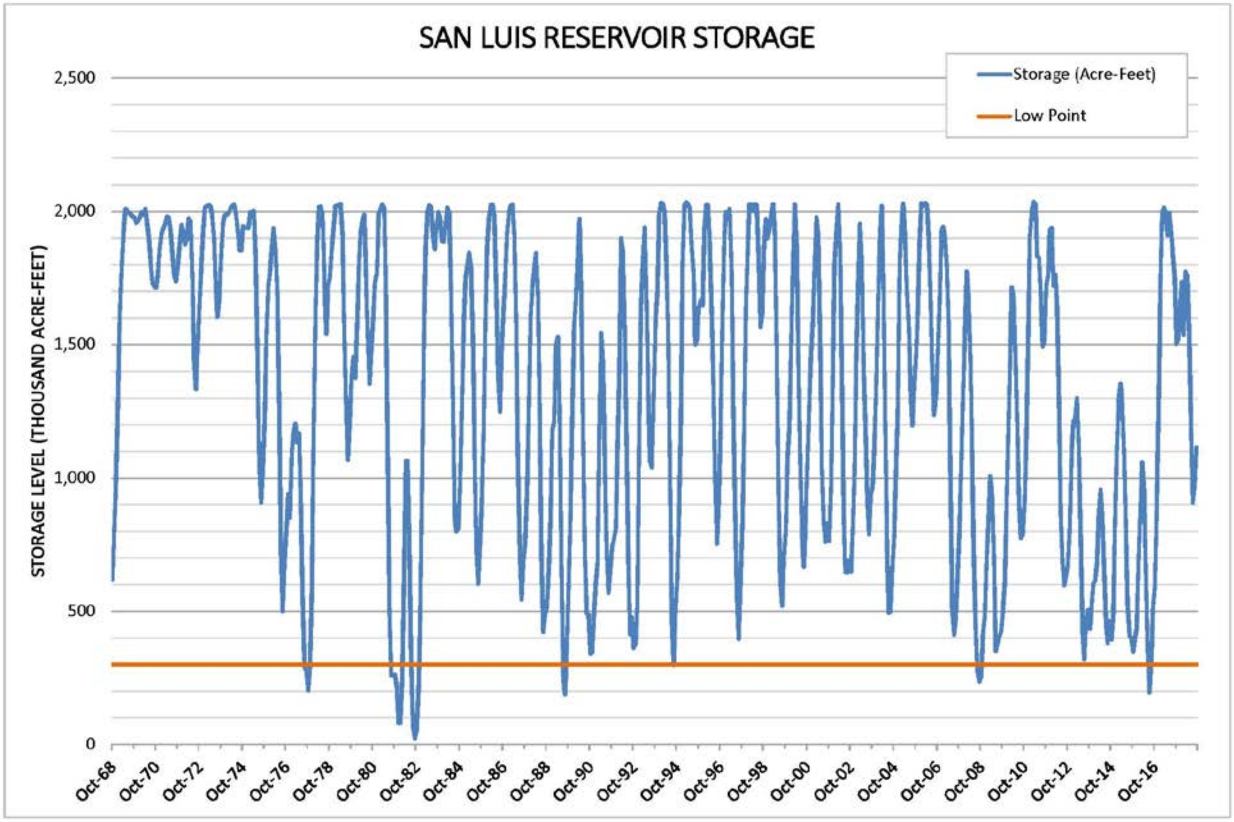
3.1 San Luis Reservoir

San Luis Reservoir is an off-stream storage reservoir in Merced County. Reclamation owns and jointly operates San Luis Reservoir with DWR to provide seasonal storage for the CVP and the SWP. San Luis Reservoir is capable of receiving water from both the DMC and the California Aqueduct, which enables the CVP and SWP to pump water into the reservoir during the wet season (October through March) and release water into the conveyance facilities during the dry season (April through September) when demands are higher. Deliveries from San Luis Reservoir also flow west through Pacheco Pumping Plant and Conduit to the San Felipe Division of the CVP. The CVP contractors that receive water from San Luis Reservoir include the San Felipe Division and the Central Valley Region CVP Contractors.

San Luis Reservoir and the surrounding area tend to be windy and are characterized by wet, cool winters and warm, dry summers. During the summer months, when water levels are low, water quality in the San Luis Reservoir deteriorates due to a combination of higher warmer temperatures, wind-induced nutrient mixing, and algal blooms near the reservoir surface. Presently, when San Luis Reservoir approaches its late summer/early fall low point, algae growth may begin to degrade water quality for contractors that utilize the water. If the algal layer is significantly thick, when the lake storage volume is reduced to approximately 300,000 AF, algae may begin to enter the Lower San Felipe Intake. The water quality within the algal blooms results in clogging issues for agricultural water users with drip irrigation systems in San Benito County or for M&I water users relying on existing water treatment facilities in Santa Clara County. Increasing water demands in the future will increase pressure to fully utilize all available storage in the reservoir (SCVWD 2005).

Appendix D provides detailed information about constituents of concern listed in the Clean Water Act (CWA) and beneficial uses of California waters defined in the California Water Code. The appendix also discusses water quality in the Delta, and general water quality characteristics of reservoirs. Water quality samples are routinely collected through automated monitoring at O’Neill Forebay at Gianelli Pumping Plant. Electrical conductivity (EC), dissolved oxygen (DO) and dissolved nitrate data from this sampling location are presented in Appendix D. Historic algae count data collected at Pacheco Pumping Plant indicate greatest algae cell counts during mid- to late-summer months, peaking in some years above 70,000 algae cell counts. DO is often lowest in the late summer and fall following excessive algae growth. Nitrate levels drop beginning in late spring as algae begins to form and depletes nitrate levels through late fall. In addition, San Luis Reservoir and O’Neill Forebay were designated in 2010 on the California 303(d) List for mercury impairment. Potential sources of the impairment are listed as unknown.

Figure 3-2 shows monthly storage in San Luis Reservoir from 1968 through early 2018. Storage is highly variable throughout the year as the reservoir refills in the fall and winter months and releases water in spring and summer to meet CVP and SWP demands. In most years, the storage level in San Luis Reservoir has remained above 300 TAF. As Figure 3-2 shows, San Luis Reservoir was drawn down in 1981 and 1982 to a storage level of 79 TAF to facilitate repairs. During the drought periods of 1976–1977, 1988–1992, and 2007–2008, the reservoir was drawn down to below 300 TAF. San Luis Reservoir also fell below 300 TAF in the summer of 2016 (Reclamation 2016a).



Source: CDEC 2018

Figure 3-2. Monthly Storage in San Luis Reservoir from 1968 to 2018

Several special districts, including community service districts, water districts, and sanitary districts provide sanitary sewer service within the unincorporated communities in Merced County. Unincorporated communities that lack sanitary sewer infrastructure are serviced by septic systems (Merced County 2013). There are two active solid waste disposal and landfill facilities in the county—the Highway 59 Landfill located in Merced, and the Billy Wright Landfill located in Los Banos. Electric services in the county are provided by PG&E and the Merced and Turlock Irrigation Districts. PG&E provides natural gas within the county (Merced County 2013).

Certain water supply facilities in the reservoir area use power to transport water and generate power. Gianelli Pumping Plant is a joint Federal/State facility that lifts water from O’Neill Forebay to San Luis Reservoir. During the irrigation season, water released from San Luis Reservoir through B.F. Sisk Dam generates energy as it flows back through the pump turbines to the forebay. Each of the eight pumping-generating units has a 63,000-horsepower (hp) motor and a capacity of 53,000 kilowatts (kW) as a generator, for a total installed capacity of 424,000 kW (Reclamation 2011a). At the Pacheco Pumping Plant, water from San Luis Reservoir is lifted through the San Felipe Intake to be transported to the San Felipe Division facilities. The Pacheco Pumping Plant has 12 pumps, with a total of 24,000 hp, approximately 300 feet in lift, and a total capacity of 600 cfs of flow.

San Luis Reservoir is in the Panoche-San Luis Reservoir watershed, part of the San Joaquin River Basin. San Luis Reservoir is drained by San Luis Creek, a tributary to the San Joaquin River. Natural runoff is captured by canals, reservoirs, and pumping facilities, and directed into a complex network of water supply infrastructure for SWP and CVP beneficial uses (Reclamation and California Department of Parks and Recreation [CDPR] 2013). There is no current streamflow monitoring at any of these inlets into the reservoir.

The area surrounding San Luis Reservoir is designated on the Federal Emergency Management Agency (FEMA) current Flood Insurance Rate Maps (FIRMs) as within Zones D, X, and A (FEMA 2016). Low-lying areas along creeks and the banks of San Luis Reservoir are susceptible to flooding. The San Joaquin County and City of Los Banos San Luis Reservoir dam failure inundation maps describe flood waters flowing in a northeast direction from the reservoir through Los Banos toward the San Joaquin River which could impact communities extending downstream and upstream along the river through Merced and Stanislaus Counties and portions of San Joaquin County (San Joaquin County Office of Emergency Services [OES] 2003, City of Los Banos 2003). Reclamation conducted an evaluation of the dam at San Luis Reservoir and concluded that during a severe earthquake, failure of the dam could occur, leading to overtopping as a result of embankment sloughing and/or seiche-generated wave action. Modifications to address seismic concerns under Reclamation’s SOD Act, as amended, are currently under final design.

The vast majority of land within Merced County is designated as Agricultural and Foothill Pasture Land and lies outside of existing cities (Merced County 2013). County land surrounding the reservoir includes a variety of uses. The unincorporated community of Santa Nella, located northeast of O’Neill Forebay, includes residential and commercial uses (Reclamation and CDPR 2013). Other land use in the area surrounding the reservoir is primarily grazing land. Lands to the southeast of the reservoir include privately owned ranchlands, agricultural lands, public utility uses, and other scattered nonresidential uses (Reclamation and CDPR 2013). There is no land surrounding San Luis Reservoir designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance or land enrolled in Williamson Act contracts.

The San Luis Reservoir State Recreation Area (SRA) spans approximately 27,000 acres and includes major facilities such as the San Luis Reservoir, O'Neill Forebay, and Los Banos Reservoir, as well as several other Federal and State owned lands and facilities (Reclamation and CDPR 2013). The San Luis Reservoir SRA Resource Management Plan/General Plan (RMP/GP) defines distinct geographic divisions, or management zones, within the SRA based on physical, social, and management characteristics (Reclamation and CDPR 2013). The management zones include Administrative and Operations Zone (for staff, operations, and maintenance activities), Frontcountry Zone (for the majority of visitor facilities, camping, and concessions), and Backcountry Zone (for less intensive recreation and with limited camping and trails).

The San Luis Reservoir SRA contains five use areas (areas designated as major public recreational facilities)—Basalt, Dinosaur Point, Los Banos Creek, Medeiros, and San Luis Creek—and one minor use area for off-highway vehicle (OHV) use. There are two additional areas designated for wildlife; both allow for hunting and primitive hiking, along with nature study activities. The primary activities at each use area vary but, collectively, the San Luis Reservoir SRA provides opportunities for boating, swimming, windsurfing, camping, and fishing

(Reclamation and CDPR 2013). Boating and other water sports, such as jet skiing and windsurfing, are allowed from sunrise to sunset on San Luis Reservoir, O'Neill Forebay, and Los Banos Creek Reservoir (CDPR 2003). There are boat ramps at all five use areas; however, the boat ramp at the Medeiros Use Area is currently closed due to safety concerns (Reclamation and CDPR 2013). The San Luis Reservoir SRA also provides over 640 campsites for visitor use. The San Luis Reservoir SRA consists of two developed campgrounds, at the Basalt and San Luis Creek use areas and undeveloped campgrounds at the Medeiros and Los Banos Creek use areas.

Pacheco State Park (SP) lies directly west of the San Luis Reservoir SRA. The park is only partially open to the public for day use recreation such as hiking and bicycling. The Pacheco SP offers an approximately 25-mile-long trail system, including 15 designated trails. The remainder of the park is used for equestrian activities and cattle grazing, in addition to a wind turbine farm that generates clean energy for 3,500 homes. The only campground facilities available at Pacheco SP consist of primitive horse campgrounds; however, tent camping is available for corporate events and is permitted upon request (CDPR 2004, CDPR 2011).

Public utilities serving San Luis Reservoir SRA include sewage and water treatment, water storage facilities, power transmission and distribution lines, and propane. There is no formal stormwater system at the San Luis Reservoir. Runoff from the campgrounds, parking grounds, and boat ramps flows overland into area water bodies or percolates into the groundwater.

The area surrounding San Luis Reservoir is dominated by agricultural land uses and publicly owned parkland and wildlife areas, which are relatively quiet. Motor boats are the main source of noise in the vicinity of the San Luis Reservoir at the O’Neill Forebay Recreational Boating area. Motor boats are the main source of noise at O’Neill Forebay. Several campgrounds and day-use picnic areas present along the shores of the reservoir and forebay are relatively close to areas where construction activities would take place under some project alternatives, including San Luis Creek Use Area. The residences nearest potential construction sites at San Luis Reservoir include a subdivision off SR 152 and a residence on Harper Lane. Figure E1-2 in Appendix E1 depicts these noise-sensitive land uses around San Luis Reservoir. At these sensitive receptors, the estimated noise level is a Day-night average level (L_{dn}) of 40 A-weighted decibels (dBA), based on the United States Environmental Protection Agency (USEPA) *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (USEPA 1974).

This environmental assessment relied on the United States Department of Agriculture (USDA), Forest Service Scenery Management System (SMS) to classify the visual resources in the project area. Because visual sensitivity as well as judgments of visual quality and viewer response is dependent on a number of conditions, they tend to be subjective in nature. The SMS uses scenic attractiveness and Landscape Visibility to develop a meaningful measurement of the relative importance and sensitivity or what is seen and perceived in the landscape. Overall, the area around San Luis Reservoir offers open scenic vistas of undeveloped land and open water. These scenic qualities are enhanced by the surrounding undeveloped landscape consisting of “open grassland, expansive vistas of the rolling terrain and the adjacent Diablo range” (Reclamation and CDPR 2013). Utilizing the USDA SMS, San Luis Reservoir is considered a Class A resource, and O’Neill Forebay has elements that are Class A and Class B (USDA Forest Service

1995). State designated scenic highways include SR 152 from the Santa Clara County line to the junction with Interstate (I)- 5.

San Luis Reservoir and O'Neill Forebay are near the boundary of the Great Valley (San Joaquin Valley portion) and the Coast Ranges geomorphic provinces (California Geological Survey [CGS] 2002). As mapped by the county, the eastern portion of San Luis Reservoir including O'Neill Forebay is in a low potential landslide zone while the western portion of the reservoir is in a medium potential landslide zone (Merced County 1990). Surface soil texture surrounding San Luis Reservoir is generally characterized as silt loam on the eastern portion, and loam and sandy loam on the western portion (USDA, Natural Resources Conservation Service [NRCS] 2016a). The silt loam soils have moderate erodibility while the sandy loam soils have a high erodibility (USDA, NRCS 2016b). Shrink-swell potential surrounding San Luis Reservoir can be characterized as low to moderate (USDA, NRCS 2016c).

San Luis Reservoir is in a seismically active area and is close to several faults and fault systems. The Ortigalita fault passes under the reservoir in two locations, one is along the western shore of the reservoir crossing over Lone Oak Bay to the east and the other runs from Cottonwood Bay close to the eastern shore of the reservoir on the eastern side of Basalt Hill (Reclamation and CDPR 2013, USGS 2011). The statewide map of aggregate availability shows the location of aggregate mines in Merced County; however, none are located in the vicinity of San Luis Reservoir. The general location of the mine(s) is southwest of Los Banos on the east side of Highway 5 (Kohler 2006). The California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOC, DOGGR) identified one dry hole well near the eastern edge of the O'Neill Forebay near the connection to the California Aqueduct. This well was abandoned in 1937 (California DOC, DOGGR 2010). There is one mine in the vicinity of San Luis Reservoir and three mines located near Los Banos SRA (California DOC, Office of Mine Reclamation 2012).

San Luis Reservoir is not located within 2 miles of a public or private land-based airport. However, the San Luis Reservoir Sea Plane Base, owned by the CDPR, allows water landings of planes on the reservoir. Approximately 25 aircraft operations per year take place at the reservoir. No overnight mooring of seaplanes is allowed and landing must be at least 500 feet from shore. Notices to Airmen (NOTAMs) are provided as needed from the seaplane base (Airport-Data 2017). The SRA is surrounded by wildlands and the potential for a wildfire in this area does exist which could affect neighboring urbanized areas of Santa Nella. Much of the area surrounding San Luis Reservoir SRA is designated within a moderate or high fire severity zone and is within the State Responsibility Area, which is protected by the California Department of Forestry and Fire Protection (CAL FIRE). Merced County Fire Department provides primary response services to urban fires in unincorporated Merced County Local Responsibility Areas (Merced County 2013). The closest school to San Luis Reservoir SRA is Romero Elementary School on West Luis Road in Santa Nella approximately 1.5 miles east of O'Neill Forebay (Gustine Unified School District [USD] 2013).

One active hazardous materials site was discovered within the San Luis Reservoir SRA consisting of soil and groundwater contamination from a leaking underground storage tank (LUST) containing gasoline. The status of the site is open and remediation of soil and groundwater occurred under the supervision of Merced County until September 2009. Central

Valley Regional Water Quality Control Board (RWQCB) has issued a request to California Department of General Services to continue with monitoring and the installation of additional monitoring wells to assess the extent of soil and groundwater contamination still present (Central Valley RWQCB 2016). Three open hazardous materials sites are within the vicinity of the San Luis Reservoir SRA. The Anderson's Pea Soup LUST cleanup site on SR 33 is contaminated with diesel and gasoline. The Anderson's Pea Soup site is open with a completed site assessment and interim remedial action. Santa Nella Parcel 41, formerly known as Central Valley Pipelines, is located on Santa Nella Road. Santa Nella Parcel 41 is open and currently under remediation for crude oil contamination. The Forebay Chevron site located on Gonzaga Road and is open with a completed site assessment. Emergency evacuation routes within the study area include I-5, SR 33, and SR 152.

Figure F-1 in Appendix F exhibits the road network surrounding the proposed construction sites in the San Luis Reservoir Area. Table 3-1 provides the existing (2016) operating conditions of highway segments located in the vicinity of the project site. Table 3-2 summarizes the daily traffic along the three local access routes. At a junction a highway segment is divided into upstream and downstream and will have two different annual average daily traffic volumes (AADT) values. For conservative purposes, the higher value was used for analysis.

Table 3-1. Existing Highway Operations – San Luis Reservoir Area

Highway	Junction	Jurisdiction	Lanes	Road Type	2016 AADT[1]	Highest LOS
I-5	SR 152	Merced County	4	Rural Freeway	32,000	B
US 101	SR 152 North Junction	Santa Clara County	6	Rural Freeway	110,000	B[2]
SR 152	SR 156 Junction	Santa Clara County	4	Rural Freeway	39,500	B[2]
SR 152	I-5	Merced County	4	Rural Freeway	30,700	B
SR 152	SR 33	Merced County	4	Rural Freeway	29,100	B
SR 33	I-5 West Junction	Merced County	2	Rural Non-Freeway Isolated Stops	14,200	F

AADT – Annual Average Daily Traffic Volumes, LOS – Level of Service
Notes: [1] Source: Caltrans 2016 ; [2] Source: VTA 2014

Table 3-2. Existing Local Roadway Operations – San Luis Reservoir Area

Parameter	Fifield Road/ Dinosaur Point Road	Basalt Road
Road Type	Rural Non-Freeway Isolated Stops	Rural Non-Freeway Isolated Stops
Number of Lanes	2	2
Average Maximum Daily Trips	137	191
Level of Service	B	B

Source: Reclamation and CDPR 2013

All work on Alternative 2 and Alternative 4 would occur at San Luis Reservoir in Merced County. Table 3-3 below presents the 2016 population and housing characteristics for the communities nearest to San Luis Reservoir that would be expected to supply local workers and provide housing for non-local workers.

Table 3-3. Population and Housing for Communities near San Luis Reservoir (Estimated 2012-2016)

Population and Housing	Los Banos	Newman	Gilroy	Gustine	Santa Nella	Total
2016 Population	37,012	10,808	52,576	5,684	1,965	**108,045**
Total Housing Units	11,272	3,403	15,802	2,129	630	**33,236**
Total Occupied	10,698	3,195	15,386	1,960	606	**31,845**
Total Vacant	574	208	416	169	24	**1,391**
Vacant: For Rent	199	164	96	0	0	**459**
Vacant: For Sale	53	0	43	0	6	**102**

Source: U.S. Census Bureau 2016a.

Demographic data from the 2016 American Community Survey 5-Year Estimates by the U.S. Census Bureau show that Merced County is considered a minority affected area, as the county exhibits a total minority proportion exceeding 50 percent; it is at 70.5 percent (U.S. Census Bureau 2016b). Economic data from the U.S. Census Bureau show that Merced County is not considered a low-income affected area. Merced County has a higher proportion of low-income residents than the State (21.4 percent); however, the county does not surpass the identified 24.6 percent poverty level threshold (U.S. Census Bureau 2016b). Identified census tracts within the San Luis Reservoir Region include the communities of Gustine, Ingomar and Volta (Census Tract 20); San Luis Reservoir SRA and Santa Nella (Census Tract 21); and Los Banos (Census Tracts 22.01, 22.02, 23.01, and 23.02). Demographic data show that all the census tracts have total minority proportions exceeding 50 percent, with the largest minority population located within Census Tract 22.02 at 81.5 percent (U.S. Census Bureau 2016a). Economic data identified Census Tract 22.01 as the only tract in the San Luis Reservoir region that is considered a low-income affected area (U.S. Census Bureau 2016c).

3.2 Sacramento-San Joaquin River Delta

San Luis Reservoir provides off-stream storage, with a majority of water supplied to the reservoir by Delta exports. Water quality in the Delta Region is governed in part by Delta hydrodynamics, which are highly complex. The principal factors affecting Delta hydrodynamic conditions are (1) river inflows from the San Joaquin and Sacramento River systems, (2) daily tidal inflows and outflows through the San Francisco Bay, and (3) export pumping from the south Delta through the Harvey O. Banks Pumping Plant (Banks Pumping Plant) and C.W. “Bill” Jones Pumping Plant (Jones Pumping Plant). These Delta hydrodynamic conditions are primarily measured using the parameters of the Sacramento River flow, Delta outflow, Delta inflow, low salinity zone, Old and Middle River flows, and Delta exports. Of these parameters, the transition area between saline waters and fresh water, frequently referred to as the low salinity zone[1] (LSZ), typically located within Suisun Bay and the western Delta and commonly associated with the position of the low salinity zone (X2), is directly controlled by the others—Delta inflow, Old and Middle River flows, and Delta exports. Given this connection, changes in the position of the LSZ and X2 can be used to characterize likely changes in the other parameters.

The existing water quality constituents of concern in the Delta can be categorized broadly as metals, pesticides, nutrient enrichment and associated eutrophication, constituents associated with suspended sediments and turbidity, salinity, bromide, and organic carbon. The relative concentrations of these constituents over time is closely related to the hydrodynamic conditions, including the position of X2, described above. Other physical parameters (including pH, temperature, and EC), monitored daily at Clifton Court Forebay (see Appendix D), can provide a demonstration of how change in these hydrodynamic conditions can affect water quality conditions in the Delta over time.

3.2.1 South-of-Delta CVP Contractors and Facilities

Reclamation operates the CVP, which diverts water from the Delta through Jones Pumping Plant at the southern end of the Delta and lifts the water into the DMC. This canal delivers water to CVP contractors and exchange contractors on the San Joaquin River and to water rights contractors on the Mendota Pool. The CVP water is also conveyed to the San Luis Reservoir for deliveries to CVP contractors through the San Luis Canal. Water from the San Luis Reservoir is also conveyed through the Pacheco Tunnel to CVP contractors in Santa Clara and San Benito Counties (Reclamation 2017).

The San Luis & Delta-Mendota Water Authority (SLDMWA) agencies hold contracts for approximately 3 million acre-feet (MAF) of CVP water annually. Approximately 2.5 MAF of the water is used to irrigate 1.2 million acres of agricultural lands in the Central Valley and Santa Clara and San Benito Counties, while 150,000 to 250,000 AF is used for M&I purposes and 250,000 to 300,000 AF is used for environmental purposes, including wildlife habitat management in the San Joaquin Valley (SLDMWA 2016).

The CVP has only delivered 100 percent of the contracted water to agricultural and M&I contractors in the SLDMWA service area four times since 1990, and the SWP has only delivered 100 percent of the contracted amount twice since 1990. Because of groundwater overdraft conditions throughout the SLDMWA region, groundwater supplies are declining. This has further reduced water supplies for the SLDMWA agencies. In 2014, only 45 percent of the maximum contract volume were delivered to South-of-Delta CVP contractors (Reclamation 2015), and in 2015, South-of-Delta CVP M&I allocations were 25 percent of the contract total (Reclamation 2016b). In 2016, South-of-Delta CVP M&I allocations increased to 55 percent of the contract total (Reclamation 2016b), in 2017 the allocation was 100% (Reclamation 2018a) and in 2018 the allocation was 50% (Reclamation 2019). The San Felipe Division of the CVP and SCVWD are discussed below in more detail.

[1] The LSZ is often referenced by X2, which is the distance upstream, in kilometers, from the Golden Gate Bridge where tidally averaged salinity is equal to 2 parts per thousand. X2 is largely determined by Delta outflow (Kimmerer 2004).

3.2.2 South-of-Delta SWP Contractors and Facilities

The DWR operates the SWP, which diverts water from the Delta through the Banks Pumping Plant into Bethany Reservoir. The California Aqueduct is 444 miles long and delivers water from Bethany Reservoir south to the Central Valley and Southern California. The California Aqueduct flows south 60 miles to O'Neill Forebay at San Luis Reservoir (DWR 2015). At O'Neill Forebay, the California Aqueduct becomes the San Luis Canal, which is managed jointly by Reclamation and DWR and serves both the CVP and the SWP. The San Luis Canal is Federally-built and extends 103 miles from O'Neil Forebay southeast to just past Kettleman City (Reclamation 2011a). At this point it becomes the California Aqueduct again, an SWP facility that delivers water over the Tehachapi Mountains to Southern California.

The SBA was constructed by the SWP in the 1960s to provide water to the south San Francisco Bay area in Alameda and Santa Clara Counties. The South Bay Pumping Plant lifts water 566 feet into the aqueduct (DWR 2001). Water then flows to a junction and a portion is pumped into Lake Del Valle. The SBA conveys water from the Delta through a combination of more than 40 miles of pipelines and canals to the SCVWD, among other water providers. Maximum Table A SWP allocations conveyed by the SBA includes the delivery of 80,000 AF to the Alameda County Flood Control and Water Conservation District (Zone 7), 42,000 AF to Alameda County Water District, and 100,000 AF to SCVWD (DWR 2016a). The SBA ends in a 160-foot diameter Santa Clara Terminal Tank in San Jose at the Penitencia WTP (DWR 2001).

The SWP delivers water to 29 public water agencies in Northern, Central and Southern California that hold long-term contracts for surface water deliveries. The agencies deliver water for both urban use and agricultural use, representing over 25 million municipal water users and 750,000 acres of irrigated farmland. Five of the agencies use the SWP water primarily for agricultural uses, and the remaining 24 use the SWP water primarily for municipal use. As noted above, Alameda County Flood Control and Water Conservation District (Zone 7), Alameda County Water District, and SCVWD all receive their SWP supplies through the SBA.

Water supplies for the agencies include imported SWP water, groundwater, local surface water, and, for some agencies, other imported supplies. The agencies collectively have received deliveries ranging from approximately 1.4 MAF in dry water years to approximately 4 MAF in wet years.

Similar to CVP South-of-Delta deliveries, SWP exports from the Delta, and the corresponding South-of-Delta deliveries have decreased over time. Implementation of the 2008 and 2009 U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) Biological Opinions for the Long-Term Operations of the SWP and CVP resulted in substantial changes in South-of-Delta SWP deliveries. In the period between 2005 and 2013, average annual SWP exports have fallen by 12 percent (DWR 2015).

The affected environment for socioeconomics includes counties where CVP and SWP water service contractors could be affected by the SLLPIP alternatives. The CVP water service contractors have service areas in the San Joaquin Valley ranging from the Delta south to Kern County and in the Bay Area region. The SWP water service contractors have services areas in the Bay Area region, San Joaquin Valley region in Kern and Tulare Counties, and in Southern

California. Table 3-4 presents the regional economy for all counties potentially affected by the alternatives. Regional economic data are presented at a county level, with data from the U.S. Census Bureau and Impact Planning and Analysis (IMPLAN) 2014 data (see Appendix G for a description of IMPLAN). IMPLAN data files are compiled annually from a variety of sources, the U.S. Bureau of Economic Analysis, U.S. Bureau of Labor, and U.S. Census Bureau. Output represents the dollar value of industry production. Labor income is the dollar value of total payroll (including benefits) for each industry plus income received by self-employed individuals.

Table 3-4. Regional Economy by Region and County, 2014

County	Employment (Jobs)	Output (Million $)	Labor Income (Million $)
San Joaquin Valley Region Total	1,824,909	$302,817.6	$96,359.9
Fresno	470,293	$70,994.1	$23,897.1
Kern	415,280	$76,664.5	$23,899.8
Kings	58,269	$13,220.8	$3,627.1
Madera	63,301	$10,171.3	$3,314.8
Merced	101,718	$17,576.2	$5,405.6
San Joaquin	292,108	$45,653.5	$14,867.7
Stanislaus	230,322	$38,336.4	$11,847.3
Tulare	193,616	$30,201.0	$9,500.6
Bay Area Region	**2,830,602**	**$687,275.6**	**$242,696.9**
Alameda	965,630	$179,704.3	$67,638.5
Contra Costa	524,255	$135,972.5	$34,342.2
San Benito	23,672	$3,861.4	$1,124.3
Santa Clara	1,317,045	$367,737.4	$139,592.2
Southern California Region	12,823,418	$2,137,945.0	$757,102.0
Los Angeles	6,082,843	$1,052,751.2	$369,535.2
Orange	2,052,670	$366,579.0	$129,830.8
Riverside	926,353	$123,121.4	$41,561.5
San Bernardino	907,976	$130,158.4	$44,286.0
San Diego	1,981,064	$332,070.8	$124,801.5
San Luis Obispo	163,580	$22,968.6	$7,633.3
Santa Barbara	269,245	$39,491.2	$15,105.5
Ventura	439,686	$70,804.4	$24,348.4

Source: 2014 IMPLAN data; MIG 2016

3.3 San Felipe Division

The San Felipe Division of the CVP was authorized in 1960 and currently delivers water to agriculture and M&I users in Santa Clara County and the northern portion of San Benito County (Reclamation 2011a). The three agencies that make up the San Felipe Division are SCVWD, SBCWD, and Pajaro Valley Water Management Agency (PVWMA). Table 3-5 shows the CVP contract allocations for each of the San Felipe Division agencies. The PVWMA currently does not have a connection to the CVP system or San Luis Reservoir and is therefore not discussed further in this water supply section.

Table 3-5. Contract Allocations for the San Felipe Division

San Felipe Division Members	Contract Type		Source of CVP Water
	Agriculture (AF)	M&I (AF)	
SCVWD[1]	33,100	119,400	San Luis Reservoir
SBCWD	38,244	5,556	San Luis Reservoir
PVWMA[2]	6,260	0	None (See Note 2)

Source: Reclamation 2016c

AF = Acre-Feet

[1] The SCVWD CVP water is used throughout Santa Clara County.

[2] Currently, the PVWMA does not have a connection to the CVP system. However, the PVWMA plans to construct a connection in the future. PVWMA has a contract reservation for an additional 19,900 AF per year which is not under contract until provisions of the Central Valley Project Improvement Act are fulfilled

SCVWD and SBCWD receive water directly from San Luis Reservoir through the San Felipe Division facilities. Water for the San Felipe Division is released from San Luis Reservoir via two intakes on the west side of the reservoir. From the intakes, water flows west through the Pacheco Tunnel Reach 1 to the Pacheco Pumping Plant. At the plant, water is lifted to Reach 2 of the Pacheco Tunnel and conveyed through the Pacheco Conduit to the bifurcation of the Santa Clara and Hollister Conduits.

Water for SCVWD is delivered to the Coyote Pumping Plant via the Santa Clara Conduit, a tunnel that runs through the Diablo Mountains. From Coyote Pumping Plant, the water can be delivered to Anderson Reservoir, Calero Reservoir, groundwater recharge facilities, or the Rinconada and/or Santa Teresa WTPs.

Water from the Hollister Conduit serves San Benito County and extends from Pacheco Conduit to San Justo Reservoir. San Justo Reservoir, located three miles southwest of the City of Hollister, has a total storage capacity of 9,785 AF (Reclamation 2011b). The reservoir regulates San Benito County’s imported water supplies, provides for pressure deliveries to some agricultural lands in the service area, and provides storage for peaking of agricultural water (USFWS 2008). SCVWD operates all San Felipe Division facilities with the exception of the Hollister Conduit and San Justo Reservoir, which are operated by SBCWD.

3.4 Santa Clara Valley Water District/Santa Clara County

The SCVWD service area has several water supply sources, including imported water (CVP and SWP), water from the San Francisco Public Utilities Commission, natural groundwater, local surface water, recycled water, and surface water rights held by San Jose Water Company and Stanford University (SCVWD 2015). Table 3-6 shows a breakdown of the SCVWD water supply sources for 2015.

Table 3-6. SCVWD 2015 Water Supply

Source	Percent
Natural Groundwater Recharge	15%
Local Surface Water	17%
Recycled Water	8%
San Francisco Public Utilities Commission	16%
CVP and SWP Allocations	23%
Carryover, Transfer, and Semitropic Takes	21%

Source: SCVWD 2015

SCVWD receives imported water from the CVP through San Luis Reservoir and Pacheco Conduit, and from the SWP through the SBA. SCVWD has a maximum Table A contract for 100 TAF per year of water from the SWP, although deliveries vary depending on hydrological conditions, environmental regulations, and conveyance limitations. Almost all of this supply is used to meet M&I needs (SCVWD 2010). SCVWD's CVP contract is for a maximum of 152.5 TAF per year, with 119.4 TAF for M&I and 33.1 TAF for agricultural irrigation. The actual amount SCVWD receives from the CVP is generally less than the contractual amount because of climate conditions, environmental regulations, and conveyance limitations.

In Santa Clara County, additional water sources not under the jurisdiction of SCVWD are available, and their use helps to reduce reliance on SCVWD supplies. Several municipalities in Santa Clara County have agreements with the City and County of San Francisco for water from the Hetch Hetchy system. The San Jose Water Company and Stanford University have surface water rights of approximately 11,000 AF per year that they exercise to meet their demands (SCVWD 2015). Approximately 20 TAF of recycled water is currently used from four publicly-owned wastewater treatment plants in Santa Clara County (SCVWD 2015).

SCVWD manages water resources and sells treated water wholesale to retailers in Santa Clara County. SCVWD's infrastructure for water supply includes conveyance facilities, reservoirs, groundwater extraction wells, groundwater recharge basins, and WTPs. About half of the water used in Santa Clara County is pumped from the groundwater subbasins. SCVWD uses local and imported surface water to supplement natural recharge. Raw water is treated at three SCVWD WTPs (Santa Teresa, Penitencia, and Rinconada) and then distributed, or used for groundwater recharge, providing a significant portion of the potable water used within the service area serving the greater San Jose metropolitan region. Santa Teresa WTP in San Jose would be affected by Alternative 3. The Santa Teresa WTP primarily treats Federal (or CVP) water from San Luis Reservoir and other local reservoirs and serves the eastern and central regions of the SCVWD service area. Ten reservoirs managed by SCVWD capture local runoff and store it for groundwater recharge, irrigation, or drinking water treatment (SCVWD 2015). The total storage capacity of all ten reservoirs is approximately 170 TAF; however, this capacity has been restricted to approximately 113 TAF due to SOD interim operating restrictions (SCVWD 2010). With the exception of Anderson Reservoir, the local reservoirs were constructed for annual operations, storing water in the winter and releasing that water in the summer and fall for groundwater recharge. Santa Clara County includes five watersheds. Santa Teresa WTP is located in the Guadalupe watershed (SCVWD 2016).

PG&E provides natural gas and power service to Santa Clara County. SCVWD receives power from the Power and Water Resource Pooling Authority (PWRPA), a California Joint Powers Authority that consists of 15 water purveyors. Power is delivered through PG&E facilities. Numerous landfills exist within the SCVWD service area. In Santa Clara County, there are at least five solid waste landfills.

The major urban areas within Santa Clara County have numerous stormwater runoff collection and discharge facilities. Also, non-point source pollution management plans are established in Santa Clara County to minimize environmental impacts from stormwater runoff to San Francisco Bay and other local waters (Santa Clara County 1994a). Flood control structures are in place to minimize flooding during major storm events. As described in the Santa Clara County General Plan Draft EIR, approximately 20 percent of the valley floor is flood-prone (Santa Clara County 1994b). Most areas with flooding potential are located on the main valley floor and in the baylands, especially along the Guadalupe and Coyote Creeks. The area around Santa Teresa WTP is designated on FEMA's current FIRMs as within Flood Zone D, defined as possible but undetermined flood risk.

The northern and western areas of Santa Clara County are urban, with San Jose as the largest city. The eastern and southern portions of Santa Clara County are rural and designated as Ranchlands, Other Public Open Lands, and Regional Parks, with the exception of the lands immediately surrounding and in the cities of Morgan Hill and Gilroy (Santa Clara County 2013). Appendix H includes land use maps of these areas. Santa Teresa WTP is located on land designated as open space. There is no land surrounding the WTP designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance or land enrolled in Williamson Act contracts.

At Santa Teresa WTP, the estimated noise level is a L_{dn} of 55 dBA. This is based on noise monitoring data in the *Envision San Jose 2040 General Plan Comprehensive Update Environmental Noise Assessment* (Illingworth & Rodkin, Inc. 2010). At the closest monitored location to the water treatment plant, a L_{dn} of 56 dBA was measured 110 feet from the nearest lane of the Almaden Expressway. Santa Teresa WTP is located in an open space area adjacent to a residential neighborhood.

The existing Santa Teresa WTP is boarded by Greystone Lane and the Santa Teresa hills in the City of San Jose. The environmental setting of the existing WTP is primarily built. Utilizing the USDA SMS to classify the visual resources, Santa Teresa WTP and the surrounding area are Class C resources.

In the vicinity of the Santa Teresa WTP, soils are defined as having a surface texture of clay and sandy loam (USDA, NRCS 2016a). The clay soils have low erodibility while the sandy loam soils have a high erodibility (USDA, NRCS 2016b). In addition, clay soils have a high shrink-swell potential while the sandy loam soils have a low shrink-swell potential (USDA, NRCS 2016c). There are no areas prone to landslides near the construction site under Alternative 3 (Santa Clara County 2006).

There are two schools, San Jose Chinese School and Leland High School, located within one-quarter of a mile of existing and proposed WTP facilities where hazardous materials could be used during construction or operation of the new or expanded facilities. There are no active or hazardous materials sites under evaluation in the vicinity of the Santa Teresa WTP. The City of San Jose does not specifically designate evacuation routes (City of San Jose 2011). For the purpose of this study, it is assumed that all freeways, State highways, arterials, and major city roads would be used for an evacuation if needed.

Table 3-7 presents the 2016 population and housing characteristics for San Jose. Because of its large population, it is assumed that under Alternative 3 most of the local workers would come from San Jose and the non-local workers would likely find accommodations in San Jose.

Table 3-7. Population and Housing for San Jose near the Santa Teresa Water Treatment Plant (Estimated 2012-2016)

Population and Housing	San Jose
2014 Population	1,009,363
Total Housing Units	328,185
Total Occupied	317,317
Total Vacant	10,868
Vacant: For Rent	7,548
Vacant: For Sale	1,641

Demographic data show that Santa Clara County is considered a minority affected area, as the county exhibits a total minority proportion exceeding 50 percent, at 66.8 percent (U.S. Census Bureau 2016b). Economic data show that Santa Clara County has a lower proportion of low-income residents, lower than that for the State (6.2 percent), and is not considered a low-income affected area (U.S. Census Bureau 2016c).

Figure F-2 in Appendix F identifies the roads that would provide access to and from the construction site at the Santa Teresa WTP. Table 3-8 provides a summary of existing (2016) operating conditions of highway segments located in the SCVWD service area. The local area roads throughout the SCVWD's service area are identified in Table 3-9.

Table 3-8. Existing Highway Operations – Santa Clara Valley Water District Service Area

Highway	Junction	Lanes	Road Type	Capacity[1] (vph)	2016 AADT[2]	2016 Maximum Density[3]	2016 Average Speed[3]	2016 LOS[3]
I-280	SR 17/I-880	8	Urban Freeway	18,400	205,000	114	10	F
SR 87	I-280	6	Urban Freeway	13,800	169,000	93	16	F
SR 85	SR 17	6	Urban Freeway	13,800	128,000	122	9	F

AADT – Annual Average Daily Traffic Volumes, LOS – Level of Service, vph – Vehicles per hour

Notes: [1]Based on the guidelines provided in the Transportation Impact Analysis Guidelines, VTA, CMP, October 2014.

[2] Source: Caltrans 2016.

[3] Source: Santa Clara County 2016. Reported the worst of the a.m. or p.m. LOS level for the mixed-use lanes. The source document reports a.m. values for 2016 and p.m. values for 2014.

Table 3-9. Local Roadways – Santa Clara Valley Water District Service Area

Road Type[1]	Name	Number of Lanes	Provides Access to
Suburban Non-Freeway	Almaden Expressway	6	Santa Teresa WTP
Suburban Non-Freeway	Camden Avenue	4	Guadalupe Sanitary Landfill, Santa Teresa WTP
Suburban Collector	Guadalupe Mines Road	2	Guadalupe Sanitary Landfill
Suburban Collector	Graystone Lane	2	Santa Teresa WTP
Suburban Collector	Carriage Hill Drive	2	Santa Teresa WTP
Suburban Collector	Rosalind Lane	2	Santa Teresa WTP

[1] Road Type is assigned based on description of road and number of lanes.

The Santa Teresa WTP is located within Census Tract 5119.11 in the City of San Jose (see Figure I-2 in Appendix I). Demographic data show that Census Tract 5119.11 has a total minority proportion of 41.3 percent, below 50 percent, and is not considered a minority affected area (U.S. Census Bureau 2016b). Economic data indicate that the Santa Teresa WTP census tract has a median and per capita income above both the State and county averages and does not fall below the U.S. Census Bureau's defined poverty thresholds, and it is not considered a low-income affected area (U.S. Census Bureau 2016c).

3.5 Pacheco Reservoir

Pacheco Reservoir is located on the North Fork of Pacheco Creek and was established in 1939 through construction of the North Fork Dam. This existing earthen dam is owned and operated by Pacheco Pass Water District (PPWD). Water released from the Reservoir flows down Pacheco Creek and seeps through the creek bed and into the underlying groundwater aquifer as it winds towards its confluence with the Pajaro River. The released flow is controlled to fully infiltrate into a groundwater aquifer that begins at the northern tip in Santa Clara County and extends southwards into San Benito County. Agricultural users in PPWD and SBCWD’s service areas pump water from the aquifer.

The design capacity of Pacheco Reservoir is 6,000 AF, with an operational capacity of 5,500 AF. The earthen dam is 100 feet tall and collects rainfall from a 75-square-mile watershed. Since the 1940s, the facility has undergone multiple repairs to its spillway. North Fork Dam is currently under restricted-operation criteria through an April 5, 2017 order of DWR’s Division of Safety of Dams (DSOD) due to existing spillway deficiencies. The PPWD is coordinating with FEMA and DSOD on short-term and long-term repairs. The DSOD has stated that if satisfactory progress is not made to address spillway deficiencies, additional remedies would be invoked, inclusive of revocation of the PPWD’s Certificate of Approval to store water.

Pacheco Reservoir is situated on the North Fork of Pacheco Creek, a tributary of the Pajaro River (see Chapter 2, Figure 2-6). Water released from Pacheco Reservoir flows into the North Fork Pacheco Creek and joins the South Fork Pacheco Creek, just upstream from SR 152 to flow downstream as Pacheco Creek. East of the City of Gilroy, San Felipe Lake, a natural lake, is formed by the confluence of Pacheco Creek, Tequisquita Slough and Ortega Creek. The lake drains through two man-made outlet channels that join to form Miller Canal, which was completed in 1874 to facilitate agricultural development. Miller Canal joins the Pajaro River southwest of San Felipe Lake. The Pajaro River then flows southwest until it drains into Monterey Bay.

Pacheco Creek is designated on the 303(d) List for DO and turbidity impairment. Potential sources of the impairment are listed as unknown. Rearing and migratory habitat for South-Central California Coast steelhead in Pacheco Creek downstream of the dam is almost completely dependent upon releases from Pacheco Reservoir. The reservoir may not fill completely in dry years, leading to inadequate flow releases to the North Fork of Pacheco Creek in spring and summer months to provide suitable habitat for rearing steelhead downstream. Even in wet years, flow releases can be inadequate to support steelhead rearing in Pacheco Creek by mid-summer.

No established facilities exist at Pacheco Reservoir that require wastewater service. Residents in the area of the reservoir rely on septic systems for wastewater needs. There is no established stormwater infrastructure at the reservoir. Stormwater is captured in Pacheco Reservoir and then released downstream in Pacheco Creek and it is not collected by any established drains or collectors. The South Valley Recology facility in Gilroy has the capacity to accept Class A debris (such as construction debris). Some debris may be brought to the John Smith Landfill in Hollister. Gas and electricity service in the area is provided by PG&E.

Pacheco Reservoir area is within Zones A and D (FEMA 2018). Areas susceptible to flooding include low-lying areas along Pacheco Creek and around Pacheco Reservoir. Pacheco Dam failure inundation mapping is presented in the Santa Clara County General Plan Book B (Santa Clara County 1994a). The dam failure inundation area is primarily along Pacheco Creek toward its confluence with the Pajaro River and into the northern section of San Benito County. Historically, flooding downstream of the dam occurs during major storm events along portions of SR 152, agricultural land, and rural residential properties within the Pacheco Creek floodplain. If the dam were to fail, it would likely inundate these same areas. Currently, the North Fork Dam is operating under restricted operations due to spillway deficiencies.

The land surrounding Pacheco Reservoir is privately owned and is rural, primarily used for livestock grazing, designated by the Santa Clara County General Plan as ranchlands (Santa Clara County 1994a). Two single-family residences are located 1 mile south of the existing North Fork Dam. There is no land surrounding Pacheco Reservoir designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Several parcel of grazing land surrounding Pacheco Reservoir are enrolled in ongoing Williamson Act contracts.

The Henry W. Coe SP boundary is located less than 0.5 mile from the reservoir. At 87,000 acres, Henry W. Coe SP is the largest state park in Northern California. Recreational uses in the park include hiking, backpacking, camping, mountain biking, fishing, and horseback riding. The state park is open year-round for hikers, mountain bikers, backpackers, equestrians, campers, and picnickers.

At Pacheco Reservoir, the estimated noise level is L_{dn} of 40 dBA. This is based on the *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (USEPA 1974). The following are the sensitive receptors closest to Pacheco Reservoir: a residence on El Toro Road, a residence on Dinosaur Point Road, and a produce stand along SR 152.

Pacheco Reservoir is located within the Diablo Range portion of the Coast Ranges Geomorphic Province. Soils in the vicinity are defined as having surface texture of loam and gravelly loam (USDA, NRCS 2018). The loam and gravelly loam soils have a low to moderate erodibility and have a low shrink-swell potential (USDA, NRCS 2018). There are no areas prone to landslides near the construction site for Alternative 5 (Santa Clara County 2006). There are no wells or mines in the vicinity of Pacheco Reservoir.

Utilizing the USDA SMS to classify the visual resources, the area surrounding Pacheco Reservoir is rural, pastoral landscape of open space (Class B and C resources). Current views of the reservoir and dam are limited to the few private properties surrounding the reservoir. No views of the reservoir exist from any scenic overlooks, trails, or roads within Henry W. Coe SP.

Much of the area surrounding Pacheco Reservoir and Pacheco Creek is designated within moderate to high fire severity zones, and these areas are within the State Responsibility Area, which is protected by CAL FIRE (CAL FIRE 2007). Emergency evacuation routes within the Pacheco Reservoir area include SR 152, County and private roads. There are no active or hazardous materials sites, schools, or airports within 5 miles of Pacheco Reservoir.

Pacheco Reservoir is located within Census Tract 5153 in unincorporated Santa Clara County (see Figure I-3 in Appendix I). Census Tract 5153 has a minority proportion of 43.7 percent, below 50 percent, and is not considered a minority affected area (U.S. Census Bureau 2016b). Economic data indicate that the Pacheco Reservoir census tracts have median and per capita incomes above both the State and county averages, do not fall below the U.S. Census Bureau's defined poverty thresholds, and are not considered low-income affected area (U.S. Census Bureau 2016c). All work on Alternative 5 would occur at Pacheco Reservoir in Santa Clara County. Table 3-10 below presents the 2016 population and housing characteristics for the communities nearest to Pacheco Reservoir that would be expected to supply local workers and provide housing for non-local workers.

Table 3-10. Population and Housing for Communities near Pacheco Reservoir (Estimated 2012–2016)

Population and Housing	Hollister	Los Banos	Gilroy	Santa Nella	Total
2016 Population	36,901	37,012	52,576	1,965	128,454
Total Housing Units	10,669	11,272	15,802	630	38,373
Total Occupied	10,386	10,698	15,386	606	37,076
Total Vacant	283	574	416	24	1,297
Vacant: For Rent	67	199	96	0	362
Vacant: For Sale	11	53	43	6	113

Source: U.S. Census Bureau 2016a.

SR 152 would provide access to and from the construction site at Pacheco Reservoir. The Transportation Element of the Santa Clara County General Plan (Santa Clara County 1994a) describes SR 152 as a busy highway and one of the scenic gateways in Santa Clara County. SR 152 is built to rural standards, with direct at-grade access to the highway, allowing for cross roads at various locations. Vehicles would access Pacheco Reservoir via the existing access road adjacent to SR 152.

3.6 Groundwater Basins

The South-of-Delta CVP contractor service area includes the San Joaquin Valley Groundwater Basin. Table 3-11 summarizes the key groundwater characteristics in the CVP contractor service area. The South-of-Delta SWP contractor service area includes 14 groundwater basins. Table 3-12 lists the groundwater basins and summarizes the key groundwater characteristics in the SWP Contractor Service areas. See Appendix J for detailed discussion of the groundwater basins.

There are no mapped groundwater basins underlying San Luis Reservoir or Pacheco Reservoir areas (DWR 2016b), but the San Joaquin Valley Groundwater Basin (Delta-Mendota subbasin) underlies O'Neill Forebay (see Table 3-11). Though there would be minimal to no direct recharge under the Pacheco Reservoir, the reservoir is currently operated for groundwater recharge through releases to Pacheco Creek. Pacheco Creek flows through the Gilroy-Hollister groundwater subbasin (see Table 3-12).

Table 3-11. CVP Groundwater Basins and Key Characteristics

Groundwater Basin/Subbasin	CASGEM Prioritization	Issues of Concern in the basin
San Joaquin Valley Groundwater basin (Tracy subbasin)	Medium Priority	Degraded water quality throughout the subbasin (DWR 2014a) Subbasin has high potential for subsidence (DWR 2014b) NASA's InSAR study has recorded up to 2 feet of subsidence in portions of the San Joaquin Valley for the period between May 2015 through September 2016 (Farr et al. 2016)
San Joaquin Valley Groundwater basin (Delta-Mendota subbasin)	High Priority	Overdraft concerns in the subbasin (DWR 2014a) Subbasin has high potential for subsidence (DWR 2014b) NASA's InSAR study has recorded up to 2 feet of subsidence in portions of the San Joaquin Valley for the period between May 2015 through September 2016 (Farr et al. 2016)
San Joaquin Valley Groundwater basin (Westside subbasin)	High Priority	Overdraft, land subsidence and water quality concerns in the subbasin including saline conditions, very high TDS and pesticide contamination in portions of the subbasin (DWR 2014a). Subbasin has high potential for subsidence (DWR 2014b) NASA's InSAR study has recorded up to 2 feet of subsidence in portions of the San Joaquin Valley for the period between May 2015 through September 2016 (Farr et al. 2016).

Sources: DWR 2014a, DWR 2014b, Farr et al. 2016

Table 3-12. SWP Groundwater Basins and Key Characteristics

Groundwater Basin/Subbasin	CASGEM Prioritization	Issues of Concern in the basin
Santa Clara Valley Groundwater Basin (Santa Clara subbasin)[1]	Medium Priority	Water Quality concerns in the subbasin with elevated mineral levels in portions of the northern subbasin and elevated nitrate in portions of the southern subbasin (DWR 2014a and Santa Clara Valley WD 2017). Santa Clara Valley Water District manages its groundwater use to avoid subsidence and has established subsidence thresholds equal to the current acceptable rate of 0.01 feet per year (Santa Clara Valley WD 2012)
Gilroy-Hollister Groundwater Basin (Llagas Subbasin)[1]	High Priority	Water Quality concerns in the subbasin with elevated Nitrate levels. Perchlorate is also a problem in portions of the subbasin (San Clara Valley WD 2017). Subbasin has high potential for subsidence (DWR 2014b)
Fremont Valley Groundwater Basin	Low Priority	Basin has naturally high TDS and other constituents like fluoride and sodium (DWR 2014a) Subbasin has medium to high potential for subsidence (DWR 2014b) and CGPS station within the subbasin have recorded up to 0.02 feet of subsidence since 2005 (DWR 2016b).
Antelope Valley Groundwater Basin	High Priority	Basin is undergoing groundwater overuse and has groundwater quality concerns. Subbasin has high potential for subsidence (DWR 2014) and CGPS station within the subbasin have recorded up to 0.03 feet of subsidence since 2005 (DWR 2016b)
Ames Valley Groundwater Basin	Very Low Priority	Groundwater in the subbasin has locally occurring high TDS, fluoride and chloride levels (DWR 2014a).
Copper Mountain Valley Groundwater Basin	Very Low Priority	Groundwater in the subbasin has locally occurring high TDS levels (DWR 2014a).
Warren Valley Groundwater Basin	Medium priority	Adjudicated since 1977 and is managed by Warren Valley Basin Watermaster
Coachella Valley Groundwater Basin (Indio, San Gorgonio and Mission Creek subbasins)	Medium priority (Indio, San Gorgonio and Mission Creek subbasins)	Groundwater Quality concerns including high nitrate levels, salts due to use of imported Colorado River water for irrigation within subbasins (DWR 2014a) San Gorgonio subbasin has overdraft concerns (DWR 2014a)
Northwest Metropolitan Area Groundwater Basins (Oxnard Plain, Oxnard Forebay, Pleasant Valley, Santa Rosa and West, East and South Los Posas subbasins)	High Priority (Oxnard Plain, Oxnard Forebay, and Pleasant Valley subbasins) Medium Priority (Santa Rosa subbasin)	Saline intrusion, nitrates, pesticides, and PCBs have impacted some water wells in the Oxnard Plain and Oxnard Forebay subbasins (DWR 2014a). Pleasant Valley subbasin has discharge of poor-quality groundwater from dewatering wells and effluent discharge from the wastewater treatment facility into the Arroyo Simi have led to rising water levels in the basin along with higher TDS and Chloride levels (DWR 2014a).
San Fernando Valley Groundwater Basin	Medium priority	Basin has been adjudicated since 1979.
San Gabriel Valley Groundwater Basin	High priority	Basin has been adjudicated since 1971.

Groundwater Basin/Subbasin	CASGEM Prioritization	Issues of Concern in the basin
Coastal Plains of Los Angeles Groundwater Basin (Santa Monica, Hollywood, West Coast, and Central subbasins)	Medium priority (Santa Monica and West Coast subbasins) High Priority (Central subbasins)	Central and west coast basins have been adjudicated since 1965 and 1961 respectively.
Coastal Plains of Orange County Groundwater Basin	Medium priority	Basin has noticed saline water intrusion issues (DWR 2014a). Basin is prioritized as having high potential for subsidence (DWR 2014b)
Upper Santa Ana Valley Groundwater Basin	High priority	High nitrates, salinity, and TDS (DWR 2014a) Water quality degradation issues known in several public supply wells (DWR 2014a).

Notes: [1] SCVWD manages these groundwater basins. SCVWD is a SWP and CVP contractor.
Sources: DWR 2014a, DWR 2014b, SCVWD 2012, SCVWD 2017

3.7 Air Quality and Greenhouse Gases

3.7.1 Air Quality

San Luis Reservoir is located in Merced County, which is within the San Joaquin Valley Air Basin (SJVAB). The Valley is bordered on the west by the Coast Ranges, on the east by the Sierra Nevada Mountains and on the south by the Tehachapi Mountains. The region is highly susceptible to pollutant accumulation over time because of the mountains that surround the valley. Marine air flows toward the east through gaps in the Coast Range at the Golden Gate Strait and Carquinez Strait.

Low wind speeds contribute to high concentrations of air pollutants in the winter time. During the summer, winds typically originate from the north end of the basin and flow in a south-southeast direction though the valley. These conditions contribute to persistent summer inversions that prevent the vertical dispersion of air pollutants. Summertime inversions occur when a layer of cool, marine air is trapped below a mass of warmer air above.

The Federal Clean Air Act requires States to classify air basins (or portions thereof) as either attainment or nonattainment with respect to criteria air pollutants, based on whether the National Ambient Air Quality Standards (NAAQS) have been achieved, and to prepare air quality plans containing emission reduction strategies for those areas designated as nonattainment. Table 3-13 shows the attainment status for the SJVAB.

While Pacheco Reservoir is located in Santa Clara County, it is located near San Luis Reservoir (Merced County) and so the air quality in the region of Pacheco Reservoir is assumed to be similar to that described for Merced County.

Table 3-13. Attainment Status for SJVAB (Merced County)

Pollutant	National Standards [1,2,3]	California Standards [1,2]
Ozone (O_3)	Nonattainment, extreme [4]	Nonattainment
Carbon monoxide (CO)	Attainment	Unclassified
Nitrogen dioxide (NO_2)	Attainment	Attainment
Sulfur dioxide (SO_2)	Attainment	Attainment
Inhalable Particulate Matter (PM_{10})	Maintenance	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment [5]	Nonattainment
Lead (Pb)	Attainment	Attainment

Source: California Air Resources Board (CARB) 2017; USEPA 2018a; 40 CFR 81.305.

Notes:

[1] Nonattainment means that the area does not meet the ambient air quality standard for that pollutant.

[2] Attainment means that the area meets the ambient air quality standard for that pollutant.

[3] Maintenance means that the area has recently met the standard and must continue to provide USEPA with information showing that it is maintaining the standard before the area can qualify for redesignation as attainment.

[4] The San Joaquin Valley, which includes Merced County, was designated as a nonattainment area for the 2015 O_3 NAAQS on August 3, 2018 (83 FR 25776).

[5] Classified as moderate nonattainment for the 2012 annual primary NAAQS and serious nonattainment for the 2006 24-hour NAAQS.

Santa Teresa WTP is located in Santa Clara County, which is in the San Francisco Bay Area Air Basin (SFBAAB). The basin is mostly covered on the east and south by the Diablo Range, on the west by the Pacific Ocean, and on the north by the Coast Ranges. The basin is characterized by complex terrain consisting of inland valleys, coastal mountain ranges, and the San Francisco Bay.

The basin's climate is mostly determined by a high pressure system regularly present over the eastern Pacific Ocean off the West Coast. This high pressure system shifts to the south during the winter, allowing storms to pass through the region. During the summer, abundant sunshine and the region's topography and subsidence inversion create conditions that favor the formation of pollutants such as ozone. Table 3-14 shows the attainment status for the SFBAAB.

Sensitive receptors are segments of the population susceptible to poor air quality—children, elderly, and people with pre-existing health problems. Examples of sensitive receptors include residences, schools and school yards, parks and playgrounds, daycare centers, nursing homes, and medical facilities. Table 3-15 summarizes the health effects associated with criteria air pollutants. The USEPA set the NAAQS and the air districts set CEQA significance thresholds to reduce these health risks to acceptable levels. See Appendix E1 for more information on sensitive receptors in the study area.

Table 3-14. Attainment Status for SFBAAB

Pollutant	National Standards [1,2,3]	California Standards [1,2]
Ozone (O_3)	Nonattainment, marginal [4]	Nonattainment
Carbon monoxide (CO)	Maintenance	Attainment
Nitrogen dioxide (NO_2)	Attainment	Attainment
Sulfur dioxide (SO_2)	Attainment	Attainment
Inhalable Particulate Matter (PM_{10})	Attainment	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment [5]	Nonattainment
Lead (Pb)	Attainment	Attainment

Source: CARB 2017; USEPA 2018a; 40 CFR 81.305.

Notes:

[1] Nonattainment means that the area does not meet the ambient air quality standard for that pollutant.

[2] Attainment means that the area meets the ambient air quality standard for that pollutant.

[3] Maintenance means that the area has recently met the standard and must continue to provide USEPA with information showing that it is maintaining the standard before the area can qualify for redesignation as attainment.

[4] The San Francisco Bay Area, which includes Santa Clara County, was designated as a nonattainment area for the 2015 O_3 NAAQS on August 3, 2018 (83 FR 25776).

[5] Classified as moderate nonattainment for the 2006 24-hour NAAQS.

Table 3-15. Criteria Pollutants and Their Effects on Health

Pollutant	Characteristics	Health Effects	Major Sources
O_3	A highly reactive photochemical pollutant created by the action of sunshine on O_3 precursors	• Cough, chest tightness pain upon taking a deep breath • Worsening of wheezing and other asthma symptoms • Reduced lung function • Increased hospitalizations for respiratory causes	Pollutants emitted from vehicles, factories, and other industrial sources, fossil fuels combustion, consumer products, and evaporation of paints.
NO_2	Reactive, oxidizing gas formed during combustion	• Respiratory symptoms • Episodes of respiratory illness • Impaired lung function	High temperature combustion processes, such as those occurring in trucks, cars, and power plants
SO_2	Colorless gas with a pungent odor	• Wheezing, shortness of breath, and chest tightness • Pulmonary symptoms and disease • Decreased pulmonary function • Increased risk of mortality	Sulfur-containing fuel burned by locomotives, ships, and off-road diesel equipment or industrial sources like petroleum refining and metal processing
CO	Odorless, colorless gas that is highly toxic. Formed by the incomplete combustion of fuels	• Impairment of oxygen transport in the bloodstream • Aggravation of cardiovascular disease • Fatigue, headache, dizziness	Carbon-containing fuels like gasoline or wood

Pollutant	Characteristics	Health Effects	Major Sources
PM_{10} and $PM_{2.5}$	Small particles that measure 10 microns or less are term PM_{10} (fine particles less than 2.5 microns are $PM_{2.5}$). Solid and liquid particles of dust, soot, aerosols, smoke, ash, and pollen and other matter that is small enough to remain suspended in the air for a long period.	• Increased risk of hospitalization for lung and heart-related respiratory illness • Increased risk of premature deaths • Reduced lung function • Increased respiratory symptoms and illness	Burning fuels like gasoline, oil, diesel or wood ($PM_{2.5}$) and windblown dust (PM_{10}).
Pb	Soft and resilient metal	• Impaired blood formation and nerve conduction • Fatigue, anxiety, short-term memory loss, depression, weakness in extremities, and learning disabilities in children • Cancer	Various industrial activities

3.7.2 Greenhouse Gas Emissions

Greenhouse gases (GHGs) – carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons – are emitted from human activities and natural systems into the atmosphere and trap heat that would otherwise be released into space. Thermal radiation absorbed by the GHGs is re-radiated in all directions, including back toward the surface of the earth. This results in an increase of Earth's surface temperatures above what they would be without the presence of the GHGs, which are persistent and remain in the atmosphere for long periods of time. GHGs differ from criteria pollutants in that GHG emissions do not cause direct adverse human health effects. Rather, the direct environmental effect of GHG emissions is the increase in global temperatures, which in turn has numerous indirect effects on the environment and humans.

Scientific research shows that global GHG emissions from human activities have grown since pre-industrial times, with an increase of 78 percent between 1970 and 2010 (Intergovernmental Panel on Climate Change 2014). Atmospheric concentrations of carbon dioxide equivalent (CO2e) reached 405.5 parts per million (ppm) in 2017, up from 403.3 ppm in 2016 and 400.1 ppm in 2015, far exceeding the natural range over the last 800,000 years, as measured in ice core samples (American Meteorological Society 2017). A majority of anthropogenic CO2 emissions is attributed to the burning of fossil fuels electricity, heat, and transportation and land use changes, such as deforestation (USEPA 2018b).

If left unchecked, by the end of the century CO2 concentrations could reach levels three times higher than pre-industrial times, leading to climate change that threatens the public health, economy, and environment. Efforts are underway globally to both mitigate GHG emissions to reduce further climate change as well as to adapt to the unavoidable changes in climate that will result from past and future GHG emissions that have already been emitted. However, recent studies show that global GHG emissions continue to rise (Melillo 2014).

3.8 Cultural Resources in Study Area

The cultural resources area of analysis is centered on the area of potential effects (APE) for each alternative considered in this EIS/EIR. The APE encompasses all areas in which cultural resources may be directly or indirectly impacted by project activities. The cultural resources area of analysis also includes a buffer surrounding the APE for each alternative. The APE for the four action alternatives is as follows: (1) the Alternative 2 APE, which encompasses a proposed aeration facility, the Basalt Use Area, the Dinosaur Point Use Area, Dinosaur Point Road, an intake or dredging area surrounding the proposed pipeline or tunnel, and Gate Shaft Island (2,087 acres); (2) the Alternative 3 APE, which includes the full extents of the existing Santa Teresa WTP (11.8 acres); (3) the Alternative 4 APE, which spans the Basalt Hill borrow area and Borrow Area 6, the Cottonwood Bay levee modification and levee raise areas, the Dinosaur Point boat launch modification area, downstream fill impact areas, haul road and Highway 152 impact areas, potential construction staging areas, and the San Luis Reservoir shoreline (4,483 acres); and (4) the Alternative 5 APE, which includes the existing North Fork Dam, a proposed dam and reservoir, new pipelines and tunnels, inlet/outlet facilities, a pump station, borrow areas, temporary haul roads, and a new transmission line (2,269 acres). Buffers centered on the APE for each alternative include a generalized 0.5-mile radius for Alternative 2, a 300-foot radius for Alternative 3, and a 0.5-mile radius for Alternatives 4 and 5.

Reclamation serves as the Federal Lead Agency for the SLLPIP under NEPA, and SCVWD serves as the State Lead Agency under CEQA. Federal laws, policies, and regulations applicable to the project include NEPA, the National Historic Preservation Act (NHPA), the Native American Graves Protection and Repatriation Act (NAGPRA), and regulations published by the Advisory Council on Historic Preservation (ACHP) and the National Park Service (NPS). Relevant State laws, policies, and regulations include CEQA and California Office of Historic Preservation (OHP) guidelines. Regional or local policies and regulations may be found in the effected county general plans. All of these laws, policies, and regulations are described more fully in Appendix C.

Information on cultural resources within the area of analysis for each action alternative was collected through archival and record searches; an examination of current literature; cultural resource inventory surveys; and an analysis of buried cultural resource sensitivity. This information is detailed fully in the Project technical report (Pacific Legacy 2018) attached as Appendix K.

Indian Trust Assets (ITAs) are defined as legal interests in property held in trust by the United States government for Indian tribes or individuals, or property protected under United States (U.S.) law for Indian tribes or individuals. There are no ITAs within or adjacent to the area of analysis. A map indicating the closest ITAs to the study area is included in Appendix H. The ITAs in closest proximity to the area of analysis are Chicken Ranch ITA, northeast of Merced County in Tuolumne County, and Picayune ITA, east of Merced County in Madera County. See Section 4.6 for additional information on ITAs.

3.8.1 Cultural Context

The Project action alternatives span the Central Coast and Central Valley regions, which were inhabited by Native Americans beginning at least 10,000 years ago. The Ohlone and the Northern Valley Yokuts, the two major Native groups who would have been encountered by early Euro-Americans, left behind a rich material culture evident in archaeological sites throughout both regions. These groups were followed by Spanish, Mexican, and American explorers, missionaries, soldiers, and settlers who later altered the landscape in distinct ways. The prehistoric, ethnographic, and historic period cultural history of the SLLPIP area of analysis is explored in depth in Appendix K and provides a more detailed context for the cultural resources discussed below.

3.8.2 Archival and Record Searches and Cultural Resource Inventory Surveys

Archival and record searches of known cultural resource locations and prior cultural resource studies were carried out in 2009, 2012, 2016, and 2018 at the Central California Information Center (CCIC) and the Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS) for the cultural resources area of analysis associated with each proposed action alternative. Pedestrian inventory surveys within the APE for Alternatives 2, 4, and 5 were conducted between 2012 and 2018 while the APE for Alternative 3 was examined in 2002. Due to access issues and/or changes in alternative design since the initial surveys, the approximately 405 acres within the Alternative 4 APE and 381 acres within Alternative 5 APE remain pending. Although existing record search and survey information is adequate to support the impact analysis and conclusions in this EIS/EIR, if either is selected as the preferred alternative, the inventory survey of remaining portions of the Alternative 4 or Alternative 5 APE will be completed following Congressional authorization and prior to the release of a Final EIS/EIR and the signing of a ROD. The APE for each action alternative was examined using a survey interval of no more than 12 to 15 meters, and all previously recorded and newly discovered cultural resources were documented as appropriate. An architectural field survey and evaluation of the B.F. Sisk Dam and its associated features was conducted in 2018 (JRP 2018). Archival and record search and inventory survey results for the action alternatives are summarized below, and further details on these efforts are presented in Appendix K.

Lower San Felipe Intake Alternative

Forty-two cultural resources were previously recorded within the Alternative 2 area of analysis, including 11 within the APE and 31 within a surrounding 0.5-mile buffer. Six of the 11 resources within the APE are prehistoric archaeological sites, one is a prehistoric archaeological district, three are historic period resources, and one is a historic period district. The prehistoric district (P-24-000489/San Luis Gonzaga Archaeological District) is listed in the National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR), and one historic period resource (P-24-000643/California State Historical Landmark [CHL] 829) is listed in the CRHR. Twenty-eight prior cultural resource studies overlapped the Alternative 2 area of analysis, including 17 that encompassed portions of the APE.

All accessible areas (856 acres) within the Alternative 2 APE were subject to inventory survey in 2012 (Pacific Legacy 2018). Twelve historic period archaeological sites or built environment resources were newly discovered and three known resources were re-recorded. The newly discovered resources included seven historic period roads (CA-MER-487H, CA-MER-488H, CA-MER-489H, CA-MER-491H, CA-MER-493H, CA-MER-494H, and CA-MER-495H); transmission poles and a debris scatter (CA-MER-484H); two historic period debris scatters (CA-MER-485H and CA-MER-490H); an earthworks dam (CA-MER-486H); and an industrial site (CA-MER-492H) used in the construction of the B.F. Sisk Dam. A multi-component site with a historic period earthen dam, a stock pond, and a prehistoric lithic scatter (CA-MER-26/H); a prehistoric lithic scatter with midden and human remains (CA-MER-94); and a series of road segments (P-24-001822) were re-recorded. One resource was noted but required no further documentation (P-24-000643/CHL 829). Two known districts (P-24-000489/San Luis Gonzaga Archaeological District and P-24-001856/ San Luis Gonzaga Rancho Historic District) lacked any material presence within the APE and were not re-recorded, while four resources were not relocated because they were inundated (CA-MER-8, CA-MER-17, and P-24-001818) or capped with fill soil (CA-MER-27). One previously recorded resource (CA-MER-437) was found to be non-cultural.

Treatment Alternative

One prehistoric resource (CA-SCL-377) containing a single chert flake, possible midden soils, and a possible bedrock mortar feature was previously recorded within the Alternative 3 area of analysis; both the midden soils and bedrock mortar were interpreted as potentially natural features. The resource lay outside the APE but within a surrounding 300-foot buffer. Four prior cultural resource studies overlapped the Alternative 3 APE, including one pedestrian inventory that fully encompassed it. The Alternative 3 APE (11.8 acres) was subject to a full inventory survey in 2002 (Cartier 2002) in support of a SCVWD project and was not re-examined for the SLLPIP. No cultural resources were discovered.

San Luis Reservoir Expansion Alternative

Fifty cultural resources were previously recorded within the Alternative 4 area of analysis, including 19 within the APE and 31 within a surrounding 0.5-mile buffer. Fifteen of the 19 resources within the APE are prehistoric archaeological sites, one is a prehistoric archaeological district, and three are historic period resources. Of the 19 resources in the APE, two prehistoric sites (CA-MER-130 and CA-MER-136) and the prehistoric district (P-24-000489/San Luis Gonzaga Archaeological District) are listed in the NRHP and CRHR. Fifty-two prior cultural resource studies overlapped the Alternative 4 area of analysis, including 33 that encompassed portions of the APE.

All accessible areas (4,083 acres) within the Alternative 4 APE were subject to inventory survey in 2012 or in 2016. Nineteen historic period archaeological sites or built environment resources were newly identified and seven known resources were re-recorded. Resources newly discovered in 2012 or 2016 included a series of historic period transmission poles with a debris scatter (CA-MER-484H); two industrial sites (CA-MER-492H and CA-MER-509H) associated with construction of the B.F. Sisk Dam; seven historic period road segments (CA-MER-489H, CA-MER-491H, CA-MER-493H, CA-MER-494H, CA-MER-495H, CA-MER-513H, and CA-MER-519H); a concrete equipment pad (CA-MER-510H); a water tank on railroad ties (CA-MER-511H); a helicopter pad (CA-MER-512H); a ditch segment (CA-MER-514H); three earthen dams with impound ponds (CA-MER-515H, CA-MER-516H, and CA-MER-518H); a prehistoric midden site with lithics and groundstone (CA-MER-517); and a series of survey markers and monitoring wells (CA-MER-520H) associated with the B.F. Sisk Dam.

The seven known resources that were re-recorded within the Alternative 4 APE included five prehistoric sites (CA-MER-15, CA-MER-28, CA-MER-82, CA-MER-83, and CA-MER-130), most with midden, lithics, and groundstone; one historic period water tank and trough (CA-MER-521H); and one historic period road (P-24-001822). Two of the known resources that were re-recorded within the APE were originally plotted outside it but were found to intersect it during inventory survey. Two known resources that were not re-recorded in 2012 or 2016 included the San Luis Gonzaga Archaeological District (P-24-000489), which comprises an artificial boundary lacking any material presence within the APE, and the B.F. Sisk Dam and its key features, which were recorded in 2018 during an architectural field survey (JRP 2018).

Eleven resources previously recorded in the Alternative 4 APE were not relocated. Seven were prehistoric archaeological sites originally noted along the reservoir shoreline (CA-MER-20, CA-MER-21, CA-MER-22, CA-MER-23, CA-MER-27, CA-MER-29, and CA-MER-41) that may have been mis-plotted during prior recording, destroyed or obscured through geomorphic processes, or subject to modern disturbance. Two prehistoric sites (CA-MER-136 and CA-MER-137) lay along the Cottonwood Bay shoreline, which was inaccessible during the 2016 inventory survey. One historic period ranch complex (CA-MER-451H) lay within an area added to the Alternative 4 APE after the 2016 inventory survey was completed. One prehistoric site (CA-MER-14) lay within the dam footprint and was presumed destroyed.

Pacheco Reservoir Expansion Alternative

Thirty-five cultural resources were previously recorded within the Alternative 5 area of analysis, including 12 within the APE and 23 within a surrounding 0.5 mile buffer. Nine of the 12 previously recorded resources within the APE are prehistoric archaeological sites (CA-SCL-116, CA-SCL-121, CA-SCL-322, CA-SCL-682, CA-SCL-683, CA-SCL-684, CA-SCL-685, CA-SCL-686, and CA-SCL-687), most containing lithics as well as midden and/or groundstone; two are multi-component resources, one containing a prehistoric lithic scatter with midden and groundstone as well as historic period debris (CA-SCL-679/H), the other containing prehistoric midden deposits and a historic period structure with associated debris (CA-SCL-680/H); and one is a historic period farmhouse and barn (P-35-000236). One additional historic period built environment resource, the North Fork Dam, intersects the Alternative 5 APE, though it has never been formally recorded. None of these resources have been evaluated for listing in the NRHP and/or the CRHR. Forty-seven prior cultural resource studies overlapped the Alternative 5 area of analysis, including 23 that encompassed portions of the APE.

Accessible areas (1,152 acres) within the Alternative 5 APE were subject to inventory survey in 2018 and 2019. One built environment resource and nine prehistoric archaeological sites were newly identified while eight known resources were re-recorded. Resources newly discovered in 2018 or 2019 included a bedrock milling site (PL-Pacheco-CRP-007); three prehistoric midden sites with lithics, groundstone, and other artifacts (PL-Pacheco-CRP-010, PL-Pacheco-CRP-012, PL-Pacheco-CRP-015); four prehistoric lithic scatters (PL-Pacheco-CRP-013, PL-Pacheco-CRP-017, PL-Pacheco-CRP-019, and PL-Pacheco-CRP-023); one lithic scatter with groundstone (PL-Pacheco-CRP-022); and a historic period concrete bridge (PL-Pacheco-CRP-009).

The eight known resources that were re-recorded within the Alternative 5 APE included six prehistoric sites (CA-SCL-682, CA-SCL-683, CA-SCL-684, CA-SCL-685, CA-SCL-686, and

CA-SCL-687), most with midden, lithics, and groundstone, as well as the two multi-component sites (CA-SCL-679/H and CA-SCL-680/H). The North Fork Dam is being examined as a part of a separate architectural field survey. The four resources that have not been re-recorded are in areas for which access permissions have not yet been granted.

3.8.3 Tribal Cultural Resources

No Native American resources were identified by the Native American Heritage Commission (NAHC) through a search of the Sacred Lands Inventory as it encompasses the APE for the four action alternatives. No tribal cultural resources as defined under PRC Section 21074 have been reported within the APE for the action alternatives. Formal consultation with tribes under AB 52 (Chapter 532, Statutes of 2014) was not required for this EIS/EIR because the Notice of Preparation (NOP) was published in 2008; AB 52 consultation is required for projects that have NOPs filed on or after July 1, 2015.

3.9 Paleontological Resources in Study Area

Paleontological resources include fossilized remains and the geologic context in which they occur, providing information about the history of life on earth (City of San Jose 2011). Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined using a qualitative measurement of fossil data, including rock type, history of the geologic unit in producing significant fossils, and fossil localities that are recorded from that geologic unit. In areas of high sensitivity, full-time monitoring by a professionally trained paleontologist is recommended during any type of ground disturbance (City and County of San Francisco 2005).

Pacheco Reservoir and the western side shoreline of San Luis Reservoir lie within the Franciscan Formation, from the Jurassic or Cretaceous Period 80 million to 200 million years ago (Reclamation and CDPR 2013). This formation consists of a thick assemblage of sedimentary, igneous, and metamorphic rocks and has been ranked at low sensitivity due to the general lack of recorded vertebrate fossils (City and County of San Francisco 2005). The Panoche Formation makes up most of the eastern shore of San Luis Reservoir, from the late Cretaceous Period about 65 million years ago (Reclamation and CDPR 2013). The Panoche Formation consists of shale and thinly bedded sandstone, approximately 25,000 feet thick and has been ranked as moderately sensitive due to the discovery of noteworthy invertebrate marine fossils (California High Speed Rail Authority [CHSRA] 2004).

Santa Clara Valley consists mostly of Holocene Epoch sediments from the past 10,000 years after the last major glacial period, which cover the Santa Clara Formation, older sediments of the Pleistocene Epoch from 1.8 million to about 10,000 years ago (City of San Jose 2011). Paleontological resources are primarily located in the hills of San Jose, including the Santa Teresa Hills, where the Santa Teresa WTP is located. The Santa Teresa Hills are within an area of Unnamed Sedimentary Rock from the Eocene Epoch, dating from 56 million to 33 million years ago (Dibblee and Minch 2005). The Santa Teresa WTP is within a Holocene Epoch alluvial fan, which is classified as highly sensitive (City of San Jose 2011).

3.10 Fisheries Resources in Study Area

The area of fisheries analysis includes the area around San Luis Reservoir that is Federally-owned and leased to the CDPR. San Luis Reservoir is a large and intensively managed reservoir that contains warm water fishes, primarily exported from the Delta. San Luis Reservoir is an artificial environment and does not support a naturally evolved aquatic community. Although a few native species may still be present, the vast majority of fish species in the reservoir have either been directly introduced or transported into the reservoir via the California Aqueduct and DMC.

The Delta region includes the Delta, which comprises channels of the Sacramento and San Joaquin Rivers, including from about the I-Street Bridge in Sacramento on the Sacramento River and Vernalis on the San Joaquin River, west to Martinez and includes Suisun Bay and the Suisun Marsh. The Delta is tidally influenced and is the diversion point for both the CVP and the SWP. The Delta is made up of tidal river channels and sloughs and many constructed features. More than 120 fish species rely on the Delta and San Francisco Bay as important areas to complete one or more life stages. Channels and sloughs of the Delta and Suisun Bay provide important migration and rearing habitats for anadromous salmonids, delta smelt, longfin smelt and splittail.

The existing North Fork Pacheco Reservoir is operated by the Pacheco Water District to supply agricultural irrigation water through streambed percolation (Smith 2007). Rearing and migratory habitat for South-Central California Coast steelhead in Pacheco Creek downstream of the dam is almost completely dependent upon releases from North Fork Pacheco Reservoir (Smith 2007). The reservoir may not fill completely in dry years, and, even in wet years, there is usually no additional inflow to the reservoir by early to mid-summer, making Pacheco Creek unsuitable for rearing steelhead (Smith 2007).

See Appendix L1 for details on special status fish species present in San Luis Reservoir, the Delta Region, and Pacheco Creek.

3.11 Terrestrial Resources in Study Area

3.11.1 Natural Communities

Dominant natural communities within the San Luis Reservoir Region include valley foothill riparian, coast live oak woodland, chaparral/scrub, annual grassland, purple needlegrass grassland, freshwater emergent wetland, seasonal wetland, agricultural, and urban/disturbed (Reclamation and CDPR 2013, Reclamation 2018b, ESA 2018) (see Figures M1-1a and M1-1b in Appendix M1).

Major vegetation communities that occur in the SCVWD service area include grassland, chaparral and coastal scrub, oak woodland, riparian forest and scrub, and wetland and open water (Santa Clara County 2012). The Santa Teresa WTP is located primarily within developed areas. However, grassland, oak woodland, and riparian forest and scrub vegetation communities occur at or near proposed construction areas.

The area surrounding Pacheco Reservoir is mostly undeveloped. Oak woodland comprises the majority of land cover in the vicinity of the reservoir including: foothill-pine oak woodland, mixed oak woodland, blue oak woodland, and valley oak woodland. Other habitat types in the area include valley foothill riparian, annual grassland, and scrub/chaparral (see Figures M1-2a and M1-2b in Appendix M1).

See Appendix M2 for a description of common natural communities, sensitive natural communities, and wildlife in the area of analysis.

Common Natural Communities

Common natural communities in the project area include annual grassland, chaparral/scrub, and disturbed areas. Annual grassland is the dominant natural community in the San Luis Reservoir Area and within the SCVWD Service Area. It is dominated by introduced grasses and forbs, with occasional patches of native grasses. Chaparral/scrub communities occur principally west of San Luis Reservoir, interspersed in the grasslands on undisturbed slopes of the SCVWD Service Area, and around Pacheco Reservoir.

Sensitive Natural Communities

Sensitive natural communities in the area of analysis include oak woodland, valley foothill riparian, freshwater emergent wetland, and seasonal wetlands. Oak woodlands occur within the area around San Luis Reservoir, but not within the vicinity of the dam where construction activities would occur. The Pacheco Creek watershed is comprised of oak woodlands, including blue oak woodland and foothill pine-oak woodland. Patches of valley foothill riparian habitat generally occur in draws on the margin of San Luis Reservoir. The mainstem reach of Pacheco Creek supports a broad, relatively wide floodplain with valley foothill riparian vegetation and alluvial sycamore woodland. Freshwater emergent wetland occurs along creek banks and within the few ponds around San Luis Reservoir, as well as within the reservoir. Seasonal wetlands occur within grasslands near San Luis Reservoir, including short-lived pools that may pond water long enough to support listed crustaceans.

Wildlife

The annual grassland, oak woodland, chaparral/scrub and wetlands support a wide variety of common wildlife species. Grassland and chaparral habitats support many species of migratory birds and raptors. A variety of amphibians, reptiles and mammals also inhabit grassland, and chaparral/scrub may provide cover for these types of wildlife. Riparian woodland support numerous common wildlife species, including amphibians and nesting migratory birds.

3.11.2 Special Status Species

Special status species are protected pursuant to Federal and/or State endangered species laws or have been designated as species of concern by the California Department of Fish and Wildlife (CDFW). In addition, Section 15380(b) of the CEQA Guidelines provides a definition of rare, endangered, or threatened species that are not included in any listing. Species recognized under these terms are collectively referred to as “special-status species.” Appendix M2 describes the database searches and surveys conducted to determine which special-status species have potential to occur in the area of analysis. Focused surveys for special-status plants and wildlife have not been completed in all areas; the absence of documented special-status species occurrences does not indicate species absence. Appendix M2 provides a table with the potential for occurrence of special-status species and provides species accounts for the species that could be affected. Maps of known occurrences of special-status species in the vicinity of the area of analysis are provided in Appendix M1, Figures M1-3, M1-4, and M1-5.

Invertebrates

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) has potential to occur near San Luis Reservoir because stands of at least 35 elderberry (*Sambucus nigra* ssp. *caerulea*), the beetle's host plant, were found on-site (ESA 2018). Valley elderberry longhorn beetle (VELB) were observed in 1987 about 6 miles from the reservoir (CDFW 2018). The Pacheco Reservoir area is not within the known range of this species. Small areas of suitable habitat for vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardi*) were found within grassland below B.F. Sisk Dam (ESA 2018). However, ooccurrences of these species have not been documented within the area of analysis.

Amphibians and Reptiles

For California tiger salamander (*Ambystoma californiense*), there are three California Natural Diversity Database (CNDDB) records over 2.5 and 4 miles from San Luis Reservoir. Critical habitat is designated for California tiger salamander approximately 1 mile southeast of San Luis Reservoir and approximately 2.5 miles from the construction gravel pit area (USFWS 2018). Suitable habitat is present in grasslands surrounding the reservoir. Critical habitat is also located 6 miles downstream of Pacheco Reservoir.

There are several CNDDB occurrences documented for California red-legged frog (*Rana draytonii*) (CRLF) within the western portion of the San Luis Reservoir region. Critical habitat is designated along the western boundary of San Luis Reservoir (see Figure M1-6 in Appendix M1). In addition, ESA (2018) identified a California red-legged frog breeding population at the Willow Spring pond, approximately 0.3 mile south of San Luis Reservoir (see Figure M1-7 in Appendix M1). Though within the project site, this location is on the fringe of the designated borrow area. CRLF occurrences are documented within the SCVWD service area. The riverine habitat, ponds, and associated riparian habitat within the Pacheco Reservoir region provide suitable habitat for this species, and the entire area is designated critical habitat (see Figure M1-6). Biological resource surveys in the Pacheco Reservoir region are planned for winter 2018 and results will be incorporated in this chapter.

Foothill yellow-legged frog (*Rana boylii*) and San Joaquin whipsnake (*Masticophis flagellum ruddocki*) also have potential to occur in the area of analysis. Though at the fringe of this species' range, Alameda whipsnake (*Masticophis lateralis euryxanthus*) may be of concern in chaparral habitat surrounding Pacheco Reservoir. Additional California species of special concern identified in Appendix M2 also have potential to occur in the project area.

Birds

Foraging habitat for bald eagle (*Haliaeetus leucocephalus*), California condor (*Gymnogyps californianus*), golden eagle (*Aquila chrysaetos*), and Swainson's hawk (Buteo swainsoni) occurs in the area of analysis. Breeding and foraging habitat for tricolored blackbird (*Agelaius tricolor*) and white-tailed kite (*Elanus leucrus*) have potential to occur in the area of analysis. The California species of special concern identified in Appendix M2 may also have potential to occur in the project area.

Mammals

The endangered San Joaquin kit fox (*Vulpes macrotis mutica*) and California species of special concern including American badger (*Taxidea taxus*) have potential to occur in the area of analysis. Three observations of kit foxes were made in 2005 between San Luis Reservoir and Los Banos Creek Reservoir. A habitat evaluation for kit fox in 2010 found one known den (with kit fox tracks) and 194 potential kit fox dens within the B.F. Sisk SOD Modification Project boundary, similar to the current area of analysis (Reclamation, 2010). CNDDB records of San Joaquin kit fox are located within both the SCVWD Service Area and the Pacheco Reservoir Region. Badgers are known to occur in grasslands surrounding San Luis Reservoir, including within the project area (ESA 2018).

Plants

Thirty-two special-status plant species have at least a moderate potential to occur within the area of analysis. These species may occur in grassland, oak woodland, chaparral/scrub, seasonal and emergent wetlands, and riparian habitat (see Table M2-1 in Appendix M2). Rare plant surveys have not been conducted within the San Luis or Pacheco Reservoir areas; thus, potential to occur is based on analysis of habitat suitability, range, and database occurrences (CNDDB and Calflora).

3.12 Regulatory Setting

Table 3-16 lists the Federal, State, regional, and local laws, regulations, policies, and plans that are relevant and applicable to the affected environment, area of analysis, and analysis of impacts. The alternatives would not have any inconsistencies with applicable local and regional plans.

Table 3-16. Federal, State, and Local Laws, Regulations, and Plans

Laws, Regulations, and Plans	Applicable Resources	Full Description
Federal		
Advisory Council on Historic Preservation Section 106 Consultation	Cultural	C.1.1
Bald and Golden Eagle Protection Act	Terrestrial	C.1.2
Central Valley Project Improvement Act	Water Supply	C.1.3
Civil Rights Act of 1964 and EO 12898	Environmental Justice	C.1.4

Laws, Regulations, and Plans	Applicable Resources	Full Description
Clean Air Act	Air Quality	C.1.5
Clean Water Act	Water Quality, Fisheries, Terrestrial	C.1.6
Comprehensive Environmental Response, Compensation, and Liability Act	Hazards & Hazardous Materials	C.1.7
Dam Safety Guidelines	Flood Control	C.1.8
Earthquake Hazard Reduction Act of 1977	Geology, Seismicity, & Soils	C.1.9
Endangered Species Act	Water Supply, Fisheries, Terrestrial	C.1.10
EO 11990, Protection of Wetlands	Water Quality, Terrestrial	C.1.11
EO 11988, Floodplain Management	Flood Control	C.1.12
EO 13007, Indian Sacred Sites	Cultural	C.1.13
EO 13783, Promoting Energy Independence and Economic Growth	GHG	C.1.14
Federal Water Project Recreation Act	Recreation	C.1.15
Fish and Wildlife Coordination Act	Fisheries, Terrestrial, Recreation	C.1.16
Magnuson-Stevens Fishery Conservation and Management Act	Fisheries	C.1.17
Memorandum of April 29, 1994, “Government-to-Government Relations with Native American Tribal Governments”	Indian Trust Assets (ITAs)	C.1.18
Migratory Bird Treaty Act	Terrestrial	C.1.19
Native American Graves Protection and Repartition Act	Cultural	C.1.20
National Environmental Policy Act	All	C.1.21
National Flood Insurance Program	Flood Control	C.1.22
National Historic Preservation Act	Cultural	C.1.23
National Park Service Regulations	Cultural	C.1.24
Noise and Vibration Legislation	Noise & Vibration	C.1.25
Principles and Requirements for Federal Investments in Water Resources	GHG	C.1.26
Real-Time Decision-Making to Assist Fishery Management	Fisheries	C.1.27
Resource Conservation and Recovery Act	Hazards & Hazardous Materials	C.1.28
Safe Drinking Water Act	Water Quality	C.1.29
San Luis Reservoir State Recreation Area	Visual	C.1.30
Stage 1 and Stage 2 Disinfectants and Disinfection Byproducts Rule: Long Term 1 Enhanced Surface Water Treatment Rule and Long Term 2 Enhanced Surface Water Treatment Rule	Water Quality	C.1.31
Superfund Amendments and Reauthorization Act	Hazards & Hazardous Materials	C.1.32
Surface Water Treatment Rule	Water Quality	C.1.33
US DOI, Reclamation NEPA Handbook	GHG	C.1.34
US DOI, Reclamation Safety of Dams Act	Flood Control	C.1.35
US DOI, Climate Change Adaptation Plan	GHG	C.1.36
US DOI Plan for a Coordinated, Science-based Response to Climate Change Impacts on Our Land, Water, and Wildlife Resources	GHG	C.1.37
US DOI Secretarial Order No. 3215	ITAs	C.1.38
US DOI Secretarial Order No. 3289, Amendment No.1	GHG	C.1.39
US DOI Secretarial Order No. 3360	GHG	C.1.40

Laws, Regulations, and Plans	Applicable Resources	Full Description
State		
Alquist-Priolo Earthquake Fault Zoning Act	Geology, Seismicity, & Soils	C.2.1
California Air Resources Board 2017 Scoping Plan	GHG	C.2.2
California Assembly Bill 32	GHG	C.2.3
California Building Code	Geology, Seismicity, & Soils, Noise & Vibration	C.2.4
California Clean Air Act	Air Quality	C.2.5
CDFW Species Designations	Fisheries	C.2.6
California Department of Toxic Substances Control	Hazards & Hazardous Materials	C.2.7
DWR Division of Safety of Dams	Flood Control	C.2.8
DWR Non-Project Water Acceptance Criteria	Water Quality	C.2.9
California Endangered Species Act	Fisheries, Terrestrial	C.2.10
California Energy Efficiency Strategic Plan	Public Utilities	C.2.11
Cal EPA Unified Program	Hazards & Hazardous Materials	C.2.12
CEQA Guidelines	GHG	C.2.13
California EO S-3-05	GHG	C.2.14
California EO B-30-15 and Senate Bill 32	GHG	C.2.15
California Fish and Game Code Section 1600, Streambed Alterations	Terrestrial	C.2.16
California Fish and Game Code Sections 3500-3705, Migratory Bird Protection	Terrestrial	C.2.17
California General Plan Guidelines	Noise & Vibration	C.2.18
California Government Code 65040.12	Environmental Justice	C.2.19
California Occupational Safety and Health Administration Standards	Hazards & Hazardous Materials	C.2.20
California Porter-Cologne Water Quality Control Act	Water Quality	C.2.21
California Register of Historical Resources	Cultural	C.2.22
California Safe Drinking Water Act	Water Quality	C.2.23
California Senate Bill 32	GHG	C.2.24
California State Parks Guidelines	Noise & Vibration	C.2.25
California Water Code	Water Quality, Water Supply, Groundwater	C.2.26
Hazardous Waste Control Act	Hazards & Hazardous Materials	C.2.27
Noise Element Guidelines	Noise & Vibration	C.2.28
Seismic Hazards Mapping Act	Geology, Seismicity, & Soils	C.2.29
State Scenic Highways	Visual	C.2.30
SWRCB and DTSC Hazardous Waste Management	Hazards & Hazardous Materials	C.2.31
Surface Mining and Reclamation Act of 1975	Geology, Seismicity, & Soils	C.2.32
Williamson Act	Land Use & Agriculture	C.2.33
Local/ Regional		
BAAQMD Plans and Regulations, including 2017 Clean Air Plan	Air Quality	C.3.1
California DWR San Luis Division	Hazards & Hazardous Materials	C.3.2
City of Gilroy Performance Standards	Noise & Vibration	C.3.3
City of Gustine Code of Ordinances	Noise & Vibration	C.3.4
City of Los Banos Municipal Code	Noise & Vibration	C.3.5
City of San Jose General Plan	Visual, Noise & Vibration, Land Use & Agriculture, Public Utilities, Cultural	C.3.6

Laws, Regulations, and Plans	Applicable Resources	Full Description
City of San Jose Municipal Code	Noise & Vibration	C.3.7
Merced County Code	Noise & Vibration	C.3.8
Merced County General Plan	Water Quality, Flood Control, Geology, Seismicity, & Soils, Visual, Noise & Vibration, Fisheries, Terrestrial, Land Use & Agriculture, Recreation, Public Utilities, Cultural	C.3.9
Merced County Office of Environmental Services	Hazards & Hazardous Materials	C.3.10
Pacheco State Park General Plan	Recreation	C.3.11
SJVAPCD Plans	Air Quality	C.3.12
Santa Clara County General Plan	Water Quality, Flood Control, Geology, Seismicity, & Soils, Visual, Noise & Vibration, Fisheries, Terrestrial, Land Use & Agriculture, Recreation, Public Utilities, Cultural	C.3.13
Santa Clara County Ordinance Code	Noise & Vibration	C.3.14
Santa Clara County OES Services	Hazards & Hazardous Materials	C.3.15
Santa Clara Valley Habitat Plan	Fisheries, Terrestrial	C.3.16
SCVWD Flood Control	Flood Control	C.3.17
SCVWD Groundwater Management Plan	Groundwater	C.3.18
SCVWD Water Resources Protection Ordinance	Water Quality	C.3.19
San Luis Reservoir SRA Resource Management Plan/General Plan	Terrestrial, Recreation, Public Utilities	C.3.20
Traffic and Transportation Regulations	Traffic & Transportation	C.3.21
Tree Protection Ordinances	Terrestrial	C.3.22

Chapter 4 Environmental Consequences/Environmental Impacts

This chapter presents the analysis of impacts associated with implementation of each alternative. The subsection begins with an explanation of the assessment method(s) used to identify and address potential impacts and then presents the basis and criteria for determining whether the potential impacts are significant (under CEQA), and whether mitigation of the impact is warranted. Impacts are determined relative to the No Project Alternative, or existing condition baseline (for CEQA), and the No Action Alternative (for NEPA). However, the No Action Alternative would be the same as existing conditions/No Project Alternative at the time of the NOP because substantive changes in the area of analysis are not expected. Therefore, for this analysis the No Action/No Project Alternative (Alternative 1) is used as the basis for comparison for both CEQA and NEPA.

The subsections begin with an explanation of the assessment method(s) used to identify and address potential impacts and then presents the basis and criteria. In general the Lead Agencies identified the severity or extent of the impacts that would result from implementation of each of the alternatives within the context of the environmental baseline and regulatory framework. The Lead Agencies used a variety of data sources, models, and various other types of research and analysis to predict the impacts. The Lead Agencies then determined the magnitude or significance of the impacts based on significance criteria, where required.

For each resource area, significance criteria were developed consistent with the CEQA Guidelines and used to assess the significance level of the impacts under CEQA. Pursuant to NEPA, significance is used to determine whether an EIS or some other level of documentation is required, and once the decision to prepare an EIS is made, the magnitude of the impact is evaluated and no further judgment of significance is required. Therefore, any determinations of significance are for CEQA purposes only.

The impact discussion is concluded with a bold CEQA significance determination that indicates if there is no impact to a resource area or if the impact to a resource area is beneficial, less than significant, or significant. For those impacts that would be significant, the Lead Agencies identified feasible mitigation measures, if they exist, to reduce the level of the impact. Impacts for each resource are summarized in this chapter, with detailed analysis in appendices. Each resource subsection contains an effects analysis table containing a summary of the significance criteria, assessment methodology, significance determination, mitigation measures, and the location of the evaluation support, which is located either within the chapter or in an appendix.

4.1 Water Quality

4.1.1 Assessment Methods

Water quality monitoring data and computer modeling were used to aid in evaluating potential impacts. Temporary construction impacts were evaluated qualitatively based on anticipated construction practices, materials, locations, and duration of construction and related activities. Long-term effects were evaluated using results from computer modeling tools. Specifically, the California Simulation Model II (CalSim II) was used to estimate both existing (short term) and future (long term) changes in reservoir storage and stream flow within the area of analysis. Hydrodynamic and water quality modeling of the Delta was performed using the Delta Simulation Model-2 (DSM2). Where modeling is not available, effects are evaluated based on changes in CVP deliveries, anticipated changes in flow through the Delta (increases or decreases), and the timing of the changes. Appendix D describes the changes to water quality under each action alternative and includes the detailed modeling results and interpretation of those results.

4.1.2 Significance Criteria

Impacts would be significant if they resulted in one or more of the following conditions or situations: (1) violate existing water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality; (2) substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would: (a) result in substantial erosion or siltation on or off-site, (b) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; (3) in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation; (4) conflict with or obstruct implementation of a water quality control plan; or (5) result in substantial effects on water quality related beneficial uses. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-1.

Table 4-1. Water Quality Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Cause a violation of existing water quality standards or waste discharge requirements.	Evaluation of how the alternatives could potentially generate violations of water quality standards or waste discharge requirements during construction or operation of new facilities	1	NI	--	Section 4.1.3
		2	LTS	None	Section 4.1.4 Appendix D
		3	LTS	None	Section 4.1.5 Appendix D
		4	LTS	None	Section 4.1.6 Appendix D
		5	LTS	None	Section 4.1.7 Appendix D
Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on or off-site or provide substantial additional sources of polluted runoff.	Evaluation of how construction or operation of the alternatives could alter the existing drainage pattern and create or contribute runoff water when compared to existing conditions.	1	NI	--	Section 4.1.3
		2	Construction - S, LTS Operations - LTS	WQ-1	Section 4.1.4
		3	Construction - S, LTS Operations - LTS	WQ-1	Section 4.1.5
		4	Construction - S, LTS Operations - LTS	WQ-1	Section 4.1.6
		5	Construction - S, LTS Operations - LTS	WQ-1	Section 4.1.7
In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.	Evaluation the risk of how construction or operation of the alternatives could release pollutants due to project inundation in flood hazard, tsunami, or seiche zones.	1	NI	--	Section 4.1.3
		2	NI	None	Section 4.1.4
		3	NI	None	Section 4.1.5
		4	NI	None	Section 4.1.6
		5	NI	None	Section 4.1.7
Conflict with or obstruct implementation of a water quality control plan.	Evaluation of whether construction or operation of the alternatives could conflict with or obstruct water quality control plan objectives.	1	NI	--	Section 4.1.3
		2	S, LTS	WQ-1	Section 4.1.4
		3	S, LTS	WQ-1	Section 4.1.5
		4	S, LTS	WQ-1	Section 4.1.6
		5	S, LTS	WQ-1	Section 4.1.7

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Result in effects on water quality related beneficial uses.	Evaluation of whether construction or operation of the alternatives could limit the use of potentially impacted water's beneficial uses	1	S, SU	--	Section 4.1.3
		2	B	None	Section 4.1.4
		3	SCVWD Service Area - B SBCWD Service Area - NI	None	Section 4.1.5
		4	B	None	Section 4.1.6
		5	B	None	Section 4.1.7

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

4.1.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

The No Action/No Project Alternative includes the most likely future conditions in the absence of the project. No physical modifications or operational or institutional changes would occur under this alternative to alter existing drainage patterns, create or contribute runoff water or degrade existing water quality conditions. Water quality conditions within the area of analysis would remain similar to existing conditions. In the No Action/No Project Alternative, low point issues would continue when San Luis Reservoir falls below 300 TAF. At this point, the San Felipe intake receives algae-laden water that is not treatable with existing treatment facilities in SCVWD. Due to potential adverse effects, SCVWD would not use the algae-laden water during this period. **This would be a significant impact.** The proposed action alternatives considered as a part of the SLLPIP would mitigate this impact, however as a part of the No Action/No Project Alternative they cannot be considered. **Therefore, this impact is significant and unavoidable.**

4.1.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Under Alternative 2, X2 results indicate that on average there are negligible changes to Delta water quality resulting from changes in Delta outflows. Table D-5 in Appendix D summarizes X2 results that modeled potential changes in salinity. As shown in Tables D-7 and D-10 in Appendix D, changes in South-of-Delta export of CVP and SWP water and Delta outflow under this alternative would be minimal. **This impact would be less than significant.**

San Luis Reservoir is not located within a flood hazard, tsunami, or seiche zone. Therefore, construction and operation of Alternative 2 would not result in an increased risk of pollutants released due to project inundation within a flood hazard, tsunami, or seiche zone. **There would be no impact.**

Under Alternative 2, SCVWD would be able to fully divert its CVP allocation and would not have to leave water in San Luis storage as it does in the No Action/No Project Alternative; therefore, reservoir levels would be lower (see Table D-16 in Appendix D). During periods with lower reservoir levels algae growth could further reduce DO levels, increasing cyanobacteria levels and associated taste and odor issues, which would adversely affect beneficial uses identified for San Luis Reservoir. However, the alternative includes a hypolimnetic aeration facility to address these DO effects and improve conditions for the beneficial use of the water, specifically its treatability at SCVWD WTPs and odor issues at San Luis Reservoir for recreational users. After construction of the new lower intake, San Felipe Division water users would be able to pump and treat water from the reservoir until the water level reaches 331 feet, as opposed to being limited to pumping until 369 feet, increasing water users' access to usable storage capacity and improving municipal, industrial and agricultural supply beneficial uses. Operation of the alternative would generate no impact on the other beneficial uses at San Luis Reservoir. **This would be a beneficial impact.**

During construction of the tunnel option, excavated material would be generated and disposed of at Dinosaur Point to extend the existing boat ramp farther into the reservoir. The placement of this soil has the potential to result in the dispersion of this disposed soil into the adjacent reservoir which could affect water quality. During construction of the pipeline option, soil would be dredged from within San Luis Reservoir and disposed of across the reservoir floor. Dredging activities could impact water quality and substantially degrade existing water quality during construction. The known presence of mercury in the reservoir, regardless of its original source, makes it that reservoir sediment disturbed during dredging operations would likely contain at least trace amounts of mercury. While natural amounts of suspended sediments are essential to the ecological function of a water body, in excessive amounts they can constitute a major ecosystem stressor. In addition, runoff from exposed soils in active work areas at San Luis Reservoir are likely to contain high concentrations of particulates and potentially, residual petroleum products from construction equipment. Therefore, construction-related activities have the potential to degrade water quality and create additional sources of polluted runoff. Disturbance at surface areas used for construction staging along with excavated material storage and disposal locations could also result in localized surface erosion, minor changes in drainage patterns, and changes in erosion rates.

Construction would likely require permits under Sections 402 and 401 of the CWA, preparation of a stormwater pollution prevention plan (SWPPP) would be required by the RWQCB under the Construction General Permit. Additionally, the RWQCB and would require best management practices (BMPs), monitoring and other construction controls to protect water quality. Water quality regulations are further described in Appendix D. **Notwithstanding compliance with these regulations, this impact would be significant**. Mitigation Measure WQ-1, described below in Section 4.1.8, would be implemented to decrease erosion rates and delivery of sediments along with any other resident pollutants to surface waters through the use of mechanisms such as stockpile covering, fill material compaction, construction vehicle washing and revegetation. **Therefore, impacts on water quality would be less than significant after mitigation.**

Several different regional Water Quality Control Plans govern water bodies within the SLLPIP area of analysis (See Section C.2.24 in Appendix C). These plans establish water quality standards and requirements for parameters such as toxic chemicals, bacterial contamination, and other factors which have the potential to adversely affect beneficial uses or cause nuisance conditions (SWRCB 2006). As previously discussed, changes to Delta water quality would be minimal and would not cause nuisance conditions or adversely affect beneficial use of the Delta. Construction-related activities have the potential to degrade water quality under Alternative 2, which could adversely affect beneficial use of San Luis Reservoir and conflict with a water quality control plan. Water quality regulations require preparation of a SWPPP, BMPs, monitoring and other construction controls would be required to protect water quality. **Nevertheless, this impact would be significant.** Mitigation Measure WQ-1, described below in Section 4.1.8, would be implemented to decrease erosion rates and delivery of sediments along with any other resident pollutants to surface waters. **Therefore, conflicts with water quality control plans would be less than significant after mitigation.**

4.1.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Under Alternative 3, X2 results and changes to Delta exports and outflows would be similar to effects described above under Alternative 2. Changes to Delta exports and outflows would be minimal and would have minimal effects on Delta water quality. **This impact would be less than significant.**

Santa Teresa WTP is not located within a flood hazard, tsunami, or seiche zone. Therefore, construction and operation of Alternative 3 would not result in an increased risk of pollutants released due to project inundation within a flood hazard, tsunami, or seiche zone. **There would be no impact.**

Similar to Alternative 2, SCVWD would be able to fully divert its CVP allocation under Alternative 3 and would not have to leave water in San Luis storage as it does in the No Action/No Project Alternative; therefore, reservoir levels would be lower (see Table D-16 in Appendix D). The potential water quality issues as algae conditions contribute to reduced DO levels and taste and odor issues identified under Alternative 2 would not be addressed by Alternative 3. These conditions would persist consistent with conditions present in San Luis Reservoir when it is drawn down to low levels under existing conditions. The continued delivery of CVP supply to SCVWD during periods when storage in the reservoir is drawn down below 300 TAF would not contribute to new violations of water quality standards at San Luis Reservoir or substantial degradation of water quality in the reservoir. **This impact would be less than significant.**

The current algae generated water quality issues that affect treatability and use would be avoided by improving Santa Teresa WTP's ability to treat algae-laden water from the reservoir, increasing SCVWD water users' access to usable storage capacity. The alternative would not change water quality conditions for agricultural water users in the SBCWD service area. While the filter clogging issues generated by low point conditions increase back flushing requirements, they do not require interruption of CVP supply deliveries. **This effect would have a beneficial impact on beneficial uses in the SCVWD Service Area and no change from existing conditions in the SBCWD Service Area.**

Ground-disturbing construction activities at the Santa Teresa WTP could generate changes in local stormwater drainage patterns and temporarily create additional sources of polluted runoff resulting in erosion from the construction areas and increased sediment content in receiving surface waters (Alamitos Creek). Changes in runoff to surface water bodies downstream from the Santa Teresa WTP site could adversely affect aquatic habitat. Construction activities would likely require permits under Sections 402 and 401 of the CWA. Preparation of a SWPPP would be required by the RWQCB under the Construction General Permit. **Nevertheless, these impacts would be significant.** Implementation of Mitigation Measures WQ-1, described below in Section 4.1.8, would reduce these impacts to less than significant. **Therefore, impacts on water quality would be less than significant after mitigation.**

Several different regional Water Quality Control Plans govern water bodies within the SLLPIP area of analysis (See Section C.2.24 in Appendix C). As previously discussed, changes to Delta water quality would be minimal and would not cause nuisance conditions or adversely affect beneficial use of the Delta. Construction-related activities have the potential to degrade water quality under Alternative 3, which could adversely affect beneficial use of water bodies in the San Felipe Division Region and conflict with a water quality control plan. Water quality regulations require preparation of a SWPPP, BMPs, monitoring and other construction controls would be required to protect water quality. **Nevertheless, this impact would be significant.** Mitigation Measure WQ-1, described below in Section 4.1.8, would be implemented to decrease erosion rates and delivery of sediments along with any other resident pollutants to surface waters. **Therefore, conflicts with water quality control plans would be less than significant after mitigation.**

4.1.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

San Luis Reservoir is not located within a flood hazard, tsunami, or seiche zone. Therefore, construction and operation of Alternative 4 would not result in an increased risk of pollutants released due to project inundation within a flood hazard, tsunami, or seiche zone. **There would be no impact.**

Under Alternative 4, on average there are negligible changes to Delta water quality resulting from changes in Delta outflows compared to the No Action/No Project Alternative. Appendix D summarizes X2 results which modeled potential changes in salinity. While there would be changes to Delta exports and outflows, changes in Delta water quality would not be impacted, as noted in Table D-6. **This impact would be less than significant.**

During construction of the expanded reservoir and during the implementation of Mitigation Measure REC-1 and REC-2, described in Section 4.17.8, the exposure of bare soils, soil and material stockpiles, and the presence of fuels, lubricants, and solid and liquid wastes could cause short-term water quality impacts to the reservoir if not managed properly. Therefore, construction-related activities have the potential to degrade water quality and create additional sources of polluted runoff. Soil disturbance at surface areas used for construction staging along with excavated material storage and disposal locations could result in localized surface erosion, minor changes in drainage patterns and changes in erosion rates.

Construction activities would likely require permits under Sections 402 and 401 of the CWA. Preparation of a SWPPP would be required by the RWQCB under the Construction General Permit. **Nevertheless, this impact would be significant.** Mitigation Measure WQ-1, described below in Section 4.1.8, would be implemented to significantly decrease erosion rates and delivery of sediments and any other resident pollutants to surface waters during construction and following construction prior to and after the reestablishment of vegetation at construction sites. **Therefore, the impact on water quality would be less than significant after mitigation.**

Following construction, storage of CVP and SWP supplies in the new expanded reservoir footprint is anticipated to result in the loss of primarily grassland vegetation, as is detailed in Section 4.14.6. Following the loss of this vegetation in the first water year where the new capacity is exercised, this new section of reservoir floor would interact with the water stored in the reservoir in the same fashion as the current reservoir floor. **Therefore, the impact on water**

quality in San Luis Reservoir from the long-term operation of the expanded reservoir capacity would be the same as existing conditions and there would be no impact.

Alternative 4 would generate slightly increased storage levels in San Luis Reservoir when compared to the No Action/No Project Alternative (see Table D-17 in Appendix D). At higher reservoir storage levels, wind and warming effects of the sun would have less influence on water temperatures, which could decrease algae growth and could result in increased DO levels and decreased associated taste and odor issues when compared to existing conditions. These increased water quality conditions could positively affect beneficial uses identified for San Luis Reservoir. In addition, following the B.F. Sisk Dam raise, SCVWD would have access to additional usable storage capacity during most water year types. **This would be a beneficial impact.**

Several different regional Water Quality Control Plans govern water bodies within the SLLPIP area of analysis (See Section C.2.24 in Appendix C). As previously discussed, changes to Delta water quality would be minimal and would not cause nuisance conditions or adversely affect beneficial use of the Delta. Construction-related activities have the potential to degrade water quality under Alternative 4, which could adversely affect beneficial use of San Luis Reservoir and conflict with a water quality control plan. Water quality regulations require preparation of a SWPPP, BMPs, monitoring and other construction controls would be required to protect water quality. **Nevertheless, this impact would be significant.** Mitigation Measure WQ-1, described below in Section 4.1.8, would be implemented to decrease erosion rates and delivery of sediments along with any other resident pollutants to surface waters. **Therefore, conflicts with water quality control plans would be less than significant after mitigation.**

4.1.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Under Alternative 5, on average there are negligible changes to Delta water quality resulting from changes in Delta outflows compared to the No Action/No Project Alternative. Appendix D summarizes X2 results, which estimate potential changes in salinity. While there would be changes to Delta exports and outflows, changes in Delta water quality would not be impacted, as noted in Table D-5 of Appendix D. **This impact would be less than significant.**

Pacheco Reservoir is not located within a flood hazard, tsunami, or seiche zone. Therefore, construction and operation of Alternative 5 would not result in an increased risk of pollutants released due to project inundation within a flood hazard, tsunami, or seiche zone. **There would be no impact.**

During construction of the Pacheco Reservoir and related pipelines, exposure of bare soils, soil and material stockpiles and the presence of fuels, lubricants, and solid and liquid wastes could cause short-term water quality impacts to the reservoir if not managed properly. Therefore, construction-related activities have the potential to degrade water quality and create additional sources of polluted runoff. Soil disturbance at surface areas used for construction staging along with excavated material storage and disposal locations could result in localized surface erosion, minor changes in drainage patterns and changes in erosion rates.

Construction activities would likely require permits under Sections 402 and 401 of the CWA. Preparation of a SWPPP would be required by the RWQCB under the Construction General Permit. **Nevertheless, this impact would be significant.** Mitigation Measure WQ-1, described below in Section 4.1.8, would be implemented to significantly decrease erosion rates and delivery of sediments and any other resident pollutants to surface waters during construction and following construction prior to and after the reestablishment of vegetation at construction sites. **Therefore, this impact would be less than significant after mitigation.**

Similar to Alternative 2, SCVWD would be able to fully divert its CVP allocation under Alternative 5 and would not have to leave water in San Luis storage as it does in the No Action/No Project Alternative; therefore, reservoir levels would be lower (see Table D-16 in Appendix D). Lower San Luis Reservoir levels could promote algae growth and result in reduced DO levels, increasing cyanobacteria levels and associated taste and odor issues, which would adversely affect beneficial uses. However, based on the small changes in overall reservoir storage, as well as the regular refill during fall and winter, neither water quality nor beneficial uses are expected to be substantially changed as a result of the alternative.

The expanded Pacheco Reservoir would continue to limit the frequency of and impact from harmful cyanobacteria blooms in Pacheco Reservoir. Prior to the implementation of an experimental reservoir operations plan in 2014 designed to improve habitat conditions on Pacheco Creek downstream, cyanobacteria blooms toxic to fish downstream occurred during mid-summer low water storage conditions (Smith 2007, Micko 2014, Smith 2014). Increased reservoir carryover storage under this experimental operations plan limited the occurrence of these cyanobacteria blooms by reserving a larger storage volume in Pacheco Reservoir later in the year. As is noted in Section 2.2.5, since April 2018 North Fork Dam has been operated under the terms of a DWR Division of Safety of Dams order requiring upstream and downstream outlets to be maintained in a fully open position to maintain the lowest possible water surface elevation, limiting the benefits of this experimental reservoir operations plan that had been in place since 2014. Under Alternative 5, the expanded reservoir would, similar to the experimental reservoir operations plan, be operated to minimize low storage volume conditions conducive to cyanobacteria blooms. The import of CVP supplies from San Luis Reservoir is not anticipated to further contribute to these algae conditions given small proportion of these supplies in comparison to the natural inflow to the reservoir. **This impact would be less than significant.**

After construction, the dam and reservoir would be operated in compliance with federal, state, and local regulations. Operation of Alternative 5 would not contribute pollutants identified as impairing water quality in Pacheco Reservoir or Pacheco Creek. In addition, the operation of the new reservoir will provide for improved flows and temperatures in Pacheco Creek. Increased late-spring, summer, and fall flows and reduced water temperatures are anticipated to have beneficial effects on dissolved oxygen levels in Pacheco Creek. Therefore, water quality impacts from the operation of Alternative 5 are not expected to change significantly beyond existing conditions. **This impact would be less than significant.**

Currently, San Felipe Division water users, including SCVWD and SBCWD, experience water quality issues that affect treatability and use for municipal, industrial, and agricultural irrigation when San Luis Reservoir reaches an elevation of 369 feet or less due to the presence of algal blooms. Following the construction of the expanded Pacheco Dam, SCVWD would have access to additional usable storage capacity during most water year types. **This would be a beneficial impact.**

Several different regional Water Quality Control Plans govern water bodies within the SLLPIP area of analysis (See Section C.2.24 in Appendix C). As previously discussed, changes to Delta water quality would be minimal and would not cause nuisance conditions or adversely affect beneficial use of the Delta. Operation of Alternative 5 is not expected to change water quality significantly beyond existing conditions and would not adversely affect beneficial use of Pacheco Creek. Construction-related activities have the potential to degrade water quality under Alternative 5, which could adversely affect beneficial use of Pacheco Reservoir and conflict with a water quality control plan. Water quality regulations require preparation of a SWPPP, BMPs, monitoring and other construction controls would be required to protect water quality. **Nevertheless, this impact would be significant.** Mitigation Measure WQ-1, described below in Section 4.1.8, would be implemented to decrease erosion rates and delivery of sediments along with any other resident pollutants to surface waters. **Therefore, conflicts with water quality control plans would be less than significant after mitigation.**

4.1.8 Mitigation Measures

Mitigation Measure WQ-1: Construction Water Quality Impact Avoidance Measures. The following construction requirements will be required by Reclamation for Alternatives 2 and 4, and SCVWD for Alternatives 3 and 5, to help avoid adverse water quality impacts. Many of these construction requirements were modified from those listed in the SCVWD Best Management Practices Handbook, as noted (SCVWD 2014).

1. **General Requirements for Construction Personnel**
   a. All food-related trash items such as wrappers, cans, bottles, and food scraps generated during construction, subsequent facility operation, or permitted operations and maintenance activities of existing facilities will be disposed of in closed containers only and removed at least once a week from the site.

   b. Dispose of refuse frequently. Prohibit burning or burying refuse inside the plan area.

2. **Assess Pump/Generator Set Operations and Maintenance**

   Pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species.

   a. Pumps and generators will be maintained according to manufacturers' specifications to regulate flows to prevent dry-back or washout conditions.

   b. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding.

   c. Sufficient back-up pumps and generators will be onsite to replace defective or damaged pumps and generators.

d. Pumps and generators that operate within the bankfull channel will be placed in a suitable containment structure to prevent the accidental release of hydrocarbons into area waterways.

3. **Handle Sediments so as to Minimize Water Quality Impacts**

Sediments will be stored and transported in a manner that minimizes water quality impacts.

a. Wet sediments may be stockpiled outside of a live stream or water body so water can drain or evaporate before removal.

b. This measure applies to saturated, not damp, sediments and depends upon the availability of a stockpile site.

c. Water draining from stockpiles will not be allowed to flow back into a water body or into local storm drains that enter the creek, unless water quality protection measures recommended by the RWQCB are implemented.

d. Trucks may be lined with an impervious material (e.g. plastic), or the tail gate blocked with dry dirt or hay bales, for example, or trucks may drain excess water by slightly tilting their loads and allowing the water to drain out.

e. Water will not drain directly into water bodies (outside of the work area) or onto public streets without providing water quality control measures.

f. Streets will be cleared of mud and/or dirt by street sweeping (with a vacuum-powered street sweeper), as necessary, and not by hosing down the street.

4. **Avoid Runoff from Soil Stockpiles**

If soil is to be stockpiled, no run-off will be allowed to flow to a water body. Store and stabilize excavated material in upland areas to prevent discharge into water bodies or wetlands. Stockpiled materials should be covered during the rainy season when not in use.

5. **Use Temporary Seeding for Erosion Control As Appropriate**

For banks that are scraped, an erosion control seed mix will be used. Temporary earthen access roads will be seeded when site and horticultural conditions are suitable.

6. **Stabilize Construction Entrances and Exits**

Measures will be implemented to minimize soil from being tracked onto streets near work sites:

a. Methods used to prevent mud from being tracked out of work sites onto roadways include installing a layer of geotextile mat, followed by a 4-inch thick layer of 1 to 3-inch diameter gravel on unsurfaced access roads.

b. Access will be provided as close to the work area as possible, using existing ramps where available and planning work site access so as to minimize disturbance to the water body bed and banks, and the surrounding land uses.

7. **Maintain Clean Conditions at Work Sites**

The work site, areas adjacent to the work site, and access roads will be maintained in an orderly condition, free and clear from debris and discarded materials. Personnel will not sweep, grade, or flush surplus materials, rubbish, debris, or dust into storm drains or waterways.

Upon completion of work, all building materials, debris, unused materials, concrete forms, and other construction-related materials will be removed from the work site.

8. **Assure Proper Vehicle and Equipment Fueling**

No fueling will be done in a waterway or immediate flood plain, unless equipment stationed in these locations is not readily relocated (i.e., pumps, generators).

a. For stationary equipment that must be fueled on-site, containment will be provided in such a manner that any accidental spill of fuel will not be able to enter the water or contaminate sediments that may come in contact with water.

b. Any equipment that is readily moved out of the waterway will not be fueled in the waterway or immediate flood plain.

c. All fueling done at the job site will provide containment to the degree that any spill will be unable to enter any waterway or damage riparian vegetation (SCVWD 2014).

9. **Assure Proper Vehicle and Equipment Maintenance**

No equipment servicing will be done in a water body or immediate flood plain, unless equipment stationed in these locations cannot be readily relocated (i.e., pumps, generators).

a. Any equipment that can be readily moved out of the water body will not be serviced in the water body or immediate flood plain.

b. All servicing of equipment done at the job site will provide containment to the degree that any spill will be unable to enter any channel or damage stream vegetation.

c. If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location will be done in a water body or flood plain.

d. If emergency repairs are required, containment will be provided equivalent to that done for fueling or servicing.

e. Inspect equipment for hydraulic and oil leaks prior to use on construction sites, and implement inspection schedules to prevent contamination of soil and water.

f. Dispose of volatile wastes and oils in approved containers for removal from the site to avoid contamination of soils, drainages, and watercourses

10. **Spill Prevention and Control**

Prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water.

a. Field personnel will be appropriately trained in spill prevention, hazardous material control, and clean-up of accidental spills.

b. No fueling, repair, cleaning, maintenance, or vehicle washing will be performed in a creek channel or in areas at the top of a channel bank that may flow into a creek channel (SCVWD 2014).

c. Keep absorbent pads, booms, and other material on-site to contain oil, hydraulic fluid, and solvents in locations where heavy equipment is used.

11. **Manage Well or Exploratory Boring Materials**

All materials or waters generated during drilling, well or exploratory boring construction, well development, pump testing, or other activities associated with wells or exploratory borings, will be safely handled, properly managed, and disposed of according to all applicable Federal, State, and local statutes regulating such. In no case will these materials and/or waters be allowed to enter, or potentially enter, on- or off-site storm sewers, dry wells, or waterways. Such materials/waters must not be allowed to move off the property where the work is being completed (SCVWD 2014).

12. **Protect Well or Exploratory Borings from Contaminants**

Any substances or materials that may degrade groundwater quality will not be allowed to enter any well or boring. Lubricants used on drill bits, drill pipe, or tremie pipe will not be comprised of oily or greasy substances or other materials that may degrade groundwater quality. Well openings or entrances will be sealed or secured in such a way as to prevent the introduction of contaminants (SCVWD 2014).

13. **Prevent Stormwater Pollution**

Suitable erosion control, sediment control, source control, treatment control, material management, and non-stormwater management BMPs will be implemented consistent with the latest edition of the California Stormwater Quality Association "Stormwater Best Management Practices Handbook" (SCVWD 2014).

14. **Manage Groundwater at Work Sites**

If high levels of groundwater in a work area are encountered, the water will be pumped out of the work site. If necessary to protect water quality, the water will be directed into specifically constructed infiltration basins, into holding ponds, or onto areas with vegetation to remove sediment prior to the water re-entering a receiving water body. Water pumped into vegetated areas will be pumped in a manner that will not create erosion around vegetation.

4.2 Surface Water Supply

4.2.1 Assessment Methods

This chapter estimates the potential water supply effects of SLLPIP implementation using the CalSim II model (see Appendix B for a model description). Because the differences between existing conditions and the No Action/No Project Alternative are minimal (generally less than 10 AF), the analysis compares the impacts of the action alternatives only to the impacts of the No Action/No Project Alternative. Appendix N describes the changes to water supply associated with each action alternative and includes the detailed modeling results and interpretation of those results.

4.2.2 Significance Criteria

Impacts on water supply would be considered significant if the alternative would: (1) Substantially reduce the annual supply of water available to the CVP, SWP, or other water users. This criterion, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-2.

4.2.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

Under the No Action/No Project Alternative, the CVP and SWP would continue to operate and provide water supply, as under existing conditions. Future changes in hydrology, land use, and regulations could affect water deliveries; however, the types of changes that could occur are unclear and incorporating these changes into the No Action/No Project Alternative would be speculative.

Under the No Action/No Project alternative, SCVWD operations would remain the same as existing conditions. Under this alternative, modeling results have predicted that there would be 17 years (out of the 82 calendar years analyzed) where the San Luis Reservoir would be drawn below 300 TAF of storage, i.e. low point years. During dry years when a low point supply interruption occurs (or could occur) SCVWD would change operations to ensure adequate supplies for essential uses and public health and safety. Low point events would likely result in reduced deliveries of treated water and would require using alternative supplies that would otherwise be dedicated to other uses to reduce the potential for curtailments to M&I customers. SCVWD would likely rely on local and other imported water supplies to cover the periods when CVP supplies were not available; however, local and imported water supplies may or may not be able to meet demands during the low point years. **This would be a significant impact.** The proposed action alternatives considered as a part of the SLLPIP would mitigate this impact, however as a part of the No Action/No Project Alternative they cannot be considered. **Therefore, this impact is significant and unavoidable.**

Table 4-2. Water Supply Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Substantially reduce the annual supply of water available to the CVP, SWP, or other water users.	Evaluation of how the alternatives could change CVP and SWP water supply deliveries	1	S, SU	--	Section 4.2.3, Appendix B, Appendix N
		2	South-of-Delta CVP and SWP - LTS SCVWD - B	None	Section 4.2.4, Appendix B, Appendix N
		3	South-of-Delta CVP and SWP - LTS SCVWD - B	None	Section 4.2.5, Appendix B, Appendix N
		4	S, SU (Short-term, with shear key) NI (Short-term, without shear key) South-of-Delta SWP - LTS (Long-term) South-of-Delta CVP - B (Long-term)	None	Section 4.2.6, Appendix B, Appendix N
		5	South of Delta CVP and SWP - LTS SCVWD - B	None	Section 4.2.7, Appendix B, Appendix N

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

4.2.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

4.2.4.1 South-of-Delta CVP and SWP Facilities and Contractors

Construction of Alternative 2 could result in temporary interruptions in CVP water supply to the San Felipe Division. Both SCVWD and SBCWD would be provided a schedule ahead of time with any planned short-term outages and are expected to be able to rely on other existing local supplies. Long-term operation of Alternative 2 would support the delivery of M&I water supply to SCVWD that is currently interrupted during low point conditions and carried over in San Luis Reservoir as undelivered supply. This reduction in undelivered supply could generate small reductions in deliveries in subsequent years to other South-of-Delta CVP and SWP contractors.

Under Alternative 1, deliveries from San Luis Reservoir to SCVWD are interrupted during low point events. These supplies remain in San Luis storage and increase the amount of reservoir carryover storage. In the year following a low point event, the amount of water in San Luis would be greater than in years without prior low point events because of the undelivered SCVWD water. Under Alternative 2, average storage in San Luis Reservoir would be less than Alternative 1 because SCVWD would be able to withdraw their full CVP water allocation each year from San Luis Reservoir, even during low point months. This would result in less carryover water stored in San Luis Reservoir and less overall storage during some years. Decreased carryover storage after low point events could decrease deliveries to CVP South-of-Delta agricultural contractors in subsequent years. As shown in Tables N-8 and N-9 in Appendix N, the change in delivery of water to CVP South-of-Delta agricultural contractors would be less than one percent and only evident in above normal, below normal, and dry water years. While Alternative 2 would affect the operations of CVP supplies, SWP supplies would remain unchanged. As shown in Tables N-10 and N-11, there is functionally no difference in the SWP deliveries and surplus water supply. **This impact would be less than significant**.

4.2.4.2 Santa Clara Valley Water District

During a low point issue, Alternative 2 would reduce or avoid the need to blend San Luis Reservoir water with other higher quality water supplies or switch to alternate water supply sources such as groundwater when surface water supplies were reduced. Under this alternative, annual San Felipe Division CVP M&I deliveries would increase on average by 3,200 AF and there would be a negligible difference in agricultural deliveries, as shown in Tables N-12 and N-13. Alternative 2 would allow uninterrupted delivery of SCVWD CVP M&I deliveries in all low point years and would be able to fully replace SCVWD’s unmet treated water demand in 10 of the 17 low point years compared to the No Action/No Project Alternative. **This would be a beneficial long-term water supply impact for SCVWD.**

4.2.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

4.2.5.1 South-of-Delta CVP and SWP Facilities and Contractors

Alternative 3 would allow SCVWD to divert water from San Luis Reservoir regardless of water levels within the reservoir. It would result in similar impacts to South-of-Delta CVP and SWP contractors and benefits to SCVWD as described for Alternative 2 because it would allow uninterrupted deliveries in the same way as Alternative 2. **Impacts from Alternative 3 on South-of-Delta CVP and SWP contractors water supply would be less than significant.**

4.2.5.2 Santa Clara Valley Water District

Alternative 3 would result in modifications to the existing Santa Teresa WTP to allow it to more effectively treat the algae-laden water from San Luis Reservoir and avoid supply curtailments during low point events. Algae-laden water that would have otherwise remained in San Luis Reservoir would be treated at the WTP and then conveyed to users. Alternative 3 would deliver additional M&I supply in all low point years when compared to the No Action/No Project Alternative, reducing SCVWD unmet demand during low point events. **This would be a beneficial long-term water supply impact for SCVWD.**

4.2.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

4.2.6.1 South-of-Delta CVP and SWP Facilities and Contractors

South-of-Delta CVP agricultural deliveries are expected to increase up to 25,000 AF under certain water year types, as shown in Tables N-16 and N-17 in Appendix N. Increased CVP supplies would be available during wetter years when surplus water is available in the Delta and San Luis Reservoir would have filled in the No Action/No Project Alternative. Under this alternative, there would be a slight reduction in Table A SWP deliveries, an average of 3,000 AF, as summarized in Tables N-18 and N-19 in Appendix N. In addition, this alternative would reduce potential surplus water supply (Article 21) deliveries to SWP contractors as CVP deliveries increase. The availability of this surplus water in any particular year is uncertain, and contractors do not base long-term water supply decisions on the availability of this water. **Therefore, operating Alternative 4 would have a less than significant impact on South-of-Delta SWP contractors and a beneficial effect on South-of-Delta CVP contractors.**

As described in Chapter 2, construction of Alternative 4 would be scheduled for completion during times when the reservoir is typically drawn down to lower levels to avoid any adverse impact on storage capacity and water supply. However, implementation of the optional shear key action would require limits on the maximum surface elevation in San Luis Reservoir for two seasons, during the period that the berm foundation would be excavated. This reduction in surface elevation would reduce storage capacity in the reservoir and would limit CVP and SWP deliveries during this construction period. **The Crest Raise Alternative without the shear key option would have no impact on South-of-Delta CVP and South-of-Delta SWP water contractors, however with the shear key option the alternative would have a short-term significant impact for these contractors.**

With the shear key option, the temporary reduction in water supply deliveries would not be able to be replaced reliably from other sources, such as groundwater pumping or water transfers, or new surface storage. Reclamation evaluated the potential use of groundwater banking as an option to replace the lost storage in San Luis Reservoir and determined that given the availability of capacity in existing groundwater banks, the time necessary and complexity of developing a new groundwater bank with the capacity to reduce this impact to a less than significant level, that this option would not be feasible. Similarly, the use of water transfers to mitigate this impact was evaluated and was determined to be unable to meaningfully offset this impact given uncertainty with the availability of willing sellers of sufficient amounts of water and the availability of conveyance capacity to transfer those supplies at the time they are needed. The development of new surface storage at a different location to offset the lost capacity at San Luis Reservoir was determined to be infeasible given the potential for numerous significant environmental effects potentially generated by that action and the time necessary to develop this new storage facility. Given the environmental and technological limits and the time necessary to implement other potential options to offset this impact during the two water years that the Shear Key Option would restrict reservoir operations no feasible[1] mitigation has been identified to reduce these impacts to a less than significant level. **Therefore, the short-term water supply impact under Alternative 4 with the shear key option remains significant and unavoidable.**

4.2.6.2 Santa Clara Valley Water District

Under Alternative 4, annual San Felipe Division CVP M&I and agricultural deliveries would both increase on average by 300 AF, as shown in Tables N-20 and N-21 in Appendix N. The alternative would deliver additional M&I supply in 7 out of the 17 low point years when compared to the No Action/No Project Alternative, partially reducing SCVWD unmet demand during low point events. **This would be a beneficial long-term water supply impact for SCVWD.**

4.2.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Under Alternative 5, SCVWD would transfer 2,000 AF of its CVP water supplies (in below normal water years), directly or through transfer and exchanges, in perpetuity to Reclamation and USFWS' RWSP, for use in the Incremental Level 4 water supply pool for wildlife refuges. **This impact would be beneficial.**

4.2.7.1 South-of-Delta CVP and SWP Facilities and Contractors

Alternative 5 would allow SCVWD to divert water from San Luis Reservoir regardless of water levels within the reservoir. It would result in similar impacts to South-of-Delta CVP and SWP contractors and benefits to SCVWD as described for Alternative 2 because it would allow uninterrupted deliveries in the same way as Alternative 2. **This impact would be less than significant**.

[1] As defined in CEQA Guidelines Section 15364

4.2.7.2 Santa Clara Valley Water District
Under this alternative, the expanded Pacheco Reservoir would provide an alternate source of water to SCVWD during a low point event. It would also provide additional water supply to SCVWD during dry conditions and would increase annual San Felipe Division CVP M&I deliveries on average by 2,800 AF, as shown in Tables N-26 and N-27 in Appendix N. Alternative 5 would allow uninterrupted delivery of SCVWD CVP M&I deliveries 14 out of the 17 low point years when compared to the No Action/No Project Alternative, partially reducing SCVWD unmet demand during low point events. **This would be a beneficial long-term water supply impact for SCVWD.**

4.2.8 Significant Unavoidable Impacts
Alternative 1 and Alternative 4 would have significant and unavoidable impacts on water supply. Under Alternative 1, low point events would continue and likely result in reduced deliveries of treated water to SCVWD M&I customers. The construction of the shear key option under Alternative 4 would temporarily reduce storage in the San Luis Reservoir for two seasons, resulting in a short-term decrease in water supply deliveries to CVP and SWP contractors. No feasible mitigation measures were identified that could reduce these impacts to a less than significant level.

4.3 Groundwater Resources

4.3.1 Assessment Methods
Potential impacts to groundwater resources were estimated using results from the CalSim II model (see Appendix B for description of the assumptions and methods used in the CalSim II model). The CalSim II model provides the projected change in imported water supply under each alternative. Potential changes to groundwater levels, land subsidence, and changes in groundwater quality were assessed qualitatively. For land subsidence, the expected increase in groundwater pumping and drawdown were compared to areas with existing subsidence to identify areas that may be susceptible to impacts. Groundwater quality impacts were assessed by considering areas of known quality concerns and determining whether modeled groundwater drawdown could cause those areas to migrate.

4.3.2 Significance Criteria
An impact would be significant if the proposed alternative would result in: (1) substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin; (2) degradation in groundwater quality such that it would exceed regulatory standards or would substantially impair reasonably anticipated beneficial uses of groundwater; (3) increases in groundwater use that generates permanent/inelastic land subsidence caused by water level declines; or (4) conflict with or obstruct implementation of a sustainable groundwater management plan. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-3.

Table 4-3. Groundwater Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin	Evaluation of how the alternatives could change surface water availability and associated groundwater use in a way that impacted its long-term availability for both water supply and environmental purposes like stream/river inflow or outflow	1	NI	--	Section 4.3.3
		2	South-of-Delta CVP – LTS South-of-Delta SWP – NI SCVWD Service Area - B	None	Section 4.3.4
		3	South-of-Delta CVP – LTS South-of-Delta SWP – NI SCVWD Service Area (Constr.) – LTS SCVWD Service Area (Oper.) – B	None	Section 4.3.5
		4	South-of-Delta CVP – B South-of-Delta SWP – LTS SCVWD Service Area - B	None	Section 4.3.6
		5	South-of-Delta CVP – LTS South-of-Delta SWP – NI SCVWD Service Area - B	None	Section 4.3.7
Cause a degradation in groundwater quality such that it would exceed regulatory standards or would substantially impair reasonably anticipated beneficial uses of groundwater	Evaluation of whether the alternatives would introduce groundwater extraction or recharge facilities in locations where they do not currently exist to determine whether and to what degree they might introduce contaminated water or induce new groundwater migration	1	NI	--	Section 4.3.3
		2	NI	None	Section 4.3.4
		3	NI	None	Section 4.3.5
		4	NI	None	Section 4.3.6
		5	NI	None	Section 4.3.7
Cause an increase in groundwater use that generates a net reduction in groundwater levels that would generate permanent/ inelastic land subsidence caused by water level declines	Evaluation of how the alternatives could change surface water availability and associated groundwater use in a way that would contribute to any permanent/ inelastic land subsidence	1	NI	--	Section 4.3.3
		2	NI	None	Section 4.3.4
		3	NI	None	Section 4.3.5
		4	NI	None	Section 4.3.6
		5	NI	None	Section 4.3.7

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Conflict with or obstruct implementation of a sustainable groundwater management plan	Evaluation of whether construction or operation of the alternatives could conflict with or obstruct implementation of a sustainable groundwater management plan.	1	NI	--	Section 4.3.3
		2	NI	None	Section 4.3.4
		3	NI	None	Section 4.3.5
		4	B	None	Section 4.3.6
		5	NI	None	Section 4.3.7

Key: Alt = alternative; B = beneficial; Constr. = construction; LTS = less than significant; NI = no impact; Oper. = operation; S = Significant; SU = significant and unavoidable; W = with; WO = without

4.3.3 Environmental Consequences/Environmental Impacts of Alternative 1 - No Action/No Project Alternative

Under the No Action/No Project Alternative, future reductions in CVP and SWP deliveries via the Delta-Mendota Canal to South-of-Delta contractors could result in increased groundwater use. However, implementation of the Sustainable Groundwater Management Act (SGMA) could establish limits on groundwater use within the valley and prevent additional overdraft. The types and magnitude of changes in imported supplies and groundwater use that could occur are not currently known and incorporating these changes into the No Action/No Project Alternative would be speculative. **Under the No Action/No Project Alternative, groundwater use in the CVP and SWP contractor service areas would be same as under existing conditions and there would be no impact.**

SCVWD would continue to rely on local surface water supplies and groundwater during dry periods when local and imported water supplies do not meet Santa Clara County's water needs. Groundwater levels within the county (Santa Clara and Llagas subbasins) would continue to have fluctuations based on hydrologic conditions (with increased drawdown during dry periods). Under the No Action/No Project Alternative, these fluctuations would be similar to those under existing conditions. SCVWD off-stream recharge facilities depend on locally conserved and imported water deliveries. SCVWD would continue operating recharge facilities and accessing groundwater supplies to anticipating interruptions or curtailment of imported CVP supply from San Luis Reservoir; however, local and imported water supplies may or may not be able to meet demands during the low point years. This alternative would continue to subject SCVWD's customers to water curtailments. **Under the No Action/No Project Alternative, the SCVWD recharge facilities would be operated in the same manner as under existing conditions and there would be no impact.**

4.3.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Alternative 2 would not introduce groundwater extraction or recharge facilities in locations where they do not currently exist and as a result would have no effect on groundwater quality through the introduction of contaminated water or the inducement of new groundwater migration. Alternative 2 also would not involve any construction activities with the potential to decrease groundwater levels or contribute to any permanent/ inelastic land subsidence. **There would be no impact.**

Alternative 2 would result in less carryover water stored in the San Luis Reservoir and potentially decrease deliveries to South-of-Delta CVP agricultural contractors. Supply shortages due to decreased imported water deliveries could be made up through groundwater pumping in addition to existing groundwater pumping. Under Alternative 2 reductions to imported deliveries would be minimal, at an annual average of approximately 2,000 AF reduction in supplies to South-of-Delta CVP agricultural contractors. The Central Valley Hydrologic Model (CVHM) estimates groundwater pumping in the western portion of the valley to be approximately 60,000 AF per year. Therefore, potential increase in groundwater pumping, even if all the deficit in delivery is made up via groundwater pumping, would be less than 4 percent of the total pumping in the area. **This impact would be less than significant**.

Alternative 2 would affect the operations of CVP supplies, but SWP supplies would remain unchanged. **Therefore, groundwater pumping under this alternative would be same as under existing conditions and there would be no impact.**

Alternative 2 would on average increase San Felipe Division CVP M&I deliveries by 3,200 AF when compared to the No Action/No Project Alternative. Improved water supply reliability during low point years would reduce Santa Clara County's reliance on groundwater to make up the difference between the county's water demands and available local and imported water supplies. Additionally, SCVWD off-stream recharge facilities depend on locally conserved and imported water deliveries. Thus, under Alternative 2, SCVWD would be better able to operate recharge facilities. **This impact would be beneficial.**

Alternative 2 would impact groundwater use in the South-of-Delta CVP contractor service area, which includes medium and high priority subbasins. SGMA requires those high and medium priority basins to be managed under a groundwater sustainability plan by January 31, 2020. Implementation of the groundwater sustainability plans would establish limits on groundwater use within the subbasins and prevent additional overdraft. The potential 4 percent increase of total pumping in the area would not significantly impact the sustainable management of the subbasins. **Construction and operation of Alternative 2 would not conflict with or obstruct the implementation of a sustainable groundwater management plan.**

4.3.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Alternative 3 would not introduce groundwater extraction or recharge facilities in locations where they do not currently exist and, as a result, would have no effect on groundwater quality through the introduction of contaminated water or the inducement of new groundwater migration or contribute to any permanent/ inelastic land subsidence. **There would be no impact.**

The effects in the CVP contractors' service area under this alternative would be similar to the impacts under Alternative 2. **This impact would be less than significant**. Similar to Alternative 2, Alternative 3 would affect the operations of CVP supplies, but SWP supplies would remain unchanged. **There would be no impact.**

Excavation and trenching activities during construction might encounter groundwater; however, Santa Teresa WTP is not located over a groundwater aquifer and the likelihood of encountering groundwater would be minimal. If any groundwater is encountered during construction activities, it would be pumped from the excavated area and contained and treated in accordance with all applicable State and Federal regulations before being discharged. This pumping of groundwater from the shallow aquifer encountered by these trenching activities could cause temporary groundwater level declines at the Santa Teresa WTP during construction activities. These impacts would only occur during construction and any dewatering activities would end after construction is complete. **This impact would be short-term and less than significant**.

Alternative 3 would on average increase San Felipe Division CVP M&I deliveries by 3,200 AF when compared to the No Action/No Project Alternative. Improved water supply reliability during low point years would reduce Santa Clara County's reliance on groundwater to make up the difference between the county's water demands and available local and imported water supplies. Additionally, SCVWD off-stream recharge facilities depend on locally conserved and imported water deliveries. Thus, under Alternative 3 SCVWD would be better able to operate recharge facilities. **This impact would be beneficial.**

Alternative 3 would impact groundwater use in the South-of-Delta CVP contractor service area, which includes medium and high priority subbasins. SGMA requires those high and medium priority basins to be managed under a groundwater sustainability plan by January 31, 2020. Implementation of the groundwater sustainability plans would establish limits on groundwater use within the subbasins and prevent additional overdraft. The potential 4 percent increase of total pumping in the area would not significantly impact the sustainable management of the subbasins. **Construction and operation of Alternative 2 would not conflict with or obstruct the implementation of a sustainable groundwater management plan.**

4.3.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

Alternative 4 would not introduce groundwater extraction or recharge facilities in locations where they do not currently exist and as a result would have no effect on groundwater quality through the introduction of contaminated water or the inducement of new groundwater migration. Alternative 4 also would not involve any construction activities with the potential to decrease groundwater levels or contribute to any permanent/ inelastic land subsidence. **There would be no impact.**

Alternative 4 would result in increased deliveries to CVP contractors by approximately 14,000 AF per year on average. Alternative 4 would support a reduced reliance on groundwater because of improved imported CVP water supply reliability. Under this alternative, there would be a slight reduction in Table A SWP deliveries, an average of 3,000 AF, and would also reduce potential surplus water supply (Article 21) deliveries to SWP. Potential increases in SWP groundwater pumping even if all the deficit in delivery is made up via groundwater pumping would be minimal. **Therefore, operating Alternative 4 would have a less than significant impact on South-of-Delta SWP groundwater use and a beneficial effect on South-of-Delta CVP groundwater use.**

Alternative 4 would support additional San Felipe Division M&I deliveries of approximately 600 AF on average to meet SCVWD demands. Increased water supply during low point years would reduce Santa Clara County's reliability on groundwater to make up the difference between the county's water demands and available local and imported water supplies. Additionally, SCVWD off-stream recharge facilities depend on imported water deliveries. Thus, under Alternative 4, SCVWD would be able to operate recharge facilities without imported water supply interruptions or curtailment. Alternative 4 would support a reduced reliance on groundwater because of improved imported water supply reliability during low point years which would be beneficial to groundwater resources. **This impact would be beneficial.**

Alternative 4 would reduce reliability on groundwater use in the San Felipe Division and South-of-Delta contractor service area, which includes medium and high priority subbasins. SGMA requires those high and medium priority basins to be managed under a groundwater sustainability plan by January 31, 2020. Implementation of the groundwater sustainability plans would establish limits on groundwater use within the subbasins and prevent additional overdraft. The potential decrease in pumping in the area would improve the sustainable management of the subbasins. **This impact would be beneficial.**

4.3.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Alternative 5 would not introduce groundwater extraction or recharge facilities in locations where they do not exist and would have no effect on groundwater quality through the introduction of contaminated water or the inducement of new groundwater migration. Alternative 5 also would not involve any construction activities with the potential to decrease groundwater levels or contribute to any permanent/ inelastic land subsidence. **There would be no impact.**

The effects in the CVP contractors' service area under this alternative would be similar to the impacts under Alternative 2. **This impact would be less than significant.** Similar to Alternative 2, Alternative 5 would affect the operations of CVP supplies, but SWP supplies would remain unchanged. **There would be no impact.**

Under this alternative, the expanded Pacheco Reservoir would provide an alternate source of water to SCVWD during a low point event. It would also provide additional water supply to SCVWD during dry conditions. Alternative 5 would support additional San Felipe Division deliveries of approximately 2,800 AF on average to meet SCVWD demands. Increased water supply during low point years would reduce Santa Clara County's reliance on groundwater to make up the difference between the county's water demands and available local and imported water supplies. Additionally, SCVWD off-stream recharge facilities depend on imported water deliveries and local supplies. Under Alternative 5, SCVWD would be able to operate recharge facilities without imported water supply interruptions or curtailment during low point years. The Pacheco Reservoir is currently operated under a 2018 DWR Division of Safety of Dams order requiring that the upstream and downstream controls be left fully open to maximize release and maintain the lowest possible surface elevation. Prior to this, under the existing 2014 revised operations plan for Pacheco Reservoir, early season inflow was stored in the reservoir for the purpose of groundwater recharge through releases to Pacheco Creek later in the year.

During construction, a temporary cofferdam and bypass structure would be constructed to ensure flows in Pacheco Creek are maintained. Following construction, average monthly releases to Pacheco Creek would be higher than under existing conditions in most months given the reservoir's current operation with its outlet structures open. Pacheco Creek flows under existing conditions are expected to be higher in January, February and March of wet year types based on historic hydrology from 2012 to 2017. Therefore, there would be an overall increase in downstream Pacheco Creek flows under Alternative 5 in comparison to existing conditions. Consequently, groundwater recharge of the Gilroy-Hollister groundwater subbasin through Pacheco Creek flows would be higher under Alternative 5. In addition, the delivery of Incremental Level 4 refuge water supply to Grassland Resource Conservation District in below normal water years can, in part, reduce reliance on groundwater pumping in a region that has experienced significant land subsidence due to chronic overdraft. **This impact would be beneficial.**

Alternative 5 would impact groundwater use in the South-of-Delta contractor service area, which includes medium and high priority subbasins. SGMA requires those high and medium priority basins to be managed under a groundwater sustainability plan by January 31, 2020. Implementation of the groundwater sustainability plans would establish limits on groundwater use within the subbasins and prevent additional overdraft. The potential 4 percent increase of total pumping in the area would not significantly impact the sustainable management of the subbasins. **Construction and operation of Alternative 5 would not conflict with or obstruct the implementation of a sustainable groundwater management plan.**

4.4 Flood Control

4.4.1 Assessment Methods

Flood impacts under the action alternatives would stem from construction activities impeding flood flow or exposing people to flooding risks. Additionally, short- or long-term increases in runoff could result in flooding impacts. Under Alternative 4 and Alternative 5, surface elevations and total storage capacity would increase at both reservoirs. Potential changes to increases to flood risk are assessed qualitatively.

4.4.2 Significance Criteria

Impacts related to flooding would be considered significant if the project would result in the: (1) substantial alteration of the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would: (a) substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site, (b) impede or redirect flood flows. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-4.

Table 4-4. Flood Control Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Substantial alteration of the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would: (a) substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site, (b) impede or redirect flood flows.	a) Comparison of new proposed infrastructure against stream, river and drainage mapping to determine how it would interact with those features and whether it could alter the rate or amount of surface runoff from the site, b) Comparison of all proposed structures against 100-year flood mapping to determine their relation to the 100-year flood hazard area.	1	NI	--	Section 4.4.3
		2	LTS	None	Section 4.4.4
		3	LTS	None	Section 4.4.5
		4	LTS	None	Section 4.4.6
		5	Construction - LTS Operation - NI	None	Section 4.4.7

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

4.4.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

There would be no construction of any new structures under the No Action/No Project Alternative. Under the No Action/No Project Alternative, current operations at San Luis Reservoir, Anderson Reservoir, and Pacheco Reservoir would remain unchanged. Flooding occurrence and flood risk in Merced and Santa Clara Counties would not change. There would be no placement of structures in FEMA-defined flood zones and no alteration of existing drainage patterns. There would be no addition of impervious surfaces and no increase in runoff water that would result in flooding on- or off-site. **There would be no impact.**

4.4.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

All proposed components of Alternative 2 would be located in Flood Zone D, defined as possible but undetermined flood risk. No permanent structures would be placed in the 100-year flood hazard area at San Luis Reservoir. While the potential for flood hazards exists during construction, risks of flood hazard would not increase. Long-term operations of the reservoir would not differ from existing operations in ways that would increase the likelihood or susceptibility of flooding or the risk of dam failure. The aeration system structure would be a new facility with an approximate footprint of 1,200 square feet and constructed on already developed land. Increases in runoff would be negligible and could infiltrate into surrounding pervious land. As mentioned in Section 4.1, preparation of a SWPPP would be required, which would include measures to ensure stormwater during construction does not substantially increase during construction and prior to establishment of revegetation efforts. **Therefore, impacts to the drainage pattern and surface runoff and associated flood risks would be less than significant.**

4.4.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

The Santa Teresa WTP is located in Flood Zone D, defined as possible but undetermined flood risk and there would be no impact to the 100-year flood hazard area. The plant sits on a hillside at an elevation of approximately 450 feet above mean sea level. The nearest creek is found downslope at approximately 265 feet above mean sea level. New structures would be constructed in Zone D and would be surrounded by the existing facility causing no change to flood flows or increased flood risk. Operation of the technology retrofits under Alternative 3 would be similar to existing operations with respect to flood risk related to levee or pond embankment failure. Ground-disturbing construction activities at the Santa Teresa WTP could generate changes in local stormwater drainage patterns and temporarily increase stormwater runoff rates. However, as mentioned in Section 4.1, preparation of a SWPPP would be required, which would include measures to ensure stormwater during construction does not substantially increase during construction to prevent any exceedance of the existing drainage systems capacity. **Therefore, impacts to the drainage pattern and surface runoff and associated flood risks would be less than significant.**

4.4.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

Construction activity would temporarily place equipment and structures downstream of the reservoir. Modification to the existing glory hole spillway would temporarily interrupt operation of the spillway. The temporary removal of embankment material and excavation of portions of the embankment down to bedrock would temporarily reduce the dam's capacity until the fill material is replaced. Final design of the corrective action and the dam raise would include a construction schedule that completes this type of work within the portion of a single water year when rain is unlikely and reservoir levels are lower. This schedule approach may require the completion of some construction components in phases over multiple water years. The construction health and safety plan would include a response plan to flood forecasts to suspend construction activities and move equipment to higher ground. The borrow and staging areas would not result in significant additions of new impervious surfaces or structures that would impede flows and are all located upstream of the reservoir. Increases in runoff would be negligible and could infiltrate into surrounding pervious land. As mentioned in Section 4.1, preparation of a SWPPP would be required, which would include measures to ensure stormwater during construction does not substantially increase during construction and prior to establishment of revegetation efforts. Long-term operations of the expanded reservoir under Alternative 4 would not differ significantly from operations under existing conditions. **Impacts to flood flows and flood control system capacity during construction and operation would be less than significant.**

4.4.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Construction at the Pacheco Pumping Plant is the only work within Merced County, and it would not impede or restrict flood flows nor increase flood risk to the surrounding areas. The area surrounding Pacheco Reservoir and Pacheco Creek in Santa Clara County is primarily within FEMA-designated Flood Zone D with low-lying areas within FEMA-designated Flood Zone A (100-year floodplain). Removal of the existing dam and construction of the new dam, spillway and facilities would temporarily place equipment and temporary and permanent structures within the 100-year floodplain. Flood hazards at North Fork Dam and in the downstream inundation could increase temporarily. Final design would include developing a construction schedule that times the work to occur when rain is unlikely and reservoir levels are lower. The water level would be drawn down prior to removal of the dam and a coffer dam would be constructed upstream of the new dam location. The coffer dam crest would be 500 feet to ensure flows in Pacheco Creek are maintained during construction and accommodate a 50-year flood event. The contractor would be required to develop a health and safety plan, which would include a response plan to flood forecasts to suspend construction activities and move equipment to higher ground.

Borrow areas and access roads are located within Flood Zones A and D. Although proposed improvements would be in areas of the 100-year floodplain and where flood risks are undetermined, they would not result in significant additions of new impervious surfaces or structures that would impede flows in undeveloped areas around the reservoir. The drawdown prior to construction would reduce the risk of flooding during construction. With the timing of construction and the reservoir drawdown schedule, no increases in flooding, including flooding from failure of a levee or dam, would be anticipated. Construction activities would not significantly alter the existing drainage patterns or increase stormwater runoff. New permanent access roads would replace existing access roads to be inundated with the new reservoir capacity and would be similar in size to the existing access roads. As mentioned in Section 4.1, preparation of a SWPPP would be required, which would include measures to control stormwater runoff and ensure runoff volumes do not substantially increase to prevent any exceedance of the existing drainage systems capacity. Permanent post-construction controls would be identified in the SWPPP to reduce erosion and flooding. **Impacts to flood flows and flood control system capacity during construction would be less than significant.**

Long term operation of the reservoir would alter the physical structure of Pacheco Creek, changing the size and location of areas impacted by flooding. However, through design of project features and incidental increased storage during the flood season, Alternative 5 would reduce downstream flood flows and corresponding flood stages along Pacheco Creek, by storing and regulating the release of peak flows during storm events. **There would be no impact to flood flows and flood control system capacity during operation of Alternative 5.**

4.5 Geology and Soils

4.5.1 Assessment Methods

The environmental consequences of the proposed alternatives were analyzed qualitatively, based on a review of soil, geologic, and paleontological data. Analysis of potential impacts focuses on the alternatives' potential to increase the risk of personal injury, loss of life, and damage to property, including project facilities, as a result of geologic conditions in the area of analysis as well as the alternative's potential to destroy paleontological resources. Because substantive changes to geology and soils are not anticipated into the future, the analysis compares the impacts of the action alternatives only to the impacts of the No Action/No Project Alternative.

4.5.2 Significance Criteria

Impacts related to geology, seismicity, and soils would be considered significant if the project would: (1) directly or indirectly cause potential substantial adverse effects, including risk of loss, injury, or death, through rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure; and landslides; (2) be located on a geologic unit or soil that is unstable or would become unstable as a result of the project, and potentially would result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse; (3) be located on expansive soil[2], creating substantial direct or indirect risk to life or property; (4) result in substantial soil erosion or the loss of topsoil; (5) result in the loss of availability of a known mineral resource that would be of value to the region and residents of the State; (6) result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan; or (7) directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. These criteria, the associated

[2] As defined in Table 18-1-B of the UBC (1994)

significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-5.

4.5.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

Under the No Action/No Project Alternative, current operations at San Luis Reservoir and Pacheco Reservoir would remain unchanged. There would be no construction activities and no impact on geology, soils, or paleontological resources in the area of analysis in Merced or Santa Clara Counties. **The No Action/No Project Alternative would result in no impact to geology and soils.**

4.5.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Construction activities would not directly influence earthquake activity; however, in the case of an earthquake or strong ground movement during construction, workers would be exposed to the risk of loss, injury, or death. San Luis Reservoir is located within a low to medium landslide hazard area. Construction and tunneling activities would follow standard safety measures as well as compliance with safety requirements of the Federal Occupational Safety and Health Administration (OSHA). In addition, construction activities would not result in moisture changes in soils and would have no impacts from expansive soils. Potential impacts would be similar for both the tunnel construction and pipeline construction. Construction activities could impact soil erosion and result in the potential for loss of topsoil around San Luis Reservoir where construction would take place. As mentioned in Section 4.1, a SWPPP would be implemented to control accelerated erosion and loss of topsoil during and after project construction.

While earthquake activity and unstable soil pose a risk if strong seismic ground shaking and associated ground failure, liquefaction, or landslides occurred while workers were on-site for maintenance activities, the action alternative is not constructing structures for human habitation. Additionally, regular maintenance occurs at the facilities under existing conditions; therefore, operation and maintenance under Alternative 2 would not result in risks greater than the existing conditions. In addition, this alternative would be designed to accommodate potential seismic-related ground shaking and ground failure generated by nearby faults without structure failure. Engineering design would include emergency shutoff features in the event of structure failure to prevent impacts to other existing water conveyance infrastructure. **Alternative 2 would have less than significant impact to geology and soils.**

Table 4-5. Geology and Soils Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Directly or indirectly cause potential substantial adverse effects, including risk of loss, injury, or death, through rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure; and landslides	Comparison of all proposed alternative infrastructure locations to available fault mapping, seismic risk data, liquefaction risk, and landslide mapping data	1	NI	--	Section 4.5.3
		2	LTS	None	Section 4.5.4
		3	LTS	None	Section 4.5.5
		4	LTS	None	Section 4.5.6
		5	LTS	None	Section 4.5.7
Located on a geologic unit or soil that is unstable or would become unstable as a result of the project, and potentially would result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse	Comparison of all proposed alternative infrastructure locations to available unstable soil mapping data	1	NI	--	Section 4.5.3
		2	NI	None	Section 4.5.4
		3	NI	None	Section 4.5.5
		4	LTS	None	Section 4.5.6
		5	LTS	None	Section 4.5.7
Complete construction on expansive soils creating a substantial risk to life or property	Comparison of all proposed alternative infrastructure locations to available expansive soil mapping data	1	NI	--	Section 4.5.3
		2	NI	None	Section 4.5.4
		3	NI	None	Section 4.5.5
		4	LTS	None	Section 4.5.6
		5	LTS	None	Section 4.5.7
Result in substantial soil erosion or the loss of topsoil	Evaluation of how construction or operation of the alternatives could result in soil erosion or the loss of topsoil.	1	NI	--	Section 4.5.3
		2	LTS	None	Section 4.5.4
		3	LTS	None	Section 4.5.5
		4	LTS	None	Section 4.5.6
		5	LTS	None	Section 4.5.7
Result in the loss of availability of a known mineral resource of regional or local importance	Comparison of all proposed alternative infrastructure locations to available mineral resource mapping data	1	NI	--	Section 4.5.3
		2	NI	None	Section 4.5.4
		3	NI	None	Section 4.5.5
		4	NI	None	Section 4.5.6
		5	NI	None	Section 4.5.7

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Result in long term impacts to geology, soils, or mineral resources	Comparison of all proposed alternative infrastructure locations to available geology, soils, or mineral resources mapping data	1	NI	--	Section 4.5.3
		2	NI	None	Section 4.5.4
		3	NI	None	Section 4.5.5
		4	NI	None	Section 4.5.6
		5	NI	None	Section 4.5.7
Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	Evaluation of the potential for impacts to known or previously undiscovered paleontological resources or unique geologic features through the review of literature and previously completed survey reports to determine the potential for impacts to known resources and estimate the potential for impacts to previously undiscovered resources.	1	NI	--	Section 4.5.3
		2	S, LTS	PR-1	Section 4.5.4
		3	NI	None	Section 4.5.5
		4	S, LTS	PR-1	Section 4.5.6
		5	S, LTS	PR-1	Section 4.5.7

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

Construction activities would not affect the availability of a known mineral resource of value to the region or State, or cause the loss of a locally important resource recovery site. **There would be no impacts to mineral resources.**

There are no unique geologic features that could be directly or indirectly destroyed during construction and operation of Alternative 2. There is the potential to encounter previously undetected but potentially significant paleontological resources during construction of Alternative 2. The area surrounding San Luis Reservoir has been ranked as low to moderately sensitive (see Section 3.8.4 in Chapter 3). Therefore, there is a low to moderate probability of encountering previously undetected paleontological resources in the vicinity of known paleontological resources, in areas of poor surface visibility where detection may have been impeded, and in areas that have not been subject to prior investigation. **Impacts would be significant.** Mitigation Measure PR-1, discussed in Section 4.5.8, would ensure earthmoving construction activities would be monitored by a qualified paleontologist and implementation of measures to avoid, record, preserve, or recover unique paleontological resources if encountered. **Implementation of Mitigation Measure PR-1 would reduce these impacts to a less than significant.**

4.5.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Construction activities would not directly influence earthquake activity; however, in the case of an earthquake or strong ground movement during construction, workers would be exposed to the risk of loss, injury, or death. Construction at the Santa Teresa WTP would follow standard safety measures and compliance with safety requirements of the Federal OSHA. While earthquake activity during construction could result in adverse effects to workers, this risk is temporary during the timeframe of construction. Additionally, Alternative 3 would not construct structures for human habitation. Construction would take place on already developed sites and would not result in moisture changes in soils. In addition, there is no unstable soil and no landslide or liquefaction zones near the WTP. Construction activities could impact soil erosion and result in the potential for loss of topsoil around Santa Teresa WTP where construction would take place. As mentioned in Section 4.1, a SWPPP would be implemented to control accelerated erosion and loss of topsoil during and after project construction. Following construction, operations at the WTP would be the same as under existing conditions and there would be no long-term impact. **Alternative 3 would have short term, less than significant impact to geology and soils.**

Construction activities would not affect the availability of a known mineral resource of value to the region or State, or cause the loss of a locally important resource recovery site. **There would be no impacts to mineral resources.**

No new or expanded facilities are proposed under Alternative 3, and all technological retrofits would be made within the existing footprint of the Santa Teresa WTP. Therefore, there are no unique geologic features that could be directly or indirectly destroyed and there is no potential to encounter significant paleontological resources during construction and operation of Alternative 3. **There would be no impacts to geologic features or paleontological resources.**

4.5.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

The area where construction would take place at San Luis Reservoir is not in a high landslide or liquefaction hazard area; however, ground failure can occur during earthquake activity. Pre-construction design would include the detailed survey and mapping of any locations in the construction footprint with the potential for liquefaction and landslide and the development of construction plans to avoid or minimize that risk. Construction activities would not directly influence earthquake activity; however, in the case of an earthquake or strong ground movement during construction, workers would be exposed to the risk of loss, injury, or death. Construction activities would follow the safety requirements of OSHA to reduce the potential for harm to construction workers or equipment. Construction activities requiring the excavation and redevelopment of the dam foundation and embankment slope would be scheduled for completion during periods of the year when reservoir storage levels are lower to limit potential for a seismic event during construction to cause dam overtopping or failure that could expose construction workers to injury or death. In addition, construction activities that would result in moisture changes in soils would be evaluated during engineering design to accommodate potential soil expansion. Construction activities and reservoir-level fluctuations would have the potential to contribute to accelerated soil erosion and loss of top soil around San Luis Reservoir where construction would take place. As mentioned in Section 4.1, a SWPPP would be implemented to control accelerated erosion and loss of topsoil during and after project construction. Erosion resulting from reservoir fluctuations would be contained by the reservoir and could be minimized through management of reservoir-level operations.

While earthquake activity and unstable soil pose a risk if strong seismic ground shaking and associated ground failure, liquefaction, or landslides occurred while workers were on-site for operations, the San Luis Reservoir expansion is not constructing structures for human habitation. Additionally, regular maintenance occurs at the facilities under existing conditions; therefore, operation and maintenance associated with Alternative 4 would not result in risks that are greater than existing conditions. In addition, Alternative 4 would be designed to accommodate potential seismic-related ground shaking and ground failure generated by nearby faults without structure failure based on the findings of the geologic investigations and engineering designs developed for the Safety of Dams Corrective Action Study. **Alternative 4 would have less than significant impact to geology and soils.**

Construction activities would not affect the availability of a known mineral resource of value to the region or State, or cause the loss of a locally important resource recovery site. **There would be no impacts to mineral resources.**

There are no unique geologic features that could be directly or indirectly destroyed during construction and operation of Alternative 4. There is the potential to encounter previously undetected but potentially significant paleontological resources during construction of Alternative 4. The area surrounding San Luis Reservoir has been ranked as low to moderately sensitive (see Section 3.8.4 in Chapter 3). Therefore, there is a low to moderate probability of encountering previously undetected paleontological resources in the vicinity of known paleontological resources, in areas of poor surface visibility where detection may have been impeded, and in areas that have not been subject to prior investigation. **Impacts would be**

significant. Mitigation Measure PR-1, discussed in Section 4.5.8, would ensure earthmoving construction activities would be monitored by a qualified paleontologist and implementation of measures to avoid, record, preserve, or recover unique paleontological resources if encountered. **Implementation of Mitigation Measure PR-1 would reduce these impacts to a less than significant.**

4.5.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Construction activities would not take place in a high liquefaction hazard area and would not directly influence earthquake activity; however, in the case of an earthquake or strong ground movement during construction, workers would be exposed to the risk of loss, injury, or death. Construction activities would follow the safety requirements of OSHA to reduce the potential for harm to construction workers or equipment. Moderate expansive soils are present surrounding Pacheco Reservoir, however construction activities that would result in moisture changes in soils and result in expansive soils, would be evaluated during engineering design to accommodate potential soil expansion. Construction activities and reservoir-level fluctuations would have the potential to contribute to accelerated soil erosion and loss of top soil around Pacheco Reservoir where construction would take place. As mentioned in Section 4.1, a SWPPP would be implemented to control accelerated erosion and loss of topsoil during and after project construction. Erosion resulting from reservoir fluctuations would be contained by the reservoir and could be minimized through management of reservoir-level operations.

Earthquake activity and unstable soil pose a risk if strong seismic ground shaking and associated ground failure, liquefaction, or landslides occurred while workers were on-site for operations; however, this alternative is not constructing structures for human habitation and regular maintenance occurs at the facilities under existing conditions; therefore, operation and maintenance associated with Alternative 5 would not result in risks that are greater than existing conditions. In addition, the Pacheco Reservoir Expansion Alternative would be designed to accommodate potential seismic-related ground shaking and ground failure generated by nearby faults without structure failure. **Alternative 5 would have less than significant impact to geology and soils.**

Construction activities would not affect the availability of a known mineral resource of value to the region or State, or cause the loss of a locally important resource recovery site. **There would be no impacts to mineral resources.**

There are no unique geologic features that could be directly or indirectly destroyed during construction and operation of Alternative 5. There is the potential to encounter previously undetected but potentially significant paleontological resources during construction of Alternative 5. The area surrounding Pacheco Reservoir has been ranked as low to moderately sensitive (see Section 3.8.4 in Chapter 3).Therefore, there is a low to moderate probability of encountering previously undetected paleontological resources in the vicinity of known paleontological resources, in areas of poor surface visibility where detection may have been impeded, and in areas that have not been subject to prior investigation. **Impacts would be significant.** Mitigation Measure PR-1, discussed in Section 4.5.8, would ensure earthmoving construction activities would be monitored by a qualified paleontologist and implementation of measures to avoid, record, preserve, or recover unique paleontological resources if encountered. **Implementation of Mitigation Measure PR-1 would reduce these impacts to less than significant.**

4.5.8 Mitigation Measures

Mitigation Measure PR-1: Avoidance and Management of Inadvertent Paleontological Discoveries. The following construction requirements will be required by Reclamation for Alternatives 2 and 4, and SCVWD for Alternative 5, to help avoid adverse paleontological resource impacts. A qualified paleontologist will monitor earth moving construction activities that have the potential to disturb previously undisturbed native sediment. Monitoring will not be conducted in areas where the ground has been previously disturbed, in areas of artificial fill, or in areas where exposed sediment will be buried, but not otherwise disturbed. If paleontological remains are discovered during construction, construction will cease or be directed away from the discovery, and the potential resource will be evaluated by the paleontologist. The paleontologist will recommend appropriate measures to avoid, record, preserve, or recover the resource if determined to be unique.

4.6 Indian Trust Assets

Indian Trust Assets (ITAs) are defined as legal interests in property held in trust by the United States government for Indian tribes or individuals, or property protected under United States (U.S.) law for Indian tribes or individuals. An Indian trust has three components: 1) the trustee, 2) the beneficiary, and 3) the trust asset. ITAs can include land, minerals, Federally-reserved hunting and fishing rights, Federally-reserved water rights, and in-stream flows associated with a reservation or Rancheria. Beneficiaries of the Indian trust relationship are federally-recognized Indian tribes with trust land. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the U.S. The characterization and application of the U.S. trust relationship have been defined by case law that supports Congressional acts, executive orders, and historic treaty provisions. There are no ITAs within or adjacent to the area of analysis, so there would be no impact to ITAs from SLLPIP actions. A map indicating the closest ITAs to the study area is included in Appendix H. The ITAs in closest proximity to the area of analysis are Chicken Ranch ITA, northeast of Merced County in Tuolumne County, and Picayune ITA, east of Merced County in Madera County.

4.7 Air Quality

4.7.1 Assessment Methods

This section describes the assessment methods used to analyze potential air quality effects of the alternatives, including the No Action/No Project Alternative. Construction-related emissions were estimated using the following sources: OFFROAD2017 web database (California Air Resources Board [CARB] 2017), EMFAC2014 web database (CARB 2014), California Emission

Inventory and Reporting System particulate matter speciation profiles (CARB 2016), paved road dust emission factors (USEPA 2011), CalEEMod User's Guide, Appendix D: Default Data Tables (California Air Pollution Control Officers Association [CAPCOA] 2017), and rulemaking documentation related to diesel engines on commercial harbor craft (CARB 2004, CARB 2007, CARB 2010). Appendix O provides detailed information on the emission calculations for off-road construction equipment exhaust; on-road haul/vendor truck and construction worker commuting exhaust; fugitive dust emissions from unpaved road material handling, grading, and bulldozing; and marine exhaust emissions from dredging activities.

4.7.2 Significance Criteria

Impacts on air quality would be considered significant if the proposed project or alternatives would: (1) conflict with or obstruct implementation of the applicable air quality plan; (2) result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (3) expose sensitive receptors to substantial pollutant concentrations; or (4) result in other emissions (such as those leading to objectionable odors) adversely affecting a substantial number of people. The quantitative significance criteria developed by the local air districts and the general conformity *de minimis* thresholds were developed to determine compliance with the first two significance criteria. This project is subject to the general conformity regulations because it involves a Federal agency (Reclamation) and is in a nonattainment or maintenance area. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-6. The second criterion for cumulative impacts is addressed in Chapter 5, Cumulative Effects, and is not discussed further in this chapter.

Table 4-6. Air Quality Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Conflict with or obstruct implementation of the applicable air quality plan	Estimates of potential emissions from the short-term construction generated and long-term operations and maintenance of the alternatives were developed and compared to significance thresholds established by the respective air district where the alternative would be implemented.	1	NI	--	Section 4.5.3 Appendix O
		2	Tunnel Option Constr. - S, LTS Pipeline Option Constr. – S, LTS Operation – LTS	Tunnel - AQ-1, AQ-2, AQ-3 Pipeline - AQ-1, AQ-2, AQ-3, AQ-4, AQ-5	Section 4.5.4 Appendix O
		3	Constr. – LTS Operation - LTS	None	Section 4.5.5 Appendix O
		4	Constr. – S, SU Operation - LTS	AQ-1, AQ-2, AQ-6	Section 4.5.6 Appendix O
		5	Constr. – S, SU Operation - LTS	AQ-1, AQ-2	Section 4.5.7 Appendix O
Expose sensitive receptors to substantial pollutant concentrations	Each alternative's potential to generate TACs was measured and then evaluated considering the distance to the nearest sensitive receptor.	1	NI	--	Section 4.5.3 Appendix O
		2	LTS	None	Section 4.5.4 Appendix O
		3	LTS	None	Section 4.5.5 Appendix O
		4	LTS	None	Section 4.5.6 Appendix O
		5	LTS	None	Section 4.5.7 Appendix O

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people	Each alternatives potential to generate emissions, including objectionable odors, was measured and then evaluated considering the distance to the nearest sensitive receptor.	1	NI	None	Section 4.5.3 Appendix O
		2	NI	None	Section 4.5.4 Appendix O
		3	NI	None	Section 4.5.5 Appendix O
		4	NI	None	Section 4.5.6 Appendix O
		5	NI	None	Section 4.5.7 Appendix O
Cause temporary and short-term construction-related emissions of criteria pollutants or precursors that would exceed the general conformity *de minimis* thresholds.	For NEPA purposes, estimates of potential emissions from the short-term construction of the alternatives were developed and compared to the general conformity de minimis threshold.	1	NI	--	Section 4.5.3 Appendix O
		2	No Adverse Impact	None	Section 4.5.4 Appendix O
		3	No Adverse Impact	None	Section 4.5.5 Appendix O
		4	General Conformity Determination Required	None	Section 4.5.6 Appendix O
		5	General Conformity Determination Required	None	Section 4.5.7 Appendix O

Key: Alt = alternative; B = beneficial; Constr. = construction; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; TACs = toxic air contaminants; W = with; WO = without

The San Joaquin Valley Air Pollution Control District (SJVAPCD) (2015) and Bay Area Air Quality Management District (BAAQMD) (2017) publish CEQA guidelines to assist Lead Agencies with uniform procedures for addressing air quality impacts in environmental documentation. Construction and operation activities occurring in Merced County for Alternatives 2 and 4 would be under the jurisdiction of the SJVAPCD, whereas construction and operations in Santa Clara County for Alternatives 3 and 5 would be under the jurisdiction of the BAAQMD. Impacts on air quality would be significant if implementing an alternative would cause the thresholds shown in the CEQA guidance documents to be exceeded; if these thresholds are exceeded, conflicts with applicable air quality plans and contributions to air quality standard violations for applicable pollutants can be assumed.

Table 4-7 summarizes the results of the air quality impacts estimated for the SJVAPCD. Table 4-8 summarizes air quality impacts in the BAAQMD. Detailed calculations are provided in Appendix O.

Table 4-7. Unmitigated and Mitigated Construction Emissions (SJVAPCD)

Alternative	VOC, tpy	NOx, tpy	CO, tpy	SO_2, tpy	PM_{10}, tpy	$PM_{2.5}$, tpy
Alternative 2 (tunnel option)	6	**64**	31	<1	3	3
Alternative 2 (pipeline option)	**16**	**230**	70	<1	10	10
Alternative 4	**12**	**147**	74	<1	**743**	**80**
SJVAPCD Significance Thresholds	*10*	*10*	*100*	*27*	*15*	*15*
General Conformity De Minimis Thresholds	*10*	*10*	*n/a*	*100*	*100*	*100*
Mitigated Alternative 2 (tunnel option)	3	7	23	<1	1	<1
Mitigated Alternative 2 (pipeline option)	6	9	47	<1	1	1
Mitigated Alternative 4	4	9	49	<1	**41**	6

Note: Values in bold indicate that the SJVAPCD significance threshold and/or the general conformity *de minimis* threshold was exceeded.

Key: CO = carbon monoxide; NOx = nitrogen oxides; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; SJVAPCD = San Joaquin Valley Air Pollution Control District; SO_2 = sulfur dioxide; tpy = tons per year; VOC = volatile organic compounds

Table 4-8. Unmitigated and Mitigated Construction Emissions (BAAQMD)

Alternative	VOC, lb/day (tpy)	NOx, lb/day (tpy)	CO, lb/day (tpy)	SO_2, lb/day (tpy)	PM_{10}, lb/day (tpy)	$PM_{2.5}$, lb/day (tpy)
Alternative 3	4 (<1)	41 (7)	35 (5)	<1 (<1)	4 (<1)	2 (<1)
Alternative 5	**77** (14)	**647** (**116**)	860 (**156**)	2 (<1)	42 (8)	28 (5)
BAAQMD Significance Thresholds, lb/day	*54*	*54*	*n/a*	*n/a*	*82*	*54*
General Conformity De Minimis Thresholds, tpy	*100*	*100*	*100*	*100*	*n/a*	*100*
Mitigated Alternative 5	45 (8)	**206** (37)	728 (**132**)	2 (<1)	27 (5)	12 (2)

Note: Values in bold indicate that the BAAQMD significance threshold and/or the general conformity *de minimis* threshold was exceeded.

Key: BAAQMD = Bay Area Air Quality Management District; CO = carbon monoxide; lb/day = pound per day; NOx = nitrogen oxides; PM_{10} = inhalable particulate matter; $PM_{2.5}$ = fine particulate matter; SO_2 = sulfur dioxide; tpy = tons per year; VOC = volatile organic compounds

4.7.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

The No Action/No Project Alternative includes the most likely future conditions in the absence of the project. This analysis assumes that no short-term construction activities or long-term operational impacts would occur. As such, air quality conditions under the No Action/No Project Alternative would be the same as existing conditions. **The No Action/No Project Alternative would result in no impact on air quality.**

4.7.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Construction-related and operational emissions were estimated for the proposed tunnel option. Table 4-7 summarizes the annual construction-related emissions for the tunnel option. Construction of the proposed project has the potential to emit toxic air contaminants (TACs) in exhaust emissions, such as diesel particulate matter (DPM); however, construction would be short term and its impacts would be temporary. DPM is listed by the Office of Environmental Health Hazard Assessment (OEHHA) as a carcinogen and has a non-cancer chronic reference exposure level (REL); DPM does not contribute to acute health hazards because it does not have a published REL for acute health effects. Because there would be no long-term exposures to any TACs, the impact to sensitive receptors would be minimal. Additionally, due to the short installation period and distance to sensitive receptors, odors from diesel exhaust would not affect a substantial number of people.

New long-term operational impacts that could occur during the tunnel option include operation of the aeration facility near the Romero Visitor's Center and additional pumping at the Pacheco Pumping Plant that would increase with SCVWD being able to fully divert its CVP allocation, but no local criteria pollutant emissions would occur. Regional emissions could occur at nearby power plants to accommodate the increased electricity use, but because the plants would only operate within permitted limits, there would be no net increase in criteria pollutant emissions. As shown on Table 4-7, during construction, emissions of nitrogen oxides (NOx) would exceed the CEQA significance threshold and the general conformity *de minimis* threshold. Regulatory requirements and improvements in engine technology generally cause exhaust emissions to decrease with newer model year (e.g., 2015) and higher emission tiers (e.g., Tier 4) when compared to the existing fleet average. As demonstrated in Appendix O and Table 4-7, the required mitigation would reduce emissions below the significance criteria. Implementation of Mitigation Measures AQ-1, AQ-2, and AQ-3, described below in Section 4.7.8, would reduce maximum NOx emissions to less than significant. **Air quality impacts for the tunnel option would be significant pre-mitigation but less than significant with implementation of Mitigation Measures AQ-1, AQ-2, and AQ-3.**

Air quality impacts for the construction and operation of the pipeline option would be similar to those summarized above for the tunnel option. As discussed for the tunnel option, no local criteria pollutant emissions would occur from operation of the aeration facility and additional pumping. However, as shown on Table 4-7, during construction, emissions of volatile organic compound (VOC) and NOx would exceed the CEQA significance threshold and the general conformity *de minimis* threshold. Implementation of Mitigation Measures AQ-1, AQ-2, AQ-3, AQ-4, and AQ-5 described below in Section 4.7.8, would reduce maximum emissions for these pollutants to less than significant.

Pre-mitigation exceedances of SJVAPCD mass emission thresholds for O_3 precursors would, in general, lead to the increased health risks described in Chapter 3 within the affected air basin. For relatively small projects such as this alternative, attempts to model regional O_3 concentration impacts and resulting health impacts pre- and post-mitigation would not be practical or produce meaningful information. O_3 is a regional air pollutant and O_3 formation rates are a function of complex physical factors such as topography, VOC and NOx concentration ratios, meteorology, and sunlight exposure. **Air quality impacts for the pipeline option would be significant pre-mitigation, but less than significant with implementation of Mitigation Measures AQ-1, AQ-2, AQ-3, AQ-4, and AQ-5.**

4.7.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Construction-related emissions were estimated for off-road construction equipment, on-road haul trucks and delivery vehicles, and construction worker commuting. The basic fugitive dust control measures would be implemented during any construction activities at the Santa Teresa WTP. Table 4-8 summarizes the average daily construction-related emissions.

As shown in the table, emissions would not exceed the BAAQMD's significance thresholds or the general conformity *de minimis* thresholds. Because no long-term TAC emissions (including DPM) would occur, the impact to sensitive receptors would be minimal. Additionally, due to the short installation period and distance to sensitive receptors, odors from diesel exhaust would not affect a substantial number of people.

The use of raw water ozonation at the WTP would increase the use of liquid oxygen (LOX) at the WTP, thereby increasing the trip generation rate for deliveries. The additional LOX demand would increase truck trips by approximately nine trucks per year. Maximum emissions would not exceed 1 lb/day or 1 tpy for any pollutant and would be less than the BAAQMD's significance thresholds and the general conformity *de minimis* thresholds. **The impact on air quality would be less than significant**.

4.7.6 Environmental Consequences/Environmental Impacts of Alternative 4 - San Luis Reservoir Expansion Alternative

Construction-related emissions in the SJVAPCD were estimated for off-road construction equipment, on-road haul trucks and delivery vehicles, construction worker commuting. Table 4-7 summarizes the annual construction-related emissions. Because no long-term TAC emissions (including DPM) would occur, the impact to sensitive receptors would be minimal. Additionally, due to the short installation period and distance to sensitive receptors, odors from diesel exhaust would not affect a substantial number of people. **As shown in the table, VOC, NOx, PM_{10}, and $PM_{2.5}$ emissions would exceed the SJVAPCD's significance thresholds, while VOC, NOx, and PM_{10} would exceed the general conformity *de minimis* thresholds.** Implementation of Mitigation Measures AQ-1, AQ-2, and AQ-6 described below in Section 4.7.8, would be used to reduce VOC, NOx and $PM_{2.5}$ emissions to less than significant; however, PM_{10} emissions would remain significant and unavoidable. Tier 4 emission standards are the strictest emission standards for off-road engines and model year 2015 has the most stringent emission requirements for on-road engines. Given the scale of earth-moving activities proposed under this alternative, no additional technically feasible mitigation could be identified to reduce this impact to a less than significant level while not substantially slowing of the construction schedule. Table 4-7 summarizes the maximum annual emissions that would occur with mitigation.

Health impacts from O_3 precursor emissions are discussed in Alternative 2. Pre- and post-mitigation exceedances of SJVAPCD mass emission thresholds for PM_{10} and $PM_{2.5}$ would, in general, lead to increased health risks within the affected air basin, as described in Chapter 3. Sensitive receptors that could be affected by mass emissions of PM_{10} and $PM_{2.5}$ are identified in Appendix E1, *Noise and Vibration Supporting Information*. Exposure would occur over the duration of construction but would be variable based on the types of equipment being used. The closest sensitive receptor is approximately one mile (5,600 feet) from the center of construction and so any impacts from fugitive dust from a large construction area would be minimal. Therefore, it was not practical or meaningful to model ambient PM_{10} and $PM_{2.5}$ concentrations pre- and post-mitigation. **VOC, NOx, and $PM_{2.5}$ air quality impacts would be significant pre-mitigation but less than significant with implementation of Mitigation Measures AQ-1, AQ-2, and AQ-6, but PM_{10} emissions would be significant and unavoidable. Because mitigated emissions would be more than the general conformity *de minimis* thresholds, a general conformity determination would need to be developed for this alternative if it is Reclamation's preferred alternative in the Final EIS/EIR before a ROD can be issued for the SLLPIP.**

The additional capacity from reservoir enlargement would result in additional pumping into the reservoir and associated electricity consumption, but no local criteria pollutant emissions would occur. Regional emissions could occur at nearby power plants to accommodate the increased electricity use, but because the plants would only operate within permitted limits, there would be no net increase in criteria pollutant emissions. No other operational changes would occur that would increase criteria pollutant emissions. **Air quality impacts from operation of the enlarged reservoir would be less than significant.**

4.7.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Construction-related emissions in the BAAQMD were estimated for off-road construction equipment, on-road haul trucks and delivery vehicles, and construction worker commuting. Because no long-term TAC emissions (including DPM) would occur, the impact to sensitive receptors would be minimal. Additionally, due to the short installation period and distance to sensitive receptors, odors from diesel exhaust would not affect a substantial number of people. Table 4-8 summarizes the daily and annual construction-related emissions. As shown in the table, NOx, VOC, and CO emissions would exceed the BAAQMD's significance thresholds, while NOx and CO emissions would exceed the general conformity *de minimis* thresholds. Implementation of Mitigation Measures AQ-1 and AQ-2, described below in Section 4.7.8, would be sufficient to reduce VOC emissions to less than significant; however, NOx and CO emissions would remain significant and unavoidable. Tier 4 emission standards are the strictest emission standards for off-road engines and model year 2015 has the most stringent emission requirements for on-road engines. Given the scale of earth-moving activities proposed under this alternative, no additional technically feasible mitigation could be identified to reduce this impact to a less than significant level while not substantially slowing of the construction schedule. Table 4-8 summarizes the maximum daily and annual emissions that would occur with mitigation.

Health impacts from O_3 precursor emissions are discussed in Alternative 2. Pre- and post-mitigation exceedances of SJVAPCD mass emission thresholds for CO would, in general, lead to increased health risks within the affected air basin, as described in Chapter 3. Sensitive receptors that could be affected by mass emissions of CO are identified in Appendix E1, *Noise and Vibration Supporting Information*. Exposure would occur over the duration of construction but would be variable based on the types of equipment being used. The closest sensitive receptor is nearly a quarter mile (1,250 feet) from the center of construction and the project site is in an area designated attainment for CO. Because vehicle exhaust would be occurring over a large project area, impacts to nearby receptors would be minimal. Therefore, it was not practical or meaningful to model ambient PM_{10} and $PM_{2.5}$ concentrations pre- and post-mitigation. **VOC air quality impacts would be significant pre-mitigation but less than significant with implementation of Mitigation Measures AQ-1 and AQ-2, but NOx and CO emissions would be significant and unavoidable. Because mitigated emissions would be more than the general conformity *de minimis* thresholds, a general conformity determination would need to be developed for this alternative if it is Reclamation's preferred alternative in the Final EIS/EIR before a ROD can be issued for the SLLPIP.**

The operation of the expanded Pacheco Reservoir would result in additional pumping into the reservoir and associated electricity consumption, but no local criteria pollutant emissions would occur. Regional emissions could occur at nearby power plants to accommodate the increased electricity use, but because the plants would only operate within permitted limits, there would be no net increase in criteria pollutant emissions. No other operational changes would occur that would increase criteria pollutant emissions. **Air quality impacts from operation of the expanded Pacheco Reservoir would be less than significant.**

4.7.8 Mitigation Measures

The following mitigation measures would reduce the severity of the air quality impacts. They would be included in bid documents and construction contracts and their implementation would be monitored by the Lead Agencies.

Mitigation Measure AQ-1. Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, would reduce impacts on air quality from construction activities by using construction equipment compliant with the Tier 4 emission standards for off-road diesel engines instead of the fleet average for the San Joaquin Valley Air Basin (Alternatives 2 and 4) or the San Francisco Bay Area Air Basin (Alternative 5). Records will be maintained by the construction contractor that demonstrate that actual emissions would not exceed the SJVAPCD's significance criteria and would be submitted monthly to Reclamation under Alternatives 2 and 4 and to SCVWD under Alternative 5.

If NOx emissions are forecasted to exceed thresholds based on the monthly recordkeeping logs, then changes will be made so that the threshold is not exceeded, or work will be stopped. Possible changes that could be made to reduce emissions include changing the project phasing so less simultaneous operations would be required, reducing the daily number of hours worked per piece of equipment, or using alternative-fueled equipment when feasible.

Mitigation Measure AQ-2. Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, will ensure all haul trucks, vendor trucks, or other vehicles operating onsite with on-road engines will meet model year 2015 or better emission standards.

Mitigation Measure AQ-3. Reclamation will ensure that the contractor will equip all marine propulsion and auxiliary engines with selective catalytic reduction capable of achieving an 85 percent reduction in NOx.

Mitigation Measure AQ-4. Reclamation will ensure that the contractor will limit tug boat operations to 485 trips per year or less.

Mitigation Measure AQ-5. Reclamation will ensure that the contractor will install diesel oxidation catalysts on all off-road construction equipment capable of achieving an 80 percent reduction in NOx.

Mitigation Measure AQ-6. Reclamation will ensure that the contractor will pave all unpaved haul and access roads to/from borrow and disposal areas (i.e., Basalt Hill and Borrow Area 6) to reduce fugitive PM_{10} and $PM_{2.5}$ emissions.

4.7.9 Significant Unavoidable Impacts

Alternative 4 and Alternative 5 would have significant and unavoidable effects associated with temporary construction activities. As previously discussed, Tier 4 emission standards are the strictest emission standards for off-road engines and model year 2015 has the most stringent emission requirements for on-road engines. Given the magnitude of the project’s construction actions, no additional feasible mitigation measures were identified that could reduce these impacts to a less than significant level.

4.8 Greenhouse Gas Emissions

4.8.1 Assessment Methods

GHG emissions were estimated using the same methods discussed in Section 4.7, Air Quality, with notable differences detailed in Appendix P. Additionally, Appendix Q evaluates how significance determinations for each resource area could change under future climate variability scenarios. This analysis does not identify new impacts that were not analyzed in this EIS/EIR, but it describes how those impacts might change with future climate variability.

4.8.2 Significance Criteria

Impacts on GHG emissions would be considered significant if the proposed project or alternatives would: (1) generate GHG emissions, either directly or indirectly, that may have a significant impact on environment; or (2) conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the GHG emissions. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-9.

The BAAQMD and the SJVAPCD do not publish quantitative GHG significance thresholds to evaluate the effects of construction activities. However, the BAAQMD uses a threshold of 1,100 $MTCO_2e$ per year for project operations (BAAQMD 2017). Furthermore, although the project is not located in its boundaries, the Sacramento Metropolitan Air Quality Management District (SMAQMD) uses a threshold of 1,100 $MTCO_2e$ per year for construction activities (SMAQMD 2015). A threshold of 1,100 $MTCO_2e$ per year was selected as the significance criteria for both construction and operational emissions. Table 4-10 summarizes the results of the GHG impacts estimated for construction of the alternatives. See Appendix P for detailed emission calculations.

Table 4-9. Greenhouse Gas Emissions Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Generate greenhouse gas emissions, either directly or indirectly, that could have a significant impact on the environment.	Estimates of potential emissions from the short-term construction generated and long-term operations and maintenance of the alternatives were developed and compared to project thresholds established by the BAAQMD and the SMAQMD.	1	NI	--	Section 4.8.3 Appendix P
		2	S, LTS	AQ-1, AQ-2, AQ-3, AQ-4, GHG- 1, GHG-2	Section 4.8.4 Appendix P
		3	LTS	None	Section 4.8.5 Appendix P
		4	S, LTS	AQ-1, AQ-2, AQ-3, AQ-4, GHG- 1, GHG-2	Section 4.8.6 Appendix P
		5	S, LTS	AQ-1, AQ-2, AQ-3, AQ-4, GHG- 1, GHG-2	Section 4.8.7 Appendix P
Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	Comparison of all proposed alternative emissions estimates against applicable plans, policies, or regulations adopted to reduce GHG emissions	1	NI	--	Section 4.8.3 Appendix P
		2	S, LTS	AQ-1, AQ-2, AQ-3, AQ-4, GHG- 1, GHG-2	Section 4.8.4 Appendix P
		3	LTS	None	Section 4.8.5 Appendix P
		4	S, LTS	AQ-1, AQ-2, AQ-3, AQ-4, GHG- 1, GHG-2	Section 4.8.6 Appendix P
		5	S, LTS	AQ-1, AQ-2, AQ-3, AQ-4, GHG- 1, GHG-2	Section 4.8.7 Appendix P

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SMAQMD = Sacramento Metropolitan Air Quality Management District; SU = significant and unavoidable; W = with; WO = without

Table 4-10. Unmitigated Construction Emissions

Alternative	Total CO_2e (MT/project)	Maximum Annual CO_2e (Mt/year)
Alternative 2 (tunnel option)	**43,265**	**13,753**
Alternative 2 (pipeline option)	**34,916**	**23,541**
Alternative 3	2,279	851
Alternative 4 (shear key option)	**297,850**	**30,688**
Alternative 4 (no shear key)	**239,382**	**30,688**
Alternative 5	**121,742**	**27,290**
Significance Threshold	n/a	1,100

Note: Values in **bold** exceed the significance criteria.
Key: CO_2e = carbon dioxide equivalent; MT = metric tons; n/a = not applicable

4.8.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

The No Action/No Project Alternative includes existing conditions and the most likely future conditions in the absence of the project. This analysis assumes that no short-term construction activities or long-term operational impacts would occur. **The No Action/No Project Alternative would result in no impact on GHG emissions.**

4.8.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Construction-related emissions were estimated for off-road construction equipment, on-road haul trucks and delivery vehicles, construction worker commuting, and marine emissions (tugboats, crew/supply vessels). As shown in Table 4-10, emissions from construction of the tunnel and pipeline options would exceed the significance threshold for maximum annual emissions. **Therefore, construction of the tunnel and pipeline options would be significant.** Annual emissions from operation of the aeration facility and additional pumping would range from 238 to 279 metric tons CO_2e per year ($MTCO_2e$/yr) depending on whether oxygen was provided by a compressed air system or by a LOX tank and would be less than significant.

Mitigation Measures AQ-1 through AQ-4 would reduce construction GHG emissions, and Mitigation Measure GHG-1 would require the use of electrification and/or alternative fuels to further reduce construction emissions, but it is assumed that these types of equipment are not available in sufficient quantities to complete the required construction. Therefore, an additional mitigation measure to purchase GHG emission offsets in an amount necessary to reduce GHG emissions to less than the significance threshold would also be required. Implementation of Mitigation Measures AQ-1 through AQ-4, GHG-1, and GHG-2, described below in Section 4.8.8, would reduce emissions to less than significant.

Because construction GHG emissions exceed the quantitative significance threshold, they would also conflict with GHG reduction plans and policies such as the 2017 Scoping Plan, the BAAQMD Clean Air Plan, AB 32, SB 32, and Executive Order (EO) S-3-05. **The construction of the tunnel and pipeline options could generate GHG emissions that could have a**

significant GHG impact and conflict with GHG reduction plans/policies pre-mitigation but would have a less than significant impact on GHG emissions and GHG reduction plan/policy conflicts with mitigation.

4.8.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

As shown in Table 4-3, emissions from construction of the proposed improvements to the Santa Teresa WTP would not exceed the significance criterion for GHG emissions. The proposed improvements to the WTP increase operational emissions by 3 $MTCO_2e$/year from routine maintenance and solid waste disposal. Impacts associated with construction and operation of Alternative 3 would not exceed the significance criteria and therefore also would not conflict with an applicable plan or policy to reduce GHG emissions. **The construction and operation of Alternative 3 would not generate GHG emissions that would have a significant impact, and would not conflict with GHG reduction plans or policies, resulting in a less than significant impact on GHG emissions.**

4.8.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

Table 4-3 summarizes the annual construction-related emissions for this alternative. In addition to routine operational and maintenance emissions associated with the treatment plant retrofits, additional pumping at Gianelli and Pacheco would increase GHG emissions by 6,516 $MTCO_2e$/yr. Impacts associated with construction and operation of the enlarged reservoir would exceed the significance criterion. Because construction and operation GHG emissions exceed the quantitative significance threshold, they would also conflict with GHG reduction plans and policies such as the 2017 Scoping Plan, the BAAQMD Clean Air Plan, AB 32, SB 32, and EO S-3-05. Implementation of Mitigation Measures AQ-1 through AQ-4, GHG-1, and GHG-2, described below in Section 4.8.8, would reduce impacts to less than significant. **The construction and operation of the expanded reservoir would generate GHG emissions that would have a significant GHG impact and conflict with GHG reduction plans/policies pre-mitigation, but would have a less than significant impact on GHG emissions and GHG reduction plan/policy conflicts with mitigation.**

4.8.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Table 4-3 summarizes the annual construction-related emissions for this alternative. Routine operational emissions associated with increased pumping at the expanded Pacheco Reservoir would increase GHG emissions by 263 $MTCO_2e$/yr and would be less than significant. Impacts associated with construction of the enlarged reservoir would exceed the significance criterion. Because construction GHG emissions exceed the quantitative significance threshold, they would also conflict with GHG reduction plans and policies such as the 2017 Scoping Plan, the BAAQMD Clean Air Plan, AB 32, SB 32, and EO S-3-05. Implementation of Mitigation Measures AQ-1 through AQ-4, GHG-1, and GHG-2, described below in Section 4.8.8, would reduce impacts to less than significant. **The construction of the expanded Pacheco Reservoir would generate GHG emissions that would have a significant GHG impact and conflict**

with GHG reduction plans/policies pre-mitigation but would have a less than significant impact on GHG emissions and GHG reduction plan/policy conflicts with mitigation.

4.8.8 Mitigation Measures

The following mitigation measures would further reduce the severity of the GHG impacts. Mitigation Measures AQ-1, AQ-2, AQ-3, and AQ-4, although intended to reduce criteria pollutant emissions, would also reduce GHG emissions. They would be included in bid documents and construction contracts and their implementation would be monitored by the Lead Agencies.

Mitigation Measure GHG-1. Since further on-site reduction of GHG emissions is not feasible or practical, Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, will require the contractor to use engine electrification (including hybrid equipment) and use renewable diesel or biodiesel, when feasible, for all on- and off-road construction equipment.

Mitigation Measure GHG-2. Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, will require the contractor to purchase carbon offsets before construction activities commence in an amount sufficient to reduce GHG emissions remaining after implementation of Mitigation Measures AQ-1 through AQ-4 and GHG-1 to less than significant levels (1,100 $MTCO_2e$/year). Only emission offsets consistent with standards used for CARB's Compliance Offset Protocols may be used to reduce GHG emissions. These standards assure that offsets are real, permanent, quantifiable, verifiable, enforceable, and additional (Health and Safety Code Section 38562(d)). Registries selling approved offsets meeting these standards include the American Carbon Registry, the Climate Action Reserve, and Verra (formally the Verified Carbon Standard).

4.9 Visual Resources

4.9.1 Assessment Methods

The aesthetic value of an area is derived from both natural and artificial features. The value is determined by contrasts, forms, and textures exhibited by geology, hydrology, vegetation, wildlife, and man-made features. Individuals respond differently to changes in the physical environment depending on prior experiences and expectations, as well as proximity and duration of views. Consequently, aesthetic effects analyses tend to be highly subjective in nature.

Assessment of visual resources was accomplished through the use of the U.S. Forest Service's SMS, outlined in *Landscape Aesthetics: A Handbook for Scenery Management*, *Agriculture Handbook Number 701* (USDA U.S. Forest Service 1995). The SMS is used to categorize the visual resources within the project area and to analyze the significance of potential impacts to these resources from the implementation of the project alternatives. The three classes of Scenic Attractiveness that are used in the following assessment are:

- **Class A, Distinctive –** Areas where landform, vegetation patterns, water characteristics, and cultural features combine to provide unusual, unique, or outstanding scenic quality. These landscapes have strong positive attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.

- **Class B, Typical –** Areas where landform, vegetation patterns, water characteristics, and cultural features combine to provide ordinary or common scenic quality. These landscapes have generally positive yet common attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance. Normally they would form the basic matrix within the ecological unit.

- **Class C, Indistinctive –** Areas where landform, vegetation patterns, water characteristics, and cultural land use have low scenic quality. Often water and rockform of any consequence are missing in Class C landscapes. These landscapes have weak or missing attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.

For example, reservoirs are generally Class A or B visual resources when their water surface elevations are near to or at their maximum.

4.9.2 Significance Criteria

Impacts on visual resources would be considered significant if the project would: (1) have a substantial permanent or temporary adverse effect on a scenic vista (areas with Scenic Attractiveness Class A or Class B classifications); (2) substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings, within a state scenic highway corridor; (3) in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings and in urbanized areas, conflict with applicable zoning and other regulations governing scenic quality; or (4) create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-11.

4.9.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

Under this No Action/No Project Alternative, there would be no construction or changes to existing operations in the study area. **Therefore, there would be no short- or long-term impacts to visual resources from these construction and operation activities. This alternative would result in no impact on visual resources.**

Table 4-11. Visual Resources Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Have a substantial adverse effect on a scenic vista (areas with Scenic Attractiveness Class A or Class B classifications are considered scenic vistas)	Evaluation of the degree to which construction activities and long-term placement of new infrastructure could detract from viewing experience at scenic vistas	1	NI	--	Section 4.9.3
		2	Construction - LTS Operation - S, LTS	VIS-1, VIS-3	Section 4.9.4
		3	NI	None	Section 4.9.5
		4	LTS	None	Section 4.9.6
		5	LTS	None	Section 4.9.7
Substantially damage scenic resources within a State scenic highway corridor.	Evaluation of the degree to which construction activities and long-term placement of new infrastructure could detract from viewing experience along scenic highway corridors	1	NI	--	Section 4.9.3
		2	S, LTS	VIS-4	Section 4.9.4
		3	NI	None	Section 4.9.5
		4	S, LTS	VIS-4	Section 4.9.6
		5	LTS	None	Section 4.9.7
Substantially degrade the existing visual character or quality of public views of the site and its surroundings or conflict with applicable regulations governing scenic quality.	Evaluation of the degree to which construction activities and long-term placement of new infrastructure could degrade the existing visual character or quality of the site and its surroundings	1	NI	--	Section 4.9.3
		2	S, LTS	VIS-2	Section 4.9.4
		3	NI	None	Section 4.9.5
		4	LTS	None	Section 4.9.6
		5	LTS	None	Section 4.9.7
Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.	Evaluation of the degree to which construction activities and long-term placement of new infrastructure could introduce new light or glare sources	1	NI	--	Section 4.9.3
		2	S, LTS	VIS-1	Section 4.9.4
		3	NI	None	Section 4.9.5
		4	S, LTS	VIS-1	Section 4.9.6
		5	S, LTS	VIS-1	Section 4.9.7

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

4.9.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Construction and material staging would affect views from public roadways (including SR 152), the Romero Outlook Visitors Center, and open space areas, however impacts would be short-term (approximately 33 to 47 months). In addition, the panoramic nature of background views from distant static viewing locations and the speed of motorists passing the site from adjacent roadways reduce the overall impact generated by construction activities from Alternative 2. **This impact would be less than significant.**

Under the tunnel option, construction activities could take place after day-light hours, in which case lights in the construction staging areas and at Gate Shaft Island could have a negative impact on nighttime views in the project area. Construction lighting would be removed after construction activities are completed. **These impacts would be significant.** Implementation of Mitigation Measure VIS-1, described in Section 4.9.8, would implement measures to reduce light and glare while meeting minimum safety and security standards, reducing these impacts to less than significant. **Therefore, impacts would be less than significant after mitigation.**

The tunnel option would generate excavated material that would need to be disposed at a spoil site at Dinosaur Point Use Area. This deposit of soils material at Dinosaur Point would change the existing visual character of the spoil site by covering existing vegetation until new vegetation is established which is inconsistent with the aesthetics resource goals outlined in the San Luis Reservoir SRA RMP/GP. **These impacts would be significant.** Implementation of Mitigation Measure VIS-2, described in Section 4.9.8, would locate spoils disposal locations primarily out of sight from major public viewsheds, reducing these impacts to less than significant. **Therefore, impacts would be less than significant after mitigation.**

Operations of the new facility in the San Luis Reservoir would allow the reservoir to be drawn down to lower levels during low point years, but this change in reservoir surface elevations would be small and would not affect visual resources. The aeration system would consist of a new facility near Romero Outlook Visitors Center and would permanently change the visual experience of viewers from the Visitor Center, watercraft on the reservoir, and shoreline areas (from a distance) around the reservoir, which is inconsistent with the aesthetics resource goals as outlined in the San Luis Reservoir SRA RMP/GP. **These impacts would be significant.** Implementation of Mitigation Measures VIS-1 and VIS-3, described in Section 4.9.8, would implement measures to reduce light and glare and design and placement standards, reducing these impacts to less than significant. **Therefore, impacts would be less than significant after mitigation.**

As was noted above, the introduction of construction equipment and lighting could introduce new visual distraction to views from SR 152. However, the distance separating motorists from the construction areas, along with the speed that those motorists would be traveling, both limit the magnitude of any impact on those viewers’ scenic experience. To complete construction operations, the two existing intersections along SR 152 (at Dinosaur Point Road and at Basalt Road) would be improved to accommodate the high volume of trucks and other heavy equipment anticipated during construction. **These impacts would be significant.** Implementation of

Mitigation Measure VIS-4, described in Section 4.9.8, would ensure compliance with planning and design standards, reducing these impacts to less than significant. **Therefore, impacts would be less than significant after mitigation.**

4.9.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Because the visual character of the site is that of a WTP and improvements are within the character of the site and would not conflict with any applicable regulations governing scenic quality, **there are no short- or long-term impacts to visual resources expected.**

4.9.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

Construction of Alternative 4 would take 8 to 12 years and generate up to 240 large deliveries per day. Dam modifications would affect the area around the dam and recreational facilities that surround the dam. The magnitude and length of construction would affect scenic vistas and the scenic character. In the long term, scenic values for recreation users at the San Luis Reservoir and in the background from vistas along public roadways (including SR 152), at the Romero Outlook Visitors Center, and open space areas, such as the Cottonwood Creek Wildlife Area and portions of Pacheco SP, would return to their current quality level and remain consistent with the aesthetics resource goals outline in the San Luis Reservoir SRA RMP/GP. Background views of B.F. Sisk Dam from these same locations would be impacted with the introduction of disturbed earth on the dam face and crest. However, the panoramic nature of background views from distant static viewing locations and the speed of motorists passing the site from adjacent roadways reduce the overall impact generated by construction activities from Alternative 4. Implementation of Mitigation Measure REC-1, as described in Section 4.17.8, would add new camp sites and visitor facilities in areas directly adjacent to similar uses.

Alternative 4 would generate slightly increased storage levels in San Luis Reservoir in both non-low point years and years with low point events (See Section N.5.5 in Appendix N). The 10 foot increase in San Luis Reservoir's maximum surface elevation would inundate 425 acres of new land around the shore of the reservoir when the reservoir is full (See Figure 2-3). Given the large scale of the existing San Luis Reservoir footprint, this increased footprint would be minor. In addition, the annual operation approach would remain unchanged with annual reservoir drawdown and refill targets unchanged. **This impact would be less than significant.**

The introduction of construction lighting to support nighttime work would add a more substantial visual distraction to the landscape with new stationary lighting sources at staging areas and on the dam embankment. In addition, mobile lighting sources on construction equipment and vehicles traversing the site would also contribute to the lighting impacts, given the contrast from the otherwise low-light condition in the surrounding landscape. **Therefore, the use of lighting during the construction of Alternative 4 would have a significant impact on scenic vistas and visual character in the study area. Implementation of Mitigation Measure VIS-1, as described below in Section 4.9.8, would reduce the severity of this impact to less than significant.**

As was noted above, the introduction of construction equipment and vehicles, construction lighting, and the introduction of disturbed earth on the dam face and crest could introduce new visual distraction to views from SR 152. However, the distance separating motorists from the construction areas, along with the speed that those motorists would be traveling, both limit the magnitude of any impact on those viewers' scenic experience. Similar to Alternative 2, to complete construction operations, the two existing intersections along SR 152 (at Dinosaur Point Road and at Basalt Road) would be improved to accommodate the high volume of trucks and other heavy equipment anticipated during construction. **This impact from the roadway improvements would be significant to scenic resources within a designated State scenic highway, but with implementation of Mitigation Measure VIS-4 in Section 4.9.8, this impact would be less than significant.**

4.9.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Construction activity, including the presence of equipment, vehicles, and construction personnel, would temporarily degrade the quality of views in the area. However, due to the topography of the surrounding area, the construction area would not be visible from Henry W. Coe SP and would be temporary. Operations of the expanded Pacheco Reservoir would increase the inundation area and change the scenic quality and character of the area. The new reservoir bed would extend nearly to the southern boundary of Henry W. Coe SP and may be visible from some areas within the park. However, the overall visual effect of raising the water level at the reservoir would be relatively minor because substantial portions of the vegetated landscape would remain visually intact and views of the expanded reservoir would be limited given the narrow valley in its upstream sections. In periods when the reservoir would be drawn down, exposed reservoir bed could introduce small sections of visual contrast visible from Henry W. Coe SP, but the magnitude of this contrast would be limited by the surrounding grassland vegetations similar coloring to these exposed soils given the seasonal drying of this vegetation that corresponds to the anticipated timing of reservoir drawdown.

The introduction of construction equipment and vehicles and construction lighting could introduce new visual distraction to views from SR 152. However, due to the topography of the surrounding area and the distance separating motorists from the construction areas, along with the speed that those motorists would be traveling, the magnitude of any impact on those viewers' scenic experience would be limited. The introduction of construction worker traffic to and from the site along with construction equipment and material haul trucks along SR 152 would not as is evaluated in Section 4.11.7, substantially increase traffic volumes or introduce vehicle types not currently present along this major thoroughfare. Following construction, portions of the new dam would be visible along SR 152 but similar to the construction effect described above, the magnitude of any impact on those viewers' scenic experience from the introduction of this new facility would be limited. **This impact would be less than significant.**

The introduction of construction lighting to support nighttime work would add a more substantial visual distraction to the landscape with new stationary lighting sources at staging and construction areas. In addition, mobile lighting sources on construction equipment and vehicles traversing the site would also contribute to the lighting impacts, given the contrast from the otherwise low-light condition in the surrounding landscape. **Therefore, construction of Alternative 5, including lighting at night, would have a significant impact on scenic vistas and visual character in the study area. Implementation of Mitigation Measure VIS-1, as described below in Section 4.9.8, would reduce the severity of this impact to less than significant.**

4.9.8 Mitigation Measures

The following mitigation measures would reduce the severity of the visual resource impacts.

Mitigation Measure VIS-1. To reduce visual intrusion from light sources, Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, shall require the contractors to implement measures to reduce light and glare while meeting minimum safety and security standards. Light reduction measures must include: directing lighting downward to prevent spillover onto nearby areas, utilization of lighting fixtures with directional shielding to focus on areas being lit, and a construction requirement that all lighting in areas not under active construction be shut off. To reduce the amount of glare, building finishes shall be subdued and earth-toned. Onsite mechanical equipment roofing materials, and any exposed vents or flashings must be constructed of non-glare finishes that minimizes reflectivity.

Mitigation Measure VIS-2. Reclamation will require contractors to locate spoils disposal locations primarily out of sight from major public viewsheds to the greatest extent possible. Spoils and topsoil shall be removed and stockpiled while the underlying soil layer is scarified. Spoils shall then be spread evenly to a thickness of one foot while following the natural topography. The stockpiled topsoil will be replaced over the spoiled material so that the pre-disturbance seed bank and topsoil shall be maintained consistent with the surrounding landscape. Native grasses shall be planted in the disturbed areas to reduce landscape scarring and other aesthetic impacts.

Mitigation Measure VIS-3. To reduce visual intrusion and maintain the existing visual character, Reclamation will require contractors to implement the following measures. The design of new structures visible from major public viewsheds, shall be compatible with the open space of the area. Building design shall complement and harmonize with surrounding buildings, in form, scale, materials, and color. Building finishes shall be subdued and earth-toned. Any fencing surrounding the facilities shall be designed to be minimally intrusive and complimentary of the architectural character of the building.

New structures must be located, to the greatest extent feasible, on a portion of the site with the greatest screening ability in terms of vegetation or landform. Revegetation efforts shall blend with existing vegetation or since the surrounding area is predominately annual grasslands, the revegetation shall be consistent with plants that are native and indigenous to the project area. A vegetation plan shall be implemented within a year of construction completion and include an irrigation and maintenance component during the plant establishment period.

Mitigation Measure VIS-4. Reclamation will require contractors to implement the following measures. Road improvements at highway intersections shall comply with planning and design standards for development of official scenic highways including, but not limited to, (1) detailed land and site planning; (2) careful attention to and control of earthmoving and landscaping; and (3) the design and appearance of structures and equipment (Caltrans 2011).

4.10 Noise

4.10.1 Assessment Methods

Activities with the potential for generating short-term, temporary increases in noise levels include construction activities and construction-related traffic. Long-term noise impacts could occur from operation of new facilities or new water treatment equipment. Appendix E1 presents a framework for understanding noise and vibration levels, a detailed description of the existing environment, area of analysis figures, as well as details on the methods and results of the noise modeling conducted.

4.10.2 Significance Criteria

Impacts on noise would be considered significant if the project would result in: (1) generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity or the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies[3]; (2) generation of excessive groundborne vibration or groundborne noise levels (significance threshold of 0.3 in/sec); (3) a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project; or (4) for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-12.

4.10.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

Ambient noise levels under the No Action/No Project Alternative would be the same as existing conditions. Neither construction-related activities nor increased operational activities would occur. **The No Action/No Project Alternative would result in no impact on noise.**

[3] The applicable local standards are detailed in Appendix C: Section C.3.7 City of San Jose Municipal Code, Section C.3.8 Merced County Code, and Section C.3.14 Santa Clara County Ordinance Code

Table 4-12. Noise and Vibration Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Expose sensitive receptors to noise levels in excess of standards established in the local general plan or noise ordinance.	Comparison of predicted noise levels during construction and operation of the alternatives to established general plan and noise ordinance standards and to existing noise levels in the project area	1	NI	--	Section 4.10.3 Appendix E1
		2	LTS	None	Section 4.10.4 Appendix E1
		3	LTS	None	Section 4.10.5 Appendix E1
		4	Construction – S, SU Operation – LTS	NOISE-1, NOISE-2, HAZ-5	Section 4.10.6 Appendix E1
		5	Construction – S, SU Operation – S, LTS	NOISE-1, NOISE-2, NOISE-3, HAZ-5	Section 4.10.7 Appendix E1
Expose sensitive receptors to excessive groundborne vibration or groundborne noise.	Evaluation of predicted ground borne vibration levels during construction and operation of the alternatives at the nearest sensitive receptors (significance threshold of 0.3 in/sec)	1	NI	--	Section 4.10.3 Appendix E2
		2	LTS	None	Section 4.10.4 Appendix E2
		3	LTS	None	Section 4.10.5 Appendix E2
		4	LTS	None	Section 4.10.6 Appendix E2
		5	LTS	None	Section 4.10.7 Appendix E2
Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.	Comparison of predicted noise levels during construction of the alternatives to existing noise levels in the project area	1	NI	--	Section 4.10.3 Appendix E1
		2	Tunnel Option – S, SU Pipeline Option – LTS	NOISE-1	Section 4.10.4 Appendix E1
		3	S, LTS	NOISE-1	Section 4.10.5 Appendix E1
		4	S, SU	NOISE-1, NOISE-2, HAZ-5	Section 4.10.6 Appendix E1
		5	S, SU	NOISE-1	Section 4.10.7 Appendix E1

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Operational sources located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport could expose people residing or working in the project area to excessive noise levels.	Consideration of the alternative’s location in relationship to an airport and their consistency with that airports land use plans	1	NI	--	Section 4.10.3
		2	LTS	None	Section 4.10.4
		3	NI	None	Section 4.10.5
		4	LTS	None	Section 4.10.6
		5	NI	None	Section 4.10.7

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

4.10.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

4.10.4.1 Tunnel Option

Construction impacts on ambient noise levels generated by Alternative 2 would be short-term and would not result in permanent increases in ambient noise levels. Limited construction would occur during the 10-hour nighttime shift and would only involve workers directly associated with tunnel boring activities. These activities would be limited to construction workers commuting to the site, operation of the tunnel boring machine, and occasional tug boat trips. Nighttime construction-related noise would be intermittent and limited in duration, and noise levels would not be substantially different from existing background noise from motorboats on the reservoir. Furthermore, any noise from the tunnel boring machine would be limited because it would be submerged. As a result, nighttime noise levels would be less than significant. All other construction activities would occur during daytime hours between 7:00 a.m. and 6:00 p.m. and would be exempt from the Merced County Code sound level limitations, provided all construction equipment is properly muffled and maintained. The peak particle velocity (PPV) for construction activities would not exceed the significance threshold of 0.3 inch/second (in/sec). No long-term project operations would occur that could generate vibrations or groundborne noise, or otherwise expose persons to such impacts. Table E1-8 in Appendix E1 summarizes the results of possible vibration effects from each construction phase. Detailed calculations are provided in Appendix E2. The only new long-term operational impact that would occur from the tunnel option is operation of the aeration facility near the Romero Visitor’s Center, which utilizes an approximately 200 hp electric compressor. Because the nearest sensitive receptor (San Luis Creek Use Area) is approximately 1.9 miles from the proposed aeration facility, the daytime increase in noise levels would be less than 1 A-weighted decibel (dBA) and long-term operational impacts would be negligible (see Appendix E2 for detailed noise level calculations). Noise impacts associated with operating this alternative within an airport land use plan would be less than significant. **These impacts would be less than significant.**

Noise levels at the sensitive receptors, the residence on Harper Lane, the San Luis Creek Use Area, and the residence off Dinosaur Point Road, would not exceed the significance criterion of 10 dBA (see Appendix E2 for detailed noise calculations). However, the addition of heavy-duty haul trucks and construction workers could substantially increase the equivalent noise level on local roads (Fifield Road/ Dinosaur Point Road) by more than 10 dBA, representing a doubling of noise levels and a significant impact (see Appendix E2). **This impact is significant. Implementation of Mitigation Measure NOISE-1, described below in Section 4.12.8, would reduce noise impacts; however, the measure would not reduce impacts to less than significant levels.** The Lead Agencies evaluated potential mitigation measures including the development of permanent or semi-permanent sound barriers at the sensitive receptors to isolate them from the noise sources but determined that given the large construction area across which noise will be generated would not be feasible given their incompatibility with uses at the receptors, including the San Luis Creek Use Area that would create a fixed barrier between the campsites and the O’Neill Forebay. Given the social and environmental limits on implementing other potential options to offset this impact no feasible mitigation (CEQA Section 21061.1) has been identified to further reduce these impacts to a less than significant level. **Noise impacts of the tunnel option would be significant and unavoidable.**

4.10.4.2 Pipeline Option

All construction activities associated with the pipeline option would not conflict with the Merced County Code. The PPV for construction activities would not exceed the significance threshold of 0.3 in/sec. The only new long-term operational impact that would occur with the tunnel option is operation of the aeration facility near the Romero Visitor's Center, which uses an approximately 200 hp electric compressor. Because the nearest sensitive receptor (San Luis Creek Use Area) is approximately 1.9 miles from the proposed aeration facility, the daytime increase in noise levels would be less than 1 dBA and long-term operational impacts would be negligible (see Appendix E2 for noise level calculations). Construction traffic would increase AADT by approximately six times; therefore, the increase in traffic would be noticeably louder but would not cause a significant increase in noise levels and would be consistent with Merced County Code. Noise impacts associated with operating this alternative within an airport land use plan would be less than significant. **This impact would be less than significant.**

4.10.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Daytime unmitigated noise levels (L_{eq}) at the nearest noise-sensitive receptors at the Santa Teresa WTP would range from 60 to 69 dBA. Construction activities at the Santa Teresa WTP would occur within the designated construction hours Monday through Friday 7:00 a.m. to 7:00 p.m. and would not violate the noise ordinance for the City of San Jose. While construction would continue for more than 12 months, it would not involve substantial noise generating activities, as defined in the San Jose 2040 General Plan. The PPV at the Santa Teresa WTP would not exceed 0.3 in/sec significance threshold. Detailed calculations are provided in Appendix E2. No long-term project operations would occur that could generate vibrations or groundborne noise or otherwise expose persons to such impacts. No perceptible change in off-site plant noise levels during operations would occur because the modifications would occur within the existing process area. **Impacts would be less than significant.**

The maximum daytime construction noise increase in 1-hour L_{eq} over existing conditions for the Santa Teresa WTP would be 14 dBA at the nearest residential receptor. Construction traffic would increase the AADT by approximately 2 percent at the Santa Teresa WTP; therefore, the increase in traffic would not cause an increase in noise levels that would be perceptible to the human ear. Detailed calculations are provided in Appendix E2. **Construction noise impacts would be significant.** With implementation of Mitigation Measure NOISE-1, described below in Section 4.10.8, a noise barrier or enclosure that completely breaks the line of sight between the noise source and the receptor could achieve a minimum 5 dBA noise reduction. **Impacts would be less than significant with implementation of Mitigation Measure NOISE-1.**

The Santa Teresa WTP is not located within an airport land use plan or within 2 miles of a public airport. **There would be no impact related to airport noise.**

4.10.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

The PPV for construction activities would not exceed the significance threshold of 0.3 in/sec, see calculations in Appendix E2. No long-term project operations would occur that could generate vibrations or groundborne noise or otherwise expose persons to such impacts. Construction impacts on ambient noise levels generated by the San Luis Reservoir expansion would not result in permanent increases in ambient noise levels. Because the alternative would only raise B.F. Sisk Dam but would not change its methods of operation, there would be no long-term operational noise impacts. Noise impacts associated with operating this alternative within an airport land use plan would be less than significant. **Vibration impacts and noise impacts related to airports would be less than significant.**

Construction activities, except for blasting, would be performed 24 hours per day. Blasting operations at Basalt Hill would be limited to the hours between 6:00 a.m. to 6:00 p.m. Nighttime noise levels to sensitive receptors at San Luis Creek Use Area and a subdivision off SR 152 would exceed the Merced County Code sound level limitations of an increase of 5 dBA between 10:00 p.m. and 7:00 a.m., with an increased noise level of 18 dBA at San Luis Creek Use Area and 13 dBA at the subdivision off SR 152 (see Table E1-12 in Appendix E1 and Appendix E2 for calculations). Due to existing traffic on the local road (Fifield Road/Dinosaur Point Road) is limited with less than 200 cars per day on each road (Reclamation and CDPR 2013), the addition of heavy-duty haul trucks and construction workers to the section of Fifield Road/Dinosaur Point Road that will remain open to the public during the approximately 1 year of construction at Dinosaur Point and at the Gianelli Pumping Plant, could substantially increase the equivalent noise level on this road by more than 10 dBA, representing a doubling of noise levels and a significant impact. **This impact would be significant. Implementation of Mitigation Measures NOISE-1 and NOISE-2, described below in Section 4.10.8, and Mitigation Measure HAZ-5 (blasting plan), described below in Section 4.12.8, would reduce noise impacts; however, the measures would not reduce impacts to less than significant levels.** Even if the construction site was completely enclosed and shielded, only a 10 dBA reduction in noise would be expected (FHWA 2006), leaving the increased nighttime noise level at San Luis Creek Use Area at 8 dBA and still exceeding the 5 dBA nighttime threshold. The Lead Agencies evaluated other potential mitigation measures including the development of permanent or semi-permanent sound barriers at the sensitive receptors to isolate them from the noise sources but determined that given the large construction area across which noise would be generated would not be feasible given their incompatibility with uses at the receptors, including the San Luis Creek Use Area that would create a fixed barrier between the campsites and the O’Neill Forebay. Given the social and environmental limits on implementing other potential options to offset this impact no feasible additional mitigation has been identified to further reduce these impacts to a less than significant level. **Noise impacts remain significant and unavoidable after implementation of Mitigation Measures NOISE-1, NOISE-2, and HAZ-5.**

4.10.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Pacheco Reservoir is not located within an airport land use plan or within 2 miles of a public airport. **Therefore, there would be no impact associated with permanent operational noise within an airport land use plan.**

Construction equipment and activities such as dozers and rollers would generate vibrations that could result in groundborne noise or vibration that may affect nearby structures and sensitive receptors. The PPV for construction activities would not exceed the significance threshold of 0.3 in/sec, see Table E1-14 in Appendix E1. Detailed calculations are presented in Appendix E2. No long-term project operations would occur that could generate vibrations or groundborne noise or otherwise expose persons to such impacts. **This impact is less than significant.**

There would be a temporary construction-related noise increase due to the use of heavy equipment and blasting. Blasting would be infrequent, occurring approximately one to two times a week and only during daytime hours. Noise from blasting would be loud enough to briefly disturb the nearest sensitive receptors, as well as portions of Henry W. Coe SP, particularly the ridgeline overlooking the Pacheco Reservoir. Noise levels at sensitive receptors would be 69 dBA (a 29 dBA increased noise level) at the residence on El Toro Road and 50 dBA (a 10 dBA increased noise level) at the residence off SR 152. Noise levels at the residence on El Toro Road exceed Santa Clara County maximum daytime noise level standard of 55 dBA from 7:00 a.m.-10:00 p.m. The residence off SR 152 and the residence on El Toro Road would exceed County maximum nighttime noise level standard of 45 dBA from 10:00 p.m. – 7:00 a.m. (see Table E1-13 in Appendix E1). The volume of construction-related traffic generated by construction worker vehicles, visitor vehicles, material delivery trucks, and off-hauling of materials would be low in relation to existing traffic volumes along SR-152, I-5, and SR-33. The increase in construction traffic would not substantially increase traffic noise from these highways. Detailed calculations are presented in Appendix E2. **Noise impacts would be significant. Implementation of Mitigation Measures NOISE-1 and NOISE-2, described below in Section 4.10.8, and Mitigation Measure HAZ-5, described below in Section 4.12.8, would reduce noise impacts; however, the measures would not reduce impacts to less than significant levels**. Even if the construction site was completely enclosed and shielded, only a 10 dBA reduction in noise would be expected (FHWA 2006), leaving the increased noise level at the residence on El Toro Road at a 19 dBA noise increase, exceeding the significance criterion. The Lead Agencies evaluated other potential mitigation measures including the development of permanent or semi-permanent sound barriers at the sensitive receptors to isolate them from the noise sources but determined that given the large construction area across which noise would be generated would not be feasible given their incompatibility with uses at the receptors. Given the social and environmental limits on implementing other potential options to offset this impact no feasible additional mitigation has been identified to further reduce these impacts to a less than significant level. **Noise impacts remain significant and unavoidable after implementation of Mitigation Measures NOISE-1, NOISE-2, and HAZ-5.**

This alternative includes building a new dam and pump station, and expanding Pacheco Reservoir, resulting in changes to the reservoir's operations. Long-term operation of the pump station would cause noise levels at the residence on El Toro Road to increase to 54 dBA, exceeding the 45 dBA Santa Clara County Ordinance nighttime exterior noise limit. **Noise**

impacts would be significant (see Table E1-16 in Appendix E1 and Appendix E2 for detailed calculations). Implementing Mitigation Measure NOISE-3, described below in Section 4.10.8, would reduce operational noise impacts by completely enclosing or shielding the pump station, resulting in a 10 dBA reduction in noise level (FHWA 2006). This would reduce noise levels at the residence on El Toro Road to a 44 dBA noise levels, which would be in compliance with the Santa Clara County Ordinance. **Noise impacts would be less than significant after mitigation.**

4.10.8 Mitigation Measures

In addition to Mitigation Measure HAZ-5, the following mitigation measures would reduce the severity of the noise and vibration impacts.

Mitigation Measure NOISE-1. Reclamation, under Alternative 2 (tunnel option) and Alternative 4, and SCVWD, under Alternative 3 and Alternative 5, will ensure a Noise Control Plan (NCP) will be developed by the construction contractor prior to the start of any construction activities to address increased noise levels as a result of the proposed project and alternatives. The NCP will identify the procedures for predicting construction noise levels at sensitive receptors and will describe the reduction measures required to minimize construction noise. The noise mitigation measures in the NCP will include, but are not limited to:

- Appropriate level of sound attenuation will be used or constructed to minimize noise levels by at least 3 dBA. Potential sound attenuation measures could include, but are not limited to stationary equipment and stockpiles, or otherwise placed between the source(s) of construction noise and noise-sensitive receptors, as appropriate. The feasible measures will be determined by the construction contractor based on an initial evaluation of each construction site.
- Contractor will be responsible for maintaining equipment in best possible working condition and outfitting construction equipment with the most effective locally available commercial mufflers or other noise attenuation devices;
- When feasible, the loudest construction activities will be conducted during Merced County construction noise exempt hours, between 7:00 a.m. and 6:00 p.m.;
- Shutting down equipment that are queued or not in use for 5 minutes or more;
- Pre-construction meeting with contractors and project managers to confirm that noise mitigation procedures are in place;
- Signs shall be posted at the construction sites that include permitted construction days and hours, a day and evening contact number for the job site, and a contact number in the event of problems;
- The public will be kept informed of the construction hours and days;
- List contact information for complaints and respond to noise complaints; and
- An on-site complaint and enforcement manager shall respond to and track complaints and questions related to noise.

Mitigation Measure NOISE-2. Reclamation will ensure a pre-construction noise survey will be completed during daytime and nighttime periods at multiple locations across the project area, including identified sensitive receptors, to establish background noise levels at those times. During construction, noise will be monitored weekly at these locations to assess any increases in noise levels that exceed the local noise ordinances. If noise levels are recorded exceeding the background noise level by 10 dBA between 6:00 p.m. and 10:00 p.m. or by 5 dBA between 10:00 p.m. and 7:00 a.m. or if noise complaints are received, an investigation will be conducted to determine the source of the noise. After the investigation, noise will be reduced using all feasible measures, including mitigation at the receiver impacted by the noise. Potential mitigation at the receiver would include building envelope improvements and acoustical window treatments.

Mitigation Measure NOISE-3. SCVWD will ensure the pump station at Pacheco Reservoir will be completely enclosed or shielded with a solid barrier, allowing for an 8 dBA reduction of noise levels (FHWA 2006).

All mitigation requirements will be included in bid documents and construction contracts.

4.10.9 Significant Unavoidable Impacts

Alternative 2 (tunnel option), Alternative 4, and Alternative 5 would have significant effects associated with short-term and temporary construction activities that would exceed the local noise ordinances, resulting in a significant and unavoidable impact. The Lead Agencies evaluated other potential mitigation measures but determined that given the large construction area across which noise would be generated would not be feasible given their incompatibility with uses at the receptors. Given the magnitude of the construction actions and the extensive mitigation measures already proposed, no additional feasible mitigation measures were identified to reduce these impacts to a less than significant level.

4.11 Traffic and Transportation

4.11.1 Assessment Methods

For each project alternative, anticipated short-term construction-related and long-term operations-related trip generation were identified. These additional trips were assigned to roadways located in the vicinity of the service areas (the San Luis Reservoir Region for Alternatives 2, 4, and 5 and the SCVWD Service Area for Alternative 3) to determine traffic operations and Level of Service (LOS) under various project alternatives.

Appendix F provides detailed information about traffic flow assessment methods, trip generation, and roadway operations under the action alternatives. LOS thresholds for various jurisdictions shown in Appendix F were used to identify traffic impacts. For roadways within Merced County, LOS value was determined using criteria for different types of roadways provided in Appendix F. For roadways in Santa Clara County, guidelines provided in the Transportation Impact Analysis Guidelines, Santa Clara Valley Transportation Authority (VTA)

Congestion Management Program were used to evaluate potential traffic impacts. Freeway segments were evaluated using the LOS criteria provided in Appendix F.

Traffic safety effects were analyzed by identifying potentially hazardous areas (areas where slow-moving traffic would need to merge with fast-moving traffic) or roads/intersections that were not designed to adequately handle the proposed construction traffic. Safety hazards include blind corners or turnouts and sharp turns or areas where slow construction traffic might conflict with high roadway speed limits. Any potential routes where increases in construction traffic would conflict with existing public transit routes and their operations were analyzed. Construction and operations effects were analyzed to identify conditions that could result in inadequate emergency access.

4.11.2 Significance Criteria

Impacts related to traffic and transportation would be considered significant if they result in one or more of the following conditions or situations: (1) conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities; (2) increase traffic substantially in relation to the existing traffic load and capacity of the street system; (3) substantially increase hazards due to a geometric design feature or incompatible uses; or (4) result in inadequate emergency access. The significance criteria apply to all transportation systems that could be affected by the project. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-13.

4.11.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

The No Action/No Project Alternative would result in no change to existing and future “no build” traffic volumes or air traffic patterns. **The No Action/No Project Alternative would have no impact on traffic and transportation.**

Table 4-13. Traffic and Transportation Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities	Evaluation of whether construction or operation of the alternatives would generate traffic that would conflict with any goals or objectives of a program, plan, ordinance or policy addressing the circulation system	1	NI	--	Section 4.11.3
		2	NI	None	Section 4.11.4
		3	NI	None	Section 4.11.5
		4	NI	None	Section 4.11.6
		5	NI	None	Section 4.11.7
Cause a substantial increase in traffic in relation to the existing traffic load and capacity of the street system	Comparison of alternative's contribution to local traffic conditions during and after construction based on level of service changes	1	NI	--	Section 4.11.3 Appendix F
		2	Construction – LTS Operation - LTS	None	Section 4.11.4 Appendix F
		3	Construction – LTS Operation - LTS	None	Section 4.11.5 Appendix F
		4	Construction – LTS Operation - NI	None	Section 4.11.6 Appendix F
		5	Construction – LTS Operation - LTS	None	Section 4.11.7 Appendix F
Substantially increase traffic hazards due to a geometric design feature or incompatible use.	Consideration of the alternative's potential to alter the transportation network that would increase traffic hazards.	1	NI	--	Section 4.11.3
		2	S, LTS	TR-1	Section 4.11.4
		3	S, LTS	TR-1	Section 4.11.5
		4	S, LTS	TR-1	Section 4.11.6
		5	S, LTS	TR-1	Section 4.11.7
Result in inadequate emergency access.	Evaluation of whether construction activities could impede emergency response vehicle access on site or along study area roadways	1	NI	--	Section 4.11.3
		2	S, LTS	TR-1	Section 4.11.4
		3	S, LTS	TR-1	Section 4.11.5
		4	S, LTS	TR-1	Section 4.11.6
		5	S, LTS	TR-1	Section 4.11.7

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

4.11.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Construction-related traffic under Alternative 2 would not conflict with the goals and objectives of any applicable programs, plans, ordinances, or policies that establish roadway performance standards and would not result in a substantial increase in traffic in relation to the existing traffic load and roadway capacity.

Trip generation and roadway operations during construction of Alternative 2 are presented in Appendix F. For daily operations, the added construction-related trips would not change the LOS at any of the study roadway segments in Merced County. The added construction-related trips would not change the LOS during the 7:00 to 9:00 a.m. or 4:00 to 6:00 p.m. peak hours at any of the study roadway segments in Merced County, except on the Basalt Road northbound and southbound segments (a.m. and p.m. peak hours) and on SR 152 eastbound at SR 33 (p.m. peak hour). Even though the LOS increases after the construction-related trips are added, it does not exceed the threshold of significance (LOS C) for rural roadways. The minimal increase in traffic would not increase traffic hazards during operations. In Santa Clara County, none of the study roadway segments need to be evaluated because the added construction trips would be less than 1 percent of the respective roadway capacities (the VTA threshold for freeway segment evaluation). **This impact would be less than significant.**

Construction equipment and construction worker vehicle trips would increase hazards at dangerous intersections including Fifield Road near SR 152, Gonzaga Road, Basalt Road, and Dinosaur Point Road. For safety reasons, Reclamation, DWR, and CDPR personnel must be able to access areas around the reservoir and dam at all times. Construction traffic has the potential to limit or slow this emergency access. **Construction of Alternative 2 would increase the potential for traffic hazards at intersections and potentially conflict with emergency vehicles, resulting in a significant impact.** Developing a site-specific Health and Safety Plan, installing caution signs, implementing dust control measures, and implementing construction traffic management actions, included in **Mitigation Measure TR-1, described below in Section 4.11.8, would reduce the severity of this impact to less than significant.**

4.11.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Construction-related traffic under Alternative 3 would not conflict with the goals and objectives of any applicable programs, plans, ordinances, or policies that establish roadway performance standards and would not result in a substantial increase in traffic in relation to the existing traffic load and roadway capacity.

Trip generation and roadway operations during construction of Alternative 3 are presented in Appendix F. Alternative 3 would generate construction-related traffic that would be less than the VTA recommended threshold for roadway evaluation (1 percent of roadway capacity). With minimal increase in traffic, operations of Alternative 3 would not result in changes to existing LOS on roadways or substantially increase traffic hazards in the area of analysis. **This impact would be less than significant.**

Heavy construction vehicles and increased traffic from worker commutes could result in traffic safety hazards. Construction traffic has the potential to limit or slow emergency access. **Construction of Alternative 3 would increase the potential for traffic hazards at intersections and potentially conflict with emergency vehicles, resulting in a significant impact.** By installing caution signs, implementing dust control measures, and implementing construction traffic management actions, **Mitigation Measure TR-1, described below in Section 4.11.8 would reduce the severity of this impact on traffic safety to less than significant**

4.11.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

Construction-related traffic under Alternative 4 would not conflict with the goals and objectives of any applicable programs, plans, ordinances, or policies that establish roadway performance standards and would not result in a substantial increase in traffic in relation to the existing traffic load and roadway capacity.

Trip generation and roadway operations during construction of Alternative 4 are presented in Appendix F. For daily operations, the added construction-related trips would not change the LOS at any of the study roadway segments in Merced County. The added construction-related trips would not change the LOS during the a.m. and p.m. peak hours at any of the study roadway segments in Merced County, except on the Basalt Road northbound segment in the a.m. peak hour and southbound segment in the p.m. peak hour, and on SR 152 eastbound at SR 33 (p.m. peak). Even though the LOS increases after the construction-related trips are added on these three segments, it does not exceed the threshold of significance (LOS C) for rural roadways. In Santa Clara County, none of the study roadway segments need to be evaluated because the added construction trips would be less than 1 percent of the respective roadway capacities (the VTA threshold for freeway segment evaluation). **Construction of Alternative 4 would have a less than significant short-term impact on traffic flow.**

During operations of Alternative 4, roadway operations would remain similar to those under No Action/No Project Alternative conditions. No long-term additional trips would be associated with the operations of Alternative 4. **Operations of Alternative 4 would have no long-term impact on traffic flow.**

Construction equipment and construction worker vehicle trips would increase hazards at dangerous intersections, including Fifield Road near SR 152, Gonzaga Road, Basalt Road, and Dinosaur Point Road. For safety reasons, Reclamation, DWR, and CDPR personnel must be able to access areas around the reservoir and dam at all times. Construction traffic has the potential to limit or slow this emergency access. To reduce the potential for adverse traffic safety interactions between this construction truck and worker traffic and other vehicle traffic, temporary traffic signals would be installed at the junctions of SR 152 with Basalt Road and the Romero Visitor Center access road for use during the 8- to 12-year construction schedule. **Construction of Alternative 4 would increase the potential for traffic hazards at intersections and potentially conflict with emergency vehicles, resulting in a significant impact.** Developing a site-specific Health and Safety Plan, installing caution signs, implementing dust control measures, and implementing construction traffic management actions included in **Mitigation Measure TR-1, described below in Section 4.11.8, would reduce the severity of this impact to less than significant.**

4.11.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Construction-related traffic under Alternative 5 would not conflict with the goals and objectives of any applicable programs, plans, ordinances, or policies that establish roadway performance standards and would not result in a substantial increase in traffic in relation to the existing traffic load and roadway capacity.

Trip generation and roadway operations during construction of Alternative 5 are presented in Appendix F. For daily operations, the added construction-related trips would not change the LOS at any of the study roadway segments in Merced County. The added construction-related trips would not change the LOS during the a.m. and p.m. peak hours at any of the study roadway segments in Merced County, except on SR 152 eastbound at I-5 and SR 33 northbound at I-5 segments in the a.m. and p.m. peak hours. Although the LOS increases after the construction-related trips are added, it does not exceed the threshold of significance (LOS C) for rural roadways. In Santa Clara County, none of the study roadway segments need to be evaluated, because the added construction trips would be less than 1 percent of the respective roadway capacities (the VTA threshold for freeway segment evaluation). With minimal increase in traffic, operation of Alternative 5 would not result in changes to future no-build LOS on study area roadways. The minimal increase in traffic would not increase traffic hazards during operations. **This impact would be less than significant.**

Construction equipment and construction worker vehicle trips would increase hazards at dangerous intersections, including El Toro near SR 152. For safety reasons, emergency personnel must be able to access areas around the reservoir and dam at all times. Construction traffic has the potential to limit or slow this emergency access. **Construction of Alternative 5 would increase the potential for traffic hazards at intersections and potentially conflict with emergency vehicles, resulting in a significant impact.** Developing a site-specific Health and Safety Plan, installing caution signs, implementing dust control measures, and implementing construction traffic management actions, included in **Mitigation Measure TR-1, described below in Section 4.11.8, would reduce the severity of this impact to less than significant.**

4.11.8 Mitigation Measures

The following mitigation measures would reduce the severity of the traffic and transportation impacts.

Mitigation Measure TR-1. Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 3 and 5, will ensure the following construction management actions are documented in a traffic control plan, which will be developed by the contractor as a requirement in the construction contract. The temporary traffic control plan will be submitted for Caltrans review and approval during the Encroachment Permit process. Construction contractors shall install signage at intersections identified as dangerous in accordance with the California Manual on

Uniform Traffic Control Devices guidelines warning motorists of slow moving construction traffic and lane closures. Roadways with signage would include SR 152, Basalt Road, and the Romero Visitor Center access road under Alternatives 2 and 4, Camden Avenue and Graystone Lane under Alternative 3, and SR 125 and El Toro under Alternative 5. Signage shall also be posted at these intersections one month in advance to allow motorists time to plan for delays or alternate routes. Construction contractors shall implement dust abatement and perform proper construction traffic management actions, including signage warning motorists of construction activity and traffic controls like flaggers or temporary traffic lights where construction equipment will be entering roadways, to reduce conflicts during periods of high traffic volume in and around each construction site and to avoid conflicts with emergency responders entering and existing the area during an emergency.

In addition to the temporary traffic control plan, prior to the initiation of any construction actions, construction contractors shall develop and adhere to a health and safety plan outlining all applicable OSHA requirements, important traffic safety plans including identification of emergency access routes in and through construction areas that would will need to be kept clear at all times during construction. The health and safety plan shall include coordination with emergency service personnel to ensure adequate mitigation for all impacts.

4.12 Hazards and Hazardous Materials

4.12.1 Assessment Methods

The following qualitative evaluation focuses on two types of impacts associated with hazardous materials: (1) the potential to encounter hazardous materials, contaminated soil and/or groundwater, at existing active hazardous materials sites near proposed construction, and (2) accidental release of hazardous materials during construction and operations, including accidental releases during transportation to/from sites related to construction and operations. Other hazard risk considerations evaluated include proximity of the alternatives to wildlands, airports, and schools, and conflicts with emergency evacuation plans.

4.12.2 Significance Criteria

Hazards and hazardous materials impacts would be considered significant if the project would: (1) create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; (2) create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; (3) emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school; (4) be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government code Section 65962.5 and, as a result would it create a significant hazard to the public or the environment; (5) result in a safety hazard for people residing or working in the project area for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport; (6) impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; (7) expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires; or (8) if located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project: (a) substantially impair an adopted emergency response plan or emergency evacuation plan, (b) due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire, (c) require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment, (d) expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-14.

4.12.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

The No Action/No Project Alternative includes the most likely future conditions in the absence of the project. No construction nor impacts related to hazards and hazardous materials would occur. No changes to the types or extent of the hazards are underway that would change the character of hazards or hazardous materials in the future. **There would be no impact.**

4.12.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Some hazardous materials (motor oil, gasoline, diesel fuel, solvents, and degreasers) would be used on-site during construction and operation of Alternative 2. Development of a SWPPP, as described in Section 4.1, would require safety measures and BMPs to be implemented when transporting, storing, or using hazardous materials and would describe actions to prevent a release of hazardous materials and procedures in case of an accidental spill or release of hazardous materials. **Impacts related to hazardous materials during construction and operation of Alternative 2 would be less than significant.**

There are no schools within one-quarter mile of construction zone. **There would be no impact for local school children and school staff from exposure to hazardous materials.**

Table 4-14. Hazards and Hazardous Materials Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Increase the risk of exposure from hazardous materials to the public and construction workers during alternative construction onsite, during the transport, use or disposal of hazardous materials offsite, and during long-term operations and maintenance activities.	Consideration of the types of waste materials generated by the alternatives onsite, the transportation routes to any disposal sites and the need for interaction with or generation of hazardous materials as a part of operation and maintenance of the alternatives	1	NI	--	Section 4.12.3
		2	LTS	None	Section 4.12.4
		3	LTS	None	Section 4.12.5
		4	Construction – S, LTS Operation - NI	HAZ-5	Section 4.12.6
		5	Construction – S, LTS Operation - NI	HAZ-5	Section 4.12.7
Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment	Consideration of the potential for foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	1	NI	--	Section 4.12.3
		2	LTS	None	Section 4.12.4
		3	LTS	None	Section 4.12.5
		4	LTS	None	Section 4.12.6
		5	LTS	None	Section 4.12.7
Increase the potential for exposure to hazardous materials to local school children and staff with construction located within one-quarter mile of an existing or proposed school	Evaluation of whether of whether construction activities would occur within one-quarter mile of an existing or proposed school	1	NI	--	Section 4.12.3
		2	NI	None	Section 4.12.4
		3	LTS	None	Section 4.12.5
		4	NI	None	Section 4.12.6
		5	NI	None	Section 4.12.7
Interfere with an active remediation site which could create a hazard to the public or the environment if contaminated soil and/or groundwater is encountered and released to the environment.	Evaluation of whether any of the alternative construction sites would be located at or near an active remediation site and whether implementation of the alternatives would interfere with that site	1	NI	--	Section 4.12.3
		2	S, LTS	HAZ-1	Section 4.12.4
		3	LTS	None	Section 4.12.5
		4	S, LTS	HAZ-6	Section 4.12.6
		5	NI	None	Section 4.12.7
Conflict with activities and operations at airports near or within the project area during construction, resulting in safety hazards for pilots or people working and residing in the area.	Evaluation of whether any of the alternative construction sites would be located at or near an airport	1	NI	--	Section 4.12.3
		2	S, LTS	HAZ-3, HAZ-4	Section 4.12.4
		3	NI	None	Section 4.12.5
		4	S, LTS	HAZ-3, HAZ-4	Section 4.12.6
		5	NI	None	Section 4.12.7

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Temporarily interfere with an emergency response plan or emergency evacuation plan for the project vicinity as a result of construction traffic and traffic controls impacting local roads.	Evaluation of how construction generated truck traffic and any construction traffic controls could impact emergency response in the study area	1	NI	--	Section 4.12.3
		2	S, LTS	TR-1	Section 4.12.4
		3	LTS	None	Section 4.12.5
		4	S, LTS	TR-1	Section 4.12.6 Section 4.11.8
		5	S, LTS	TR-1	Section 4.12.7 Section 4.11.8
Increase the risk of wildfire within the vicinity of the project area through the use of mechanical equipment during construction	Evaluation of the proposed construction activities and proposed construction disturbance areas for potential fire risk	1	NI	--	Section 4.12.3
		2	S, LTS	HAZ-2	Section 4.12.4
		3	NI	None	Section 4.12.5
		4	S, LTS	HAZ-2	Section 4.12.6
		5	S, LTS	HAZ-2	Section 4.12.7
if located in or near state responsibility areas or lands classified as very high fire hazard severity zones, (a) substantially impair an adopted emergency response plan or emergency evacuation plan, (b) exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire, (c) require the installation or maintenance of associated infrastructure that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment, (d) expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.	Evaluation of the location of the alternative in relation to state responsibility areas or lands classified as very high fire hazard severity zones. If within or nearby those areas, evaluation of any potential impairment of an emergency plan, the exacerbation of wildfire risks, or exposure of people or structures to significant risks as a result of construction or operation of the alternative.	1	NI	--	Section 4.12.3
		2	LTS	None	Section 4.12.4
		3	NI	None	Section 4.12.5
		4	LTS	None	Section 4.12.6
		5	LTS	None	Section 4.12.7

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

One active hazardous materials site under CDPR management is within the San Luis Reservoir SRA along Gonzaga Road near Park Headquarters. Under the oversight of the Central Valley RWQCB the regulatory status is open with an order for continued soil and groundwater monitoring. The site is outside the area of most of the proposed disturbance with exception of a 5-acre staging area south of Gianelli Pumping Plant off of Gonzaga Road. **A significant impact could occur if contaminated soil and/or groundwater was encountered and released during construction.** Mitigation Measure HAZ-1 would require that the contractor prepare a Contaminated Soil/Groundwater Management Plan for implementation, if contamination is encountered during construction, to avoid disturbance to the soil and groundwater remediation site. **Preparation and implementation of a Contaminated Soil/Groundwater Management Plan under Mitigation Measure HAZ-1 would reduce impacts to less than significant levels.**

The construction of Alternative 2 would require the closure of the San Luis Reservoir, including the temporary suspension of all air operations at the San Luis Reservoir Sea Plane Base for duration of between 33 and 47 months. Closure of the base is necessary due to use of cranes during pipeline tunneling or construction, which could pose a height conflict for air operations be a safety hazard to pilots, the general public, and workers, if pilots are unaware of the temporary base closures. **Construction of the project within the San Luis Reservoir Airbase could have significant public safety and hazard impacts.** Mitigation Measure HAZ-3, described below in Section 4.12.8, would require development of a construction safety plan in accordance with *FAA Advisory Circular 150/5370-2F Operational Safety on Airports During Construction* to coordinate construction activities, schedule and notice requirements. Mitigation Measure HAZ-4, would require a NOTAM to be issued to alert pilots of the sea plane base closure prior to use of any impeding construction equipment and to notify pilots of construction activities. **Coordination between the project contractor and Airbase personnel, including issuance of NOTAMs, and other elements described in Mitigation Measures HAZ-3 and HAZ-4 would reduce impacts to less than significant levels.**

SR 152 would be the main site access for trucks, heavy equipment and construction worker access to Dinosaur Point and Basalt staging areas. SR 152 is the main access into the San Luis Reservoir SRA from both directions and would be the main evacuation route from the park in case of an emergency. A CAL FIRE station is located within the SRA on Gonzaga Road near the Park Headquarters. **Potential conflicts with emergency vehicles in the form of traffic slowdowns or temporary roadway blockages during construction would be a significant impact.** Traffic control Mitigation Measure TR-1, described in Section 4.11.8, would be required during construction to allow emergency vehicles through work areas as needed and according to approved traffic control plans. Construction traffic would be held from using emergency vehicle routes until emergency vehicles had left the site. **Therefore, with implementation of traffic control Mitigation Measure TR-1, the impact would be reduced to less than significant.**

Sparks could be generated while using mechanical equipment, which could cause a wildfire. **This increased fire risk would be significant.** Mitigation Measure HAZ-2 requires using equipment with spark arrestors and informing workers of the risk of starting a wildfire and how to avoid it. **Therefore, during construction of the action alternatives, changes to the risk of wildfire could be significant; however, with use of spark arrestors on equipment as**

described in Mitigation Measure HAZ-2, impacts would be reduced to less than significant with mitigation.

San Luis Reservoir is located within a state responsibility area, classified as moderate or high fire hazard severity. Construction and operation of Alternative 2 would not substantially impair or interfere with the goals and plan elements of the Merced County Emergency Operations Plan or the CAL FIRE 2018 Strategic Fire Plan for California. The new intake would not alter the landscape or require the installation of infrastructure that would exacerbate wildfire risk. There would be no increase in exposure of people or structures to significant wildfire related risk as a result of Alternative 2. In addition, emergency fire protection is provided by CAL FIRE, stationed south of Gonzaga Road, which includes fire prevention efforts. **This impact would be less than significant.**

4.12.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Some hazardous materials (motor oil, gasoline, diesel fuel, solvents, and degreasers) would be used on-site during construction and operation of Alternative 3. Development of a SWPPP, as described in Section 4.1, would require safety measures and BMPs to be implemented when transporting, storing, or using hazardous materials and would describe actions to prevent a release of hazardous materials and procedures in case of an accidental spill or release of hazardous materials. There is no existing hazardous material contamination on site or nearby. **Impacts related to hazardous materials during construction and operation of Alternative 3 would be less than significant.**

There are two existing schools within one-quarter mile of the Santa Teresa WTP. The hazardous materials to be used during construction of Alternative 3 would be limited to low toxicity materials associated with construction equipment. In addition, development of a SWPPP would require proper handling, storage, transport, and disposal of all hazardous materials. **This impact would be less than significant.**

There are no airports within 2 miles of the WTP that would be impacted by construction activities. **Alternative 3 would have no impact related to airport safety.**

Since all of the construction work would take place at the WTP site, it is unlikely that contamination from nearby sites would be encountered during construction. **Therefore, construction of Alternative 3 would have a less than significant impact related to hazardous materials because contamination from hazardous waste sites within the vicinity would not be encountered.**

Construction vehicles may use some of same routes used for emergency evacuations to access the WTP during construction. Because the proposed construction sites are within urban areas, public services for emergency response are available nearby. During construction, the contractor would be required to allow emergency vehicles through work areas as needed and according to approved traffic control plans. Construction traffic would be held from using emergency vehicle routes until the emergency had passed. **Therefore, Alternative 3 would have a less than significant impact to emergency response and evacuation plans.**

Santa Teresa WTP is not located in or near a state responsibility area or land classified as very high fire hazard severity zones. Therefore, Alternative 3 would not substantially impair an emergency plan, exacerbate wildfire risks, expose people or structures to significant risks within a state responsibility area or very high fire hazard severity zone. **There would be no impact.**

4.12.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

Some hazardous materials (motor oil, gasoline, diesel fuel, solvents, and degreasers) would be used on-site during construction and operation of Alternative 4. Development of a SWPPP, as described in Section 4.1, would require safety measures and BMPs to be implemented when transporting, storing, or using hazardous materials and would describe actions to prevent a release of hazardous materials and procedures in case of an accidental spill or release of hazardous materials. Blasting during construction of Alternative 4 would occur at Basalt Hill and involve the transport, handing, and use of explosives. This would create a hazard for those workers conducting the blasting and those working in proximity to Basalt Hill. **This impact would be significant during construction**. Mitigation Measure HAZ-5 would require a Blasting Plan that with safety measures, including minimum standoff distances, handling procedures, an emergency action plan, and transportation requirement that would reduce impacts. **Impacts related to hazardous materials during construction of Alternative 4 would be less than significant with implementation of Mitigation Measure HAZ-5. Impacts related to hazardous materials during operation of Alternative 4 would be less than significant.**

The closest school to San Luis Reservoir is 1.5 miles away and there are no schools within one-quarter mile of construction zone. **There would be no impact for local school children and school staff from exposure to hazardous materials.**

The project would be constructed near an active remediation site within San Luis Reservoir SRA similar to what is described under Alternative 2. **A significant impact could occur if contaminated soil and/or groundwater was encountered and released during construction.** Ongoing state-mandated soil and groundwater monitoring activities at the contaminated site may be affected. Mitigation Measure HAZ-6 would require that the project contractor prepare a Contaminated Soil/Groundwater Remediation Plan for implementation if contamination is still present based on available monitoring data or if contaminated soil or groundwater is encountered during construction. Reclamation would contact CDPR and the Central Valley RWQCB to determine whether ongoing monitoring of the site is needed during or after construction. **During construction of Alternative 4, release and exposure of hazardous materials could be significant; however, preparation and implementation of a Contaminated Soil/Groundwater Remediation Plan under Mitigation Measure HAZ-6, would reduce this impact to less than significant levels.**

The construction of Alternative 4 would place construction equipment including barge-mounted cranes, at B. F. Sisk Dam throughout the 7-year construction schedule. This would not prevent the use of other portions of the reservoir by the seaplane base. Construction activities at B.F. Sisk Dam could be a safety hazard to pilots, the general public, and workers within the project area, if pilots are unaware of the temporary base closures. Mitigation Measures HAZ-3 and HAZ-4, described under Alternative 2 would be implemented under Alternative 4. **Construction of the project within the San Luis Reservoir Airbase could have significant public safety and hazard impacts; however, coordination between the project contractor and Airbase personnel, including issuance of NOTAMs, and other elements described in Mitigation Measures HAZ-3 and HAZ-4 would reduce impacts to less than significant levels.**

Impacts related to potential conflicts with emergency response and evacuation plans related to use of SR 152 and Basalt Road for construction impacts would be the same as those described in Alternative 2. **Potential conflicts with emergency vehicles in the form of traffic slowdowns or temporary roadway blockages during construction would be a significant impact. Therefore, with implementation of traffic control Mitigation Measure TR-1, the impact would be less than significant.**

San Luis Reservoir is located within a state responsibility area, classified as moderate or high fire hazard severity. Construction and operation of Alternative 4 would not substantially impair or interfere with the goals and plan elements of the Merced County Emergency Operations Plan or the CAL FIRE 2018 Strategic Fire Plan for California. The reservoir expansion would not alter the landscape or require the installation of infrastructure that would exacerbate wildfire risk. There would be no increase in exposure of people or structures to significant wildfire related risk as a result of Alternative 2. **This impact would be less than significant.**

4.12.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

During construction, hazardous materials typically associated with proposed construction activities, such as fuel, oil, explosives and lubricants would be used. Operation of intake valves and gates would require hydraulic fluids, typically oil. Construction and operation of Alternative 5 would comply with relevant statutes and regulations related to hazardous materials and would include the development of a SWPPP, as described in Section 4.1, which would require safety measures and BMPs to be implemented when transporting, storing, or using hazardous materials. There is no existing hazardous material contamination on site or nearby. Blasting during construction of Alternative 5 would occur at Pacheco Reservoir and involve the transport, handing, and use of explosives. This would create a hazard for those workers conducting the blasting and those working in proximity to Pacheco Reservoir. **This impact would be significant during construction**. Mitigation Measure HAZ-5 would require a Blasting Plan that with safety measures, including minimum standoff distances, handling procedures, an emergency action plan, and transportation requirement that would reduce impacts. **Impacts related to hazardous materials during construction of Alternative 5 would be less than significant with implementation of Mitigation Measure HAZ-5. Impacts related to hazardous materials during operation of Alternative 5 would be less than significant.**

There are no active or hazardous materials sites, no existing or proposed schools, and no airports within 5 miles of Pacheco Reservoir. **There would be no impact related to these hazards.**

SR 152 would be the main site access for trucks, heavy equipment and construction workers access to the project area; pipeline improvements are proposed under SR 152. SR 152 is the main access route from both directions and would be the main evacuation route from the project area in case of an emergency. Construction activities on SR 152 could temporarily conflict with emergency response and evacuation plans for the Pacheco Reservoir. **Potential conflicts with emergency vehicles in the form of traffic slowdowns or temporary roadway blockages during construction would be a significant impact.** Traffic control Mitigation Measure TR-1 would be required during construction to allow emergency vehicles through work areas as needed and according to approved traffic control plans. Construction traffic would be held from using emergency vehicle routes until the emergency had passed. **Therefore, with implementation of traffic control Mitigation Measure TR-1, the impact would be less than significant.**

CAL FIRE identified the area surrounding Pacheco Reservoir as a region of high risk for wildfire (CAL FIRE 2007). Sparks could be generated while using mechanical equipment, which could cause a wildfire. **Therefore, during construction of Alternative 5, changes to the risk of wildfire could be significant; however, with the implementation of Mitigation Measure HAZ-2, this impact would be less than significant.**

Pacheco Reservoir is located within a state responsibility area, classified as high or very high fire hazard severity. Construction and operation of Alternative 5 would not substantially impair or interfere with the goals and plan elements of the Santa Clara County Emergency Operations Plan or the CAL FIRE 2018 Strategic Fire Plan for California. The reservoir expansion would not alter the landscape or require the installation of infrastructure that would exacerbate wildfire risk. There would be no increase in exposure of people or structures to significant wildfire related risk as a result of Alternative 5. **This impact would be less than significant.**

4.12.8 Mitigation Measures

In addition to Mitigation Measure TR-1, the following mitigation measures would reduce the severity of the hazard and hazardous materials impacts.

Mitigation Measure HAZ-1. Reclamation will ensure that construction contracts include requirements for the contractor to prepare a Contaminated Soil/Groundwater Management Plan in coordination with CDPR and the Central Valley RWQCB to avoid disturbance to any active hazardous waste or contaminated site during construction. In support of this Contaminated Soil/Groundwater Management Plan, pre-construction sediment sampling in all areas where disturbance would occur will be completed to fully characterize the scope of site contamination. All construction buffer and contaminated soil/groundwater handling requirements will be incorporated into the construction contracts.

A buffer will be required around the limits of each hazardous waste or contaminated site. Construction fencing shall be placed around the perimeter of the buffer prior to the beginning of construction where work is proposed in the vicinity of a hazardous waste or contaminated site. The size of the buffer will be determined based on the extent of the contamination. If contamination is encountered during construction, the contractor shall implement the Contaminated Soil/Groundwater Remediation Plan in coordination with CDPR, Central Valley RWQCB, and/or San Francisco Bay RWQCB which includes: notification, sampling and analysis, proper handling, storage, transport and disposal procedures. Dust control measures, groundwater collection, treatment and discharge procedures shall also be included in the plan.

Mitigation Measure HAZ-2. Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, will include requirements in all construction contracts requiring the use of spark arrestors on all construction equipment. The contract shall also include requirements for the contractor to educate all construction workers about the risk of starting a wildfire and how to avoid it and who to contact in case a wildfire is started. In addition, under Alternative 4, restrictions shall be placed on smoking and campfires for any personnel utilizing Basalt Campground.

Finally, the construction contractor shall prepare a Fire Prevention Plan to prevent a fire from occurring. The plan must include (U.S. Department of Labor, OSHA 2018):

- A list of all major fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each major hazard.
- Procedures to control accumulations of flammable and combustible waste materials.
- Procedures for regular maintenance of safeguards installed on heat-producing equipment to prevent the accidental ignition of combustible materials.
- The name or job title of employees responsible for maintaining equipment to prevent or control sources of ignition or fires.
- The name or job title of employees responsible for the control of fuel source hazards.

Mitigation Measure HAZ-3. Reclamation will ensure the construction contracts include requirements for the contractor to prepare a construction safety plan prior to any construction activities in collaboration with airbase personnel to coordinate construction activities including: a schedule, coordination of personnel with aviation radios, and notice requirements. Also, consistent with Mitigation Measure TR-1, the contractor shall coordinate with emergency service personnel to ensure adequate mitigation for all impacts.

Mitigation Measure HAZ-4. Reclamation, in coordination with the construction contractor, shall notify the San Luis Airbase administrator when a NOTAM is required to be issued prior to the commencement of construction activities within the airbase and when high profile equipment will be used within safety zones.

Mitigation Measure HAZ-5. Reclamation, under Alternatives 4, and SCVWD, under Alternative 5, will ensure that the construction contractor prepares and follows a Blasting Plan for construction that includes the following:

- Identification of blast officer;
- Scaled drawings of blast locations, and neighboring buildings, streets, or other locations which could be inhabited;
- Blasting notification procedures, lead times, and list of those notified. Public notification to potentially affected vibration and nuisance noise receptors describing the expected extent and duration of the blasting;

- Description of means for transportation and on-site storage and security of explosives in accordance with local, State and Federal regulations;
- Minimum acceptable weather conditions for blasting and safety provisions for potential stray current (if electric detonation);
- Traffic control standards and traffic safety measures (if applicable);
- Required personal protective equipment;
- Minimum standoff distances and description of blast impact zones and procedures for clearing and controlling access to blast danger;
- Procedures for handling, setting, wiring, and firing explosives; and procedures for handling misfires per Federal code;
- Type and quantity of explosives and description of detonation device.
- Methods of matting or covering of blast area to prevent flyrock and excessive air blast pressure;
- Description of blast vibration and air blast monitoring programs;
- Dust control measures in compliance with applicable air pollution control regulations (to interface with general construction dust control plan);
- Emergency Action Plan to provide emergency telephone numbers and
- directions to medical facilities. Procedures for action in the event of injury;
- Material Safety Data Sheets for each explosive or other hazardous materials to be used;
- Evidence of licensing, experience, qualifications of blasters, and description of insurance for the blasting work
- A sound attenuation plan shall be prepared outlining sound control measures that would include the use of blasting mats or sound walls;
- If vibration results in damage to any nearby structures or utilities, or scenic rock faces, blasting shall immediately cease. The stability of segmental retaining walls, existing slopes, creek canals, etc. shall be monitored and any evidence of instability due to blasting operations shall result in immediate termination of blasting;
- Explosive materials shall be delivered in specially built vehicles marked with United Nations (UN) hazardous materials placards. Explosives and detonators shall be delivered in separate vehicles or be separated in compartments meeting Department of Transportation (DOT) rules within the same vehicle. Vehicles shall have at least two ten-pound Class-A fire extinguishers and all sides of the vehicles display placards displaying the UN Standard hazard code for the onboard explosive materials. Drivers shall have commercial driver licenses (CDL) with Hazmat endorsements, and drivers shall carry bill-of-lading papers detailing the exact quantities and code dates of transported explosives or detonators;
- The contractor must comply with U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) table-of-distance requirements (CFR 27, U.S. Department of Justice, Alcohol, Tobacco, Firearms and Explosives Division Part 555) that restrict explosive quantities based

on distance from occupied buildings and public roadways. Employees must also comply with the security requirements of the Safe Explosives Act (Title XI, Subtitle C of Public Law 107-296, Interim Final Rule), implemented in March 2003. These requirements require background checks for all persons that use, handle or have access to explosive materials; and responsible persons on a now required Federal explosives license must submit photographs and fingerprints with the application to ATF.

Mitigation Measure HAZ-6. Reclamation will ensure the construction contract will include requirements for the coordination with the CDPR and the Central Valley RWQCB to review existing monitoring data of the San Luis Reservoir SRA LUST Cleanup Site to evaluate the potential for interacting with hazardous soil contamination during construction. If the contractors determine that interaction with contaminated soil cannot be avoided and these construction actions could generate a release of this soil to nearby water bodies or elsewhere offsite the contractors shall prepare a Contaminated Soil/Groundwater Remediation Plan. This remediation plan will detail the nature of the contaminants on site, measures required to avoid interaction with these contaminants including if necessary a pre-construction cleanup of the site, and a response action plan in the event of an inadvertent release of contaminated soils from the construction site. This plan will be submitted to the CDPR and the Central Valley RWQCB for review and approval prior to any construction taking place.

4.13 Aquatic Resources

4.13.1 Assessment Methods

Project-related fisheries resources impacts would fall into two categories: (1) short-term construction-related impacts and (2) long-term operations-related impacts. Short-term construction-related impacts would include the temporary loss of fish habitat from disturbance and increased sedimentation, release, and exposure of construction-related contaminants. Long-term operational impacts would be triggered by changes in hydrology associated with changes in operations.

4.13.1.1 Operational Impacts to Delta Fishes

Extensive modeling of hydrologic conditions was performed using CalSim II to provide a quantitative basis from which to assess potential operational effects of the project alternatives on fisheries resources and aquatic habitats in the Delta. Hydrologic indicators (or parameters) for habitat quality in the Delta that were used in this analysis include Sacramento River flow, Delta outflow, Delta inflow, low salinity zone (X2), Old and Middle River flows, and Delta exports (see Section L2.1.1 of Appendix L2 for details on the analysis).

4.13.1.2 Operational Impacts to Pacheco Creek Steelhead

Habitat suitability modeling was performed to evaluate the impact of the expanded Pacheco Reservoir operations on South-Central California Coast Steelhead critical habitat located in Pacheco Creek. Suitability modeling evaluated the impact of expanded Pacheco Dam flow releases on steelhead habitat quality for all life stages (adult migration to juvenile outmigration) present in Pacheco Creek. The model considered a range of environmental factors important for steelhead, including flow, temperature, and macro-habitat features (see Section L2.1.2 of Appendix L2 for details on the analysis).

4.13.2 Significance Criteria

Impacts of an alternative on fisheries and aquatic ecosystems would be significant if project implementation would do any of the following: (1) have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, USFWS, or NMFS; (2) interfere substantially with the movement of any native resident or migratory fish or aquatic-dependent species or with established native resident or migratory corridors, or impede the use of native nursery sites; (3) conflict with any local policies or ordinances protecting fisheries resources; or (4) conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan, or other approved local, regional, or State HCP. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-15.

4.13.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

The No Action/No Project Alternative includes the most likely future conditions in the absence of the project. The No Action/No Project Alternative would leave the current operations at San Luis Reservoir and Pacheco Reservoir unchanged. Therefore, no new construction would occur. There would be no impacts on fish migration corridors, and no conflicts with habitat conservation plans or other local plans or policies. **Because the No Action/No Project Alternative does not entail construction, there would be no related impacts on special-status fish species or their habitat.**

4.13.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Construction of Alternative 2 could result in temporary impacts on aquatic habitats for fish species from clearing, grading, staging of equipment, and other ground-disturbing activities. However, there are no special-status fish species present in the San Luis Reservoir. **As a result, changes in aquatic habitat due construction activities would result in no impacts to special-status fish.** In addition, to further minimize impacts Mitigation Measure BIO-1 would be implemented to avoid or reduce impacts on watercourses, wetlands, riparian areas, and other sensitive habitats during construction. Construction of Alternative 2 would not interfere with the movement on any native resident or migratory fish or aquatic-dependent species, or with established native resident or migratory corridors, or impede the use of native nursery sites.

Table 4-15. Aquatic Resources Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, USFWS, or NMFS	Evaluate how construction of new infrastructure or later through operation of the alternatives could potentially impact any species identified as a candidate, sensitive, or special-status species through direct effects or through habitat modification	1	NI	--	Section 4.13.3 Appendix L2
		2	Construction – NI Operation (Delta) - LTS	BIO-1	Section 4.13.4 Appendix L2
		3	Construction –NI Operation (Delta) - LTS	BIO-1	Section 4.13.5 Appendix L2
		4	Construction –NI Operation (Delta) - LTS	BIO-1	Section 4.13.6 Appendix L2
		5	Construction – S, LTS Operation (Delta) – LTS Operation (Pacheco Creek/Pajaro River) – S, LTS	BIO-1, BIO-2	Section 4.13.7 Appendix L2
Interfere substantially with the movement of any native resident or migratory fish or aquatic-dependent species or with established native resident or migratory corridors, or impede the use of native nursery sites	Evaluate how implementation of the alternatives through the placement of equipment or development of new infrastructure during construction or through changes in water flow or availability during operation, could interfere with the movement of any native resident or migratory fish or aquatic-dependent species or with established native resident or migratory corridors, or impede the use of native nursery sites	1	NI	--	Section 4.13.3
		2	NI	None	Section 4.13.4
		3	NI	None	Section 4.13.5
		4	NI	None	Section 4.13.6
		5	LTS	None	Section 4.13.7
Conflict with any local policies or ordinances protecting fisheries resources	Evaluate how implementation of the alternatives could conflict with policies or ordinances protecting fisheries resources	1	NI	--	Section 4.13.3
		2	NI	None	Section 4.13.4
		3	NI	None	Section 4.13.5
		4	NI	None	Section 4.13.6
		5	NI	None	Section 4.13.7
Conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or State HCP	Evaluate how implementation of the alternatives could conflict with HCPs or Natural Community Conservation Plan	1	NI	--	Section 4.13.3
		2	NI	None	Section 4.13.4
		3	NI	None	Section 4.13.5
		4	NI	None	Section 4.13.6
		5	NI	None	Section 4.13.7

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

Operation of Alternative 2 would allow the San Felipe Division to draw water from San Luis Reservoir at the same elevation as the Gianelli Intake. Operations of the reservoir would be generally the same as under the No Action/No Project Alternative. CalSim II modeling results indicate that, on average, there are very slight changes (less than 1 percent) to Delta hydrology, hydrodynamics, and water quality resulting from changes in Delta operations of the CVP and SWP compared to the No Action/No Project Alternative, which could affect Delta fishes, their habitats, or impact their migration. Operation of Alternative 2 would comply with the policies established in the San Luis Reservoir SRA RMP/GP (Reclamation and CDPR 2013). There are no HCPs or local tree protection ordinances that cover the San Luis Reservoir Region. Operation of Alternative 2 would not interfere substantially with the movement of any native resident or migratory fish or aquatic-dependent species, or with established native resident or migratory corridors, or impede the use of native nursery sites. **As a result, operational impacts would be less than significant for special-status fish, HCPs, and local ordinances.**

4.13.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Construction of Alternative 3 would occur at the existing Santa Teresa WTP and within areas already disturbed by development. There would be no construction activities within or near aquatic habitats. **Therefore, construction of Alternative 3 would have no impact on sensitive habitats for special status fish species or the movement of any native resident or migratory fish species.** In addition, to further minimize impacts Mitigation Measure BIO-1 would be implemented to avoid or reduce impacts on watercourses, wetlands, riparian areas, and other sensitive habitats during construction. Although the area of construction would be covered under the Santa Clara Valley Habitat Plan, the plan does not cover aquatic species, and consistency with that plan is therefore not a concern for aquatic resources.

Operation of Alternative 3 would be similar to Alternative 2. CalSim II modeling results indicate that, on average, there are very slight changes (less than 1 percent) to Delta hydrology, hydrodynamics, and water quality resulting from changes in Delta operations of the CVP and SWP compared to the No Action/No Project Alternative, which could affect delta fishes, their habitats, or impact their migration. Operation of Alternative 3 would comply with the policies established in the San Luis Reservoir SRA RMP/GP (Reclamation and CDPR 2013). **Operational impacts would be less than significant.**

4.13.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

Construction of Alternative 4 could result in temporary impacts on aquatic habitats for fish species from clearing, grading, and other ground-disturbing activities associated with construction of an expanded Sisk Dam. As discussed above, there are no special-status fish species present in San Luis Reservoir. **As a result, changes in aquatic habitat due to construction activities would result in no impacts to special-status fish.** In addition, to further minimize impacts Mitigation Measure BIO-1 would be implemented to avoid or reduce impacts on watercourses, wetlands, riparian areas, and other sensitive habitats during construction.

Operation of Alternative 4 would comply with the policies established in the San Luis Reservoir SRA RMP/GP (Reclamation and CDPR 2013). There are no HCPs or local tree protection ordinances that cover the San Luis Reservoir Region. Operation of Alternative 4 could result in changes to CVP and SWP operations in the Delta, which, in turn, could result in changes to hydrological indicators for habitat. These changes are described below.

4.13.6.1 Sacramento River Flow

Simulated Sacramento River flow at Hood would decrease by less than one percent on average in all months of all water-year types (See Section L2.2.1.3.1 of Appendix L2) for Alternative 4 compared to the No Action/No Project Alternative. During most years Sacramento River flows would be unchanged.

There would be no discernable Sacramento River flow-related effects on special-status fish species under Alternative 4, relative to the No Action/No Project Alternative. Functional flows for fish species would be unchanged, leading to no discernible impact to Delta fishes, their habitat, or their migration. **Therefore, Sacramento River flow-related effects on special-status fish species would be less than significant.**

4.13.6.2 Low Salinity Zone (X2)

Modeling simulations predict that operation of the proposed project would result in small changes to the X2 position[4] (see Section L2.2.1.3.2 of Appendix L2 for a summary of this analysis). X2 would not change by more than 0.02 kilometers (km) during February through May or September through November, periods when special-status fish species use the low salinity zone (LSZ) for rearing. During most months of most years, the position of the LSZ would be unchanged. Additionally, all operations would be guided by Reasonable and Prudent Alternative (RPA) Actions established by NMFS and USFWS Biological Opinions (BOs) to manage the position of X2 and reduce any adverse effects to special-status fish species. There would be no discernable effects related to changes in the position of the LSZ (X2) on special-status fish species under Alternative 4, relative to the No Action/No Project Alternative. **Therefore, changes in the position of the LSZ (X2) on special-status fish species would be less than significant.**

4.13.6.3 Delta Outflow

Simulated Delta outflow would decrease by less than 1 percent in all months of all water-year types (see Section L2.2.2.1.3.3 of Appendix L2 for a summary of this analysis). During most months of most years Delta outflows would be unchanged.

Any potential small effects attributed to changes in Delta outflow would be further minimized because CVP and/or SWP operations would be guided by any real-time operations and operational actions identified in the RPAs established by the NMFS and USFWS BOs to reduce any impacts to special-status fish species. There would be no discernable Delta outflow-related effects on special-status fish species under Alternative 4, relative to the No Action/No Project

[4] The “X2” water quality parameter represents the distance from the Golden Gate Bridge to the location of 2 parts per thousand salinity concentration in the Delta.

Alternative. Functional flows for fish species would be unchanged, leading to no discernible impact to Delta fishes, their habitat, or their migration. **Therefore, Delta outflow-related effects on special-status fish species would be less than significant.**

4.13.6.4 Old and Middle River Flows

Modeling simulations predict that operation of Alternative 4 would result in small changes to Old and Middle rivers reverse flows for most months of most year types (see Section L2.2.1.3.4 of Appendix L2 for a summary of this analysis). While even small adverse changes in reverse flows could be considered significant, the Smelt Working Group and the Delta Operations for Salmonids and Sturgeon (DOSS) group work with USFWS, NMFS, DWR, CDFW, and Reclamation to manage reverse flows to avoid reaching the actual take limits for the federally listed fish species at the CVP and SWP facilities. Reclamation and DWR reduce or stop reverse flows to avoid hitting the take limits that are established by USFWS and NMFS in the BOs and by CDFW in the longfin smelt incidental take permit (ITP). Functional flows for fish species would be nearly unchanged, leading to no discernible impact to Delta fishes, their habitat, or their migration. **Therefore, this impact would be less than significant.**

4.13.6.5 Delta Exports

Except for two model periods, simulated Delta exports would increase by less than 2 percent in all months of all water-year types (see Section L2.2.1.3.5 of Appendix L2 for a summary of this analysis). While any potential effect could be considered significant, the Smelt Working Group and the DOSS group work with USFWS, NMFS, DWR, CDFW, and Reclamation to avoid reaching the actual take limit at the CVP and SWP facilities. Reclamation and DWR reduce or stop exports to avoid hitting the take limits established by USFWS and NMFS in the BOs and by CDFW in the longfin smelt ITP. **Therefore, this impact would be less than significant.**

4.13.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Construction of Alternative 5 could result in temporary impacts on aquatic habitats for fish species from clearing, grading, and other ground-disturbing activities associated with construction of an expanded Pacheco Dam. The use of heavy machinery traversing aquatic habitat and riparian areas for access to Pacheco Creek could result in disturbance of aquatic habitats. In addition, hazardous materials associated with construction equipment (fuel, oil) could be released to the environment and could adversely affect water quality in aquatic habitats. As was noted in Section 2.2.5, the North Fork Dam is currently being operated under the terms of a DWR Division of Safety of Dams order requiring that the upstream and downstream outlet controls be maintained in the fully open position to maximize releases and maintain the lowest possible surface elevation in Pacheco Reservoir given the current condition of its spillway (DWR 2018). To support construction of the new dam, a temporary cofferdam would be constructed with a bypass structure to ensure that flows in Pacheco Creek are maintained consistent with the current conditions throughout construction.

Construction activity could temporarily cause direct or indirect substantial adverse impacts to South-Central California Coast Steelhead, their habitat, and their movement in Pacheco Creek. If

Alternative 5 is selected for implementation, during the pre-construction design phase, Reclamation would initiate consultation with NMFS under Section 7 of ESA. **This impact is significant**. **Mitigation Measure BIO-1 would be implemented to avoid or reduce impacts on watercourses, wetlands, riparian areas, and other sensitive habitats during construction.** This measure would minimize the amount of construction disturbance to aquatic habitats for South-Central California Coast Steelhead in Pacheco Creek by minimizing erosion, preventing entrainment through screening of intakes, and minimizing removal of woody debris and riparian vegetation. **As a result, changes in aquatic habitat for this species, and its ability to migrate through Pacheco Creek, due to construction activities would be less than significant after mitigation.**

4.13.7.1 Operational Impacts on Delta Fishes

Operations of the San Luis Reservoir would be generally the same as under the No Project. CalSim II modeling results indicate that, on average, there are very slight changes (<1 percent) to Delta hydrology, hydrodynamics, and water quality resulting from changes in Delta operations of the CVP and SWP compared to the No Action/No Project Alternative, which could impact Delta fisheries and habitats. **Therefore, operational impacts on special-status fish species in the Delta would be less than significant.**

4.13.7.2 Operational Impacts on Pacheco Creek and Pajaro River Fishes

Changes to suitable habitat for South-Central California Coast Steelhead in Pacheco Creek under Alternative 5 were evaluated through the use of the Pacheco Creek Steelhead Habitat Suitability Model (See Section L2.1.2 of Appendix L2 for a summary of this analysis). The model was used to simulate with- and without-Project conditions across the 1922-2003 simulation period. The Lead Agencies assumed in this modeling that absent construction of the Pacheco Reservoir Expansion Alternative that the dam safety issue requiring this DWR Division of Safety of Dams order would be addressed and that future operation of the reservoir would return to the experimental flow regime developed in the *Comprehensive strategy and instructions for operation of Pacheco Reservoir* (Micko 2014) that was implemented between 2014 and 2018. When compared to this No Action/No Project Alternative condition, the Pacheco Creek Habitat Suitability Model predicted improved viability of steelhead populations through improved habitat conditions in Pacheco Creek in all water year types under Alternative 5. The model predicted an average percentage increase in steelhead cohort scores of 270 percent across all water year types.

Increases in carryover storage in Pacheco Reservoir under Alternative 5 could also further limit the occurrence of harmful cyanobacteria blooms in the reservoir. As was detailed in Section 4.1.7, the experimental operations plan for the existing Pacheco Reservoir implemented in 2014, limited the occurrence of cyanobacteria blooms that occur during periods of low storage levels by increasing carryover storage. The expanded Pacheco Reservoir would be operated similarly to limit mid-summer cyanobacteria blooms that are toxic to fish downstream by increasing reservoir storage and water releases downstream in Pacheco Creek (Smith 2007, Micko 2014, Smith 2014). Introduction of Delta water that passes through San Luis Reservoir prior to delivery into Pacheco Creek and the Pajaro River Watershed downstream has the potential to introduce invasive aquatic species not currently present into Pacheco Creek or the Pajaro River, and potentially impact the imprinting behavior of steelhead. While the expanded Pacheco Reservoir would be primarily filled using natural inflows from the North and East Forks of Pacheco Creek, supplemental flows to the expanded reservoir would arrive from SCVWD's share of contracted CVP water supply pumped from San Luis Reservoir. During years when SCVWD water supplies exceed the water demands in SCVWD's service area and excess storage capacity is available in the expanded reservoir, SCVWD would convey CVP supplies from San Luis Reservoir through the Pacheco Conduit into the expanded Pacheco Reservoir.

Inter-basin water transfers are recognized as one of the major pathways of freshwater invasion (Gallardo and Aldridge 2018). Transferred water can provide a direct link between previously isolated catchments and may modify the habitat conditions of the receiving waters such that they become more favorable for the establishment of invasive species (Gallardo and Aldridge 2018). The introduction of CVP water into the Pajaro River Watershed has the potential to introduce harmful invasive fish species, including striped bass, that may compete or prey upon listed South-Central California Coast Steelhead. Also, the release of CVP water could cause the introduction of non-native invertebrates (clams, mussels) or aquatic plant species that may alter the food-web of Pacheco Creek or Pajaro River. However, introductions of Delta species that are adapted to tidally-influenced, large river channels and sloughs may not be able to successfully colonize the small, coastal river systems of Pacheco Creek or Pajaro River, limiting the impact of their introductions. The potential introduction of non-native predators to Pacheco Creek like striped bass that are currently present in San Luis Reservoir could however negatively impact native fish populations on the creek including South-Central California Coast Steelhead.

Philopatry (i.e., homing) to natal sites is a fundamental life-history trait of most anadromous salmon and trout (Keefer and Caudill 2014). Homing increases the likelihood that reproductive-age fish will find mates and locate habitats that are favorable for both adult spawning and juvenile survival. (Keefer and Caudill 2014). Water chemistry of the natal river system of an up-migrating salmonid may be of particular importance given the use of olfaction for route finding and home site recognition (Keefer and Caudill 2014). Therefore, the introduction of out-of-basin CVP water from the Delta may hinder the imprinting of juvenile steelhead on water from Pacheco Creek or Pajaro River, thereby affecting the homing behavior of adults returning to spawn. However, this impact is expected to be limited since the Pacheco Reservoir would be primarily filled with natural inflows from the Pacheco Creek Watershed, with CVP inputs only occurring as capacity in the Pacheco Conduit allows in advance of anticipated low point water supply interruptions or later during low point water supply interruptions when the water couldn't otherwise be accepted by the SCVWD WTPs. As is noted in Appendix B, the expanded Pacheco Reservoir would increase San Felipe Division CVP M&I deliveries by 3,000 AF while increasing average available total local surface storage volumes by 97,000 AF. This difference between imported CVP supply and storage of local runoff are anticipated to limit the influence of the imported CVP supplies on salmonid imprinting.

While the introduction of Delta water into Pacheco Creek may negatively impact South-Central California Coast steelhead downstream by potentially affecting the imprinting of juveniles or through the introduction of non-native invasive species, the improved habitat quality resulting from the increased releases on Pacheco Creek proposed under Alternative 5 are anticipated to outweigh any potential negative impacts from imprinting. Under current conditions, Pacheco

Reservoir may not fill completely in dry years, leading to inadequate flow releases in Pacheco Creek in spring and summer months (with some stretches of Pacheco Creek going dry), making habitat unsuitable for rearing steelhead (Smith 2007). Even in wet years, flow releases can be inadequate to support steelhead rearing in Pacheco Creek by mid-summer (Smith 2007). As the results from the Pacheco Creek Steelhead Habitat Suitability Model show, increased water deliveries under Alternative 5 would greatly increase the suitability of habitat downstream of the expanded Pacheco Reservoir, likely leading to enhanced viability of Pacheco Creek steelhead.

Increased water deliveries into Pacheco Creek, and ultimately the Pajaro River, under Alternative 5 would likely provide beneficial habitat impacts to other California State species of concern that are present in the Pajaro River. Pacific lamprey is an anadromous species that, like steelhead, migrate into freshwater to spawn, occurring slightly later than steelhead during March – May. Therefore, increased winter and springtime flows under Alternative 5 would likely expand spawning habitat and increase habitat connectivity for migrating adult lamprey. Other California species of concern, the Monterey roach and Monterey hitch, can tolerate a wide range of habitat types and water temperature ranges, but both are most frequently found in large, low-gradient pools. Increased flow deliveries into the Pajaro River would likely expand the occurrence of pool habitat, particularly during the summer months which would benefit these species. It is anticipated that these improved habitat conditions with improvements in the reliability and frequency of flows in Pacheco Creek would also offset any impacts to channel form evolution, floodplain inundation rates and duration, and vegetation community composition and density along the creek from the expanded reservoir's potential increased attenuation of flood flows on Pacheco Creek. **Given the potential for the introduction of invasive aquatic species not currently present into Pacheco Creek, operational impacts on special-status fish species in or their migration through Pacheco Creek and the Pajaro River would be significant.** Mitigation Measure BIO-2 would be implemented to limit the potential for the introduction of invasive aquatic species through the storage of CVP water in he expanded Pacheco Reservoir. This measure would require the installation of a screen or treatment system capable of preventing the conveyance of fish, larvae and eggs from San Luis Reservoir to the expanded Pacheco Reservoir. **As a result, operational impacts on special-status fish species in or their migration through Pacheco Creek and the Pajaro River would be less than significant after mitigation.**

Operation of Alternative 5 would be consistent with the policies established in the Santa Clara Valley Habitat Plan, a Habitat Conservation Plan/Natural Communities Conservation Plan developed for Santa Clara County (Santa Clara Valley Habitat Agency 2012). **Therefore, operations would not conflict with ordinances or HCPs, resulting in no impact.**

4.13.8 Mitigation Measures

Mitigation Measure BIO-1: Aquatic and Terrestrial Resource Construction Requirements. The following construction requirements will be implemented by Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 3 and 5, to help mitigate adverse aquatic resource impacts and adverse terrestrial resource impacts (see Section 4.14). Many of these construction requirements were modified from those listed in the SCVWD Best Management Practices Handbook, as noted (SCVWD 2014).

1. **Biological Resources Awareness Training**

   Before any ground-disturbing work (including vegetation clearing and grading) occurs in the construction area, a qualified biologist shall conduct biological resources awareness training as a mandatory requirement for all construction personnel and the construction foreman. This training will inform the crews about special-status species and habitat that could occur on site. The training will consist of a brief discussion of the biology and life history of the special-status species; how to identify each species, including all life stages; the habitat requirements of these species; their status; measures being taken for the protection of these species and their habitats; and actions to be taken if a species is found within the project area during construction activities, and penalties for noncompliance. Identification cards will be issued to shift supervisors; these cards will have photos, descriptions, and actions to be taken upon sighting of special-status species during construction. Upon completion of the training, all employees will sign an acknowledgment form stating that they attended the training and understand all protection measures. Such training will be repeated for new construction personnel added to the project after the initial training, and an updated training program will be given to construction personnel in the event that a change in special-status species occurs or other new important information arises regarding sensitive biological resources at the project site.

2. **General Requirements for Construction Personnel**

   a. The contractor will clearly delineate the construction limits and prohibit any construction-related traffic outside these boundaries. Construction crews will be required to maintain a low speed on all unpaved roads to reduce the chance of wildlife being harmed if struck by construction equipment.

   b. All food-related trash items such as wrappers, cans, bottles, and food scraps generated during construction, subsequent facility operation, or permitted operations and maintenance activities of existing facilities will be disposed of in closed containers only and removed at least once a week from the site. The identified sites for trash collection will be fenced to minimize access from wildlife.

   c. No deliberate feeding of wildlife will be allowed.

   d. No pets will be allowed on the project site.

   e. No firearms will be allowed on the project site.

   f. Any worker who inadvertently injures or kills a Federal or State listed species, bald eagle, or golden eagle, or finds one dead, injured, or entrapped will immediately report the incident to the construction foreman or biological monitor. The construction foreman or monitor will notify Reclamation under Alternatives 2 and 4 and SCVWD under Alternative 3 and 5 within 24 hours of the incident.

3. **Minimize Access Impacts**

   Existing access ramps and roads to waterways will be used where possible. If temporary access points are necessary, they will be constructed in a manner that minimizes impacts:

   a. Temporary project-access points will be created as close to the work area as possible to minimize running equipment in waterways and will be constructed so as to minimize adverse impacts.

   b. Any temporary fill used for access will be removed upon completion of the project. Site topography and geometry will be restored to pre-project conditions.

   c. Off-road vehicular access routes will be surveyed and flagged by a qualified biologist prior to use to avoid where possible sensitive plants, animal burrows, wetlands and vernal pools, or other sensitive habitat. Whenever possible, routes should be not more than 15 feet wide. Personnel and vehicles are required to stay within marked access areas (SCVWD 2014).

4. **Remove Temporary Fills as Appropriate**

   Temporary fills, such as for diversion structures or cofferdams, will be removed upon finishing the work (SCVWD 2014).

5. **Assess Pump/Generator Set Operations and Maintenance**

   Pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species.

   a. Pumps and generators will be maintained according to manufacturers’ specifications to regulate flows to prevent dry-back or washout conditions.

   b. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding.

   c. Pump intakes will be screened to prevent uptake of fish and other vertebrates.

   d. Sufficient back-up pumps and generators will be onsite to replace defective or damaged pumps and generators.

   e. Pumps and generators that operate within the bankfull channel will be placed in a suitable containment structure to prevent the accidental release of hydrocarbons into area waterways.

6. **Minimize Impacts on Vegetation Whenever Clearing (or Trimming) is Necessary**

   Cutting vegetation will be limited to the minimum length, width, and height necessary for safely accessing survey locations, and completing the cross-section surveys. Tree pruning will conform to International Society of Arboriculture pruning standards. No trees with a 4 inch or greater diameter at breast height (DBH) will be removed; and, no branches greater than 4” diameter will be removed.

Woody vegetation (i.e. trees and shrubs) which require pruning for equipment access, construction operations, etc., shall be pruned correctly such that health status is maintained and no post-construction impacts accrue. Woody material (including live leaning trees, dead trees, tree trunks, large limbs, and stumps) will be retained on site, unless it is threatening a structure or impedes access, in which case it must be moved to a less threatening position (SCVWD 2014).

7. **Minimize Root Impacts on Woody Vegetation**

Construction activities, including cut and fill, will be minimized to the extent practicable within the root zones of existing woody vegetation to remain post project. In general, root extent can be estimated as 2-3 times canopy radius, but vary depending on slope and soil conditions. To the extent practicable, construction setbacks will be calculated using parameters including tree DBH and age class and sensitivity to disturbance (species dependent) per standard guidelines for protection of riparian vegetation. Additionally, mulching the root zone will be employed to provide root protection from unavoidable equipment traffic during construction, which may remain in place after work if approved by a qualified biologist or vegetation specialist (SCVWD 2014).

8. **Invasive Species**

To avoid or reduce impacts on special-status plants and waterways from the introduction of invasive species, construction vehicles, equipment and boats will be cleaned with compressed water or air within a designated containment area to remove pathogens, invasive plant seeds, or plant parts. Use of chemical decontaminants will be used for work in areas with amphibians to prevent the spread of chytrid fungus (Bd).

In addition, any imported soils and fill materials will be selected for compatibility with native soils. Native or seed-free mulch will be used to minimize surface erosion and introduction of non-native plants.

9. **Avoid Animal Entry and Entrapment**

All pipes, hoses, or similar structures less than 12 inches diameter will be closed or covered to prevent animal entry. All construction pipes, culverts, or similar structures, greater than 2 inches diameter, stored at a construction site overnight, will be inspected thoroughly for wildlife by a qualified biologist or by properly trained construction personnel before the pipe is buried, capped, used, or moved.

If inspection indicates presence of sensitive or State- or Federally-listed species inside stored materials or equipment, work on those materials will cease until a qualified biologist determines the appropriate course of action.

To prevent entrapment of animals, all excavations, steep-walled holes or trenches more than 6 inches deep will be secured against animal entry at the close of each day. Any of the following measures may be employed, depending on the size of the hole and method feasibility:

a. Hole to be securely covered (no gaps) with plywood, or similar materials, at the close of each working day, or any time the opening will be left unattended for more than one hour; or

b. In the absence of covers, the excavation will be provided with escape ramps constructed of earth or untreated wood, sloped no steeper than 2:1, and located no farther than 15 feet apart; or

c. In situations where escape ramps are infeasible, the hole or trench will be surrounded by filter fabric fencing or a similar barrier with the bottom edge buried to prevent entry (SCVWD 2014).

10. **Use Exclusion Devices to Prevent Migratory Bird Nesting**

Nesting exclusion devices will be installed to prevent potential establishment or occurrence of nests in areas where construction activities will occur. All nesting exclusion devices will be maintained throughout the nesting season or until completion of work in an area makes the devices unnecessary. All exclusion devices will be removed and disposed of when work in the area is complete (SCVWD 2014).

Mitigation Measure BIO-2: Invasive Aquatic Species Prevention. Prior to the delivery of any imported water from San Luis Reservoir to an expanded Pacheco Reservoir under Alternative 5, SCVWD will develop a new NMFS, USFWS and CDFW approved screening or treatment facility at the Pacheco Pumping Plant or between the expanded reservoir and its connection to the Pacheco conduit to prevent the potential conveyance of invasive fish, fish larvae and fish eggs.

4.14 Terrestrial Resources

4.14.1 Assessment Methods

The environmental analyses for the Project area are consistent with NEPA and CEQA requirements (40 CFR Parts 1500-1508; California PRC Section 21000 et seq.; California Code of Regulations [CCR] Section 15000 et seq.).

4.14.2 Significance Criteria

Impacts of an alternative on terrestrial resources would be significant if project implementation would do any of the following: (1) have a substantial adverse effect, either directly or through habitat modifications, on any species identified as an endangered, threatened, candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW, NMFS, or USFWS; (2) have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW, NMFS, or USFWS; (3) have a substantial adverse effect on Federally or State protected wetlands (including, but not limited to, marsh, vernal pool, coast, etc.) through direct removal, filling, hydrological interruption, or other means; (4) interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites; (5) conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or (6) conflict with the provisions of an adopted HCP, Natural Community Conservation Plan (NCCP), or other approved local, regional, or State conservation plan. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-16.

4.14.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

Under the No Action/No Project Alternative, there would be no construction, and no related impacts on terrestrial resources. **The No Action/No Project Alternative would have no impact.**

4.14.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Construction would result in permanent impacts to wetland and riparian vegetation communities. Potential significant impacts to unmapped sensitive natural communities/habitats and jurisdictional waters of the U.S. and waters of the State could occur from construction. **These impacts would be significant.** During construction Mitigation Measure BIO-1, described above in Section 4.13.8, would be implemented to avoid and reduce impacts to wetlands, riparian communities, and other sensitive habitats and special status species. Mitigation Measures TERR-1 through TERR-17, as described in Section 4.14.8, require the protection of sensitive natural communities, and sensitive habitat and require wetland surveys, avoidance, and compensatory mitigation to address impacts to wetland and riparian habitats, and special status species. Mitigation Measure TERR-16 requires avoiding wetlands whenever practicable, fencing to delineate waters of the U.S. and State within and adjacent to construction areas that would not be filled, and providing for identification of these areas as sensitive habitat before construction to prevent unintended damage to wetland vegetation by construction personnel and equipment. Mitigation Measure TERR-16 further requires that areas disturbed by construction be replanted with native plants to minimize erosion. **With the implementation of mitigation, there would be no long-term loss or modification of wetland habitat, riparian vegetation, or purple needlegrass grassland, and impacts on these communities would be reduced from significant to less than significant.**

Table 4-16. Terrestrial Resources Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as an endangered, threatened, candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW, NMFS, or USFWS	Evaluate how construction of new infrastructure or later through operation of the alternatives could potentially impact any species identified as a candidate, sensitive, or special-status species through direct effects or through habitat modification	1	NI	--	Section 4.14.3
		2	Construction – S, LTS Operation - NI	BIO-1, TERR-1 through TERR-15	Section 4.14.4
		3	Construction –S, LTS Operation - NI	BIO-1 TERR-6	Section 4.14.5
		4	Construction –S, LTS Operation – S, LTS	BIO-1, TERR-1 through TERR-15	Section 4.14.6
		5	Construction – S, LTS Operation – S, LTS	BIO-1, BIO-2 TERR-1 through TERR-15	Section 4.14.7
Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW, NMFS, or USFWS	Evaluate how implementation of the alternatives through the placement of equipment or development of new infrastructure during construction or through changes in water flow or availability during operation, could impact any riparian habitat or other sensitive natural community	1	NI	--	Section 4.14.3
		2	S, LTS	TERR-1, TERR-3, TERR-4, TERR-14, TERR-15, TERR-16, TERR-17	Section 4.14.4
		3	NI	None	Section 4.14.5
		4	S, LTS	TERR-1, TERR-3, TERR-4, TERR-14, TERR-15, TERR-16	Section 4.14.6
		5	S, LTS	TERR-1, TERR-16, TERR-18	Section 4.14.7

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Have a substantial adverse effect on Federally or State protected wetlands (including, but not limited to, marsh, vernal pool, coast, etc.) through direct removal, filling, hydrological interruption, or other means	Evaluate how implementation of the alternatives could through the placement of equipment or development of new infrastructure during construction or over the long term with operations could impact any Federally or State protected wetlands	1	NI	--	Section 4.14.3
		2	S, LTS	TERR-14, TERR-16	Section 4.14.4
		3	NI	None	Section 4.14.5
		4	S, LTS	TERR-14, TERR-16	Section 4.14.6
		5	S, LTS	TERR-16	Section 4.14.7
Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites	Evaluate how implementation of the alternatives could impact wildlife corridors or interfere with a wildlife species use of or a wildlife corridor	1	NI	--	Section 4.14.3
		2	LTS	None	Section 4.14.4
		3	NI	None	Section 4.14.5
		4	S, LTS	TERR-12, TERR-13, TERR-15	Section 4.14.6
		5	S, LTS	TERR-12, TERR-15	Section 4.14.7
Conflict with any local policies or ordinances protecting biological resources, or adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or State conservation plan	Evaluate how implementation of the alternatives could conflict with policies or ordinances protecting terrestrial resources such as a tree preservation policy or ordinance, HCPs or Natural Community Conservation Plan	1	NI	--	Section 4.14.3
		2	S, LTS	TERR-1 through TERR-17	Section 4.14.4
		3	S, LTS	BIO-1, TERR-18	Section 4.14.5
		4	S, LTS	TERR-1 through TERR-14, TERR-17	Section 4.14.6
		5	S, LTS	TERR-1, TERR-18	Section 4.14.7

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

Special-status terrestrial species that could be adversely affected by construction at the San Luis Reservoir include vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander, California red-legged frog, foothill yellow-legged frog, western pond turtle, San Joaquin whipsnake, white-tailed kite, Swainson's hawk, golden eagle, California condor, northern harrier, western burrowing owl, tricolored blackbird, other migratory birds and raptors, special-status bats, ringtail, San Joaquin kit fox, and American badger. No critical habitat for any listed species would be impacted by construction.

If seasonal wetlands and pools supporting vernal pool crustacean habitat occur within staging areas, construction footprint, and haul roads, construction activities could result in direct mortality or injury to vernal pool fairy shrimp and vernal pool tadpole shrimp. Indirect effects could occur to these species if their habitat is modified through changes in hydroperiod or siltation due to construction. **These impacts would be significant.** Mitigation Measure TERR-14 would avoid pools to the extent practicable, and mitigate for unavoidable impacts, including initiating Section 7 consultation. Mitigation Measure TERR-15 includes worker education by a qualified biologist, which would train workers to avoid impacting wetlands and potential habitat for vernal pool crustaceans. **With the implementation of mitigation, this impact would be reduced to less than significant.**

Clearing and grading of vegetation at construction sites could result in disturbance of nesting raptors (potentially including Swainson's hawk) and other migratory birds. Noise and nighttime lighting during construction activities could also result in disturbance to nesting birds. **Potential significant impacts to nesting migratory birds, including raptors and special-status species, could occur due to construction.** Implementation of Mitigation Measures BIO-1 and TERR-6 through TERR-10 would minimize the potential for adverse effects by requiring pre-construction surveys and species-specific avoidance measures in the event of the identification of nesting migratory birds near the construction areas. **With the implementation of mitigation, this impact would be less than significant.**

Disturbance during construction could temporarily reduce foraging habitat for golden eagle and California condor. Construction would occur in limited areas at the San Luis Reservoir, representing only a small portion of suitable foraging habitat for these species. **Potential significant impacts to golden eagles and California condors could occur due to construction**.

Mitigation Measure BIO-1, which would be implemented during construction, entails the use of nest exclusion devices to ensure migratory bird nesting does not occur in certain construction areas that cannot be avoided. Mitigation Measure TERR-6 would require pre-construction surveys for identifying nesting birds in and near the proposed construction areas and for avoiding any nests discovered during these surveys through the nesting season. Mitigation Measure TERR-8 would require species-specific survey protocols and avoidance measures for golden eagle, bald eagle, and California condor to reduce the potential for significant adverse impacts. **With the implementation of mitigation, this impact would be less than significant.**

During construction, Mitigation Measure BIO-1 would be implemented to avoid or to reduce impacts on special-status plants by training construction workers on avoidance requirements, implementation of limits on vegetation clearing, application of measures to avoid impacts to woody vegetation root zones, and avoidance of invasive species import to the construction site. **However, potential significant impacts to previously unidentified special-status plant species could occur due to construction.** Mitigation Measures TERR-1 and TERR-2 require special-status plant species surveys, species-specific avoidance, and species-specific compensatory mitigation. **With the implementation of mitigation, as appropriate, this impact would be reduced to less than significant.**

San Joaquin kit fox and other terrestrial wildlife species may use the construction site as movement corridors. Fencing utilized during construction would temporarily block corridors through this area. Temporary construction fencing and protective fencing around wetlands, riparian areas, or other sensitive natural communities, special-status plants, or wildlife habitat, would be removed following construction and restoration of disturbed areas. Interference with riparian corridors would be avoided to the maximum extent possible. **Therefore, impacts on wildlife corridors would be less than significant.**

The Merced County General Plan includes objectives and policies to preserve and protect biological resources. These include provisions to preserve existing lands and increase the overall acreage of protected lands in the county, and to protect and designate buffers around wetlands. There are no HCPs or local tree protection ordinances that cover the San Luis Reservoir Region. **Conflicts with local policies and ordinances would be a significant impact, but with implementation of mitigation impacts on consistency with local policies or ordinances protecting biological resources would be less than significant.**

4.14.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Project actions under Alternative 3 would not impact special-status natural communities, wetlands or waters, wildlife corridors or nursery sites, or special-status terrestrial species or critical habitat, other than birds. However, vegetation near the existing Santa Teresa WTP may support nesting migratory birds, including raptors. **Project effects to nesting migratory birds would be significant.** During construction, Mitigation Measure BIO-1 would be implemented to avoid impacts on migratory birds by using exclusion devices to prevent nesting. These actions, along with the implementation of Mitigation Measure TERR-6, would minimize the potential for adverse effects. **This impact would be less than significant after mitigation.**

In addition, if construction of Alternative 3 requires the removal or pruning of protected trees, **this would be a significant impact.** Mitigation Measure BIO-1 would be implemented to prevent impacts to protected trees. In addition, compliance with local tree protection ordinances through implementation of Mitigation Measure TERR-18 would avoid significant impacts to tree species by requiring that protected trees be replanted within the project area or at another location to mitigate for the removal of protected trees. Construction and operation of Alternative 3 would comply with the policies established in the Santa Clara Valley Habitat Plan, a Habitat Conservation Plan/Natural Communities Conservation Plan developed for Santa Clara County (Santa Clara Valley Habitat Agency 2012) and with resource conservation policies of the Santa Clara County General Plan (Santa Clara County 1994). **Conflict with the local tree ordinance would be a significant impact, but with implementation of mitigation, impacts on**

consistency with local policies or ordinances protecting biological resources would be less than significant.

4.14.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

As shown in Table 4-17, most anticipated habitat impacts associated with Alternative 4 are associated with the construction phase (3,113.1 acres).

Table 4-17. Habitat Impacts Associated with Alternative 4

Habitat Type	San Luis Reservoir Expansion Impact (Acres)		
	Construction Footprint	**Inundation Footprint**	**Total Impact**
Terrestrial Habitats			
Annual Grassland	2,342.9	304.6	2,647.5
Oak Woodland	29.8	40.8	70.6
Riparian Woodland	0.8	19.4	20.2
Scrub / Chaparral	131.2	15.9	147.1
Ruderal	—	1.7	1.7
Barren	479.4	—	479.4
Developed	100.4	9.5	109.9
Terrestrial Subtotal	**3,084.50**	**391.90**	**3,476.40**
Aquatic Habitats			
Creek / Drainage	1.5	2.6	4.1
Fresh Emergent Wetland	18.6	—	18.6
Seasonal Wetland	8.4	—	8.4
Aquatic Subtotal	**28.5**	**2.6**	**31.1**
Totals	**3,113.1**[1]	**394.4**	**3,507.5**[1]

[1] These totals do not include 626.0 acres of seasonally flooded open water habitat that is within the construction footprint.

Construction of the expanded reservoir would result in permanent impacts to wetland and riparian vegetation communities associated with clearing, soil borrowing, grading, staging of equipment, and other ground-disturbing activities that are proposed within streams and jurisdictional aquatic features. **These impacts would be significant.** These impacts could also be generated during the development of additional camp sites, visitor features, and trails during implementation of Mitigation Measure REC-1 and REC-2, described in Section 4.17.8.

Changes to local topography could alter the surface or subsurface hydrology of these sensitive habitats. In addition, hazardous materials associated with construction equipment (fuel, oil) could be released to the environment and adversely affect water quality in wetland and riparian areas.

Mitigation Measure TERR-16a requires a formal wetland delineation to support resource agency permitting and support the avoidance of sensitive areas. Mitigation Measure TERR-16b defines compensatory mitigation requirements to offset impacts. **With implementation of mitigation,**

impacts to wetland habitat or riparian vegetation at the San Luis Reservoir associated with construction would be less than significant.

The construction activities described above would physically disturb approximately 2,533.3 acres of upland and aquatic habitat within the construction footprint (excludes 479.4 acres of developed areas and 100.4 acres of barren areas on the dam face and historic borrow sites) (Table 4-5).

Seasonal wetlands occur within the staging areas, construction footprint, haul roads, and the inundation footprint. During 2018 surveys, four features were identified below the dam which could provide habitat for listed vernal pool invertebrates, including vernal pool fairy shrimp and vernal pool tadpole shrimp (ESA 2018). **Impacts to vernal pool crustaceans would be significant.** Mitigation Measure TERR-14 would avoid pools to the extent practicable, and mitigate for unavoidable impacts, including initiating Section 7 consultation. **Implementation of mitigation would reduce impacts to listed vernal pool invertebrates to less than significant.**

Impacts to Valley elderberry longhorn beetle (VELB) could occur if host plant elderberries are removed or harmed during construction activities. VELB has been recorded near the San Luis Reservoir, along Los Banos Creek in 1987 (CDFW 2018), and a large mixed stand containing more than 25 elderberry shrubs was identified during 2018 field surveys in the project area northwest of Basalt Quarry. Additional small stands with approximately 10 shrubs were also present in the vicinity. No evidence of VELB was found but not all shrubs could be examined due to vegetation density (ESA 2018). **VELB impacts would be significant.** Mitigation Measure TERR-2 would avoid all potential VELB shrubs with a 100-foot buffer, or mitigate for all unavoidable impacts to VELB habitat, including initiating Section 7 consultation. **Implementation of mitigation would reduce impacts to VELB to less than significant.**

Construction activities could affect special-status amphibians and reptiles including California tiger salamander, California red-legged frog, foothill yellow-legged frog, San Joaquin whipsnake, Coast horned lizard, and western pond turtle. Project construction has the potential to directly affect the California red-legged frog breeding population at the Willow Spring pond and could affect potential habitat for red-legged frog and California tiger salamander in other aquatic areas and inundate upland aestivation sites in seasonal wetlands, drainages or annual grasslands.

Ground clearing and earth-moving activities could directly harm or kill special-status amphibians and reptiles by either collapsing burrows or crushing them with equipment. The removal of terrestrial or aquatic habitat could expose amphibians and reptiles to increased predation and environmental stress. **This impact would be significant.** Implementation of Mitigation Measure TERR-3 would help reduce the potential for these impacts by having a qualified biologist surveying for and avoiding all sensitive amphibian and reptile habitat, including wetlands and grasslands that may provide upland habitat. Amphibians and reptiles found within the work site may be relocated in coordination with wildlife agencies. Mitigation would be provided for unavoidable impacts to habitat, and Section 7 consultation initiated for listed species. Mitigation Measure TERR-4 includes surveys and relocation for western pond turtle, and Mitigation Measure TERR-5 for San Joaquin whipsnake, in coordination with CDFW. **Implementation of mitigation would reduce impacts to special-status amphibians and reptiles to less than significant.** No impacts would occur to designated critical habitat for any listed species.

Western red bat was detected during 2018 field surveys, and roosting habitat was identified for Yuma myotis and Mexican free-tailed bat (ESA 2018). **Impacts to these bat species would be significant.** Mitigation Measure TERR-11 would require surveys for potential bat roost trees for evidence of habitation and evacuation of any resident bats according to an established protocol. **With implementation of mitigation impacts to special-status bats would be less than significant.**

Reservoir expansion and in-watershed facilities would permanently impact approximately 2,647.5 acres of annual grassland and 70.6 acres of oak woodland that provide habitat to San Joaquin kit fox. Though focused surveys have not been performed to ascertain the distribution of San Joaquin kit fox around the San Luis Reservoir, the species was observed near the reservoir in 2005 (CDFW 2018), and the project area scrub and grasslands potentially provide kit fox denning, foraging, or dispersal habitat. Kit fox was not observed during 2018 field surveys.

Kit fox and other terrestrial wildlife migratory corridors may be disturbed by project construction. The existing reservoir and pipeline already restrict movement of kit fox and other wildlife but allow movement in a limited area across the dam. This movement corridor would be impeded during construction. Alternate passage would not be provided because wildlife movement across the site during construction would be hazardous. **The temporary limit to wildlife movement would be less than significant because the existing movement corridor is limited.** Following construction, kit fox and other wildlife would again be able to cross north to south along the dam, and a north-south connectivity program would be established and maintained, according to Mitigation Measure TERR-12. **With implementation of mitigation, impacts to migratory corridors would be further reduced to less than significant.**

Nighttime lighting would be used during the 24-hour construction period. Some reservoir facilities would require nighttime lighting for safety and security, both during and after construction. Existing nighttime lighting occurs within the construction footprint along SR 33 and within 1 mile of the construction footprint within Santa Nella. Nighttime lighting may disturb San Joaquin kit fox or expose them to injury or limit their access to a migratory corridor. **This impact would be significant.** Lighting would be minimized and shielded during construction to reduce disturbance to kit fox. Mitigation Measure TERR-12 includes surveys of potential dens for kit fox and avoidance of all occupied dens with a 200-foot buffer. Nighttime lighting would also be minimized, and speed limits maintained for protection of kit fox. Section 7 consultation would also be initiated for kit fox. Mitigation Measure TERR-15 includes worker education about kit fox and other species and protection measures for the site including avoiding litter, which may attract nuisance wildlife. **With implementation of mitigation, impacts would be reduced to less than significant.**

During 2018 field surveys, an American badger was observed at the junction of Gonzaga Road and Basalt Road, and badger remains were found in the cattail marsh south of the dam (ESA 2018). American badgers could be directly affected by vehicle and construction-related mortality at active construction sites. Reservoir inundation would result in the permanent removal of grassland habitat for American badgers and potentially limit their access to a migratory corridor. **This impact would be significant.** Impacts on badgers within annual grasslands and oak woodland would be minimized through a combination of worker training, preconstruction surveys, and passively or actively relocating animals in coordination with CDFW, as discussed in Mitigation Measures TERR-13 and TERR-15. Habitat loss in grasslands would be compensated according to Mitigation Measure TERR-12. **With the implementation of mitigation, this impact would be less than significant.**

Construction activities could result in direct mortality of nesting birds that are considered special-status (i.e., loggerhead shrike, California horned lark, tricolored blackbird) or are protected under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, federal or California Endangered Species Act. A tricolored blackbird colony has been repeated documented along Basalt Road in the San Luis Reservoir SRA; however, no active nesting colonies have been documented in the vicinity (CDFW 2018). Special-status raptors including Swainson’s hawk, golden eagle, California condor, and bald eagle could be impacted, because 2,473 acres of grassland would be temporarily lost as foraging habitat and the expanded dam footprint would permanently cover 81 acres of annual grassland habitat. **These impacts would be significant.** Mitigation Measures TERR-6, TERR-7, TERR-8, TERR-9, and TERR-10 protect migratory nesting birds, Swainson’s hawks, eagles and condors, burrowing owl and tricolored blackbird nests through surveys and avoidance with a buffer appropriate to the species. **With implementation of mitigation, impacts on migratory and special-status birds would be less than significant.**

Construction and expanded reservoir inundation could cause temporary and permanent loss of special-status plants or their habitat. **These impacts would be significant.** Mitigation Measure TERR-1 includes surveys for special-status plants, avoidance measures and relocation measures, if avoidance is not possible. Mitigation Measure TERR-15 includes worker education about special status species and protection measures for the site including avoiding pets onsite and avoiding the spread of plant pathogens. **With implementation of mitigation, there would be a less than significant impact on special-status plants.**

The Merced County General Plan includes objectives and policies to preserve and protect biologic resources in the county. There are no HCPs or local tree protection ordinances that cover the San Luis Reservoir Region. **Conflicts with local policies and ordinances would be a significant impact, but with implementation of mitigation, impacts on consistency with local policies or ordinances protecting biological resources would be less than significant.**

About 394.4 acres of habitat would be subject to inundation (Table 4-5). A 10-foot raise in the reservoir surface elevation coupled with defined construction areas would impact approximately 31.1 acres of Federal and/or State jurisdictional waters. An additional 20.2 acres of riparian woodland habitat would be subject to direct impacts from inundation during reservoir filling (Table 4-5). **These impacts would be significant.** Mitigation Measure TERR-16 includes delineation of wetlands, waters and stream channels, and mitigation for impacts to these areas, in coordination with regulatory agencies, in areas where avoidance is not possible. **With the implementation of mitigation, impacts to wetland habitat or riparian vegetation would be less than significant.**

The expanded reservoir would produce a reduction in prey availability for raptors around the expanded reservoir. **These impacts would be significant.** Mitigation Measure TERR-8 calls for surveying and monitoring nest activity and avoiding commencing construction in nest areas during nest season. In addition, permanent loss of grassland foraging habitat would be mitigated by replacement in coordination with wildlife agencies. **With implementation of mitigation, impacts would be less than significant.**

4.14.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Construction of the new reservoir would result in impacts to wetland, pond, and riparian vegetation communities associated with clearing, soil borrowing, grading, staging of equipment, and other ground-disturbing activities that are proposed within jurisdictional aquatic features. A formal delineation of wetlands and other waters has not yet been performed for this proposed alternative. In addition, hazardous materials associated with construction equipment (e.g., fuel, oil, etc.) could be released to the environment and adversely affect water quality in wetland and riparian areas. Impacts to vegetation communities under Alternative 5 are shown in Table 4-18 and Figure M1-2b.

Construction activities would physically disturb approximately 1,946 acres of upland and aquatic habitat within the construction footprint (excludes 123 acres of lacustrine habitat in the current reservoir, and also excludes areas downstream of the proposed dam, including the pipeline). The new dam would require the use of materials excavated from borrow areas, and construction would require areas for equipment and materials staging, equipment access, excavation, deconstruction of the dam cap, and reconstruction of the dam. Each of these activities could directly affect special-status species in the project area.

Table 4-18. Habitat Impacts Associated with Alternative 5

Habitat Type	Pacheco Reservoir Region Impact (Acres)[1]	
	Temporary (includes known and potential source areas)	Permanent[2]
Annual Grassland	54.0	101.5
Oak Woodland	188.7	1,120.7
Riparian	0.5	22.8
Scrub / Chaparral	11.4	62.0
Rock	0	1.6
Developed	0.1	0
Pond	0	2.0
TOTAL	**256.3**	**1,432.2**

Notes:

[1] Impacts do not include 123.1 acres of impact to presently inundated lacustrine habitat and impact areas downstream of the proposed dam.

[2] In addition to the expanded reservoir's inundation area, estimates include lands permanently altered as a result of the development of new infrastructure

Following construction, an additional 1,245 acres of habitat would be subject to inundation when the expanded reservoir reaches full capacity. This total includes approximately 2.0 acres of ponds and 22.8 acres of riparian habitat that would be inundated. Wetland communities and sycamore alluvial woodlands would also be inundated. The Santa Clara Valley Habitat Plan vegetation mapping does not show these vegetation types, but the National Wetland Inventory mapping for the Alternative 5 project area shows 1.4 acres of freshwater wetlands and 128 acres of waters permanently impacted, with 0.05 acres of wetland and 2.3 acres of waters temporarily impacted. In addition, sensitive riparian plant communities and the species that use these areas downstream of the new dam, including sycamore alluvial woodland (see Figure MI-2a) would experience altered flow regime following construction of this alternative. The altered flow regime may alter the distribution of plant and animal species. **Impacts to wetlands, jurisdictional waters and riparian habitat would be significant.** Mitigation Measure TERR-16 would include a jurisdictional delineation of wetlands and waters, avoidance, minimization and compensatory mitigation in coordination with regulatory agencies. **With the implementation of mitigation, the loss of wetlands, jurisdictional waters and riparian habitat would be less than significant.**

Most impacts would be to oak woodland habitats, including foothill pine-oak woodland, mixed oak woodland, valley oak woodland and blue oak woodland, in addition to sycamore alluvial woodland in the riparian zone. These are sensitive natural communities in California. Approximately 62.0 acres of scrub and chaparral habitat would be lost permanently from inundation, and annual grassland habitat losses would be approximately 101.5 acres.

In addition to the permanent loss of habitat from inundation, approximately 256.3 acres would be temporarily impacted as borrow and staging areas, including 54.0 acres of annual grassland, 11.4 acres of scrub and chaparral, unknown acreage of sycamore alluvial woodland, and 188.7 acres of oak woodlands. Dam construction would last approximately five years, but additional years may pass before the temporary impact areas are fully revegetated. Wildlife and plant species would be able to re-occupy these habitat areas following construction, from nearby source populations. **Impacts to sensitive natural communities and from tree removal would be significant.** Mitigation Measure TERR-1 and TERR-18 would protect natural communities by surveying work areas, avoiding impacts where possible, and providing compensatory mitigation for unavoidable impacts. **With the implementation of mitigation, impacts to sensitive natural communities and from tree removal would be less than significant.**

In addition, Alternative 5 would include removal of the existing dam following construction of the expanded Pacheco Reservoir dam, and restoration of the channel of Pacheco Creek downstream of the new dam. This reconstruction would incorporate riparian restoration within the channel, and revegetation and erosion control on the slopes of the channel (which are presently inundated and lacking vegetation), a beneficial impact to riparian habitat.

Construction activity within habitat areas and inundation of riparian, shoreline and pond habitat could disturb, injure or kill special-status amphibians, including California red-legged frog and California tiger salamander, foothill yellow-legged frog, or western pond turtle. Construction could also promote invasion of non-native amphibian species or chytrid fungus. Operation of Alternative 5 could modify seasonal amphibian habitat along Pacheco Creek to more permanent aquatic habitat. Less temporary aquatic habitat could reduce habitat for native amphibians such as California red-legged frog, if they would occur along the creek. More permanent aquatic features along the creek could also provide habitat for non-native bullfrogs (*Lithobates* *catesbeianus*) that are predators and competitors of native amphibian species. The import of CVP water from San Luis Reservoir to an expanded Pacheco Reservoir could also introduce non-native predators to Pacheco Creek like striped bass that are currently present in San Luis Reservoir could however negatively impact native amphibians on the creek including California red-legged frog. **Impacts to special-status amphibian species would be significant.** Implementation of Mitigation Measure TERR-3 would help reduce the potential for impacts by having a qualified biologist surveying for and avoiding all sensitive amphibian and reptile habitat, including wetlands and grasslands that may provide upland habitat. Amphibians and reptiles found within the work site, or whose habitat would be flooded by operation of New Pacheco Reservoir, may be relocated in coordination with wildlife agencies. Mitigation would be provided for unavoidable impacts to habitat, and Section 7 consultation initiated for listed species. Mitigation Measure TERR-4 includes surveys and relocation for western pond turtle, in coordination with CDFW, Mitigation Measure TERR-15 would provide worker awareness training and site protection. Mitigation Measure BIO-2 would develop a screening or treatment facility at the Pacheco Pumping Plant or between the expanded reservoir and its connection to the Pacheco conduit to prevent the potential conveyance of invasive fish, fish larvae and fish eggs. **With the implementation of mitigation, impacts to special-status amphibian species and loss of their habitat would be reduced to less than significant.** No impacts would occur to critical habitat for any listed species.

San Joaquin kit fox and American badger may occur within grasslands of the Pacheco Reservoir Region, and be killed, injured or disturbed during construction, and lose grassland habitat or migratory corridors as a result of construction or from expanding Pacheco Reservoir. **Impacts to special-status amphibian species would be significant.** Impacts on badgers within annual grasslands and oak woodland would be minimized through a combination of worker training, preconstruction surveys, and passively or actively relocating animals in coordination with CDFW, as discussed in Mitigation Measures TERR-13 and TERR-15. Habitat loss in grasslands would be compensated according to Mitigation Measure TERR-12. **With implementation of mitigation, impacts on these species would be reduced to less than significant.**

Nesting birds, including raptors, may be found in grassland, scrub, chaparral, oak woodland and riparian habitat in the Pacheco Reservoir Region. Roosting bats may also be found in trees. These species may be harmed or disturbed during construction and may lose habitat from inundation. **These impacts would be significant.** Mitigation Measures TERR-6, TERR-7, TERR-8, TERR-9, and TERR-10 protect migratory nesting birds, Swainson’s hawks, eagles and condors, burrowing owl and tricolored blackbird nests through surveys and avoidance with a buffer appropriate to the species. Mitigation Measure TERR-11 protects roosting bats through surveys and exclusion of bats from trees prior to removal. Mitigation Measure TERR-15 includes worker awareness training and site protection. **With implementation of mitigation, impacts on migratory and special-status nesting birds and bats would be less than significant.**

Construction and operation of Alternative 5 would comply with the policies established in the Santa Clara Valley Habitat Plan, a Habitat Conservation Plan/Natural Communities Conservation Plan developed for Santa Clara County (Santa Clara Valley Habitat Agency 2012), The resource conservation policies of the Santa Clara County General Plan call for minimizing impacts on habitat and preserving areas rich in biodiversity (Santa Clara County 1994). Local tree protection ordinances would be addressed through implementation of Mitigation Measure TERR-18, in order to avoid significant impacts to tree species by requiring that protected trees be replanted within the project area or at another suitable location. **Conflicts with local policies and ordinances would be a significant impact, but with implementation of mitigation impacts on consistency with local policies or ordinances protecting biological resources would be less than significant.**

4.14.8 Mitigation Measures

The following mitigation measures include species specific components that would be implemented for certain special-status species that have unique habitat requirements or require special protections based on their life history, along with identification and compensation measures for potential impacts to wetlands. Although some of the special status species have low potential to occur within the proposed construction areas, pre- construction surveys outlined in these mitigation measures would be implemented and the applicable avoidance and restoration actions described in the mitigation measures will be implemented. Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 3 and 5, will implement the following mitigation measures for wetlands, sensitive natural communities, and special-status plant and wildlife species with potential to occur in the area of analysis.

Mitigation Measure TERR-1: Special-Status Plant Species and Sensitive Natural Communities

Prior to construction:

a. Surveys of the project area for special status plant species and purple needlegrass will be conducted during the identifiable blooming period for each. If surveys are conducted during a dry year, additional surveying may be required the following year. Special-status plants with moderate or high potential to occur are listed in Table M2-1.

b. The qualified biologist will ensure avoidance of impacts on special status plant species and sensitive natural communities by implementing one, or more, of the following, as appropriate, per the biologist’s recommendation:

    i. Flag the population or natural community areas to be protected;
    ii. Allow adequate buffers; and/or,
    iii. Time construction or other activities during dormant and/or non-critical life cycle periods (SCVWD 2011).

For unavoidable impacts to special-status plant species and sensitive natural communities, compensatory mitigation may be required based on recommendations of the qualified biologist in coordination with resource agencies. Consultation with the USFWS through the Section 7 process will be required to determine avoidance, conservation, and mitigation measures for potential impacts to federally listed plant species. If deemed necessary based on the type and extent of special-status plant populations or natural communities affected, compensatory mitigation will entail:

c. The protection, through land acquisition or a conservation easement, of a population of equal or greater size and health. Or,

d. If it is not feasible to acquire and preserve a known area of natural community or population of a special status plant to be impacted, suitable, unoccupied habitat capable of supporting the species will be acquired and used to create a new population. For population creation, the following considerations will also be met:

- Prior to unavoidable and permanent disturbance to a population of a special status plant species or a sensitive natural community, propagules of all relevant species shall be collected from the population to be disturbed. This may include seed collection or cuttings, and these propagules will be used to establish a new population on suitable, unoccupied habitat as described above. Transplantation may be attempted but will not be used as the primary means of plant salvage and new population creation.
- Creation of new plant populations and communities will require identifying suitable locations and researching and determining appropriate and viable propagation or planting techniques for the species. It will also require field and literature research to determine the appropriate seed sampling techniques and harvest numbers for acquisition of seed from existing populations.
- A minimum ten-year monitoring plan with adaptive management will be implemented to document the success of creating new plant populations or communities. Adequate funding for compensatory mitigation will be provided on an agreed-to schedule, following a discussion with the appropriate regulatory agencies, to ensure long-term protection and management of lands acquired or placed under conservation easement.

Mitigation Measure TERR-2: Valley Elderberry Longhorn Beetle
Prior to construction and in areas where inundation would occur, surveys for elderberry shrubs would be conducted to determine the number of elderberry shrubs present, their stem diameters, and, if feasible, the presence and number of exit holes formed by VELB as they exit the branch. A 100 foot buffer around construction areas would also be surveyed for elderberry shrubs that could be affected by dust from construction. If elderberry shrubs with stems greater than 1-inch in diameter are found within these areas, they would be protected with fencing and avoided to the extent possible. Consultation with the USFWS through the Section 7 process will be required to determine avoidance, conservation, and mitigation measures for potential impacts to valley elderberry longhorn beetle. If shrubs cannot be avoided, mitigation measures would be implemented, including transplanting trees to a USFWS-approved conservation area and implementing minimization measures at a ratio ranging from 1:1 to 8:1 depending on the diameter of the impacted elderberry stems and habitat type that they were removed from (riparian or non-riparian) under an Elderberry Mitigation Plan approved by USFWS.

Mitigation Measure TERR-3: Special-Status Amphibians

Consultation with the USFWS through the Section 7 process will be required to determine avoidance, conservation, and mitigation measures for potential impacts to special status amphibians.

- Before and during construction: The Proponent shall submit the name and credentials of a biologist qualified to act as construction monitor to USFWS and CDFW for approval at least 15 days before construction work begins. General minimum qualifications are a 4-year degree in biological sciences and experience in surveying, identifying, and handling California tiger salamanders and California red-legged frogs.

- A USFWS and CDFW-approved biologist shall survey the work sites 2 months before the onset of construction. The biologist shall also survey seasonally ponded portions of Pacheco Creek that are expected to be more permanently flooded due to operation of the New Pacheco Reservoir (reducing the seasonal habitat availability or quality). If California tiger salamanders, California red-legged frogs or foothill yellow-legged frogs (or their tadpoles or eggs) are found, the approved biologist shall contact USFWS and CDFW to determine whether moving any of these life-stages is appropriate. If USFWS and CDFW approve moving the animals, the approved biologist shall be allowed sufficient time to move frogs and/or salamanders from the work sites, or Pacheco Creek, before work begins. If these species are not identified, construction can proceed at these sites. The approved biologist shall use professional judgment to determine whether (and if so, when) the California tiger salamanders and/or frogs are to be moved. The biologist shall immediately inform the construction manager that work shall be halted, if necessary, to avert avoidable take of listed species.

- Prior to construction, suitable relocation sites free of bullfrogs or where successful bullfrog control is feasible, will be identified for use in the event relocation of special-status amphibians is necessary. Measures will be taken to avoid the spread of chytrid fungus (*Batrachochytrium dendrobatidis*) to potential relocation sites. Field clothing, boots, and equipment will be cleaned and decontaminated before traveling to relocation sites.

- Work areas will be monitored during construction to identify, capture, and relocate special-status amphibians, if present.

- Areas beneath construction equipment and vehicles shall be inspected daily, prior to operation, for presence of special-status amphibians under tracks/tires and within machinery. If special-status amphibians are found a qualified biologist will capture and relocate animals from work sites.

- If necessary, a detailed amphibian relocation plan will be prepared at least 3 weeks before the start of groundbreaking, and submitted to CDFW and USFWS for review. The purpose of the plan is to standardize amphibian relocation methods and relocation sites.

- A USFWS and CDFW-approved biologist shall be present at the active work sites until special-status amphibians have been removed, and habitat disturbance has been completed. Thereafter, the contractor shall designate a person to monitor onsite compliance with all minimization measures. A CDFW and USFWS-approved biologist shall ensure that this individual receives training consistent with USFWS requirements.

- The project proponent and its contractors shall install frog-exclusion fencing (i.e., silt fences) around all construction areas that are within 100 feet of potential special-status amphibian aquatic breeding habitat.

- Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, shall provide compensation for permanent and temporary impacts on California tiger salamander and California red-legged frog aquatic habitat at a minimum ratio of 1:1 or as established in coordination with resource agencies. Compensatory mitigation shall be provided for the loss of aquatic breeding sites that will be filled or otherwise directly affected by the project (perhaps one site located in the southern arm of San Luis Reservoir, and one site located in the borrow area; number to be confirmed by pre-construction surveys) as well as mitigation for impacts on associated California red-legged frog or California tiger salamander upland habitat and designated critical habitat that contains primary constituent elements (PCEs) through compensatory mitigation. If possible, Compensatory mitigation for areas within designated critical habitat shall be located within a California red-legged frog Recovery Area, as identified in the 2002 *California Red-legged Frog Recovery Plan* (USFWS 2002).

- The total area, size and number of California red-legged frog or California tiger salamander mitigation ponds to be created will be based on a comparable loss of breeding sites (e.g., a minimum 1:1 replacement ratio) as a result of the project. These ponds shall concurrently satisfy wetland mitigation requirements identified in Mitigation Measure TERR-2. To the degree possible, new mitigation ponds that are created for California red-legged frog and California tiger salamander shall be hydrologically self-sustaining and shall not require a supplemental water supply.

Mitigation Measure TERR-4: Western Pond Turtle
Before construction activities begin, a qualified biologist shall conduct western pond turtle surveys within creeks and in other ponded areas affected by the project. Adjacent upland areas shall also be examined for evidence of nests as well as individual turtles. The project biologist shall be responsible for the survey and for the relocation of pond turtles, if found. Construction shall not proceed until a reasonable effort has been made to capture and relocate as many western pond turtles as possible to minimize take. However, some individuals may be undetected or enter sites after surveys, and would be subject to mortality. If a nest is observed, a biologist with the appropriate permits and prior approval from CDFW shall move eggs to a suitable location or facility for incubation, and release hatchlings into the creek system the following autumn. Consultation with the USFWS may also be required.

Mitigation Measure TERR-5: San Joaquin Whipsnake
Before construction activities begin a qualified biologist shall conduct San Joaquin whipsnake surveys 2 weeks prior to construction activities within work sites and within 100 feet of disturbance areas. A qualified biologist shall relocate any San Joaquin whipsnakes to suitable habitat outside of areas of disturbance. There is possibility of snakes to move into the work sites

after pre-construction surveys have checked the area and some individuals could be subject to mortality. If San Joaquin whipsnakes are detected in work sites construction activities and equipment travel shall cease in the immediate area of detection until the snake has left work site or has been relocated out of the area by a qualified biologist.

Mitigation Measure TERR-6: Nesting Bird Surveys
A USFWS-approved biologist would conduct nesting bird surveys prior to construction and avoidance of nests during construction. The generally accepted nesting season extends from February 1 through September 15. If an active nest is found, construction within 300 feet of the nest (500 feet for raptor nests, excluding Swainson's hawk) would be postponed until the nest is no longer active.

Mitigation Measure TERR-7: Swainson's Hawk
Consistent with the Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California (CDFG 1994), mitigation shall include the following approach:

- No intensive new disturbances or other project-related activities that could cause nest abandonment or forced fledging shall be initiated within 0.25 mile (buffer zone) of an active nest between March 15 and September 15.

- Nest trees shall not be removed unless no feasible avoidance exists. If a nest tree must be removed, Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, shall obtain a management authorization (including conditions to offset the loss of the nest tree) from CDFW. The tree removal period specified in the management authorization is generally between October 1 and February 1.

- Monitoring of the nest by a qualified biologist may be required if the project-related activity has the potential to adversely impact the nest.

Prior to construction, surveys for active Swainson's hawk nests will be conducted in and around all potential nest trees within 0.5 mile of construction areas. If known or active nests are identified through preconstruction surveys or other means, a 0.5-mile no-disturbance buffer shall be established around all active nest sites if construction cannot be limited to occur outside the nesting season (February 15 through September 15). Buffer sizes may be reduced if approved by CDFW and active nest sites are monitored during construction by a qualified biologist.

Prior to construction, a qualified biologist will determine the need to restore any temporarily disturbed grassland foraging habitat for Swainson's hawk based on the quality and extent of foraging habitat affected. Restoration of grassland foraging habitat for Swainson's hawk will be conducted to restore disturbed areas following construction, based on the recommendations of the qualified biologist and following consultation with CDFW.

Permanent foraging habitat losses (i.e., grasslands) within one mile of active Swainson's hawk nests shall be compensated by preserving in perpetuity suitable foraging habitat at a ratio of 1:1. This includes permanently disturbed construction sites and inundation zones above existing conditions (i.e., +10 feet elevation above existing fill capacity). The CDFW shall approve the location and types of habitats preserved.

Mitigation Measure TERR-8: Bald and Golden Eagles, and California Condor
To ensure that nesting golden eagles and bald eagles are protected, the following measures address potential impacts on nesting eagles in the San Luis Reservoir vicinity. Prior to the initiation of construction, an Eagle Conservation Plan will need to be developed that details eagle protection guidelines specific to the San Luis Reservoir construction area. Consultation with USFWS under the Bald and Golden Eagle Protection Act will be initiated as part of this process. Protections for eagles will include the initiation of pre-construction surveys and monitoring by a USFWS-approved biologist for golden eagles and bald eagles. beginning approximately two years prior to construction and continuing through the construction period.

These surveys will be completed across an area at a 10-mile radius from where impacts from the project occur, including construction and inundation areas. Any nesting sites identified during these surveys would be mapped and monitored for up to ten years, depending on the monitoring specifications identified within the plan. Whenever feasible, construction near recently active nest sites shall start outside the active nesting season. The nesting period for golden eagles is between January 15 and August 15 and bald eagles nest between January 1 and August 15. If groundbreaking activities begin during the nesting period, a qualified biologist shall perform a preconstruction survey 14 to 30 days before the start of each new construction phase to search for eagle nest sites within two miles of proposed activities. If active nests are not identified, no further action is required and construction may proceed. No active or inactive eagle nests would be removed as part of this project. If active nests are identified, the avoidance guidelines identified below shall be implemented. Additional avoidance and minimization guidelines may be recommended by USFWS during the consultation process.

- For golden and bald eagles, construction contractors shall observe CDFW and USFWS avoidance guidelines, which stipulate a minimum 500 foot to 0.5-mile buffer zone depending upon the severity of the activity (e.g., earth-moving versus blasting) (USFWS 2007). Buffer zones shall remain until young have fledged. A qualified biologist will monitor the nest daily for one week to determine whether construction activities are disturbing nest behavior. If nest behavior appears normal, then weekly monitoring will continue until the nest is no longer active. If the nest appears disturbed, the biological monitor will increase the no-work buffer at their discretion to ensure normal nesting behavior. For activities conducted with agency approval within this buffer zone, a qualified biologist shall monitor construction activities and the eagle nest(s) to monitor eagle reactions to activities. If activities are deemed to have a negative effect on nesting eagles, the biologist shall immediately inform the construction manager that work should be halted, and CDFW and USFWS will be consulted.

- CDFW and USFWS often allows construction activities that are initiated outside the nesting season to continue without cessation even if raptors such as eagles choose to nest within 500 feet of work activities. Thus, work at the dam construction site may continue if approved by CDFW and USFWS and a qualified biologist monitors the nest site during construction.

- To compensate for the loss of grassland, which provides suitable foraging habitat for golden eagles and California condors, grasslands shall be enhanced or restored at a minimum ratio of 1:1. Restoration or enhancement of grassland habitat shall be conducted under a USFWS and CDFW-approved restoration/enhancement plan, and may be conducted on lands also used for mitigation for Swainson's hawk and/or San Joaquin kit fox. Habitat restoration will be conducted in coordination with the Santa Clara Valley HCP on lands within its bounds.

Mitigation Measure TERR-9: Burrowing Owl

Prior to construction, surveys for burrowing owls would be conducted in areas supporting potentially suitable habitat. Any occupied burrows shall not be disturbed during the breeding season (February 1 through August 31). A minimum 160 foot-wide buffer shall be placed around occupied burrows during the nonbreeding season (September 1 through January 31), and a 250 foot-wide buffer shall be placed around occupied burrows during the breeding season. Ground-disturbing activities shall not occur within the designated buffers.

The project proponent shall implement the measures listed below for grassland habitats to avoid incidental take of burrowing owls. In advance of construction, a qualified biologist shall follow the current CDFW burrowing owl survey guidance to evaluate burrowing owl use. Measures shall apply to all construction activities near active nests or within potential burrowing owl nesting habitat, to avoid, minimize, or mitigate impacts on burrowing owls.

Breeding season surveys shall be performed to determine the presence of burrowing owls for the purposes of inventory, monitoring, avoidance of take, and determining appropriate mitigation. In California the breeding season begins as early as February 1 and continues through August 31. Under the Burrowing Owl Consortium's multi-phase survey methodology, for areas within 500 feet of construction boundaries, a biologist shall: 1) perform a habitat assessment to identify essential components of burrowing owl habitat, including artificial nest features; 2) perform intensive burrow surveys in areas that are identified to provide suitable burrowing owl habitat, and; 3) perform at least four appropriately-timed breeding season surveys (four survey visits spread evenly [roughly every 3 weeks] during the peak of the breeding season, from April 15 to July 15) to document habitat use.

Pre-construction surveys shall be used to assess the owl presence before site modification is scheduled to begin. Initial pre-construction surveys should be conducted outside of the owl breeding season (February 1–August 31), but as close as possible to the date that ground-disturbing activities will begin. Generally, initial pre-construction surveys should be conducted within 7 days, but no more than 30 days prior to ground-disturbing activities. Additional surveys may be required when the initial disturbance is followed by periods of inactivity or the development is phased spatially and/or temporally over the project area. Up to four or more survey visits performed on separate days may be required to assure with a high degree of certainty that site modification and grading will not take owls. The full extent of the pre-construction survey effort shall be described and mapped in detail (e.g., dates, time periods, area[s] covered, and methods employed) in a biological report that will provided for review to CDFW.

In addition to the above survey requirements, the following measures shall be implemented to reduce project impacts to burrowing owls:

- Construction exclusion areas (e.g., orange exclusion fence or signage) shall be established around occupied burrows, where no disturbance shall be allowed. During the nonbreeding season (September 1 through January 31), the exclusion zone shall extend at least 160 feet around occupied burrows. During the breeding season (February 1 through August 31), exclusion areas shall extend 250 feet around occupied burrows (or farther if warranted to avoid nest abandonment).

- If work or exclusion areas conflict with owl burrows, passive relocation of onsite owls could be implemented as an alternative, but only during the nonbreeding season and only with CDFW approval. The approach to owl relocation and burrow closure will vary depending on the number of occupied burrows. Passive relocation shall be accomplished by installing one-way doors on the entrances of burrows within 160 feet of the project area. The one-way doors shall be left in place for 48 hours to ensure the owls have left the burrow. The burrows shall then be excavated with a qualified biologist present. Construction shall not proceed until the project area is deemed free of owls.

- Unoccupied burrows within the immediate construction area shall be excavated using hand tools, and then filled to prevent reoccupation. If any burrowing owls are discovered during the excavation, the excavation shall cease and the owl shall be allowed to escape. Excavation could be completed when the biological monitor confirms the burrow is empty.

- Artificial nesting burrows will be provided as a temporary measure when natural burrows are lacking. To compensate for lost nest burrows, artificial burrows shall be provided outside the 160-foot buffer zone. The alternate burrows shall be monitored daily for 7 days to confirm that the owls have moved in and acclimated to the new burrow.

Mitigation Measure TERR-10: Tricolored Blackbird

Prior to construction, surveys for tricolored blackbirds would be conducted in areas supporting potentially suitable habitat within 0.25 miles of construction areas. Habitat within 0.25 miles of tricolored blackbird colonies will be avoided during nesting season, which can begin as early as mid-March and extend through August. If colonies cannot be avoided, CDFW shall be consulted to potentially reduce buffer distances with active monitoring by a qualified biologist. Consultation with the USFWS may also be required.

Mitigation Measure TERR-11: Special-Status Bats

Impacts to special-status bats shall be minimized by performing preconstruction surveys and creating no-disturbance buffers around active bat roosting sites.

Before construction activities (i.e., ground clearing and grading, including trees or shrub removal) within 200 feet of trees that could support special-status bats, a qualified bat biologist shall survey for special-status bats. If no evidence of bats (i.e., direct observation, guano, staining, or strong odors) is observed, no further mitigation shall be required.

If evidence of bats is observed, the following measures shall be implemented to avoid potential impacts on breeding populations:

- A no-disturbance buffer of 250-feet shall be created around active bat roosts during the breeding season (April 15 through August 15). Bat roosts initiated during construction are presumed to be unaffected by the indirect effects of noise and construction disturbances. However, the direct take of individuals will be prohibited.

- Removal of trees showing evidence of active bat activity shall occur during the period least likely to affect bats, as determined by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula, and between August 15 and April 15 for maternity roosts). If the exclusion of bats from potential roost sites is necessary to prevent indirect impacts due to construction noise and human activity adjacent, bat exclusion activities (e.g., installation of netting to block roost entrances) shall also be conducted during these periods. If special status bats are identified in the dam or special allowances must be made to relocate bats, Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, will coordinate the effort in advance with CDFW.

Mitigation Measure TERR-12: San Joaquin Kit Fox

San Joaquin kit fox would be affected by construction activities if animals are harmed or killed by equipment or their dens or other habitat is altered or destroyed. Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, will require contractors to take the following actions. Prior to construction, a qualified biologist will conduct surveys to identify potential dens more than 5 inches in diameter. If dens are located within the proposed work area, and cannot be avoided during construction activities, a USFWS- and CDFW-approved biologist will determine if the dens are occupied. If occupied dens are present within the proposed work, their disturbance and destruction shall be avoided. Consultation with the USFWS through the Section 7 process will be required to determine avoidance, conservation, and mitigation measures for this species. Exclusion zones will be implemented following the latest USFWS procedures (USFWS 2011).

The Proponent shall implement San Joaquin kit fox protection measures. The following measures, which are intended to reduce direct and indirect project impacts on San Joaquin kit foxes, are derived from the *San Joaquin Kit Fox Survey Protocol for the Northern Range* (USFWS 1999a) and the *Standardized Recommendations for Protection of the San Joaquin Kit Fox* (USFWS 1999b). The following measures shall be implemented for construction areas at San Luis Reservoir:

- Preconstruction surveys shall be conducted within 200 feet of work areas to identify potential San Joaquin kit fox dens or other refugia in and surrounding workstations. A qualified biologist shall conduct the survey for potential kit fox dens 14 to 30 days before construction begins. All identified potential dens shall be monitored for evidence of kit fox use by placing an inert tracking medium at den entrances and monitoring for at least 3 consecutive nights. If no activity is detected at these den sites, they shall be closed following guidance established in the USFWS *Standardized Recommendations* document.

- If kit fox occupancy is determined at a given site, the construction manager should be immediately informed that work should be halted within 200 feet of the den and the USFWS contacted. Depending on the den type, reasonable and prudent measures to avoid effects to kit foxes could include seasonal limitations on project construction at the site (i.e., restricting the construction period to avoid spring-summer pupping season), and/or establishing a construction exclusion zone around the identified site, or resurveying the den a week later to determine species presence or absence.

- Nighttime vehicle traffic shall be kept to a minimum. Off-road traffic and equipment movement will be limited to the project footprint.

- To compensate for impacts to grassland, which provides habitat for San Joaquin kit fox, lands shall be acquired and covered by conservation easements or mitigation credits shall be purchased at compensation ratios that have been approved by the USFWS and the CDFW.

- The Proponent will develop a plan to maintain and enhance north-south wildlife connectivity through the San Luis Reservoir – O'Neil Forebay – Santa Nella region. The plan shall provide for no loss of connectivity following construction activities associated with the raising of Sisk Dam and the enlarging of San Luis Reservoir, particularly for San Joaquin kit fox populations.

Mitigation Measure TERR-13: American Badger
Concurrent with other required surveys, during winter/spring months before new project activities, and concurrent with other preconstruction surveys (e.g., kit fox and burrowing owl), a qualified biologist shall perform a survey to identify the presence of active or inactive American badger dens. If this species is not found, no further mitigation shall be required. If badger dens are identified within the construction footprint, they shall be inspected and closed using the following methodology.

When unoccupied dens are encountered outside of work areas but within 100 feet of proposed activities, vacated dens shall be inspected to ensure they are empty and temporarily covered using plywood sheets or similar materials. If badger occupancy is determined at a given site within the work area, work activities at that site should be halted. Depending on the den type, reasonable and prudent measures to avoid harming badgers will be implemented and may include seasonal limitations on project construction near the site (i.e., restricting the construction period to avoid spring-summer pupping season), and/or establishing a construction exclusion zone around the identified site, or resurveying the den at a later time to determine species presence or absence. Badgers may be passively relocated using burrow exclusion (e.g., installing one-way doors on burrows) or similar CDFW-approved exclusion methods. In unique situations it might be necessary to actively relocate badgers (e.g., using live traps) to protect individuals from potentially harmful situations. Such relocation could be performed with advance CDFW coordination and concurrence.

Mitigation Measure TERR-14: Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp
Final project design shall avoid and minimize the fill of potentially occurring seasonal wetlands and pools identified as suitable habitat for vernal pool crustaceans to the greatest practicable extent. If any suitable habitat features are mapped and cannot be avoided, the project proponent may assume presence of the species. Consultation with the USFWS through the Section 7 process will be required to determine avoidance, conservation, and mitigation measures. Measures may include, but are not limited to, compensating for impacts at a minimum of a 2:1 ratio for preservation and 1:1 ratio for creation. Final ratios will be determined through consultation with state and federal agencies.

Mitigation Measure TERR-15: Contractor Environmental Awareness Training and Site Protection Measures
All construction personnel working in biologically sensitive areas shall attend an environmental education program delivered by a qualified biologist prior to starting work. The training shall include an explanation as how to best avoid the accidental take of special-status plants and wildlife. The field meeting shall include species identification, life history, descriptions, and habitat requirements. The program shall include an explanation of Federal and State laws protecting endangered species, and avoidance and minimization methods being implemented to protect these species. The program will also include training in measures to avoid the spread of exotic species and diseases, including plant pathogens in oak woodland, and chytrid fungus in amphibian habitat.

The contractor shall properly dispose of all trash items (e.g., wrappers, cans, bottles, food scraps) in closed containers. Work sites shall be cleaned of litter before closure each day, and placed in wildlife-proof garbage receptacles. Construction personnel shall not feed or otherwise attract any wildlife. No pets, excluding service animals, shall be allowed onsite or in construction areas. Nighttime vehicle traffic shall be kept to a minimum on non-maintained roads with a maximum speed of 15 mph. To minimize disturbance to wildlife, temporary and permanent exterior lighting shall be installed such that:

a. lamps and reflectors are not visible from beyond the project site,
b. reflective glare will be minimized to the extent feasible;
c. illumination of the project and its immediate vicinity is minimized;
d. lighting shall incorporate fixture hoods/shielding, with light directed downward or toward the area to be illuminated;
e. all lighting shall be of minimum necessary brightness consistent with operational safety and security;
f. lights in areas not occupied on a continuous basis (such as maintenance areas) shall have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied, and
g. the plan complies with local policies and ordinances.

Mitigation Measure TERR-16: Mitigation measures for jurisdictional wetlands or waters, and streambeds and banks regulated by CDFW and USACE

Mitigation Measure TERR -16a. Final project design shall avoid and minimize the fill of wetlands and other waters to the greatest practicable extent. The following actions shall be performed to define the location and extent of jurisdictional wetlands:

1. The distribution of federal and State jurisdictional wetlands and waters; streambeds and banks regulated by CDFW; mitigation sites regulated by United States Army Corps of Engineers (USACE); and sensitive habitat regulated by CDFW shall be defined and avoided to the greatest possible extent.

2. At least six months prior to construction, a qualified biologist will delineate the extent of jurisdictional areas to be avoided in the field. Delineation surveys will not be conducted during the dry season. Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, will designate areas to be avoided as “Restricted Areas” and protect them using highly visible fencing, rope, or flagging, as appropriate based on site conditions. No construction activities or disturbance will occur within restricted areas that are designated to protect wetlands.

3. Minimize the removal of riparian and wetland vegetation. Avoid disturbance of riparian and aquatic habitat north of the access road to the dam.

Mitigation Measure TERR-16b. Where jurisdictional wetlands and other waters cannot be avoided, to offset temporary and permanent impacts that would occur as a result of the project, restoration and compensatory mitigation shall be provided as described below.

A wetland mitigation and monitoring plan shall be developed by a qualified biologist in coordination with CDFW, USACE, and/or RWQCB that details mitigation and monitoring obligations for temporary and permanent impacts to wetlands and other waters as a result of construction activities; and other CDFW jurisdictional areas. The plan shall quantify the total acreage lost, describe mitigation ratios for lost habitat (described below), annual success criteria, mitigation sites, monitoring and reporting requirements, and site specific plans to compensate for wetland losses resulting from the project.

Prior to construction, the aquatic structure of wetland and riparian areas to be disturbed will be delineated according to established USACE and CDFW protocols. Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, will recontour and revegetate disturbed portions of jurisdictional areas in areas temporarily affected by construction prior to demobilization by the contractor at the end of project construction. Creek banks will be recontoured to a more stable condition if necessary. Revegetation will include a palette of species native to the watershed area according to a revegetation plan to be developed by Reclamation, under Alternatives 2 and 4, and SCVWD, under Alternative 5, and submitted to the USACE, CDFW, and RWQCB for approval. Following removal, woody trees would be replanted at a minimum 1:1 ratio, or as determined and agreed upon by the appropriate wetland permitting agencies. Interim vegetation or other measures will be implemented as necessary to control erosion in disturbed areas prior to final revegetation.

Wetland and other waters impacts in the construction area shall be compensated at a ratio of 2:1 or as ratio agreed upon by the wetland permitting agencies. Compensatory mitigation shall be conducted by creating or restoring wetland and aquatic habitat at an agency-approved location on nearby lands or through purchasing mitigation credits at a USACE and/or CDFW-approved mitigation bank (depending on the resource). If mitigation is conducted on- or off-site, a five-year wetland mitigation and monitoring program for onsite and offsite mitigation shall be developed. Appropriate performance standards may include, but are not limited to: a 75 percent survival rate of restoration plantings; absence of invasive plant species; and a viable, self-sustaining creek or wetland system at the end of five years.

A weed control plan for the project to limit the spread of noxious or invasive weeds shall also be developed. This plan would be consistent with current Integrated Pest Management Plans that are already in practice on lands surrounding the reservoir. Noxious or invasive weeds include those rated as "high" in invasiveness by the California Invasive Plant Council. The plan will include a baseline survey to identify the location and extent of invasive weeds in the project area prior to ground-disturbing activity, a plan to destroy existing invasive weeds in the construction area prior to initiation of ground-disturbing activity, weed-containment measures while the project is in progress, and monitoring and control of weeds following completion of construction.

Mitigation Measure TERR-17: San Luis Reservoir Shoreline Restoration
Consistent with Mitigation Measure BIO-1 from the San Luis Reservoir SRA RMP/GP (Reclamation and CDPR 2013), Reclamation will ensure areas disturbed by construction activities at the San Luis Reservoir will be restored following construction through planting and/or seeding of native species collected from the local watershed.

Mitigation Measure TERR-18: Tree Protection Ordinance Compliance
To ensure compliance with local tree protection ordinances, SCVWD will require pre-construction surveys for trees on site to determine whether any tree removal will be required for construction actions proposed in unincorporated Santa Clara County or the City of San Jose. In the event that tree removal is required, the survey will include measurement and taxonomic identification of all potentially impacted trees. Following the survey, SCVWD will secure the appropriate tree removal permits and include provisions in any construction contract for the replacement of impacted trees consistent with the permit requirements.

4.15 Regional Economics

4.15.1 Assessment Methods

Regional economic effects include changes to employment, income, or output as a result of the project alternatives. Impacts to regional economics are determined consistent with NEPA relative to the No Action/No Project Alternative. For the quantitative analysis, the analysis uses 2014 IMPLAN data, an input-output (I-O) database and modeling software, to estimate economic impacts of changes in final demand or spending associated with the project alternatives.

IMPLAN estimates total economic effects that include: (1) direct effects – changes in final demand; (2) indirect effects – changes in expenditures within the region in industries supplying goods and services; (3) induced effects – changes in expenditures of household income. Construction and annual operation and maintenance (O&M) expenditures would create jobs and generate additional economic activity within the region during the period of construction. The regional economic analysis uses engineering estimates of total project costs, including materials and labor costs. IMPLAN is then used to determine indirect and induced effects of construction work.

For M&I water users, water shortages could increase water costs and water rates if contractors must develop alternate supplies or implement additional water conservation measures. These effects are evaluated qualitatively. For the analysis of agricultural economic effects, the Statewide Agricultural Production (SWAP) Model estimates changes in value of production of crops as a result of changes in water supply. Appendix R further described the SWAP agricultural economics model. Change in value of production is a direct effect to the crop industry sectors, which is input into IMPLAN as an industry change to estimate regional economic effects. This section also evaluates effects to visitor spending associated with the alternatives' impacts on recreation facilities. If spending increases or decreases, there would be regional economic effects.

4.15.2 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

Under the No Action/No Project Alternative, interrupted San Felipe Division M&I deliveries affect SCVWD's ability to meet treated water demands. SCVWD and retail agencies would implement Water Shortage Contingency Plans that include actions to be taken during water shortages. This would result in implementation costs for SCVWD and retail agencies. Increased costs would ultimately be passed on to the water users through increased water rates. Similarly, SWP contractors in southern California are subject to water shortages due to drought conditions and Delta export restrictions under the No Action/No Project Alternative. Securing alternate water supplies and implementing water conservation measures may be costlier for the agencies than SWP water supplies. An increase in water rates would reduce the disposable income of Santa Clara County and Southern California residents and could result in less spending in the regional economy. Under the No Action/No Project Alternative, agricultural water deliveries would decrease due to Delta export restrictions or drought conditions. Growers would implement actions, such as idling fields or increasing groundwater pumping, to respond to water shortages. Cropland idling would reduce farm incomes, purchases of agricultural inputs, and farm labor, and pumping groundwater would increase costs and reduce farm incomes. Therefore, there would be adverse economic impacts under the No Action/No Project Alternative.

4.15.3 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Increased water supply during low-point years would lessen the need for SCVWD and retail agencies to implement water shortage contingency actions, which would avoid implementation costs. Santa Clara County residents are less likely to be required to implement mandatory conservation measures and avoid economic effects associated with implementing conservation.

Improved water supply reliability would support the long-term economic vitality of the county. Increased water supply as a result of Alternative 2 would be a beneficial economic effect to SCVWD. If water rates to customers are increased to pay for improvements to the reservoir, the resulting economic effect would be a decrease in customers' discretionary income available to spend in the region. This would be an adverse economic effect.

Under Alternative 2, there would be a small reduction in agricultural deliveries to South-of-Delta CVP contractors by about 2,000 acre-feet on average annual basis. These decreases would likely result in increased groundwater pumping and decreased farm revenues. A small amount of acreage may be fallow due to the decreased supply. The regional economic effects would be adverse, but minor.

The construction period for the Tunnel Option of Alternative 2 would be 47 months. Estimated construction costs would be $962.1 million. There would be approximately 100 on-site construction workers during peak times. This analysis assumes 400 construction workers over the construction period. Total economic effects (direct, indirect, induced) would be an increase of 4,396 jobs, $394.3 million in labor income, and $1,438.5 million in output. The construction period for the Pipeline Option of Alternative 2 would last 33 months. Estimated construction costs would be $842.1 million. There would be approximately 100 on-site construction workers during peak times. This analysis assumes 400 on-site construction workers over the construction period. Total economic effects (direct, indirect, induced) would be an increase of 3,998 jobs, $350.0 million in labor income, and $1,273.4 million in output. These would be temporary beneficial economic effects in Santa Clara and Merced counties. O&M costs to implement Alternative 2 would be $2.5 million per year for the pipeline and tunnel options. These effects would be long-term and would occur each year during project operation. Total economic effects would be an increase of 22 jobs, $1.7 million in labor income, and $3.4 million in output.

Temporary closure of recreation facilities at Basalt and Dinosaur Point use areas within the San Luis Reservoir SRA would reduce local spending and revenues in Merced County. During construction of the intake, both use areas would be used for project staging and would be closed to the public during a period of 33 to 47 months, due to potential public safety hazards at the construction site. Combined, the Basalt and Dinosaur Point use areas annually serve approximately 120,000 day use and 8,000 overnight visitors. Visitors that originate outside of Merced County (out-of-region visitors) generate new economic activity for the county because they bring money into the region that would otherwise be spent elsewhere. Because of facility closures, some visitors may choose to recreate at alternate sites in the San Luis Reservoir SRA. This would not result in any economic impacts in Merced County. However, due to crowded conditions at the San Luis Creek use area and limited recreation opportunities at both the Los Banos or Medeiros use areas, visitors may choose to recreate outside of the San Luis Reservoir SRA and outside of Merced County. As a result, the Merced County economy would lose any spending by out-of-region visitors that occurred under the No Action/No Project Alternative. In addition to the above spending, visitors would not pay park entry fees. California SPs would therefore lose revenues. These effects would only occur while the facilities are closed for construction activities. A decline in park fees would reduce funds into the State Treasury. Temporary closures could result in temporary job losses for staff at the recreation areas. These economic effects would be adverse effects for the Merced County economy. Effects would be temporary, and visitation would be expected to restore to levels under the No Action/No Project Alternative after construction is complete.

4.15.4 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Economic benefits associated with increased water supply under Alternative 3 would be the same as those described for Alternative 2. The construction period for Alternative 3 would be approximately 3 years. Capital cost expenditures for Alternative 3 would be approximately $37.0 million over the construction period. There would be an average of approximately 24 on-site construction workers at the site. This analysis assumes a total of 90 on-site construction workers on site over the construction period. Total economic effects of construction would be an increase of 263 jobs, $21.5 million in labor income, and $62.6 million in output. O&M costs to implement Alternative 3 would be $0.3 million per year. These costs include increased power demands, increased chemical demand and one additional full time O&M operator at the treatment plant. Increased power and chemical costs would not have a significant effect on the regional economy. There would be one additional direct job needed for increased O&M at the treatment plant. This additional job would result in some minor positive effects to the regional economy.

4.15.5 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

In addition to increased deliveries during low point years, this alternative would provide SCVWD with increased access to its CVP supplies during non-low point years. In addition to SCVWD, this alternative would increase CVP and SWP water supplies to M&I water service contractors south of the Delta and in the Bay Area. This would be an economic benefit because water contractors would not need to acquire expensive water supplies on the spot water transfer market or implement costly water conservation measures during years with water shortages. It is likely that a portion of project costs would be allocated to CVP and SWP contractors in accordance with the benefits of the project to them, which would likely be passed on to retail agencies or water customers through increased water rates. If water rates to customers are increased, the resulting economic effect is a decrease in customers' discretionary income available to spend in the region. This would be an adverse economic effect.

Increased water supplies for agricultural uses in the San Joaquin Region would increase value of production. Annual value of production would increase by about $2.6 million in dry years, $1.5 million in below normal and critical years, and $1.2 million in wet years. Effects in below normal, critical and wet years would be less than those in dry years because modeling estimated that less water would be provided to agricultural water users in these hydrologic year types. Increased water supply would increase value of production and consequently increase employment, value added, labor income, and output in the crop sectors and the overall regional economy through indirect and induced impacts. Increased water supply under Alternative 4 would have minor positive effects to the agricultural economy.

The construction duration for Alternative 4 would be approximately 8 to 12 years. Capital cost expenditures for Alternative 4 would be approximately $830.0 million over the construction period. There would be 217 workers at San Luis Reservoir. Total economic effects of construction would be an increase of 6,011 jobs, $219.8 million in labor income, and $1,002 million in output. The modifications at B.F. Sisk Dam to increase reservoir storage is expected to increase pumping and consequently energy usage at Gianelli Pumping Plant. All or a portion of these increased pumping costs would be passed on to the rate payers.

During 8 to 12 years of construction of the reservoir, Basalt and Dinosaur Point use areas would be used for project staging and would be closed to the public. This would result in substantial adverse regional economic effect to the Merced County economy and to California SP entry fees collected as discussed for Alternative 2.

4.15.6 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

In addition to increased deliveries during low point years, this alternative would provide SCVWD water supplies during non-low point years. Increased water supply during low point years would lessen the need for SCVWD and retail agencies to implement water shortage contingency actions, which would avoid implementation costs. Santa Clara County residents would not be required to implement mandatory conservation measures and would avoid economic effects associated with implementing conservation. Improved water supply reliability would support the long-term economic vitality of the county in regard to population growth, business development, and employment opportunities. Increased water supply would be a beneficial economic effect to SCVWD. If water rates to customers are increased to pay for the reservoir, the resulting economic effect would be a decrease in customers’ discretionary incomes available to spend in the region. This would be an adverse economic effect.

Under Alternative 5, there would be a small reduction in agricultural deliveries to San Felipe Division Contractors by about 100 acre-feet on average annual basis. These decreases would likely result in increased groundwater pumping and decreased farm revenues. A small amount of acreage may be fallow due to the decreased supply. The regional economic effects would be adverse, but minor.

The construction duration for Alternative 5 would be approximately 5 years. Capital cost expenditures would be approximately $1,116.2 million over the construction period. There would be 475 workers at San Luis Reservoir. Total economic effects of construction would be an increase of 9,301 jobs, $717.4 million in labor income, and $1,531.0 million in output. O&M cost of the expanded Pacheco Reservoir includes energy conveyance costs to pump water from San Luis Reservoir to the expanded Pacheco Reservoir. All or a portion of these increased pumping costs would be passed on to the rate payers. Additionally, there would be some non-energy O&M costs associated with civil maintenance and vegetation maintenance at the new facility. These non-energy costs would result in some minor positive effects to the regional economy.

4.16 Land Use and Agricultural Resources

4.16.1 Assessment Methods

Construction and long-term operations of the alternatives could affect land use in the San Luis Reservoir region and in Santa Clara County. Changes in water supply or distribution could lead to changes in agricultural land use. The potential for these effects to occur and their magnitude is evaluated qualitatively within the counties in the area of analysis. Changes in land use could result in incompatible uses and adverse effects.

4.16.2 Significance Criteria

Impacts related to land use and agricultural resources would be considered significant if the project would: (1) physically divide a community; (2) convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use; (3) conflict with existing zoning for agricultural use or a Williamson Act contract; or (4) cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environment effect. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-19. The potential for impacts related to the potential conversion of forestland, conflicts with existing zoning or causing the rezoning of forestland is not evaluated in this EIS/EIR. None of the alternatives under consideration would be located in forested areas or areas zoned as forestland. In addition, the alternatives would not impact either directly or indirectly forested areas inside or outside of the study area.

4.16.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

SCVWD would continue to change operations in an effort to provide adequate water supplies during dry years and low point interruptions. Water supply shortages would occur during summer months and be supplemented, when possible, with other local and imported supplies. These shortages would not change land uses or generate any conflicts with applicable land use plans, policies, or regulations. **The No Action/No Project Alternative would have no impact on land use or agricultural resources.**

Table 4-19. Land Use and Agricultural Resources Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Cause an existing community to be physically divided	Evaluate how implementation of the alternatives could potentially introduce a new land use type that would differ from or conflict with existing land uses that would divide an existing community to be divided	1	NI	--	Section 4.12.3
		2	NI	None	Section 4.12.4
		3	NI	None	Section 4.12.5
		4	LTS	None	Section 4.12.6
		5	LTS	None	Section 4.12.7
Result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use	Evaluate how implementation of the alternatives could potentially require the conversion of farmland with new construction or as a result of changes in water supply deliveries	1	NI	--	Section 4.12.3
		2	NI	None	Section 4.12.4
		3	NI	None	Section 4.12.5
		4	LTS	None	Section 4.12.6
		5	LTS	None	Section 4.12.7
Conflict with existing zoning for agricultural use or a Williamson Act contract	Evaluate how implementation of the alternatives could potentially require the conversion lands currently zoned for agricultural use or protected under Williamson Act contract	1	NI	--	Section 4.12.3
		2	NI	None	Section 4.12.4
		3	NI	None	Section 4.12.5
		4	LTS	None	Section 4.12.6
		5	SU, LTS	LU-1	Section 4.12.7
Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environment effect	Evaluate how implementation of the alternatives could potentially implement new land uses that would conflict with land use plan, policy, or regulation of an agency with jurisdiction over the project	1	NI	--	Section 4.12.3
		2	NI	None	Section 4.12.4
		3	NI	None	Section 4.12.5
		4	LTS	None	Section 4.12.6
		5	LTS	None	Section 4.12.7

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

4.16.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Construction would occur on lands at the reservoir owned by Reclamation and CDFW and managed by CSP, DWR, and CDFW. Construction activities would be temporary and would not conflict with land use policies of these agencies nor the policies in the San Luis Reservoir SRA RMP/GP. Construction and operation of the alternative would not occur on land designated as Important Farmland. Therefore, there would be no impact to Prime Farmland, Unique Farmland, or Farmland of Statewide Importance or conflict with Williamson Act contracts. Operations of the new facilities would increase supply reliability for SCVWD water users; however, it would not result in changes to land use designations given that the uninterrupted deliveries provided by the alternative would meet existing demand and would not represent a new supply. Construction and operation of the alternative would not affect any of the towns or cities in the county, would not divide a community, and would not affect land use or change land use designations. **Alternative 2 would have no impact on land use or agricultural resources.**

4.16.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Construction of the retrofits at Santa Teresa WTP would occur on existing WTP property and would not affect land use designations, convert agricultural lands, or create conflicts with land use plans. Operations of the new facilities would increase supply reliability for SCVWD water users; however, it would not result in changes to land use designations given that the uninterrupted deliveries provided by the alternative would meet existing demand and would not represent a new supply. There would be no impact to Prime Farmland, Unique Farmland, or Farmland of Statewide Importance or conflict with Williamson Act contracts. Construction and operation of the alternative would not affect any of the towns or cities in the county, would not divide a community, and would not affect land use or change land use designations. **Alternative 3 would have no impact on land use and agricultural resources.**

4.16.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

Construction activities would be temporary and would impact lands (non-agricultural) on and directly around the reservoir. Long-term operations of the alternative would increase the water elevation in the reservoir when the expanded storage capacity is filled. The approximately 394 acres of additional land that would be inundated are located within the San Luis Reservoir SRA front country and backcountry zones. The expanded B.F. Sisk Dam would be located on lands in the Administration and Operations Zone. Long-term operations would not require a change to these land management designations and would not result in activities contrary to the existing allowable uses in that zone. Operations of the new facilities would increase supply reliability for water users in SCVWD and the Central Valley and reduce the amount of fallowed or purposefully dryland farmed lands. However, this would not result in the permanent conversion of nonagricultural lands to agricultural. There would be no impact to Prime Farmland, Unique Farmland, or Farmland of Statewide Importance or conflict with Williamson Act contracts. Construction and operation of the alternative would not affect any of the towns or cities in the county, would not divide a community, and would not affect land use or change land use designations. **Alternative 4 would have a less than significant impact to land use and agricultural resources.**

4.16.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Construction activities would be temporary and would impact Ranchlands (used for grazing) around the existing Pacheco Reservoir and land adjacent to San Luis Reservoir. Construction activities would not conflict with relevant land use policies or the policies in the San Luis Reservoir SRA RMP/GP. The newly inundated lands (1,245 acres) would be located on PPWD land and Ranchlands. Implementation of Alternative 5 would require temporary and permanent rights-of-way and acquisitions of private property, which are not designated as Important Farmland. Therefore, there would be no impact to Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Operations of the new reservoir could increase supply reliability for SCVWD water users but would not result in land use conversions within the SCVWD service area. Construction and operation of the alternative would not affect any of the towns or cities in the county and would not divide a community. Operations of the new facilities would increase supply reliability for SCVWD water users; however, it would not result in changes to land use designations given that the uninterrupted deliveries provided by the alternative would meet existing demand and would not represent a new supply. **Alternative 5 would have a less than significant impact to land use and agricultural resources.**

Operation of Alternative 5 would inundate grazing lands currently covered by Williamson Act contracts. The inundation of this land would conflict with these Williamson Act contracts. **This impact would be significant.** Implementation of Mitigation Measure LU-1, described in Section 4.16.8, would reduce these impacts to a less than significant level by the purchase of a conservation easement or the payment of the agricultural mitigation fee. **Therefore, Mitigation Measure LU-1 would reduce the severity of impacts to a less than significant level.**

4.16.8 Mitigation Measures

The following mitigation measures would reduce the severity of the land use and agricultural impacts.

Mitigation Measure LU - 1: Williamson Act Land Replacement. Agricultural land currently covered by Williamson Act contracts inundated by the operation of Alternative 5 will be replaced by SCVWD through the purchase of a conservation easement at a 1:1 ratio, in accordance with Santa Clara County Local Agency Formation Commission polices. Or, if enacted, SCVWD will pay the agricultural mitigation fee for development that converts viable agricultural land to other uses (Santa Clara County 2018).

4.17 Recreation

4.17.1 Assessment Methods

This analysis assesses impacts to recreation by evaluating closures or access restriction sites at or near the San Luis Reservoir SRA, Pacheco SP, and Anderson Park. This analysis also assesses impacts to recreation by evaluating potential impacts to recreation during operation of each of the project alternatives. If reservoir operations during future low points were to reduce or increase water levels during summer months, water-based recreation such as boating, fishing, and swimming could be affected.

This analysis estimates the potential water storage and surface levels, and their associated effect on recreation facility availability and quality of SLLPIP implementation using the CalSim II and the Water Evaluation and Planning (WEAP) models. See Appendix B for a description of the assumptions and methods used in these models. The recreation facility availability and quality analysis in this chapter relies on the modeling results and therefore contains a degree of uncertainty.

4.17.2 Significance Criteria

For the purposes of the SLLPIP EIS/EIR, effects would be significant if they resulted in: (1) recreational use of trails would be substantially reduced as a result of construction; (2) construction activities would substantially reduce access to or close recreation areas; (3) displaced recreation from sites affected by construction would substantially contribute to overcrowding or exceed the facility capacity at other recreation sites, such that substantial physical deterioration of the facility would occur or be accelerated; or, (4) operational changes to water levels in recreational water bodies would be reduced to an extent that recreational uses would be substantially affected. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-20.

4.17.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

This section describes potential effects of the No Action/No Project Alternative on recreation in the area of analysis. The No Action/No Project Alternative would result in no change in the area of analysis to recreational trail use, access to recreation facilities or opportunities, or visitor use at other local and regional recreation sites. **Under the No Action/No Project Alternative, conditions at all recreation facilities within the area of analysis would be the same as those experienced under existing conditions.**

Table 4-20. Recreation Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Substantially reduce recreational use on trails as a result of project construction	Evaluation of how the alternatives could potentially restrict access to trails in and around proposed construction impact areas with consideration of the capacity of other trails available in the immediate area to offset this effect	1	NI	--	Section 4.17.3
		2	LTS	None	Section 4.17.4
		3	NI	None	Section 4.17.5
		4	LTS	None	Section 4.17.6
		5	NI	None	Section 4.17.7
Substantially reduce access to or close recreation areas as a result of project construction	Evaluation of how the alternatives could potentially require access limits to or close recreation sites near the proposed construction impact areas	1	NI	--	Section 4.17.3
		2	S, LTS	REC-1	Section 4.17.4
		3	NI	None	Section 4.17.5
		4	S, LTS	REC-1	Section 4.17.6
		5	NI	None	Section 4.17.7
Contribute to overcrowding or exceed the facility capacity at other recreation sites by displacing users and substantial physical deterioration of the facility would occur or be accelerated	Evaluation of average visitor numbers at any facilities that would have access limited or be closed by the alternatives, compare those numbers against user rates and any unused capacity at other regional facilities, and further evaluate if an increased number of users would result in substantial physical deterioration of the facility	1	NI	--	Section 4.17.3
		2	LTS	None	Section 4.17.4
		3	NI	None	Section 4.17.5
		4	LTS	None	Section 4.17.6
		5	NI	None	Section 4.17.7
Reduce access to recreation uses through long-term operational changes to water levels in recreational water bodies	Review of CalSim II model results for San Luis Reservoir do determine how each alternative could potentially change storage levels in the reservoir and potentially impact seasonal reservoir access	1	NI	--	Section 4.17.3, Appendix N
		2	NI (non low point years), LTS (low point years)	None	Section 4.17.4, Appendix N
		3	NI (non low point years), LTS (low point years)	None	Section 4.17.5, Appendix N
		4	S, LTS (trail closures), B (water-based rec.)	REC-2	Section 4.17.6, Appendix N
		5	NI (non low point years), LTS (low point years)	None	Section 4.17.7

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; REC = recreation; S = Significant; SU = significant and unavoidable; W = with; WO = without

4.17.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

To implement this alternative, recreational activities within the San Luis Reservoir SRA near the project construction would be closed to the public for safety purposes during construction, including the Basalt and Dinosaur Point use areas. The Basalt Use Area includes two of the three formally designated trails within the San Luis Reservoir SRA, the Basalt Campground Trail and the Lone Oak Trail. There are no formally designated recreation trails at the Dinosaur Point Use Area. Although trails at the Basalt Use Area would be temporarily affected, hiking opportunities within the San Luis Reservoir SRA would still be available for use during project construction. These would include formally designated and primitive trails at both Los Banos Creek and San Luis Creek use areas, and within the designated wildlife use areas. In addition, Pacheco SP, just west of the San Luis Reservoir SRA, offers several public hiking opportunities. **This impact would be less than significant.**

Closure of the Basalt Use Area during the construction period would result in a loss of camping, picnicking, fishing, boating and water sports, swimming, and hiking recreation opportunities. About 2,500 boats are currently launched from the Basalt Use Area boat ramp each year (CDPR 2018). Additionally, 79 campsites with RV accessibility, eight ADA accessible campsites, one of two fish cleaning stations in the SRA, and the only public storage lockers would be unavailable to the public during the construction period (Reclamation and CDPR 2013). Closure of the Dinosaur Point Use Area would result in a loss of fishing, boating and water sports, and swimming opportunities. About 2,000 boats are currently launched from the Dinosaur Point Use Area boat ramp each year (CDPR 2018).

Closure of recreation resources at both the Basalt and Dinosaur Point use areas during construction could be compensated for at the other three use areas within the San Luis Reservoir SRA. In addition, nearby Pacheco SP (immediately adjacent to the San Luis SRA) offers primitive camping opportunities and Henry Coe SP (approximately 15 miles west of San Luis Reservoir) offers both improved and unimproved camping opportunities that would offset this lost capacity. However, the temporary closures would leave the SRA with only two active boat ramps (San Luis Creek on O'Neill Forebay and Los Banos Creek on Los Banos Reservoir) and San Luis Reservoir with no boat ramp access; only six ADA accessible campsites; RV accommodations at only two use areas, Medeiros and San Luis Creek; and no public showers. **Alternative 2 would cause a significant impact by reducing recreation opportunities during construction.** Mitigation Measure REC-1, as described below in Section 4.17.8, would develop new campsites, a fish cleaning station, public storage lockers, and shower facilities and expand the boat launch to further reduce the impacts of the closure of the Basalt and Dinosaur Point use areas. **Therefore, Mitigation Measure REC-1 would reduce the severity of impacts on recreational opportunities in the San Luis Reservoir SRA to a less than significant level.**

Construction activities could displace visitors and substantially contribute to overcrowded conditions at other local and regional recreation sites. Combined, the Basalt and Dinosaur Point use areas annually serve approximately 55,000 day-use and 6,500 overnight visitors and account for over 25 percent of the annual attendance at the San Luis Reservoir SRA (CDPR 2018).

Recreation opportunities at the other three use areas within the San Luis Reservoir SRA, Medeiros, Los Banos Creek, and San Luis Creek, may experience changes in visitor rates during construction, due to the closure of neighboring recreation facilities and increased construction related traffic. The Los Banos Creek Use Area receives approximately 10,000 annual visitors and could accommodate a portion of the displaced visitors (CDPR 2018). The San Luis Creek Use Area currently receives approximately 100,000 annual visitors and currently experiences crowded conditions, which could lead visitors to choose to recreate outside of the San Luis Reservoir SRA during the construction period (CDPR 2018).

Pacheco SP and Henry Coe SP, both located near the San Luis Reservoir SRA, could experience an increase in visitation. Both SPs could supplement some of the hiking and camping opportunities lost by the closure of the Basalt Use Area. Neither Pacheco SP nor Henry Coe SP currently report user capacity issues, and displaced San Luis Reservoir users would not be expected to overcrowd the two SPs. At 87,000 acres and the largest state park in northern California, Henry Coe SP accommodates over 40,000 visitors each year (CDPR 2016). Henry Coe SP offers opportunities for hiking, fishing, and camping. Approximately 2,000 people visit Pacheco SP each year (CDPR 2016). Pacheco SP offers opportunities for hiking and camping. In addition, San Luis National Wildlife Refuge in Merced County is approximately 22 miles from San Luis Reservoir and offers fishing, hunting, nature trails, and wildlife viewing. Water based recreation, camping, hiking, and other activities are offered at Coyote Lake Harvey Bear Ranch County Park and Anderson Lake County Park in Santa Clara County, approximately 35 miles from San Luis Reservoir.

Because the San Luis Creek and Los Banos Creek use areas would remain open during construction of Alternative 2 to offset lost capacity at the Basalt and Medeiros use areas, it is assumed that only a portion of the 55,000 day-use and 6,500 overnight visitors offset at San Luis Reservoir would shift to the other regional recreation area. As a result, the current capacities at these regional recreation areas would not be exceeded. In addition, with a number of similar alternative recreational opportunities nearby, no one recreational area would be expected to experience substantial increase in use such that deterioration of its facilities would occur or be accelerated. **Therefore, Alternative 2 would have a less than significant impact on conditions at other recreation sites and would not increase use that would result in deterioration of the facilities.**

Alternative 2 would generate no change in storage levels in San Luis Reservoir when compared to Alternative 1 in non-low point years. Operational changes under Alternative 2 would only occur in years with low point events and only would result in a less than a 1-foot decrease in reservoir elevation when compared to existing conditions (Alternative 1) and would not significantly affect reservoir-based recreation (see Appendix N for San Luis Reservoir storage level modeling results). **This impact would be less than significant.**

4.17.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Under Alternative 3, construction of treatment upgrades at SCVWD's Santa Teresa WTP would not occur at or interfere with any recreation trails, or temporarily close any recreation facilities.

Moreover, displacement of visitors or overcrowded conditions at other local and regional recreation sites would not occur. Alternative 3 would not cause or accelerate any substantial physical deterioration of any recreational facilities. Operational changes at the San Luis Reservoir under Alternative 3 would be similar to those under Alternative 2 and would not significantly affect reservoir-based recreation. **Alternative 3 would have a less than significant effect on water-based recreation from operational changes at the San Luis Reservoir and no impact to other recreational facilities**.

4.17.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

To implement this alternative, recreational activities within the San Luis Reservoir SRA near the project construction would be closed to the public for safety purposes during construction, including the Basalt and Medeiros use areas. The Basalt Use Area includes two of the three formally designated trails within the San Luis Reservoir SRA, the Basalt Campground Trail and the Lone Oak Trail. There are no formally designated recreation trails at the Medeiros Use Area. Although trails at the Basalt Use Area would be temporarily affected, hiking opportunities within the San Luis Reservoir SRA would still be available for use during project construction. These would include formally designated and primitive trails at both Los Banos Creek and San Luis Creek use areas, and within the designated wildlife use areas. In addition, Pacheco SP, just west of the San Luis Reservoir SRA, offers several public hiking opportunities. **This impact would be less than significant.**

Closure of the Basalt Use Area during the construction period would result in a loss of camping, picnicking, fishing, boating and water sports, swimming, and hiking recreation opportunities. About 2,500 boats are currently launched from the Basalt boat ramp each year, which would be closed during construction (CDPR 2018). Additionally, 79 campsites with RV accessibility, eight ADA accessible campsites, one of two fish cleaning stations in the SRA, and the only public storage lockers would be unavailable to the public during the construction period (Reclamation and CDPR 2013). Closure of the Medeiros Use Area would result in a loss of camping, picnicking, fishing, and swimming opportunities. The Medeiros Use Area has the capacity to support approximately 400 unimproved and unassigned camping sites that would be inaccessible during the construction period.

Closure of recreation resources at both the Basalt and Medeiros use areas during construction could be compensated for at the other three use areas within the San Luis Reservoir SRA. In addition, nearby Pacheco SP (immediately adjacent to the San Luis SRA) offers primitive camping opportunities and Henry Coe SP (approximately 15 miles west of San Luis Reservoir) offers both improved and unimproved camping opportunities that would offset this lost capacity. However, when the two use areas are closed, the SRA would have only three active boat ramps (San Luis Creek on O'Neill Forebay and Los Banos Creek on Los Banos Reservoir, Dinosaur Point on San Luis Reservoir) and only six ADA accessible campsites; RV accommodations at only one use area, San Luis Creek; and no public showers. **Alternative 4 would cause a significant impact by reducing recreation opportunities during construction.** Mitigation Measure REC-1, as described below in Section 4.17.8, would develop new campsites, a fish cleaning station, public storage lockers, and shower facilities and expand the boat launches to further reduce the impacts of the closure of the Basalt and Medeiros use areas. **Therefore, Mitigation Measure REC-1 would reduce the severity of impacts on recreational opportunities in the San Luis SRA to a less than significant level.**

Construction activities could displace visitors and substantially contribute to overcrowded conditions at other local and regional recreation sites. Combined, the Basalt and Medeiros use areas annually serve approximately 60,000 day-use and 17,000 overnight visitors and account for over 38 percent of the annual attendance at the San Luis Reservoir SRA (CDPR 2018).

Recreation opportunities at the other three use areas within the San Luis Reservoir SRA, Dinosaur Point, Los Banos Creek and San Luis Creek, may experience changes in visitor rates during construction, due to the closure of neighboring recreation facilities and increased construction related traffic. The Los Banos Creek Use Area receives approximately 10,000 annual visitors and could accommodate a portion of the displaced visitors. The San Luis Creek Use Area currently receives approximately 100,000 annual visitors and currently experiences crowded conditions, which could lead visitors to choose to recreate outside of the San Luis Reservoir SRA during the construction period (CDPR 2018).

Pacheco SP and Henry Coe SP, both located near the San Luis Reservoir SRA, could experience an increase in visitation. Both SPs could supplement some of the hiking and camping opportunities lost by the closure of both the Basalt and Medeiros use areas. Neither Pacheco SP nor Henry Coe SP currently report user capacity issues, and displaced San Luis Reservoir users would not be expected to overcrowd the two SPs. At 87,000 acres and the largest state park in northern California, Henry Coe SP accommodates over 40,000 visitors each year. Henry Coe SP offers opportunities for hiking, fishing, and camping (CDPR 2016). Approximately 2,000 people visit Pacheco SP each year. Pacheco SP offers opportunities for hiking and camping (CDPR 2016). In addition, San Luis National Wildlife Refuge in Merced County is approximately 22 miles from San Luis Reservoir and offers fishing, hunting, nature trails, and wildlife viewing. Water based recreation, camping, hiking, and other activities are offered at Coyote Lake Harvey Bear Ranch County Park and Anderson Lake County Park in Santa Clara County, approximately 35 miles from San Luis Reservoir.

Because the San Luis Creek, Dinosaur Point, and Los Banos Creek use areas would remain open during construction of Alternative 4 to offset lost capacity at the Basalt and Medeiros use areas, it is assumed that only a portion of the 60,000 day-use and 17,000 overnight visitors offset at San Luis Reservoir would shift to the other regional recreation area. As a result, the current capacities at these regional recreation areas would not be exceeded. In addition, with a number of similar alternative recreational opportunities nearby, no one recreational area would be expected to experience substantial increase in use such that deterioration of its facilities would occur or be accelerated. **Therefore, Alternative 4 would have a less than significant impact on conditions at other recreation sites and would not increase use that would result in deterioration of the facilities.**

During construction of Alternative 4 water levels would be the same as existing conditions (Alternative 1). However, if the shear key option is implemented, the reservoir's water levels would be lowered for two seasons. These lower water levels could impact recreational uses within the reservoir and could potentially make boating access difficult. However, boat access would remain available at San Luis Creek and Los Banos Creek use areas. Water levels at the San Luis Reservoir from the operation of Alternative 4 would slightly increase in non-low point years and in years with low point events (see Appendix N for San Luis Reservoir storage level modeling results). The San Luis Reservoir would experience an average increase of 8 TAF in total storage and a little over 1-foot increase in reservoir elevation over all years. While reservoir expansion would impact trail use at Basalt Use Area, it would have a beneficial effect on water-based recreation, such as boating, fishing, and swimming. **With the inclusion of the shear key option, construction of Alternative 4 would result in a temporary less than significant impact to water-based recreation. However, in the long-term, operation of Alternative 4 would provide beneficial impacts to water-based recreation.**

It is anticipated that surface inundation would increase such that the reservoir would expand slightly in size and reach additional areas in the approximately 14 percent of years that this new storage would be exercised. This would result in the inundation of portions of the Basalt Campground Trail and the Lone Oak Trail, requiring temporary trail closure until water levels recede. These trails traverse loam and clay soil types, which have a low to moderate erodibility. Therefore, after inundation, the trails would remain in good condition and would not require additional maintenance. **Alternative 4 would cause a significant impact by temporarily closing trails and reducing recreation opportunities during times when the reservoir is fully inundated.** Implementation of Mitigation Measure REC-2, described below in Section 4.17.8, would relocate the trails that would be inundated and reduce the long-term impact on trails to a less than significant impact. **Therefore, operational impacts on trails and recreation facilities associated with Alternative 4 would be less than significant with implementation of Mitigation Measure REC-2.**

4.17.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Pacheco Reservoir is not currently utilized for recreation. Therefore, Alternative 5 would not result in any temporary displacement of visitors or any closures of recreational facilities due to construction. Under this alternative, all proposed activities would take place outside of Henry W. Coe SP and the new dam would not be visible from the park. Alternative 5 would not cause or accelerate any substantial physical deterioration of any recreational facilities. Operation of Alternative 5 would allow SCVWD to receive its full allocation of water stored in San Luis Reservoir would generate slight decreases in reservoir storage levels in both low point and non-low point years (see Appendix N for San Luis Reservoir storage level modeling results). Changes in San Luis Reservoir levels would result in impacts similar to those discussed in Alternative 2 and would not significantly affect reservoir-based recreation. **Alternative 5 would have a less than significant effect on recreational facilities from operational changes at the San Luis Reservoir and no impact to other recreational facilities**.

4.17.8 Mitigation Measures

The following mitigation measures would reduce the severity of the recreation impacts.

Mitigation Measure REC - 1: Campsite Replacement.[5] Campsites closed at San Luis Reservoir during construction of an alternative will be replaced by Reclamation at a 1:1 ratio at the San Luis Creek Use Area and then as necessary at the Los Banos Creek Use Area. These new replacement campsites would be developed consistent with the new facilities considered in the San Luis Reservoir SRA RMP/GP and will not exceed the quantities of new facilities considered in the RMP at each use area. Reclamation will include this mitigation requirement in bid documents and construction contracts.

In addition, Reclamation will work with CDPR to implement the following measure. The boat launches at the San Luis Creek and Dinosaur Point use areas would be expanded by addition of a launch lane and a boarding float. In addition, a fish cleaning station, public storage lockers, and shower facilities would be developed at San Luis Creek Use Area.

REC - 2: Trail Relocation.[5] Reclamation will work with CDPR to implement the following measure. Sections of the Basalt Campground Trail and the Lone Oak Trail near the San Luis Reservoir shoreline will be moved upslope to avoid the potential for inundation when an enlarged San Luis Reservoir is forecasted to be filled to capacity.

4.18 Environmental Justice

4.18.1 Assessment Methods

NEPA requires an analysis of social, economic, and environmental justice effects; however, there is no standard set of criteria for evaluating environmental justice impacts. For purposes of this EIS/EIR, the No Action/No Project Alternative is the basis of comparison, as required by NEPA. The CEQ (1997) recommends that the following three factors be considered in the environmental justice analysis to determine whether disproportionately high and adverse impacts may accrue to minority or low-income populations: (1) whether there is or would be an impact on the natural or physical environmental that significantly and adversely affects a minority population, low-income population, or Indian tribe; such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural environment; (2) whether the environmental effects are significant and are having or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group; and (3) whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

[5] Impacts from implementation of Mitigation Measure REC-1 and REC-2 are evaluated in Section 4.1.6, 4.9.6, and 4.14.6.

Appendix I includes the existing regional and local-level demographic and economic characteristic census data, including race, ethnicity, income, and poverty for the SLLPIP environmental justice area of analysis.

4.18.2 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

Under the No Action/No Project Alternative, no construction activities associated with the SLLPIP would occur; therefore, none of the minority or low-income populations would be exposed to adverse effects or hazards from project-related construction. **The No Action/No Project Alternative would not have an adverse or disproportionate effect on minority and low-income populations.**

4.18.3 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

All construction activities under Alternative 2 would take place in Merced County. At the regional level, Merced County has been identified as a minority affected area. At the local level, the communities nearby San Luis Reservoir, including Gustine, Ingomar and Volta (Census Tract 20); San Luis Reservoir SRA and Santa Nella (Census Tract 21); and Los Banos (Census Tracts 22.01, 22.02, 23.01, and 23.02), have also been identified as a minority affected area. Census Tract 22.01 was identified as a low-income affected area in the San Luis Reservoir region. These construction activities would result in significant air quality, noise, and traffic and transportation impacts. However, any potential effects from construction would be temporary and would be reduced by mitigation measures discussed in Sections 4.7.8, 4.10.8, and 4.11.8. Following implementation of the mitigation measures, temporary construction effects associated with construction noise could have an adverse effect on minority populations in the San Luis Reservoir region and low-income population group in Census Tract 22.01. These effects would however be shared across all inhabitants of the communities that all support similar income and minority demographics. As a result, these construction effects would not be disproportionately focused on any low-income and minority affected areas in the study area. Alternative 2 would have a temporarily adverse effect on minority and low-income populations but those effects would not be disproportionately focused on these populations.

4.18.4 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

At the regional level, Santa Clara County has been identified as a minority affected area. At the local level, the Santa Teresa WTP Census Tract 5119.11 has not been identified as a minority affected area. No low-income affected areas were identified at either the regional or local levels. Potential effects from construction associated with Alternative 3 include air quality, noise, and traffic impacts. However, any potential effects from construction would be temporary and would be reduced by mitigation measures discussed in Sections 4.7.8, 4.10.8, and 4.11.8. Following implementation of the mitigation measures, temporary construction effects associated with Alternative 3 would be reduced to a less than significant level and not have an adverse effect on minority populations in Santa Clara County. In addition, these effects would be shared across all inhabitants of the communities that all support similar income and minority demographics. Alternative 3 would not have an adverse effect on minority and low-income populations.

4.18.5 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

At the regional level, Merced County has been identified as a minority affected area. At the local level, the San Luis Reservoir region (Census Tract 20; Census Tract 21; and Census Tracts 22.01, 22.02, 23.01, and 23.02) has also been identified as a minority affected area. Census Tract 22.01 was identified as a low-income affected area in the San Luis Reservoir region. Construction activities under Alternative 4 would result in significant air quality, noise, and traffic and transportation impacts. Potential effects from construction would be temporary and would be reduced by mitigation measures discussed in Sections 4.7.8, 4.10.8, and 4.11.8. Following implementation of the mitigation measures described in these sections, temporary construction effects associated with air quality and noise have an adverse effect on minority populations in the San Luis Reservoir region and low-income population group in Census Tract 22.01. These effects would however be shared across all inhabitants of the communities that all support similar income and minority demographics. As a result, these construction effects would not be disproportionately focused on any low-income and minority affected areas in the study area. Alternative 4 would have a temporarily adverse effect on minority and low-income populations but those effects would not be disproportionately focused on these populations.

4.18.6 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

At the regional level, Santa Clara County has been identified as a minority affected area. At the local level, the Pacheco Reservoir region has not been identified as a minority affected area. Construction activities under Alternative 5 would result in significant air quality, noise, and traffic and transportation impacts. Potential effects from construction would be temporary and would be reduced by mitigation measures discussed in Sections 4.7.8, 4.10.8, and 4.11.8. Following implementation of the mitigation measures described in these sections, temporary construction effects associated with air quality and noise could cause an adverse effect on minority populations in Santa Clara County. These effects would however be shared across all inhabitants of the communities that all support similar income and minority demographics. As a result, these construction effects would not be disproportionately focused on any low-income and minority affected areas in the study area. Alternative 5 would have a temporarily adverse effect on minority and low-income populations but those effects would not be disproportionately focused on these populations.

4.19 Public Utilities Services, and Power

4.19.1 Assessment Methods

Impacts to public services, utilities, and power resources could occur during construction of the action alternatives due to the use of construction equipment. The significance of these impacts is assessed qualitatively. Potential long-term impacts to energy use and power in the area of analysis could result from changes in water supply sources and the operation of water supply facilities. These changes are analyzed based on the energy impact guidance in CEQA Appendix F: Energy Conservation.

4.19.2 Significance Criteria

Impacts related to public utilities, services, and power would be considered significant if the project would: (1) result in substantial adverse physical or environmental impacts associated with the provision of new or physically altered governmental services or facilities including fire protection, police protection, and schools; (2) require or result in the relocation or construction of new or expanded water, wastewater, or stormwater treatment/drainage facilities, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects; (3) result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments; (4) generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals; (5) comply with federal, state, and local management and reduction statutes and regulations related to solid waste; (6) result in adverse effects related to the depletion of local or regional energy supplies; (7) result in significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or (8) conflict with or obstruct a state or local plan for renewable energy or energy efficiency. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-21.

4.19.3 Environmental Consequences/Environmental Impacts of Alternative 1 – No Action/No Project Alternative

Under the No Action/No Project Alternative, current operations at the San Luis Reservoir would remain unchanged. No construction activities would result in adverse impacts related to the provision of new or physically altered governmental facilities. The No Action/No Project Alternative would not require new water, wastewater, or stormwater facilities to be constructed. Further, the No Action/No Project Alternative would not produce solid waste and would not result in increased energy use or the need for additional energy supply capacity. **There would be no impacts related to public utilities, services, energy, or power in the area of analysis.**

Table 4-21. Public Utilities, Services, and Power Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Substantial adverse physical or environmental impacts associated with the provision of new or physically altered governmental services or facilities including fire protection, police protection, and schools.	Evaluation of how the alternatives could potentially affect governmental services, such as emergency services during construction	1	NI	--	Section 4.19.3
		2	LTS (Short-term)	None	Section 4.19.4
		3	LTS (Short-term)	None	Section 4.19.5
		4	LTS	None	Section 4.19.6
		5	LTS	None	Section 4.19.7
Require or result in the relocation or construction of new or expanded water, wastewater, or stormwater treatment/drainage facilities, natural gas, or telecommunications facilities	Evaluation of how the alternatives could potentially generate increased water demands, water treatment, or an expansion of wastewater treatment facilities.	1	NI	--	Section 4.19.3
		2	LTS (Short-term)	None	Section 4.19.4
		3	LTS (Short-term)	None	Section 4.19.5
		4	LTS	None	Section 4.19.6
		5	LTS	None	Section 4.19.7
Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments	Evaluation of each alternatives potential to increase wastewater and its effect on the exiting wastewater treatment system.	1	NI	--	Section 4.19.3
		2	LTS (Short-term)	None	Section 4.19.4
		3	LTS (Short-term)	None	Section 4.19.5
		4	LTS	None	Section 4.19.6
		5	LTS	None	Section 4.19.7
Construction activities would generate solid waste, the disposal of which could exceed the capacity of landfills designated to accommodate the project's solid waste disposal needs	Evaluation of each alternative's potential to generate solid waste and compare those numbers against the remaining capacity at the local landfill.	1	NI	--	Section 4.19.3
		2	LTS (Short-term)	None	Section 4.19.4
		3	LTS	None	Section 4.19.5
		4	LTS	None	Section 4.19.6
		5	LTS	None	Section 4.19.7

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Comply with federal, state, and local management and reduction statutes and regulations related to solid waste	Evaluation of whether construction or operation of the alternatives could conflict with or obstruct federal, state, and local management and reduction statutes and regulations related to solid waste	1	NI	--	Section 4.19.3
		2	NI	None	Section 4.19.4
		3	NI	None	Section 4.19.5
		4	NI	None	Section 4.19.6
		5	NI	None	Section 4.19.7
Adverse impacts associated with the use and/or depletion of local or regional energy supplies.	Evaluation of each alternative's potential power demands on the local power supply and compare those demands against the capacity of local medium voltage distribution lines.	1	NI	--	Section 4.19.3
		2	LTS (Short-term)	None	Section 4.19.4
		3	LTS (Short-term)	None	Section 4.19.5
		4	LTS	None	Section 4.19.6
		5	LTS	None	Section 4.19.7
Result in significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation	Evaluation of each alternative's energy consumption against the period of consumption.	1	NI	--	Section 4.19.3
		2	LTS	None	Section 4.19.4
		3	LTS	None	Section 4.19.5
		4	LTS	None	Section 4.19.6
		5	LTS	None	Section 4.19.7
Conflict with or obstruct a state or local plan for renewable energy or energy efficiency	Evaluation of whether construction or operation of the alternatives could conflict with or obstruct a state or local plan for renewable energy or energy efficiency	1	NI	--	Section 4.19.3
		2	NI	None	Section 4.19.4
		3	NI	None	Section 4.19.5
		4	NI	None	Section 4.19.6
		5	NI	None	Section 4.19.7

Key: Alt = alternative; LTS = less than significant; NI = no impact; W = with; WO = without

4.19.4 Environmental Consequences/Environmental Impacts of Alternative 2 – Lower San Felipe Intake Alternative

Construction activities would require the presence of workers and, in the case of an emergency situation, could require emergency services from local fire or police responders. However, emergency response or remediation and containment plans would be implemented, if required, and OSHA standards would be maintained. The construction workforce would be expected to be drawn from the local area and, for some staff, non-local construction workers who would establish temporary residence. Given the short-term construction schedule, the alternative would not generate a considerable influx of new permanent residents. Thus, there would not be substantial adverse impacts related to the need for governmental services or facilities.

Construction activities would not generate increased demands for water supply, would not result in the need for additional water treatment, and would not result in the production of significant amounts of wastewater that would exceed the capacity of existing wastewater treatment facilities. Alternative 2 would require the transport and disposal of approximately 1,200 cubic yards of construction waste at the closest solid waste landfill, the Billy Wright Landfill, which has a remaining capacity of 11,370,000 cubic yards (CalRecycle 2016d). Given the need for less than 1 percent of the remaining capacity at the landfill, there would be adequate capacity to serve solid waste disposal needs for construction of the alternative. The use of the disposal sites would constitute an irreversible and irretrievable commitment of resources. Potable water and wastewater handling capacity demands generated by construction activities and the presence of construction workers would be met by existing local facilities and temporary/portable drinking water and waste disposal facilities brought on site and serviced by the Lead Agencies. The alternative includes stormwater runoff controls if it is expected that runoff after construction would exceed the capacity of the current stormwater drainage system. The implementation of Mitigation Measure WQ-1 would control stormwater runoff and associated soil erosion and would adequately treat anticipated stormwater runoff generated at the reservoir during construction.

Power for construction activities would be provided by portable generators. Thus, construction activities would not cause stress to, or lead to the depletion of existing power supplies at the reservoir. Construction would increase energy consumption in the form of fuel use increases from the operation of construction equipment and vehicle trips to/from the construction sites. Approximately 55 million gallons of diesel fuel and 65,000 gallons of gasoline could be used during construction activities if the tunnel option is selected, whereas 38 million gallons of diesel fuel and 29,000 gallons of gasoline would be used if the pipeline option is selected. Although construction would consume energy resources, construction activities would be temporary and would cease at the end of construction; therefore, there would be no long-term energy impacts associated with construction, construction equipment and vehicles would comply with applicable regulatory requirements that limit energy consumption, and construction would not result in wasteful, inefficient or unnecessary consumption of energy. In addition, implementation of Mitigation Measures AQ-1 and AQ-2, described in Section 4.7.8., would require all on-site equipment and off-site vehicles to meet strict emissions requirements, which would help to avoid potentially wasteful fuel use during construction.

Under the alternative, given the movement of the intake to a lower elevation, water would have to be pumped a greater vertical distance, compared to existing conditions, to reach the Pacheco Pumping Plant to be transported to the San Felipe Division facilities. This increased pumping is necessary to help SCVWD avoid water supply interruptions from low point-generated water quality concerns. Operation of the alternative would include the hypolimnetic aeration system to improve reservoir oxygen levels during low point conditions and is necessary to avoid water supply interruptions. This aeration system would be designed to maximize efficiency and avoid additional power demands that would exceed local supplies. Changes in operation of the Pacheco Pumping Plant and impacts from operation of the hypolimnetic aeration facility would not result in the need for additional energy supplies and would not result in the substantial depletion of local or regional energy supplies. Changes in operation of the Pacheco Pumping Plant would increase electricity use by nearly 2 million megawatts-hours per year. Additionally, impacts from operation of the hypolimnetic aeration facility could increase electricity usage by 360,000 kilowatt-hours per year if air compressors are used or diesel fuel consumption could increase by 711 gallons per year if trucks are used to deliver liquid oxygen. In its *2018 Integrated Resource Plan* (IRP), Pacific Gas & Electric (PG&E) outlined adequate electricity supply and transmission capabilities to meet the needs of its customers through 2030. In its Preferred Scenario, PG&E's projection for its total load is 36,922 GWh by 2030, and its total projected energy supply is 36,922 GWh (PG&E 2018) of which the utility forecasts it will purchase approximately 12,000 GWh in the open power market. The California Energy Commission (CEC) forecasts that total statewide energy demand in 2030 will be between 326,026 and 354,209 GWh (CEC 2018). The Lower San Felipe Intake Alternative would generate on average approximately 2,360 GWh in new demand annually or less than 1% of the total 2030 forecast statewide demand, and an approximately 20% increase in the power planned for purchase by PG&E for its service area in 2030. In 2017, California total system electric generation was 292,039 GWh which is projected to increase to between 333,224 and 360,812 GWh (CEC 2019). This increased capacity would be sufficient to supply the increase in demand generated by the Lower San Felipe Intake Alternative in combination with the statewide demand projections. Therefore, given the new power demand generated by this alternative in comparison to the projected power capacities in the study area noted above, this alternative would not result in the substantial depletion of local or regional energy supplies. Further, operation of this alternative would not result in wasteful, inefficient or unnecessary consumption of energy. **Alternative 2 would have less than significant impacts to public utilities, services, energy, or power in the area of analysis.**

Construction and operation of Alternative 2 would not conflict with the goals and strategies of the California Energy Efficiency Strategic Plan (California Public Utilities Commission 2011). Disposal of construction waste under Alternative 2 would comply with federal, state, and local statutes and regulations related to solid waste. **Alternative 2 would have no impact on federal, state or local plans and regulations related to solid waste or energy efficiency.**

4.19.5 Environmental Consequences/Environmental Impacts of Alternative 3 – Treatment Alternative

Construction activities would require the presence of workers, and in the case of an emergency situation, could require emergency services from local fire or police responders. However, the impact of hazardous conditions during construction would be less than significant with the implementation of safety measures through the National Pollutant Discharge Elimination System (NPDES) permit and BMPs for transporting, storing, or using any hazardous construction materials. In addition, OSHA standards would be maintained during construction to protect worker safety. The construction workforce would be expected to be drawn from the local area and, for some staff, non-local construction workers who would establish temporary residence. Given the short-term construction schedule, the alternative would not generate a considerable influx of new permanent residents. Thus, there would not be substantial adverse impacts related to the need for governmental services or facilities.

Construction activities would not generate increased demands for water supply, would not result in the need for additional water treatment, and would not result in the production of significant amounts of wastewater that would exceed the capacity of existing wastewater treatment facilities. Alternative 3 would require the transport and disposal of approximately 7,000 cubic yards of construction waste at the closest solid waste landfill, the Guadalupe Sanitary Landfill, which has a remaining capacity of 11,055,000 cubic yards (CalRecycle 2016d). Given the need for less than 1 percent of the remaining capacity at the landfill, there would be adequate capacity to serve solid waste disposal needs for construction of the alternative. Potable water and wastewater handling capacity demands generated by construction activities and the presence of construction workers would be met by existing local facilities and temporary/portable drinking water and waste disposal facilities brought on site and serviced by the Lead Agencies and no additional stormwater control structures would be required in the SCVWD service area. In addition, implementation of Mitigation Measure WQ-1 would control stormwater runoff and associated soil erosion would control and treat anticipated stormwater runoff generated during construction.

Construction would be temporary and energy resources used during construction would be supplied by the contractor. Construction and operation of Alternative 3 would increase energy consumption from the use of temporary on-site generators and vehicle fuels and electricity use during operation of the alternative from increased production of ozone onsite. Approximately 16 million gallons of diesel fuel and 12,000 gallons of gasoline would be used during construction activities. Although construction would consume energy resources, construction activities would be temporary and would case at the end of construction; therefore, there would be no long-term energy impacts associated with construction. Energy used during construction and operation of the alternative would not interfere with surrounding residential, commercial, or industrial energy supplies and use.

Alternative 3 would increase total ozone generation capacity at the Santa Teresa WTP which when used to respond to low point-generated water quality concerns would increase total power use. The capacity for this additional ozone generation would be met using existing excess electrical capacity available at the plant through the existing service connection. Alternative 3 would also increase the number of liquid oxygen deliveries to the WTP to support this increase ozone generation which would increase fuel use. Diesel and gasoline fuel use would negligibly increase by nearly 300 and 60 gallons, respectively, during operations.

Final implementation of Alternative 3 includes recommended pilot testing of the raw water ozonation technology. During pilot testing, the electrical system capacity at the Santa Teresa

WTP would be analyzed in greater detail to understand any necessary upgrades. These technologies do not add significantly to the electrical demands of the water treatment processes and would not result in adverse effects related to the depletion of local or regional energy supplies.

Long-term operation of the Santa Teresa WTP would not differ significantly from existing operations at this site. Operations of the alternative would not detrimentally affect public safety or result in increased risks to workers and would not lead to population increases. Implementation of the alternative would not result in the WTP treating a higher volume of water, and there would be no need for additional water or wastewater treatment facilities outside of the technology retrofits. Additionally, long-term operations would not result in a substantial increase in stormwater runoff that would exceed the capacity of the existing stormwater drainage system. Improvements at the WTP include ballasted clarification, resulting in dried sludge recovered through the treatment process, which would be disposed of in a local landfill. There would be adequate landfill capacity to serve solid waste disposal. The use of the disposal sites would constitute an irreversible and irretrievable commitment of resources.

Alternative 3 would allow the San Felipe Division to draw water from the San Luis Reservoir from a lower elevation during conditions of high algae concentrations. This increased pumping is necessary to help SCVWD avoid water supply interruptions from low point generated water quality concerns. Although the exact amount of pumping was not quantified, PG&E indicated in its 2018 IRP that it has adequate electricity supply and transmission capabilities to meet the needs of its customers through 2030. Changes in operation of the Pacheco Pumping Plant and associated facilities, resulting from the ability to withdraw water from a lower elevation, would not result in the substantial depletion of local or regional energy supplies. Also, operation of this alternative would not result in wasteful, inefficient or unnecessary consumption of energy. **Alternative 3 would have less than significant impacts to public utilities, services, energy, or power in the area of analysis.**

Construction and operation of Alternative 3 would not conflict with the goals and strategies of the California Energy Efficiency Strategic Plan. Disposal of construction waste under Alternative 3 would comply with federal, state, and local statutes and regulations related to solid waste. **Alternative 3 would have no impact on federal, state or local plans and regulations related to solid waste or energy efficiency.**

4.19.6 Environmental Consequences/Environmental Impacts of Alternative 4 – San Luis Reservoir Expansion Alternative

Construction activities would require the presence of workers and, in the case of an emergency situation, could require emergency services from local fire or police responders. However, emergency response or remediation and containment plans would be implemented, if required, and OSHA standards would be maintained. It is expected that 25 percent or 54 workers would be non-local construction workers who would establish temporary residence, which would not result in a long-term impact on public schools. Thus, there would not be substantial adverse impacts related to the need for governmental services or facilities.

Construction activities would not generate increased demands for water supply and would not result in the need for additional water treatment or expansion of wastewater treatment facilities. Alternative 4 would require the transport and disposal of approximately 455 cubic yards of construction waste at the closest solid waste landfill, the Billy Wright Landfill, which has a remaining capacity of 11,370,000 cubic yards (CalRecycle 2016d). Given the need for less than 1 percent of the remaining capacity at the landfill, there would be adequate capacity to serve solid waste disposal needs for construction of the alternative. The use of the disposal sites would constitute an irreversible and irretrievable commitment of resources. Potable water and wastewater handling capacity demands generated by construction activities and the presence of construction workers would be met by existing local facilities and temporary/portable drinking water and waste disposal facilities brought on site and serviced by the Lead Agencies. The implementation of Mitigation Measure WQ-1 would control stormwater runoff and associated soil erosion and would adequately treat anticipated stormwater runoff generated at the reservoir during construction. Temporary BMPs would be provided around stockpiles and dust control watering would be managed to avoid excess water from running off site. The alternative includes planned permanent stormwater control structures to be constructed at the dam, the impacts of which are analyzed in other resource sections of this EIS/EIR.

During construction, temporary power facilities would be needed for construction equipment, welding, and trailers. Of these new power demands, only the construction trailers would require connection via temporary distribution lines connected to existing local power supply lines at the Gianelli Pumping Plant and Pacheco Pumping Plant; power for all of the other construction demands would be supported through portable or trailer mounted generators. The new power demand generated by the construction trailers would be similar to a small residential home and would not exceed the capacity of the medium voltage distribution lines that serve power connections in the study area. Thus, construction activities would not cause stress to, or lead to the depletion of existing power supplies at the reservoir. Construction of Alternative 4 would increase energy consumption in the form of fuel use increases. Approximately 138 million gallons of diesel and nearly 2 million gallons of gasoline could be used during construction activities. Although construction would consume energy resources, construction activities would be temporary and would cease at the end of construction and construction equipment and vehicles would comply with applicable regulatory requirements that limit energy consumption; therefore, there would be no long-term energy impacts associated with construction and would not result in wasteful, inefficient or unnecessary consumption of energy. In addition, implementation of Mitigation Measures AQ-1 and AQ-2, described in Section 4.7.8., would require all on-site equipment and off-site vehicles to meet strict emissions requirements, which would help to avoid potentially wasteful fuel use during construction.

Long-term operations of Alternative 4 would not change the water supply processes currently in place at the reservoir. Water exported from the Delta by the CVP and SWP would continue during periods when supply is in excess of demand for delivery later when demand increases would continue. As a result, there would be no long-term impacts to governmental services and facilities, water supply and wastewater infrastructure, or solid waste generation and disposal.

Operation would increase demand on the existing pumps at the Gianelli Pumping Plant in years when the new reservoir space is filled. Overall, changes in operation of the Gianelli Pumping

Plant resulting from the ability to fill an additional 120,000 AF in the San Luis Reservoir would result in the need for additional energy supplies. However, this energy could be partially recaptured when water is released back into the forebay. In addition, the projected frequency of this new storage capacity being filled is infrequent. On average this increase in power demand is projected to be 42,899,932 kWh/yr. In years when it is filled, the existing 10,600 megawatts of production capacity in the Western Area Power Administration (WAPA) system can meet this increased demand. Operation also would increase electricity use at the Pacheco Pumping Plant given the increases in the total amount of water pumped. The increased pumping at the Pacheco Pumping Plant is necessary to help SCVWD avoid water supply interruptions from low point-generated water quality concerns. **Alternative 4 would have less than significant impacts to public utilities, services, energy, or power in the area of analysis.**

Construction and operation of Alternative 4 would not conflict with the goals and strategies of the California Energy Efficiency Strategic Plan. Disposal of construction waste under Alternative 4 would comply with federal, state, and local statutes and regulations related to solid waste. **Alternative 4 would have no impact on federal, state or local plans and regulations related to solid waste or energy efficiency.**

4.19.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Construction activities would require the presence of workers and, in the case of an emergency situation, could require emergency services from local fire or police responders. However, emergency response or remediation and containment plans would be implemented, if required, and OSHA standards would be maintained. It is expected that 25 percent or 119 workers would be non-local construction workers who would establish temporary residence, which would not result in a long-term impact on public schools. Thus, there would not be a substantial adverse impact related to the need for governmental services or facilities.

Construction and operation of Alternative 5 would not generate increased demands for water supply and would not result in the need for additional water treatment or expansion of wastewater treatment facilities. The majority of waste generated from site demolition and modifications would be recycled at a concrete or asphalt batching facility. Additional solid non-recyclable waste generated from construction and contractor activities would be transported to the nearest solid waste facility, the Billy Wright Landfill, which has a remaining capacity of 11,370,000 cubic yards (CalRecycle 2016d). There would be adequate capacity to serve solid waste disposal needs for construction of the alternative. The use of the disposal sites would constitute an irreversible and irretrievable commitment of resources. Potable water and wastewater handling capacity demands generated by construction activities and the presence of construction workers would be met by existing local facilities and temporary/portable drinking water and waste disposal facilities brought on site and serviced by the Lead Agencies. Temporary BMPs would be provided around stockpiles and dust control watering would be managed to avoid excess water from running off site. In addition, the implementation of Mitigation Measure WQ-1 would control stormwater runoff and associated soil erosion and would adequately treat anticipated stormwater runoff generated at the reservoir during construction. No additional stormwater control structures would be required.

Construction of Alternative 5 would increase energy consumption in the form of fuel use increases from the operation of construction equipment and vehicle trips to/from the construction sites. Approximately 20 million gallons of diesel fuel and 2 million gallons of gasoline could be used during construction activities. Although construction would consume energy resources, construction activities would be temporary and would cease at the end of construction and construction equipment and vehicles would comply with applicable regulatory requirements that limit energy consumption; therefore, there would be no long-term energy impacts associated with construction and would not result in wasteful, inefficient or unnecessary consumption of energy. During construction, portable or trailer-mounted generators would be used and would not cause stress to, or lead to the depletion of, existing power supplies. In addition, implementation of Mitigation Measures AQ-1 and AQ-2, described in Section 4.7.8., would require all on-site equipment and off-site vehicles to meet strict emissions requirements, which would help to avoid potentially wasteful fuel use during construction.

Under the alternative, water would have to be pumped a greater vertical distance, compared to existing conditions, to be transported to the Pacheco Reservoir and the San Felipe Division facilities. This increased pumping is necessary to help SCVWD avoid water supply interruptions from low point-generated water quality concerns. The expanded Pacheco Reservoir Pump Station would serve as a two-way pump station that delivers water to and withdraws water from the Pacheco Reservoir. The existing 70 kilovolt (kV) PG&E transmission line would need to be upgraded to support the additional load of 1,960,404 kilowatt hours per year required by the new pump station. This upgrade is further described in Chapter 2 and associated impacts are analyzed throughout this document. The pump station would consist of eleven pumps (10 duty and 1 standby). The pump motors would be sized for the first operating range (higher lift) at 1,250 hp or 932 kW each (13,750 total hp or 10,253 total kW). The existing production capacity in the PG&E system can meet this increased demand, as indicated in the 2018 IRP. Changes in operation of the Pacheco Pumping Plant and Pacheco Reservoir would not result in the substantial depletion of local or regional energy supplies. Further, operation of this alternative would not result in wasteful, inefficient or unnecessary consumption of energy. **Alternative 5 would have less than significant impacts to public utilities, services, energy, or power in the area of analysis.**

Construction and operation of Alternative 5 would not conflict with the goals and strategies of the California Energy Efficiency Strategic Plan. Disposal of construction waste under Alternative 5 would comply with federal, state, and local statutes and regulations related to solid waste. **Alternative 5 would have no impact on federal, state or local plans and regulations related to solid waste or energy efficiency.**

4.20 Cultural Resources

4.20.1 Assessment Methods

Section 106 of the NHPA requires Federal agencies to consider the effects of their undertakings on historic properties, or cultural resources listed or eligible for listing in the NRHP, and affords the ACHP an opportunity to comment on such undertakings. Implementing regulations under 36

CFR Part 800 outline steps that must be taken to comply with Section 106 of the NHPA. The criteria for evaluating cultural resources for listing in the NRHP are defined at 36 CFR Part 60.4. A formal determination of NRHP eligibility is made when the State Historic Preservation Officer (SHPO) concurs with an evaluation made by the Federal Lead Agency. Alternatively, the evaluation of a historic property may be submitted to the Keeper of the NRHP for a formal determination of NRHP eligibility. The analysis of potential impacts to historic properties employs the criteria of adverse effect, which is defined under 36 CFR Part 800.5. Adverse effects can occur when an undertaking alters, directly or indirectly, any of the characteristics of a historic property that qualify it for inclusion in the NRHP in a manner that diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. As outlined under 36 CFR Part 800.6, the resolution of adverse effects to historic properties under Section 106 of the NHPA requires consultation with appropriate parties to seek ways to avoid, minimize, or mitigate adverse effects and calls for the execution of a formal agreement (Memorandum of Agreement or Programmatic Agreement) with the SHPO and other parties to govern implementation of the undertaking.

CEQA requires State and local public agencies to identify potential impacts to historical resources, or cultural resources listed or eligible for listing in the CRHR, and to determine if those impacts would be significant. CEQA further requires State and local public agencies to identify alternatives and mitigation measures that would substantially reduce or eliminate significant impacts to historical resources. Similar provisions are established for unique archaeological resources under PRC Section 21083.2(b) and for tribal cultural resources under PRC Section 21084.3. Pursuant to PRC Section 21084.1, an impact is considered significant if a project would cause a substantial adverse change in the significance of a historical resource. The criteria for evaluating cultural resources for listing in the CRHR are based on NRHP criteria and are defined at PRC Section 5024.1. A resource is listed in the CRHR once an eligibility nomination has been reviewed by the SHPO and approved by the California State Historical Resources Commission.

4.20.2 Significance Criteria

For the purposes of the SLLPIP EIS/EIR, impacts would be significant if they would result in adverse effects to historic properties listed or eligible for listing in the NRHP; result in substantial adverse changes to historical resources, unique archaeological resources, or tribal cultural resources listed or eligible for listing in the CRHR; or disturb human remains, including those interred outside of formal cemeteries. These criteria, associated significance determinations, mitigation measures, and references to the location of supporting evaluations for these determinations are detailed in Table 4-22.

Table 4-22. Cultural Resources Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Result in adverse effects to historic properties listed or eligible for listing in the NRHP, and/or substantial adverse changes to historical resources, unique archaeological resources, or tribal cultural resources listed or eligible for listing in the CRHR or result in the disturbance of human remains	Evaluation of how implementation of the alternatives would adversely affect or change known or previously undiscovered significant cultural resources	1	NI	-	Section 4.20.3
		2	S, SU	CR-1, CR-2, CR-3	Section 4.20.4 Appendix K
		3	NI	None	Section 4.20.5 Appendix K
		4	S, SU	CR-1, CR-2, CR-3	Section 4.20.6 Appendix K
		5	S, SU	CR-1, CR-2, CR-3	Section 4.20.7 Appendix K

Key: Alt = alternative; B = beneficial; LTS = less than significant; NI = no impact; S = Significant; SU = significant and unavoidable; W = with; WO = without

4.20.3 Environmental Consequences/Environmental Impacts of Alternative 1 - No Action/No Project Alternative

Under Alternative 1, the Project would not be implemented, and no impacts associated with new or expanded facilities would occur. SCVWD would continue O&M of its existing facilities, and current operations at the San Luis Reservoir would remain unchanged. Alternative 1 would have **no impact** on cultural resources (including historical resources, unique archaeological resources, tribal cultural resources, or human remains).

4.20.4 Environmental Consequences/Environmental Impacts of Alternative 2 - Lower San Felipe Intake Alternative

Archival and records searches and inventory surveys revealed 16 archaeological sites (some of which may also be tribal cultural resources and contain human remains) or built environment resources within the Alternative 2 APE, including eight historic period roads (CA-MER-487H, CA-MER-488H, CA-MER-489H, CA-MER-491H, CA-MER-493H, CA-MER-494H, CA-MER-495H, and P-24-001822); two historic period debris scatters (CA-MER-485H and CA-MER-490H); a historic period industrial site (CA-MER-492H) associated with construction of the B.F. Sisk Dam; a historic period transmission pole alignment and debris scatter (CA-MER-484H); a historic period earthen dam (CA-MER-486H); a historic period earthen dam and stock pond with a prehistoric lithic scatter (CA-MER-26/H); a prehistoric lithic scatter with midden and human remains (CA-MER-94); and a commemorative historical plaque (P-24-000643/CHL 829). Inventory surveys failed to reveal surface evidence of a historic period district (P-24-001856/San Luis Gonzaga Rancho Historic District) and a prehistoric district (P-24-000489/San Luis Gonzaga Archaeological District) that overlapped portions of the Dinosaur Point staging area and access road. Three previously recorded cultural resources were not relocated because they were inundated (CA-MER-8 and CA-MER-17) or capped with fill soil (CA-MER-27). The San Luis Gonzaga Archaeological District (P-24-000489) has been listed in the NRHP and CRHR, and the historical plaque (P-24-000643/CHL 829) is listed in the CRHR.

Certain areas within the Alternative 2 APE remained inaccessible to inventory survey due to inundation or extreme slope, and those portions of the APE would likely not be used as staging or stockpiling locations. Also, inundated portions of the APE at Gate Shaft Island would likely not be used during construction of the vertical shaft. Cultural resources within stockpile or staging areas can likely be avoided and would not be subject to direct impacts, while cultural resources that comprise or are situated near roads would likely be impacted as a result of road use or improvement under Alternative 2. The presence or location of cultural resources within the Alternative 2 APE for the new intake structure and underwater pipeline or tunnel option areas cannot be determined, as these areas are and would remain inundated.

The implementation of Alternative 2 is expected to impact eight historic period roads (CA-MER-487H, CA-MER-488H, CA-MER-489H, CA-MER-491H, CA-MER-493H, CA-MER-494H, CA-MER-495H, and P-24-001822) and one historic period debris scatter adjacent to a road (CA-MER-490H) that have all been recommended not eligible for listing in the NRHP and CRHR (see Appendix K). The CRHR-eligible historical plaque (P-24-000643/CHL 829) would be avoided by construction of the proposed aeration facility. One prehistoric site (CA-MER-94) recommended eligible for listing in the NRHP and CRHR and one site with prehistoric and historic period components (CA-MER-26/H) that could not be fully evaluated without further information lie within staging or stockpiling areas. The prehistoric site (CA-MER-94), though not previously identified as such, may be considered a tribal cultural resource per PRC Section 20174 based on the presence of known human remains. Both sites can likely be avoided and have a low likelihood of being impacted by Alternative 2.

The proposed Alternative 2 intake would be constructed while the base of the San Luis Reservoir remains inundated. Known and unknown cultural resources within the underwater pipeline or tunnel option areas cannot currently be identified, evaluated, or mitigated. One prehistoric resource that could not be relocated (CA-MER-8) was recorded near the proposed intake structure associated with the underwater pipeline or tunnel option; it has not been evaluated for listing in the NRHP or CRHR.

Compared to existing conditions and the No Action/No Project Alternative, **impacts to cultural resources (including historical resources, unique archaeological resources, tribal cultural resources, and/or human remains) would be significant due to substantial adverse effects** under Alternative 2. These **impacts would be reduced through implementation of Mitigation Measure CR-1, CR-2, and CR-3,** though these **impacts would be significant and unavoidable** despite mitigation efforts (see Section 4.20.8).

4.20.5 Environmental Consequences/Environmental Impacts of Alternative 3 - Treatment Alternative

No new or expanded facilities are proposed under Alternative 3, and all technological retrofits would be made within the existing footprint of the Santa Teresa WTP. An archival and records search and an inventory survey revealed no archaeological or built environment resources within the Alternative 3 APE, and the likelihood of encountering previously undiscovered cultural resources during implementation of the alternative is considered extremely low (see Appendix K). Compared to existing conditions and the No Action/No Project Alternative, there would be **no impacts** to known historic properties, historical resources, or other cultural resources under Alternative 3.

4.20.6 Environmental Consequences/Environmental Impacts of Alternative 4 - San Luis Reservoir Expansion Alternative

Archival and records searches and inventory surveys revealed 28 archaeological sites (some of which may also be tribal cultural resources and contain human remains) or built environment resources within the Alternative 4 APE, including the B.F. Sisk Dam and its key features; three sites associated with the construction (CA-MER-492H and CA-MER-509H) or maintenance (CA-MER-520H) of the dam; eight historic period roads (CA-MER-489H, CA-MER-491H, CA-MER-493H, CA-MER-494H, CA-MER-495H, CA-MER-513H, CA-MER-519H, and P-24-001822); transmission line poles with a debris scatter (CA-MER-484H); two historic period livestock watering locales (CA-MER-511H and CA-MER-521H); three earthen dams with impound ponds (CA-MER-515H, CA-MER-516H, and CA-MER-518H); a concrete equipment pad (CA-MER-510H); a helicopter pad (CA-MER-512H); a historic period ditch (CA-MER-514H); six prehistoric midden sites (CA-MER-15, CA-MER-28, CA-MER-82, CA-MER-83, CA-MER-130, and CA-MER-517), most with lithics and groundstone; and a prehistoric district (P-24-000489/San Luis Gonzaga Archaeological District). Eleven cultural resources previously recorded in Alternative 4 APE were not relocated during inventory surveys. These included seven prehistoric sites along the reservoir shoreline (CA-MER-20, CA-MER-21, CA-MER-22, CA-MER-23, CA-MER-27, CA-MER-29, and CA-MER-41); two prehistoric sites (CA-MER-136 and CA-MER-137) in the Cottonwood Bay area, which was inaccessible in 2016; and one historic period ranch complex (CA-MER-451H), which was in an area added to the APE after the 2016 inventory survey was completed. The prehistoric San Luis Gonzaga Archaeological District (P-24-000489) and one of its contributing sites (CA-MER-130) are listed in the NRHP and CRHR. The other prehistoric sites noted above that were relocated have not been evaluated pending further investigation. The B.F. Sisk Dam and its key features have been recommended eligible for listing in the NRHP and CRHR (JRP 2018). Seven historic period resources (CA-MER-510H, CA-MER-511H, CA-MER-512H, CA-MER-513H, CA-MER-514H, CA-MER-520H, and CA-MER-521H) have been determined not eligible for listing in the NRHP and CRHR while the remaining historic period resources noted above have all been recommended not eligible for inclusion in either register (see Appendix K).

Some areas within the Alternative 4 APE remained inaccessible to inventory survey in 2016 because of safety constraints, inundation, or a lack of access permissions while other areas were added to the APE subsequent to the inventory survey. Also, those portions of the APE that remained inundated would likely not be used as staging, stockpiling, or borrow locations under Alternative 4, though some areas (e.g., along the base of the existing dam) may be capped by fill materials or subject to stabilization measures. Cultural resources within potential construction staging areas may be avoided and would have a low likelihood of being impacted, though resources located within the Basalt Hill borrow area, Borrow Area 6, Cottonwood Bay levee modification and levee raise areas, the Dinosaur Point boat launch modification area, fill impact areas, and haul road or Highway 152 impact areas would have a higher likelihood of being impacted (see Appendix K). Cultural resources along the expanded reservoir shoreline, particularly those with portable surface artifacts, may be impacted by wave action and fluctuating water levels under Alternative 4.

The B.F. Sisk Dam, which has been recommended eligible for listing in the NRHP and CRHR as a part of a historic district, would be expanded under Alternative 4. The expansion of the dam is not expected to remove, alter, or add elements to the B.F. Sisk Dam or its associated features that are incongruent with its current setting or use, and JRP (2018) concluded that modifications to the dam would result in no adverse effects to the historic district or its contributing elements. Two historic period industrial resources associated with construction of the dam would be impacted by use of the Basalt Hill borrow area (Basalt Hill Quarry/CA-MER-509H) and a potential construction staging area (CA-MER-492H). Both resources have been recommended not eligible for listing in the NRHP and CRHR, and both are regarded as non-contributing elements to the B.F. Sisk Dam/San Luis Reservoir Historic District. The implementation of Alternative 4 also is expected to impact seven historic period road segments (CA-MER-489H, CA-MER-491H, CA-MER-493H, CA-MER-494H, CA-MER-495H, CA-MER-519H, and P-24-001822) that would likely be used or improved to support Project construction. Each has been recommended not eligible for listing in the NRHP and CRHR. The debris scatter associated with the historic period transmission pole alignment (CA-MER-484H) is located along the reservoir shoreline and would be susceptible to increased wave action and fluctuating water levels with the expansion of the San Luis Reservoir. Three historic period earthen dams with impound ponds (CA-MER-515H, CA-MER-516H, and CA-MER-518H) are also located along the reservoir shoreline. Each is recommended not eligible for inclusion in the NRHP and CRHR. Given the nature of their construction, they should not be impacted by implementation of Alternative 4.

Six prehistoric sites along the reservoir shoreline, including five that have not been evaluated (CA-MER-15, CA-MER-28, CA-MER-82, CA-MER-83, and CA-MER-517) and one (CA-MER-130) that has been listed in the NRHP and CRHR as a part of the San Luis Gonzaga Archaeological District (P-24-000489), are located along the reservoir shoreline and would be susceptible to increased wave action and fluctuating water levels following expansion of the San Luis Reservoir. None of these sites have been previously identified as tribal cultural resources, and none are known to contain human remains. Further research in the form of subsurface testing and/or consultation may indicate that one or all of these sites meet the definition of a tribal cultural resource per PRC Section 20174.

Compared to existing conditions and the No Action/No Project Alternative, **impacts to cultural resources (including historical resources, unique archaeological resources, tribal cultural resources, and/or human remains) would be significant due to substantial adverse effects** under Alternative 4. These **impacts would be reduced through implementation of Mitigation Measure CR-1, CR-2, and CR-3,** though these **impacts would be significant and unavoidable** despite mitigation efforts (see Section 4.20.8).

4.20.7 Environmental Consequences/Environmental Impacts of Alternative 5 – Pacheco Reservoir Expansion Alternative

Archival and records searches and inventory surveys revealed 18 archaeological sites (some of which may also be tribal cultural resources and contain human remains) or built environment resources within the Alternative 5 APE[6]. These included nine prehistoric sites (CA-SCL-682, CA-SCL-683, CA-SCL-684, CA-SCL-685, CA-SCL-686, CA-SCL-687, PL-Pacheco-CRP-010, PL-Pacheco-CRP-012, PL-Pacheco-CRP-015, and PL-Pacheco-CRP-022), most with midden, lithics, and groundstone; four prehistoric lithic scatters (PL-Pacheco-CRP-013, PL-Pacheco-CRP-017, PL-Pacheco-CRP-019, and PL-Pacheco-CRP-023); a prehistoric bedrock milling site (PL-Pacheco-CRP-007); two multi-component sites (CA-SCL-679/H and CA-SCL-680/H) with prehistoric and historic period materials; and a historic period bridge (PL-Pacheco-CRP-009). The North Fork Dam is being examined as a part of an architectural field survey. Four previously recorded cultural resources that have not been relocated are in areas for which access permissions have not yet been granted. They include three prehistoric archaeological sites (CA-SCL-116, CA-SCL-121, and CA-SCL-322) and one historic period farmhouse and barn (P-35-000236), all associated with the PG&E transmission line. None of the resources within the

[6] The Alternative 5 APE includes the existing North Fork Dam, a proposed dam and reservoir, new pipelines and tunnels, inlet/outlet facilities, a pump station, borrow areas, temporary haul roads, and a new transmission line (2,269 acres). Pacheco Creek downstream of the construction effect area is not included in the Alternative 5 APE given as was noted in Section 4.4, Alternative 5 would reduce downstream flood flows and corresponding flood stages along Pacheco Creek, by storing and regulating the release of peak flows during storm events. With these reductions in peak flows and release volumes over the course of the year that would not exceed existing peak flows, no increase in streambank or streambed erosion downstream of Pacheco Dam would be anticipated from implementation of this alternative.

Alternative 5 APE have been evaluated for listing in the NRHP and/or the CRHR (see Appendix K).

Cultural resources within the footprint for the proposed dam, the proposed tunnel or pipeline, proposed haul roads, and potential staging or source material areas would have a high likelihood of being impacted under Alternative 5. The historic period North Fork Dam, which incidentally intersects the proposed tunnel or pipeline, would be demolished. Material excavated from the dam, if suitable for earth fill, would be used for construction of the temporary cofferdam (see Appendix K). Cultural resources along the 16-mile long PG&E transmission line would have a low likelihood of being impacted, as Project activities would consist of replacing existing transmission poles to support increased circuit load requirements. One historic period built environment resource (P-35-000236) has been recorded within the Alternative 5 APE for transmission line improvements, but as the resource comprises standing structures it would be avoided during these improvements.

One prehistoric site (CA-SCL-682) intersects a potential borrow area and haul road under Alternative 5 and has a high likelihood of being impacted; though not previously identified as such, it may be considered a tribal cultural resource per PRC Section 20174 based on the presence of known human remains at the site. Six known prehistoric resources (CA-SCL-680/H, CA-SCL-683, CA-SCL-684, CA-SCL-685, CA-SCL-686, and CA-SCL-687) and one multi-component site (CA-SCL-679/H) within the Alternative 5 APE overlap the proposed reservoir expansion footprint and would be fully or partially inundated if Alternative 5 is implemented. Similar to resources along the expanded reservoir shoreline under Alternative 4, these sites would be subject to the effects of increased wave action and fluctuating water levels as well as effects from inundation. Three of these sites (CA-SCL-679/H, CA-SCL-684, and CA-SCL-685) are known to contain human remains and, though not previously identified as such, may be considered tribal cultural resources per PRC Section 20174. Three additional prehistoric archaeological sites (CA-SCL-116, CA-SCL-121, and CA-SCL-322), if extant, may be affected by pole replacement activities associated with the PG&E transmission line, particularly if expanded pole footprints are required to support increased circuit loads.

Some areas within the Alternative 5 APE remained inaccessible to inventory survey in 2018 or 2019 because of safety constraints, inundation, or a lack of access permissions. It is assumed that portions of the APE that remained inundated would not be used as staging, stockpiling, or borrow locations under Alternative 5. Cultural resources within potential construction staging areas can be avoided and would have a low likelihood of being impacted, though resources located along the haul roads or proposed tunnel/pipeline would have a higher likelihood of being impacted (see Appendix K). Cultural resources along the expanded reservoir shoreline, particularly those with portable surface artifacts, may be impacted by wave action and fluctuating water levels under Alternative 5.

Compared to existing conditions and the No Action/No Project Alternative, **impacts to cultural resources (including historical resources, unique archaeological resources, tribal cultural resources, and/or human remains) would be significant due to substantial adverse effects** under Alternative 5. These **impacts would be reduced through implementation of Mitigation Measure CR-1, CR-2, and CR-3,** though these **impacts would be significant and unavoidable** despite mitigation efforts (see Section 4.20.8).

4.20.8 Mitigation Measures

4.20.8.1 NEPA Only Mitigation Measures

A reasonable and good faith effort has been made to identify historic properties within the APE for the SLLPIP action alternatives through archival research and inventory surveys on lands accessible to the lead agencies. Additional inventory survey efforts are needed, however, to identify historic properties within the APE for Alternatives 4 and 5 and to assess the effects of the project on those properties. These efforts cannot be practically completed at this time. If Congress authorizes funding for final design and construction of an action alternative identified in the companion Feasibility Report and in this EIS/EIR, an agreement document outlining a process for completing identification efforts and resolving adverse effects to historic properties will be negotiated with the SHPO to satisfy NHPA Section 106 compliance requirements.

Following Congressional authorization, but prior to the release of a Final EIS/EIR and the signing of a ROD to implement the project, Reclamation will complete all remaining historic property identification and evaluation efforts required by the negotiated agreement document. Adverse effects to historic properties will be resolved through the completion of the Section 106 process, which will satisfy Federal Lead Agency requirements with respect to the NHPA as well as NEPA. A process to avoid, minimize, and/or mitigate adverse effects to historic properties will be formalized in the agreement document in compliance with 36 CFR Part 800.6(c).

4.20.8.2 CEQA and NEPA Mitigation Measures

Mitigation Measure CR-1: Complete Cultural Resource Survey and Evaluation Efforts. Following Congressional authorization but prior to the release of a Final EIS/EIR and the signing of a ROD to implement the project, Reclamation for Alternatives 2 and 4, or SCVWD for Alternatives 3 and 5 will ensure that cultural resource identification and evaluation efforts for the preferred alternative are completed, consistent with the Section 106 agreement document. These efforts will be directed by an archaeologist meeting the Secretary of the Interior’s Professional Qualifications Standards for archaeology and will include the inventory survey of all accessible areas within the APE for the selected action alternative that have not been examined to date (see Appendix K). The survey methodology will be consistent with that used in prior inventory surveys conducted for the SLLPIP (see Appendix K). Resources located during the survey will be recorded on appropriate California Department of Parks and Recreation (DPR) 523 forms, photographed, mapped using a GPS receiver, and plotted on USGS 7.5-minute topographic maps. The significance of cultural resources within the APE for the selected alternative will be evaluated using CRHR and NRHP criteria (see Appendix C). A technical report detailing the identification and evaluation efforts will be produced and forwarded to the CHRIS.

Mitigation Measure CR-2: Implement Avoidance or Mitigation Measures. Once identification and evaluation efforts have been completed, Reclamation for Alternatives 2 and 4 or SCVWD for Alternatives 3 and 5 will ensure that measures to avoid, minimize, or mitigate impacts to significant cultural resources, including tribal cultural resources and/or resources with human remains, are implemented consistent with the Section 106 agreement document, CEQA Guidelines Section 15126.4(b), and PRC Section 21084.3. Significant cultural resources that can be avoided by project ground disturbing activities will be marked for exclusion on project plans and/or on the ground using flagging, fencing, or appropriate signage. Where identified as appropriate in the technical report (see Mitigation Measure CR-1), a qualified archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards for archaeology will monitor project ground disturbing activities to ensure the avoidance of significant cultural resources. Other methods to ensure preservation in place (e.g., capping or incorporation within an open space or permanent easement) will be used, if identified as appropriate, following completion of the inventory survey. Where data recovery through excavation is the only feasible form of mitigation, a data recovery plan will be prepared that provides for the recovery of significant information from the resource; for tribal cultural resources, the data recovery plan will be prepared in consultation with the culturally-affiliated tribe. Studies and reports resulting from excavations will be deposited with the CHRIS. If human remains are encountered, procedures under California Health and Safety Code Section 7050.5 and PRC Section 5097.98 will be implemented.

Mitigation Measure CR-3: Implement a Detailed Inadvertent Discovery Plan. Prior to initiating construction of the selected alternative, Reclamation for Alternatives 2 and 4 or SCVWD for Alternatives 3 and 5 will ensure that a detailed, project-specific Inadvertent Discovery Plan consistent with the Section 106 agreement document is prepared for the project by a qualified archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards for archaeology. The Inadvertent Discovery Plan will outline cultural resource training procedures for construction personnel and the protocols to follow if cultural materials or human remains are discovered during project ground disturbing activities. In the event of an inadvertent discovery, construction will halt in the vicinity of the find and work will be directed elsewhere while its significance is evaluated by a qualified archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards for archaeology. If the discovery is significant, additional measures identified in the Inadvertent Discovery Plan (e.g., avoidance, capping beneath a layer of sterile soil, or data recovery excavations, including consultation with the culturally-affiliated tribe for suspected tribal cultural sources) will be implemented consistent with CEQA Guidelines Section 15126.4(b) and PRC Section 21084.3. If human remains are encountered, procedures under California Health and Safety Code Section 7050.5 and PRC Section 5097.98 will be implemented.

4.20.9 Significant and Unavoidable Impacts Under CEQA

No mitigation measures are available under CEQA that would reduce potential adverse impacts to known or unknown cultural resources within the Alternative 2 intake area. Because the intake area is and would remain inundated during construction, it is inaccessible to inventory survey. Known and unknown cultural resources that may be eligible for listing in the NRHP and/or the CRHR may lie within the intake area APE that cannot be observed, recorded, evaluated, or mitigated. Any impacts to such resources would remain significant and unavoidable.

Under Alternatives 4 and 5, the capacity of existing reservoirs would be expanded, and known and unknown cultural resources that may be eligible for listing in the NRHP and/or the CRHR would be subject to mechanical and biochemical impacts associated with inundation and/or increased wave activity. Resources that lie within the expanded reservoir footprint cannot be avoided. Capping could lessen impacts from mechanical activity but would not diminish biochemical impacts to cultural resources. Data recovery excavations could be implemented for cultural resources within the expanded reservoir area for Alternatives 4 or 5, but impacts would remain significant because it may not be possible to reduce those impacts to a level that is less than significant.[11]

4.21 Population and Housing

4.21.1 Assessment Methods

This analysis considers whether an action alternative would result in a substantial increase in population, and if there would be sufficient housing available to accommodate this population increase. Table 4-23 presents the number of construction workers who would be needed during peak construction, including the estimated number of local workers and the number of non-local workers for each of the action alternatives. For purposes of the analysis, it is assumed that one housing unit would be required per non-local worker and that this housing would be provided by the existing housing stock and that no new housing would be constructed for these workers.

4.21.2 Significance Criteria

For purposes of the EIS/EIR, impacts on population and housing would be considered significant if they would: (1) induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure); or (2) displace substantial numbers of people or existing people or housing, necessitating the construction of replacement housing elsewhere. These criteria, the associated significance determinations, mitigation and references to the location of supporting evaluations for these determinations are detailed in Table 4-24.

4.21.3 Environmental Impacts of No Action/No Project Alternative

The impact of not implementing the SLLPIP and not conducting the associated construction or operational activities would not change current or future population or housing trends. Population and housing growth would continue at a rate similar to existing conditions. **Therefore, the No Action/No Project Alternative would have no impact on population growth or housing resulting from growth inducement.**

4.21.4 Environmental Impacts of Action Alternatives

Under each alternative, no more than 119 non-local workers would be required during construction, as shown in Table 4-23. This small number of workers would temporarily increase populations in the surrounding communities during construction. As shown in Tables 3-3, 3-7, and 3-10 in Chapter 3, there are an adequate number of housing units available for rent and for sale in the surrounding communities to provide accommodations for the non-local workers; no new housing would be required. Operations for each alternative would not require any increase in non-local workers and impacts would be similar to the No Action/No Project Alternative. The action alternatives would not induce development growth or remove a barrier for growth because they do not provide a reliable source of water that could be used to approve specific development projects by local agencies. The action alternatives would not result in new housing, utilities, services, or permanent employment that could induce growth in the region, the action alternatives would not result in any impacts that would require the provision of new housing, utilities, services, or permanent employment. Therefore, the action alternatives would not induce growth. **Impacts on population and housing from growth inducement or displacement would be less than significant for Alternatives 2, 3, 4 and 5.**

Table 4-23. Construction Workers by Alternative

Alternative		Maximum Construction Workers	Number of Local Workers (75%)	Number of Non-Local Workers (25%)	Months of Construction
Lower San Felipe Intake Alternative	Pipeline	**37**	28	9	33
	Tunnel	**119**	89	30	47
Treatment Alternative		**50**	37	13	36
San Luis Reservoir Expansion Alternative		**217**	163	54	96–144
Pacheco Reservoir Expansion Alternative		**475**	356	119	60

Table 4-24. Population and Housing Effect Analysis Summary

Significance Criteria	Assessment Methodology	Alt.	Significance Determination (W/O Mitigation, W Mitigation)	Mitigation	Evaluation Support
Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)	Evaluation of census population trends and the local housing market to assess how the alternative would impact the population and housing needs in the area of analysis.	1	NI	-	Section 4.21.3
		2	LTS	None	Section 4.21.4
		3	LTS	None	Section 4.21.5
		4	LTS	None	Section 4.21.6
		5	LTS	None	Section 4.21.7
Displace substantial numbers of people or existing people or housing, necessitating the construction of replacement housing elsewhere.	Evaluation of the local housing market to determine whether each alternative would require construction of new housing units.	1	NI	-	Section 4.21.3
		2	NI	None	Section 4.21.4
		3	NI	None	Section 4.21.5
		4	NI	None	Section 4.21.6
		5	NI	None	Section 4.21.7

Key: Alt = alternative; LTS = less than significant; NI = no impact; W = with; WO = without

This page left blank intentionally.

Chapter 5
Cumulative Effects

This chapter provides an analysis of cumulative effects of the action alternatives taken together with other past, present, and reasonably foreseeable probable future projects (or actions) as required by NEPA implementing regulations (40 CFR 1508.7) and CEQA guidelines (Section 15130). A full detailed cumulative analysis is presented in Appendix S.

5.1 Methods and Assumptions

This section provides an overview of the methodology used to analyze cumulative effects.

5.1.1 Area of Analysis

Table 5-1 describes the specific cumulative effects area of analysis for each resource area.

Table 5-1. Cumulative Effects Area of Analysis

Section	Resource	Area of Analysis
4.1	Water Quality	San Luis Reservoir; Sacramento/San Joaquin River Delta, Pacheco Reservoir; and Santa Teresa WTP in San Jose.
4.2	Surface Water Supply	Same as Water Quality with the addition of the California Aqueduct and South-of-Delta CVP Contractors (SLDMWA).
4.3	Groundwater Resources	San Joaquin Valley/Tulare Lake Hydrologic Region, San Francisco Bay Hydrologic Region, South Lohantan Hydrologic Region, Colorado River Hydrologic Region, South Coast Hydrologic Region
4.4	Flood Control	Merced, San Benito, and Santa Clara counties
4.5	Geology, Seismicity, and Soils	Merced and Santa Clara counties
4.6	Indian Trust Assets	Merced and Santa Clara counties
4.7	Air Quality	Merced County and the San Joaquin Valley Air Basin; and, Santa Clara County and the San Francisco Bay Area Air Basin.
4.8	Greenhouse Gases	Regional and Global
4.9	Visual Resources	San Luis Reservoir and O'Neill Forebay; Pacheco Reservoir; sightlines in relation to properties associated with the Santa Teresa WTP in the SCVWD Service Area.
4.10	Noise and Vibration	San Luis Reservoir, Merced County; Pacheco Reservoir and Santa Teresa WTP, Santa Clara County.
4.11	Traffic and Transportation	Roadways in Santa Clara and Merced counties as well as local roads in the cities of Gustine, Los Banos, Gilroy, San Jose, and the village of Santa Nella.
4.12	Hazards and Hazardous Materials	San Luis Reservoir and the SRA; Pacheco Reservoir; SCVWD facilities where construction is proposed.
4.13	Aquatic Resources	San Luis Reservoir and the associated SRA, SCVWD service area, Pacheco Reservoir and Pacheco Creek, Sacramento/San Joaquin River Delta.

Table 5-1. Cumulative Effects Area of Analysis

Section	Resource	Area of Analysis
4.14	Terrestrial Resources	Santa Clara Basin; Pacheco Reservoir; San Luis Reservoir and the SRA
4.15	Regional Economics	Santa Clara County, Merced County
4.16	Land Use	San Luis Reservoir, Merced County, including the SRA, O'Neill Forebay, Los Banos Creek Reservoir, San Luis Wildlife Area, Pacheco State Park, and Cottonwood Creek Wildlife Area; Pacheco Reservoir; and, CVP agricultural contractors receiving water from the San Felipe Division (counties include Santa Clara, Monterey, Santa Cruz, and San Benito).
4.17	Recreation	San Luis Reservoir and the SRA; Pacheco Reservoir.
4.18	Environmental Justice	Communities close to San Luis Reservoir and the SRA including Volta, Trent, Los Banos, Ingomar, Gustine, and unincorporated Santa Nella; Santa Clara County and the City of San Jose.
4.19	Public Utilities, Services, and Power	San Luis Reservoir, Merced County; Pacheco Reservoir, Santa Clara County; SCVWD service area including Santa Teresa WTP in San Jose; and San Felipe Division Facilities.
4.20	Cultural Resources	San Luis Reservoir, Merced County, Pacheco Reservoir, Santa Clara County, San Benito County
4.21	Population and Housing	The cities of Los Banos, Newman, Gilroy, Gustine, and San Jose.

Key: CVP = Central Valley Project; SCVWD = Santa Clara Valley Water District; SLDMWA = San Luis & Delta-Mendota Water Authority; SRA = State Recreation Area; WTP = Water treatment plant

5.1.2 Timeframe for Cumulative Effects Analysis

The timeline for the cumulative effects analysis with the exception of greenhouse gasses and traffic and transportation, is 8 to 12 years for all short-term construction-related impacts. These impacts would be temporary and would only occur during construction. The timeframe for all long-term impacts is 20 years, which represents the planning horizon addressed in this EIS/EIR. The analysis in Section 5.2.6 relies on a 30-year timeframe for long-term impacts consistent with the BAAQMD emission amortization guidelines. The analysis in Section 5.2.10 utilizes a 25-year timeframe for long-term impacts consistent with the Merced County and Santa Clara Valley Transportation Authority analysis guidelines.

5.1.3 Identifying Past, Present, and Future Actions and Projects Contributing to Cumulative Effects

CEQA Guidelines Section 15130(b)(1) identifies two methods that may be used to analyze cumulative impacts:

1. "A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency," and/or

2. "A summary of projections contained in an adopted local, regional, or statewide plan or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include: a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such

projections may be supplemented with additional information such as a regional modeling program. Any such document shall be referenced and made available to the public at a location specified by the Lead Agency."

This EIS/EIR analyzes cumulative impacts using both CEQA methods identified above. These methods are sufficient to satisfy NEPA and CEQA requirements for identifying past, present, and future actions and projects that may contribute to cumulative effects. Most EIS/EIR resources use one method or the other, but several resource areas use a combination of both methods.

A variety of Federal, State, county, and local government sources were reviewed to identify and collect information on past, present, and reasonably foreseeable actions in the project area that could contribute to cumulative effects. These include

- City and county general plans;
- Future population, housing, traffic, and other projections found in existing city and county general plans;
- Published reports, documents, and plans;
- Biological Management Plans (BOs, HCPs, etc.);
- Environmental documents (such as EIS/EIRs).
- Scoping comments; and
- Consultation with Federal, State, and local agencies.

Sections 5.1.4 and 5.1.5 below describe the projects and projections considered for this cumulative effects analysis.

5.1.4 Cumulative Projects Considered for All Resources

This section describes the past, present, and reasonably foreseeable future cumulative actions and projects considered in this cumulative effects analysis.

Addendum to the Agreement for Coordinated Operation of the CVP and SWP

In December 2018, Reclamation and DWR amended four key elements of the Coordinated Operation Agreement as follows:

- Article 6(c) of the Agreement is amended to share the responsibility for meeting Sacramento Valley inbasin use with storage withdrawals during balanced water conditions;
- Article 10(b) of the Agreement is amended to have the State transport CVP water through the California Aqueduct and provide available capacity at the Banks Pumping Plant to the CVP;
- Article 10(i) is added to the Agreement to share the applicable export capacity when exports are constrained; and
- Article 14(a) of the Agreement is amended to have the U.S. and the State review and revise the Agreement (Reclamation 2018a).

Bay-Delta Conservation Plan/California Water Fix/Delta Conveyance

The *Bay Delta Conservation Plan* (BDCP)/California Water Fix is being prepared by Reclamation and DWR, along with Kern County Water Agency, Metropolitan Water District of Southern California, SLDMWA, SCVWD, State and Federal Water Contractors Agency, Westlands Water District, and Zone 7 Water Agency (referred to as Potential Authorized Entities).

The BDCP/California WaterFix planning process began in 2006 when updates to the SWP and coordinated operations of the CVP were initially proposed as the BDCP. The BDCP envisioned updating the SWP by adding new points of diversion in the north Delta and by providing for large-scale species conservation through a 50- year HCP/natural communities conservation plan (NCCP). The HCP/NCCP was intended to comply with Section 10 of the federal Endangered Species Act and to achieve compliance with the California Endangered Species Act through the California Natural Community Conservation Planning Act. A Draft EIS/EIR was released in December 2013.

Following release of the Draft EIS/EIR, Reclamation and DWR issued a Supplemental Draft EIS/Partially Recirculated Draft EIR that included for consideration three additional alternatives that would update the SWP without the large-scale conservation efforts in an HCP/NCCP. The lead agencies proposed that one of these non-HCP alternatives, known as California WaterFix Alternative 4A, be identified as the preferred alternative in replacement of the BDCP alternative (DWR and Reclamation 2015). The preferred WaterFix alternative (4A) consists of three new diversion points in the north Delta, tunnel conveyance and ancillary facilities, operational elements, restoration measures, and an adaptive management program (DWR and Reclamation 2015). The Supplemental Draft EIS/Partially Recirculated Draft EIR also included updates to the BDCP alternative as well as other revisions and updates to the 2013 Draft EIR/EIS analyses. In addition, the state proposed as a separate program, California EcoRestore, to provide restoration efforts for species conservation independent of the SWP facility upgrades.

The Final EIS/EIR for the BDCP/California WaterFix that identified the California WaterFix for implementation was released in December 2016 (DWR and Reclamation 2016). Biological Opinions for the California WaterFix were release in June 2017 and a Notice of Determination (NOD) was filed in July 2017. In July 2018, DWR released a Draft Supplemental EIR/EIS for California WaterFix, which analyzes several proposed changes designed to reduce the project’s footprint and costs, and minimize impacts on environmental resources in the Delta (DWR and Reclamation 2018). In May 2019, the California Water Fix effort was halted to allow for a new environmental evaluation of a modified Delta Conveyance Project that would shift from a previously proposed two conveyance tunnels down to one tunnel (DWR 2019). That evaluation is currently underway by DWR in coordination with the Delta Conveyance Design and Construction Authority (DWR 2019).

Bay-Delta Plan Update for the Lower San Joaquin River and Southern Delta

The State Water Resources Control Board adopted Bay-Delta Plan Update for the Lower San Joaquin River and Southern Delta in December 2018, which is designed to restore water flows through the Lower San Joaquin River and its tributaries. The plan sets a starting point for increased flows but also makes allowances for reduced river flows on tributaries where stakeholders have reached voluntary agreements to pursue a combination of flow and “non-flow” measures that improve conditions for fish and wildlife, such as habitat restoration and reducing predation (SWRCB 2018). The update includes improved instream flows February through June, the critical months for migrating fish on the Stanislaus, Tuolumne and Merced rivers, and a revision of the salinity standard for the southern Delta (SWRCB 2018).

B.F. Sisk Safety of Dams Modification Project

Reclamation and DWR are evaluating alternatives for the B.F. Sisk Dam Safety of Dams (SOD) Modification Project to address dam stability and safety concerns at B.F. Sisk Dam. These concerns are associated with several sections of the B.F. Sisk Dam and select foundation materials in the event of seismic activity. The analyzed alternatives for the B.F. Sisk Dam SOD Modification Project would help prevent destabilization of the dam embankment, reduce safety concerns and maintain water supply deliveries to state and federal contractors. Reclamation and DWR released a Draft EIS/EIR for public review in May 2019 that identified a Crest Raise Alternative as the Proposed Action (Reclamation and DWR 2019). The Crest Raise Alternative would raise sections of the B.F. Sisk Dam crest by 12 feet and develop stability berms along sections of the embankment. The San Luis Reservoir Expansion Alternative evaluated in this EIS/EIR is as was noted in Chapter 2, would build upon and is a connected action under NEPA to the B.F. Sisk Dam SOD Modification Project Crest Raise Alternative. As a connected action the the B.F. Sisk Dam SOD Modification Project Crest Raise Alternative to effects generated by the San Luis Reservoir Expansion Alternative reported in this chapter already include the cumulative contribution of that connected action. The B.F. Sisk Dam SOD Modification Project Crest Raise Alternative's contribution to the other alternatives are detailed in this chapter.

California High Speed Rail Project

The CHSRA and United States Department of Transportation Federal Railroad Administration completed a programmatic EIS/EIR for the San Francisco to Central Valley portion of an approximately 800 mile long high speed rail network connecting San Francisco to San Diego. The track alignments considered in the EIS/EIR included one configuration traversing Pacheco Pass adjacent to SR 152 and San Luis Reservoir. The railway is being designed to support train speeds in excess of 125 miles per hour and would construct both at grade and tunnel sections through Pacheco Pass (CHSRA 2010).

The Final Partially Revised Programmatic EIS/EIR was released by the CHSRA April 6, 2012. The EIS/EIR identified the Pacheco Pass Network Alternative as the preferred alternative for consideration in future project level engineering and environmental compliance (CHSRA 2012).

The San Jose to Merced project section is part of the first phase of the California High-Speed Rail System that will provide a critical rail link between the Silicon Valley and the Central Valley. The approximately 84-mile project section would travel between stations in San Jose and Gilroy and (after passing through the Central Valley Wye) north to Merced or south to Fresno (CHSRA 2017). The Pacheco Pass tunnels and the extension to Merced will be the last link of the Silicon Valley to Central Valley Line to be constructed, with geotechnical analysis, environmental review, design, and right-of-way acquisition to be completed by 2022 (CHSRA 2018).

CVP Municipal & Industrial Water Shortage Policy

Allocation of CVP water supplies for any given water year is based upon forecasted reservoir inflows and Central Valley hydrologic conditions, amounts of storage in CVP reservoirs, regulatory requirements, and management of Section 3406(b)(2) resources and refuge water supplies in accordance with implementation of the Central Valley Project Improvement Act. In some cases, M&I water shortage allocations may differ between CVP divisions due to regional CVP water supply availability, system capacity, or other operational constraints (Reclamation 2015).

The purposes of the M&I Water Shortage Policy (WSP) are to:

- Define water shortage terms and conditions applicable to all CVP M&I contractors;
- Establish a water supply level that (a) with M&I contractors' drought water conservation measures and other water supplies will sustain urban areas during droughts, and (b) during severe or continuing droughts will, as far as possible, protect public health and safety; and
- Provide information to help M&I contractors develop drought contingency plans (Reclamation 2015).

The M&I WSP and implementation guidelines are intended to provide detailed, clear, and objective guidelines for the distribution of CVP water supplies during water shortage conditions, thereby allowing CVP water users to know when, and by how much, water deliveries may be reduced in drought and other low water supply conditions (Reclamation 2015). This increased level of predictability is needed by water managers and the entities that receive CVP water to better plan for and manage available CVP water supplies, and to better integrate the use of CVP water with other available non-CVP water supplies.

While the specific future policy and shortage allocation process is currently under evaluation, it is likely that both agricultural and M&I water service contractors will receive reduced allocations during shortage conditions. Reclamation will periodically reassess both the availability of CVP water supply and CVP water demand (Reclamation 2015).

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

The CDPR, in partnership with Reclamation, manages the majority of the San Luis Reservoir SRA. The CDPR planning process is integrated with Reclamation's Resource Management Planning Process. The CDPR, in partnership with Reclamation, has developed and adopted the San Luis Reservoir SRA RMP/GP (Reclamation and CDPR 2013), in order to direct the future development, operations and maintenance of the SRA. The plan was officially adopted in 2013 and has a life expectancy of 25 years. CDPR and Reclamation continue to collaborate on the San Luis Reservoir SRA RMP/GP to guide future growth.

The plan area consists of 27,000 acres owned by Reclamation and includes the water surfaces of San Luis Reservoir, O'Neil Forebay, Los Banos Reservoir, and adjacent recreation lands in the vicinity of Los Banos, California. The project area was built as part of the water storage and delivery system of reservoirs, aqueducts, power plants, and pumping stations operated under the

SWP and CVP. Lands managed by CDPR for recreation are part of the State Park system and comprise the SRA.

The plan's primary objective is to identify general areas in which future development may occur for recreation management. The plan includes an overview of existing conditions, including a summary of opportunities and constraints, a plan for future use and management of the project area, and the associated environmental analysis pursuant to NEPA and CEQA (Reclamation and CDPR 2013).

Los Vaqueros Reservoir Expansion Project, Phase 2

Expansion of Los Vaqueros Reservoir, owned and operated by Contra Costa Water District (CCWD), is being conducted in two phases. A Final EIS/EIR was completed in 2010 and served as the basis for Phase 1 construction, which was completed in 2012. A draft Supplement to the Final EIS/EIR (Supplement) was released to the public in July of 2017 to reflect changes since the 2010 Final EIS/EIR, including refined alternatives being considered for a Phase 2 expansion (Reclamation 2018b). In 2018, a Draft Feasibility Report was release evaluating the feasibility of expanding Los Vaqueros Reservoir from the recently expanded size of 160,000 acre-feet to 275,000 acre-feet and adding new conveyance facilities. The expansion could improve water supply reliability and water quality for San Francisco Bay Area water users, including through emergency storage (Reclamation 2017).

Pacheco Reservoir Reoperation Project

The Resource Conservation District of Santa Cruz County (RCDSCC), in cooperation with the SBCWD, PPWD, NMFS, and CDPR, developed operational guidelines for Pacheco Reservoir to improve water supply reliability through conjunctive management of surface water and groundwater supplies and to provide in stream flows to protect all life stages of steelhead downstream of Pacheco Reservoir (SBCWD 2013). Guidelines for Pacheco Reservoir were developed by constructing a watershed system simulation model which was used to evaluate environmental and water supply outcomes associated with alternate operation strategies. The guidelines were developed and finalized in 2015 (NOAA 2018).

San Luis Transmission Project

The San Luis Transmission Project will develop approximately 95 miles of new transmission lines connecting the Tracy Substation and the Dos Amigos Substation with segments crossing O’Neill Forebay and connecting to the San Luis Substation. Additional components of the San Luis Transmission Project will include two new 500-kV substations, substation improvements, communication facilities, improvements to existing access roads, and new permanent access roads (WAPA and SLDMWA 2015). The Final EIS/EIR for the San Luis Transmission Project was released in March 2016 with construction scheduled for 2021 (Linares 2018).

San Luis Solar Project

The San Luis Solar Project would allow a 30-year Land Use Authorization to access, install, operate, maintain, and remove a 26-megawatt alternating current solar facility. The project would be constructed on three sites adjacent to the San Luis Reservoir SRA, to the northwest of the SR 152/SR 33 interchange. The three sites will cover a total of 159 acres and consist of solar photovoltaic panels, racks to hold the panels, and electrical infrastructure (Reclamation 2018c).

The Final Environmental Assessment (EA) and Plan of Development for the San Luis Solar Project was released in May 2018, with construction scheduled for 2018.

Upper Guadalupe River Flood Control Project

The *Upper Guadalupe River Flood Control Project* follows upon the completed Downtown, and Lower Guadalupe River Projects. The project would provide flood protection along a 5.7 mile stretch of the Guadalupe River, from I-280 to Blossom Hill Road in the City of San Jose. In May 2010, construction began on the portion of the project from I-280 to the Union Pacific Railroad crossing just downstream of Willow Street. The project includes flood protection, habitat restoration, and fish passage components. Pending available Federal funds, remaining reaches of the Upper Guadalupe River may be completed by 2021 (SCVWD 2012).

Young Ranch Residential Project

In 2017, the Santa Clara County Planning Office prepared a Draft EIR for the Young Ranch Residential Project, a cluster subdivision consisting of 30 lots and a 4,000 square foot community center. The subdivision would be located on a 2,150 acre site southeast of downtown San Jose along Coyote Ridge, east of Highway 101. The project would develop 79 single-family homes and 16 secondary units and designate 1,947 acres as open space (Santa Clara County 2017).

Blanchard Road Warehouse/Distribution Center

An EIR is currently being prepared for the Blanchard Road Warehouse/Distribution Center, which would consist of a 415,000 square foot industrial warehouse on a 29.92 acre site on Blanchard Road in the Coyote Valley area south of San Jose. The site will be paved and would include 196 parking stalls for employee and visitors. Although the warehouse operator has not been identified, it is not anticipated that hazardous materials would be stored or distributed. Construction would take approximately nine months and would cover all site improvements as well as construction of the building. Blanchard Road would be widened to provide access to the site (City of San Jose 2016).

5.1.5 Cumulative Projections Considered for All Resources

This section describes the specific projections shown in Table 5-2 that have been used for the cumulative effects analysis.

Table 5-2. Summary of Projections Used in Cumulative Effects Analysis

Author	Document Title	Projections Used	Document Date
Merced County	Merced County General Plan – Revised Draft, Demographics & Economics. Background Report	Population Employment	2012
County of Santa Clara	Santa Clara County General Plan – Housing Element Update 2015-2022	Housing	2014
LAFCO Santa Clara County	Cities Service Review	Population	2015
County of Stanislaus	Stanislaus County General Plan and Airport Land Use Compatibility Plan Update Draft Program EIR	Population	2016

Source: Merced County 2013, Santa Clara County 2014, LAFCO of Santa Clara County 2015, and Stanislaus County 2016.

Notes: LAFCO = Local Area Formation Committee

Merced County General Plan – Background Report

The Background Report for the 2030 *Merced County General Plan* was released in December 2013. This document presents population and employment projections through 2030. The projections have been developed by the California Department of Finance (DOF).

Table 5-3 shows both past and projected population estimates from the General Plan's projections from 2013. The current DOF (2017) population projection for Merced County in 2030 has been revised downward, to 326,574, but the use of a higher population projection provides a more conservative cumulative impact analysis. Additionally, the table also displays average annual growth rates for each time period. As indicated in Table 26-3, the county's population had an average annual growth rate of 3.1 percent from 2000 to 2005 and 2.7 percent from 2005 to 2010 and a projected growth rate of 2.6 percent from 2010 to 2030 (Merced County 2013). Utilizing these population projections, the Background Report identifies an estimated population increase from 2010 to 2030 of approximately 141,000 people that will require housing within the county (Merced County 2013).

Table 5-3. Past and Projected Population Estimates Merced County and California (2000-2030)

	Merced County	
Year	Population	Average Annual Growth Rate
2000	210,544	--
2003	225,115	2.3 percent
2005	243,700	4.1 percent
2010	276,200	2.7 percent
2020	340,800	2.3 percent
2030	417,200	2.2 percent

Source: Merced County 2013

Employment growth projections presented in the Background Report identified approximately 27,600 jobs that would be added in Merced County between 2005 and 2030. Table 5-4 shows these employment projections for both unincorporated and incorporated areas within the county from 2005 to 2030.

Table 5-4. Past and Projected Employment Estimates Merced County (1990-2030)

Year	Observed/ Projected	Total Jobs	Average Annual Growth Rate
1990	Observed	77,300	--
2004	Observed	86,500	0.9 percent
2005	Projected	87,400	1.0 percent
2030	Projected	115,000	2.1 percent

Santa Clara County General Plan – Housing Element Update 2015-2022

The Housing Element Update 2015-2022 of the *County of Santa Clara General Plan* was adopted June 10, 2014 and certified on July 25, 2014. This document presents job growth projections through 2025. The projections have been developed by the Association of Bay Area Governments (ABAG).

Table 5-5 shows job growth trends from ABAG's Projections 2009. It projects that during the 2015 to 2025 period, Santa Clara County will add 196,290 jobs, growing an average of two percent annually. The projections for the unincorporated County also forecast an increase in employment of approximately 11 percent from 2015 to 2025. However, these projections and ABAG's methodology do not adequately take into account annexation of urban islands into the cities over time. For example, most of the islands with non-residential use patterns have been annexed into San Jose over the last several decades. Annexations are expected to continue.

Table 5-5. Santa Clara County Job Growth Trends

Job Growth Projections	2010	2015	2020	2025
Countywide Santa Clara County	906,270	981,230	1,071,980	1,177,520
Unincorporated Santa Clara County	50,400	53,590	56,670	59,690

Source: ABAG Projections 2009 in City of San Jose 2012

Local Area Formation Commission of Santa Clara County – Cities Service Review

The Local Area Formation Commission (LAFCO) of Santa Clara County completed a Cities Service Review that developed population, household, income, and employment projections for Santa Clara County through 2040. Table 5-6 shows the population projections.

Table 5-6. LAFCO Projections – Growth and Population Trends (2015-2040)

City	2015	2040	25-Year Growth	Average Annual Growth
Campbell	41,857	48,100	14.9%	0.60%
Cupertino	59,756	71,200	19.2%	0.77%
Gilroy	53,000	61,400	15.8%	0.63%
Los Altos	30,036	32,800	9.2%	0.37%
Los Altos Hills	8,341	8,600	3.1%	0.12%
Los Gatos	30,505	32,600	6.9%	0.27%
Milpitas	72,606	109,100	50.3%	2.01%
Monte Sereno	3,451	3,700	7.2%	0.29%
Morgan Hill	41,779	50,800	21.6%	0.86%
Mountain View	77,914	100,000	28.3%	1.13%
Palo Alto	66,932	84,600	26.4%	1.06%
San Jose	1,016,479	1,334,100	31.2%	1.25%
Santa Clara	120,973	156,500	29.4%	1.17%
Saratoga	30,799	32,700	6.2%	0.25%
Sunnyvale	148,028	194,300	31.3%	1.25%
Cities population and growth projections	1,802,456	2,320,500	28.7%	1.15%
Unincorporated	87,182	123,000	41.1%	1.64%
Countywide population and growth projections	1,889,638	2,443,500	29.3%	1.17%

Source: LAFCO of Santa Clara County 2015

5.2 Cumulative Effects Analysis

5.2.1 Water Quality

Implementation of the California WaterFix/California EcoRestore, 2018 Addendum to the Coordinated Operation Agreement, and 2018 Bay-Delta Plan Update for the Lower San Joaquin River and Southern Delta could result in long-term changes to Delta region operations and habitat health with the implementation of conservation and restoration measures designed to improve the health of the Delta ecosystem while also improving water supply and water quality conditions. Future improved conditions in the Delta region could result in increased south-of Delta exports. Changes in Delta water quality, South-of-Delta export of CVP and SWP water, and Delta outflow would result in a less than one percent change compared to existing conditions under all of the action alternatives and impacts would be minimal. **Therefore, cumulative impacts in combination with other projects in the Delta region would not result in significant cumulative impacts on water quality.**

Construction activities associated with the B.F. Sisk Dam SOD Modification Project would involve earth moving and construction projects at and similarly, the California High Speed Rail Project and near the San Luis Reservoir and the Pacheco Reservoir. Construction of trails, campgrounds, and wells identified in the San Luis SRA General Plan would involve earth moving and construction near the shore of the San Luis Reservoir. One cumulative project that could impact water quality in Alternative 3 vicinity is the Upper Guadalupe River Flood Control Project. Other construction is projected to occur in Merced and Santa Clara counties due to projected population growth. Construction of the action alternatives would involve earth moving activities that could introduce pollutants into the water and compromise water quality. Together, these projects could result in significant cumulative short-term effects associated with potential contaminants causing water quality degradation in nearby water bodies. However, the cumulative projects would be required to implement BMPs and mitigation measures to reduce impacts. **In addition, mitigation measures would be implemented under all of the alternatives to reduce impacts to water quality to a less than significant level and the alternatives' contribution, although cumulatively considerable pre-mitigation, would not be cumulatively considerable post-mitigation.**

5.2.2 Water Supply

Water supplies in California are currently constrained by hydrologic and regulatory conditions, and the CVP and SWP cannot deliver adequate supplies to meet demands in the Central Valley and Southern California. The California Delta Conveyance Project, the 2018 Addendum to the Coordinated Operation Agreement, the 2018 Bay-Delta Plan Update for the Lower San Joaquin River and Southern Delta, the CVP M&I WSP, Los Vaqueros Reservoir Expansion Project, the B.F. Sisk Dam SOD Modification Project and the Pacheco Reservoir Reoperation Project could result in short- and long-term changes in water supply availability. Projected growth in the area of analysis also could result in cumulative impacts and water demand. The WaterFix, the Addendum to the Coordinated Operation Agreement, and the M&I WSP would change the delivery patterns of CVP and SWP supplies, and population growth would increase water demands. The 2018 Bay-Delta Plan Update for the Lower San Joaquin River and Southern Delta could change the availability of exported water supply south of the Delta. The Los Vaqueros Reservoir Expansion Project would improve San Francisco Bay Area water supply reliability, along with increased Level 4 Refuge supplies. The B.F. Sisk Dam SOD Modification Project could potentially impact operations at San Luis Reservoir during construction activities on the dam crest. The Pacheco Reservoir Reoperation Project would improve water supply reliability for water users downstream of Pacheco Reservoir. New state regulations set to enact indoor and outdoor water use efficiency requirements in 2019, along with many county general plan provisions incorporate conservation efforts that would reduce the cumulative contribution associated with population growth.

Alternatives 2 through 5 would all produce beneficial impacts on water supply reliability within the SCVWD service area that would help offset potential cumulative water supply reliability effects under the cumulative condition and would help to reduce the significant cumulative water supply effects described above for SCVWD. Alternatives 2 and 3 result in small reductions to South-of-Delta agricultural deliveries to CVP contractors, and Alternatives 4 and 5 result in small reductions to SWP contractors. These reductions would be minimal and only evident in some water years. **Alternatives 2 through 5 would not have cumulatively considerable incremental contributions to a significant cumulative impact to water supply.**

Alternative 4, with the shear key option, would result in a short-term significant impact to CVP and SWP water supply deliveries due to construction. As discussed in Section 4.2.6, Reclamation evaluated the potential use of groundwater banking as an option to replace the lost storage in San Luis Reservoir and determined that given the availability of capacity in existing groundwater banks, the time necessary and complexity of developing a new groundwater bank with the capacity to reduce this impact to a less than significant level, that this option would not be feasible. Similarly, the use of water transfers to mitigate this impact was evaluated and was determined to be unable to meaningfully offset this impact given uncertainty with the availability of willing sellers of sufficient amounts of water and the availability of conveyance capacity to transfer those supplies at the time they are needed. The development of new surface storage at a different location to offset the lost capacity at San Luis Reservoir was determined to be infeasible given the potential for numerous significant environmental effects potentially generated by that action and the time necessary to develop this new storage facility. Given the environmental and technological limits and the time necessary to implement other potential options to offset this impact during the two water years that the Shear Key Option would restrict reservoir operations no feasible[1] mitigation has been identified to reduce these impacts to a less than significant level. **Cumulative water supply impacts would be significant and the temporary reduction under Alternative 4 during construction of the optional shear key would be cumulatively considerable.**

5.2.3 Groundwater Resources

SGMA requires those high and medium priority basins to be managed under a groundwater sustainability plan (GSP) by January 31, 2020. It requires all other groundwater basins designated as high or medium priority basins to be managed under a GSP by January 31, 2022. The GSP must achieve groundwater basin sustainability within 20 years of plan implementation and maintain sustainable yield for the following 50 years. A Groundwater Sustainability Agency (GSA) is a local entity tasked with developing the GSP and associated rules and regulations. The GSP will include provisions to avoid chronic lowering of groundwater levels, along with

[1] As defined in CEQA Guidelines Section 15364

avoiding significant and unreasonable degradation of water quality and land subsidence. When the GSP is in place and the basins are managed according to that GSP, the groundwater basin will be operated sustainably for the long term and not be subject to additional degradation of conditions. Any long-term lowering of water levels in the basin is also expected to slow after January 2020, when the GSP is required to be implemented. None of the alternatives would result in groundwater quality impacts. In addition, the GSP will also require the long-term sustainable management of water quality in the basin.

The decrease in deliveries to CVP agricultural contactors due to Alternative 2, Alternative 3, and Alternative 5's uninterrupted M&I deliveries to SCVWD during low point events could result in long-term supply shortages to agricultural contractors. Water supply shortages under the action alternatives could result in increases in groundwater pumping by these agricultural contractors in addition to existing groundwater pumping. This includes increase pumping from multiple groundwater aquifers that have been identified by DWR as critically overdrafted (DWR 2016). Therefore, given the critical overdraft of these aquifers, **Alternative 2, Alternative 3, and Alternative 5's incremental long-term contribution to this significant cumulative effect would be a cumulatively considerable impact.** No feasible mitigation has been identified to reduce these cumulative impacts to a less than significant level.

There would be no negative impacts to groundwater resources resulting from the construction and operation of Alternative 4 in the Santa Clara subbasin or Llagas subbasin, **therefore there would be no cumulative impacts.**

5.2.4 Flood Protection

The cumulative projects (new trails and facilities at San Luis Reservoir in the San Luis Reservoir SRA RMP/GP, construction and operation of the San Luis Transmission Project, San Luis Solar Project and California High Speed Rail Project Pacheco Pass segment) would have less than significant impacts to drainage flow and capacity, flood flows and increased flood hazard risk with implementation of mitigation measures. The B.F. Sisk Dam SOD Modification Project would improve flood risk conditions downstream of San Luis Reservoir during potential seismic events. Construction and operations of new facilities under Alternatives 2, 3, 4 and 5 would result in less than significant short-term impacts to drainage patterns and capacity, flood flows and increased flood hazard risk. **Overall, the action alternatives in combination with other cumulative projects would not result in a cumulative significant impact related to drainage, runoff, or flood flows or increase the risk of flood hazards.**

5.2.5 Geology and Soils

Of the cumulative projects considered for all resources, the San Luis Reservoir SRA RMP/GP (Reclamation and CDPR 2013), the California High Speed Rail Project, the B.F. Sisk Dam SOD Modification Project, San Luis Transmission Project and San Luis Solar Project are considered for cumulative geology, seismicity, and soils effects. Projected growth in the area of analysis could result in cumulative impacts to geology and soils. Development and construction in Merced and Santa Clara counties related to projected population growth would not likely occur near the alternatives and would not add to potential geology and soil effects. Construction projects related to projected growth would require individual geotechnical assessments to ensure soil stability and short- and long-term safety of people and structures. Construction activities, under all alternatives, would not directly influence earthquake activity. In the event of an earthquake, construction activities would follow the safety requirements of OSHA to reduce the potential for harm to construction workers or equipment. Similarly, construction of cumulative projects proposed would be subject to the same safety requirements. These cumulative projects, similar to all alternatives, however are not proposing permanent structures for human habitation. The California High Speed Rail Project would be designed to include safeguards to stop train traffic in the event of seismic activities to prevent any accidents caused by impacts to the tracks. The visitor facilities proposed under the San Luis Reservoir SRA RMP/GP would be subject to California building codes that require protection against seismic ground shaking. **Construction, operation, and maintenance of all action alternatives, with mitigation under Alternative 2, Alternative 4, and Alternative 5, in combination with other projects would not result in a short or long-term significant cumulative impact on geology, seismicity, and soils.**

There is the potential to encounter previously undetected but potentially significant paleontological resources during construction of Alternative 2, Alternative 4, and Alternative 5; however, Mitigation Measure PR-1 would reduce impacts to less than significant. The cumulative projects, with the exception of the B.F. Sisk Dam SOD Modification Project, would note generate ground disturbing actions within the same footprint as the alternatives. The combined effect of Alternative 4 and the B.F. Sisk Dam SOD Modification Project as a connected action on paleontological resources is presented in Chapter 4.While there would be no other cumulative projects with ground disturbing actions within the same footprint as the alternatives, these cumulative projects could also affect similar paleontological resources to Alternative 2, Alternative 4, and Alternative 5. **Therefore, cumulative impacts on paleontological resources would be significant, Alternatives 2, 4, and 5's incremental impacts would be cumulatively considerable pre-mitigation, but not cumulatively considerable post-mitigation.**

5.2.6 Air Quality

Air pollution, by definition, is a cumulative impact because no single project determines the California Ambient Air Quality Standards (CAAQS) or NAAQS attainment status of a region. Air pollution is largely a cumulative impact because the attainment status of the region is a result of past and present development. While a single project would not determine the region's attainment status, it would continue to add to any existing air quality issues and would have a significant cumulative effect. Because the Chapter 4 significance thresholds for criteria pollutants are intended to both attain and maintain the CAAQS and NAAQS, they are sufficient to determine if a project's individual air quality impacts would also be cumulatively considerable. This approach is consistent with the CEQA guidance documents developed by both the BAAQMD (2017) and the SJVAPCD (2015). Pre-mitigation exceedances of SJVAPCD mass emission thresholds for O_3 precursors would, in general, lead to the increased health risks described in Chapter 3 within the affected air basin. For relatively small projects such as the action alternatives, attempts to model regional O_3 concentration impacts and resulting health impacts pre- and post-mitigation would not be practical or produce meaningful information and are not included in the cumulative analysis. **For construction of Alternative 3, the incremental contribution to significant cumulative air quality impacts would not be cumulatively considerable. Alternative 2's (tunnel option and pipeline option) incremental short-term contribution to significant air quality impacts, although cumulatively considerable pre-mitigation, would not be cumulatively considerable post-mitigation. Because emissions would exceed the respective significance thresholds before and after mitigation, the**

temporary incremental contribution to significant cumulative air quality impacts for construction of Alternatives 4 and 5 would be cumulatively considerable pre-mitigation, and for NOx and CO remain cumulatively considerable post-mitigation.

5.2.7 Greenhouse Gas Emissions

No single project can noticeably change the global climate temperature; therefore, when considered in relationship to all past, present, and future development, implementation of the action alternatives would result in a significant cumulative impact. The significance criterion used to assess an alternative's individual significance is sufficient to determine if a project would conflict with an applicable plan, policy, or regulation adopted for reducing GHG emissions for which project-specific thresholds have been set. Therefore, if an alternative would produce GHG emission impacts that are individually significant, then the alternative would also be cumulatively considerable. **Therefore, the incremental contribution to the significant cumulative GHG effect for construction of Alternative 3 would not be cumulatively considerable because emissions are less than the significance criteria. The incremental contribution to the significant cumulative GHG effect for construction of Alternative 2, Alternative 4, and Alternative 5 would be cumulatively considerable because the criteria are exceeded, but with mitigation would not be cumulatively considerable.**

5.2.8 Visual Resources

If construction of the San Luis Transmission Project and the San Luis Solar Project were completed concurrently with either Alternative 2 or Alternative 4, construction of the B.F. Sisk Dam SOD Modification Project was completed concurrently with Alternative 2 or Alternative 5, and if construction of the California High Speed Rail Project was completed concurrently with Alternative 5, there could be a cumulative short-term impact on visual resources given the introduction of construction equipment, construction traffic and construction lighting. However, implementation of Mitigation Measures VIS-1, VIS-2, VIS-3, and VIS-4 would reduce effects of Alternative 2, Alternative 4, and Alternative 5 to a less than significant level. None of the cumulative projects would occur in close proximity to the Santa Teresa WTP under Alternative 3. **Therefore, although these alternatives may combine with other projects to create a cumulatively considerable contribution to significant cumulative visual impacts pre-mitigation, impacts would not be cumulatively considerable post-mitigation.**

5.2.9 Noise and Vibration

Cumulative projects and population growth in the area of analysis could result in cumulative impacts to noise. Construction is projected to occur in Merced and Santa Clara counties as a result of projected population growth; however, construction is not expected to be in the vicinity of San Luis Reservoir, Santa Teresa WTP, or Pacheco Reservoir. Construction of the California High Speed Rail Project or the B.F. Sisk Dam SOD Modification Project could occur at the same time as Alternative 5 and the San Luis Transmission Project and the San Luis Solar Project could occur at the same time as Alternative 2 or Alternative 4. These cumulative projects, along with the alternatives, would involve a substantial amount of construction equipment and vehicle traffic that would cause an increase in ambient noise levels in the project vicinity. Therefore, the contribution of Alternative 2, Alternative 4, and Alternative 5 to temporary significant cumulative noise impacts during construction **would be cumulatively considerable and remain cumulatively considerable post mitigation.** Construction noise under Alternative 3 would have a significant impact to noise and vibration that would be **cumulatively considerable pre-**

mitigation, although the impact would be reduced through Mitigation Measure NOISE-1 and **therefore would not be cumulatively considerable post-mitigation.**

Operation of the Alternative 2, 3, and 4 would have less than significant impacts and **would not contribute to any cumulative noise impacts.** Long-term operation of the pump station under Alternative 5 would have a significant impact to noise and vibration that would be **cumulatively considerable pre-mitigation,** although the impact would be reduced through Mitigation Measure NOISE-3 and **therefore would not be cumulatively considerable post-mitigation.**

5.2.10 Traffic and Transportation

Construction of projects considered for cumulative impacts in Merced County including the California High Speed Rail Project, the San Luis Reservoir SRA RMP/GP, the B.F. Sisk Dam SOD Modification Project and development projects related to projected growth in the county could create additional construction traffic in the area of analysis during the same time period. The San Luis Reservoir SRA RMP/GP notes that as specific projects at the SRA are developed, site-specific environmental analyses would be conducted, and mitigation measures would be implemented to reduce impacts to visitor access or circulation on local roads. In addition, construction of the California High Speed Rail Project and the B.F. Sisk Dam SOD Modification Project would include mitigation, such as adding signals to intersections to improve LOS/operations, to reduce transportation impact. For Alternatives 2, 3, 4, and 5, construction-related traffic increases would be temporary and would not degrade the LOS values of roads in the area of analysis below the LOS standard. Operations of Alternatives 2, 3, 4, and 5 would not result in long-term increases in traffic, there would be no public transit impacts, and there would be no cumulative effects on public transit. **Therefore, cumulative operational impacts on traffic flow would not be significant.** Construction of Alternatives 2, 3, 4, and 5 could generate a short-term significant cumulative impact on traffic safety that would be **cumulatively considerable pre-mitigation,** although the impact would be reduced through Mitigation Measure TR-1 and **therefore would not be cumulatively considerable post-mitigation.**

5.2.11 Hazards and Hazardous Materials

The cumulative projects (new trails and facilities at San Luis Reservoir proposed in the San Luis Reservoir SRA RMP/GP, construction of the B.F. Sisk Dam SOD Modification Project, construction and operation of the San Luis Transmission Project, San Luis Solar Project and California High Speed Rail Project Pacheco Pass segment) could generate significant impacts to hazards and hazardous waste. The construction and operation of Alternatives 2, 4 and 5 in combination with these cumulative actions could result in significant cumulative impacts on hazards and hazardous materials, including increasing wildfire risk and conflicting with emergency response, and each of these alternative's temporary contribution to these **impacts would be cumulatively considerable.** The implementation of mitigation measures would reduce the severity of these alternatives' significant impacts to a less than significant level. **Therefore, with implementation of Mitigation Measures HAZ-1 through HAZ-6 and Mitigation Measure TR-1, as applicable to Alternatives 2, 4, and 5, these alternatives' incremental contribution to significant cumulative effects on hazards and hazardous materials, although cumulatively considerable pre-mitigation, would not be cumulatively considerable post-mitigation. Alternative 3's hazards and hazardous materials impacts would be less than significant, and Alternative 3's incremental contributions to cumulative hazards and hazardous materials impacts would not be cumulatively considerable.**

5.2.12 Aquatic Resources

The San Luis Reservoir SRA RMP/GP, Upper Guadalupe River Flood Control Project, State Water Project Supply Allocation Settlement Agreement, the B.F. Sisk Dam SOD Modification Project, Los Vaqueros Reservoir Expansion Project, San Joaquin River Restoration Program, The Pacheco Reservoir Reoperation Project, California Delta Conveyance Project, 2018 Addendum to the Coordinated Operation Agreement, and 2018 Bay-Delta Plan Update for the Lower San Joaquin River and Southern Delta could result in short-term and long-term effects to aquatic resources. For Alternatives 2, 3, and 4 effects on aquatic habitat conditions would be largely localized to areas where special-status fish species do not occur, so there would be no contribution to significant cumulative effects. For Alternative 5 construction and operation of the expanded Pacheco Reservoir could cause short and long-term direct or indirect impacts to South-Central California Coast Steelhead and their habitat further contributing to their threatened status given adverse significant cumulative conditions on Pacheco Creek caused by low water flow and habitat loss. **This impact would be cumulatively considerable**, but implementation of Mitigation Measure BIO-1 and Mitigation Measure BIO-2 would reduce the impact from construction and operation and render the alternative's contribution to the significant adverse cumulative impact **less than cumulatively considerable post-mitigation**. Following construction, with the implementation of Mitigation Measure BIO-2, Alternative 5 would improve conditions on Pacheco Creek with increased creek flows beneficial to aquatic resources downstream of the expanded reservoir. **For all of the alternatives, any new diversions or other water operation changes with the potential to affect aquatic habitats in the Delta would be required to operate consistently with regulatory requirements, which are designed to avoid significant impacts to fisheries, leading to no cumulatively considerable contribution to significant cumulative effects in the Delta.**

5.2.13 Terrestrial Resources

Construction activities or operational impacts under Alternatives 2, 4, or 5 would result in significant impacts on terrestrial biological resources in the San Luis and Pacheco Reservoirs region. Alternatives described in the San Luis Reservoir SRA RMP/GP, the California High Speed Rail Project, the B.F. Sisk SOD Modification Project, the San Luis Transmission Project, and the San Luis Solar Project would also have impacts on terrestrial biological resources in the San Luis and Pacheco Reservoirs region. Together, these projects and implementation of Alternatives 2, 4, or 5 could result in significant cumulative effects associated with impacts on terrestrial biological resources, including loss of a large amount of habitat for wildlife and plants. **Incremental contributions of Alternatives 2, 4, and 5 to terrestrial biological impacts would be cumulatively considerable. With implementation of Mitigation Measures BIO-1 and BIO-2 and Mitigation Measures TERR-1 through 18, the incremental contribution of Alternative 2, 4 or 5 to significant cumulative effects on terrestrial biological resources, although cumulatively considerable pre-mitigation, would not be cumulatively considerable post-mitigation.**

Construction of Alternative 3 would not impact the terrestrial resources that Alternatives 2, 4 and 5 would impact, but could have significant impacts on migratory birds, including raptors, if active nests are disturbed during construction. The implementation of Mitigation Measure TERR-6 would minimize the potential for adverse effects on birds. No other cumulative activities or projects have been identified that would take place at the same time as construction of Alternative 3 that would impact migratory birds in the vicinity of the Santa Teresa WTP. **Therefore, there would be no significant cumulative effects at this location.**

5.2.14 Regional Economics

Delta Conveyance Project and the Los Vaqueros Reservoir Expansion Project would increase water exports to South-of-Delta contractors. This would increase water supply reliability for SCVWD and reduce economic effects associated with potential water shortages. The CVP M&I WSP would increase CVP water supplies to SCVWD during drought to avoid adverse public health and safety impacts. This also would avoid economic losses from water shortages. The SLLPIP alternatives would increase SCVWD water supply reliability during low point years and allow SCVWD to avoid economic effects of water shortages. Similar to the SLLPIP alternatives, construction expenditures for the California High Speed Rail Project and the B.F. Sisk Dam SOD Modification Project would result in economic output, labor income, and employment in Santa Clara and Merced counties. **Cumulatively, the projects would have a beneficial long-term economic effect.**

Alternative 2, Alternative 4, the San Luis Transmission Project, and the San Luis Solar Project would all result in closures of recreational facilities during construction. This would reduce the number of visitors to the San Luis Reservoir and reduce spending in Merced County, which would be an adverse short-term cumulative effect to the regional economy of Merced County. **The SLLPIP alternatives would contribute substantially to cumulative economic impacts related to reduced recreational spending in Merced County.**

Increases in population and jobs would increase economic activity as more housing would be developed and commercial development would likely increase. Industries with the largest projected job growth, in number of jobs, include health, educational, and recreational services; financial and professional services; manufacturing; wholesale; and transportation. There would be a long-term cumulative effect associated with job and population growth and the water supply provided by the SLLPIP alternatives**. This would be a positive, long-term cumulative effect.**

5.2.15 Land Use and Agricultural Resources

Delta Conveyance Project, the California High Speed Rail Project, CVP M&I WSP, San Joaquin River Restoration Program, the B.F. Sisk Dam SOD Modification Project, San Luis Solar Project, San Luis Transmission Project, and recreation area improvements in the San Luis Reservoir SRA RMP/GP could result in short-term and long-term changes in land use and agricultural resources. Projected growth in the area of analysis could result in cumulative impacts to land use and agricultural resources. Under Alternative 2 and 3 there would be no impacts to important farmland, no conflicts with zoning or land use plans, policies, or regulations, and no physical divisions of an existing community. Operation of Alternative 4 would increase the inundation area of San Luis Reservoir, but would not result in changes to land use nor the loss of Important Farmland or conflict with Williamson Act contracts. The cumulative projects and projected growth would occur outside of these areas of inundation. **Therefore, Alternatives 2, 3, and 4 in combination with other cumulative projects would not result in a significant cumulative impact related to land use and agricultural resources, and the impacts from the alternatives would not be cumulatively considerable.**

Operation of Alternative 5 would inundate grazing lands currently covered by Williamson Act contracts. The permanent inundation of this land would conflict with these Williamson Act contracts and would be **cumulatively considerable pre-mitigation,** although the impact would be reduced through Mitigation Measure LU-1 and **therefore would not be cumulatively considerable post-mitigation.**

5.2.16 Recreation

The San Luis Reservoir SRA RMP/GP, the B.F. Sisk Dam SOD Modification Project, and San Luis Transmission Project could result in short- and long-term changes in recreational facilities. The San Luis Reservoir SRA RMP/GP outlines future park improvements and expansion, while the San Luis Transmission Project could result in temporary closures of the Medeiros Use Area. Together, Alternative 2 and the B.F. Sisk Dam SOD Modification Project, and both Alterative 2 and Alternative 4, alongside the proposed improvements at San Luis Reservoir SRA, and the development of the San Luis Transmission Project could result in significant cumulative effects associated with recreation resources. **This temporary cumulative impact would be significant, and Alternative 2 and 4's short-term incremental contribution would be cumulatively considerable**, but implementation of Mitigation Measures REC-1 and REC-2 would reduce the impact of this construction and render the alternative's contribution to the significant adverse cumulative impact **less than cumulatively considerable. Alternatives 3 and 5 would have no or less than significant impacts on recreational facilities, and there would be no cumulatively considerable contribution to significant cumulative recreation impacts.**

5.2.17 Environmental Justice

The California High Speed Rail Project, the B.F. Sisk Dam SOD Modification Project, Young Ranch Residential Project, Blanchard Road Warehouse/Distribution Center for the San Luis Solar Project, San Luis Transmission Project, and recreation area improvements in the San Luis Reservoir SRA RMP/GP have been identified as cumulative projects with the potential to contribute to construction-related effects to minority and/or low-income populations within the area of analysis. Multiple, simultaneous construction projects at San Luis Reservoir could increase the likelihood of minority and/or low-income populations being adversely, disproportionately affected by air quality related construction effects. If construction of Alternatives 2 and 4 and implementation of other construction projects at San Luis Reservoir occurred at the same time, Alternatives 2 and 4 could contribute to an adverse cumulative effect on minority and/or low-income populations. However, the alternatives' effects would not be disproportionate given the similar demographic characteristics of all of the communities in the study area and the similar effects each community would experience. If Alternatives 3 and 5 are developed during the construction period of any of the identified cumulative projects or plans, Alternatives 3 and 5 could increase construction-related impacts on minority populations in addition to those already anticipated from the other cumulative construction projects. However, any potential effects from construction would be temporary and would be reduced by mitigation measures for air quality, noise and vibration, and traffic and transportation, as described in Chapter 4. **The impacts from the action alternatives would not be cumulatively considerable.**

5.2.18 Public Utilities, Services, and Power

Construction of projects considered for cumulative impact include the California High Speed Rail Project, the B.F. Sisk Dam SOD Modification Project, San Luis Transmission Project and San Luis Solar Project and the development projects related to projected growth in the counties. Construction associated with the cumulative projects would be subject to a SWPPP that would require the implementation of BMPs to control stormwater runoff during construction and comply with NPDES permit requirements. Over time, construction debris from other construction projects, and from future growth and development, could cause the landfill to reach capacity. However, the action alternatives' contributions to the regional landfills' remaining capacity would be minimal. Energy demand associated with construction of the cumulative projects, including the action alternatives, could be met by regional supplies, especially with construction efforts of the alternatives using generators.

Changes in operation of the action alternatives would not result in the need for additional energy supplies and would not result in significant energy impacts or the substantial depletion of local or regional energy supplies. Also, the action alternatives would not cause significant impacts on the provision of public services. **Therefore, the action alternatives in combination with other cumulative projects would not result in a cumulative significant short or long-term impact related to public utilities, services and power, and the impacts from the action alternatives would not be cumulatively considerable.**

5.2.19 Cultural Resources

The California High Speed Rail Project, the San Luis Transmission Line Project, the San Luis Solar Project, the B.F. Sisk Dam SOD Modification Project, and implementation of the San Luis Reservoir SRA RMP/GP have all been identified as cumulative actions that could result in significant short-term construction generated impacts to cultural resources, which include historical resources, unique archaeological resources, tribal cultural resources, and human remains. Archival and records search information, geoarchaeological sensitivity studies, and pedestrian inventory surveys were used to assess potential impacts to cultural resources within the SLLPIP area of analysis in Merced and Santa Clara counties. Alternative 3 would have no impact on cultural resources, so there would be no contribution to cumulative effects. For Alternatives 2, 4, and 5, the cumulative projects noted above could have a cumulatively significant effect on cultural resources, and **the incremental contributions of Alternatives 2, 4, and 5 to this impact would be cumulatively considerable.** Because Alternative 2 may involve impacts to cultural resources that cannot be identified, avoided, evaluated, or mitigated, **the incremental contribution to cumulative effects from this alternative would remain cumulatively considerable post mitigation.** Impacts under Alternatives 4 and 5 would be reduced through implementation of Mitigation Measures CR-1, CR-2 and CR-3, though given the alternatives' potential to increase mechanical and biochemical impacts generated by inundation and/or increased wave activity on known and unknown cultural resources that may be eligible for listing in the NRHP and/or the CRHR, the incremental contribution to **cumulative effects from these alternatives would remain cumulatively considerable post-mitigation.**

5.2.20 Population and Housing

The cities and counties expected to accommodate non-local workers for the duration of construction and operation for each alternative are expected to have projected growth through 2030 and have planned for this growth through their general plans by encouraging new development, including new housing (Merced County 2012, Stanislaus County 2016). Population increases in Merced and Santa Clara counties through 2040 are expected to be substantial in all nearby communities. This projected population increase, and the associated need for increased housing, is considered to be cumulatively significant. Alternatives 2, 3, 4, and 5 would have the potential to increase the population of any one of these four communities by a maximum of 119 non-local workers. These impacts would be temporary and would end after construction as the non-local workers would return to their places of origin. The number of new people attributable to the alternative is less than 1 percent of the population of any of the individual nearby communities, and only a fraction of 1 percent of the population of all four communities combined. No new housing is expected to be constructed for accommodation of the temporary workers, as sufficient available housing stock is expected to be available. **Therefore, the temporary incremental contribution to the significant cumulative effect associated with population and housing growth for Alternatives 2, 3, 4, and 5 would not be cumulatively considerable.**

5.2.21 Summary of Cumulative Effects

A summary of the cumulative effects identified for each alternative are presented in Table 5-7.

Table 5-7. Cumulative Effects Summary

Significance Criteria	Alt.	Contribution to Cumulative Condition	Mitigation
Water Quality			
Cause a violation of existing water quality standards or waste discharge requirements.	2-5	Not cumulatively considerable contribution to significant cumulative impact	None
Substantially degrade existing water quality conditions.	2-5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	WQ-1
In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.	2-5	Not cumulatively considerable contribution to significant cumulative impact	None
Conflict with or obstruct implementation of a water quality control plan.		Not cumulatively considerable contribution to significant cumulative impact after mitigation	WQ-1
Result in effects on water quality related beneficial uses.	2-5	Beneficial	None
Water Supply			
Substantially reduce the annual supply of water available to the CVP, SWP, or other water users.	2 -5	SCVWD - Beneficial	None
	2-5	South of Delta CVP Ag. and SWP (Operations) – Not cumulatively considerable contribution to significant cumulative impact	None
	4	South of Delta CVP Ag. and SWP (Construction) – Cumulatively considerable contribution to significant cumulative impact	None
Groundwater Resources			
Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin	2-5	Cumulatively considerable contribution to significant cumulative impact	None

Significance Criteria	Alt.	Contribution to Cumulative Condition	Mitigation
Cause a degradation in groundwater quality such that it would exceed regulatory standards or would substantially impair reasonably anticipated beneficial uses of groundwater	2-5	Not cumulatively considerable contribution to significant cumulative impact	None
Cause an increase in groundwater use that generates a net reduction in groundwater levels that would generate permanent/ inelastic land subsidence caused by water level declines	2-5	No cumulative impact	None
Conflict with or obstruct implementation of a sustainable groundwater management plan	2, 3, 5	No cumulative impact	None
	4	Beneficial	None
Flood Control			
Substantial alteration of the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would: (a) substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site, (b) impede or redirect flood flows.	2-3, 5	Not cumulatively considerable contribution to significant cumulative impact	None
	4	Not cumulatively considerable contribution to significant cumulative impact (Short-term) No cumulative impact (Long-term)	None
Geology and Soils			
Directly or indirectly cause potential substantial adverse effects, including risk of loss, injury, or death, through rupture of a known earthquake fault; strong seismic ground shaking; seismic-related ground failure; and landslides	2-5	Less than significant cumulative impact	None
Located on a geologic unit or soil that is unstable or would become unstable as a result of the project, and potentially would result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse	2-5	Less than significant cumulative impact	None
Complete construction on expansive soils creating a substantial risk to life or property	2-5	Less than significant cumulative impact	None
Result in substantial soil erosion or the loss of topsoil	2-5	Less than significant cumulative impact	None
Result in the loss of availability of a known mineral resource of regional or local importance	2-5	No cumulative impact	None
Result in long term impacts to geology, soils, or mineral resources	2-5	Less than significant cumulative impact	None
Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	2, 4-5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	PR-1
	3	No cumulative impact	None

Significance Criteria	Alt.	Contribution to Cumulative Condition	Mitigation
Air Quality			
Conflict with or obstruct implementation of the applicable air quality plan	2	Tunnel Option Constr. - Not cumulatively considerable contribution to significant cumulative impact after mitigation Pipeline Option Constr. –Not cumulatively considerable contribution to significant cumulative impact after mitigation Operation – Not cumulatively considerable contribution to significant cumulative impact	Tunnel - AQ-1, AQ-2, AQ-3 Pipeline - AQ-1, AQ-2, AQ-3, AQ-4, AQ-5
	3	Constr. – Less than significant cumulative impact Operation - Less than significant cumulative impact	None
	4	Constr. – Cumulatively considerable contribution to significant cumulative impact after mitigation Operation - Less than significant cumulative impact	AQ-1, AQ-2, AQ-6
	5	Constr. – Cumulatively considerable contribution to significant cumulative impact after mitigation Operation - Less than significant cumulative impact	AQ-1, AQ-2
Expose sensitive receptors to substantial pollutant concentrations	2-5	Less than significant cumulative impact	None
Cause temporary and short-term construction-related emissions of criteria pollutants or precursors that would exceed the general conformity de minimis thresholds.	2-3	No Adverse Impact	None
	4-5	General Conformity Determination Required	None
Create objectionable odors affecting a substantial number of people.	2-5	No cumulative impact	None
Greenhouse Gas Emissions			
Generate greenhouse gas emissions, either directly or indirectly, that could have a significant impact on the environment.	2, 4, 5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	GHG- 1 Carbon Offsets
	3	Not cumulatively considerable contribution to significant cumulative impact	None
Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	2, 4, 5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	GHG- 1 Carbon Offsets
	3	Not cumulatively considerable contribution to significant cumulative impact	None
Visual Resources			
Have a substantial adverse effect on a scenic vista (areas with Scenic Attractiveness Class A or Class B classifications are considered scenic vistas)	2	Not cumulatively considerable contribution to significant cumulative impact after mitigation	VIS-1, VIS-3
	3-5	No cumulative impact	None
Substantially damage scenic resources within a State scenic highway corridor.	2, 4	Not cumulatively considerable contribution to significant cumulative impact after mitigation	VIS-4
	3, 5	No cumulative impact	None

Significance Criteria	Alt.	Contribution to Cumulative Condition	Mitigation
Substantially degrade the existing visual character or quality of the site and its surroundings.	2	Not cumulatively considerable contribution to significant cumulative impact after mitigation	VIS-2
	3-5	No cumulative impact	None
Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.	2, 3, 5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	VIS-1
	3	No cumulative impact	None
Noise and Vibration			
Expose sensitive receptors to noise levels in excess of standards established in the local general plan or noise ordinance.	2-3	Less than significant cumulative impact	None
	4	Cumulatively considerable contribution to significant cumulative impact after mitigation	NOISE-1, NOISE-2, HAZ-5
	5	Cumulatively considerable contribution to significant cumulative impact after mitigation	NOISE-1, NOISE-2, NOISE-3, HAZ-5
Expose sensitive receptors to excessive groundborne vibration or groundborne noise.	2-5	Less than significant cumulative impact	None
Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.	2, 3, 5	Cumulatively considerable contribution to significant cumulative impact after mitigation	NOISE-1
	4	Cumulatively considerable contribution to significant cumulative impact after mitigation	NOISE-1, NOISE-2, NOISE-3
Operational sources located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport could expose people residing or working in the project area to excessive noise levels.	2-5	No cumulative impact	None
Traffic and Transportation			
Cause a substantial increase in traffic in relation to the existing traffic load and capacity of the street system	2-5	Less than significant cumulative impact	None
Substantially increase traffic hazards due to a geometric design feature or incompatible use.	2-5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	TR-1
Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities	2-5	No cumulative impact	None
Result in inadequate emergency access.	2-5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	TR-1
Hazards and Hazardous Materials			
Increase the risk of exposure from hazardous materials to the public and construction workers during alternative construction onsite, during the transport, use or disposal of hazardous materials offsite, and during long-term operations and maintenance activities.	2, 3	Less than significant cumulative impact	None
	4, 5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	HAZ-5
Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment	2-5	Less than significant cumulative impact	None

Significance Criteria	Alt.	Contribution to Cumulative Condition	Mitigation
Increase the potential for exposure to hazardous materials to local school children and staff with construction located within one-quarter mile of an existing or proposed school	2, 4,5	No cumulative impact	None
	3	Less than significant cumulative impact	None
Interfere with an active remediation site which could create a hazard to the public or the environment if contaminated soil and/or groundwater is encountered and released to the environment.	2	Not cumulatively considerable contribution to significant cumulative impact after mitigation	HAZ-1
	3	Less than significant cumulative impact	None
	4	Not cumulatively considerable contribution to significant cumulative impact after mitigation	HAZ-5
	5	No cumulative impact	None
Conflict with activities and operations at airports near or within the project area during construction, resulting in safety hazards for pilots or people working and residing in the area.	2, 4	Not cumulatively considerable contribution to significant cumulative impact after mitigation	HAZ-3, HAZ-4
	3, 5	No cumulative impact	None
Temporarily interfere with an emergency response plan or emergency evacuation plan for the project vicinity as a result of construction traffic and traffic controls impacting local roads.	2, 4, 5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	TR-1
	3	Less than significant cumulative impact	None
Increase the risk of wildfire within the vicinity of the project area through the use of mechanical equipment during construction	2, 4	Not cumulatively considerable contribution to significant cumulative impact after mitigation	HAZ-2
	3, 5	No cumulative impact	None
Aquatic Resources			
Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by CDFW, USFWS, or NMFS	2, 3, 4	San Luis Reservoir – No cumulative impact Delta - Not cumulatively considerable contribution to significant cumulative impact	None
	5	Pacheco Creek Construction - Not cumulatively considerable contribution to significant cumulative impact after mitigation Pacheco Creek Operation - Not cumulatively considerable contribution to significant cumulative impact Delta - Not cumulatively considerable contribution to significant cumulative impact	BIO-1, BIO-2
Interfere substantially with the movement of any native resident or migratory fish or aquatic-dependent species or with established native resident or migratory corridors, or impede the use of native nursery sites	2, 3, 4	No cumulative impact	None
	5	Pacheco Creek Construction - Not cumulatively considerable contribution to significant cumulative impact after mitigation Pacheco Creek Operation - No cumulative impact	BIO-1
Conflict with any local policies or ordinances protecting fisheries resources	2-5	No cumulative impact	None
Conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or State HCP	2-5	No cumulative impact	None

Significance Criteria	Alt.	Contribution to Cumulative Condition	Mitigation
Terrestrial Resources			
Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as an endangered, threatened, candidate, sensitive, or special-status species, riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW, NMFS, or USFWS	2	Not cumulatively considerable contribution to significant cumulative impact after mitigation	BIO-1, TERR-1 through 17
	3	Not cumulatively considerable contribution to significant cumulative impact after mitigation	BIO-1 TERR-6
	4	Not cumulatively considerable contribution to significant cumulative impact after mitigation	BIO-1, TERR-1 through 15
	5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	BIO-1, BIO-2 TERR-1 through 15, TERR-18
Have a substantial adverse effect on Federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coast, etc.) through direct removal, filling, hydrological interruption, or other means	2, 4, 5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	TERR-14, TERR-16
	3	No cumulative impact	None
Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites	2	Less than significant cumulative impact	None
	3	No cumulative impact	
	4	Not cumulatively considerable contribution to significant cumulative impact after mitigation	TERR-12, TERR-13, TERR-15
	5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	TERR-12, TERR-15
Conflict with any local policies or ordinances protecting biological resources, or adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or State conservation plan	2	Not cumulatively considerable contribution to significant cumulative impact after mitigation	TERR-1 through TERR-17
	3	Not cumulatively considerable contribution to significant cumulative impact after mitigation	BIO-1, TERR-18
	4	Not cumulatively considerable contribution to significant cumulative impact after mitigation	TERR-1, through, TERR-14, TERR-17
	5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	TERR-1, TERR-18
Regional Economics			
Changes in water supply to SCVWD due to low point interruptions could affect the regional economy.	2-5	Beneficial cumulative effect	None
Changes in water supply to CVP M&I users in the Bay Area could affect the regional economy.	2, 3	No cumulative effect	None
	4, 5	Beneficial cumulative effect	None
Changes in water supply to SWP M&I users in Bay Area and Southern California could affect the regional economy.	2, 3	No cumulative effect	None
	4, 5	Beneficial cumulative effect	None
Changes in water supply to agricultural users in the San Joaquin Valley could affect the regional economy.	2, 3	No cumulative effect	None
	4, 5	Beneficial cumulative effect	None

Significance Criteria	Alt.	Contribution to Cumulative Condition	Mitigation
Construction expenditures could increase employment, income, and output in the regional economy.	2-5	Beneficial cumulative effect	None
Operation and maintenance activities could increase employment, income, and output in the regional economy.	2-5	Beneficial cumulative effect	None
Changes in recreation opportunities could affect economic activity in Merced County related to San Luis Reservoir.	2, 4	Substantial contribution to adverse cumulative effect	None
	3, 5	No cumulative effect	None
Land Use and Agricultural Resources			
Cause an existing community to be physically divided	2, 3	No cumulative impact	None
	4,5	Not cumulatively considerable	None
Result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to nonagricultural use	2, 3	No cumulative impact	None
	4,5	Not cumulatively considerable	None
Conflict with existing zoning for agricultural use or a Williamson Act contract	2-4	No cumulative impact	None
	5	Not cumulatively considerable contribution to significant cumulative impact after mitigation	LU-1
Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environment effect	2, 3	No cumulative impact	None
	4,5	Not cumulatively considerable	None
Recreation			
Substantially reduce recreational use on trails as a result of project construction	2-5	No cumulative impact	None
Substantially reduce access to or close recreation areas as a result of project construction	2, 4	Not cumulatively considerable contribution to significant cumulative impact after mitigation	REC-1
	3, 5	No cumulative impact	None
Substantially contribute to overcrowding or exceed the facility capacity at other recreation sites by displacing users from San Luis Reservoir	2, 4	Not cumulatively considerable contribution to significant cumulative impact after mitigation	REC-1
	3, 5	No cumulative impact	None
Reduce access to recreation uses through long-term operational changes to water levels in recreational water bodies	2	No cumulative impact (non-low point years), Not cumulatively considerable (low point years)	None
	3, 5	No cumulative impact	None
	4	No cumulative impact (trail closures) after mitigation, Beneficial (water-based rec.)	REC-2
Environmental Justice			
Expose a minority and/or low-income population to adverse or disproportionately high effects or hazards from project construction.	2, 4	Adverse cumulative effect, would not disproportionately impact minority and low-income populations in the study area	None
	3, 5	Adverse cumulative effect, would not disproportionately impact minority populations in the study area	None
Public Utilities, Services, and Power			
Construction activities could affect the provision of governmental services or facilities including fire and police protection, and schools.	2-5	Less than significant cumulative impact	None

Significance Criteria	Alt.	Contribution to Cumulative Condition	Mitigation
Construction activities could result in the need for new water, wastewater, or stormwater facilities.	2-5	Less than significant cumulative impact	None
Construction activities would generate solid waste, the disposal of which could exceed the capacity of landfills designated to accommodate the project's solid waste disposal needs.	2-5	Less than significant cumulative impact	None
Construction activities could result in adverse impacts associated with the use and/or depletion of local or regional energy supplies.	2-5	Less than significant cumulative impact	None
Operations could result in increases in stormwater runoff and the need for new stormwater drainage facilities.	2-5	Less than significant cumulative impact	None
Changes in the operation of Pacheco Pumping Plant under the Lower San Felipe Intake Alternative could result in the need for additional capacity of energy supplies or the depletion of local or regional energy supplies.	2, 4	Less than significant cumulative impact	None
Long-term operations of the hypolimnetic aeration system could result in the need for additional capacity of energy supplies or the depletion of local or regional energy supplies.	2	Less than significant cumulative impact	None
Long-term operations could result in wasteful, inefficient, or unnecessary consumption of energy	2-5	Less than significant cumulative impact	None
Cultural Resources			
Result in adverse effects to historic properties listed or eligible for listing in the NRHP, and/or substantial adverse changes to historical resources or unique archaeological resources listed or eligible for listing in the CRHR	2	Cumulatively considerable contribution to significant cumulative impact after mitigation	CR-1
	3	No cumulative impact	None
	4, 5	Cumulatively considerable contribution to significant cumulative impact after mitigation	CR-1
Population and Housing			
Temporarily induce population growth in the area of analysis, and potentially require new housing to accommodate this growth	2-5	Not cumulatively considerable contribution to significant cumulative impact	None
Construction could displace people or houses, and potentially require construction of replacement housing.	2-5	No cumulative impact	None
Induce substantial population growth or housing in the area of analysis	2-5	No cumulative impact	None
Operations could displace a number of people or houses, and potentially require construction of replacement housing.	2-5	No cumulative impact	None

Key: Ag = agricultural; Alt = alternative; CVP = Central Valley Project; SCVWD = Santa Clara Valley Water District; SWP = State Water Project

Chapter 6 Disclosures, Coordination, and Supplemental Material

NEPA and CEQA require consideration of irreversible and irretrievable commitments of resources and significant and unavoidable impacts. These considerations are described in this chapter. In addition, this chapter summarizes activities undertaken by Reclamation and SCVWD for public and agency involvement required for SLLPIP. For a complete list of regulatory requirements necessary for implementation of the SLLPIP alternatives, see Appendix C. This chapter also provides supplemental information, including a list of preparers, acronyms, references, glossary, and index.

6.1 Irreversible and Irretrievable Commitment of Resources

Construction of all the action alternatives evaluated in this EIS/EIR would involve the consumption of non-renewable natural resources. These non-renewable natural resources would consist of petroleum for fuels necessary to operate equipment used during construction activities. This would include generation of waste from earth-moving activities during the tunneling action, dredging of soils during installation of the pipeline under Alternative 2, site preparation for the placement of new treatment infrastructure on new pads at the treatment plant under Alternative 3, preparation of the embankment for the placement of new materials and the demolition of sections of the Gianelli Intake Structure and an existing berm at the Pacheco Pumping Plant under Alternative 4, and demolition of an existing dam, and preparation of the site for a new dam under Alternative 5. Soils would be placed on site near the areas where they were excavated or potentially reused under some of the alternatives to support the development of new infrastructure. Construction waste from the disposal of non-soil materials removed during the construction of these alternatives would be hauled to regional landfills. Petroleum fuels would be used to haul these materials to the disposal sites. In addition to fuels used in transportation, the use of the disposal sites would constitute an irreversible and irretrievable commitment of resources. Operation of Alternatives 4 and 5 would also result in newly inundated lands. The commitment of this land would result in an irretrievable loss of this resource.

6.2 Significant and Unavoidable Impacts

Significant and unavoidable adverse effects refer to the environmental consequences of an action that cannot be avoided by redesigning the Project, changing the nature of the Project, or implementing mitigation measures. NEPA requires a discussion of any adverse impacts that cannot be avoided (40 CFR 1502.16). The CEQA Guidelines require a discussion on significant environmental effects that cannot be avoided and those that can be mitigated but not reduced to an insignificant level (Sections 15126.2[a] and 15126.2[b]). This section discusses the significant and unavoidable impacts of the action alternatives presented in Chapter 2.

Table 6-1 presents the impacts which, even after mitigation measures are implemented, may remain significant and unavoidable for the action alternatives.

Table 6-1. Summary of Significant and Unavoidable Impacts

Impact	Alternative	Mitigation Measures	Evaluation of Significant and Unavoidable Impacts
WS: Construction activities could cause temporary reduction in the annual supply of water available to the CVP, SWP, or other water users.	4	None	Section 4.2.6
AQ: Construction activities could cause temporary and short-term construction-related emissions of criteria pollutants or precursors that would exceed the significance thresholds.	4, 5	AQ-1: Reduction of construction-related emissions, AQ-2: On-road engine model year 2015 or newer, AQ-6: Pave all unpaved roads	Section 4.7.6 and Section 4.7.7
NOI: Construction activities could expose sensitive receptors to noise levels in excess of standards established in the local general plan or noise ordinance	4, 5	NOISE-1: Noise Control Plan, NOISE-2: Pre-Construction Surveys, Monitoring and Retrofit, HAZ-5: Blasting Plan - (Alts. 4 and 5) NOISE-3: Pump Station Enclosure - (Alt. 5)	Section 4.10.6 and Section 4.10.7
CUL: Project construction may result in direct impacts to or the inundation of known and unknown cultural resources eligible for listing in the NRHP and/or the CRHR may lie within the intake area APE that cannot be observed, recorded, evaluated, or mitigated.	2, 4, 5	NEPA-only mitigation: Avoidance, minimization of impacts, and/or mitigation measures, determined through completion of the Section 106 process, will be required prior to implementation of this alternative. CEQA and NEPA mitigation: CR-1: Complete Survey and Evaluation, CR-2: Avoidance and Minimization, CR-3: Inadvertent Discovery Plan	Section 4.20.4

Impacts with the potential to result in a cumulatively considerable contribution to a significant cumulative impact are shown in Table 6-2.

Table 6-2. Impacts of Action Alternatives with the Potential to Result in a Cumulatively Considerable Incremental Contribution to a Significant Cumulative Impact

Resource Area	Impact
Groundwater Resources	The alternatives could cause changes in water deliveries to South-of-Delta CVP and SWP contractors and changes in storage in San Luis Reservoir resulting in increased groundwater use.
Air Quality	The San Luis Reservoir Expansion Alternative could cause temporary and short-term construction-related emissions of criteria pollutants or precursors that would exceed the significance thresholds.
Noise and Vibration	Construction activities could cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels, even without the Project. Additionally, construction activities associated with the San Luis Reservoir Expansion Alternative could expose sensitive receptors to noise levels in excess of standards established in the local general plan or noise ordinance and could expose sensitive receptors to excessive groundborne vibration or groundborne noise.
Regional Economics	The reduced visitor spending that would occur for the 8 to 12 year construction period and would be a substantial cumulative effect to the regional economy in Merced County.
Environmental Justice	Exposure of a minority and/or low-income population to adverse or disproportionately high effects or hazards from project construction in combination with other cumulative projects.
Cultural Resources	Construction of the proposed intake tunnel or pipeline, road improvements, and use or modification of staging areas may alter or destroy known or unknown cultural resources.

6.3 Areas of Controversy and Issues to be Resolved

CEQA requires disclosure of areas of controversy raised by agencies and the public and issues to be resolved. Table 6-3 presents a summary of the project issues identified during the scoping period. The scoping reports (SCVWD 2002, United States Department of Interior [DOI] and Reclamation 2008) provide further information on issues identified by agencies and the public during the public scoping process. Issues to be resolved include the final selection of the proposed action/project, and final selection of mitigation measures to reduce significant impacts.

Table 6-3. Areas of Controversy and Issues Raised by Agencies and the Public

Areas of Controversy/Issue	Summary of Issue	Document/Section Addressing Issue
Impacts to Land Use and Agriculture	Impacts of the action alternatives on residential property, agriculture, and grazing lands in the project area if the action alternatives are implemented.	Section 4.16 Land Use and Agricultural Resources
Impacts to Wildlife	Impacts of the action alternatives on wildlife habitat for sensitive and/or special status species	Section 4.13 Aquatic Resources and Section 4.14 Terrestrial Resources
Alternatives Analyzed in the EIS/EIR	Safety issues related to flooding and earthquake hazards if new dams were constructed. The range of alternatives considered in the EIS/EIR.	Chapter 2 Project Description

Areas of Controversy/Issue	Summary of Issue	Document/Section Addressing Issue
Impacts to Recreation, Power and Visual Resources	Impacts of the action alternatives on fishing, recreation, power generation and visual quality if the action alternatives are implemented	Section 4.9 Visual Resources, Section 4.17 Recreation, and Section 4.19 Public Utilities, Services and Power
Impacts to Water Quality	Impacts of the action alternatives on water quality if the action alternatives are implemented	Section 4.1 Water Quality
Federal Interest in the SLLPIP	Clarification of the Federal interest in the SLLPIP	Chapter 1 Introduction

Key: SLLPIP = San Luis Low Point Improvement Project

6.4 Agency Coordination

The development of the SLLPIP EIS/EIR, and implementation of the proposed action/project, has and will require coordination with a variety of Federal, State, and local agencies. The following sections describe these agencies and their roles in the process.

6.4.1 United States Fish and Wildlife Service

Reclamation initiated informal consultation with USFWS in July 2007 to ensure compliance with Endangered Species Act and the Fish and Wildlife Coordination Act. The USFWS provided Reclamation with a list of all the endangered species in each alternative's area of analysis that was utilized to support the analysis in Chapter 4. The USFWS will receive a copy of the Draft EIS/EIR for review. Depending on the preferred alternative's potential to affect ESA-listed species, Reclamation will either submit a letter documenting no effect or a Biological Assessment for compliance with ESA.

6.4.2 National Marine Fisheries Service

Construction activity could temporarily cause direct or indirect impacts to South-Central California Coast Steelhead and their habitat. If Alternative 5 is the preferred Alternative, consultation with NMFS would be initiated under Section 7 of ESA for construction related impacts on South-Central California Coast Steelhead.

6.4.3 U.S. Army Corps of Engineers

The SLLPIP has the potential to impact wetlands. Therefore, Reclamation and/or SCVWD will coordinate with the Corps Regulatory Division regarding any need for a CWA Section 404 permit.

6.4.4 California Department of Parks and Recreation

The CDPR manages the lands surrounding San Luis Reservoir. The NOI/NOP was sent to CDPR and CDPR will also receive a copy of this Draft EIS/EIR for their review. Reclamation and/or

SCVWD will coordinate with CDPR to discuss potential impacts to recreation from SLLPIP, and mitigation measures to reduce these impacts.

6.4.5 State Historic Preservation Officer

Implementation of the preferred alternative for the SLLPIP will require compliance with 54 United States Code (U.S.C.) § 306108, commonly known as Section 106 of the National Historic Preservation Act. To complete the Section 106 process, as outlined at 36 CFR Part 800, Reclamation is required to consult with SHPO, and afford the ACHP an opportunity to comment, regarding the effects of the proposed undertaking on historic properties. Historic properties are cultural resources that are listed, or eligible for listing, on the NRHP. Reclamation must complete the Section 106 process prior to the approval of the expenditure of Federal funds for the SLLPIP.

6.4.6 San Francisco Regional Water Quality Control Board and Central Valley Regional Water Quality Control Board

The preferred alternative for the SLLPIP could require several permits from the San Francisco RWQCB and Central Valley RWQCB including a dewatering permit, coverage under a NPDES permit for General Construction, and water discharge requirements for discharges to waters of the State. Reclamation and/or SCVWD will be consulting with the San Francisco RWQCB and Central Valley RWQCB to determine the correct permits and their requirements. Reclamation and the construction contractor will obtain these permits prior to construction. The San Francisco RWQCB and Central Valley RWQCB will receive a copy of the Draft EIS/EIR for review.

6.4.7 State Water Resources Control Board

SCVWD will be coordinating with SWRCB on the CWA Section 401 Water Quality Certification process that will be conducted concurrent with the CWA Section 404 permitting process. The SWRCB will receive a copy of the Draft EIS/EIR for review. SCVWD will also coordinate with SWRCB on the need for any new water rights required for an expanded Pacheco Reservoir.

6.4.8 San Joaquin Air Pollution Control District and Bay Area Air Quality Management District

The SLLPIP has the potential to impact air quality in Merced County and Santa Clara County. Reclamation and/or SCVWD will coordinate with the SJVAPCD regarding air quality impacts in Merced County and with BAAQMD regarding air quality impacts in Santa Clara County. SJVAPCD and BAAQMD will receive a copy of the Draft EIS/EIR for review.

6.4.9 California Department of Fish and Wildlife

The SLLPIP has the potential to affect species covered under the California Endangered Species Act. SCVWD will consult with the CDFW regarding the need for a Section 2081 incidental take permit under the California Endangered Species Act. A Lake or Streambed Alteration

Agreement from the CDFW will be required before project construction activities commence. SCVWD will be signing a contract with CDFW to provide ecosystem enhancement benefits for WSIP funding (refuge water supply and Pacheco Creek fisheries). The CDFW will receive a copy of the Draft EIS/EIR for review.

6.4.10 California Department of Water Resources

The SLLPIP alternatives would all change to varying degrees operations at San Luis Reservoir. San Luis Reservoir is jointly managed by Reclamation and DWR. DWR will receive a copy of the Draft EIS/EIR for review and, depending on the SLLPIP alternative selected for implementation, Reclamation and/or SCVWD will coordinate with DWR on potential changes to San Luis Reservoir operations.

DWR has administered grant funding to SCVWD for their participation in the SLLPIP and will file with the SWRCB for the water rights change necessary to expand the SWP place of use to include the south-of-Delta CVP service area. SCVWD will be signing a contract with DWR to provide emergency response benefits for WSIP funding.

The Division of Safety of Dams (DSOD) will evaluate and approve dam designs for Alternative 5. SCVWD will obtain a DSOD Dam Construction Permit before geotechnical borings are conducted at the Project site. An Operational License will be issued after the new dam, expanded Pacheco Reservoir, and appurtenant facilities are constructed.

6.4.11 California High Speed Rail Authority

The SLLPIP has the potential overlap with the construction of the California High Speed Rail Project, which could have a cumulative impact on roadway and highway traffic, air quality, staging locations and land uses, borrow acquisition, and waste disposal in the study area. Reclamation and SCVWD will coordinate with the HSRA on potential mitigation for any SLLPIP and high-speed rail cumulative impacts. HSRA will receive a copy of the Draft EIS/EIR for review.

6.4.12 Local Governments

The SLLPIP has the potential to impact facilities, land uses, and resources within Santa Clara and Merced Counties, the cities of Gustine and Los Banos in Merced County, and the cities of San Jose, Saratoga, Los Gatos, Milpitas, and Campbell, Gilroy and the Town of Los Gatos in Santa Clara County. The Santa Clara County Department of Planning and Development may require Encroachment and Building permits before construction activities commence. In addition, the SCVWD will need to obtain an Excavation Permit from the County for use in the proposed project’s borrow sites. These local governments will receive a copy of the Draft EIS/EIR for review. Reclamation and/or SCVWD will coordinate with these local governments potentially impacted by the SLLPIP.

6.5 Distribution List

Copies of the Draft EIS/EIR were sent to the following agencies and organizations:

6.5.1 Federal Agencies

- National Marine Fisheries Service
- NOAA Fisheries
- United States House of Representatives
- United States Senate
- U.S. Army Corps of Engineers
- U.S. Bureau of Indian Affairs
- U.S. Bureau of Land Management
- U.S. Bureau of Reclamation
- U.S. Department of the Interior, Office of the Solicitor
- U.S. Department of Justice
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service

6.5.2 State Agencies

- California Bay-Delta Authority
- California Department of Fish and Wildlife
- California Department of Parks and Recreation
- California Department of Transportation
- California Department of Water Resources
- California Environmental Protection Agency
- California High Speed Rail Authority
- California Office of Historic Preservation
- California Regional Water Quality Control Board (Region 5)
- California State Assembly
- California State Senate
- California State Water Resources Control Board

6.5.3 Regional and Local Parties

- Alameda County
- Bay Area Air Quality Management District
- City of Gilroy
- City of Gustine
- City of Los Banos
- City of San Jose
- Contra Costa County
- East Bay Municipal Utility District
- Fresno County
- Kern County
- Kings County
- Los Angeles County
- Madera County
- Merced County
- Orange County
- Pacific Gas & Electric
- San Benito County
- San Bernardino County
- San Diego County
- San Joaquin County
- San Joaquin Valley Air Pollution Control District
- San Luis Obispo County
- Santa Barbara County
- Santa Clara County
- Santa Clara Valley Water District
- Stanislaus County
- Tulare County
- Ventura County

6.6 List of Preparers

This EIS/EIR was prepared by Reclamation and SCVWD. A list of persons who prepared various sections of the EIS/EIR, significant background materials, or participated to a significant degree in preparing this EIS/EIR is presented below in Tables 6-4 through 6-6.

Table 6-4. Federal Agencies

Preparers	Agency	Role In Preparation
Michelle Denning	Bureau of Reclamation	Project objective identification, alternative formulation, EIS/EIR development and review
Lauren Frye	Bureau of Reclamation	EIS/EIR development and review
Nicole Johnson	Bureau of Reclamation	EIS/EIR development and review
Sharon McHale	Bureau of Reclamation	Project objective identification, alternative formulation, EIS/EIR development and review
Arlan Nickel	Bureau of Reclamation	EIS/EIR development and review
Michael Tansey, PhD.	Bureau of Reclamation	EIS/EIR development and review
Bill Taylor	Bureau of Reclamation	Alternative Screening

Table 6-5. Regional Agencies

Preparers	Agency	Role In Preparation
Behzad Ahmadi	SCVWD	Groundwater modeling
Tom Boardman	SLDMWA	Project objective identification, alternative formulation
Tracy Hemmeter	SCVWD	EIS/EIR development and review
Kellye Kennedy	SCVWD	Project objective identification, alternative formulation, EIS/EIR development and review
Yaping Liu	SCVWD	Groundwater modeling
Michael Martin	SCVWD	EIS/EIR development and review
Frances Mizuno	SLDMWA	Project objective identification, alternative formulation
Judy Nam	SCVWD	Groundwater modeling
Terri Neudorf	SCVWD	EIS/EIR development and review
Melih Ozbilgin	SCVWD	EIS/EIR development and review

Key: SCVWD = Santa Clara Valley Water District; SLDMWA = San Luis Delta-Mendota Water Agency;
WEAP = Water Evaluation and Planning

Table 6-6. Consultants

Preparers	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
CDM Smith			
Carrie Buckman, P.E.	B.S. Environmental Engineering and Urban Planning M. Environmental Engineering 20 years experience	Water Resources Engineer	Program Director
Yonnel Gardes	B.S. Civil Engineering M.S. Transportation Engineering 17 years experience	Transportation Planner	Traffic and Transportation
Donielle Grimsley	B.S. Biology 10 years experience	Environmental Scientist	Water Quality

Preparers	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
Brian Heywood, P.E.	M.S. Civil Engineering 18 years experience	Senior Water Resource Engineer	Groundwater
Anusha Kashyap	M.S. Environmental Engineering 8 years experience	Environmental Engineer	Groundwater, Water Supply and Socioeconomics
Laura Lawson	B.S. Environmental Studies 2 years experience	Environmental Planner	Geology and Soils, Visual Resources, Noise, and Environmental Justice
Terichael Office	B.S. Environmental Engineering 3 years experience	Environmental Engineer	Land Use, and Agricultural Resources
Christopher Park, AICP	M.S. City and Regional Planning 13 years experience	Water Resources Planner	Project Manager, Introduction, Project Description, Water Supply, Cumulative Impacts
Gwen Pelletier	M.S. Environmental Studies 13 years experience	Environmental Scientist	Air Quality and Greenhouse Gases
Gina Veronese	M.S. Agricultural and Resource Economics 16 years experience	Resource Economist	Socioeconomics
Suzanne Wilkins, AICP	B.S. Business Administration 25 years experience	Water Resources Planner	Hazardous Waste, Public Utilities, Flood Control, and Growth Inducing Impacts
Abbie Woodruff, AICP	M.S. Urban and Environmental Planning B.S. Geography B.S. Environmental Studies 4 years experience	Water Resources Planner	Document Review and Revision, Introduction, Project Description, Water Quality, Water Supply, Consultation and Coordination
Tyler Yniguez	B.S. Civil Engineering 4 years experience	Environmental Engineer	Public Utilities and Power, Population and Housing, Recreation
Pacific Legacy			
Katelyn Fittinghoff	B.A., 2 years experience	Technician - Prehistoric Archaeology	Cultural Resources
Marc Greenberg	M.A., 20 years experience	Supervisor - Prehistoric/Historic Archaeology	Cultural Resources
Rose Guthrie	B.A., 2 years experience	Technician - Prehistoric Archaeology	Cultural Resources
Lisa Holm	Ph.D., 20 years experience	Supervisor - Prehistoric/Historic Archaeology	Cultural Resources
John Holson	M.A., 35 years experience	Principal - Regulatory Compliance; Prehistoric/Historic Archaeology	Cultural Resources
Sandra Ledebuhr	B.A., 4 years experience	Technician - Prehistoric Archaeology	Cultural Resources

Preparers	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
Mary O'Neil	B.A., 15 years experience	Supervisor - Prehistoric/Historic Archaeology	Cultural Resources
Chris Peske	B.A., 5 years experience	Technician - Prehistoric Archaeology	Cultural Resources
Ellie Reese	M.A., 20 years experience	Supervisor - Historic Archaeology	Cultural Resources
Josh Varkel	B.A., 2 years experience	Technician - Prehistoric Archaeology	Cultural Resources
Environmental Science Associates			
Brian Pittman, CWB	M.S. Environmental Studies 19 years experience	Terrestrial Biologist	Terrestrial Resources
Julie Remp	B.S. Wildlife, Fish, and Conservation Biology 10 years experience	Terrestrial Biologist	Terrestrial Resources
Gerrit Platenkamp, Ph.D.	Ph.D. Ecology 24 years experience	Terrestrial Biologist	Terrestrial Resources
Christopher Fitzer	M. Environmental Planning 19 years experience	Fisheries Biologist	Fisheries Resources
Paul Bergman	M.S. Fisheries B.S. Fisheries and Biology 13 years experience	Fisheries Biologist	Fisheries Resources
MBK Engineers			
Lee Bergfeld	M.S. Civil Engineering, 18 years experience	Hydrological Modeling	Appendix B, CalSim modeling, SCVWD Model result integration
Walter Bourez	M.S. Civil Engineering, 24 years experience	Hydrological Modeling	Appendix B, CalSim modeling, SCVWD Model result integration
Ian Uecker	M.S. Civil Engineering, 2 years experience	Hydrological Modeling	Appendix B, CalSim modeling
Wesley Walker	M.S. Civil Engineering, 2 years experience	Hydrological Modeling	Appendix B, CalSim modeling

6.7 References

Executive Summary

Santa Clara Valley Water District (SCVWD). 2017. Pacheco Reservoir Expansion Project Proposition 1 Application. Accessed: 12 18 2018. Available at: https://cwc.ca.gov/Pages/WSIP/PachecoReservoir.aspx

Chapter 1, Introduction

California Date Exchange Center (CDEC). 2018. *San Luis Reservoir Storage Levels*. Accessed on: 09 14 2018. Available at: http://cdec.water.ca.gov/cgi-progs/selectQuery?station_id=SNL&sensor_num=15&dur_code=M&start_date=1968-10-01&end_date=2016-07-01.

Santa Clara Valley Water District (SCVWD). 2002. *San Luis Reservoir Low Point Improvement Project Scoping Summary Report*. October.

United States Department of Interior, Bureau of Reclamation (Reclamation). 2008. *San Luis Low Point Improvement Project Environmental Scoping Report*. December 2008. Accessed on: 25 03 2013. Available at: http://www.usbr.gov/mp/sllpp/docs/SLLPIP_EnvironmentalScopingReport.pdf.

United States Department of the Interior, Bureau of Reclamation (Reclamation) and Santa Clara Valley Water District (SCVWD). 2019. Draft San Luis Low Point Improvement Project Feasibility Report.

Chapter 2, Project Description

California Department of Water Resources (DWR). 2018. *Second Notice Regarding Necessary Repairs*. Letter from Sharon Tapia, Chief Division of Safety of Dams to Frank O'Connell, President Pacheco Pass Water District. April 6, 2018.

Santa Clara Valley Water District (SCVWD). 2017a. San Luis Low Point EIR/EIS, Screening of Combination Alternative from Further Evaluation. Letter from Melih Ozbilgin, SCVWD to Nicole Johnson, Reclamation. April 21, 2017.

---. 2017b. Pacheco Reservoir Expansion Project Proposition 1 Application. Accessed: 12 18 2018. Available at: https://cwc.ca.gov/Pages/WSIP/PachecoReservoir.aspx

United States Department of Interior. 2015. Department of Interior Agency Specific Procedures for implementing the Council on Environmental Quality's Principles, *Requirements, and Guidelines for Water and Land Related Resources Implementation Studies.* November 2015. Accessed on: 10 25 2016. Available at: http://elips.doi.gov/elips/0/doc/4244/Page1.aspx

United States Department of the Interior, Bureau of Reclamation (Reclamation). 2013. *San Luis Reservoir Expansion Draft Appraisal Report.* December 2013. Accessed on 09 12 2016. Available at: https://www.usbr.gov/mp/sllpp/docs/2013_11_19_DRAFT_San_Luis_Expansion_Appraisal_Report.pdf.

U.S. Water Resources Council. 1983. *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies.* Accessed on: 11 06 2012. Available at: http://planning.usace.army.mil/toolbox/library/Guidance/Principles_Guidelines.pdf.

Chapter 3, Affected Environment

Airport-Data. 2017. Airport-Data.com San Luis Reservoir Seaplane Base (0O0) Information. Accessed on 02 08 2017. Available at: http://www.airport-data.com/airport/0O0/.

American Meteorological Society. 2017. State of the Climate in 2017. Accessed on: 02 01 2019. Available at: https://www.ametsoc.org/ams/index.cfm/publications/bulletin-of-the-american-meteorological-society-bams/state-of-the-climate/.

California Air Resources Board (CARB). 2017. *Area Designations Maps / State and National*. Accessed on: 02 10 2018. Available at: http://www.arb.ca.gov/desig/adm/adm.htm.

California Date Exchange Center (CDEC). 2018. *San Luis Reservoir Storage Levels*. Accessed on: 09 14 2018. Available at: http://cdec.water.ca.gov/cgi-progs/selectQuery?station_id=SNL&sensor_num=15&dur_code=M&start_date=1968-10-01&end_date=2016-07-01.

California Department of Conservation (DOC), Division of Oil, Gas & Geothermal Resources (DOGGR).2010. Well Details Webpage. Accessed on: 23 08 2012. Available at: http://owr.conservation.ca.gov/Well/WellDetailPage.aspx?domsapp=1&apinum=04700082.

California Department of Conservation (DOC), Office of Mine Reclamation. 2012. Office of Mine Reclamation’s Mines On Line. Accessed 12 06 2011. Available at: http://www.conservation.ca.gov/omr/pages/index.aspx.

California Department of Fish and Wildlife (CDFW). 2018. California Natural Diversity Database RareFind 5, Version 5.2.14. Accessed on 10 12 2018. Available at: https://map.dfg.ca.gov/rarefind/view/RareFind.aspx

California Department of Forestry and Fire Protection (CAL FIRE). 2007. Santa Clara County Fire Hazard Severity Zones in SRA Map. Accessed on 10 04 2018. Available at: http://frap.fire.ca.gov/webdata/maps/santa_clara/fhszs_map.43.pdf

California Department of Parks and Recreation (CDPR). 2003. *San Luis Reservoir State Recreation Area, Brochure*. Accessed on: 11 28 2011. Available at: www.parks.ca.gov.

--- .2004. *Pacheco State Park Preliminary General Plan and Draft Environmental Impact Report*. Accessed on: 07 12 2011. Available at: www.parks.ca.gov.

--- .2011. Pacheco State Park Webpage. Accessed on: 11 28 2011. Available at: http://www.parks.ca.gov.

--- .2016. *Statistical Report*. 2015/2016 Fiscal Year. Accessed on: 11 03 2017. Available at: http://www.parks.ca.gov/pages/795/files/15-16%20Statistical%20Report%20FINAL%20ONLINE.pdf.

--- .2018. Main Use Area Attendance and Use Data. Provide by CDPR on 02 21 2019 via email between Gerald Heberling, Sector Superintendent, Four Rivers Sector and Tyler Yniguez, Environmental Engineer, CDM Smith.

California Department of Transportation (Caltrans). 2016. *Annual Average Daily Traffic for All Vehicles on California State Highways*. Accessed on: 01 10 2018. Available at: http://www.dot.ca.gov/trafficops/census/docs/2014_aadt_volumes.pdf.

California Department of Water Resources (DWR). 2001. *South Bay Aqueduct (Bethany Reservoir and Lake Del Valle)*. Accessed on: 05 13 2016. Available at: http://www.water.ca.gov/pubs/swp/south_bay_aqueduct__lake_del_valle_and_bethany_reservoir_/south-bay-aque.pdf..

--- .2014a. CASGEM Basin Summary. Accessed on: 05 17 2016. Available at: http://www.water.ca.gov/groundwater/casgem/pdfs/basin_prioritization/NCRO%2059.pdf http://www.water.ca.gov/groundwater/casgem/pdfs/basin_prioritization/SCRO%2013.pdf.

--- .2014b. Summary of Recent, Historical, and Estimated Potential for Future Land Subsidence in California. Accessed on: 05 17 2016. Available at: http://www.water.ca.gov/groundwater/docs/Summary_of_Recent_Historical_Potential_Subsidence_in_CA_Final_with_Appendix.pdf.

--- .2015. California State Water Project Final Delivery Reliability Report 2015. Accessed on: 08 23 2016. Available at: https://msb.water.ca.gov/documents/86800/144575dd-0be1-4d2d-aeff-8d7a2a7b21e4.

--- .2016a. Engineering: South Bay Aqueduct Enlargement Webpage. Accessed on: 05 31 2016. Available at: http://www.water.ca.gov/engineering/Projects/Current/SBA_Enlargement/.

--- .2016b. Alluvial Groundwater Basins and Subbasins within the San Joaquin River Hydrologic Region. Accessed on: 09 13 2016. Available at: http://www.water.ca.gov/groundwater/bulletin118/maps/SJ.pdf.

--- .2019. Delta Conveyance Next Steps. Accessed on: 07 12 2019. Available at: https://water.ca.gov/News/Blog/2019/June-2019/Delta-Conveyance-Next-Steps.

California Geologic Survey (CGS) .2002. *California Geomorphic Provinces, Note 36*. Accessed on: 12 05 2011. Available at: http://www.consrv.ca.gov/cgs/information/publications/cgs_notes/note_36/Documents/note_36.pdf.

California High Speed Rail Authority (CHSRA) and the US Department of Transportation Federal Railroad Administration. 2004. Bay Area to Merced Section Paleontological Resources Technical Evaluation, California High-Speed Train Program Environmental Impact Statement/Environmental Impact Report. Prepared by Parson, Inc. Sacramento, CA and Washington, D.C. January 2004.

Cartier, R..2002. Cultural Resource Evaluation of Three Treatment Plants for the Santa Clara Valley Water District. Study S-026184 on file at Northwest Information Center, Sonoma State University, Rohnert Park, California.

Central Valley Regional Water Quality Control Board (RWQCB). 2016. Letter to Michael Golden of California Department of General Services Real Estate Division – Professional Services Branch, Sacramento, California.

City and County of San Francisco. 2005. Application for Certification for San Francisco Electric Reliability Project Supplement A – Volume 1. Produced by CH2MHILL. March 2005.

City of Los Banos. 2003. Los Banos 2030 General Plan, Chapter 7, pp. 7-3 and 7-7. Accessed on: 10 06 2016. Available at: http://losbanos.org/wp-content/uploads/2013/09/plan_gp_chapter_7.pdf.

City of San Jose. *2011. Envision San Jose 2040 General Plan.* Adopted November 2011. Accessed on: 05 18 2016. Available at: https://www.sanjoseca.gov/index.aspx?nid=1737.

Dibblee, T.W. and J. A. Minch. 2005. Geologic map of the Santa Teresa Hills quadrangle, Santa Clara County, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-158, scale 1:24,000.

Environmental Science Associates (ESA). 2018. B.F. Sisk Safety of Dams Modification Project Biological Survey Report.

Farr, Jones and Liu. 2016. Progress Report: Subsidence in California, March 2015- September 2016. Available at: https://water.ca.gov/LegacyFiles/waterconditions/docs/2017/JPL%20subsidence%20report%20final%20for%20public%20dec%202016.pdf.

Federal Emergency Management Agency (FEMA). 2016. Federal Emergency Management Agency (FEMA) Flood Map Service Center. Accessed on: 09 06 2016. Available at: https://msc.fema.gov/portal/search?AddressQuery=san%20luis%20reservoir#searchresultsanchor.

--- .2018. Federal Emergency Management Agency (FEMA) Flood Map Service Center. Accessed on: 10 03 2018. Available at: https://msc.fema.gov/portal/search?AddressQuery=san%20luis%20reservoir#searchresultsanchor.

Gustine Unified School District (USD). 2013. The Gustine Unified School District Webpage. Accessed on: 05 18 2016. Available at: http://www.gustine.k12.ca.us.

Illingworth & Rodkin, Inc. 2010. *Envision San Jose 2040 General Plan Comprehensive Update Environmental Noise Assessment*. December 7. Accessed on: 06 07 2016. Available at: http://www.sanjoseca.gov/DocumentCenter/View/9389.

JRP. 2018. Draft Historic Resources Inventory and Evaluation Report for the B.F. Sisk Dam Corrective Action Study Merced County, California. July.

Kimmerer, Wim. 2004. Open Water Processes of the San Francisco Estuary: From Physical Forcing to Biological Responses. *San Francisco Estuary and Watershed Science*. 2(1).

Kohler, Susan. 2006. Aggregate Availability in California, Fifty-Year Aggregate Demand Compared to Permitted Aggregate Resources, Map. Map Sheet 52, updated in 2006. Published by the California Department of Conservation, California Geological Survey. Accessed on: 12 09 2011. Available at: http://www.conservation.ca.gov/cgs/information/publications/ms/Documents/MS_52_map.pdf.

Merced County. 1990. Merced County General Plan, Safety Element. Accessed on: 12 09 2011. Available at: http://www.co.merced.ca.us/index.aspx?nid=436.

--- 2013. *2030 Merced County General Plan.* December 10, 2013. Accessed on: 21 05 2016. Available at: http://www.co.merced.ca.us/DocumentCenter/Home/View/6766.

Minnesota IMPLAN Group (MIG), Inc. 2016. IMPLAN 2014 data set. Available at: http://implan.com.

Pacific Legacy. 2018. *Draft Cultural Resources Report for the San Luis Low Point Improvement Project, Merced and Santa Clara Counties, California.* December 2018.

San Joaquin County Office of Emergency Services (OES). 2003. Dam Failure Plan. Accessed on 10 06 2016. Available at: http://www.sjgov.org/OES/getplan/Dam_Emergency_PLAN.pdf.

San Luis & Delta-Mendota Water Authority (SLDWMA). 2016. Learn More: About Us Webpage. Accessed on: 07 18 2016. Available at: http://www.sldmwa.org/learn-more/about-us/

Santa Clara County. 1994a. *Santa Clara County General Plan.* San Jose, California. 2003. Resource Conservation, p. H-15.

--- .1994b. *Santa Clara County General Plan Draft Environmental Impact Report.*

--- .2006. *Santa Clara County Geologic Hazard Zones*, Index Map. October 2006.

--- .2012. Santa Clara Valley Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP). Accessed on: 03 18 2013. Available at: http://www.scv-habitatplan.org/www/ default.aspx.

--- .2013. *Land Use Plan Map for the 1995 Santa Clara County General Plan.* June 2013. Accessed on: 05 20 2016. Available at: https://www.sccgov.org/sites/dpd/DocsForms/Documents/LandusePlan_map_2013.pdf.

---	.2016. *Annual Monitoring and Conformance Report 2016*. Accessed on: 01 10 2018. Available at: http://www.vta.org/cmp/monitoring-report.

Santa Clara Valley Transportation Authority (VTA). 2014. Transportation Impact Analysis Guidelines. Adopted October 2014. Accessed on: 06 09 2016. Available at: http://www.vta.org/sfc/servlet.shepherd/document/download/069A0000001frgIIAQ.

Santa Clara Valley Water District (SCVWD). 2005. *Integrated Water Resources Planning Study 2003*.

---	.2010. *Santa Clara Valley Water District 2010 Urban Water Management Plan*. Accessed on: 10 31 2012.

---	.2012. *2012 Groundwater Management Plan*. Available at: http://www.water.ca.gov/groundwater/docs/GWMP/SF-1_SantaClaraValleyWD_GWMP_2012.pdf.

---	.2015. 2015 Urban Water Management Plan.

---	.2016. Watershed Information Webpage. Accessed on: 10 26 2016. Available at: http://www.valleywater.org/Services/WatershedInformation.aspx.

---	.2017. Annual Groundwater Report for Calendar Year 2017. Accessed on 10 21 2018. Available at: https://www.valleywater.org/sites/default/files/2018-08/2017%20Annual%20GW%20Report_Web.pdf

Smith, Jerry. 2007. Effects of Operation of Pacheco Reservoir on Steelhead. San Jose State University. Accessed on 12 18 2018. Available at: http://scv-habitatagency.org/Archive/ViewFile/Item/198.

United States (U.S.) Census Bureau. 2016a. *2012-2016 American Community Survey 5-Year Estimate.* Total Population, Occupancy Status, Vacancy Status. Accessed on: 03 10 2018. Available at: http:// http://factfinder.census.gov/.

---	.2016b. *American Community Survey, Five Year Estimates 2012-2016, ACS Demographic and Housing Estimates.* Accessed on: 04 10 2018. Available at: http://factfinder2.census.gov/.

---	.2016c. *American Community Survey, Five Year Estimates 2012-2016, Selected Economic Characteristics*. Accessed on: 04 10 2018. Available at: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_DP03&prodType=table

United States Department of Agriculture, Forest Service (USDA, Forest Service). 1995. *Landscape Aesthetics, A Handbook for Scenery Management.* Agricultural Handbook Number 701. Accessed on: 20 05 2016. Available at: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5412126.pdf.

United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 2016a. Web Soil Survey, *Custom Soil Resource Report for Merced and Santa Clara Counties,* Surface Texture, Merced County and Santa Clara County, California. Version 5, September 28, 2016.

--- .2016b. Web Soil Survey, *Custom Soil Resource Report for Merced and Santa Clara Counties*, Wind Erodibility Group, Merced County and Santa Clara County, California. Version 5, September 28, 2016.

--- .2016c. Web Soil Survey, *Custom Soil Resource Report for Merced and Santa Clara Counties*, Linear Extensibility, Merced County and Santa Clara County, California. Version 5, September 28, 2016.

--- .2018. Web Soil Survey, *Area of Interest Interactive Map*. Accessed on: 10 05 2018. Available at: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

United States Department of the Interior, Bureau of Reclamation (Reclamation). 2010. San Joaquin Kit Fox Early Evaluation Report. B.F. Sisk Dam, Central Valley Project, California. March.

--- .2011a. Reclamation website. San Luis Unit Project. Accessed on: 05 26 2016. Available at: http://www.usbr.gov/projects/Project.jsp?proj_Name=San+Luis+Unit+Project.

--- .2011b. San Felipe Division Project Webpage. Accessed on: 07 18 2016. Available at: http://www.usbr.gov/projects/Project.jsp?proj_Name=San%20Felipe%20Division%20Project

--- .2015. CVP Contract Delivery Information. Accessed on: 08 23 2016. Available at: http://www.usbr.gov/mp/cvp-water/docs/cvp-water-deliveries.pdf

--- 2016a. B.F. Sisk Dam (SCCAO). Accessed on: 06 06 2016. Available at: http://www.usbr.gov/mp/sod/projects/sisk/index.html.

--- .2016b. Summary of Water Supply Allocations. Accessed on 02 22 2017. Available at: https://www.usbr.gov/mp/cvo/vungvari/water_allocations_historical.pdf.

--- .2016c. Central Valley Project Latest Water Contracts. Accessed on: 07 18 2016. Available at: http://www.usbr.gov/mp/cvp-water/docs/latest-water-contractors.pdf

--- . 2017. About the Central Valley Project. Accessed on: 08 23 17. Available at: https://www.usbr.gov/mp/cvp/about-cvp.html.

--- .2018a. CVP Contract Water Delivery Information. Accessed on 07 12 2019. Available at: https://www.usbr.gov/mp/cvp-water/docs/cvp-water-deliveries.pdf.

--- .2018b. Delineation of Waters of the United States. B.F. SISK Dam Safety of Dams Modification Project Aquatic Resources Delineation, California. Draft

--- . 2019. CVP Historical Allocations. Accessed on 07 12 2019. Available at: https://www.usbr.gov/mp/cvo/vungvari/water_allocations_historical.pdf.

United States Department of the Interior, Bureau of Reclamation (Reclamation) and California Department of Parks and Recreation (CDPR). 2013. Final Resource Management Plan/General Plan and Final Environmental Impact Statement/Environmental Impact Report. June 2013. Accessed on: 21 05 2016. Available at: http://www.parks.ca.gov/pages/21299/files/sanluisrmp-gp_feis-feir_cover_thru_chap_1.pdf.

United States Environmental Protection Agency (USEPA). 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. Accessed on: 10 12 2018.

--- . 2018a. *The Green Book Nonattainment Areas for Criteria Pollutants*. Accessed on: 02 10 2018. Available at: https://www.epa.gov/green-book.

--- . 2018b. *Sources of Greenhouse Gas Emissions.* Accessed on: 02 01 2019. Available at: https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#t1fn1.

United States Fish and Wildlife Service (USFWS). 2008. Biological Opinion for Operation of State Water Project and Central Valley Project.

--- .2018. List of Threatened and Endangered Species that May Occur in your Proposed Project Location, and/or May be Affected by the San Luis Low Point Improvement Project. U.S. Department of Interior Fish and Wildlife Service. Sacramento Fish and Wildlife Office. https://ecos.fws.gov/ipac/ Accessed on: 10 04 2018.

United States Geologic Survey (USGS). 2011. *Geologic Hazards Science Center, EHP Quaternary Faults Interactive Map*. Accessed 12 06 2011. Available at: http://geohazards.usgs.gov/qfaults/map.php.

Chapter 4, Environmental Impacts

Bay Area Air Quality Management District (BAAQMD). 2017. *California Environmental Quality Act Air Quality Guidelines*. May. Accessed on: 04 10 2018. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

California Air Pollution Control Officers Association (CAPCOA). 2017. *California Emissions Estimator Model® User's Guide, Version 2016.3.2. Appendix D – Default Data Tables.* Prepared by BREEZE Software in collaboration with South Coast Air Quality Management District and the California Air Districts. July. Accessed on: 04 10 2018. Available at: http://www.caleemod.com/.

California Air Resources Board (CARB). 2004. *Statewide Commercial Harbor Craft Survey, Final Report*. March. Accessed on: 01 19 2012. Available at: http://www.arb.ca.gov/ports/marinevess/documents/hcsurveyrep0304.pdf.

--- . 2007. *Emissions Estimation Methodology for Commercial Harbor Craft Operating in California, Appendix B [2007 Rulemaking]*. Accessed on: 06 15 2016. Available at: http://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf.

--- . 2010. *Staff Report: Initial Statement of Reasons for the Proposed Rulemaking. Amendments to the Regulations to Reduce Emissions from Diesel Engines on Commercial Harbor Craft Operated Within California Waters and 24 Nautical Miles of the California Baseline.* May. Accessed on: 07 19 2012. Available at: http://www.arb.ca.gov/regact/2010/chc10/harborcraftisor.pdf.

--- . 2014. *EMFAC2014 Web Database*. Accessed on: 06 15 2016. Available at: http://www.arb.ca.gov/emfac/2014/.

--- . 2016. *California Emission Inventory and Reporting System (CEIDARS)– Particulate Matter (PM) Speciation Profiles –PMSIZE (Particle size fraction data for source categories)*. June 2. Accessed on: 06 15 2016. Available at: http://www.arb.ca.gov/ei/speciate/speciate.htm#filelist.

--- . 2017. OFFROAD2017 – ORION. Accessed on: 04 10 2018. Available at: https://www.arb.ca.gov/orion/.

California Department of Fish and Game. 1994. *State Fish and Game Staff Report Regarding Mitigation for Impacts to Swainson's Hawk in the Central Valley of California*. Accessed on 12 13 2018. Available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83992

California Department of Fish and Wildlife (CDFW). 2018. California Natural Diversity Database RareFind 5, Version 5.2.14. Accessed on 10 12 2018. Available at: https://map.dfg.ca.gov/rarefind/view/RareFind.aspx

California Department of Forestry and Fire Protection (CAL FIRE). 2007. Santa Clara County Fire Hazard Severity Zones in SRA Map. Accessed on 10 04 2018. Available at: http://frap.fire.ca.gov/webdata/maps/santa_clara/fhszs_map.43.pdf

California Department of Parks and Recreation (CDPR). 2003. *San Luis Reservoir State Recreation Area, Brochure*. Accessed on: 11 28 2011. Available at: www.parks.ca.gov.

California Department of Transportation (Caltrans). 2011. *Officially Designated Scenic Highways, Merced County* [map]. "Caltrans Scenic Highway Program". Accessed on: 20 05 2016. Available at: http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/merced.htm.

California Energy Commission (CEC). 2011. Cal-Adapt: Exploring California's Climate Change Research. Accessed on: 10 03 2013. Available at: http://cal-adapt.org/.

--- 2018.California Energy Demand 2018-2030 Revised Forecast. Accessed on: 04 22 2019. Available at: https://efiling.energy.ca.gov/getdocument.aspx?tn=223244.

--- 2019. Total System Electric Generation. 2017 Total System Electric Generation in Gigawatt Hours. Accessed on: 04 22 2019. Available at: https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html.

California Public Utilities Commission. 2011. California Energy Efficiency Strategic Plan. Accessed on: 04 17 2019. Available at: http://www.cpuc.ca.gov/general.aspx?id=4125.

Council on Environmental Quality (CEQ). 1997. *Environmental justice: guidance under the National Environmental Policy Act.* Washington, DC.

Environmental Science Associates (ESA). 2018. B.F. Sisk Safety of Dams Modification Project Biological Survey Report.

Federal Highway Administration (FHWA). 2006. *FHWA Roadway Construction Noise Model User's Guide, Final Report.* Accessed on: 06 07 2016. Available at: http://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/rcnm.pdf.

Gallardo, B., and D. C. Aldridge. 2018. Inter-basin water transfers and the expansion of aquatic invasive species. Water Research 143:282-291.

Intergovernmental Panel on Climate Change. 2014. Summary for Policymakers. In: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Core Writing Team, R.K. Pachauri and L.A. Meyer [eds.]). IPCC, Geneva, Switzerland, 151 pp. Accessed on: 22 06 2016. Available at: https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.

International Conference of Building Officials. 1994. *Uniform Building Code (UFC).* Accessed on 04 10 2018. Available at: https://www.alibris.com/Uniform-Building-Code-1994/book/10451571

JRP. 2018. Draft Historic Resources Inventory and Evaluation Report for the B.F. Sisk Dam Corrective Action Study Merced County, California. July.

Keefer, M. L., and C. C. Caudill 2014. Homing and straying by anadromous salmonids: A review of mechanisms and rates. Reviews in Fish Biology and Fisheries 24:333-368.

Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe (Eds.). 2014. *Climate Change Impacts in the United States: The Third National Climate Assessment*. U.S. Global Change Research Program. Accessed on: 12 21 2017. Available at: https://nca2014.globalchange.gov/downloads.

Micko, J. 2014. Comprehensive strategy and instructions for operation of Pacheco Reservoir.

Pacific Gas & Electric (PG&E). 2018. Integrated Resource Plan. Accessed on: 03 15 2019. Available at: https://www.pge.com/pge_global/common/pdfs/for-our-business-partners/energy-supply/integrated-resource-planning/2018-PGE-Integrated-Resource-Plan.pdf.

Sacramento Metropolitan Air Quality Management District (SMQAMD). 2015. SMAQMD Thresholds of Significance Table. May. Available at: http://www.airquality.org/LandUseTransportation/Documents/CH2ThresholdsTable5-2015.pdf

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2015. *Guidance for Assessing and Mitigating Air Quality Impacts, Final Draft*. March 19. Accessed on: 15 06 2016. Available at: http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf

Santa Clara County. 2003. Code of Ordinances. Chapter VIII: Control of Noise and Vibration.

--- .2018. Santa Clara Valley Agricultural Plan: Investing in our Working Lands for Regional Resilience. January 2018. Accessed on: 04 17 2019. Available at: https://www.sccgov.org/sites/dpd/DocsForms/Documents/SCV_ActionPlan.pdf.

Santa Clara Valley Water District (SCVWD). 2011. Best Management Practices Handbook. Document No. W751M01, Revision E. Effective Date January 24, 2011.

--- .2014. *Best Management Practices Handbook. Document No. W-751-037*, *Revision E.* Effective Date 09/25/2014.

--- .2017. Annual Groundwater Report for Calendar Year 2017. Accessed on 10 21 2018. Available at: https://www.valleywater.org/sites/default/files/2018-08/2017%20Annual%20GW%20Report_Web.pdf

Smith, Jerry. 2007. Effects of Operation of Pacheco Reservoir on Steelhead. San Jose State University. Accessed on 12 18 2018. Available at: http://scv-habitatagency.org/Archive/ViewFile/Item/198.

--- .2014. Habitat Conditions for steelhead in Pacheco Creek.

United States Department of Agriculture, Forest Service (USDA Forest Service). 1995. Landscape Aesthetics, A Handbook for Scenery Management. Agricultural Handbook Number 701. Accessed on: 20 05 2016. Available at: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5412126.pdf.

United States Department of the Interior, Bureau of Reclamation (Reclamation) and California Department of Parks and Recreation (CDPR). 2013. San Luis Reservoir State Recreation Area Final Resource Management Plan/General Plan and Final Environmental Impact Statement/ Environmental Impact Report. June. Accessed on: 06 07 2016. Available at: http://www.parks.ca.gov/pages/21299/files/sanluisrmp-gp_feis-feir_chap_2.pdf.

United States Department of Labor, Occupational Safety and Health Administration (OSHA). 2018. 1910.39- Fire prevention plans. Available at: https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.39

United States Environmental Protection Agency (USEPA). 2011. *Compilation of Air Pollutant Emission Factors (AP-42). Fifth Edition, Volume I. Chapter 13.2.1 Paved Roads*. January. Accessed on: 06 15 2016. Available at: http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf.

United States Fish and Wildlife Service (USFWS). 1999a. San Joaquin Kit Fox Survey Protocol for the Northern Range, U.S. Department of the Interior, Fish and Wildlife Service, June 1999.

--- .1999b. U.S. Fish and Wildlife Service Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance, U.S. Department of the Interior, Fish and Wildlife Service, April 1999.

--- .2002. *Recovery Plan for the California Red-legged Frog* (*Rana aurora draytonii*). May 2002. Accessed on: 12 13 2018. Available at: https://www.fws.gov/arcata/es/amphibians/crlf/documents/020528.pdf

--- .2007. National Bald Eagle Management Guidelines. U.S Fish and Wildlife Service, May.

--- .2011. Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance. Prepared by the Sacramento Fish and Wildlife Office. Accessed on: 10 31 2016.

Chapter 5, Cumulative Effects

Bay Area Air Quality Management District (BAAQMD). 2017. *California Environmental Quality Act Air Quality Guidelines*. May. Accessed on: 04 10 2018. Available at: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

California Department of Finance (DOF). 2017. Total Estimated and Projected Population for California and Counties: July 1, 2010 to July 1, 2060 in 5-year Increments. February 2017. Accessed on: 04 28 2017. Available at: http://www.dof.ca.gov/Forecasting/Demographics/Projections/.

California Department of Water Resources (DWR) and U.S. Department of the Interior, Bureau of Reclamation (Reclamation). 2015. *Bay Delta Conservation Plan/California WaterFix Public Review Partially Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement*. July 2015. Accessed on: 04 28 2017. Available at: http://baydeltaconservationplan.com/2015PublicReview/PublicReviewRDEIRSDEIS/PublicReviewRDEIRSDEIS_Links.aspx.

California High Speed Rail Association (CHSRA). 2010. *Bay Area to Central Valley High-Speed Train Revised Final Program Environmental Impact Report*. August 2010. Accessed on 04 10 2018. Available at: http://www.hsr.ca.gov/Programs/Environmental_Planning/bay_area.html

--- .2012. *Bay Area to Central Valley High-Speed Train Partially Revised Final Program Environmental Impact Report.* April 2012. Accessed on 04 10 2018. Available at: http://www.hsr.ca.gov/docs/programs/bay_area_eir/BayCValley12_EIR_Main_Text.pdf

--- .2017. San Jose to Merced Project Section Fact Sheet. Accessed on: 04 28 2017. Available at: https://www.hsr.ca.gov/docs/programs/statewide_rail/proj_sections/SanJose_Merced/SJ_to_Merced_Factsheet.pdf

--- .2018. Draft Revised 2018 Business Plan. Accessed on: 10 04 2018. Available at: https://www.hsr.ca.gov/docs/about/business_plans/Draft_Revised_2018_Business_Plan.pdf.

City of San Jose. 2012. Diridon Station Area Plan, Existing Conditions Report. Accessed on: 04 18 2017. Available at: http://planning.sanjoseca.gov/planning/diridon/Diridon_Existing_Conditions_Report/Diridon%20ECR_TOC.pdf.

--- .2016. *Notice of Preparation of a Draft Environmental Impact Report for the Blanchard Road Warehouse/Distribution Center Project*. Accessed on: 03 21 2017. Available at: http://www.sanjoseca.gov/DocumentCenter/View/61339.

--- .2016. *Bay Delta Conservation Plan/ California WaterFix Final Environmental Impact Report/ Environmental Impact Statement*. December 2016. Accessed on: 08 03 2018. Available at: http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Introduction_to_Final_EIR-EIS.sflb.ashx

--- .2018. *Draft Supplemental Environmental Impact Report/ Environmental Impact Statement*. July 2018. Accessed on: 08 03 2018. Available at: https://californiawaterfix.com/resources/draft-supplemental-environmental-impact-report-environmental-impact-statement/

Local Agency Formation Commission (LAFCO) of Santa Clara County. 2015. *Cities Service Review Final Report.* Adopted December 2, 2015. Accessed on: 09 09 2016. Available at: http://santaclaralafco.org/cities-service-review.

Merced County. 2012 Merced County General Plan – Revised Draft, Demographics & Economics. Background Report. P. 2-16. Accessed on 06 27 2016; Available at: http://www.co.merced.ca.us/pdfs/planning/generalplan/DraftGP/BackroundRpt_2030/MCGPU_BR_Ch2_DemEcon-2012-11-30.pdf.

--- . 2013. *2030 Merced County General Plan.* December 10, 2013. Accessed on: 21 05 2016. Available at: http://www.co.merced.ca.us/DocumentCenter/Home/View/6766.

National Oceanic and Atmospheric Administration (NOAA). 2018. Project and Performance Metrics Database, Pacheco Reservoir Reoperation Project. Accessed on: 12 27 2018. Available at: https://www.webapps.nwfsc.noaa.gov/apex/f?p=309:19:::::P19_PROJECTID:36330713.

San Benito County Water District. 2013. Pajaro River Watershed Integrated Regional Water Management Plan Update, Project Solicitation Form: Pacheco Reservoir Reoperation. Accessed on: 12 27 2018. Available at: http://www.sbcwd.com/reports/REVISED%20Pacheco%20Reservoir%20Reoperation%20Project%20Form.pdf.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2015. *Guidance for Assessing and Mitigating Air Quality Impacts, Final Draft*. March 19. Accessed on: 06 15 2016. Available at: http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf.

Santa Clara County. 2014. *County of Santa Clara Housing Element Update 2015-2022.* Accessed on: 05 20 2016. Available at: https://www.sccgov.org/sites/dpd/PlansOrdinances/GP/Pages/Housing.aspx.

--- .2017. *Draft Environmental Impact Report Young Ranch Residential Project*. Accessed on: 03 21 2017. Available at: https://www.sccgov.org/sites/dpd/DocsForms/Documents/10256_DEIR.pdf.

Santa Clara Valley Water District (SCVWD). 2012. Santa Clara Valley Water District Flood Protection Projects Webpage. Accessed on: 03 21 2013. Available at: http://www.valleywater.org/Services/FloodProtectionProjects.aspx.

Stanislaus County. 2016. *Stanislaus County General Plan and Airport Land Use Compatibility Plan Update Draft Program EIR*. April 2016. Modesto, California. P. 3.13-6.

State Water Resources Control Board (SWRCB). 2018. Media Release: State Water Board Adopts Bay-Delta Plan Update for the Lower San Joaquin River and Southern Delta. December 2018. Accessed on: 03 13 2018. Available at: https://www.waterboards.ca.gov/press_room/press_releases/2018/pr121218_bay-delta_plan_update.pdf.

United States Department of the Interior, Bureau of Reclamation (Reclamation). 2015. Central Valley Project Municipal and Industrial Water Shortage Policy Guidelines and Procedures. Accessed: 04 28 2017. Available at: https://www.usbr.gov/mp/cvp/mandi/docs/miwsp-guidelines.pdf

--- .2017. Los Vaqueros Reservoir Expansion Project Fact Sheet. June 2017. Accessed on: 12 18 2018. Available at: https://www.usbr.gov/mp/vaqueros/docs/los-vaqueros-expansion-fact-sheet.pdf.

--- .2018a. Addendum to the Coordinated Operation Agreement Central Valley Project/State Water Project Environmental Assessment. December 2018. Accessed on: 03 13 2018. Available at: https://www.usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=36503.

--- .2018b. Los Vaqueros Reservoir Expansion Investigation Federal Draft Feasibility Study. January 2018. Accessed on: 12 18 2018. Available at: https://www.usbr.gov/mp/vaqueros/.

--- .2018b. *San Luis Solar Project Final Environmental Assessment and Plan of Development.* Accessed: 05 10 2018. Available at: https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=23959.

United States Department of the Interior, Bureau of Reclamation (Reclamation), and the California Department of Parks and Recreation (CDPR). 2013. *San Luis Reservoir State Recreation Area, Resource Management Plan/General Plan, Environmental Impact Statement/Environmental Impact Report.*

United States Department of the Interior, Bureau of Reclamation (Reclamation), and the California Department of Water Resources (DWR). 2019. *B.F. Sisk Dam Safety of Dams Modification Project Draft Environmental Impact Statement/Environmental Impact Report*. Accessed on: 07 12 2019. Available at: https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=34281

Western Area Power Administration and San Luis & Delta-Mendota Water Authority. 2015. *San Luis Transmission Project, Draft Environmental Impact Statement/Environmental Impact Report*. Accessed on: 04 28 2017. Available at: http://www.sltpeis-eir.com/projectdocs.html.

Chapter 6, Disclosures, Consultation, and Coordination

Santa Clara Valley Water District (SCVWD). 2002. *San Luis Reservoir Low Point Improvement Project Scoping Summary Report*. October.

United States Department of the Interior, Bureau of Reclamation (Reclamation). 2008. *San Luis Low Point Improvement Project. Environmental Scoping Report*. December 2008. Accessed on: 25 03 2013. Available at: http://www.usbr.gov/mp/sllpp/docs/SLLPIP_EnvironmentalScopingReport.pdf

Glossary

100-year flood: A flood having a 1% chance of being equaled or exceeded in magnitude in any given year.

acre-foot: The quantity of water required to cover 1 acre to a depth of 1 foot. Equal to 1,233.5 cubic meters (43,560 cubic feet).

affect/effect: To affect (a verb) is to bring about a change. An effect (usually a noun) is the result of an action.

affected environment: Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as a result of a proposed human action.

air quality: Measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

alternatives: Courses of action that may meet the objectives of a proposed action at varying levels, including the most likely future without the project or action. An environmental assessment or an environmental impact statement identifies and objectively evaluates and analyzes all reasonable alternatives, including a no action alternative.

Ambient Air Quality Standards (AAQS): The U.S. Environmental Protection Agency sets National Ambient Air Quality Standards (NAAQS), as required by the Clean Air Act, and the California Air Resources Board sets California Ambient Air Quality Standards (CAAQS), as required by the California Clean Air Act, for pollutants considered harmful to public health or the environment. AAQS are in place for six pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide.

ambient noise: Also called background noise, ambient noise is the background sound pressure level at a given location, normally specified as a reference level to study a new intrusive sound source.

aqueduct: Man-made canal or pipeline used to transport water.

aquifer: An underground geologic formation of permeable rock that stores, transmits, and yields significant quantities of groundwater to wells and springs.

archaeology: The study of human activity through the recovery and analysis of material culture. The archaeological record consists of artifacts, architecture, biofacts or ecofacts, and cultural landscapes.

assimilative capacity: The ability of a body of water to cleanse itself; to receive waste waters or toxic substances without deleterious effects and without damage to aquatic life or humans who consume the water.

bedrock: The solid rock at the surface or underlying other surface materials.

beneficial use: As defined in Water Code §13050, beneficial uses of the waters of the state include domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

berm: A horizontal strip or shelf built into an embankment or cut to break the continuity of the slope, usually for the purpose of reducing erosion or to increase the thickness of the embankment at a point of change in a slope or defined water surface elevation. A horizontal step in the sloping profile of an embankment dam.

best management practice (BMP): A policy, program, practice, rule, regulation, or ordinance for the use of devices, equipment, or facilities that is an established and generally accepted practice resulting in more efficient use or conservation of water, or a practice that has been given to indicate that significant conservation benefits can be achieved.

borrow area: The area from which natural materials, such as rock, gravel or soil, used for construction purposes is excavated.

California Environmental Quality Act (CEQA): California legislation that requires State, regional, and local agencies to prepare environmental impact assessments of proposed projects with potentially significant environmental effects and to circulate these documents to other agencies and the public for comment before making decisions. CEQA requires the lead agency to make findings for all significant impacts identified in an Environmental Impact Report. The lead agency must adopt all mitigation to reduce environmental impacts to a less-than significant level, unless the mitigation is infeasible or unavailable and there are overriding considerations that require the project to be approved. See Public Res. Code 21001.1, 21002, 21080; Guidelines 15002(c).

CalSim model: CalSim is a planning tool and model designed to simulate the operations of the CVP and SWP reservoir and water delivery system under current and future conditions. CalSim predicts how reservoir storage and river flows would be affected based on changes in system operations. CalSim output is typically used to help assess impacts on water supply, water quality, aquatic resources, and recreation.

Central Valley Project (CVP): As defined by Section 3403(d) of the Central Valley Project Improvement Act, “all Federal reclamation projects located within or diverting water from or to the watershed of the Sacramento and San Joaquin rivers and their tributaries as authorized by the Act of August 26, 1937 (50 Stat. 850) and all Acts amendatory or supplemental thereto, ...”

Central Valley Project water service contractor: Water users who have contracted with Reclamation for water developed by and conveyed through CVP facilities.

crest: The top surface of a weir or dam.

critical habitat: A description of the specific areas with physical or biological features essential to the conservation of a listed species and that may require special management considerations or protection. These areas have been legally designated via Federal Register notices.

cubic feet per second (cfs): A measure of the volume rate of water movement. As a rate of stream flow, a cubic foot of water passing a reference section in 1 second of time. One cubic foot per second equals 0.0283 meters per second (7.48 gallons per minute). One cubic foot per second flowing for 24 hours produces approximately 2 acre-feet.

cultural resources: Prehistoric and historic archaeological sites, architectural/built-environment resources (e.g., levees, weirs, buildings), and places important to Native Americans and other ethnic groups, generally 50 years old or older regardless of their significance.

dam: An artificial barrier that has the ability to impound water, wastewater, or any liquid-borne material, for the purpose of storage or control of water.

dam failure: Catastrophic type of failure characterized by the sudden, rapid, and uncontrolled release of impounded water or the likelihood of such an uncontrolled release.

delta: A low, nearly flat alluvial tract of land formed by deposits at or near the mouth of a river.

Dissolved Oxygen (DO): A commonly employed measure of water quality. The concentration of free (not chemically combined) molecular oxygen (a gas) dissolved in water, usually expressed in milligrams per liter, parts per million, or percent of saturation. DO levels are considered the most important and commonly employed measurement of water quality and indicator of a water body's ability to support desirable aquatic life.

earthquake: A sudden motion or trembling in the earth caused by the abrupt release of accumulated stress along a fault.

electrical conductivity: A measure of the total concentration of dissolved salts in water. A measure of a water’s ability to conduct electricity.

embankment: An earth structure, the top of which is higher than the adjoining surface.

Endangered Species Act (ESA) of 1973, as Amended: Federal legislation that is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend, and to provide programs for the conservation of those species, thus preventing extinction of plants and animals. The law is administered by the U.S. Department of the Interior’s Fish and Wildlife Service and Department of Commerce’s National Marine Fisheries Service, depending on the species.

erosion: The gradual wearing away of land by water, wind, and general weather conditions; the diminishing of property by the elements.

expansive soils: Soils that shrink and swell as a result of moisture changes.

exports: Water diverted from the Delta and conveyed to users outside the Delta.

fault: A fracture or fracture zone in the earth along which there has been displacement of the two sides relative to one another and which is parallel to the fracture.

filter: A material or constructed zone of earthfill that is designed to permit the passage of flowing water through it, but prevents the passage of significant amounts of suspended solids through it by the flowing water.

flood: A temporary rise in water levels resulting in inundation of areas not normally covered by water.

floodplain: Any land area susceptible to inundation by floodwaters from any source.

flow: The volume of water passing a given point per unit of time.

freeboard: Vertical distance between the reservoir surface elevation and the top of the dam.

groundwater: Any water naturally stored underground in aquifers, or that flows through and saturates soil and rock, supplying springs and wells.

groundwater basin: An alluvial aquifer or a stacked series of alluvial aquifers with reasonably well defined boundaries in a lateral direction and having a definable bottom.

groundwater level: Refers to the water level in a well, and is defined as a measure of the hydraulic head in the aquifer system.

Groundwater Management Plan: A comprehensive written document developed for the purpose of groundwater management and adopted by an agency having appropriate legal or regulatory authority.

groundwater overdraft: A condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years.

groundwater pumping: Quantity of water extracted from groundwater storage.

groundwater recharge: The natural and intentional infiltration of surface water into the zones of saturation.

groundwater subbasin: A subdivision of the groundwater basin created by dividing the basin using geologic and hydrologic conditions or institutional boundaries.

habitat: The place or environment where a plant or animal naturally lives and grows.

habitat conservation plan: A plan that outlines ways of maintaining, enhancing, and protecting a given habitat type needed to protect species; usually includes measures to minimize impacts, and may include provisions for permanently protecting land, restoring habitat, and relocating plants or animals to another area.

hazard: A situation that creates the potential for adverse consequences such as loss of life, property damage, or other adverse impacts.

hydroseeding: a planting process which utilizes a slurry of seed and mulch.

Indian Trust Assets (ITAs): Indian trust assets are legal interests in property held in trust by the federal government for federally recognized Indian tribes or individual Indians. “Assets” are anything owned that has monetary value.

inflow: Water that flows into a body of water.

intake: Any structure through which water can be drawn into a waterway. Any structure in a reservoir, dam, or river through which water can be discharged.

landslide: The unplanned descent (movement) of a mass of earth or rock down a slope.

lead agency: The government agency that has the principal responsibility for carrying out or approving a project and therefore the principal responsibility for preparing CEQA/NEPA documents. For the B.F. Sisk Dam Corrective Action Study EIS/EIR, U.S. Department of the Interior, Bureau of Reclamation is the Federal lead agency under NEPA and the California Department of Water Resources is the State lead agency under CEQA.

levee: A natural or artificial barrier that helps keep rivers from overflowing their banks.

liquefaction: The process in which soil loses cohesion when subject to seismic activity (i.e., shaking).

mitigation: To moderate, reduce, or alleviate the impacts of a proposed activity; includes, in order, (1) avoiding the impact by not taking a certain action or parts of an action; (2) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (3) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (5) compensating for the impact by replacing or providing substitute resources or environments.

National Environmental Policy Act (NEPA): Federal legislation establishing the national policy that environmental impacts will be evaluated as an integral part of any major Federal action. Requires the preparation of an Environmental Impact Statement for all major Federal actions significantly affecting the quality of the human environment.

Natural Community: A distinct and reoccurring assemblage of plants and animals associated with specific physical environmental conditions and ecological processes.

Notice of Determination (NOD): A brief notice to be filed by a public agency after it approves or determines to carry out a project subject to the requirements of CEQA.

outflow: The amount of water passing a given point downstream of a structure, expressed in acre-feet per day or cubic feet per second. Water flowing out of a body of water.

overtopping: Flow of water over the top of a dam or embankment.

paleontology: The study of the forms of life existing in prehistoric or geologic times, as represented by the fossils of plants, animals, and other organisms.

public involvement: Process of obtaining citizen input into each stage of the development of planning documents. Required as a major input into any Environmental Impact Statement or Environmental Impact Report.

qualitative: Having to do with quality or qualities. Descriptive of kind, type or direction, as opposed to size, magnitude or degree.

quantitative: Having to do with quantity, capable of being measured. Descriptive of size, magnitude or degree.

Reasonable and Prudent Alternative (RPA): Alternative action identified during formal consultation (under Section 7 of the ESA) that: (1) can be implemented in a manner consistent with the intended purpose of the action; (2) can be implemented consistent with the scope of the action agency's legal authority and jurisdiction; (3) are economically and technologically feasible; and (4) U.S. Fish and Wildlife Service or National Marine Fisheries Service believes would avoid the likelihood of jeopardizing the continued existence of listed species or result in the destruction or adverse modification of critical habitat (50 CFR 402.02).

Record of Decision (ROD): Concise, public, legal document required under the National Environmental Policy Act that identifies and publicly and officially discloses the responsible official's decision on an alternative selected for implementation. It is prepared following completion of an Environmental Impact Statement.

reservoir: A body of water impounded by a dam and in which water can be stored.

riprap: A layer of large uncoursed stone, precast blocks, bags of cement, or other suitable material, generally placed on the slope of an embankment or along a watercourse as protection against erosion.

salinity: The amount of dissolved salts in a given volume of water.

San Luis Low Point Improvement Project: Prepared jointly by the U.S. Department of the Interior, Bureau of Reclamation and the Santa Clara Valley Water District to address water supply reliability and schedule certainty issues for Santa Clara Valley Water District associated with low water levels in San Luis Reservoir.

Safety of Dams Corrective Action Study: Prepared jointly by the United States Department of the Interior, Bureau of Reclamation and the California Department of Water Resources to address dam stability and safety concerns associated with several sections of the B.F. Sisk Dam.

scenic vista: A viewpoint that provides expansive views of a highly valued landscape for the benefit of the general public. Areas with Scenic Attractiveness Class A or Class B classifications are considered scenic vistas.

sediment: Any finely divided organic and/or mineral matter deposited by air or water in nonturbulent areas.

seismicity: The frequency, intensity, and distribution of earthquake activity in a given area.

shear key: A device to transfer shear across a joint, usually a moveable immersion joint.

south-of-Delta: Water storage supplied with water exported south from the Delta.

State Water Project (SWP): California's State-owned and -operated water project consisting of 22 dams and reservoirs, which delivers water 600 miles from the Sacramento Valley to Los Angeles.

State Water Project water service contractor: Water users who have contracted with the California Department of Water Resources for water developed by and conveyed through SWP facilities.

stormwater: Untreated surface runoff into a body of water during periods of precipitation.

subsidence: A local mass movement that involves principally the gradual downward settling or sinking of the earth's surface with little or no horizontal motion.

Sustainable Groundwater Management Act (SGMA): Requires that all groundwater basins categorized as medium- and high-priority form a Groundwater Sustainability Agency and be managed under a Groundwater Sustainability Plan by January 31, 2020.

total maximum daily load (TMDL): Estimates of the amount of specific pollutants that a body of water can safely take without threatening beneficial uses.

Toxic Air Contaminants: According to Section 39655 of the California Health and Safety Code, a toxic air contaminant is "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose present or potential hazard to human health." Section 39655 also incorporates all federal hazardous air pollutants as toxic air contaminants by reference.

turbidity: A measure of the cloudiness of water caused by the presence of suspended matter. Turbidity in natural waters may be composed of organic and/or inorganic constituents, and has direct implications to drinking water treatment.

visual resources: The natural and artificial features of a landscape that characterize its form, line, texture, and color.

water year: A continuous 12-month period for which hydrological records are compiled and summarized. In California, a water year begins October 1 and ends September 30 of the following year.

water year hydrologic classification: Characterization of the hydrologic record for streams into wet, normal, and dry periods. Based on the Sacramento Valley Index, water year classifications are determined using the following equation:

$$INDEX = 0.4 * X + 0.3 * Y + 0.3 * Z$$

Where: X = Current year's April – July Sacramento Valley unimpaired runoff

Y = Current October – March Sacramento Valley unimpaired runoff

Z = Previous year's index

Classification	Millions of Acre-Feet
Wet	Equal to or greater than 9.2
Above Normal	Greater than 7.8 and less than 9.2
Below Normal	Equal to or less than 7.8 and greater than 6.5
Dry	Equal to or less than 6.5 and greater than 5.4
Critical	Equal to or less than 5.4

Index

A

B

C

D

E

F

G

H

I

L

M

N

O

R

S

T

U

V

W

This page left blank intentionally.