RECLAMATION

Managing Water in the West

North Valley Regional Recycled Water Program

Final Environmental Impact Statement
Volume I

U.S. Department of the Interior
Bureau of Reclamation

September 2015

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to 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.

North Valley Regional Recycled Water Program
Final Environmental Impact Statement

NEPA Lead Agency: United States Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, South-Central California Area Office

Cooperating Agencies: City of Modesto, City of Turlock, Del Puerto Water District, U.S. Fish and Wildlife Service, NOAA National Marine Fisheries Service

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) has prepared this Environmental Impact Statement (EIS) for the North Valley Regional Recycled Water Program (NVRRWP or proposed project).

The City of Modesto, City of Turlock, and Del Puerto Water District (Partner Agencies) propose to implement a regional solution to address water supply shortages in Del Puerto Water District's service area on the west side of the San Joaquin River in San Joaquin, Stanislaus and Merced Counties, south of the Sacramento-San Joaquin River Delta (Delta). The project would deliver up to 59,000 acre feet per year of recycled water produced by the cities of Modesto and Turlock to the Delta-Mendota Canal (DMC), a feature of the Central Valley Project owned by Reclamation. Water in the DMC would then be conveyed directly to DPWD turnouts for use in-district. This project also proposes to provide water to certain Central Valley Project Improvement Act designated refuges located south of the Delta to deliver a portion of their supplemental water needs.

The EIS evaluated two alternatives that use different pipeline alignments to convey water to the DMC, and a third alternative, which would continue river discharge and then divert and convey water to the DMC through expanded facilities owned by the Patterson Irrigation District. Reclamation and the Partner Agencies have identified the Combined Alignment Alternative as the Preferred Alternative in the Final EIS.

The EIS assesses potential environmental effects of the NVRRWP Action alternatives and a No Action Alternative on resources including: aesthetics, air quality, agriculture, biological resources, cultural resources, energy, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, population and housing, public services and utilities, recreation, transportation, socioeconomics, and environmental justice.

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Acronyms and Abbreviations

40 CFR Part 51	Code of Federal Regulations, Title 40, Part 51
A-2	General Agriculture (zoning)
AB	Assembly Bill
AF	Acre-feet
AFY	Acre-feet per year
Alpha-BHC	Alpha-Hexachlorocyclohexane
Alpha-HCH	Alpha-Hexachlorocyclohexane
APE	Area of Potential Effect
ASCE	American Society of Civil Engineers
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
BLAST	Bus Line Service of Turlock
BMPs	Best Management Practices
BNR	Biological Nu`trient Removal
BOD	Biochemical Oxygen Demand
BPS	Best Performance Standards
^{o}C	Degrees centigrade
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAL FIRE	California Department of Forestry and Fire Protection
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CalOSHA	California Division of Occupational Safety and Health
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCIC	Central California Information Center
CCP	Comprehensive Conservation Plan
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife

CDOC	California Department of Conservation
CDPH	California Department of Public Health
CEAT	Contractor Environenntal Awareness Training
CEC	California Energy Commission
CECs	Contaminants of Emerging Concern
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFNR	California Northern Railroad Company
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CH_4	Methane
CHRIS/CCIC	California Historical Resources Information System-Central California Information Center
CNDDB	California Natural Diversity Data Base
CNPS	California Native Plant Society
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
Commission	California Fish and Game Commission
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CSLC	California State Lands Commission
CVJV	Central Valley Joint Venture
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund
CY	cubic yards

DART	Dial-A-Ride of Turlock
dB	Decibel
dBA	A-weighted decibel
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DDW	Division of Drinking Water
Delta	Sacramento-San Joaquin River Delta
DMC	Delta-Mendota Canal
DPM	Diesel particulate matter
DPWD	Del Puerto Water District
Draft EIR/EIS	Draft Environmental Impact Report/Environmental Impact Statement
DTSC	(California) Department of Toxic Substances Control
DWP	(California) Drinking Water Program
DWR	Department of Water Resources
EC	Electrical conductivity
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMFAC	Emissions factors (model)
EO	Executive Order
EPA	(United States) Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERIP	Emission Reduction Incentive Program
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
^{o}F	Degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FMMP	Farmland Mapping and Monitoring Program
FPPA	Farmland Protection Policy Act
ft	feet

FTA	Federal Transit Administration
FWCA	Fish and Wildlife Coordination Act
GAMAQI	Guide for Assessing and Mitigating Air Quality Impacts
GGS	Giant garter snake
GHG	Greenhouse Gas
GRCD	Grasslands Resource Conservation District
GWD	Grasslands Water District
GWP	Global warming potential
H_2O	Water
H_2S	Hydrogen sulfide
HCP	Habitat Conservation Plan
HDD	Horizontal Directional Drilling
HFCs	Hydrofluorocarbons
Hp	horsepower
HPSR	Historic Property Survey Report
Hz	Hertz
I-5	Interstate 5
IL2	Incremental Level 2 (water delivery)
IL4	Incremental Level 4 (water delivery)
IPCC	Intergovernmental Panel on Climate Change
Jennings Plant	City of Modesto's Jennings Water Quality Control Facility
Jones Pumping Plant	C.W. "Bill" Jones Pumping Plant
LBV	Least Bell's vireo
LCFS	Low Carbon Fuel Standard
L_{dn}	day-night average noise level
L_{eq}	energy-equivalent noise level
LF	Linear Feet
L_{max}	maximum noise level
LOS	Level of Service
LRA	Locally Responsible Area
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MBR	Membrane bioreactor

MBTA	Migratory Bird Treaty Act
MEI	Maximally Exposed Individual
mg/L	milligrams per liter
mgd	million gallons per day
mL	milliliter
MLD	Most Likely Descendant
MMRP	Mitigation Monitoring and Reporting Program
MOU	Memorandum of Understanding
MP	Milepost
mph	Miles per hour
MPN	Most probable number
MPO	Metropolitan Planning Organization
MSDS	Material Safety Data Sheet
msl	Mean sea level
MUTCD	Manual on Uniform Traffic Control Devices
MVFPD	Mountain View Fire Protection District
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Comission
National Priority List	Federal Superfund Sites
National Register	National Register of Historic Places
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOD	Notice of Determination
NOI	Notice of Intent
NOP	Notice of Preparation

NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Area
NRCS	National Natural Resources Conservation Service
NVRRWP	North Valley Regional Recycled Water Program
NWP	Nationwide Permit
NWR	National Wildlife Refuge
O_3	Ozone
OBD	On-board diagnostic system
OSHA	Occupational Safety and Health Administration
Partner Agencies	City of Modesto, City of Turlock, Del Puerto Water District
Pb	Lead
P-D	Planned Development Zone
PFCs	Perflourocarbons
PG&E	Pacific Gas & Electric
PID	Patterson Irrigation District
PM_{10}	Particulate Matter $\leq$ 10 microns
$PM_{2.5}$	Particulate Matter $\leq$ 2.5 microns
ppb	parts per billion
ppm	parts per million
PPV	Peak particle velocity
PUA	Planned Urbanizing Area
PVC	Polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
Reclamation	Bureau of Reclamation
Recycled Water Policy	Policy for Water Quality Control for Recycled Water
RMS	Root mean square
ROG	Reactive organic gases
ROW	right-of-way
ROWD	Report of Waste Discharge
RPS	Renewables Portfolio Standard
RSL	Regional Screening Levels

RWQCF	(Turlock) Regional Water Quality Control Facility
SAA	Streambed Alteration Agreement
SCVWD	Santa Clara Valley Water District
SDC	Seismic Design Category
SDWA	Federal Safe Drinking Water Act
SF_6	Sulfur hexafluoride
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan (SIP)
SJKF	San Joaquin Kit Fox
SJV	San Joaquin Valley
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLDMWA	San Luis and Delta-Mendota Water Authority
SO_2	sulfur dioxide
SO_x	sulfur oxides
SOD	South of Delta
SR	State Route
SRA	State Responsibility Area
SRA	State Recreation Area
SSC	Species of Special Concern
StanCOG	Stanislaus Council of Governments
STaRT	Stanislaus Regional Transit
SWA	State Wildlife Area
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TDS	total dissolved solids
TID	Turlock Irrigation District
TMDL	Total Maximum Daily Load
TMP	Traffic Management Plan

U.S.	United States
U.S.C.	United States Code
UCR	Uniform Crime Reporting Program
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UV	Ultraviolet light
VdB	Vibration velocity in decibels
VELB	Valley elderberry longhorn beetle
VERA	Voluntary Emissions Reduction Agreement
VOC	Volatile organic compounds
WA	(State) Wildlife Area
WDR	Waste Discharge Requirements
WFPD	Westport Fire Protection District
WQCF	(Modesto) Water Quality Control Facility
WSCFPD	West Stanislaus County Fire Protection District
WSID	West Stanislaus Irrigation District

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Executive Summary

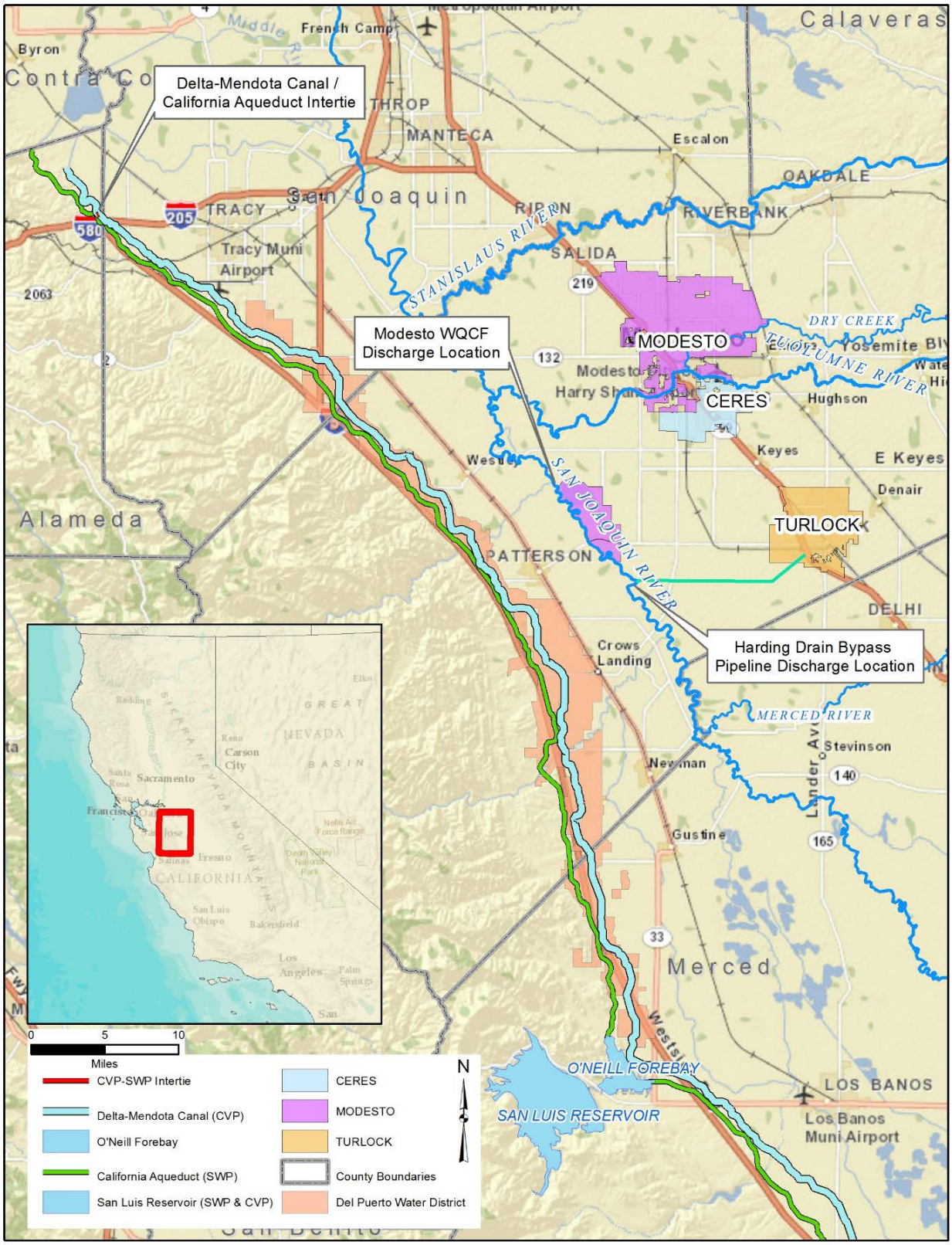
ES-1 Introduction

The U.S. Department of Interior, Bureau of Reclamation (Reclamation) as National Environmental Policy Act (NEPA) lead agency and the City of Modesto, as California Environmental Quality Act (CEQA) lead agency, prepared a Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) for the North Valley Regional Recycled Water Program (NVRRWP). The City of Modesto represents the Partner Agencies for the NVRRWP which include the Cities of Modesto and Turlock and the Del Puerto Water District (DPWD or District). The Partner Agencies have proposed the NVRRWP to address water supply shortages in DPWD's service area located on the west side of the San Joaquin River in San Joaquin, Stanislaus, and Merced Counties, south of the Sacramento-San Joaquin River Delta (Delta). The NVRRWP was developed in conformance with the requirements of Reclamation's Directives and Standards for the Title XVI Reclamation and Reuse Program (Reclamation Document WTR 11-01), including preparation of a Feasibility Study, which identified and evaluated feasible conveyance alternatives that were included in the Draft EIR/EIS.

The Draft EIR/EIS was developed to provide the public and responsible and trustee agencies reviewing the NVRRWP an analysis of the potential effects on the local and regional environment associated with construction and operation of the NVRRWP. The primary purpose of the NVRRWP is to provide recycled water from the Cities of Modesto and Turlock to DPWD (See **Figure ES-1**).

The NVRRWP would also provide supplemental water to certain south of Delta (SOD) Central Valley Project Improvement Act (CVPIA)-designated wildlife refuges and wetland areas. Although Reclamation and the City of Modesto prepared a Draft EIR/EIS for public review, due to timing constraints, the City of Modesto prepared a stand alone Final EIR (SCH# 2014042068) pursuant to CEQA requirements. The Final EIR was released on June 19, 2015 and the City of Modesto certified the Final EIR on July 7, 2015. Pursuant to NEPA requirements, Reclamation has prepared this Final EIS to address the alternatives, affected environment, and environmental consequences associated with Reclamation's federal discretionary actions and the proposed NVRRWP. The purpose of this Final EIS is to inform decisionmakers and stakeholders about the potential adverse and beneficial impacts of the Proposed Action and associated alternatives. This Final EIS also provides responses to comments received on the Draft EIR/EIS. Changes between this Final EIS and the Draft EIR/EIS, which are not minor editorial changes, are indicated by vertical lines in the left margin of this document. Additional changes have also been made to the document in order to comply with Reclamation's Visual Identity formatting and for clarity.

Figure ES-1: Project Vicinity



This EIS evaluates three Action alternatives compared to the No Action Alternative for the NVRRWP. Identification of the No Action Alternative and the three Action alternatives for this EIS was informed by the purpose and need of the project, as presented in *Section 1.2, Purpose and Need*; comments received during the scoping process, preparation of a Feasibility Study (RMC 2013), and preparation of the Draft EIR/EIS. Alternatives evaluated in the Feasibility Study but rejected from further consideration are discussed in *Section 2.7* of the Final EIS.The alternatives considered in the Final EIS include:

No Action Alternative, assumes that the proposed project would not be constructed and that recycled water would not be supplied to DPWD or to certain SOD refuges.

Alternative 1, Combined Alignment Alternative, would convey recycled water from the City of Turlock through a pipeline beginning at the end of the existing Harding Drain Bypass Pipeline north to the City of Modesto's Jennings Water Quality Control Facility (Jennings Plant), where it would be combined with recycled water from Modesto. From the Jennings Plant the pipeline would cross under the San Joaquin River, and convey water to the DMC. This alternative has been identified as the Preferred Alternative. Discharges to the river would be discontinued under this alternative.

Alternative 2, Separate Alignment Alternative, would include two separate pipelines to convey flows from Turlock and Modesto: one from the end of the Harding Drain Bypass Pipeline, crossing under the San Joaquin River and conveying flows to the DMC, and one from Modesto's Jennings Plant, crossing under the river and delivering water to the DMC. Discharges to the river would be discontinued under this alternative.

Alternative 3, PID Conveyance Alternative, would continue the existing Modesto and Turlock discharges to the San Joaquin River, which would function as a part of the conveyance system. Water would be diverted from the river through the Patterson Irrigation District (PID) intake and conveyed to the DMC through expanded PID facilities. Because the existing PID system does not have sufficient capacity to convey all of the recycled water flows from Modesto and Turlock, this alternative would need to include expansion of the existing PID intake structure on the San Joaquin River, and expansion of the conveyance system through construction of a new pipeline paralleling the PID Main Canal.

ES-2 Background

DPWD is located along the west side of the San Joaquin Valley adjacent to the DMC, and extends from near Vernalis in the north to near Santa Nella in the south. The District provides agricultural irrigation water to approximately 45,000 acres of productive farmland in Stanislaus, San Joaquin, and Merced Counties. Currently, DPWD's only source of water is through a contract with Reclamation for the delivery of up to 140,210 acre-feet (AF) of Central Valley Project (CVP) water annually.

Since the early 1990s, DPWD's CVP water allocations have been significantly reduced due to Delta pumping restrictions resulting from the passage of the CVPIA, water rights decisions that

were implemented to address Delta water quality objectives, National Marine Fisheries Service (NMFS) salmon and United States Fish and Wildlife Service (USFWS) Delta smelt biological opinions, and drought conditions. In 2014, DPWD received a 0 percent allocation of its CVP contract. Future CVP contract water deliveries to DPWD are uncertain, so DPWD is seeking a reliable alternative water supply.

DPWD's service area is located a little over five miles from Modesto's Water Quality Control Facility (Jennings Plant) and less than five miles from the end of Turlock's Harding Drain Bypass Pipeline, which will convey flows from the Turlock Regional Water Quality Control Facility (RWQCF) to a discharge located on the San Joaquin River. Both Modesto and Turlock have recycled water available that could be delivered to the District and its customers. This supply of recycled water from Modesto and Turlock could provide a long-term, reliable water supply for DPWD and its customers that would serve to augment DPWD's CVP supply.

In addition to provision of water to the DPWD service area, the NVRRWP would make recycled water available to certain SOD CVPIA-designated federal National Wildlife Refuges (NWRs), State Wildlife Areas (SWAs), and the privately-managed wetlands of the Grassland Resource Conservation District, collectively referred to herein as "refuges". Reclamation has a legislative obligation under the CVPIA, in cooperation with the USFWS,the California Department of Fish and Wildlife (CDFW)), the Grassland Water District (GWD), and the Central Valley Joint Venture (CVJV) to provide firm, average annual historical water deliveries (defined as Level 2, or L2 in the CVPIA) of suitable quality to the refuges' habitat areas. In addition to L2 deliveries, an additional increment of water supply is needed for optimal wildlife management (defined as incremental Level 4, or IL4 in the CVPIA). Provision of adequate and reliable water supplies (L2 and IL4) for the refuges to meet the CVPIA-mandated water levels has not been achieved "due in large part to state and federal budget shortages, inconsistency in the timing of water deliveries, and increases in the costs of blocks of water made available annually from willing sellers on the open market" (CVJV 2006).

ES-3 Purpose and Need

One of the authorized purposes of the CVP is to provide water for irrigation and domestic use within California's Central Valley. In recent years, SOD CVP contractors and CVPIA-designated wildlife refuges have experienced an increased reduction in CVP water allocations from historical amounts due to drought conditions and expanded Delta pumping restrictions. As a CVP contractor, DPWD has a need to establish alternative, reliable long-term agricultural water supplies to offset this reduction in supply. Also CVPIA Section 3406(d)(2) directs Reclamation to acquire and provide supplemental water to CVPIA-designated wildlife refuges in the Central Valley. The purpose of the project is to make the Cities' recycled water available to DPWD for agricultural purposes and to SOD refuges for wetland habitat purposes in support of migratory birds.

ES-4 Partner Agencies' CEQA Objectives

The overall objective of the proposed project is to maximize beneficial use of a sustainable, alternative water supply within the region, which would address reductions in water supplies from the CVP and reduce the reliance on groundwater use. Specifically, the objectives of the project are as follows:

- Establish an alternative, reliable, long-term water supply of up to 59,000 AF per year (AFY) of recycled water for DPWD and refuges.
- Maximize beneficial use of recycled water by DPWD customers and refuges.
- Maximize Partner Agencies' control of operations and delivery of water to DPWD and refuges, while recognizing the need for coordination with Reclamation and the San Luis & Delta-Mendota Water Authority (SLDMWA).
- Establish a long-term water right(s) to allow for the beneficial use of recycled water.
- Maximize use of existing facilities for treatment / delivery of recycled water.
- Provide supplemental annual water supplies annually to SOD refuges to meet CVPIA Sections 3406(b)(3) and 3406(d)(2) requirements.
- Avoid or minimize, through incorporation of design constraints and management practices, impacts to environmental resources such as surface water, groundwater supplies, land subsidence, groundwater quality and biological resources including sensitive species.
- Deliver agricultural water to DPWD at a cost that supports regional economic sustainability.

The proposed project is needed to offset the significant reduction in CVP water allocations to DPWD associated with Delta pumping restrictions, drought conditions, and climate change. In addition, the proposed project is needed to offset anticipated effects (e.g., overdraft, subsidence, water quality issues) from increased groundwater pumping that have occurred and would likely continue to occur with the absence of an alternative water supply.

ES-5 Feasibility Study

The NVRRWP Partner Agencies have worked cooperatively to define shared objectives and develop feasible alternatives to provide a supply of recycled water to DPWD. Their efforts culminated in the preparation of a Feasibility Study for the NVRRWP, which was completed in December 2013 (RMC 2013). The Feasibility Study documents the process for development of alternatives, and includes and economic and financial analysis.

ES-6 Summary of Impacts

Table ES-1 provides a summary of potential impacts by topic area. The table does not include impacts or criteria that were deemed not applicable to construction or operation of the NVRRWP. Alternatives 1 and 2 would not result in any significant and unavoidable impacts for

either alternative alignment. Alternative 3, the PID Conveyance Alternative, could result in significant unavoidable impacts associated with the need to construct upgraded wastewater treatment facilities. The No Action Alternative has the potential to result in significant and unavoidable impacts associated with conversion of agricultural land to non agriculture land uses resulting from a lack of reliable water supply and the need for additional wastewater treatment facilities in the future.

Table ES-1: NVRRWP EIS Impact Summary

Impact Statement	No Action	1-Combined Alignment	2-Separate Alignments	3 – PID Conveyance	Mitigation Measure	No Action	1-Combined Alignment	2-Separate Alignments	3 – PID Conveyance
Aesthetics									
AES-1: Substantial damage to scenic resources and substantial degradation of existing visual character	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS
AES-2: New sources of substantial light or glare	NI	PS	PS	PS	AES-2a: Nighttime Construction Lighting (Alternatives 1, 2, 3) AES-2b: Directional Security Lighting for New Pump Station at Harding Drain Bypass Pipeline (Alternative 2)	NI	LSM	LSM	LSM
Agriculture and Forestry Resources									
AG-1: Convert farmland to non-agricultural use	S&U	PS	PS	PS	AG-1: Stockpile Soil (Alternatives 1, 2, 3)	S&U	LSM	LSM	LSM
AG-2: Conflict with existing zoning for agricultural use	NI	B	LTS	B	No mitigation necessary	NI	B	LTS	B
AG-3: Conflict with Williamson Act contract	S&U	NI	LTS	NI	No mitigation necessary	S&U	NI	LTS	NI
AG-4: Provide drought-resistant source of water to agriculture	S&U	B	B	B	No mitigation necessary	S&U	B	B	B
Air Quality									
AIR-1: Construction emissions of criteria pollutants and precursors	NI	PS	PS	PS	AIR-1: Reduce NOx Emissions (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
AIR-2: Local community risks and hazards during construction	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
AIR-3: Odors generated during project construction	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
AIR-4: Direct emissions of criteria pollutants during project operation	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS
AIR-5: Local community risks and hazards during project operation	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS
AIR-6: Odor emissions during project operation	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS
AIR-7: Consistency with applicable air quality plans	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS
Biological Resources									
BIO-1: Effects on special-status plants	NI	PS	PS	PS	BIO-1a: Avoid or Minimize Impacts to Special-Status Plant Species (Alternatives 1, 2, 3) BIO-1b: Perform Focused Surveys for Special-Status Plant Species in Suitable Habitats (Alternatives 1, 2, 3) BIO-1c: Monitor or Compensate for Impacts to Special-Status Plant Species (Alternatives 1, 2, 3) BIO-1d: Develop and Implement a Frac-out Contingency Plan for Trenchless Construction (Alternatives 1 and 2)	NI	LSM	LSM	LSM
BIO-2: Effects on vernal pool fairy branchiopods	NI	PS	NI	NI	BIO-2a: Avoid Impacts to Vernal Pool Branchiopods and their Habitat (Alternative 1) BIO-2b: Minimize and Compensate for Impacts to Vernal Pool Fairy Shrimp and their Habitat (Alternative 1)	NI	LSM	NI	NI
BIO-3: Effects on valley elderberry longhorn beetle	NI	PS	PS	PS	BIO-1d: Develop and Implement a Frac-out Contingency Plan for Trenchless Construction (Alternatives 1 and 2) BIO-3a: Avoid Impacts to Valley Elderberry Longhorn Beetle (Alternatives 1, 2, 3) BIO-3b: Minimize or Compensate for Impacts to Valley Elderberry Longhorn Beetle (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM

Notes: NI= No Impact, LTS=Less than Significant, PS=Potentially Significant, LSM=Less than Significant with Mitigation, S&U=Significant and Unavoidable, B=Beneficial; Alternative 1=Combined Alignment, Alternative 2=Separate Alignment, Alternative 3=PID Conveyance

Impact Statement	No Action	1-Combined Alignment	2-Separate Alignments	3 – PID Conveyance	Mitigation Measure	No Action	1-Combined Alignment	2-Separate Alignments	3 – PID Conveyance
BIO-4: Effects of project construction on special-status fishes	NI	PS	PS	PS	BIO-1d: Develop and Implement a Frac-out Contingency Plan for Trenchless Construction (Alternatives 1 and 2) BIO-4a: Minimize Pile Driving-related Impacts to Special Status Fish (Alternatives 1 and 2) BIO-4b: Best Management Practices for In-River Intake Construction (Alternative 3)	NI	LSM	LSM	LSM
BIO-5: Effects of project operations on special-status fishes	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
BIO-6: Effects on giant garter snake	NI	PS	PS	PS	BIO-6: Avoid and Minimize Impacts to Giant Garter Snake (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
BIO-7: Effects on San Joaquin whipsnake	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
BIO-8: Effects on western pond turtle	NI	PS	PS	PS	BIO-8: Avoid and Minimize Impacts to Western Pond Turtle (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
BIO-9: Effects on burrowing owl	NI	PS	PS	PS	BIO-9: Avoid, Minimize, or Compensate for Impacts to Burrowing Owl (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
BIO-10: Effects on tricolored blackbird	NI	PS	PS	PS	BIO-10: Avoid and Minimize Impacts to Tricolored Blackbird Nesting Colonies (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
BIO-11: Effects on golden eagle and bald eagle	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
BIO-12: Effects on raptors including special-status species	NI	PS	PS	PS	BIO-12: Avoid, Minimize, or Compensate for Impacts to Raptors including Special-status species (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
BIO-13: Effects on special-status passerine species and birds protected under the MBTA	NI	PS	PS	PS	BIO-13: Avoid and Minimize Impacts to Special-status passerine species and other Birds Protected under the Migratory Bird Treaty Act (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
BIO-14: Effects on special-status mammals	NI	PS	PS	PS	BIO-14a: Avoid and Minimize Impacts to San Joaquin kit fox (Alternatives 1, 2, 3) BIO-14b: Avoid and Minimize Impacts to Special-Status Bats (Alternative 3)	NI	LSM	LSM	LSM
BIO-15: Effects on riparian habitat and other sensitive natural communities	NI	PS	PS	PS	BIO-1d: Develop and Implement a Frac-out Contingency Plan for Trenchless Construction (Alternatives 1 and 2) BIO-2a: Avoid Impacts to Vernal Pool Branchiopods and Their Habitat (Alternative 1) BIO-16a: Avoid and Minimize Impacts to Federally Protected Wetlands (Alternatives 1, 2, 3) BIO-16b: Obtain Regulatory Permits for Work Activities Taking Place in Wetlands and Waters of the United States and the State (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
BIO-16: Effects on federally protected wetlands	NI	PS	PS	PS	BIO-1d: Develop and Implement a Frac-out Contingency Plan for Trenchless Construction (Alternatives 1 and 2) BIO-16a: Avoid and Minimize Impacts to Federally Protected Wetlands (Alternatives 1, 2, 3) BIO-16b: Obtain Regulatory Permits for Work Activities Taking Place in Wetlands and Waters of the United States and the State (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
BIO-17: Effects on movement of fish and wildlife and use of breeding sites	NI	PS	PS	PS	See Mitigation Measures BIO-6, 8, 9, 10, 12 and 13 (Alternatives 1, 2, 3) and Mitigation Measure BIO-4 (Alternative 3) TR-2: Install Temporary Trench Plates Over Open Trenches (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
BIO-18: Conflict with local ordinances or policies protecting biological resources	NI	PS	PS	PS	See Mitigation Measures BIO-1d (Alternatives 1 and 2), 2a (Alternative 1), BIO-4b (Alternative 3) and 16a (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
BIO-19: Effects on existing Habitat Conservation Plan (HCP)	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
BIO-CUM-1: Effects on terrestrial vegetation, wildlife and sensitive communities	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS

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BIO-CUM-2: Effects on fish species and their habitats	PS	PS	PS	PS	BIO-CUM-1: Assistance with Salmonid Recovery Plan Actions (Alternatives 1, 2, 3)	PS	LSM	LSM	LSM
Cultural Resources									
CUL-1: Substantial adverse change in the significance of a unique archaeological resource or disturb any human remains, including those interred outside of formal cemeteries.	NI	PS	PS	PS	CUL-1: Discovery of previously unknown archaeological resources during construction (Alternatives 1, 2, 3) CUL-2: Discovery of human burials during construction (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
CUL-2: Cause a substantial adverse change in the significance of a historical resource	NI	PS	PS	PS	CUL-1: Discovery of previously unknown archaeological resources during construction (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
CUL-3: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	NI	PS	PS	PS	CUL-3: Discovery of paleontological resources during construction (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
Energy									
ENE-1: Inefficient, wasteful, or unnecessary use of energy resources	LTS	PS	PS	PS	AIR-1: Reduce NOx Emissions (Alternatives 1, 2, 3)	LTS	LSM	LSM	LSM
Geology, Soils, and Seismicity									
GEO-1: Facility damage and exposure of people to hazards from strong seismic groundshaking	NI	PS	PS	PS	GEO-1: Perform Design-Level Geotechnical Evaluations for Seismic Hazards (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
GEO-2: Facility damage and exposure of people to hazards from liquefaction and lateral spreading	NI	PS	PS	PS	GEO-2: Perform Design-Level Geotechnical Evaluations for Soil Expansion (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
GEO-3: Potential for substantial erosion or loss of top soil	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
Greenhouse Gas Emissions									
GHG-1: GHG construction emissions	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
GHG-2: GHG operational emissions	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS
GHG-3: Consistency with applicable GHG reduction plans	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS
Hazards and Hazardous Materials									
HAZ-1: Create a Hazard through Reasonably Foreseeable Upset and Accident Conditions Involving Release of Hazardous Materials into the Environment	NI	PS	PS	PS	HAZ-1a: Hazardous Materials Management and Spill Prevention Control Plan (Alternatives 1, 2, 3) HAZ-1b: Conduct Phase I Study along Pipeline Segments (Alternatives 2 and 3)	NI	LSM	LSM	LTS
HAZ-2: Expose People or Structures to a Significant Risk of Loss, Injury or Death Involving Wildland Fires	NI	LTS	LTS	LTS	HAZ-2: Prevention of Fire Hazards (Alternatives 1, 2, 3)	NI	LTS	LTS	LTS
HAZ-3: Conflict with Any Adopted Emergency Response Plan or Emergency Evacuation Plan	NI	PS	PS	PS	See Mitigation Measures HAZ-1a, HAZ-1b, and HAZ-2	NI	LSM	LSM	LTS
Hydrology and Water Quality									
HYD-1: Violation of Water Quality Standards and/or Waste Discharge Requirements (Due to Construction Activities)	NI	PS	PS	PS	HYD-1a: Comply with the Construction General Permit (Alternatives 1, 2, 3) HYD-1b: Implement BMPs to Control Erosion and Sediment During Construction (Alternatives 1, 2, 3) HYD-1c: Comply with the General Order for Dewatering or Other Appropriate NPDES Permit (Alternatives 1, 2, 3) BIO-1d: Develop and Implement a Frac-out Contingency Plan for Trenchless Construction (Alternatives 1 and 2)	NI	LSM	LSM	LSM
HYD-2: Violation of Water Quality Standards and/or Waste Discharge Requirements (at Project Implementation)	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS
HYD-3: Substantial Depletion of Groundwater Supplies or Substantial Interference with Groundwater Recharge	PS	LTS	LTS	LTS	No mitigation necessary	PS	LTS	LTS	LTS
HYD-4: Otherwise substantially degrade water quality (Constituents of Emerging Concern)	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS
HYD-5: Reduction of Flows in San Joaquin River	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS

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HYD-6: Effect on Delta Exports at Banks and Tracy Pumping Plants	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS
Land Use and Planning									
LU-1: Physically divide an established community or result in land use conflicts	NI	NI	NI	NI	No mitigation necessary	LTS	NI	NI	NI
LU-2: Conflict with any applicable land use plan, policy or regulation	S&U	LTS	LTS	LTS	No mitigation necessary for Action alternatives/ No mitigation possible for No Action	S&U	LTS	LTS	LTS
Noise									
NOI-1: Temporary Construction-Related Noise Increases	NI	PS	PS	PS	NOISE-1: Noise Reduction Measures (Alternatives 1, 2,3)	NI	LTS	LTS	LTS
NOI-2: Temporary disturbance from construction-related vibration increases	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
NOI-3: Increases in ambient noise levels due to operational noise and vibration	LTS	LTS	LTS	LTS	No mitigation necessary	LTS	LTS	LTS	LTS
Public Services and Utilities									
PUB-1: Impacts associated with new or altered governmental facilities to maintain acceptable levels of performance	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
PUB-2: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.	LTS	LTS	LTS	PS	No mitigation necessary (Alternatives 1 and 2) PUB-2: Treatment Plant Upgrades (Alternative 3)	LTS	LTS	LTS	LSM
PUB-3: Served by a landfill without sufficient permitted capacity or violate regulations related to solid waste	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
PUB-4: Temporary disruption of utilities or services due to construction-related activities	NI	PS	PS	PS	PUB-4: Coordinate Relocation and Interruptions of Service with Utility Providers during Construction (Alternatives 1, 2, 3)	NI	LSM	LSM	LSM
PUB-5: Could require construction of new wastewater treatment facilities that would cause significant environmental effects	S&U	NI	NI	S&U	No mitigation defined for PID Conveyance Alternative	S&U	NI	NI	S&U
Recreation									
REC-1: Substantial impairment of the use of existing parks or other recreational facilities	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS
REC-2: Increase in water flow to the National Wildlife refuges such that substantial increase in birdwatching and other recreational opportunities would occur	NI	NI	NI	NI	No mitigation necessary	NI	NI	NI	NI
Transportation									
TR-1: Temporary Lane and Road Closures and Potential for LOS Degradation	NI	PS	PS	PS	TR-1: Implement a Construction Management Plan to Minimize Interference with Traffic and Emergency Response Hazards (Alternatives 1, 2, 3)	NI	LTS	LTS	LTS
TR-2: Potential Impacts on Public Transit, Bicycle, and Pedestrian Uses of Affected Roadways	NI	PS	PS	PS	TR-1: Implement a Construction Management Plan to Minimize Interference with Traffic and Emergency Response Hazards (Alternatives 1, 2, 3)	NI	LTS	LTS	LTS
TR-3: Interference with Emergency Access and Circulation	NI	PS	PS	PS	TR-1: Implement a Construction Management Plan to Minimize Interference with Traffic and Emergency Response Hazards (Alternatives 1, 2, 3)	NI	LTS	LTS	LTS
TR-4: Impacts to Traffic and Circulation from Trip Generation	NI	PS	PS	PS	TR-1: Implement a Construction Management Plan to Minimize Interference with Traffic and Emergency Response Hazards (Alternatives 1, 2, 3)	NI	LTS	LTS	LTS
TR-5: Damage to Driveways from Open Trench Excavation	NI	PS	PS	PS	TR-1: Implement a Construction Management Plan to Minimize Interference with Traffic and Emergency Response Hazards (Alternatives 1, 2, 3) TR-2: Install Temporary Trench Plates Over Open Trenches (Alternatives 1, 2, 3)	NI	LTS	LTS	LTS

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TR-6: Impacts to State Route 33 and California Northern Railroad Company Railroad Tracks	NI	NI	NI	NI	No mitigation necessary	NI	NI	NI	NI
TR-7: Impacts to Roadway Surfaces as a Result of Construction Activities	NI	LTS	LTS	LTS	No mitigation necessary	NI	LTS	LTS	LTS

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Chapter 1 Introduction

The United States (U.S.) Department of Interior, Bureau of Reclamation (Reclamation) as National Environmental Policy Act (NEPA) lead agency and the City of Modesto, as California Environmental Quality Act (CEQA) lead agency, prepared a Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) for the North Valley Regional Recycled Water Program (NVRRWP). The City of Modesto represents the Partner Agencies for the NVRRWP which include the Cities of Modesto and Turlock and the Del Puerto Water District (DPWD or District). The Partner Agencies have proposed the NVRRWP to address water supply shortages in DPWD's service area located on the west side of the San Joaquin River in San Joaquin, Stanislaus, and Merced Counties, south of the Sacramento-San Joaquin River Delta (Delta). The NVRRWP was developed in conformance with the requirements of Reclamation's Directives and Standards for the Title XVI Reclamation and Reuse Program (Reclamation Document WTR 11-01), including preparation of a Feasibility Study, which identified and evaluated feasible conveyance alternatives that were included in the Draft EIR/EIS. The Draft EIR/EIS was developed to provide the public and responsible and trustee agencies reviewing the NVRRWP an analysis of the potential effects on the local and regional environment associated with construction and operation of the NVRRWP. The primary purpose of the NVRRWP is to provide recycled water from the Cities of Modesto and Turlock to DPWD. **Figure 1-1** shows the project vicinity. The NVRRWP would also provide supplemental water to certain south of Delta (SOD) Central Valley Project Improvement Act (CVPIA)-designated wildlife refuges and wetland areas. Although Reclamation and the City of Modesto prepared a Draft EIR/EIS for public review, due to timing constraints, the City of Modesto prepared a stand-alone Final EIR (SCH# 2014042068) pursuant to CEQA requirements. The Final EIR was released on June 19, 2015 and the City of Modesto certified the Final EIR on July 7, 2015.

Pursuant to NEPA requirements, Reclamation has prepared this Final EIS to address the alternatives, affected environment, and environmental consequences associated with Reclamation's federal discretionary actions and the NVRRWP. The purpose of this Final EIS is to inform decision makers and stakeholders about the potential adverse and beneficial impacts of the Proposed Action and associated alternatives. This Final EIS also provides responses to comments received on the Draft EIR/EIS. Changes between this Final EIS and the Draft EIR/EIS, which are not minor editorial changes, are indicated by vertical lines in the left margin of this document. Additional changes have also been made to the document in order to comply with Reclamation's Visual Identity formatting and for clarity.

1.1 Background

The Draft EIR/EIS was circulated for a 60-day public review period beginning on January 8, 2015. A public meeting was held on Wednesday, February 11, 2015 to receive comments on the Draft EIR/EIS. Reclamation and the City of Modesto received 15 written comments on the Draft

EIR/EIS. No verbal comments were made at the public meeting. The comments and Reclamation's response to comments are included in Chapter 8 of this Final EIS.

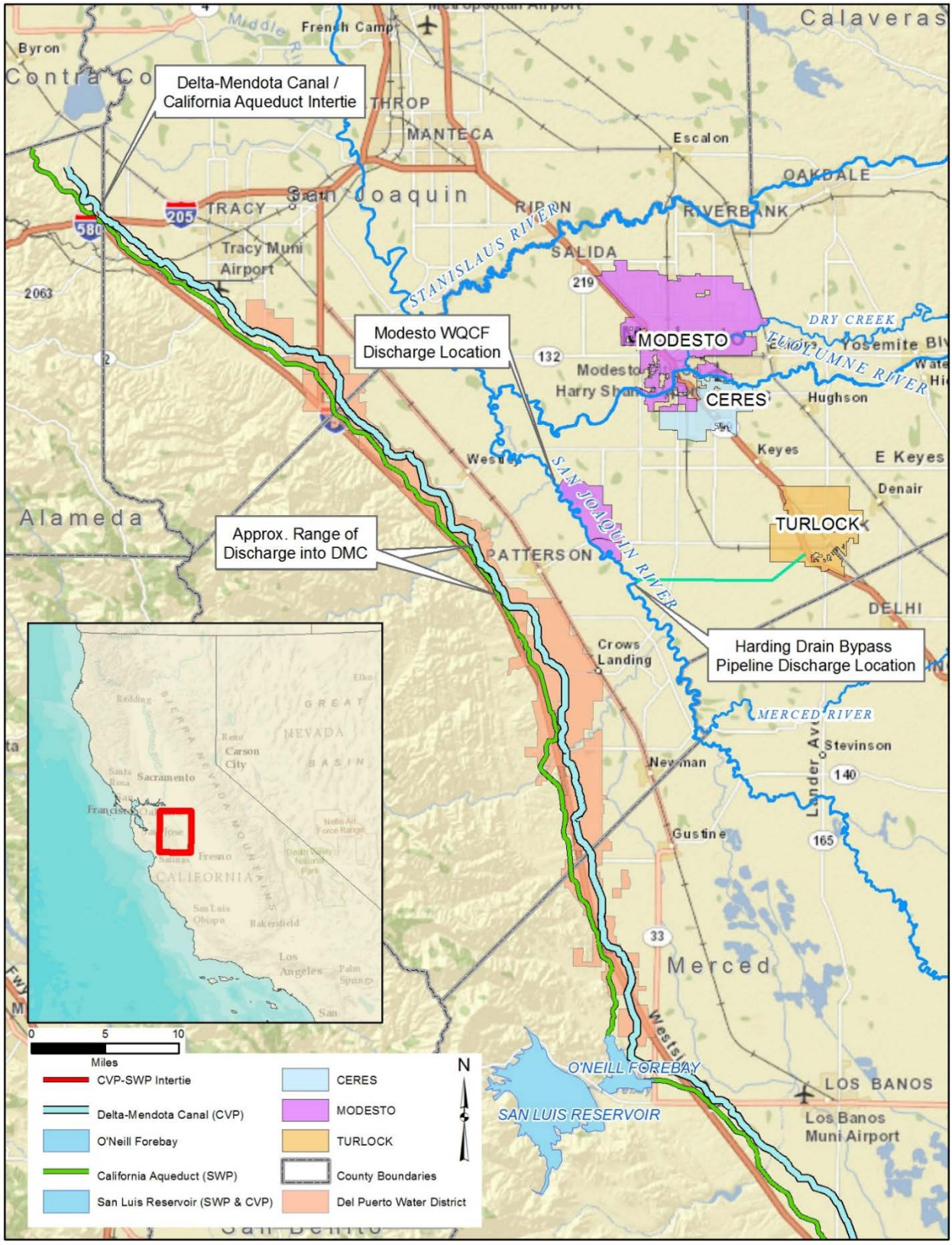
1.1.1 DPWD's Need for an Alternative Water Supply

DPWD provides irrigation water to approximately 45,000 acres of productive farmland in western San Joaquin, Stanislaus, and Merced Counties. Currently, DPWD's primary source of water is from a contract with Reclamation which provides for the delivery of up to 140,210 acre-feet (AF) of Central Valley Project (CVP) water annually. The CVP is a federal water management project consisting of multiple dams and reservoirs, conveyance facilities, and other related facilities created to provide water to California's Central Valley.

Since the early 1990s, DPWD's annual CVP water allocation has been significantly reduced due to multiple factors, including:

- Delta pumping restrictions resulting from the passage of the CVPIA and the CVPIA Anadromous Fish Restoration Program.
- State Water Resources Control Board (SWRCB) water rights decisions, in particular, Water Rights Decision 1485 regarding salinity control in the Delta and Suisun Marsh (SWRCB 1978), and the Bay Delta Accord, adopted as Water Right Decision 1641, which was implemented to address water quality objectives in the San Francisco Bay and Delta (SWRCB 2000).
- Water quality objectives as established in the Water Quality Control Plans for the San Francisco Bay/ Delta Estuary, most recently the 2006 Basin Plan (SWRCB 2006).
- National Marine Fisheries Service (NMFS) salmon and United States Fish and Wildlife Service (USFWS) Delta smelt biological opinions (USFWS 2008, NMFS 2009).
- Drought conditions.

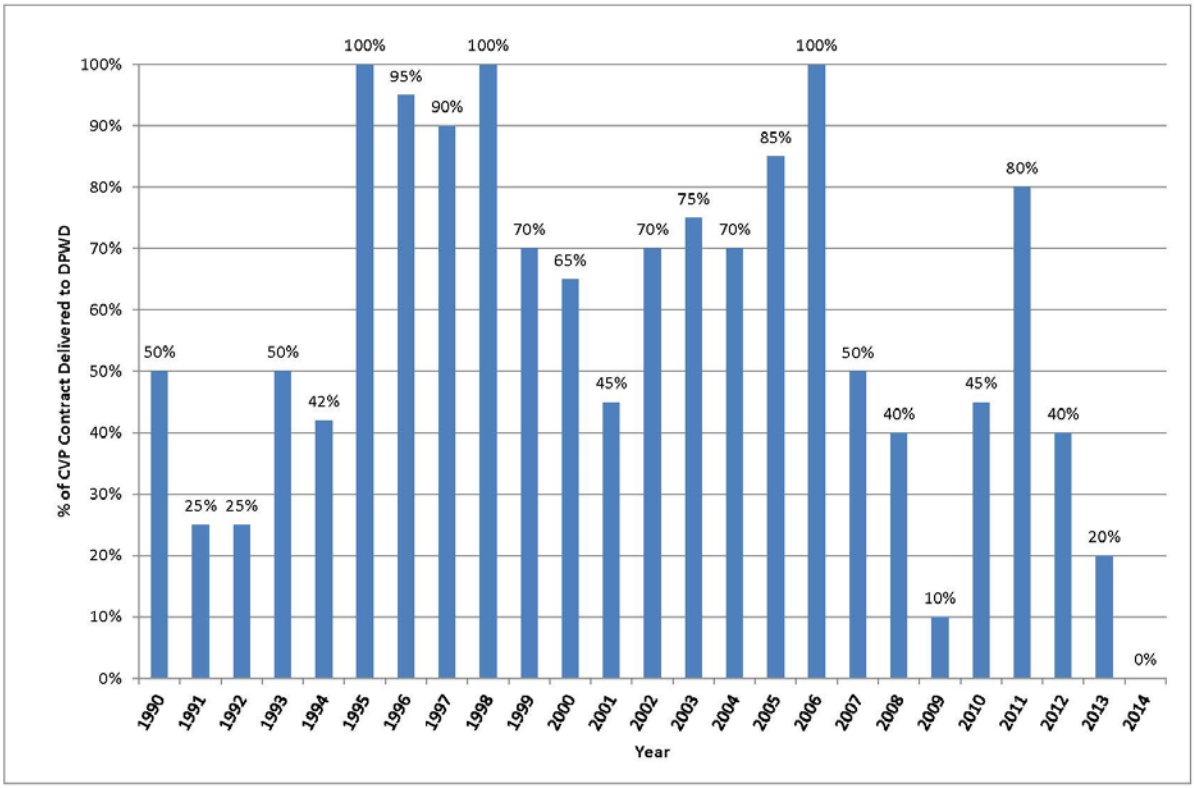
Figure 1-1: Project Vicinity



In 2009, DPWD received only 10 percent (i.e., 14,000 AF per year [AFY]) of its contract allocation. DPWD's contract supply for 2013 was 20 percent of its contracted allocation (28,000 AFY), and in 2014 and 2015 the allocation was 0 percent due to current hydrologic conditions and regulatory requirements.

Figure 1-2 shows the historic DPWD CVP allocations from 1990 to 2014 and the downward trend in the annual allocations (DPWD 2014). While future contract water deliveries to DPWD are uncertain, it is anticipated that restrictions on CVP operations will result in the District receiving no more than an average of 35 percent of its contract allocation (i.e., 49,000 AFY) on an annual basis under normal hydrologic conditions (i.e. non-drought conditions).

Figure 1-2: Historical CVP Allocations Delivered to DPWD



Source: DPWD 2014, Del Puerto Water District Historical Water Service Allocations and Rates

Shortages in CVP deliveries have resulted in economic hardships on the District and growers within the District's service area. To maintain the existing cropping patterns and economic conditions within the District, DPWD is compelled to secure alternate water supplies, and has done so through temporary water transfers from other agencies or the use of groundwater from privately owned wells. If alternate water supplies cannot be secured, growers are forced to fallow land that would otherwise have been planted. From 2001 to 2014, from 12 to 24 percent of the agricultural land in the DPWD service area has been fallowed due to limited water supplies (DPWD 2015, 2014).

In 2014 and 2015 DPWD received no allocation of CVP water, which has presented a severe hardship to growers in the District. Buying enough water through temporary transfers to keep

crops growing is becoming more difficult every year, and sufficient groundwater is not available to supplement CVP supply. In 2014, reports indicate that the fallowed acreage has increased by almost 4,000 acres over the prior year's total of 7,239 acres to 10,997 acres of fallowed land (DPWD 2015). Fallowing is not an option for approximately 24,000 acres of orchard crops within DPWD, which need to be irrigated each and every year in a uniform pattern.

Water transfers have been partially effective in meeting the District's water demands in the past, but they are not a reliable or sustainable long-term solution because of uncertainty in the availability of surface water supplies in the future, the difficulties in the ability to wheel[1] water through the Delta, and the financial impact to customers associated with the high cost of supplemental surface water supplies. As the availability of water sources decreases, the cost of water transfers will increase while the ability to secure water for transfers will decrease. Several factors could impact the availability of surface water supplies in California. Climate change is expected to affect Delta water exports (Reclamation 2014) because weather patterns are anticipated to become more severe (longer droughts and wetter non-drought years) and warmer temperatures are expected to reduce snowpack amounts. These two climate-related changes are expected to impact the amount of surface water runoff, the timing of runoff, and the ability to store and use runoff. In addition, changes in climate are expected to result in rising sea levels, which will, in turn, increase the salinity of the Delta, requiring more fresh water to be kept in the Delta to maintain water quality conditions to support the Delta ecosystem and to maintain adequate flow and water quality. Additionally, because the time frame in which transfer water can be wheeled through the Delta is limited by the USFWS and NMFS biological opinions (USFWS 2008, NMFS 2009) for the coordinated operation of the CVP and State Water Project (SWP) to the months of July-September, a significant capital investment will be needed in the future to maintain the infrastructure system that enables Delta conveyance. Without these improvements, Delta conveyance will be limited, which ultimately impacts the ability of SOD water users to wheel water transfers through the Delta (California Water Plan Update 2009, DWR Bulletin 160-09).

DPWD is located within the San Joaquin River groundwater basin and primarily overlies the Delta-Mendota groundwater subbasin, with a small section overlying the Tracy subbasin. The Delta-Mendota groundwater subbasin is not considered to be in a state of overdraft (DWR 2006), but there is concern that continued use of groundwater in DPWD's service area to supplement CVP water deliveries could result in potential issues such as declining water table elevation, land subsidence, degradation of groundwater quality, and adverse impacts to crop yield from unsuitable groundwater quality. Land subsidence creates problems both through direct effects (including ground failures and permanent reduction in the total storage capacity of the aquifer) and indirect effects (such as subsidence reducing freeboard and therefore reducing flow capacity in canals that convey water through the project area [Sneed et al. 2013]).

1.1.2 DPWD's Water Demands and Anticipated Shortfalls

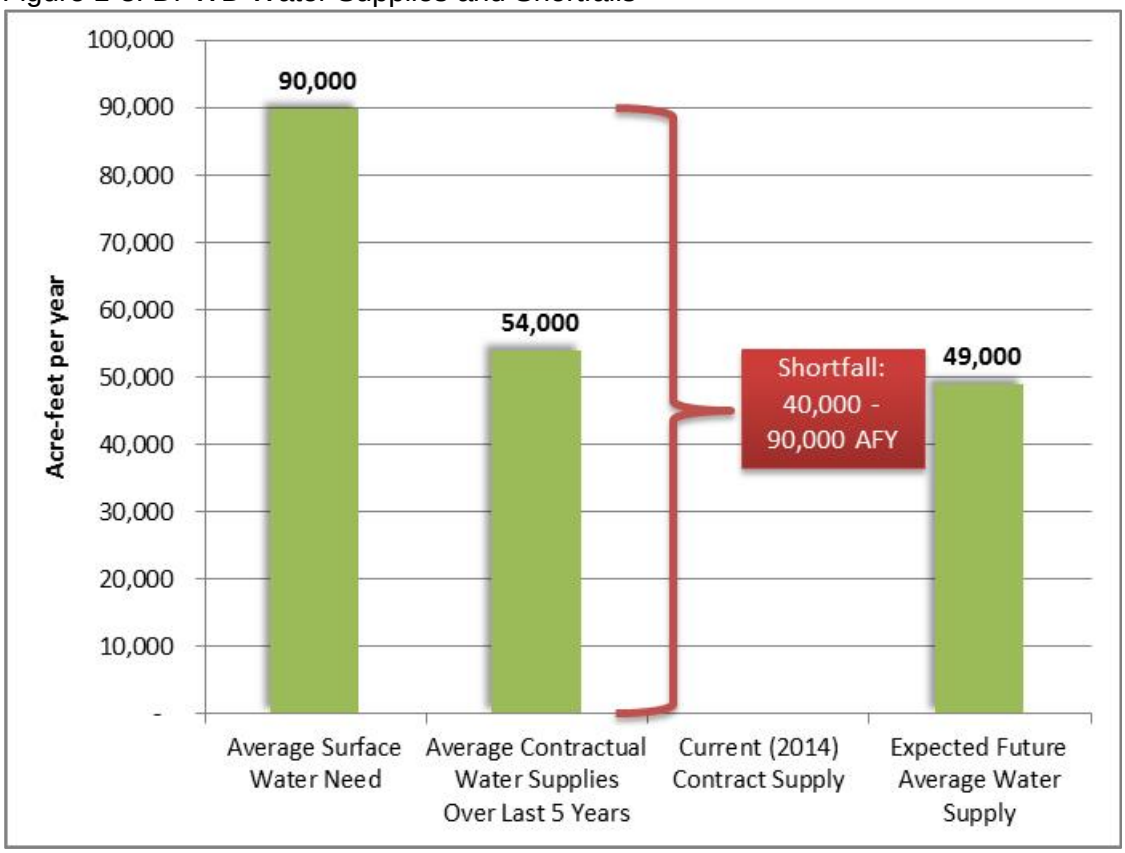
Irrigation water demands were estimated for the entire District and each target delivery area based on the projected productive cropping acreages and the specific water demand for each crop grown in the District. The 2013 water demand was estimated at approximately 90,000 AFY (see

[1] Wheeling is the conveyance of water by an entity that does not own the water it is conveying.

Figure 1-3) and was assumed to represent the District's existing average annual water demand. The existing water demand represents the demand in a dry hydrologic year, when fallowing patterns may be higher than average. It is expected that if the District had an alternate, reliable source of water, cropping and fallowing patterns would revert to more historic patterns, where the projected water demand would be closer to 110,000 AFY. Projected monthly water demands are shown in **Figure 1-4**, and would vary depending on the season, from a very small amount in the winter (January) to a high of more than 25,000 AF in the middle of summer.

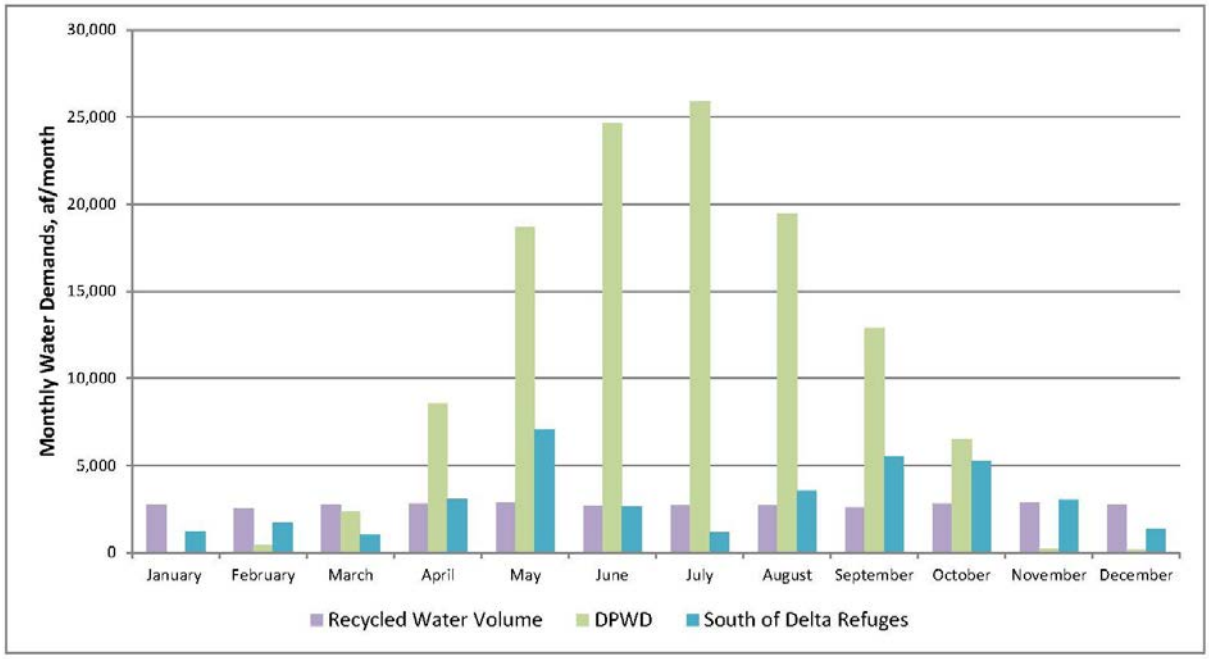
It is predicted that future deliveries from the CVP to DPWD will average approximately 49,000 AFY[2], an allocation of only 1 AF/acre (RMC 2013), which is inadequate to meet the District's water demand. This would result in an anticipated average shortfall of 41,000 AFY (see **Figure 1-3**). If compared to the 2013 supplies or the average of contractual water supplies over the last five years, the average shortfall would range from approximately 40,000 to 60,000 AFY. The 2014 and 2015 shortfall was 90,000 AFY.

Figure 1-3: DPWD Water Supplies and Shortfalls



[2] Under current regulatory conditions, it is estimated that in the future, DPWD may receive no more than 35 percent of its contract allocation (49,000 AFY) in an average hydrologic year, which would provide only 1 AF/acre. The future deliveries to DPWD were developed by applying historic SOD allocation reductions from Delta pumping restrictions due to hydrologic conditions and regulatory requirements to the DPWD contract allocation. The methodology for estimating expected allocation reductions is shown in Appendix A of the Feasibility Study for the project (RMC 2014).

Figure 1-4: Projected Monthly Demands from DPWD and IL4 Demand from Refuges and Monthly Volume of Recycled Water Production

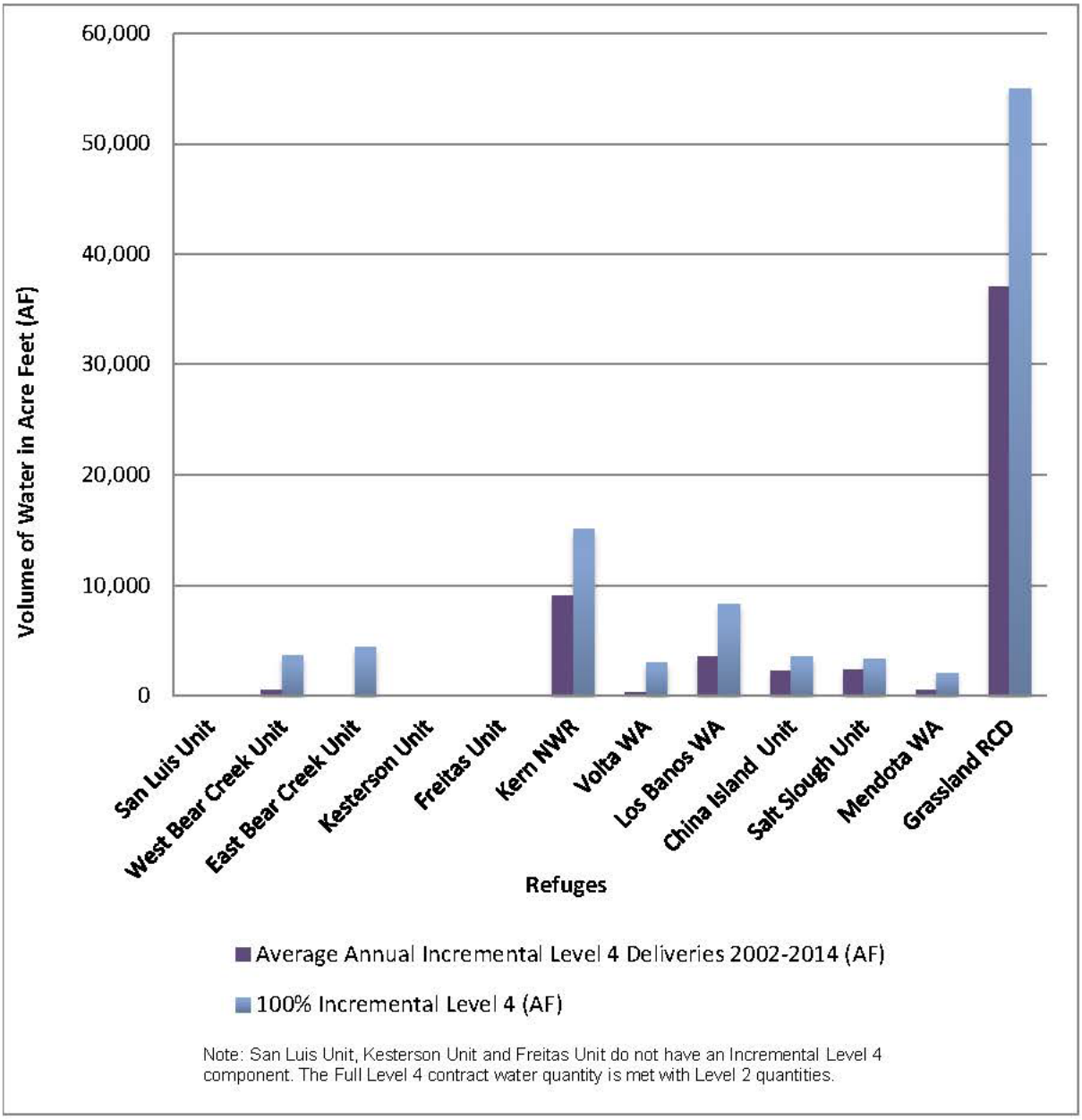


1.1.3 South of the Delta Refuges Water Needs and Descriptions

Refuges Need for Additional Water Supply

In addition to provision of water to the DPWD service area, the NVRRWP would make recycled water available to certain SOD CVPIA designated federal National Wildlife Refuges (NWRs), State Wildlife Areas (SWAs), and the privately-managed wetlands of the Grassland Resource Conservation District, collectively referred to herein as "refuges." Reclamation has a legislative obligation under the CVPIA, in cooperation with the USFWS, the California Department of Fish and Wildlife (CDFW), the Grassland Water District (GWD), and the Central Valley Joint Venture (CVJV) to provide firm, average annual historical water deliveries (defined as Level 2, or L2 in the CVPIA) of suitable quality to maintain the refuges' habitat areas. In addition to L2 deliveries, an additional increment of water supply is needed for optimal wildlife management (defined as Incremental Level 4, or IL4 in the CVPIA). Provision of adequate and reliable water supplies (L2 and IL4) for the refuges to meet the CVPIA-mandated water levels has not been achieved "due in large part to state and federal budget shortages, inconsistency in the timing of water deliveries, and increases in the costs of blocks of water made available annually from willing sellers on the open market" (CVJV 2006). An annual allocation of 271,001 AF of L2 and 105,514 AF of IL4 water supplies (a total of 376,514 AF) is required for delivery to the SOD refuges (Reclamation 2013a). In the 2012-2013 time period, Reclamation delivered 270,294 AF of L2 water supplies, which is close to the amount required. Regarding the SOD refuges' IL4 water quantity, however, the average annual amount delivered between 2002 and 2012 was 63,233 AF or about 60 percent of the total IL4 water (105,514 AF) required. **Figure 1-5** shows the IL4 demand for refuges as compared to the actual amount of water delivered in the 2012-2013 water year. The NVRRWP could not serve the full IL4 demand, but could help reduce the shortfall.

Figure 1-5: Refuge Full IL4 Water Demand vs. Average Annual IL4 Deliveries (2002-2014)



Source: Reclamation 2015

Refuges that could be served by the NVRRWP

The SOD refuges contain habitat that supports a variety of birds and wildlife species, and are an important part of the Pacific flyway, a major migration route for migratory birds. The NVRRWP could potentially benefit the refuges shown in **Table 1-1**. Additional water supplies would provide refuges an increased ability to conduct spring and summer irrigations, which would improve the production and availability of food supplies in wintering migratory waterfowl. Refuges would be able to use water supplies to protect giant garter snake habitat, and to provide higher quality brood habitat for local breeding bird populations (GWD Comments on the Draft

EIS/EIR for the NVRRWP, see Chapter 8). As shown in **Figure 1-4**, refuges need water year-round, however, their fall and winter water demand occurs in a season when there is less of a need for irrigation.

Table 1-1: Potential SOD Refuge Beneficiaries

National Wildlife Complex and Refuges	State Wildlife Areas	Other
San Luis National Wildlife Complex	Volta Wildlife Area	Grassland Resources Conservation District
East Bear Creek Unit	Mendota Wildlife Area	
Freitas Unit	Los Banos Wildlife Area	
Kesterson Unit	North Grasslands Wildlife Area	
San Luis Unit	*Salt Slough Unit*	
West Bear Creek Unit	*China Island Unit*	
Kern NWR		

1.1.4 Recycled Water Sources and Availability

DPWD's service area is located a little over five miles from Modesto's discharge location at the Jennings Wastewater Treatment Plant (Jennings Plant) and less than five miles from the end of Turlock's Harding Drain Bypass Pipeline, which currently conveys flows from the Turlock Regional Water Quality Control Facility (RWQCF) to a discharge point located on the San Joaquin River. These cities either already have upgraded or are in the process of upgrading their facilities to treat wastewater to recycled water standards to meet San Joaquin River discharge requirements in their respective National Pollutant Discharge Elimination System (NPDES) permits.

By 2045, Modesto and Turlock will produce up to 59,000 AFY of recycled water, as shown in **Table 1-2**. Recycled water would be provided incrementally under the NVRRWP as treatment facilities are expanded and flows increase from projected population growth.

Table 1-2: Recycled Water Availability at Project Start-up and at Buildout[1]

Agency	2018 Recycled Water (AFY)	2018 Recycled Water (mgd)	2045 Recycled Water (AFY)	2045 Recycled Water (mgd)
Modesto	16,500	14.7	30,600	27.3
Turlock	14,100	12.6	28,400	25.4
Total	30,600	27.3	59,000	52.9

Source: RMC, 2013
[1] Available recycled water is calculated after accounting for all currently contracted uses
mgd = million gallons per day AFY = acre-feet per year

City of Modesto (Modesto)

The City of Modesto provides primary treatment at the Sutter Wastewater Treatment Plant; primary effluent is then conveyed to the Jennings Plant, where facultative ponds are used to produce secondary effluent. The secondary effluent is applied to Modesto-owned ranch land (approximately 2,500 acres) or is discharged to the San Joaquin River pursuant to a NPDES permit (Permit No. CA0079103) between October 1 through May 31, when river flows provide a 20:1 dilution ratio. There are two storage ponds at the Jennings Plant that provide about 7,800

AF of seasonal secondary effluent storage when effluent cannot be discharged to the river or land applied. Under the Proposed Action, the City of Modesto would continue to irrigate ranch lands using secondary effluent which is blended with cannery process water that is available during the July to September canning season.

In response to new effluent discharge requirements imposed by the Central Valley Regional Water Quality Control Board (CVRWQCB), the City of Modesto added biological nutrient removal (BNR) and tertiary treatment to a portion of its flow at the Jennings Plant. BNR will provide a high quality source of recycled water once upgrades are complete. Phase 1 of the treatment upgrades was completed in 2010 and provides 2.3 million gallons per day (mgd) of tertiary effluent, all of which is applied to Modesto-owned ranch land. The Phase 2 treatment facilities are scheduled to be online by February 2016 and will provide an additional 12.6 mgd of tertiary treatment capacity, bringing the total capacity to 14.9 mgd. Modesto is planning to continue to increase tertiary treatment capacity to 27.5 mgd by build-out of the City and this water would be available for the proposed project. No tertiary treated water produced by Modesto is discharged into the San Joaquin River at this time; however, by 2016, with the completion of the Phase 2 treatment facilities, a new effluent pump station and pipeline will convey final effluent from the treatment facilities to the current point of discharge for the City of Modesto's effluent into the San Joaquin River.

The treatment process used for BNR at the Modesto facility is the membrane bioreactor (MBR) process. The MBR process contains two steps. The first step is the activated sludge process, which takes place in the BNR aeration basins. The BNR aeration basins grow the biomass (bacteria and microorganisms) that provides treatment. The second step is to separate out the solids and clean water from the biomass. This is achieved with membranes. The MBR system is designed to remove biochemical oxygen demand (BOD), and the nutrients ammonia and nitrates/nitrites. Filtered water that has passed through the membranes is then disinfected with ultraviolet (UV) light radiation.

City of Turlock (Turlock)

The City of Turlock's RWQCF has a treatment capacity of 20 mgd of tertiary-treated water. Turlock currently discharges an average annual flow of 10 mgd to the San Joaquin River via the Harding Drain Bypass Pipeline, consistent with the city's NPDES permit requirements.

Constructed in 2013, the primary goal of the Harding Drain Bypass Pump Station and Pipeline Project was to eliminate the discharge of treated wastewater to the Harding Drain, which is an open channel owned by Turlock Irrigation District (TID), and discharge directly to the San Joaquin River. Changing the point of discharge from Harding Drain to the San Joaquin River serves at least two beneficial purposes. First, removal of the City's permitted wastewater discharges from Harding Drain relieved the City of the need to coordinate with TID regarding management of wastewater flows in the Harding Drain, allowing TID to more efficiently operate and maintain its system. Second, the project allows TID and agricultural operations that discharge to Harding Drain to separately monitor and manage water quality associated with agricultural activities, which are subject to separate regulatory requirements.

The Harding Drain Bypass Pump Station and Pipeline Project provides Turlock with the ability to deliver recycled water for other beneficial uses, potentially minimizing and/or eliminating wastewater discharges to the San Joaquin River. Turlock estimates that by buildout of the City (year of 2030), 25.4 mgd will be available after other currently existing recycled water contractual commitments have been fulfilled. These commitments include a 50-year contract with the TID-owned Walnut Energy Center for 2 mgd as well as the Turlock-owned Pedretti Park for 0.1 mgd with no expiration date.

The treatment process at the Turlock facility consists of primary sedimentation, biotowers, aeration basins, and secondary clarifiers. The clarified effluent then flows to the secondary effluent equalization basins for subsequent pumping into the tertiary treatment system. Tertiary treatment facilities consist of filtration using a proprietary cloth disk system, chlorine-disinfection, and dechlorination prior to discharge. The facility provides ammonia removal to meet its NPDES permit requirements; however, unlike the Modesto facility, the Turlock facility does not remove nitrates/nitrites from the effluent.

1.1.5 Delta-Mendota Canal

Completed in 1951, the Delta-Mendota Canal (DMC) carries CVP water from the Delta southeasterly from the C.W. "Bill" Jones Pumping Plant (Jones Pumping Plant) along the west side of the San Joaquin Valley, delivering water for irrigation, municipal uses, and wildlife refuges. A portion of the water from the Delta conveyed in the DMC replaces San Joaquin River flows that would have gone to the Mendota Pool. The DMC also transports CVP water to the O'Neill Forebay for delivery to the San Luis Unit. The canal extends 70 miles from the Delta to the O'Neill Forebay and then 46 miles to the Mendota Pool on the San Joaquin River, about 30 miles west of Fresno. The initial diversion capacity is 4,600 cubic feet per second (cfs), which is gradually decreased to 3,211 cfs at its terminus at the Mendota Pool.

The San Luis & Delta-Mendota Water Authority (SLDMWA) has operated the DMC and associated facilities for Reclamation since 1992. Members of the SLDMWA, which receive water supplies for irrigation and municipal uses, include:

Banta-Carbona Irrigation District
Byron Bethany Irrigation District[3]
City of Tracy
DPWD
Firebaugh Canal Water District
GWD
James Irrigation District
Mercy Springs Water District
Pacheco Water District
Patterson Irrigation District (PID)
Reclamation District 1606
San Luis Water District
Tranquility Irrigation District
West Side Irrigation District
Broadview Water District
Central California Irrigation District
Columbia Canal Company
Eagle Field Water District
Fresno Slough Water District
Henry Miller Reclamation District #2131
Laguna Water District
Oro Loma Water District
Panoche Water District
Pleasant Valley Water District
San Benito County Water District
Santa Clara Valley Water District
Turner Island Water District
West Stanislaus Irrigation District

[3] CVP Service Area only.

Westlands Water District

Over the past 10 years, water conveyed in the canal (as measured at the Jones Pumping Plant), has varied from a high of 4.5 million AF for the 2006 water year to a low of 0.75 million AF in the 2005 water year. Reclamation routinely monitors water quality in the DMC for selenium and other inorganic and organic constituents.

1.1.6 San Luis Reservoir

The DMC is connected to the San Luis Reservoir via O'Neill Forebay midway along the length of the canal. This 2 million-AF artificial lake on San Luis Creek in the eastern slopes of the Diablo Range of Merced County is jointly owned and operated by Reclamation and the California Department of Water Resources (DWR) and is one of California's largest reservoirs (Reclamation 2013c). During the summer or dry season, water in San Luis Reservoir is used by CVP contractors, as well as SWP contractors. The California Aqueduct also flows into the O'Neill Forebay at San Luis Reservoir; from the O'Neill Forebay, the aqueduct continues south to serve municipal users in southern California including Kern, Los Angeles, San Bernadino, San Diego and Santa Barbara Counties. Under the Proposed Action, tertiary-treated water introduced and conveyed in the DMC during low-demand periods could be stored in the federal portion of San Luis Reservoir. Storage may be done either through operational exchanges with Reclamation or through direct delivery. Any storage of recycled water would occur after the water has been blended with flows in the DMC as it moves down the DMC from the introduction point north of O'Neill Forebay (see **Figure 1-1**).

1.1.7 Recycled Water Quality

Recycled water from the Modesto and Turlock treatment facilities is suitable for all currently allowed uses of recycled water, including irrigation of public parks and food crops. Although recycled water discharged into the DMC would not technically be required to meet criteria that are established by the California Department of Public Health (CDPH), it would have to meet the standards of the NPDES Permit for discharge issued by the CVRWQCB in addition to Reclamation's water quality criteria. As such, recycled water from both Modesto and Turlock would still be oxidized, filtered, and adequately disinfected, pursuant to the CDPH reclamation criteria, CCR, Title 22, division 4, chapter 3, (Title 22) or equivalent.

The Cities of Modesto and Turlock are pursuing revised NPDES permits to allow discharges to the DMC[4]. It is expected that the CVRWQCB would address the full range of beneficial uses of the DMC as delineated in the Central Valley Basin Plan (CVRWQCB 2011) when considering issuance of an NPDES permit. Recycled water from the NVRRWP would also have to comply with Reclamation's water quality standards for introduction of non-CVP water into the DMC. The Cities' proposed discharges would have to meet any standards established by the CVRWQCB and by Reclamation before initiating project operations.

[4] Both cities would retain their existing discharge locations and access at the San Joaquin River. Under Alternatives 1 and 2 of the Proposed Action, water would not be discharged to the river under normal circumstances. However, the Cities may discharge under either of these alternatives if there are operational constraints in the DMC that do not allow introductions during given periods of time over the life of the proposed NVRRWP.

1.1.8 San Joaquin River

Consistent with the Central Valley Basin Plan, current designated beneficial uses of the San Joaquin River downstream of the Turlock and Modesto discharges (from the mouth of the Merced River to Vernalis) include:

- Municipal and domestic supply (potential beneficial use; not existing in current Central Valley Basin Plan).
- Agricultural – irrigation and stock watering.
- Industrial process supply.
- Recreation – water contact, canoeing/rafting, and other non-contact water recreation.
- Freshwater habitat – warm water ecosystems.
- Migration of aquatic organisms – warm and cold.
- Spawning, reproduction, and/or early development of fish – warm.
- Wildlife habitat.

Since the mid-1990s Reclamation has been operating the CVP to meet the Vernalis salinity objectives. The water quality objective is 1,000 µmhos/cm 30-day running average of mean daily electrical conductivity (EC) from September 1 through April 29 and a 700 µmhos/cm 30-day running average of mean daily EC from April 30 through August 31. DWR and the U.S. Geological Survey, in partnership with Reclamation, have been participating in the San Joaquin River Real-Time Water Quality Program to perform ongoing work to facilitate the control and timing of wetland and agricultural drainage to coincide with periods when dilution flow is sufficient to meet the Vernalis salinity objectives. The water saved through this optimization can be used later to increase San Joaquin River basin streamflow during critical periods for anadromous fish restoration efforts.

1.1.9 Water Rights

Implementation of the NVRRWP would require that the Cities of Modesto and Turlock obtain approval of Wastewater Change Petition(s) from the SWRCB, Division of Water Rights. Approval of the petition(s) would establish a water right for the recycled water, and would enable a change in the point of discharge from the San Joaquin River to the DMC. The City of Modesto submitted its Wastewater Change Petition in July 2014. The City of Turlock is currently discharging to the San Joaquin River and has submitted an application to the Division of Water Rights to appropriate and divert an equivalent quantity of water at the PID intake, downstream of Turlock's current discharge point for delivery to DPWD in the interim period. It is expected that as part of implementation of the NVRRWP, the City of Turlock would submit a Wastewater Change Petition to allow the existing discharge to be re-routed directly to the DMC.

1.2 Purpose and Need

One of the authorized purposes of CVP is to provide water for irrigation and domestic use within California's Central Valley. In recent years, SOD CVP contractors and CVPIA-designated wildlife refuges have experienced an increased reduction in CVP water allocations from historical amounts due to drought conditions and expanded Delta pumping restrictions. As a

CVP contractor, DPWD has a need to establish alternative, reliable long-term agricultural water supplies to offset these reductions. Also CVPIA Sections 3406(b)(3) and 3406(d)(2) direct Reclamation to acquire and provide supplemental water to CVPIA designated wildlife refuges in the Central Valley. The purpose of the NVRRWP is to make the Cities' recycled water available to DPWD for agricultural purposes and to certain SOD refuges for wetland habitat purposes in support of migratory birds.

1.3 Partner Agencies' CEQA Objectives

The overall objective of the proposed project is to maximize beneficial use of a sustainable, alternative water supply within the region, which would address reductions in water supplies from the CVP and reduce the reliance on groundwater use. Specifically, the objectives of the project are as follows:

- Establish an alternative, reliable, long-term water supply of up to 59,000 AFY of recycled water for DPWD and refuges.
- Maximize beneficial use of recycled water by DPWD customers and refuges.
- Maximize Project Partners' control of operations and delivery of water to DPWD and refuges, while recognizing the need for coordination with Reclamation and the SLDMWA.
- Establish long-term water right(s) to allow for the beneficial use of recycled water.
- Maximize use of existing facilities for treatment/delivery of recycled water.
- Provide supplemental water supplies annually to SOD refuges to meet CVPIA Sections 3406(b)(3) and 3406(d)(2) requirements.
- Avoid or minimize, through incorporation of design constraints and management practices, impacts to environmental resources such as surface water, groundwater supplies, land subsidence, groundwater quality and biological resources including sensitive species.
- Deliver agricultural water to DPWD at a cost that supports regional economic sustainability.

The proposed project is needed to offset the significant reduction in CVP water allocations to DPWD associated with Delta pumping restrictions, drought conditions, and climate change. In addition, the proposed project is needed to offset anticipated effects (e.g., overdraft, subsidence, water quality issues) from increased groundwater pumping that have occurred and would likely continue to occur with the absence of an alternative water supply.

1.4 Compliance with NEPA

Compliance with NEPA is a Federal responsibility and involves the participation of Federal, State, tribal, and local agencies, as well as concerned and affected members of the public in the planning process. NEPA requires full disclosure of the potential effects of actions proposed by Federal agencies. NEPA requires that the Federal agencies analyze and disclose the potential impacts and possible mitigation for the Federal proposed action and a reasonable range of

alternatives to the proposed action. NEPA is required when a discretionary Federal action is proposed. The regulations (40 CFR 1508.18(a)) define a Federal action as including new and continuing activities, actions partly or entirely financed by Federal agencies (where some control and responsibility over the action remain with the Federal agency [43 CFR 46.100]), actions conducted by Federal agencies, actions approved by Federal agencies, new or revised agency rules or regulations, and proposals for legislation.

Section 102 of NEPA (42 U.S.C. section 4332) indicates that a "detailed statement" (i.e., an EIS) shall be included with "proposals for legislation and other Federal actions significantly affecting the quality of the human environment." The term "human environment" is defined to include "the natural and physical environment and the relationship of people with that environment" (40 CFR 1508.14).

An EIS provides an objective evaluation and disclosure of potential environmental consequences of a proposed action and a reasonable range of alternatives as compared to the No Action Alternative that would occur without the proposed action, identification of measures to mitigate impacts, and opportunities for public and agency participation in decision making.

1.5 Intended Use of the Final EIS

This EIS identifies and evaluates alternatives for the NVRRWP, including other actions by Reclamation as described in Section 2.1, analyzes the environmental effects on the human environment of the alternatives in an equal level of detail, and identifies measures to reduce or avoid potential adverse environmental effects resulting from implementation of the alternatives. This EIS also describes significant adverse effects that may not be avoided, indirect effects including growth-inducing effects, and significant cumulative effects; as well as effects that are not found to be significant.

This EIS does not recommend specific actions. The recommendations will be included in the Record of Decision developed by Reclamation following completion of the EIS. Other federal agencies, such as the U.S. Army Corps of Engineers (USACE), USFWS, and NMFS may use the EIS to satisfy NEPA for their individual approvals of project components.

The information in the Final EIS (and Final EIR prepared separately by the City of Modesto) would also be used to support the acquisition of regulatory permits or approvals by the City of Modesto and Partner Agencies.

Table 1-3 summarizes the potential permits and/or approvals from other agencies that may be required prior to construction of the proposed project.

Table 1-3: Responsible and Trustee Agencies and Coordination

Agency	Type of Approval
FEDERAL	
Reclamation	Warren Act Contract
Reclamation	Possible funding through Public Law 102-575, Title XVI
Reclamation	Land Use Authorization for construction, operation, and maintenance of non-federal facilities within DMC right-of-way
Reclamation	Purchase contract for supplemental supplies for Refuge Water Supply Program under CVPIA Section 3406(d)(2)
USACE	Clean Water Act, Section 404 Permit for any fill of wetlands or waters of the U.S.
USACE	Section 10 Permit for pipeline crossing under San Joaquin River, which is a navigable waterway.
USFWS & NMFS	Section 7 Consultations
Natural Resource Conservation Service	Farmland Conversion Assessment
STATE	
SWRCB	Wastewater Change Petition (Petition for Change)
CDFW	Streambed Alteration Agreement for pipeline crossings of streams
CDFW	Incidental Take Permit for California Endangered Species Act
CalOSHA	Construction Permit / Tunnel Classification
CA Office of Historic Preservation	Section 106 National Historic Preservation Act Consultation
CA State Lands Commission	Lease Agreement
California Department of Transportation	Encroachment Permit
CVRWQCB	Clean Water Act, Section 401 Water Quality Certification
CVRWQCB	Notice of Intent for coverage under Statewide Construction Stormwater Permit (Section 402 Clean Water Act)
CVRWQCB	Notice of Intent for coverage under Low-Threat Discharge Order for Dewatering during Construction and for Pipeline Discharges for Testing and Startup
CVRWQCB	NPDES Permit for Discharge to the DMC
Central Valley Flood Protection Board	Possible encroachment permit
LOCAL	
San Joaquin Valley Air Pollution Control District	Authority to Construct/Permit to Operate
Stanislaus County	Encroachment permit, grading permit, building permit, and tree removal permit
Stanislaus County	Williamson Act cancellation (if needed)
Genesee & Wyoming Railroad	Utility Occupancy License for crossing of California Northern Railroad Company rail line

1.6 Organization of the Final EIS

This Final EIS is organized into the Chapters described below. Chapters 1 through 7 were originally published in the Draft EIR/EIS and are reproduced here, incorporating changes in text that were made to address the comments on the Draft EIR/EIS. Text changes are indicated by a line in the left margin of the page, as described previously.

Executive Summary. This chapter includes a summary of the NVRRWP and the alternatives evaluated. It includes a table that summarizes the impacts, mitigation measures, and levels of significance after mitigation measures are incorporated.

Chapter 1: Introduction. This chapter provides an introduction and overview describing the project objectives, purpose and scope of the Final EIS, intended uses of the Final EIS, including a list of responsible agencies and approvals, brief explanation of areas of controversy and issues to be resolved, and a summary of the NEPA review process.

Chapter 2: Alternatives and Proposed Action. This chapter presents a detailed description of the proposed NVRRWP, including a description of proposed facilities and construction and operational considerations under each of the Action alternatives as well as the No Action Alternative.

Chapter 3: Affected Environment/Environmental Setting, Environmental Consequences/Impacts and Mitigation Measures. This chapter analyzes the environmental consequences and impacts of the Action alternatives in comparison to the No Action alternative. Each topic includes a description of the affected environment/environmental setting, regulatory setting, methodology, thresholds of significance, impacts (both project-specific and cumulative), mitigation measures, and significance after mitigation. Chapter 3 includes subsections addressing each environmental resource.

Chapter 4: Other NEPA Considerations. This chapter identifies any direct or indirect impacts, significant and unavoidable impacts, the project's irreversible and irretrievable commitment of resources, and growth-inducing impacts. The impacts of alternatives are summarized so as to allow identification of the environmentally preferable alternative.

Chapter 5: Consultation, Coordination and Compliance. This chapter addresses compliance with federal statutes and regulations, summarizes the scoping process, and identifies the distribution of the Final EIS, and opportunities for future public involvement.

Chapter 6: Report Preparation. This chapter lists the authors of the Final EIS.

Chapter 7: Index. This chapter contains an index to topics discussed in the Final EIS.

Chapter 8: Responses to Comments: This chapter contains each letter or email commenting on the Draft EIR/EIS, and includes responses to each comment. Comment letters are reproduced followed by the respective response to comments.

1.7 NEPA Process and Review

1.7.1 Notice of Intent

In accordance with 40 CFR 1508.22, a Notice of Intent (NOI) was published by Reclamation in the Federal Register on April 22, 2014. During the 36-day public review period a public scoping

meeting was held, which is described below. During the NOI public review period, which ended on May 28, 2014 Reclamation received six written comments.

1.7.2 Public Scoping

Scoping Meeting

A scoping meeting for the NVRRWP was held on May 13, 2014 as described below:

Modesto City Hall
1010 Tenth Street
Modesto, CA
3:00 to 7:00 pm

The time and location of the scoping meeting were included in the postcards announcing the availability of the NOI, in the public notice placed in The Modesto Bee, as well as in a joint press release that was sent to local media outlets. An announcement of the meeting was published in the "News & Notes" section of the newspaper. The scoping meeting was held in an open house format, and comment cards were provided for those attending the meeting to facilitate submittal of written comments. At the scoping meeting, the NVRRWP was presented to the public through use of graphic displays showing maps, pipeline alignments, and information about project objectives, purpose and need, and proposed uses of recycled water. The graphic displays used at the meeting were also made available to the public on the NVRRWP website.

Areas of Controversy/Issues to be Evaluated

Comments received in response to circulation of the NOI are included in **Appendix A**. Written comments were received from three private citizens and from the following federal, state and regional/local agencies:

- USACE.
- U.S. Environmental Protection Agency (EPA).
- SWRCB.
- CDFW.
- California State Lands Commission (CSLC).
- CVRWQCB.
- TID.
- Stanislaus County Planning and Community Development Department.
- Stanislaus County Environmental Review Committee.
- San Joaquin Valley Air Pollution Control District (SJVAPCD).

Comments included questions about the project description and about effects on water quality, water supply, and groundwater recharge flows and patterns. All of these issues are evaluated in the Final EIS.

The only area of controversy identified during scoping was the use of recycled water in the Delta-Mendota subbasin for which TID suggested an alternative that would provide recycled water to users in the Turlock subbasin.

1.7.3 Public Review of the Environmental Documentation for the NVRRWMP

Draft EIR/EIS

On January 8, 2015, the City of Modesto, as the CEQA Lead Agency, released the Draft EIR/EIS for the NVRRWP for public review. Reclamation as the NEPA lead agency released the Draft EIR/EIS for review on January 9, 2015, and published a Notice of Availability in the Federal Register. Appendix H of the Draft EIR/EIS provided the distribution list of individuals, organizations, and agencies who received the Notice of Availability; notices were also sent to property owners adjacent to proposed project facilities. A 60-day public review period ended on March 11, 2015. A public hearing on the Draft EIR/EIS was held from 5:00 p.m. to 8:00 p.m. on February 11, 2015 at the Modesto City Hall, 1010 Tenth Street, Room 2001, Modesto, CA 95354.

Final EIR

As described previously, the City of Modesto prepared and released a Final EIR (SCH# 2014042068) pursuant to CEQA requirements on June 19, 2015. A Notice of Determination was issued by the City of Modesto on July 8, 2015.

Final EIS

Reclamation has prepared this Final EIS pursuant to NEPA requirements. Comments received during the public review of the Draft EIR/EIS and Reclamation's and the City of Modesto's response to comments are included in Chapter 8 of this Final EIS. Reclamation will use this document to support a Record of Decision to document Reclamation's decisions regarding the various potential federal actions for the project, which are described in *Chapter 2, Alternatives and Proposed Action*. The Record of Decision will not be prepared until at least 30 days after the release of the Final EIS and notice in the Federal Register.

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Chapter 2 Alternatives and Proposed Action

The U.S. Department of the Interior, including Reclamation, utilizes the regulations implementing NEPA and the guidance from the Council on Environmental Quality's (CEQ) document entitled, "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations." The CEQ guidance indicates that the "range of alternatives" (addressed in Question 1b and referred to in 40 CFR Part 1502.14) includes all reasonable alternatives, which must be rigorously explored and objectively evaluated. In addition, there must be a discussion of other alternatives eliminated from detailed study, with a brief discussion of the reasons for eliminating them.

2.1 Alternative Development Process

This EIS evaluates three Action alternatives compared to the No Action Alternative for the NVRRWP. Identification of the No Action Alternative and the three Action alternatives for this EIS was informed by the purpose and need of the project, as presented in *Section 1.2, Purpose and Need*; comments received during the scoping process, preparation of a Feasibility Study (RMC 2013), and preparation of the Draft EIR/EIS.

Five alternatives were considered during the preparation of the Feasibility Study (RMC 2013). Each of the five alternatives was evaluated against the following criteria to determine the alternatives to carry forward for further analysis:

- Technical feasibility.
- Need for treatment plant upgrades.
- Recycled water delivery.
- Ability to deliver water to the entire District.
- Cost effectiveness.
- Institutional issues and obstacles.

The Feasibility Study recommended implementation of a project that provides pipeline conveyance of recycled water directly to the DMC. Therefore this EIS evaluates three Action alternatives that deliver recycled water directly to the DMC. The remaining alternatives evaluated in the Feasibility Study but rejected from further consideration are discussed in *Section 2.7*.

2.1.1 No Action Alternative

For the sake of this document, the No Action Alternative was considered to be the existing conditions of the environment in early 2014 when the NOI was published. For that reason, the No Action Alternative assumes no long-term, sustainable recycled water supply would be available to meet demands within DPWD or the refuges. The District would continue to rely on

the CVP as its primary water supply. To offset reductions in CVP allocations, the District would continue to execute water transfers/exchanges and to pump groundwater from private wells.

In 2014, the CVP allocation to DPWD was 0 percent, which resulted in the fallowing of over 11,000 acres of prime farm land, resulting in economic losses and loss of permanent crops, and placing even greater pressure on groundwater resources. To replace CVP water, DPWD irrigators were forced to rely on increased groundwater pumping and water transfers (13,459 AF for water year 2014). The availability of water for transfers may decline over time, continuing the shortfall, and potentially further increasing pressure on groundwater resources through increased pumping. Groundwater pumping could ultimately lead to overdraft of the basin and other undesired associated effects, including subsidence and groundwater quality degradation.

For the refuges, additional water supplies for wildlife management would continue to be needed. Reclamation would continue to compete for and purchase available supplemental water for SOD refuges on the open water acquisition/transfer market, which is increasingly becoming unreliable, unsustainable, and costly.

If recycled water from the NVRRWP is not conveyed, the DMC would continue operations in a fashion similar to existing conditions. Under the No Action Alternative, it is expected that operation of the DMC would continue unchanged.

If recycled water is not provided to DPWD, the Cities of Modesto and Turlock would continue their existing discharges to the San Joaquin River at their present levels. The Cities would not be obligated to discharge future, additional amounts of water to the San Joaquin River. The Cities could pursue other options for disposition of these future, additional amounts of water. If discharge to the river is continued, it is anticipated that both the Modesto and Turlock treatment plants would have to be upgraded in the future to meet increasingly stringent discharge regulations for cold-water fisheries. Even though the City of Modesto is upgrading to BNR/tertiary treatment, future discharge regulations could further increase treatment requirements. The CVRWQCB has indicated that stricter limitation on discharge to the river will be imposed in the future, which are driven, in part, by requirements for protection of anadromous fish. This could require construction of reverse osmosis or other expensive treatment processes.

The City of Turlock would also likely need to upgrade treatment processes, possibly including new UV disinfection and nitrogen removal processes. Their existing facility provides ammonia removal to meet discharge permit requirements; however, unlike the Modesto facility, the Turlock facility does not remove nitrates/nitrites from the effluent. Nitrate/nitrite removal could potentially be required in the future for Turlock, as it is for Modesto, which would require construction of new treatment processes similar to Modesto's. In addition, Turlock faces the same potential future restrictions on river discharge, which could require costly treatment processes such as reverse osmosis.

2.2 Proposed Federal Actions

This EIS addresses a number of potential actions by Reclamation: (1) provision of funding under Title XVI and/or CVPIA Section 3406(d), (2) execution of a long-term Warren Act Contract, (3) execution of a license for construction, operation, and maintenance of a discharge structure at the DMC, and (4) an agreement with the Refuge Water Supply Program to provide supplemental water supplies to certain SOD refuges. The investigation and development of the NVRRWP is being carried out in conformance with Public Law 102-575, Title XVI, which provides a mechanism for federal participation and cost-sharing in approved water reuse projects (if specifically authorized by Congress) and with the CVPIA, Public Law 102-575, Title 23, Section 3406(d), which provides authorization for Reclamation to acquire supplemental water for refuges.

The long-term Warren Act Contract between Reclamation and DPWD would be required to convey recycled water in the DMC for delivery to DPWD and to provide for storage in San Luis Reservoir. In order to facilitate the storage component of the contract, an operational exchange would be required for DPWD to take delivery of stored water out of San Luis Reservoir.

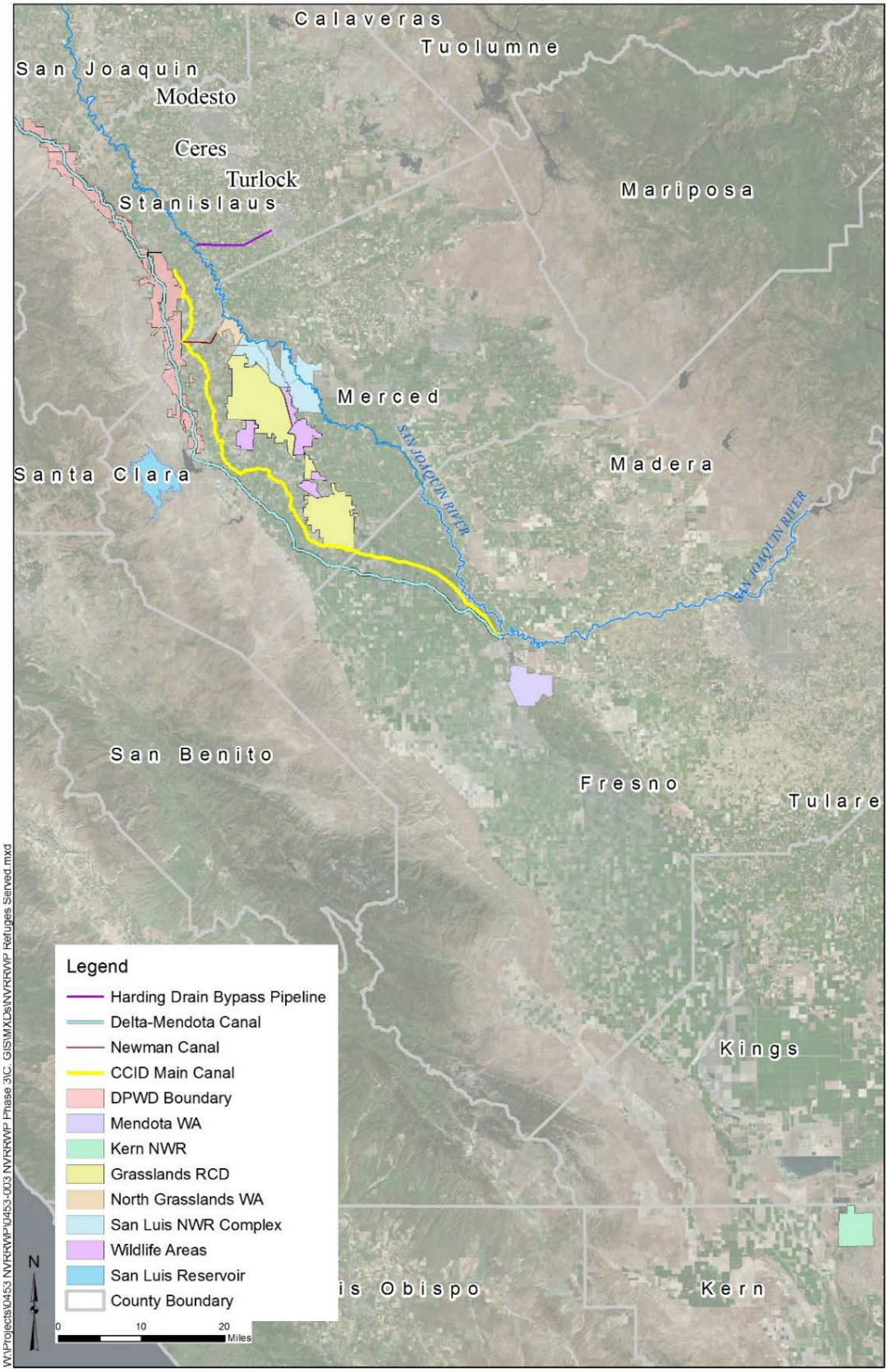
The license would allow DPWD to construct and maintain a DMC discharge structure within Reclamation's right-of-way (ROW). The project would also require a temporary construction easement from Reclamation to allow construction activities and possible staging in the area around the proposed DMC discharge structure.

Reclamation would work with DPWD to obtain supplemental water supplies (such as IL4) from the NVRRWP for delivery to certain SOD wildlife refuges.

2.3 Project Location

The Proposed Action is located within San Joaquin, Stanislaus and Merced Counties, as shown in **Figure 2-1**. Proposed facilities, consisting of pipelines, pump stations, and appurtenance improvements would generally be located about eight miles west of the cities of Modesto and Turlock, in Stanislaus County, though all work within the Jennings Plant site would be within the jurisdictional boundaries of the City of Modesto. Water would be delivered to farms within DPWD's service area in San Joaquin, Stanislaus and Merced Counties, as well as to certain SOD refuges.

Figure 2-1: Overview of Project Location



2.4 Proposed Action Components

Pipeline and pump station infrastructure would be constructed to deliver recycled water from Modesto and Turlock's treatment facilities to the DMC. The water would then be distributed to DPWD's service area and downstream refuges. This EIS evaluates three Action alternatives, which differ based on how recycled water would be conveyed from the Turlock and Modesto treatment facilities to the DMC. Alternative 1 and Alternative 2 are both "pipeline corridor alternatives", which include construction of new pipeline(s) to convey water to the DMC. Alternative 3 would use the San Joaquin River as the first segment and an expanded PID diversion and delivery distribution facility as the second segment to convey water to the DMC. The three Action alternatives considered are:

- Alternative 1: Combined Alignment Alternative (Preferred Alternative).
- Alternative 2: Separate Alignment Alternative.
- Alternative 3: PID Conveyance Alternative; continued discharge to the San Joaquin River with diversion and delivery to the DMC via an expanded PID diversion and delivery system.

All three Action alternatives were developed at two recycled water production rates (30,600 AFY available at the onset of the project in 2018, and 59,000 AFY at buildout of the Cities in 2045). Both pipeline corridor alternatives would avoid requirements for additional treatment upgrades at each City's treatment facility, have design capacity to convey all of the anticipated recycled water produced at buildout, use the CVP facilities to provide seasonal storage, and allow for delivery to the entire DPWD service area and refuges.

Both pipeline corridor alternatives would require that Modesto and Turlock obtain approval of Wastewater Change Petitions from the SWRCB, Division of Water Rights pursuant to Section 1211 of the Water Code. Approval of the petitions would enable changes in the points of discharge from the San Joaquin River to the DMC. In reviewing and approving Petitions for Change, the Division of Water Rights must find that the proposed change would not injure other legal users of water, would not unreasonably harm instream uses, and would not be contrary to the public interest. All petitioners must send a copy of the petition to CDFW, and the Division requires public notice of the petition to be provided to interested parties including other legal users of water. Protestants may raise concerns about protecting their water rights, or may raise public trust concerns. A protest sets forth the protestant's objections to approval of the petition. If the Division receives a protest, further review would be conducted. Both Modesto and Turlock would maintain their existing discharge locations at the San Joaquin River, as well as the NPDES permits for those discharges. However, the Proposed Action for these two alternatives would reduce the amount of recycled water discharged to the San Joaquin River because the primary point of discharge would be changed to the DMC.

Because the PID Conveyance Alternative would continue discharge of recycled water to the San Joaquin River, water rights for this option would need to be established through a different approval process. Instead of a Wastewater Change Petition, Turlock and Modesto would need to

acquire a new water right under Section 1485 of the California Administrative Code, which provides that agencies that discharge treated wastewater to the San Joaquin River can apply for a permit to appropriate an equal amount of water. Both Cities would need to obtain a water right to allow diversion of the recycled water from the river at the PID intake, which is downstream of the Turlock discharge location, but upstream of Modesto's discharge. Because water would be diverted upstream of Modesto's discharge point, the process for establishing a water right for diversion at the PID intake may be complex. Depending on the water rights process, the proposed project might require an exchange with a downstream diverter. Turlock would need to secure a water right for recycled water currently discharged to the San Joaquin River. Modesto would need to secure a water right for the portion of their recycled water currently discharged to the San Joaquin River (during winter months) and a water right for the portion of their recycled water that is currently land applied (during summer months), which would be discharged to the river under this alternative.

The primary difference between the three Action alternatives is how the recycled water would be conveyed to the DMC. The two pipeline corridor alternatives would convey water completely within new pipelines. Alternative 1, the Combined Alignment Alternative, includes shared conveyance facilities between Turlock and Modesto. Alternative 1 would convey recycled water from Turlock's Harding Drain Bypass Pipeline to Modesto's Jennings Plant, where it would be combined and conveyed in one pipeline to the DMC (see **Figure 2-2**). Alternative 2, the Separate Alignment Alternative includes independent pipelines from each City's treatment facility to the DMC, as shown in **Figure 2-3**. One pump station would be needed for Alternative 1 and two pump stations would be needed for Alternative 2. Alternative 3 would utilize the San Joaquin River for a portion of the conveyance, and then rely on expanded PID diversion and conveyance facilities, as shown in **Figure 2-4**. A detailed description of the project components is provided below.

Figure 2-2: Combined Alignment Alternative (Alternative 1/Preferred Alternative)

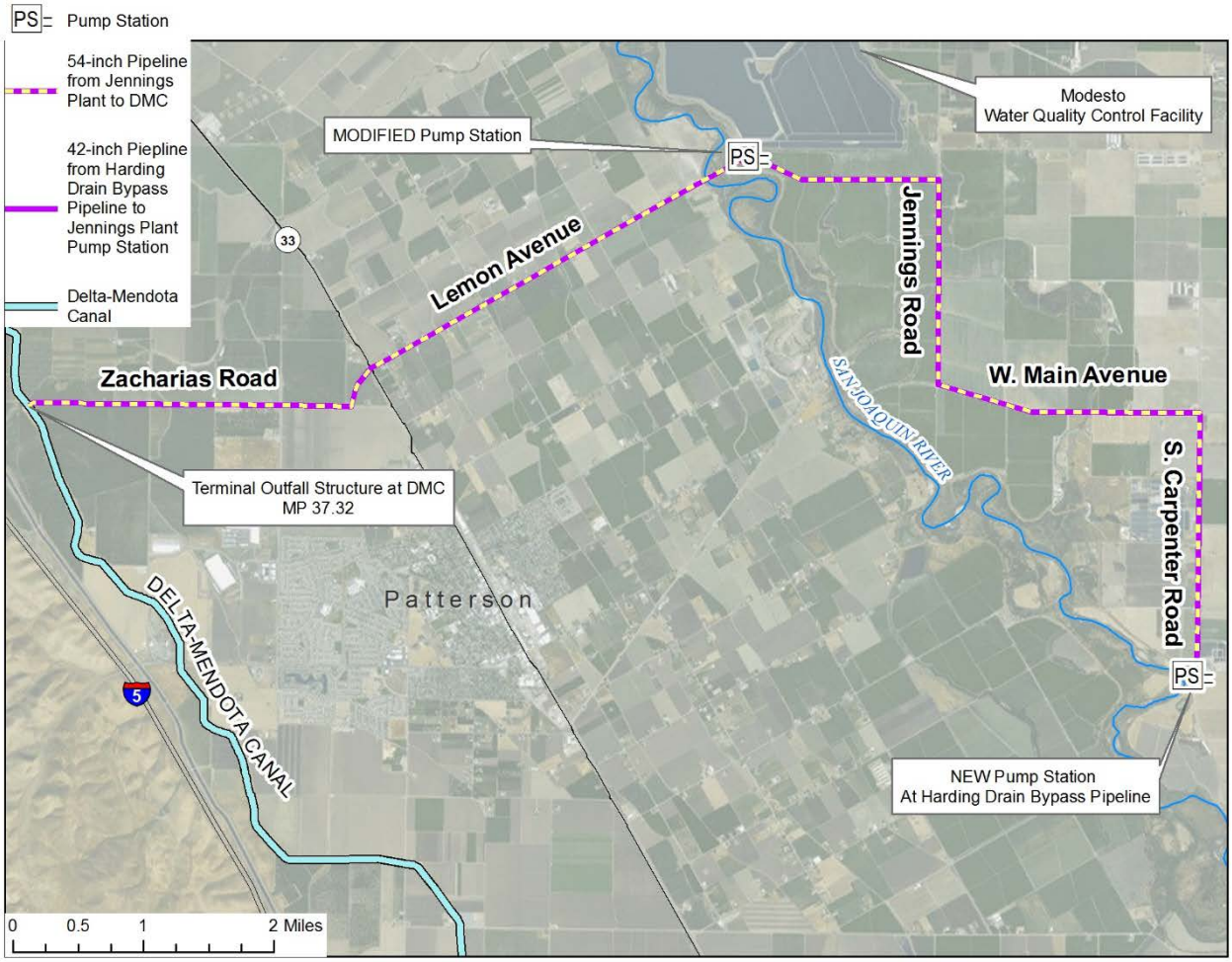


Figure 2-3: Separate Alignment Alternative (Alternative 2)

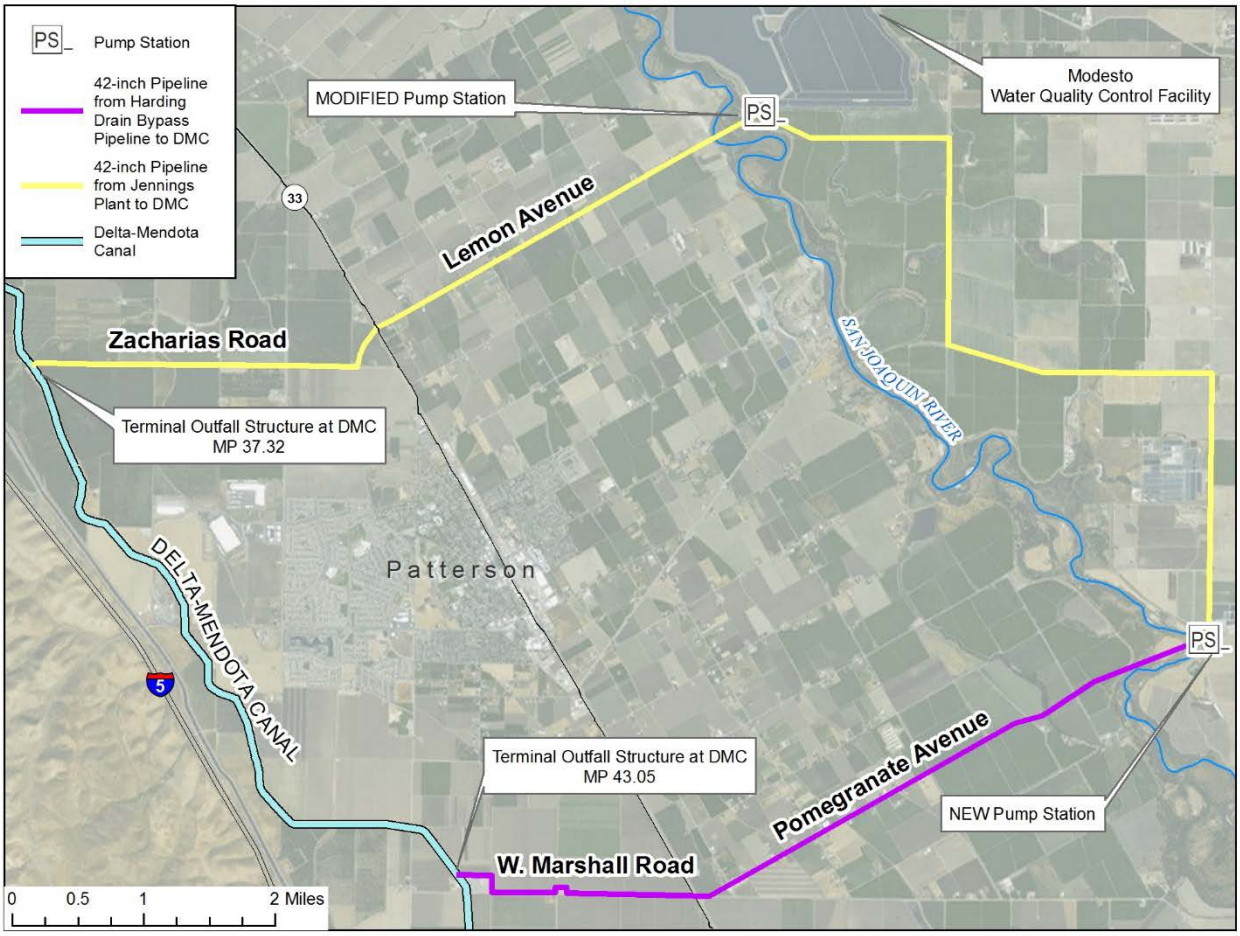
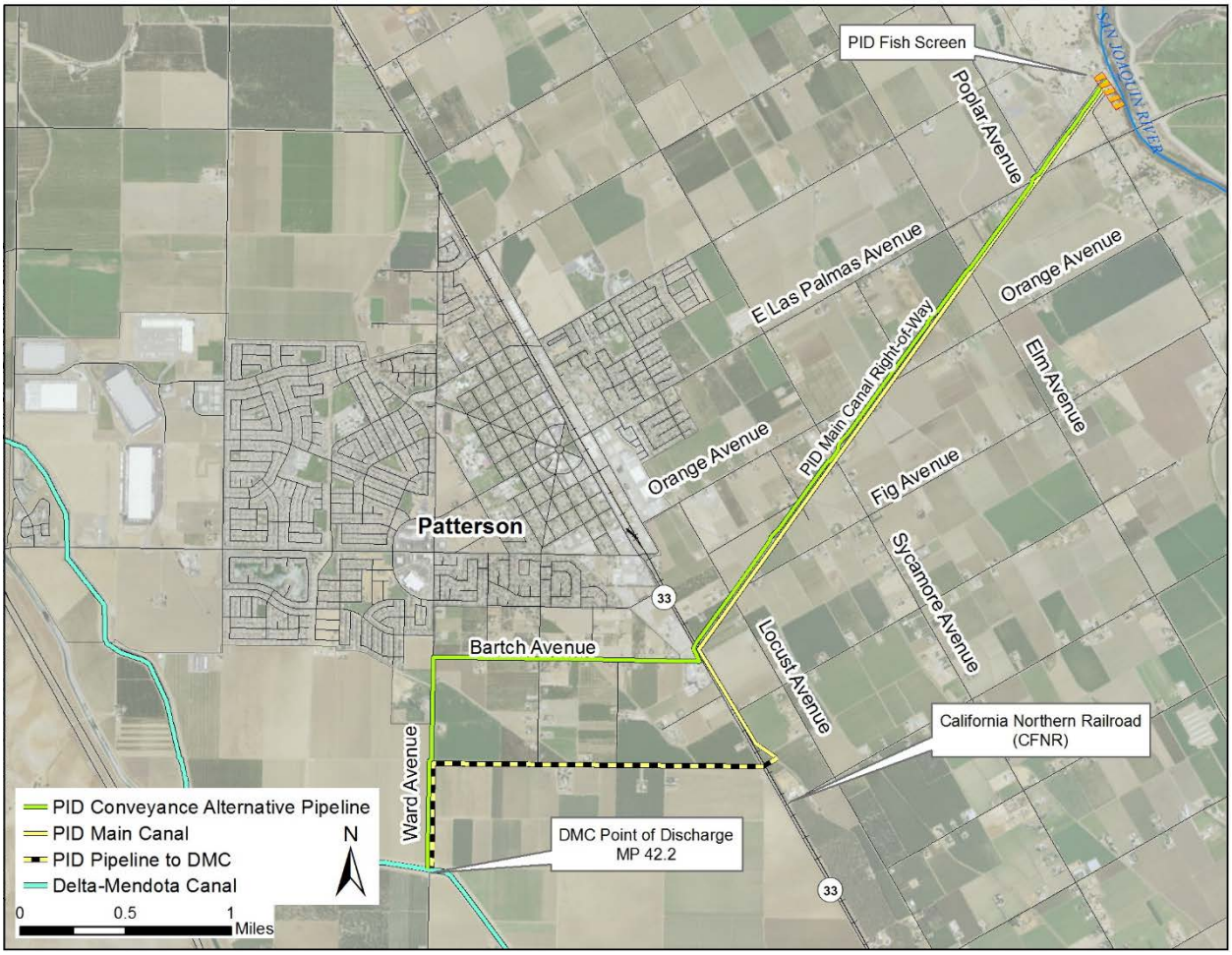


Figure 2-4: PID Conveyance Alternative (Alternative 3)



2.4.1 Pipelines and Appurtenances-Separate and Combined Alignment Alternatives

This section provides a discussion of the pipeline elements of both pipeline corridor alternatives, followed by a detailed description of each alternative.

The proposed pipeline corridor alternatives would be similar in length. The pipelines would vary from 36 to 54 inches in diameter and would likely be constructed of steel or reinforced concrete pipe. All pipelines would be equipped with air valves to release air from high points to prevent air binding that can reduce the pipeline capacity. Air valves may be located above or below ground. If located above ground, they would be housed on a concrete slab in a protective steel cage approximately 4 feet by 4 feet, on the shoulder of an adjacent road. If located underground, they would be located either within or on the shoulders of roadways in below-ground covered concrete vaults with vent pipes extending above-ground. Design and placement of air valves would be coordinated with Stanislaus County so as to ensure that vents would not interfere with potential future road widening projects such as the West Main Street Highway Improvement Project. Where feasible, air valves and vents could be located below ground so that it would be possible to construct a roadway on top of them, with appropriate venting through the pavement surface using a structure similar to a manhole. All pipelines would be equipped with drain valves

at low points in the pipeline to allow the pipelines to be drained for maintenance and repairs. Up to 30 drain valves could be required for each alternative, depending on topography. The drains would discharge to land, or if permitted, to existing drainage or irrigation supply ditches along the pipeline alignments.

The pipeline corridor alternatives would require one or two crossings of the San Joaquin River, State Route 33 (SR 33), the California Northern Railroad Company (CFNR) railroad tracks, and multiple crossings of irrigation canals. In most instances, these crossings would use trenchless installation techniques, such as horizontal directional drilling (HDD) or tunneling to minimize surface effects to waterways or transportation. The crossing of SR 33 would be coordinated with potential future roadway improvements in the area so as to not interfere with possible widening of the roadway at the location of the pipeline crossing. The recommended trenchless installation method would be determined after geotechnical data are collected and evaluated during the design phase of the project. The proposed pipeline alternatives also run parallel and across a variety of underground and overhead utilities, including natural gas, fiber optic communication, cable, electricity, and water. Although the precise pipeline locations have not yet been determined, the proposed alignments would avoid major utilities and are expected to avoid minor utilities through their strategic placement within individual alignments. Any pipelines constructed in fields would require storage and stockpiling of topsoil, which would be replaced after pipeline installation. Pipeline placement would also meet the CDPH separation requirements. Because of the rural setting of the proposed project, there are no sewer mains along potential pipeline alignments (as the area uses septic systems), and there would be no conflicts with storm drain infrastructure, as there is none in the project area.

Alternative 1: Combined Alignment Alternative (Preferred Alternative)

The Combined Alignment Alternative consists of two reaches totaling 69,800 linear feet (see **Figure 2-2**). The south-north reach from the Harding Drain Bypass Pipeline would be 42 inches in diameter and would extend from the western end of the Harding Drain Bypass Pipeline near the existing standpipe structure on South Carpenter Road, then parallel South Carpenter Road north to West Main Street, then turn west on West Main Street to Jennings Road. At Jennings Road, the pipeline would then turn north for about 1.8 miles. From Jennings Road, the pipeline would extend west along existing dirt roads through agricultural fields owned by Modesto and terminate at the existing Jennings Plant outfall pump station near the southeastern end of the Jennings Plant. Combined flows from the pumping facility at the Jennings Plant, which would be modified to meet capacity needs, would then travel in a 54-inch pipeline, cross under the San Joaquin River, and extend west to the DMC along Lemon Avenue, through farmland, and along Zacharias Road. **Table 2-1** shows the two segments and characteristics of each pipeline segment.

The proposed pipeline would cross a total of five irrigation canals along the Lemon Avenue alignment, all of which are operated by PID. Construction would take approximately 21 months, and is estimated to start in the fall of 2016.

Table 2-1: Alternative 1 - Combined Alignment Alternative Reach Characteristics

Segment	Approximate Length (feet)	Pipe size (inches)	Special Construction Considerations
Harding Drain Bypass Pipeline to Jennings Plant Pump Station – Segment 1			
South Carpenter Road between Harding Drain Bypass Pipeline and West Main Street West Main Street between South Carpenter and Jennings Road Jennings Road between West Main and agricultural field access road Agricultural field access road between Jennings Road and Jennings Plant Pump Station	37,800	42	Potential for lane/road closure requiring detours and other traffic control. Potential lane/road closures along South Carpenter Road, West Main Avenue and Jennings Road. Crossing of West Main Avenue at South Carpenter Road may use trenchless technology.
Jennings Plant Pump Station to DMC – Segment 2			
Open Space (including San Joaquin River and floodplain) between Jennings Plant and Lemon Avenue Lemon Avenue between San Joaquin River and SR 33 Agricultural Fields from east side of SR 33 to west side of SR 33 Zacharias Road from just west of SR 33 to DMC	32,000	54	Trenchless installation techniques such as HDD or tunneling of the pipeline would be required to cross under San Joaquin River to avoid the waterway and wetland resources. Road closure anticipated along Lemon Avenue during construction, requiring detours. One segment of trenchless pipe would be required to cross both SR 33 and CFNR[1]. Trenchless method may be needed to cross irrigation canals.
Total Length of two reaches	69,800		

Notes: The CFNR parallels SR 33 through much of the San Joaquin Valley, and spans the extent of the NVRRWP project bounds. The center line of SR 33 is approximately 75 feet away from the center line of the CFNR. Due to the proximity of the highway to the CFNR, it is assumed that a single trenchless pipe would be sized to span both crossings. The CFNR would require a protective casing for the pipe crossing under the railroad tracks.

Alternative 2: Separate Alignment Alternative

The Separate Alignment Alternative consists of two reaches totaling 64,000 linear feet. As shown in **Figure 2-3**, the northern reach would begin at the Jennings Plant Pump Station located at Modesto's Jennings Plant and would extend west and cross under the San Joaquin River then along Lemon Avenue and Zacharias Road to the DMC, as described above for Segment 2 of Alternative 1. The southern reach would originate at a new pumping facility at the western end of the Harding Drain Bypass Pipeline near the San Joaquin River outfall location and would cross under the river and extend west to the DMC via open space, Pomegranate Avenue, and agricultural lands (primarily along West Marshall Road). **Table 2-2** shows the two pipeline reaches and their characteristics. Pipelines in both reaches would be 42 inches in diameter. Pumping facilities are described below.

The northern reach from the Jennings Plant would cross a total of five irrigation canals, four of which are owned by PID. The southern pipeline alignment would cross four parallel PID lined and unlined irrigation canals. Similar to Alternative 1, construction would take approximately 21 months to complete once construction is initiated. Construction is estimated to begin in late summer/early fall 2016.

Table 2-2: Alternative 2 - Separate Alignment Alternative - Reach Characteristics

Segment	Approximate Length (feet)	Pipe size (inches)	Special Construction Considerations
Northern Reach – Modesto's Jennings Wastewater Treatment Plant to DMC			
Same as Segment 1 for Alternative 1	32,000	42	Same as Segment 1 for Alternative 1
Southern Reach - Harding Drain Bypass Pipeline to DMC			
Open Space (including San Joaquin River and floodplain) between Harding Drain Bypass Pipeline and Pomegranate Avenue Pomegranate Avenue between San Joaquin River floodplain and Locust Avenue Private road between Locust Avenue and SR 33 Parallel and north of West Marshall Road between SR 33 to DMC (up to 80 feet north of West Marshall Road)	32,000	42	As with the northern reach, HDD or tunneling of the pipeline would be required to cross under San Joaquin River to avoid the waterway and wetland resources. Road closure anticipated along Pomegranate Avenue during construction, requiring detours. One segment of trenchless pipe would be required to cross both SR 33 and CFNR[1]. Trenchless method also may be needed to cross irrigation canals.
Total Length of two reaches	64,000		

Notes: The CFNR parallels SR 33 through much of the San Joaquin Valley, and spans the extent of the NVRRWP project bounds. The center line of SR 33 is approximately 75 feet away from the center line of the CFNR. Due to the proximity of the highway to the CFNR, it is assumed that a single trenchless pipe would be sized to span both crossings. The CFNR would require a protective casing for the pipe crossing under the railroad tracks.

2.4.2 Pump Stations-Separate and Combined Alignment Alternatives

For Alternative 1, flow from the Harding Drain Bypass Pipeline would be conveyed by gravity to a modified pump station at the Jennings Plant, where it would combine with flow from Modesto. Only the modified existing Jennings Plant outfall pump station described below would be required as part of the proposed project to convey combined flow to the DMC under Alternative 1. **Figure 2-5** shows the conceptual modifications to the existing pump station. Details for the individual pump stations are shown in **Table 2-3**.

For Alternative 2, two pump stations would be required as part of the proposed project. For the northern reach of Alternative 2, the existing Jennings Plant outfall pump station located at the southwestern end of the Jennings Plant would be modified for pumping to the DMC by retrofitting new pumps, motors and electrical gear into the existing structure. For the southern reach of Alternative 2, a new pump station would be constructed near the western end of the Harding Drain Bypass Pipeline on land owned by the City of Turlock at the southwest corner of the intersection of South Carpenter Avenue and Harding Road. This proposed pump station would be above ground and would be enclosed. A conceptual plan and elevation for the new

above-ground pump station at the Harding Drain Bypass Pipeline are shown in **Figure 2-6** and **Figure 2-7**, and the location is shown in **Figure 2-8**.

Table 2-3: Pump Station Characteristics (Preliminary)

Alternative / Pump Station	Horsepower (hp)	Flow Rate (cfs)	Dimensions (length x width)	Maximum Height (feet)
Alternative 1				
Modified Jennings Plant Pump Station	500	46	Pumps would be installed in existing pump station structure; approximately 20 feet x 30 feet	Pumps located outdoors on top of existing wet well; approximately 15 feet high above ground level
Alternative 2				
Modified Existing Jennings Plant Pump Station	300	23	Same as above	Same as above
Pump Station at Harding Drain Bypass Pipeline	250	23	Overall site dimensions 100 feet x 100 feet. Pump building footprint approximately 40 feet x 50 feet	Building height approximately 15 feet above ground level

The pump station buildings would be surrounded by pavement for access and a fence to ensure security. Automatic-sensor lights would also be installed to provide safety and security. Power to the new pump station at Harding Drain Bypass Pipeline is assumed to be furnished by the nearby electric grid system operated by the TID. The existing TID power supply to the Jennings Plant pump station, consisting of above-grade wires mounted on poles is assumed to be used for the modified pump station under both Alternatives 1 and 2. Alternative 1 is estimated to use 15,442 megawatt hours per year of electricity for pumping; Alternative 2 is projected to require 17,898 megawatt hours per year, and Alternative 3 would require 20,063 megawatt hours per year. Generators may be needed to provide emergency power in the event of a power outage.

Figure 2-5: Modifications to Jennings Plant Pump Station

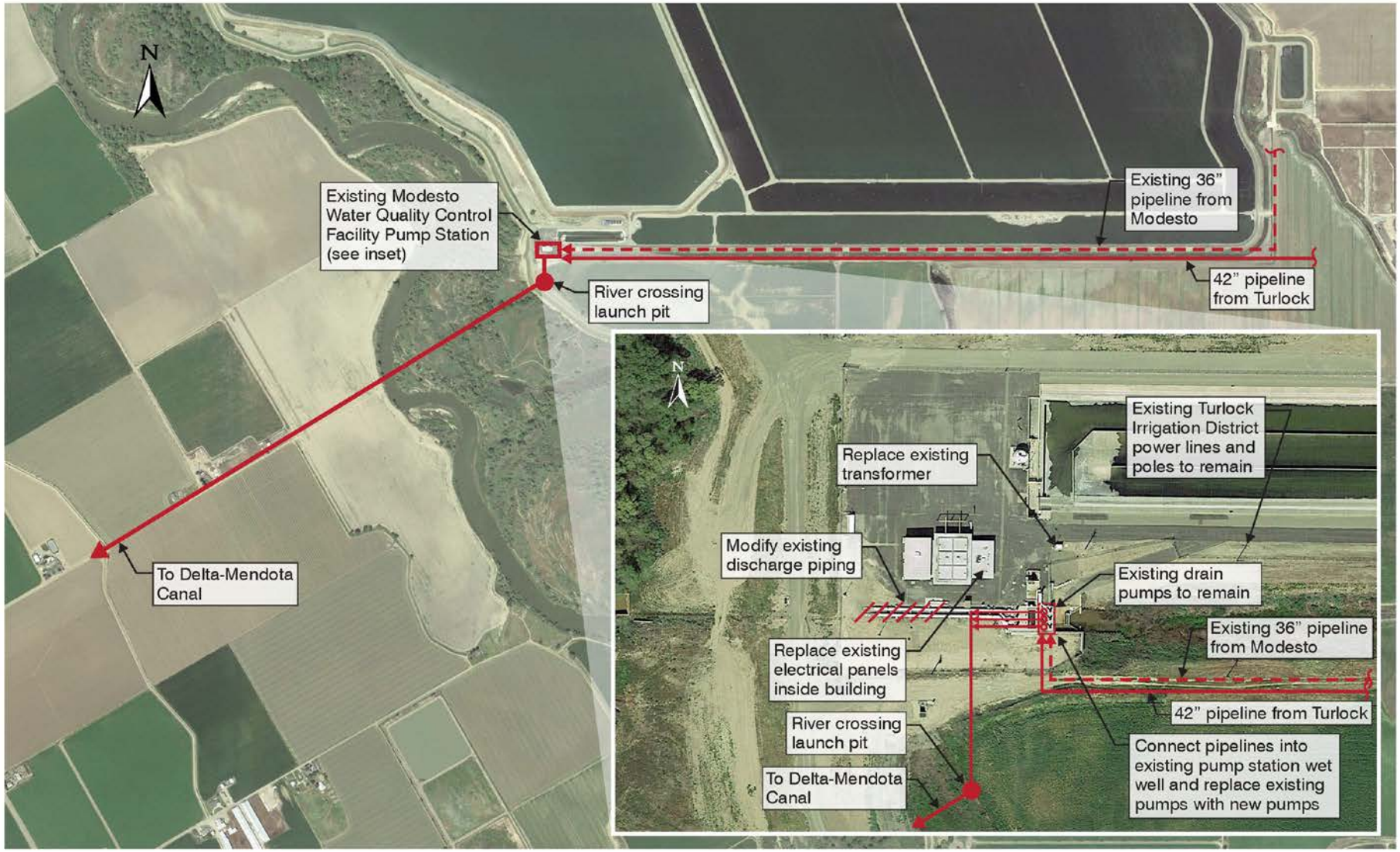


Figure 2-6: Site Plan for New Pump Station

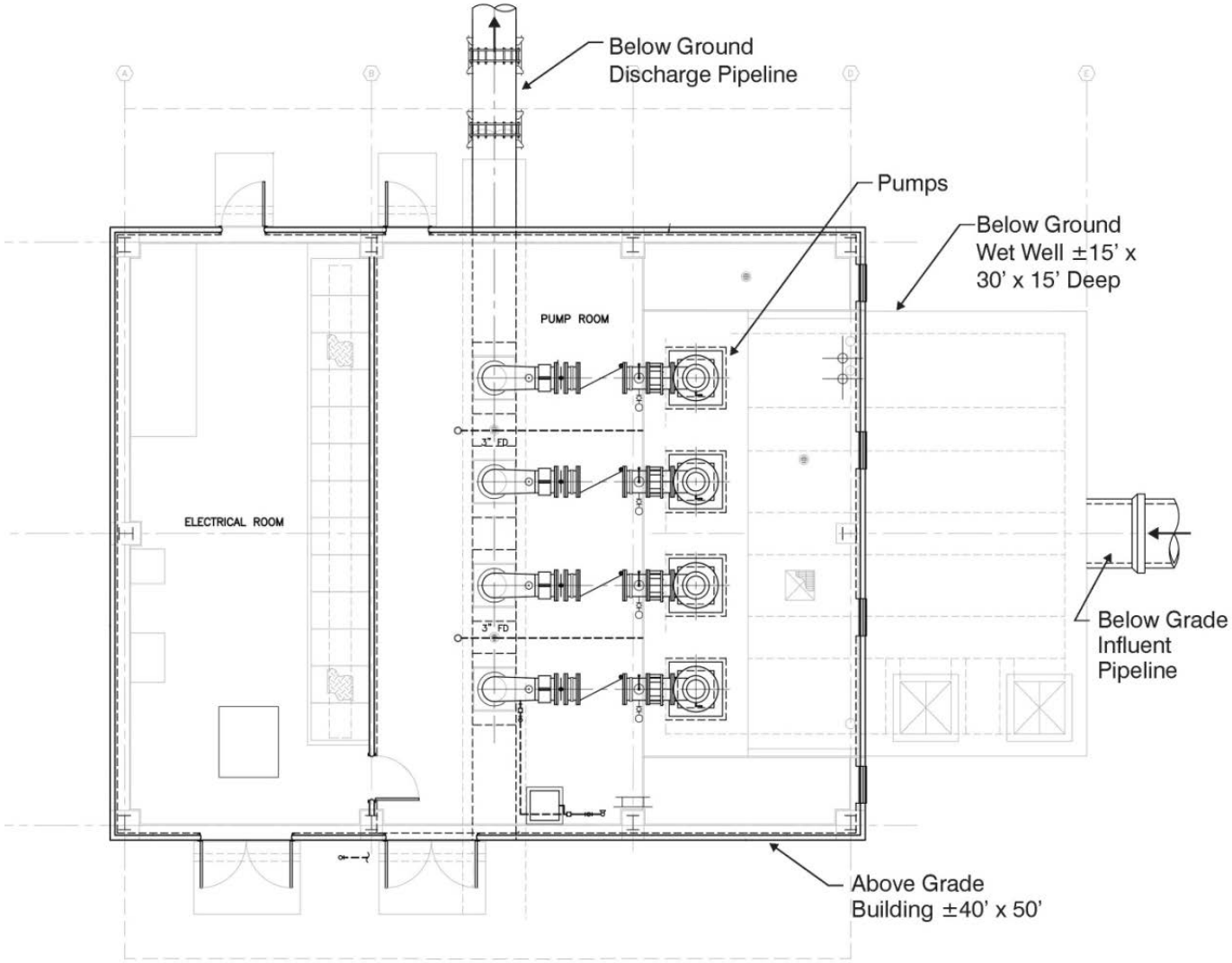


Figure 2-7: New Pump Station Elevation

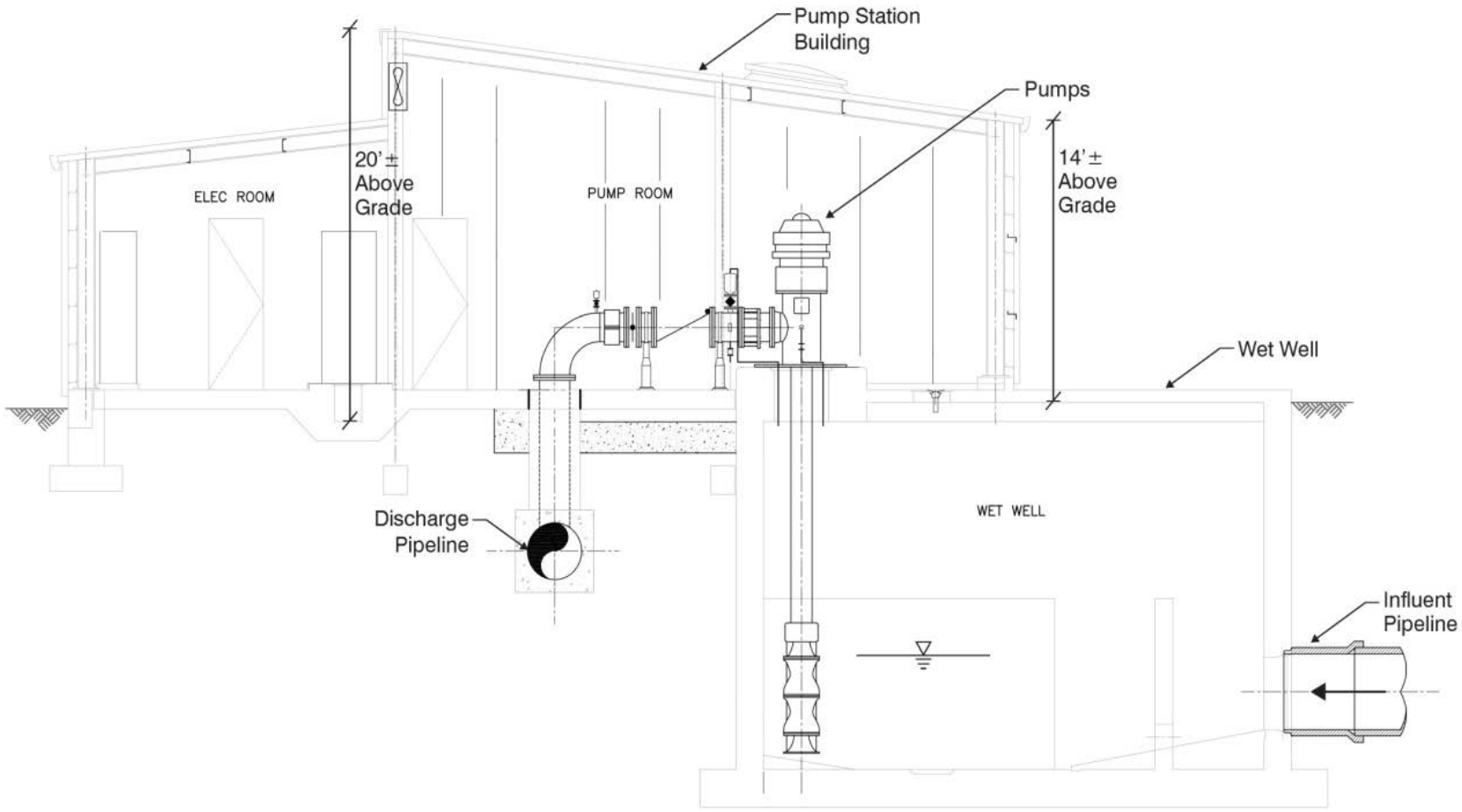
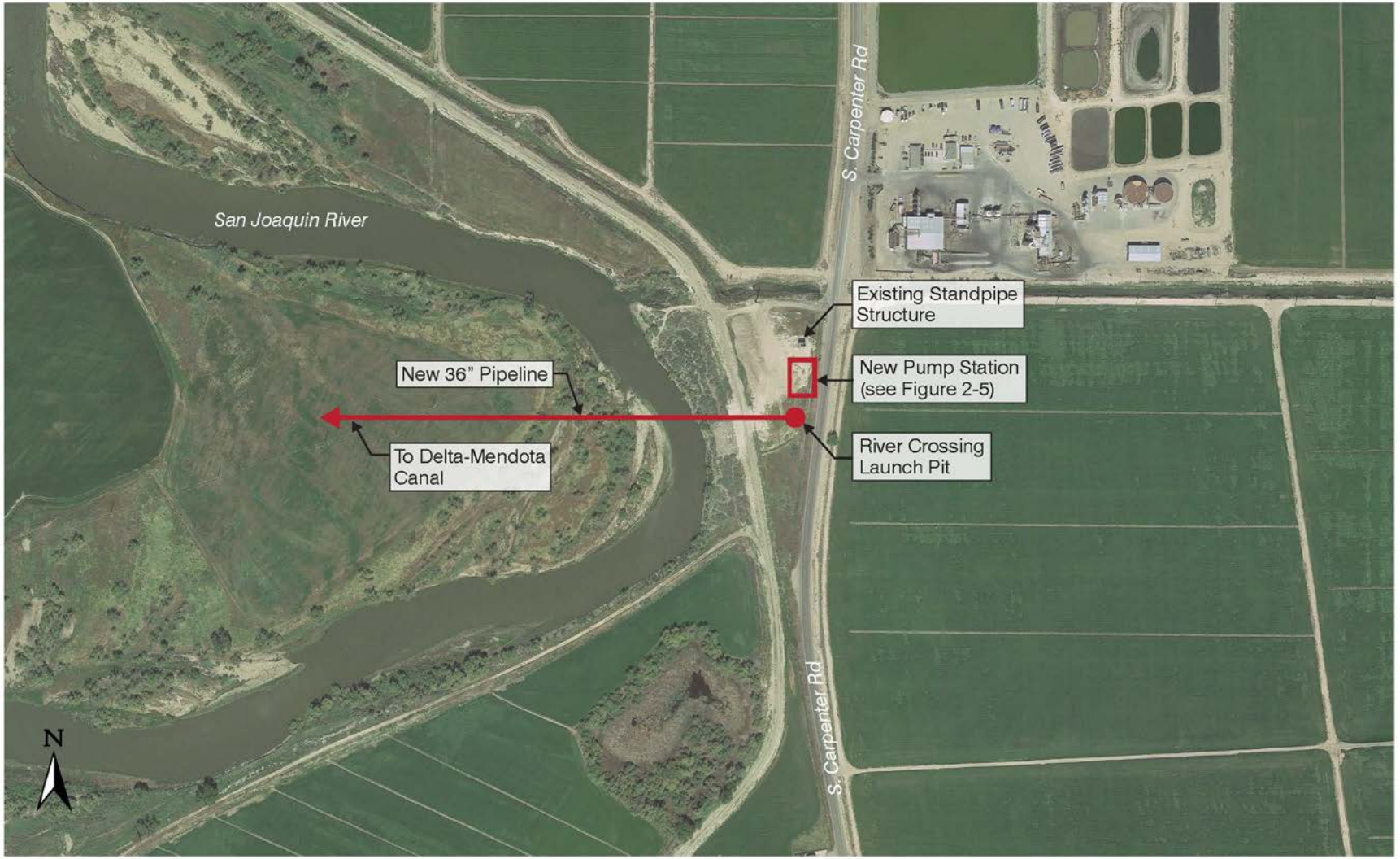


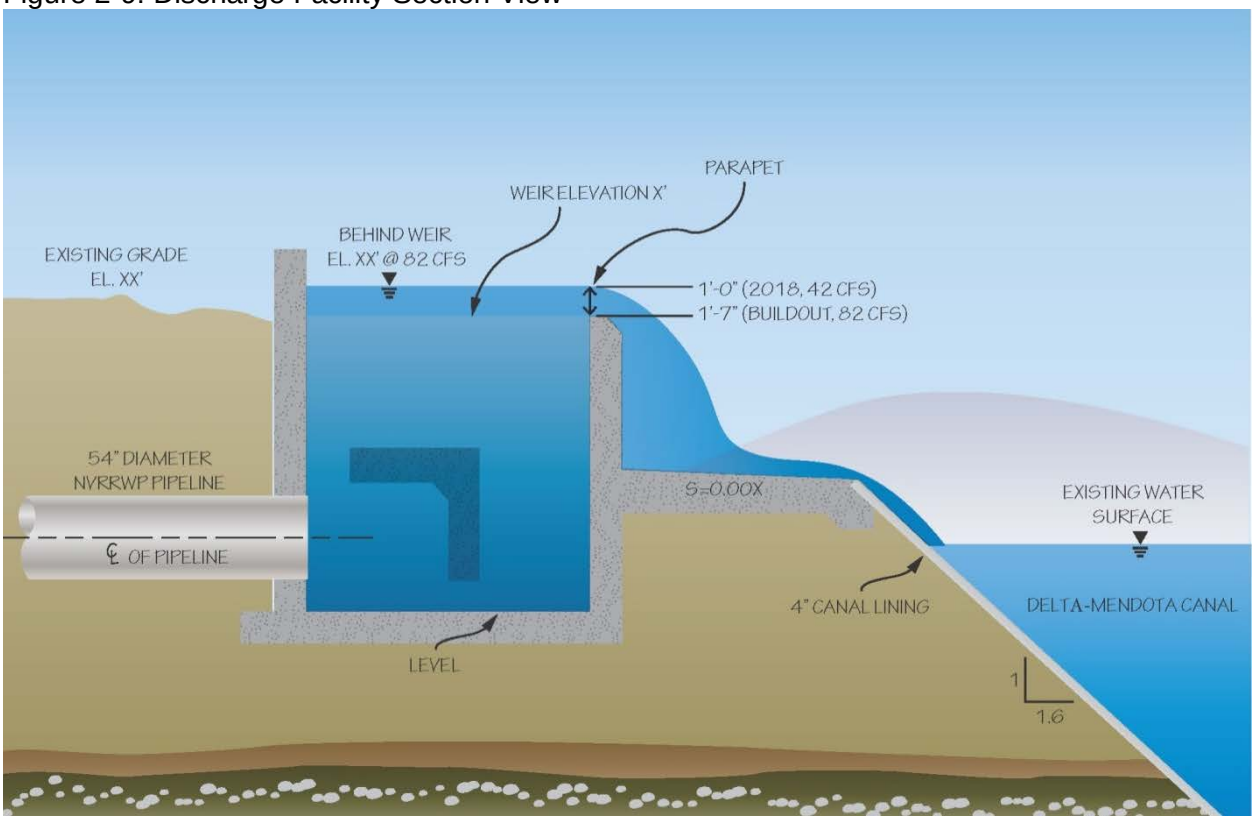
Figure 2-8: Location of New Pump Station at Harding Drain Bypass Pipeline



2.4.3 DMC Discharge Facility- Combined and Separate Alignment Alternatives

For both pipeline corridor alternatives water would be discharged to the DMC at an outfall facility located adjacent to the east bank of the existing DMC. The footprint of the facility would be approximately 30 feet by 50 feet, and would be enclosed with security fencing. The structure itself would consist of a reinforced concrete, open-ended rectangular box, situated below and above grade **(Figure 2-9)**. The box would contain a fixed-point, sharp-crested weir for hydraulic stability. Downstream of the weir, the water would flow over a concrete slab and into the DMC; this would be designed so as to require little to no modification or alteration of the existing DMC concrete lining. The facility would also include metering in a concrete vault structure and telemetry devices for communicating flow and water quality data and remote monitoring of the discharge facility.

Figure 2-9: Discharge Facility Section View



2.4.4 Alternative 3: PID Conveyance Alternative

This alternative differs from the Combined Alignment Alternative and Separate Alignment Alternative in that water would be discharged to the San Joaquin River, which would function as a portion of the conveyance system. Water would then be diverted at the PID intake and conveyed partially through existing PID facilities and partially through an expanded PID system that would connect to the DMC.

An agreement with PID would be necessary to allow conveyance of water through their system. Because the existing canal is too small to convey all of the flows, in addition to conveying water

through the canal, the PID conveyance system would have to be expanded, so that a portion of the flows would flow through a pipeline paralleling the Main Canal, and then discharged to the DMC. The PID Conveyance Alternative would have some operational constraints because PID routinely ceases operation of the Main Canal annually for 4 to 6 weeks for maintenance, specifically sediment removal. During that time period, the main canal would not be available to convey recycled water, though flows through the new pipeline paralleling the canal would continue.

Under separate environmental documentation, Reclamation is evaluating an interim transfer proposed by the City of Turlock and DPWD which would be similar in description. As proposed, the transaction would entail transfer up to 13,400 AFY of water from Turlock to DPWD. The transfer would include 10,000 AFY of existing flows, which are currently discharged to the San Joaquin River, plus future flows up to a total of 13,400 AFY. The transfer would require appropriation of San Joaquin River flows under Section 1485 of the Water Code in an amount equal to quantities discharged by Turlock to the river, conveyance of the flows through the PID intake facility and Main Canal to the DMC, and conveyance of flows to DPWD turnouts along the DMC pursuant to a Warren Act Contract with Reclamation. PID currently has sufficient capacity in the Main Canal to convey up to 13,400 AFY of existing Turlock flows to DPWD. The interim transfer would only continue until the NVRRWP was implemented.

However, because the NVRRWP contemplates conveyance of up to 59,000 AFY of flows from both Turlock and Modesto, existing PID facilities would need to be expanded because there is insufficient capacity available to convey all of flows in the existing system. It is estimated that about 13,400 AFY of capacity could be made available in the Main Canal, though the ability to negotiate a long-term conveyance agreement with PID is uncertain. Assuming that 13,400 AFY of capacity would be available, it would be necessary to construct facilities to convey an additional 45,600 AFY from the San Joaquin River through the PID intake and to the DMC. Alternatively, the entire 59,000 AFY could be conveyed through a new pipeline paralleling the Main Canal. The environmental impacts of a slightly larger pipeline are not expected to be materially different than those for a pipeline that could convey 45,600 AFY.

PID Intake Expansion

The existing intake facility would have to be expanded by installing an additional 70 linear feet of structure containing about 48 additional linear feet of fish screen to divert the additional 45,600 AFY of NVRRWP buildout flow. The existing fish screen contains ten 12-foot-long bays for a total of 120 linear feet of fish screen; the expanded intake facility would have four additional bays. Construction of the additional fish screen bays would require work be conducted within the San Joaquin River. A cofferdam would be constructed and actual construction of the expanded intake would then take place within the cofferdam.

PID Pump Station

A new pump with 2,500 installed horsepower would be required to pump water through a new pipeline from the PID intake to the DMC. The pump would be sited at the existing PID intake facility, which is located on the west bank of the San Joaquin River at the end of Old Las Palmas Avenue. An emergency generator may also be installed to ensure capture of the available recycled water flows during times of power outages at the PID diversion facility.

PID Delivery System Expansion

From the expanded pump station, an additional 30,100 linear feet of 48-inch pipeline would be required to convey water to the DMC. The pipeline would parallel the northwest side of the Main Canal to the CFNR railroad and SR 33. Crossing of the railroad and SR 33 is assumed to use a trenchless construction method. From SR 33 the pipeline would travel west on Bartch Avenue to Ward Avenue, where it would turn south and follow Ward Avenue to a discharge point at the DMC. The pipeline would cross five irrigation canals owned by PID; construction of these crossings would likely use some form of trenchless technology. The majority of the pipeline, other than the crossings described above, would be constructed using cut and cover construction.

Discharge from PID Conveyance System

Water would be discharged to the DMC through a discharge structure similar to those described for Alternatives 1 and 2. The structure would be a reinforced concrete, open-ended rectangular box containing a fixed-point, sharp-crested weir.

Future Treatment Plant Upgrades

This alternative could require the two Cities to install future treatment plant upgrades if the CVRWQCB imposes additional requirements for removal of salinity and nutrients to protect cold water fisheries in the San Joaquin River. Such improvements could require installation of reverse osmosis, or similar technologies, for removal of salts. Installation of reverse osmosis or similar membrane technologies would also entail installation of brine management and disposal facilities. Any such future improvements would be completed under applicable regulations and may require additional environmental review.

2.5 Operation and Maintenance Requirements

2.5.1 Operations

Under the NVRRWP, the SOD CVP system would be used to convey and store recycled water, which is considered “non-project water” (i.e. non-CVP water). A long-term Warren Act Contract, which would include an operational exchange component, would be needed with Reclamation. Once in the DMC, water could be diverted from any point along the DMC through existing turnouts to the DPWD service area and certain SOD refuges or to the San Luis Reservoir for storage. Because both Cities’ treatment plants operate 24 hours per day/365 days per year, the project would be operated year-round. Thus, the pump stations and pipelines would be operated 24 hours per day/365 days per year to deliver tertiary-treated water to the DMC if capacity exists. Non-CVP water conveyed in the DMC is on a “space-available” basis; availability of space is determined by Reclamation and is based on either the physical or “operational” constraints. All discharges to the DMC under this project would be scheduled in advance and approved by Reclamation and SLDMWA prior to discharge.

No changes to the District’s internal, administrative water allocation system would occur. DPWD would work directly with Reclamation and SLDMWA to track water inputs and outputs into the DMC.

With respect to the SOD refuges, it is most likely water would be delivered to them during low agricultural-demand periods, although this has yet to be determined. Water would be delivered to the refuges via either existing turnouts from the DMC or through other existing private conveyance systems, as appropriate, and in accordance with the refuges' respective annual water delivery schedules. Water delivered to SOD refuges would be managed on refuge for wetland habitat purposes in accordance with the refuges' Reclamation approved Refuge Water Management Plans (available at: http://www.usbr.gov/mp/watershare/wcplans/index.html). No additional infrastructure would be required to serve water to the refuges.

2.5.2 Maintenance

Maintenance of the project would primarily involve regular inspections of the pipelines and pump stations. The pipeline(s) would be inspected as needed in any given year, and the pump stations would be inspected monthly. Existing Turlock and Modesto operations and maintenance staff would conduct maintenance activities. No vehicular trips would be needed for inspection of the pump station at Modesto's Jennings Plant because it is located on the treatment plant site, where existing staff currently maintain its facilities. City of Turlock staff would drive to the pump station at the Harding Drain Bypass Pipeline for regular inspections. For the PID Conveyance Alternative pump station, arrangements for maintenance would need to be agreed upon with PID.

2.6 Construction Considerations

This section outlines the pipeline installation techniques under consideration for the NVRRWP. The precise construction methods are yet to be determined but work is anticipated to follow the broad methods outlined in the following sections.

All pipeline construction would occur within public roadways or other public ROW, private and municipal agricultural lands, and public open space areas (San Joaquin River and its floodplain). An easement from the California Department of Transportation (Caltrans) would be required to construct the pipeline underneath SR 33. An access agreement may be required for railroad crossings. Construction of the pipeline alignments would consist of open-cut construction, except at specific crossings (e.g., river, highway, railroad, and irrigation canals), where trenchless construction techniques would be employed.

Spoil (soil and rock) excavated during construction would be reused on site for backfilling or would be disposed of properly. Any material that would not be reused as backfill would be stabilized and stored temporarily at the construction staging area until characterized and then hauled away to a permitted disposal site. Potential for reuse of spoil from a trenchless installation would depend on the trenchless method selected because some methods remove spoil using slurry (i.e. the material is mixed with water or drilling fluid) and for those methods it is not practical to reuse excavated spoil.

2.6.1 Construction Timing

Construction is tentatively scheduled to last approximately 1.5 years for all three Action alternatives and is estimated to begin in late summer/early fall of 2016 and last until late 2017.

Typical project work hours would be Monday through Friday from 7:00 AM to 7:00 PM, but construction might take place during weekends and nighttime if necessary. The project construction contractor would be responsible for obtaining the necessary permits to conduct weekend and nighttime activities.

2.6.2 Staging Areas

Equipment, material and vehicle staging would be accommodated either at the construction zones, or at selected off-site locations (e.g., open lots) owned by the Cities. Staging areas could include:

- The area around the proposed discharge structure at the DMC.
- The area around the existing Jennings Plant Pump Station.
- The area around the site for the new pump station at the west end of the Harding Drain Bypass Pipeline.
- The area of the existing PID intake facility.

2.6.3 Pipeline Construction

Open-cut construction

Open-cut construction (also referred to as open trench with shoring, or cut-and-cover) is the proposed option for installing the majority of the pipeline along existing roadways and private and municipal agricultural lands. The open-cut trench would range from 6 to 8 feet wide and approximately 8 to 10 feet deep, depending on the pipe size, existing utility locations, and pipe bedding requirements. Shoring would be required to provide trench stability. Open-cut construction would involve cutting, removing, and replacing pavement in existing paved areas. Where possible, the pipelines would be installed along the shoulder of the roads to minimize paving and traffic disruption.

To accommodate construction equipment and work area, the entire construction corridor (active work area including the trench) would be approximately 45 feet wide. Because of the limited width of the existing roads (especially Lemon Avenue, Zacharias Road, Pomegranate Avenue, and Jennings Road) and the size of the trench and construction zone, it is expected that the construction may require full road closures unless temporary access for construction equipment can be provided along the shoulders of the road and/or adjacent property. If access can be provided along the roadway shoulders and adjacent property, only partial road closures with appropriate traffic control would be required. Otherwise segments of the affected roadway would be closed during pipeline installation activities and work would likely need to be conducted during late night/early morning hours to minimize traffic disruptions. Traffic control operations will be noticed at the location of the temporary traffic restrictions a week in advance of the any road work that impedes the flow of traffic (i.e. closes the road, closes a traffic lane, or closes the road shoulder).

It is expected that open trench construction within paved roadways would proceed at the rate of 200 to 500 feet per day within rural areas. Excavated trench materials would be sidecast within approved work areas and reused as appropriate for backfill. Upon completion of pipeline installation, affected roadways would be repaved per the requirements of Stanislaus County.

Open-cut construction would also be used within farmland. Some of the lands are fallowed while others are cultivated. Open-cut construction proposed for cultivated areas may require removal of the crop, depending on the crop and time of year. Temporary and permanent easements would be obtained from individual growers as needed.

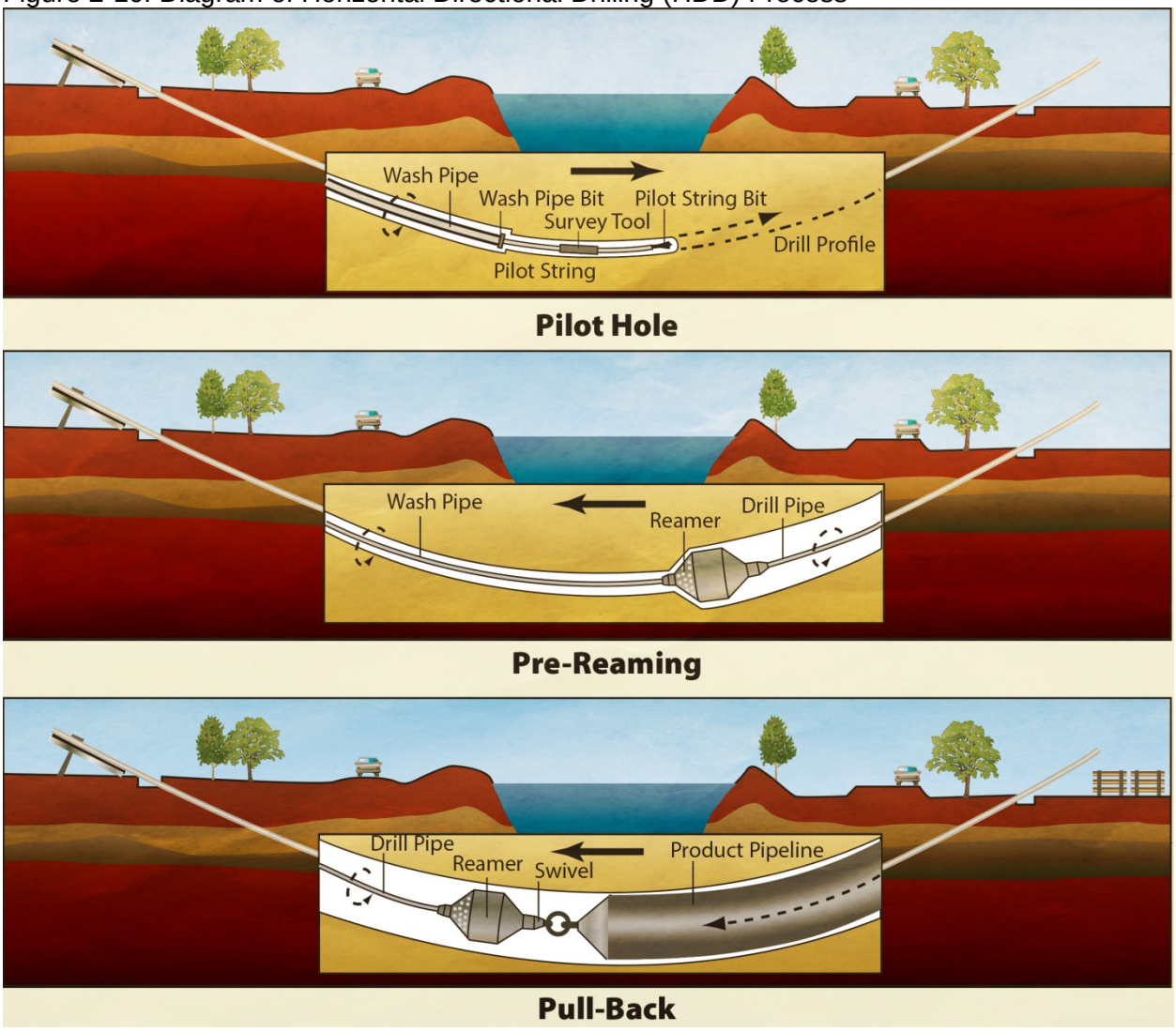
Open-cut construction would not be used to cross the San Joaquin River, which would be crossed using trenchless construction, as described below. As shown in **Figure 2-5**, open-cut construction would be used within the Jennings Plant up to the point where trenchless construction would begin at a river crossing launch pit approximately 1,260 feet east of the river. Open-cut construction also would be used for the pipeline on the west side of the river, beginning at the receiving pit for the trenchless crossing. The exact location of the receiving pit has not been determined, but would be at least 250 feet from the west side of the river. Both the Combined Alignment and Separate Alignment Alternatives would include a river crossing at the Jennings Plant Pump Station. The Separate Alignment Alternative would also require a second river crossing at the new pump station located at the end of the Harding Drain Bypass Pipeline. At that location, open cut construction would proceed up to the river crossing launch pit, which is shown in **Figure 2-8**. The launch pit would be about 250 feet east of the river, and open-cut construction would also be used to construct the pipeline to the DMC from the receiving pit, which is located about 1,300 feet west of the river.

Trenchless Pipeline Construction

As described previously, trenchless construction methods would be used for specific crossings. These methods are used to minimize the area of surface disruption required for pipeline installation or where open-cut construction is not practical or not allowed. HDD would likely be used for crossing of SR 33 and the CFNR railroad, provided that a suitable geometric profile can be designed taking into consideration entry/exit angles, bend radius of the pipe, and sufficient room for pipe assembly and laydown. Otherwise, a pipe jacking methodology would be considered for those installations. The San Joaquin River crossing may be completed using microtunneling or HDD, depending on soil conditions and other design factors. For the San Joaquin River crossing, the launching and receiving pits would be located on either side of the waterway, outside the river levees and floodplains. The exact types of trenchless methods to be employed at irrigation canal crossings have not yet been determined, but could consist of HDD, jacking and boring, and/or microtunneling.

Horizontal Directional Drilling HDD is a trenchless pipeline installation method that can be used for crossing major roadway intersections and waterways. HDD crossings are installed between an entry (launch) and exit (receiving) pit (see **Figure 2-10**). HDD involves the use of a drill rig tilted at the top at an angle, typically in the range of 10 to 15 degrees from horizontal. A small diameter (4 to 8 inch diameter) pilot hole is first drilled along a pre-determined horizontal and vertical alignment from the entry pit to the exit pit. This pilot hole can be guided using electromagnetic readings transmitted from the drill bit back to the drill rig. Excavation takes place by introducing pressurized slurry (a thin mixture of water and clay) through a drill string to the bit. The slurry pressure in combination with a rotating drill bit excavates the material, which is then transported back to the entry pit along the outside of the drill string. In some cases, a larger diameter wash pipe may be rotated around the drill string to prevent sticking of the steerable string.

Figure 2-10: Diagram of Horizontal Directional Drilling (HDD) Process



Entry and exit pits are required at each side of the crossing. The pits are approximately 50 to 100 feet square by approximately 5 feet deep, and are used as the collection point for the fluid material removed during drilling, which is a mixture of the drilling slurry and spoil. This fluid is then pumped to a slurry separation plant to separate the spoil from the fluid so that the fluid can be reused. The pilot hole is then enlarged by pulling larger reamers (see **Figure 2-10**) from the pilot exit pit back towards the drilling rig. The pipeline is then pulled into place behind the last reamer.

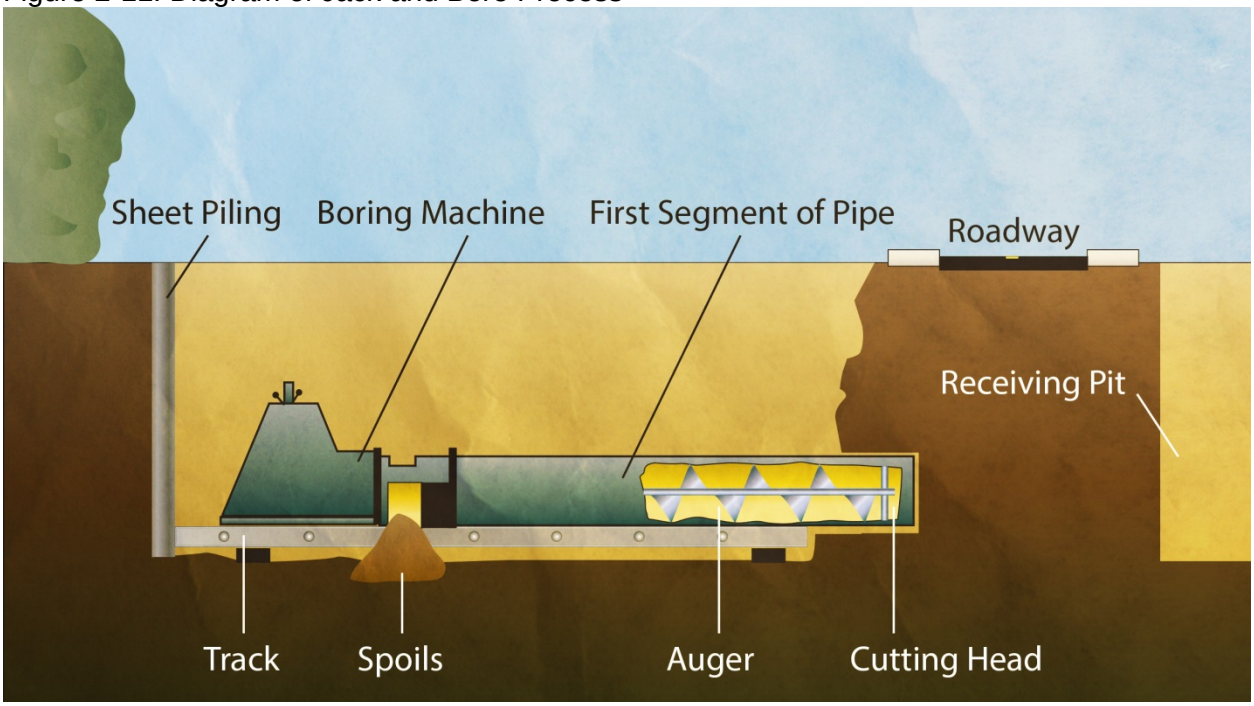
The entry side requires a work area of approximately 1,500 to 3,000 square feet for the drill rig, slurry separation plant, material storage and other support equipment. The exit side requires a work area of about 1,000 to 1,500 square feet for the pullback. This area is exclusive of the area needed for the pipe assembly and laydown area. Typically, a corridor about 15 feet wide by the length of the pipe is needed for the buildup and laydown.

Pipes would be installed at varying depths depending on features being avoided, the existing underlying utilities, soil types, environmental constraints, entry and exit constraints, and bend radius of the installed product and drill pipe. Although the exact depths of the pits and drilling have not been defined as design has not yet been initiated, for the purpose of this analysis, it is assumed that the depth of construction would vary from 30 to 50 feet under the San Joaquin River bed and 10 to 15 feet under the highway/railroad/canals.

Pipeline installation using HDD at the San Joaquin River crossing would take about 8 to 10 months, and the SR 33/CNFR railroad crossing would take approximately 4 to 6 weeks to complete.

Jack and Bore Construction Jack and bore is a method that is often used for major roadway intersections and railroad crossings where crossings are generally less than 300 feet long and above the ground water level. Jack and bore would require two pits that are excavated at each end of the pipeline to be installed (see **Figure 2-11**). A boring machine is inserted into one pit to bore the soil using an auger to remove material. As material is removed a casing is pushed forward until it reaches the receiving pit. After the casing is installed, the pipe is inserted in the casing. The jacking pit is excavated (and shored) with typical dimensions of 8 to 12 feet wide and 25 to 35 feet long depending on the casing length selected. The depth would depend on the feature to be avoided, existing utilities, or separation requirements. The exact depths of the pits and drilling have not been defined because design has not yet been initiated; however, for the purpose of this analysis, it is assumed that the depth of construction would be on the order of 15 to 20 feet deep for canal, railroad and highway crossings. Jack and bore typically has very limited steering control and it is not the method of choice if precise line and grade control is required. Jack and bore is not feasible for the San Joaquin River crossing.

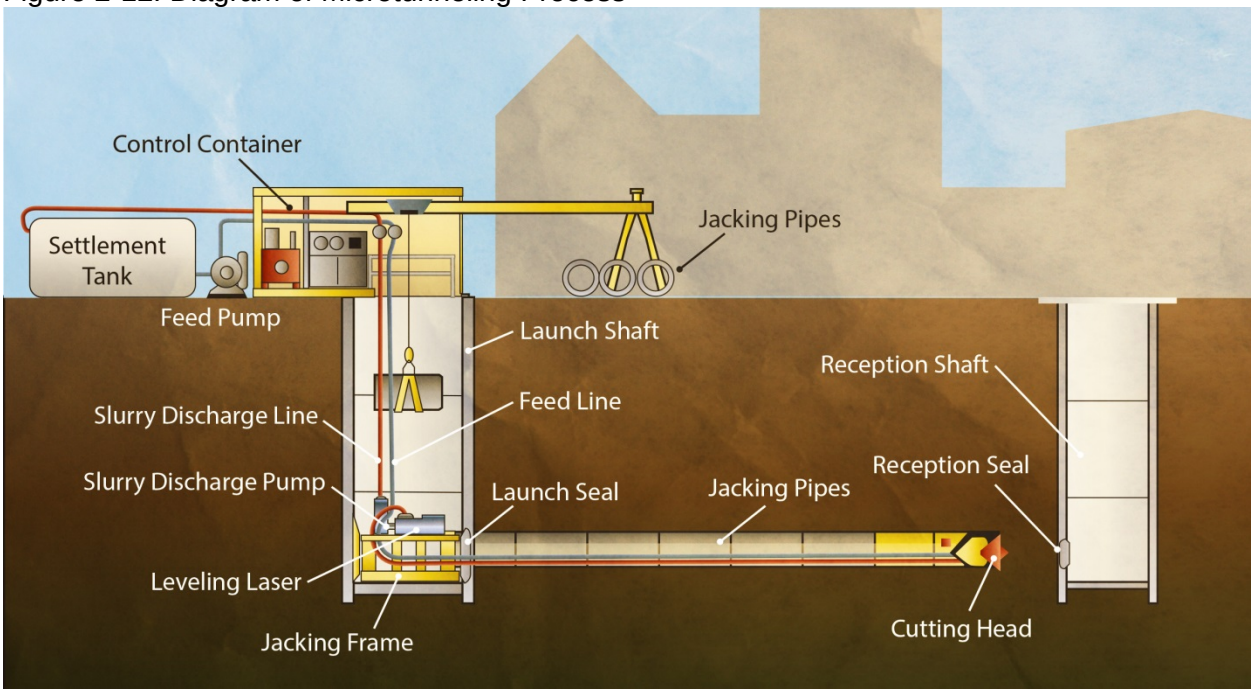
Figure 2-11: Diagram of Jack and Bore Process



Shoring, appropriate to the pit depth, would be used to support the excavation. In addition, the back wall of the jacking pit would need to be constructed so as to withstand the reactive forces from the jacking frame. An additional area of about 1,500 to 2,000 square feet would be needed around the pit for temporary storage of pipe sections and for loading material removed from the bore. The receiving pit at the other end of the crossing would be smaller, encompassing approximately 100 square feet. Pits and work areas would be located within existing ROW and along streets, where appropriate. Crossings of roadways would typically take three to five days. After pipeline construction and installation is complete, the work area would be restored to preconstruction conditions.

Microtunneling Construction Microtunneling is a remotely-controlled pipe jacking process that can be used in saturated areas below the groundwater level. The microtunneling boring machine is advanced through the ground by incrementally adding jacking pipe segments to the end of the pipe string and advancing the pipe string from a jacking pit to a receiving pit on the opposite side of the crossing (see **Figure 2-12**). A cutting head excavates material at the face as the machine is jacked forward. The excavated material is mixed with clean slurry and pumped to the surface for separation and muck removal.

Figure 2-12: Diagram of Microtunneling Process



Jacking pits for microtunneling are typically 10 to 14 feet wide. The length is dictated by the pipe segment length that would be installed. Ten-foot segments require a pit about 15 feet long and 20-foot pipe segments require a pit about 25 feet long. Receiving pits are typically 12 to 16 feet square. Pit depths would vary depending on the feature being avoided, existing utilities, and the presence of soil layers that are more favorable to tunnel through than others. The exact depths of the pits and drilling have not been defined because design has not yet been initiated. For the purpose of this analysis, it is assumed that the depth of construction would be

approximately 15 to 25 feet under the river channel. A microtunnel operation requires a work area (including the area of the pit) of approximately 2,000 to 3,000 square feet at the jacking pit. The work area at the receiving pit can be smaller, but is typically a minimum of 1,000 square feet. Off-site staging areas can be used to reduce work areas.

Pipeline installation using microtunneling at the San Joaquin River crossing would take about 10 months, and the SR 33/CNFR railroad crossing would take approximately 4 to 6 weeks to complete.

2.6.4 Pump Station Construction

Modifications to the existing outfall pump station at Modesto's Jennings Plant would require removal and replacement of the three existing outdoor pumps and motors, and a power transformer within the same footprint. The new pumps would be larger than existing pumps, requiring the existing openings in the top slab of the pump station to be enlarged. The existing switchgear and motor control center housed in the existing control building would need to be replaced with higher capacity equipment to accommodate the new pumps. Equipment would be accommodated adjacent to the project site during construction. The construction zone, including the footprint of the pump station, would be 50 by 50 feet, mainly for storage of equipment. Minimal excavation would be required.

The new pump station at the Harding Drain Bypass Pipeline outfall site in Alternative 2 would require site preparation (e.g., removal of vegetation, if any), cutting the pavement if required, excavation and shoring, and placement of the structure. After the structure has been constructed, electrical equipment (e.g., motor control cabinets, panels, switchboards, lighting) would be installed and other installations (e.g., conduits and cables) would occur. Finally, installation of pavement and fencing, restoration of the work site, and testing would be conducted prior to the start of operations. Equipment would be accommodated adjacent to the project site during construction. The construction zone, including the footprint of the pump station, would be approximately 250 feet by 200 feet to provide clearance for excavation, storage of construction materials, and equipment access.

Construction of a new pump station for the PID Conveyance Alternative would follow procedures similar to those described for the pump station at the Harding Drain Bypass Pipeline outfall site.

2.6.5 Construction Equipment, Crew, Spoil and Trip Generation

Construction Equipment and Crew Size

The installation of the proposed facilities would require, but is not limited to, the following equipment: excavator, backhoe, front-end loaders, pavement saw, dump trucks, diesel generator, water tank, water truck, flat-bed truck, drill rig, compactors, double transfer trucks for soil hauling, concrete trucks, dewatering equipment and paving equipment. Following are descriptions of typical construction operations for the proposed pipelines and pump stations.

Pipeline Installation

Prior to the start of excavation, asphalt would be cut where needed for the new pipe trench using large saw blades mounted on a special cart that would be pushed by a construction laborer. The

asphalt would be lifted in large chunks and slabs from the cut area by a front-end loader or backhoe into a dump truck for off-hauling. The saw cutting operation would be relatively fast, with several hundred feet typically being cut within a few hours. Installation of dewatering wells may be required prior to start of excavation depending on the soil type and groundwater level. Water pumped from the excavation area must be properly disposed to nearby irrigation ditches or impoundments. Dewatering pumps would run continuously (24 hours per day) in the open trench areas while excavation is taking place, to maintain the groundwater level below the bottom of trench. After the pipeline is installed and backfilled, the dewatering pumps would be removed and relocated to the next segment of pipeline construction. Heavy equipment for excavation would follow, which typically involves continuous use of an excavator to fill dump trucks which would make intermittent trips to an off-site disposal area. Typically two or more dump trucks would be used to allow continuous offloading from the excavator. In addition, dump trucks hauling material from off-site sources for pipeline bedding and backfill would make semi-continuous trips to the site as pipe is being installed. A front-end loader would be used to lift pipe segments from a flat-bed delivery truck and position the pipe in the trench. Temporary trench plates and paving would be installed over the trench at the end of each work day. Final paving and marking typically would be done for the entire pipeline length after installation. Trenchless pipe installation is described above and typically would involves use of a drill rig (for HDD) or jacking machine for 8 hours per day with associated mud collection pumps running simultaneously. It is assumed that two crews of up to 10 workers would be installing the pipelines at any one time.

Pump Stations

Construction of the proposed new Harding Drain Bypass Pipeline pump station or expansion of the PID Conveyance Alternative pump station would begin with site grading followed by excavation for below-ground utilities, foundation, and the wet well. Dewatering equipment would likely be required to maintain the groundwater level below the bottom of excavation. An excavator and dump trucks would be required during this phase of work, similar to pipeline construction. The excavation for this project would be relatively fast, likely less than one week. Below-ground concrete structures would be poured including the wet well and footings, followed by installation of the slab on grade. The building would be constructed on top of the slab, followed by installation of the pumps, electrical gear, controls, power supply, and ancillary systems.

Modification of the existing Jennings Plant outfall pump station would involve only minor excavation for new power conduits and piping. Existing pumps would be removed from the structure using a boom truck or small crane. The pump cut-outs in the existing above-ground wet well slab would be enlarged using a concrete saw. New electrical gear would be installed inside the existing control building, and a new power transformer installed in the existing transformer location. Minor grading and concrete work may be needed for a new spill containment structure for the transformer. The new pumps would then be installed in the enlarged cutouts of the existing pump locations. Much of the existing pump discharge piping would likely be re-used, pending a condition assessment.

One crew of approximately five members would construct the pump stations, which would be done in sequence.

Construction Spoil and Trip Generation

The amount of spoil generated would depend on the construction methods selected. **Table 2-4** shows estimated cubic yards (CY) of spoil from pipeline construction for each alternative.

Table 2-4: Spoil Generated by Pipeline Construction

Alternative/Facility	Spoil Quantity (CY)
Alternative 1-Combined Alignment	
Open trench construction	155,000
Trenchless construction at river	3,500
Alternative 2-Separate Alignment	
Open trench construction	150,000
Trenchless construction at river	3,700
Alternative 3-PID Conveyance	
Open trench construction	54,000

On a per day basis, assuming an average of 350 feet of pipeline would be constructed per day (200 days of construction) for Alternative 1, a maximum of 775 CY of material would be generated. This is equivalent to approximately 39 truck trips (20 CY haul, round trips) per day. For Alternative 2, the installation rate for the smaller pipe would be slightly faster. Assuming 400 feet per day (160 days of construction), the daily generation would be approximately 470 CY, resulting in approximately 23 truck trips. For Alternative 3, assuming 400 feet per day for 76 days of construction, up to 710 CY could be generated per day, requiring 36 truck trips per day. In addition, a maximum of 26 truck trips (round trips) per day would be required for all three alternatives for delivery of imported backfill, pipe, equipment and other materials. For the new pump stations, the spoil generated from the wet well excavation would be approximately 600 CY, resulting in approximately 30 truck trips.

In addition to equipment and material delivery, a total of 8 worker trips (round trip) would be generated per day assuming each individual drives separately and half of the workers travel for lunch.

2.6.6 Construction-Related Water Requirements

Water from water trucks would be used during construction activities for dust control purposes. Water generated from the trench dewatering operations may also be usable for dust control.

2.6.7 Environmental Commitments

Mitigation measures are described in *Chapter 3, Affected Environment/Environmental Setting, Environmental Consequences/Impacts and Mitigation Measures*, and address potentially significant impacts for each resource area. Pursuant to their CEQA requirements, the Partner Agencies have adopted a Mitigation Monitoring and Reporting Program (MMRP) as part of their Final EIR, which specifies the mechanisms by which implementation of mitigation measures would be ensured during construction and operation of the NVRRWP. The MMRP specifies the environmental commitments that would be adopted as conditions of project approval. A copy of the MMRP is included as **Appendix J**.

2.7 Alternatives Considered but Rejected

As described above, the following alternatives were evaluated during the preparation of the Feasibility Study for the project and were determined either to be infeasible or did not adequately meet the purpose and need or Partner Agencies' project objectives.

2.7.1 Pipeline Conveyance of Recycled Water Directly to DPWD and Refuges

Alternatives to serve various portions of the DPWD service area with recycled water pipelines direct to customers were investigated during the Feasibility Study. For ease of implementation and cost-effectiveness, service was limited to the DPWD customers east of the DMC (to avoid a pipeline crossing under the DMC) and to customers within approximately 10 miles of the Modesto Jennings Plant. The supply of recycled water to the refuges was considered by delivering recycled water to the Newman Wasteway; from there the recycled water would be delivered to a select number of refuges. Under this alternative, recycled water would only be available to the North Grasslands and China Island Units.

One concern with this alternative was the implication of direct discharges of recycled water into the refuges without the benefit of any dilution. Also, because customers would be served directly off of the pipeline network, the lack of year-round demand may require seasonal storage of recycled water in existing and potential new storage ponds. Recycled water is generated year-round, with quantities typically being higher in the rainy months when inflows to wastewater treatment facilities are higher. Demand for water supply for irrigation peaks in the summer months, and there is little demand in the winter. Therefore, maximizing reuse would require some mechanism to store recycled water during the winter for use during the irrigation season. Providing water to refuges would help to balance the seasonal supply and demand, because refuges need water during different time periods, with peak demand typically occurring in the fall, when irrigation demand is decreasing. However, this alternative would only serve two refuges, and their demand, is not expected to be sufficient to use all of the wintertime flows of recycled water that would be generated by Turlock and Modesto, especially in wet winters. Therefore, some type of additional seasonal storage would be needed to allow reuse of all of the recycled water that would be produced at buildout of the Cities.

Similar to the Proposed Action, water rights would need to be established through approval of a Wastewater Change Petition, which would allow Modesto and Turlock to change the location of discharge and place of use for water that is currently discharged to the San Joaquin River.

The direct pipeline alternatives were determined to not meet project objectives, including maximizing use of recycled water for agriculture and the refuges, as it would only serve DPWD growers on the east side of the DMC, and only provide recycled water to two refuges.

2.7.2 Pipeline Conveyance of Recycled Water to Existing Facilities for Dilution and Conveyance in the DMC

PID Main Canal for conveyance to the DMC was investigated during the Feasibility Study. This alternative is similar to Alternative 3 except that it does not propose expanding PID's existing

facilities. This alternative would reduce the overall length of pipeline that would be constructed by the NVRRWP by using the existing PID Main Canal for a portion of the conveyance distance. As such, this alternative would include a requirement for participation in PID's Proposed East-West Conveyance Project, which seeks to upgrade PID facilities using some combination of canal widening and construction of new pipeline. The combination of NVRRWP pipeline construction plus construction associated with the PID East-West Conveyance Project is expected to result in a similar degree of short-term environmental impacts, as compared to the Proposed Action.

As described under Alternative 3, PID routinely ceases operation of the Main Canal annually for 4 to 6 weeks for maintenance, specifically sediment removal. During this maintenance period, water from the Modesto and Turlock would have to be discharged to the San Joaquin River for disposal as no alternative mechanism for conveyance would be available, and could not be retrieved from the Delta for beneficial use by DPWD or the refuges because the maintenance period would be outside of the July-September transfer window. Because the quantity of water being conveyed for PID customers' use varies, the ability to achieve adequate dilution for discharge within the Main Canal would be limited at times, thus subjecting PID customers who take water from PID facilities before it reaches the DMC to requirements of a water recycling program, including signage and separation from potable water wells.

Similar to the Proposed Action, water rights would need to be secured to change the location of discharge and place of use for Modesto and Turlock. Turlock and Modesto would need to secure the right to change the location from the San Joaquin River to the PID Main Canal through a Wastewater Change Petition.

Due to the complications from PID's operational constraints on the Main Canal and the potential impacts to PID customers, this alternative was rejected. The inability to deliver recycled water year-round was considered by the Partner Agencies to be a fatal flaw because a substantial quantity of recycled water would not be available for beneficial reuse.

2.7.3 Pipeline Conveyance to DMC Utilizing Groundwater Storage and Operational Modifications

This alternative to serve DPWD and the refuges considers a combination of direct delivery to the DMC (during the months of April to June when the O'Neill Pumps at the head of the DMC are likely to be off) and groundwater recharge and recovery (year-round). During the rest of the year recycled water would be diluted with river water and percolated into the groundwater, where it would be stored for later recovery.

Conveyance of water to the DMC would be accomplished using a pipeline system connecting the City's treatment plants to the DMC, similar to the Proposed Action; however, additional pipelines would be needed to convey water to new spreading basins. This alternative investigated the creation of spreading basins near PID's planned sedimentation basin, which is currently in the feasibility stage of design, or near Orestimba Creek for groundwater recharge. This alternative would also require dilution water from the DMC and/or the San Joaquin River to meet blending requirements for recharge of Modesto and Turlock's water.

Because it would require more pipelines plus the creation of new spreading basins this alternative has the potential for greater environmental impacts and would be operationally more complicated than the Proposed Action. Because of the complexity of incorporating groundwater storage, and potentially greater environmental impacts, this alternative was rejected from further consideration. It was also determined by the Partner Agencies to be infeasible to coordinate and implement recycled water discharge to the DMC only when Reclamation's O'Neill Pumping Plant is non-operational.

2.7.4 San Joaquin River Conveyance of Recycled Water through the Delta to the DMC or O'Neill Forebay

This alternative to serve DPWD and the refuges by conveying recycled water through the San Joaquin River to the Delta and into the DMC or O'Neill Forebay via the Jones or Banks Pumping Plants was considered but rejected for analysis in the Feasibility Study. Water loss from seepage and evaporation along the San Joaquin River (estimated at 10 percent) and carriage losses (which can be from 0-100 percent, with the average being 30 percent), combined with the limited July-September timeframe during which transferred supplies can be pumped through the pumping plants, would greatly reduce the quantity of recycled water from Modesto and Turlock that would be available to DPWD and the refuges. These losses would be in addition to the standard 5 percent loss imposed by a Warren Act Contract, which under all options analyzed will be required in order to utilize conveyance and/or storage in the Federal Facilities.

Unlike the Proposed Action, which would obtain water rights through a Wastewater Change Petition, water rights would need to be secured by Turlock and Modesto to allow for diversion of water. The process for obtaining a new water right for diversion from the Delta to the DMC is expected to be more complex than the process for a Wastewater Change Petition, and it is also highly likely that a request for a water right from the Delta would be subject to protest. Turlock would secure their water right for recycled water currently discharged to the San Joaquin River. Modesto would need to secure the water right for the portion of their recycled water currently discharged to the San Joaquin River (during winter months) and the water right for the portion of their recycled water currently land applied (during summer months), which would now have to be discharged. With continued discharge to the river it is anticipated that both treatment plants would have to be upgraded in the future to provide partial treatment via reverse osmosis for salinity removal, which would be very costly. Additionally, unlike the Modesto Jennings Plant, the Turlock RWQCF does not remove nitrates/nitrites from the effluent. Nitrate/nitrite removal could potentially be required in the future under Turlock's NPDES Permit, as it is for Modesto's, which would require construction of new treatment process facilities.

Due to the potential need for future treatment plant upgrades, evaporative and carriage water losses in the San Joaquin River and the Delta, the limited window for pumping water transfers at the Jones or Banks Pumping Plants, and the complication of securing new water rights within the Delta, this alternative was rejected as it would provide far less recycled water to DPWD and the refuges and would not to meet project objectives.

2.8 References

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Chapter 3 Affected Environment/ Environmental Setting, Environmental Consequences/Impacts and Mitigation Measures

3.0 Introduction to Environmental Analysis

This chapter presents an assessment of the environmental effects associated with each alternative being considered, including the No Action Alternative. This chapter describes the existing physical environment of the Proposed Action area and delineates the potential effects that may result from implementation of the NVRRWP under each of the Action alternatives compared to the No Action Alternative. Also included is a discussion of the regulatory framework and significance criteria.

3.0.1 Determination of Impact Significance

NEPA and CEQA differ in the standard language used to describe adverse environmental effects. CEQA requires that impacts regarded as "significant" be identified as such. NEPA criteria for significance (as listed in 40 CFR 1508.27) are based on the context and intensity of the impact. Significance determinations under CEQA are based on comparisons to existing conditions. NEPA requires a comparison of the Action alternatives with the No Action, and under NEPA, when an EIS is prepared, it is not necessary to specify whether or not a particular impact is significant. The fact that the level of NEPA document is an EIS presumes that adverse impacts may have a significant impact on the quality of the human environment. Therefore, each impact assessment in the Draft EIR/EIS concluded with a finding of significance based on a comparison of the evaluated impact with the stated significance criteria in order to comply with CEQA. This has been retained in the Final EIS for continuity although it is not necessary for the Final EIS. For all impacts that are identified as significant pursuant to CEQA and considered adverse pursuant to NEPA, and where mitigation is possible and feasible, appropriate mitigation measures have been identified to reduce the impacts to a less-than-significant level. Where implementation of more than one mitigation measure is needed to reduce an impact below a threshold of significance, all of the measures are described. Finally, for all significant impacts, the significance of each impact after implementation of the mitigation measures is assessed.

Mitigation measures were formulated consistent with the strategy as set forth in CEQA Guidelines §15370 and NEPA CEQ Guidelines §1508.20 as follows:

- Avoiding the impact altogether by not taking a certain action or parts of an action.

- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

As described previously, the City of Modesto adopted a MMRP for the NVRRWP pursuant to their CEQA requirements. The Plan has been included as **Appendix J** of the Final EIS.

3.0.2 Organization of Discussion of Environmental Issue Areas

Sections 3.1 through 3.19 discuss the environmental impacts that may result with approval and implementation of the NVRRWP. Each environmental section contains a description of:

1. The environmental setting as it relates to the specific resource topic.
2. The regulatory framework governing that issue.
3. The methodology used in identifying the issue(s).
4. The CEQA significance criteria.
5. An evaluation of impacts and identification of mitigation measures, if needed; impacts are presented for the following alternatives:
    - No Action Alternative.
    - Combined Alignment Alternative (Alternative 1).
    - Separate Alignment Alternative (Alternative 2).
    - PID Conveyance Alternative (Alternative 3).
6. A determination of the level of significance after mitigation measures are implemented.

3.0.3 Analysis of Cumulative Impacts

Cumulative effects are defined as the impact on the environment that results from the incremental effects of the action when added to other past, present, and reasonably foreseeable actions, regardless of what agency (federal or non-federal) or person undertakes such actions (40 CFR 1508.7). Cumulative effects can result from individually minor but collectively major actions taking place over a period of time.

The analysis of cumulative effects associated with reasonably foreseeable future actions should not be speculative, but based upon known long-range plans and other plans developed by agencies, organizations, and individuals. The study area for effects is dependent on the resource and the anticipated range of the effect. For most resource effects, the cumulative effects analysis focuses on effects in the Action area. As the Proposed Action has a lifespan that coincides with buildout of the Cities, all reasonably foreseeable future actions are considered.

The cumulative impact analysis for each individual resource topic is described at the end of each resource section in this Chapter.

Approach to Cumulative Analysis

For evaluation of cumulative impacts, this EIS uses a list-based approach, and evaluates the potential for past, present and probable future projects in the project area to result in cumulative impacts. **Table 3.0-1** contains a list of projects under consideration in the project area, and identifies those projects that have a potential nexus with the NVRRWP (i.e. there is a possibility that the proposed project could contribute to incremental effects on the same environmental resources). The list of projects in **Table 3.0-1** was developed using information provided by Reclamation, the Partner Agencies, and Stanislaus County.

Table 3.0-1: List of Cumulative Projects for NVRRWP

Reclamation Projects in Delta-Mendota Canal				
Doc Type	**Log #**	**Status**	**Description**	**Impact Nexus?**
EA/FONSI	14-020	FONSI 7/30/2014	Warren Act Contract for Conveyance of Groundwater from 4-S/Smith Ranch to Del Puerto Water District	No
EA/FONSI	14-031	FONSI 8/4/2014	Temporary change in the selenium MCL from 2 PPB to up to 5 PPB for groundwater introduced into the upper portion of the DMC	No
CEC	14-023	FONSI 8/18/2014	License to Panoche Drainage District to Re-route Drainage Collected by the Firebaugh Sumps to the San Joaquin River Water Quality Improvement Project	No
EA/FONSI	14-021	FONSI 2/12/2015	Five-year Warren Act Contracts for Banta-Carbona Irrigation District, Byron-Bethany Irrigation District, Patterson Irrigation District, and West Stanislaus Irrigation District	No
EA/FONSI	13-050	Active	Warren Act Contract for Conveyance from Turlock to Del Puerto Water District	No
EA/FONSI	12-060	FONSI 3/13/2015	Exchange Contractors Los Banos Creek Diversion Project	No
EA/FONSI	14-034	Active	Mendota Pool Group Warren Act Agreement	No
EA/FONSI	14-033	FONSI 5/5/2015	Three-Year Extension of the Mendota Pool Group Exchange Agreements	No
EIS/EIR	12-009	Active	20-Year Extension of the Mendota Pool Group Exchange Program	No
EA/FONSI	12-061	FONSI 1/10/2013	10-Year Exchange and/or Warren Act Contracts for Conveyance of Groundwater in the Delta Mendota Canal DMC (DMC pump-in program)	No
EA/FONSI	10-051	FONSI 2/14/2011	Accelerated Water Transfers and Exchanges between Central Valley Project Contractors South of Delta Contractors Years 2011-2015	No
EA/FONSI	09-149	FONSI 2/7/2014	Long-term Contract with Byron-Bethany Irrigation District for Storage and Conveyance of Non-Project Water in the Delta Division and San Luis Unit (BBID, Tracy Hills Water Supply Project)	No
SEA	14-006	FONSI 3/6/2014	Banta-Carbona Warren Act Contract Increase of 5,500 AF	No
EA/FONSI	14-10-MP	FONSI 4/22/2014	Water Transfers for the San Luis & Delta-Mendota Water Authority in 2014	No
SEA	13-007	FONSI 5/23/2013	Supplementing the Accelerated Water Transfer Program EA for South-of-Delta Contractors to Include Water Acquisitions for Refuges	No

EA/FONSI	14-001	FONSI 5/5/2014	Firebaugh Canal Water District Transfer of up to 7,500 acre-feet of Central Valley Project Water to Panoche, San Luis, and Westlands Water Districts	No
EA/FONSI	13-059	FONSI 5/5/2014	Central California Irrigation District Transfer of up to 20,500 acre-feet of Central Valley Project Water to Del Puerto, Panoche, San Luis and Westlands Water Districts	No
EA/FONSI	13-014	FONSI 6/18/2013	Storage and Conveyance of Yuba Accord Water in Federal Facilities for South of Delta Central Valley Project Contractors	No
EA/FONSI	12-023	FONSI 6/29/2012	Annual Exchange at the Mendota Pool between the Bureau of Reclamation and Donald J. Peracchi for up to 3,600 acre-feet of Farmers Water District's Groundwater for Central Valley Project Water	No
EA/FONSI	11-013	FONSI 9/16/2013	Amendment to the Meyers Groundwater Banking Exchange Agreement	No
EA/FONSI	13-035	FONSI 9/17/2013	Merced Irrigation District Warren Act Transfer to Westlands Water District 15,000 AF	No
EA/FONSI	14-009	FONSI 6/24/14	Tranquility Irrigation District/San Luis Water District Mendota Pool Groundwater Exchange Program Contract Years 2014-2018	No
			City of Turlock Projects	
Doc Type	**Date**	**Status**	**Description/Location**	**Impact Nexus?**
IS/MND	1/22/2014	Published	Monte Verde Subdivision, 2531 West Tuolumne Rd, Turlock - 109 single family lots	No
IS/MND	4/25/2014	Published	Traditions 6, Fitzpatrick homes, 2920 Sandstone St, Turlock - 15 single family homes	No
IS/MND	5/6/2014	Published	Taco Bell, 3606 N. Golden State Bv, Turlock - 2,106-square-foot fast food restaurant	No
IS/MND	6/23/2014	Published	Verizon Wireless Cell Tower, 2300 Industrial Rowe, Turlock - new cell tower	No
IS/MND	5/29/2014	In process	Dairy Processing Plant, 4407 W Main Street, Turlock - 116,287-square-foot industrial facility	No
TBD	NA	In planning	Turlock Engineering Division Capital Project, various water, wastewater projects - none in vicinity of NVRRWP	No
			City of Modesto Projects	
Doc Type	**Date**	**Status**	**Description/Location**	**Impact Nexus?**
IS/MND	2010	under construction	Jennings Road Treatment Plant Phase 2 Improvements, 7007 Jennings Rd, Modesto - increase tertiary treatment capacity by 12.6 mgd	Yes
EIR	2013	Published	Marketplace Shopping Center, Oakdale Rd/Sylvan Av, Modesto - 170,000-square-foot retail project	No
			City of Patterson Project	
Doc Type	**Date**	**Status**	**Description/Location**	**Impact Nexus?**
EIR	2012	Approved	West Patterson Business Park Expansion Project	No
			DPWD Project	
Doc Type	**Date**	**Status**	**Description/Location**	**Impact Nexus?**
Cat Ex	2014	In planning	Orestimba Creek Groundwater Banking Pilot Project	No

Stanislaus Council of Governments (StanCOG) Project				
Doc Type	**Date**	**Status**	**Description/Location**	**Impact Nexus?**
TBD	2014	In planning	South County Corridor Study-potential route along West Main Street	Yes
TBD	2014	In planning	State Route 33 widening/expressway from Sperry Avenue (downtown Patterson) north to Rogers Road	Yes
Stanislaus County Projects				
Doc Type	***Date***	***Status***	***Description/Location***	***Impact Nexus?***
TBD	2014	In design, estimate construction in 2016	West Main Street Highway Improvement Project, from San Joaquin River to 0.8 mi. west of Carpenter Rd	Yes
EIR	10/13/14	NOP issued	Crows Landing Industrial Business Park Project, Specific Plan and zoning change for 1,532-acre project site south of West Marshall Road.	No

EA=Environmental Assessment, FONSI=Finding of No Significant Impact, CEC=Certificate of Environmental Compliance, Cat Ex=Categorical Exemption, IS/MND=Initial Study/Mitigated Negative Declaration

Projects identified above as having no impact nexus with the NVRRWP are not considered in the cumulative analysis because they are not expected to have impacts that could combine with the project. This determination is based on one or both of the factors below:

- Projects are located outside of the area where the proposed project would be constructed and could thus not have impacts that would combine with effects of the proposed project.
- Project is of a type that would not produce impacts that could combine with the NVRRWP.

Reclamation projects in the DMC could have a cumulative effect on the capacity of the canal, and potentially on water quality, both of which would be managed by Reclamation through operation of the DMC and would not be expected to result in environmental impacts.

City of Turlock projects include residential, commercial/industrial and water/wastewater projects that are not located in the vicinity of the proposed NVRRWP facilities.

The City of Modesto is considering approval of a retail project, which would not be located near the proposed NVRRWP facilities. The Jennings Road Treatment Plant Phase 2 Improvements would improve treatment, and would provide recycled water for the NVRRWP.

The City of Patterson has approved the West Patterson Business Park Expansion Project, which is expected to be developed in multiple phases over 20 to 30 years. The business park area extends from just north of Sperry Road in Patterson, north to Zacharias Road. While development proposals in the first Phase could occur during the timeframe proposed for construction of the NVRRWP, the first phases are located in the southern portion of the site and

the later phases that would include development along Zacharias Road are not projected to be developed until 2023 at the earliest. Because the timing would not overlap, the development of the business park is not expected to result in cumulative construction-related impacts. Operational impacts would primarily consist of increased traffic and increased demand for services due to new development. Because the NVRRWP would not increase demands for public services and generates minimal operational traffic, these development projects are not expected to combine with effects of the NVRRWP to result in cumulative impacts.

The DPWD Orestimba Creek Groundwater Banking project would include construction of a small segment of pipe to connect the DMC to a new recharge pond near Orestimba Creek. The project could benefit groundwater resources, and would not be expected to affect the San Joaquin River because it would not be located near the river. Because the facilities would not be constructed near the NVRRWP facilities it would not be expected to have construction impacts that would overlap with those of the proposed project. The project could have a cumulative effect on the capacity of the DMC, which would be managed by Reclamation through operation of the DMC and would not be expected to result in environmental impacts.

StanCoG is considering two roadway projects that could overlap with the NVRRWP pipeline alignments. The NVRRWP pipeline alignment would cross SR 33 in the area where widening is proposed; both the Combined Alignment and Separate Alignment Alternatives would cross SR 33 in the vicinity of Lemon Avenue and Zacharias Road. The NVRRWP would use trenchless technology to cross SR 33 and would be coordinated with the road widening project. The NVRRWP pipeline for the Combined Alignment Alternative also coincides with a portion of the potential route for the South County Corridor, which could be located along West Main Street. If this route is chosen, it would also be coordinated with the road widening project.

Stanislaus County is also proposing improvements along West Main Street. Design of the NVRRWP pipeline in this area would be coordinated with any proposed transportation projects along West Main Street, if selected.

The Crows Landing Industrial Business Park Project area is bounded by West Marshall Road on the north, Fink Road to the south, Bell Road to the east, and Davis Road to the west. The northern edge of this project area is thus adjacent to the southern reach of the NVRRWP's Separate Alignment Alternative, which follows West Marshall Road. Stanislaus County envisions that the project would be developed in three 10-year phases. A portion of Phase 1, SR 33 Corridor development, which is scheduled for 2016 to 2025, could occur in the area along the south side of Marshall Road. Phase 2, SR 33 Corridor Buildout, which would include development of the remainder of the project area adjacent to Marshall Road, is not expected to be developed until 2026. Given the extended time period for development of Phases 1 and 2, and the relatively short time period for construction of the NVRRWP, it is expected that pipeline construction can be coordinated with Stanislaus County (through the encroachment permit process) so as to avoid cumulative impacts of construction on West Marshall Road. Operation of a buried pipeline in West Marshall Road would not be expected to have any impacts that would combine with operation of the business park.

3.1 Aesthetics

This section evaluates the potential aesthetic impacts associated with implementation of the Proposed Action. Aesthetic resources are defined as the visible natural and built landscape features that surround a project site. For the purpose of this analysis, the study area includes aesthetic resources in the vicinity of the facilities to be constructed or modified under the Proposed Action. For further discussion of agricultural resources and conveyance infrastructure, see *Chapter 2, Alternatives and Proposed Action* and *Section 3.2, Agriculture and Forestry Resources*. For discussion of the NWRs and SWAs that could be served by the Proposed Action and related public viewing opportunities, see *Chapter 2* and *Section 3.15, Recreation*.

3.1.1 Environmental Setting/Affected Environment

The discussion below defines the terms used in the aesthetics evaluation and describes the visual conditions of the region and study area.

Definitions

Visual character, visual quality, and visual sensitivity are three terms used throughout this section. Visual character is the unique set of landscape features that combines to make a view, including native landforms, water, and vegetation patterns as well as built features such as buildings, roads, and other structures. Visual quality is the intrinsic appeal of a landscape or scene due to the combination of natural and built features in the landscape. Natural and built features combine to form unique perspectives with varying degrees of visual quality, which is rated in this analysis as high, moderate, or low. Visual sensitivity reflects the level of interest or concern that viewers and responsible land management agencies have for a particular visual resource with visual quality taken into account. Visual sensitivity is a measure of how noticeable proposed changes might be in a particular setting and is determined based on the distance from a viewer, the contrast of the proposed changes, and the duration that a particular view would be available to viewers. For example, areas such as scenic vistas, parks, trails, and scenic roadways typically have a high visual quality and visual sensitivity because these locales are publicly protected, appear natural, view durations are typically long, and close-up views are more commonly available.

Regional Setting

The terrain of the study area is generally flat, with the foothills of the Diablo Range rising to the southwest and the foothills of the Sierra Nevada rising to the east. The Coastal Ranges are visible from the valley floor from a distance; however, long-range visibility in the area is frequently limited by haze and particulate air quality contamination. The Sierra Nevada Mountains to the east are typically obscured or only partially visible. The valley floor is comprised of cultivated row crops, orchards, irrigated pasture, and canal systems. The San Joaquin River is the primary body of water in the study area and is the dominant natural feature in the area. Numerous riparian tree species and shrubs line the meandering river corridor. The vast system of drainage and irrigation canals also contributes to the region's sense of place.

Project Vicinity

The study area is generally located in the central portion of Stanislaus County to the north, east, and south of the City of Patterson. The Combined Alignment Alternative (Alternative 1) pipeline alignment begins near Turlock's Harding Drain Bypass Pipeline and continues north along South Carpenter Road, west on West Main Avenue, north on Jennings Road to the Jenning Plant, west beneath the San Joaquin River, and then along Lemon Avenue and Zacharias Avenue to the DMC. Land uses adjacent to the pipeline alignment and the pump station site for this alternative consist of agriculture and rural residences.

The Separate Alignment Alternative (Alternative 2) includes two independent pipelines from each City's treatment facility to the DMC. The northern segment would be the same as the western portion of the Alternative 1 alignment (from the Jennings Plant to the DMC). The southern segment would begin from a new pump station located adjacent to the Harding Drain Bypass Pipeline, continue west underneath the San Joaquin River across open space and along Pomegranate Avenue, down a private road between Locust Avenue and SR 33, continue along West Marshall Road and end at the DMC.

The PID Conveyance Alternative (Alternative 3) starts on the west side of the San Joaquin River and parallels the PID Main Canal, Bartch Avenue and Ward Avenue, ending at the DMC.

Land uses adjacent to all three Alternatives consist of varied cultivated row crops, scattered residences, and open space. The area's agricultural and rural landscape is characterized by open fields, overhead electrical utility lines, trees, and fencing. Motorists traveling on roads along and near the alignments have close-up and fleeting views of the project site. Residences located along all three alignments including those along Pomegranate Avenue, West Marshall Road, Bartch Avenue, Ward Avenue, Zacharias Avenue and Lemon Avenue have direct views of the alignment. Given the openness and agricultural nature of the lands in the study area, the visual quality is considered moderate and the visual sensitivity is medium.

Since no public access to the Jennings effluent outfall pump station is available, no public views of the proposed modifications at this facility are available. The Alternative 2 pump station site is located near the western end of the Harding Drain Bypass Pipeline near South Carpenter Road. The site is vacant and consists of open space and agricultural land uses. A cascade aeration structure (associated with the Harding Drain Bypass Pipeline) and an industrial facility owned by Darling International are situated north of the Alternative 2 pump station site. Motorists using South Carpenter Avenue would have immediate views of the pump station site. Views of land uses in the vicinity of this particular pump station site consist of agricultural land, a drainage canal, the cascade aeration structure and the nearby industrial facility. Given the rural and partially developed nature of lands in the immediate vicinity, the visual quality of the site is moderate and viewer sensitivity is medium. The PID Intake site is visible from the San Joaquin River and from the end of Old Las Palmas Avenue. Because the site is already developed with an intake facility, the visual quality of the site is moderate and viewer sensitivity is medium.

3.1.2 Regulatory Framework

This section describes laws and regulations at the state and local level that may apply to the Proposed Action. There are no federal aesthetics regulations that apply to the project.

State Policies and Regulations

California Scenic Highway Program In 1963, the state legislature established the California Scenic Highway Program, a provision of the Streets and Highways Code, to preserve and enhance the natural beauty of California (Caltrans 2014). The State Highway System includes designated scenic highways and those that are eligible for designation as scenic highways. Within San Joaquin, Stanislaus, and Merced counties, Interstate 5 (I-5) is considered an officially designated state scenic highway (between SR 152 and SR 205). There are two vista points along I-5 in Stanislaus County: one is located just south of Shiells Road Undercrossing and the other is approximately 0.5 mile south of Salado Creek. Neither of these vista points is in the immediate vicinity of the study area. Due to distance, no close-up views of the study area are available from I-5.

Local Policies and Regulations

Stanislaus County Stanislaus County has identified the following goals and policies in the Conservation Element of its General Plan (1994):

*GOAL ONE***:** Encourage the protection and preservation of natural and scenic areas throughout the County.

> *Policy One***:** Maintain the natural environment in areas dedicated as parks and open spaces.
> *Policy Two:* Assure compatibility between natural areas and development.

City of Modesto The City of Modesto's Urban General Plan does not include any policies relevant to scenic resources in the Project area. However, the General Plan envisions that the City of Modesto will preserve open space, farmland, scenic vistas, historic buildings, and sensitive environmental resources where feasible. The General Plan also envisions that in the long-term, the San Joaquin River floodplain and anticipated wetland preserves will separate urban expansions of the Highway 99 corridor from those of the I-5 corridor (City of Modesto 2008).

3.1.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This section evaluates whether construction and operation of the facilities associated with the Proposed Action would result in significant impacts related to aesthetic resources. The visual analysis is based on evaluations of aerial and ground-based photographs of the proposed project sites, and preliminary design information.

Visual effects were assessed based on the project's potential to substantially alter scenic resources or to degrade the visual character of the site. The evaluation of temporary or short-term visual impacts considers whether construction activities could substantially degrade the existing

visual character or quality of the site or surrounding area, as well as the duration over which any such changes would occur. Because of their short-term nature, construction activities occurring in an area for less than one year are typically considered to have a less-than-significant effect on visual quality. However, construction activities occurring in an area for over one year have been evaluated for potentially significant visual impacts.

Actions with long-term visual effects, such as constructing new or altered structures, grading roads, removing trees, and introducing new sources of light and glare can permanently alter the landscape in a manner that could affect the existing visual character or quality of the area, depending on the perspective of the viewer. In determining impact potential, the assessment considers the visual sensitivity of the study area. Since damage to scenic resources such as trees, rock outcroppings, and other features of the built or natural environment would typically constitute a long-term effect, the potential for project implementation to damage scenic resources is evaluated solely as a long-term effect and is not included in the analysis of construction-related impacts.

Aesthetic resources in the vicinity of pre-existing facilities that would not be physically modified, and locations that may be served by the Proposed Action, including farms within DPWD's service area and NWRs and SWAs, are evaluated in less detail due to the limited potential for adverse aesthetic effects in these areas.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines* an impact on aesthetics would be considered significant if the project would:

- Have a substantial adverse effect on a scenic vista.
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
- Substantially degrade the existing visual character or quality of the site and its surroundings.
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Criteria Requiring No Further Evaluation

Criteria listed above that are not applicable to actions associated with the Proposed Action are identified below along with a supporting rationale as to why further consideration is unnecessary and a no-impact determination is appropriate.

- *Have a Substantial Adverse Effect on a Scenic Vista* – The Proposed Action facilities are not visible from any nearby scenic vistas, including the one located just south of Shiells Road Undercrossing and the other that is approximately 0.5 mile south of Salado Creek. Therefore, construction and operation of the Proposed Action would not have a substantial adverse effect on a scenic vista.

Impacts and Mitigation Measures

Impact AES 1 Substantial Damage to Scenic Resources and Substantial Degradation of Existing Visual Character or Quality

No Action Alternative Under the No Action Alternative, no pipeline or pump station construction work would occur. Therefore, no construction-related impacts on scenic resources or the area's visual character would occur.

In the long-term, the Cities of Modesto and Turlock would discharge recycled water to the San Joaquin River and DPWD would continue to rely on the CVP for its primary water supply. The District would continue to execute water transfers/exchanges when available and pump groundwater from private wells. The fallowing of land would continue and refuges would not receive additional water for wildlife management. Under these conditions, views of fallowed fields (typically consisting of dry vegetation or bare soil) may become more prevalent. Similarly, if the refuges do not receive additional supplemental water, vegetation may become more dry in these areas. Any increase in fallowed land would incrementally degrade the open and rural visual character of the area. As views of the study area are visible from I-5, a state-designated scenic highway, some viewers may perceive the increased fallowing of land and dried vegetation as a visual degradation. From this highway, motorists would still have intermittent views of irrigated agriculture. Since views of the study area are fleeting and because motorists are expected to be focused on the road to ensure safe driving, impacts on scenic resources and the study area's visual character would be less than significant.

Combined Alignment Alternative (Alternative 1)

Construction Impacts Alternative 1 could result in temporary construction-related impacts on scenic resources and the visual character or quality of the study area and immediate vicinity. Due to the distance from I-5, construction of the Combined Alignment Alternative would not be visible from this scenic highway. Construction activities at the Jennings Plant would not be visible from any public viewpoints, as access to the plant is restricted to plant staff.

Pipeline construction activities associated with Alternative 1 would be mostly visible from public roadways including South Carpenter Road (from the Harding Bypass Pipeline to West Main Avenue), West Main Avenue, Jennings Road, Lemon Avenue, and Zacharias Road, as well as other roads intersecting the pipeline alignment. In general, pipeline construction activities would include vegetation removal, grading and excavation, open-trench pipeline installation for the majority of the alignment, trenchless pipeline installation at SR 33 and the railroad crossing and San Joaquin River crossing, and backfilling. Open-cut pipeline construction would progress at a rate of 200 to 500 feet per day. It is anticipated that staging areas would be accommodated either within the construction zones or at selected off-site locations (e.g., lots) owned by the Cities, which would be used to store equipment, vehicles, pipe, and other construction materials for approximately 1.5 years throughout the construction duration.

Existing residences located along the pipeline alignment and motorists using the affected or nearby roadways would have foreground views of construction vehicles and equipment such as excavators, dump trucks, piping, front-end loaders, backhoes, and dewatering pumps. Motorists would have fleeting views of pipeline construction activities due to the speed of travel. For

residences situated along the alignment (e.g., along Lemon Avenue and Zacharias Road), views of construction activities would generally be of short duration since construction equipment would move onto the next segment and areas affected by pipeline installation work would be restored to pre-construction conditions. In addition, as described in *Chapter 2, Section 2.5.7, Environmental Commitments,* the construction contractor would be required to keep the work areas clean. At the end of each work day, work areas would be cleaned up and trenches would be covered. Given the area's working rural landscape, the temporary nature of pipeline construction, and because the contractor would be required to clean up work areas on daily basis, construction-related impacts on scenic resources and the visual character of the study area would be less than significant.

Operation Impacts Once constructed, the pipelines would be underground and would not be visible. Underground components would therefore have no impacts on scenic resources or the visual character of the area. As described in *Chapter 2, Alternatives and Proposed Action,* air valves may be located above ground and, if so, would be housed on a concrete slab in a protective steel cage approximately 4 feet by 4 feet in dimension on the shoulder of the road. While the steel cages would be visible to motorists passing by, these facilities would be relatively small and would not dominate views of the rural fields. Further, because these views would be fleeting, the aboveground air valves would not substantially degrade the visual character of the study area.

The existing pump station at the Jennings Plant outfall pump station would be repurposed within the existing footprint (approximately 20 feet by 30 feet). As shown in **Figure 2-4**, the new pumps would be housed within the existing pump station building that rises approximately 15 feet above ground. Because the modifications to the Jennings Plant pump station would not change the appearance of the existing facility and because no public views of the pump station are available, impacts on scenic resources and the visual character of the site and surrounding area would be less than significant.

Once operational, conveyance of water through existing facilities (e.g., the DMC) and use of water on farms in DPWD's service area would have no aesthetic impacts and conceivably even a beneficial effect on the agricultural lands' visual character because some lands may no longer be fallowed, deficit irrigated, or irrigated with poorer quality groundwater, and the impact would be less than significant.

Similarly, any water supplied to the SOD refuges directly via existing turnouts from the DMC or through water exchanges/transfers would enhance viewing opportunities and would result in a beneficial effect on the refuges' visual character and the impact would be less than significant.

Separate Alignment Alternative (Alternative 2)

Construction Impacts Similar to Alternative 1, construction activities associated with Alternative 2 would mostly be visible from public roadways including Zacharias Avenue, Lemon Avenue, West Marshall Road, Pomegranate Avenue, and South Carpenter Road, and other roads that intersect the pipe alignment. Impacts associated with pipeline construction along the northern pipeline alignment would be the same as Alternative 1. Given that the visual character

in the vicinity of the southern pipeline segment is also open and rural, construction-related impacts during pipeline installation would be similar to Alternative 1.

Construction activities associated with the new pump station near the western end of the Harding Drain Bypass Pipeline would be visible from South Carpenter Road (near its intersection with West Harding Road). Typical pump station construction activities involve site preparation, pavement cutting, excavation and shoring, placement of the pump station structure, paving, fencing, and restoration. Motorists traveling on South Carpenter Road would have close-up views of construction materials and equipment. However, due to the speed of travel, such views would be short in duration. Given the industrial and working nature of the adjacent Darling International facility, construction of the new pump station would not result in a substantial impact on the site's visual character and the impact would be less than significant.

Operation Impacts Long-term impacts related to pipeline installation and delivery of water to farms and the refuges would be similar to Alternative 1 (see discussion above for details).

Regarding the new pump station, **Figure 2-6** in *Chapter 2, Alternatives and Proposed Action*, presents a conceptual elevation view of the new facility. The building itself would be up to 20 feet tall and would house the new pumps on top of the wet well and discharge pipeline. The pump station building would be surrounded by paving for access and a fence for security purposes. Automatic-sensor lights would also be installed outside of the pump station building. The new facility would be visible from South Carpenter Road and would be built consistent with Stanislaus County General Plan policies. The facility would be smaller in scale than the adjacent industrial facility and would be consistent with the industrial and rural character of the surrounding area. As such, long-term impacts on scenic resources and the visual character of the area would be less than significant.

PID Conveyance Alternative (Alternative 3)

Construction Impacts Similar to Alternatives 1 and 2, construction activities associated with Alternative 3 would mostly be visible from public roadways, including Bartch Avenue and Ward Avenue and other roads that intersect the portion of the pipeline alignment that parallels the PID Main Canal. Given that the visual character in the vicinity of the pipeline alignment is also open and rural, construction-related impacts during pipeline installation would be similar to Alternatives 1 and 2.

Construction activities associated with the expanded intake facility and new pump at the existing PID intake site would be visible from the San Joaquin River and from the end of Old Las Palmas Avenue. Because this is a dead-end road with very little traffic, construction likely would not be visible to many observers. Typical construction activities involve site preparation, pavement cutting, excavation and shoring, placement of the pump station structure, paving, fencing, and restoration. Because the site already contains an intake facility, design and layout of the new structures would not substantially modify the visual character of the immediate area. Construction of the expanded intake and new pump station would not result in a substantial impact on the site's visual character and the impact would be less than significant.

Operation Impacts Long-term impacts related to pipeline installation and delivery of water to farms and the refuges would be similar to Alternatives 1 and 2 (see discussion above for details).

Regarding the new facilities at the PID intake, the expanded fish screen and new pump would be consistent with the existing character of the surrounding area. As such, long-term impacts on scenic resources and the visual character of the area would be less than significant.

Significance Determination Less than significant for all Action alternatives and the No Action Alternative.

Mitigation Measures None.

Impact AES-2 New Sources of Substantial Light or Glare.
No Action Alternative Under the No Action Alternative, no new lighting would be installed. As such no new permanent sources of light and glare would be created and no impact would occur.

Combined Alignment Alternative (Alternative 1)

Construction Impacts As discussed in *Chapter 2, Alternatives and Proposed Action*, throughout the approximately 1.5-year construction duration, construction activities would primarily occur on weekdays from 7:00 AM to 6:00 PM. However, if necessary, construction could take place during nighttime and the contractor would be responsible for obtaining permits for any nighttime construction. Temporary views of nighttime construction lighting could be a nuisance to adjacent residences and motorists traveling on the affected roadway. To minimize any temporary adverse effects on residential views during the duration of nighttime construction, implementation of **Mitigation Measure AES-2a** would ensure that nighttime construction lighting is shielded and oriented downward and would reduce this impact to less than significant.

Operation Impacts As described above under **Impact AES-1**, once constructed, all recycled water pipelines would be underground and would therefore not result in a new source of substantial light or glare.

Improvements at the existing Jennings Plant outfall pump station would be minimal and consist of replacing an existing transformer, modifications to discharge piping, replacement of the pumps within the existing pump station structure and other interior modifications. None of these modifications would result in any changes to the exterior of the existing pump station building nor would it require new lighting. For these reasons and because no publicly accessible views of the pump station are available, operation of Alternative 1 would not adversely affect nighttime views in the area.

Separate Alignment Alternative (Alternative 2)

Construction Impacts Similar to Alternative 1, construction activities associated with Alternative 2 would primarily occur on weekdays between 7:00 AM and 6:00 PM, but some nighttime construction may be necessary. Potential construction-related impacts associated with nighttime construction would be the same as Alternative 1.

Operation Impacts For Alternative 2, one pump station would be constructed at the western end of the Harding Drain Bypass Pipeline and the existing Jennings Plant outfall pump station at the northern reach would be repurposed. Light and glare impacts associated with modifications to the Jennings Plant outfall pump station would be the same as Alternative 1. As shown in **Figure 2-6** in *Chapter 2, Alternatives and Proposed Action*, the new pump station building would rise up to 20 feet aboveground and would have dimensions of approximately 40 feet by 50 feet. Automatic-sensor lights would be installed outside for safety and security purposes. New lights would represent a new permanent source of light and could be seen from South Carpenter Road. Lights would be motion-activated and so would not always be on; however, views of nighttime lighting could be a nuisance to motorists traveling on South Carpenter Road, which would be a potentially significant impact. **Mitigation Measure AES-2b** would ensure that lights would be shielded and directed inward/downward towards the facilities and would therefore not generate substantial glare. For this reason and because there are no other sensitive viewers in the area, the impact related to new permanent sources of light and glare would be less than significant with mitigation.

PID Conveyance Alternative (Alternative 3)

Construction Impacts Similar to Alternatives 1 and 2, construction activities associated with Alternative 3 would primarily occur on weekdays between 7:00 AM and 6:00 PM but some nighttime construction may be necessary. Potential construction-related impacts associated with nighttime construction would be the same as for Alternatives 1 and 2.

Operation Impacts Light and glare impacts associated with modifications at the PID intake facility would be the similar to those for Alternative 1 and Alternative 2. Security lighting is currently installed at the intake and any new lighting would be motion-activated and thus would not always be on. For this reason and because there are very few residences in the area, the impact related to new permanent sources of light and glare would be less than significant.

Significance Determination before Mitigation No impact for the No Action Alternative. Less than significant for construction activities for all Action alternatives. Potentially significant for operations of all Action alternatives.

Mitigation Measures **Mitigation Measure AES-2a Nighttime Construction Lighting (Alternatives 1, 2 and 3) N**ighttime construction lighting, if required, shall be shielded and oriented downward to minimize effects on any nearby receptors. Lighting shall be directed toward active construction areas only, and shall have the minimum brightness necessary to ensure worker safety. **Mitigation Measure AES-2b Directional Security Lighting for New Pump Station at Harding Drain Bypass Pipeline (Alternative 2)** Night time security and associated parking lighting fixtures will be equipped with directional shields that aim light downward and away from adjacent roadways. In addition, the placement of lighting fixtures would be selected to concentrate light on-site to avoid spillover.

Significance after Mitigation Less than significant.

Cumulative Impact Analysis

The geographic scope of the cumulative impacts on aesthetic resources encompasses the study area and surrounding areas. If the Proposed Action, as well as other projects listed in **Table 3.0-1**, would adversely affect the same scenic resources or views from public roads, they could result in a significant cumulative impacts on scenic resources and the visual character of the area.

As discussed in **Impact AES-1**, during the construction phase, Alternatives 1, 2 and 3 would temporarily degrade the visual character of the study area, which would be visible from roadways such as Lemon Avenue, Zacharias Road, Carpenter Road, Pomegranate Avenue, Bartch Avenue, Ward Avenue and other intersecting public roads. Of the projects listed in **Table 3.0-1**, the Jennings Road Treatment Plant Phase 2 Upgrades project, Stanislaus County's West Main Street Highway Improvement Project, and the Stanislaus Council of Governments' South County Corridor Study would be closest to the study area. Construction of the Jennings Road Treatment Plant Phase 2 Upgrades project is currently underway and could overlap with the proposed project's construction schedule. Since construction timing of the West Main Street Highway Improvement Project and the South County Corridor Study is undetermined, this analysis conservatively assumes that the construction schedule of those two projects would overlap with the proposed project's schedule. As discussed in **Impact AES-1**, during the construction phase, the construction contractor would be required to clean up work areas at the end of every work day. If pipeline construction on West Main Avenue overlaps with construction associated with the West Main Street Highway Improvement Project and the South County Corridor Study, residents and motorists traveling on West Main would have longer views of construction activities and equipment along this road than that resulting from the Proposed Action alone. However, given the temporary nature of project construction and short duration of views available to motorists and residents, and through compliance with standard environmental commitments related to site cleanliness, the Proposed Action's contribution to this cumulative construction-related impact on visual resources would not be considerable and thus would be less than significant. As discussed in **Impact AES-1**, the Alternative 2 pump station would be visible from South Carpenter Road. None of the cumulative projects identified in **Table 3.0-1** would occur in the vicinity of this pump station site. Therefore, there would be no long-term cumulative impact on visual resources to which the Proposed Action could contribute, and there would be no impact.

Lastly, as described in **Impact AES-2**, in the event that pipeline construction requires nighttime construction lighting, the project could create a nuisance to motorists and residents near the work areas. Any construction lighting needed for the West Main Street Highway Improvement Project and the South County Corridor Study could also create a nuisance to these sensitive viewers along West Main Street (between Jennings Road and South Carpenter Road). However, implementation of **Mitigation Measure AES-2a (Nighttime Construction Lighting)** would ensure that construction lighting is oriented downwards towards the work areas and avoid glare. With implementation of this measure, the Proposed Action's contribution to this cumulative impact would not be considerable and would be less than significant. Lastly, the Alternative 2 pump station would include exterior automatic-sensor lighting. Since none of the cumulative projects identified in **Table 3.0-1** would occur in the vicinity of this pump station site, there

would be no long-term cumulative impact related to permanent light and glare effects to which the Proposed Action could contribute, and there would be no impact.

Significance Determination Less than significant with mitigation.

Mitigation Measures See **Mitigation Measures AES-2a** and **2b**.

3.1.4 References

California Department of Transportation (Caltrans). 2014. California Scenic Highway Mapping System, available online at: http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/scenic_hwy.htm, accessed June 30, 2014.

Modesto, City of. 2008. Final Urban General Plan. October 14.

Stanislaus County. 1994. Stanislaus County General Plan: Chapter 3, Conservation Element. Available at: http://www.stancounty.com/planning/pl/gp/gp-chapter3.pdf.

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3.2 Agriculture and Forestry Resources

This section evaluates the potential adverse impacts related to agriculture that could result from implementation of the proposed NVRRWP. No forestry resources exist in the study area and so impacts to these resources have not been evaluated.

3.2.1 Environmental Setting/Affected Environment

The study area for this analysis includes parts of Stanislaus, San Joaquin and Merced Counties in California's Central Valley. While all construction would take place in Stanislaus County, the Proposed Action could affect agricultural areas in other counties as well. Specifically, recycled water provided by the project would be used to irrigate farmland in DPWD's service area, which includes parts of San Joaquin, Stanislaus and Merced Counties (see **Figure 2-1**). Information is provided below on the agricultural resources of the area which would be affected by the Proposed Action.

Del Puerto Water District

As described in *Chapter 2, Alternatives and Proposed Action*, DPWD provides agricultural irrigation water to approximately 45,000 acres of productive farmland in Stanislaus, San Joaquin, and Merced Counties. Currently, DPWD's primary source of water is from a contract with Reclamation which provides for the delivery of up to 140,210 AF of CVP water annually. DPWD's CVP water allocations have been substantially reduced since the 1990s due to Delta pumping restrictions resulting from the passage of the CVPIA, water rights decisions, need to meet Delta water quality objectives, biological opinions for protection of salmon and Delta smelt, and drought conditions. In 2009, DPWD received only 10 percent (i.e., 14,000 AFY) of its contract allocation. DPWD's contract supply for 2013 was 20 percent of their contracted allocation (28,000 AFY), while the 2014 and 2015 allocation was 0 percent. **Figure 1-2** shows the historical DPWD CVP allocations from 1990 to 2013 and the downward trend in the annual allocations.

Although periodic fallowing is a normal part of farming, shortages in CVP deliveries have resulted in fallowing of land within DPWD's service area that would otherwise have been planted. **Table 3.2-1** shows the acreage of land in the DPWD service area that has been fallowed from 2001 through 2013. From 2001 to 2013 the percentage of fallowed land ranged from 12 to 24 percent. Due to reduced availability of surface water and insufficient quantities of groundwater, preliminary reports indicate that 11,020 acres of agricultural land were fallowed in 2014. Fallowing is not an option for the approximately 24,000 acres of orchard crops within DPWD, which need to be irrigated each and every year.

It is predicted that future deliveries from the CVP to DPWD will average approximately 49,000 AFY, an allocation of only 1 AF/acre, which is inadequate to meet the District's water demand. This would result in an anticipated shortfall of 41,000 AFY (see **Figure 1-3)**. If compared to the 2013 supplies or the average of contractual water supplies over the last five years, the shortfall would range from approximately 40,000 to 60,000 AFY. The 2014 and 2015 shortfall was 90,000 AFY.

Table 3.2-1: Acres of Fallowed Land in DPWD

Year	Fallowed Acreage
2001	6,763
2002	5,584
2003	6,826
2004	8,455
2005	6,431
2006	7,556
2007	8,654
2008	8,336
2009	10,737
2010	9,016
2011	6,204
2012	6,486
2013	7,239

Source: Del Puerto Water District Crop Report Summary, 2014

Crops and Production

Stanislaus County Stanislaus County consistently ranks among the top ten agricultural counties in the state. Agriculture in Stanislaus County generates more than a billion dollars annually and is the County's leading industry (Stanislaus County No Date). As shown in **Table 3.2-2**, a wide range of agricultural commodities are produced in Stanislaus County.

Table 3.2-2: Stanislaus County 2012 Agricultural Production by Commodity Category

Category	Harvest Acreage	Total
Fruit and Nut Crops	227,113	$1,264,991,000
Vegetable Crops	47,372	$186,907,000
Field Crops	725,515	$297,856,000
Other Agriculture	N/A	$25,801,000
Seed Crops	986	$1,268,000
Nursery Products	1,836	$109,432,000
Organic Products	4,113	$14,572,000
Apiary Products	N/A	$58,122,000
Livestock and Poultry	N/A	$540,244,000
Livestock and Poultry Products	N/A	$778,652,000
Total	1,006,995	$3,227,843,000

Source: Stanislaus Agricultural Commissioner's Office 2012

Milk and almonds are the two biggest commodities by total value produced in the County. **Table 3.2-3** shows the top 10 commodities in Stanislaus County**.**

Table 3.2-3: Stanislaus County Top 10 Agricultural Commodities in 2012

Commodity	Rank	Value
Milk, All	1	$739,630,000
Almonds	2	$735,826,000
Chickens, All	3	$245,771,000
Cattle & Calves, All	4	$214,217,000
Walnuts	5	$213,600,000
Silage, All	6	$148,557,000
Tomatoes, All	7	$121,148,000
Grapes, All	8	$82,439,000
Turkeys, All	9	$74,515,000
Deciduous Fruit & Nut Industry	10	$64,398,000

Source: Stanislaus Agricultural Commissioner's Office 2012

Merced County Like Stanislaus County, Merced County is a major agricultural county in California. The total value of agricultural commodities produced in Merced County was approximately $2.8 billion in 2012 (Merced County Department of Agriculture 2012). Agriculture is Merced County's number one industry and largest employer. Merced County is one of the top five producers of milk/cream, cheese, sweet potatoes, figs, cantaloupes, fresh market tomatoes, honey, almonds, cotton, sugar beets, eggs/chickens, turkeys, cattle/calves, pasture, silage, corn, honey and hay (Norton et al. 2011). **Table 3.2-4** shows agricultural production and harvest acreage in Merced County in 2012 by commodity category**.**

Table 3.2-4: Merced County 2012 Agricultural Production by Commodity Category

Category	Harvest Acreage	Value
Fruit and Nut Crops	130,835	$664,510,000
Vegetable Crops	45,327	$323,386,000
Field Crops	969,601	$490,294,000
Other Agriculture	N/A	$13,505,000
Seed Crops	4,756	$5,929,000
Nursery Products	1,554	$47,736,000
Apiary Products	N/A	$25,473,000
Livestock and Poultry Production	N/A	$669,453,000
Livestock and Poultry Products	N/A	$1,038,014,000
Total	1,152,073	$3,278,300,000

Source: Merced County Department of Agriculture 2012

In terms of specific commodities, milk and almonds were the two biggest commodities by total value produced in the County in 2012 (see **Table 3.2-5**).

Table 3.2-5: Merced County Top 10 Agricultural Commodities in 2012

Commodity	Rank	Value
Milk *(includes Market & Manufacturing)*	1	$940,236,000
Almonds *(Kernel Basis)*	2	$471,363,000
Cattle & Calves	3	$296,891,000
Chickens *(includes Fryers & Other Chickens)*	4	$290,180,000
Sweet Potatoes	5	$160,543,000
Hay (*Alfalfa)*	6	$131,885,000
Tomatoes *(includes Market & Processing Tomatoes)*	7	$115,710,000
Silage *(Corn)*	8	$109,221,000
Cotton *(includes Acala & Pima Cotton)*	9	$88,372,000
Chicken Eggs *(Market)*	10	$81,726,000

Source: Merced County Department of Agriculture 2012

San Joaquin County Like Stanislaus and Merced Counties, San Joaquin County has a robust agricultural industry. San Joaquin County consistently leads the state in the production value of apples, asparagus, cherries, grain corn and walnuts (San Joaquin County Agricultural Commissioner's Office 2012). In 2012, these five crops generated $833,452,000 (San Joaquin County Agricultural Commissioner's Office 2012). **Table 3.2-6** shows agricultural production in San Joaquin County in 2012 by commodity category and total agricultural production and harvest acreage.

Table 3.2-6: San Joaquin County 2012 Agricultural Production by Commodity Category

Category	Harvest Acreage	Value
Fruit and Nut Crops	253,000	$1,640,372,000
Vegetable Crops	55,300	$265,568,000
Field Crops	508,000	$329,973,000
Seed Crops	1,180	$3,562,000
Nursery Products	N/A	$87,957,000
Apiary Products	N/A	$21,610,000
Livestock and Poultry Production	N/A	$97,151,000
Livestock and Poultry Products	N/A	$423,279,000
Total	817,480	$2,869,472,000

Source: San Joaquin County Agricultural Commissioner's Office 2012

In terms of specific commodities, grapes and walnuts were the top two agricultural commodities produced in the County in 2012, followed by milk, almonds, cherries and tomatoes (see **Table 3.2-7**).

Table 3.2-7: San Joaquin County Top 10 Agricultural Commodities in 2012

Commodity	Rank	Value
Grapes	1	$549,000,000
Walnuts	2	$457,000,000
Milk	3	$404,000,000
Almonds	4	$300,000,000
Cherries	5	$225,000,000
Tomatoes	6	$103,000,000
Hay	7	$90,000,000
Silage Corn	8	$72,000,000
Grain Corn	9	$70,000,000
Cattle, Calves	10	$67,000,000

Source: San Joaquin County Agricultural Commissioner's Office 2012

Types of Farmland

The definitions of the various types of farmland discussed below are provided in *Section 3.2.2, Regulatory Framework, State Policies and Regulations, Farmland Mapping and Monitoring Program.*

Important Farmland Much of the study area is classified by the California Department of Conservation (CDOC) as Prime Farmland. As shown in **Figure 3.2-1**, nearly all the land adjacent to the proposed pipeline from the Modesto Water Quality Control Facility to the DMC (for Alternatives 1 and 2) is Prime Farmland (CDOC 2012a). The land adjacent to the proposed pipeline from the Harding Drain Bypass to the Jennings Plant Pump Station (Alternative 1) is generally classified as Prime Farmland (with some patches of Farmland of Statewide Importance). The pipeline from the Harding Drain Bypass to the DMC (Alternative 2) and from the PID intake to the DMC (Alternative 3) also passes through Prime Farmland (CDOC 2012a)**.**

Williamson Act Contracts As shown in **Figure 3.2-2**, numerous Williamson Act Contract lands exist within the study area. A number of parcels adjacent to the proposed pipeline from the Modesto Water Quality Control Facility to the DMC (Alternatives 1 and 2) are under Williamson Act Contracts (CDOC 2012b). Several parcels along the proposed pipeline from the Harding Drain Bypass Pipeline to the Jennings Plant Pump Station (Alternative 1) are enrolled in Williamson Act Contracts (primarily parcels along S. Carpenter Road as shown in **Figure 3.2-2**). A number of parcels along the proposed pipeline from the Harding Drain Bypass Pipeline to the DMC and from the PID intake to the DMC (Alternative 3) are under Williamson Act Contracts (CDOC 2012b**).**

Figure 3.2-1: FMMP Farmland Types

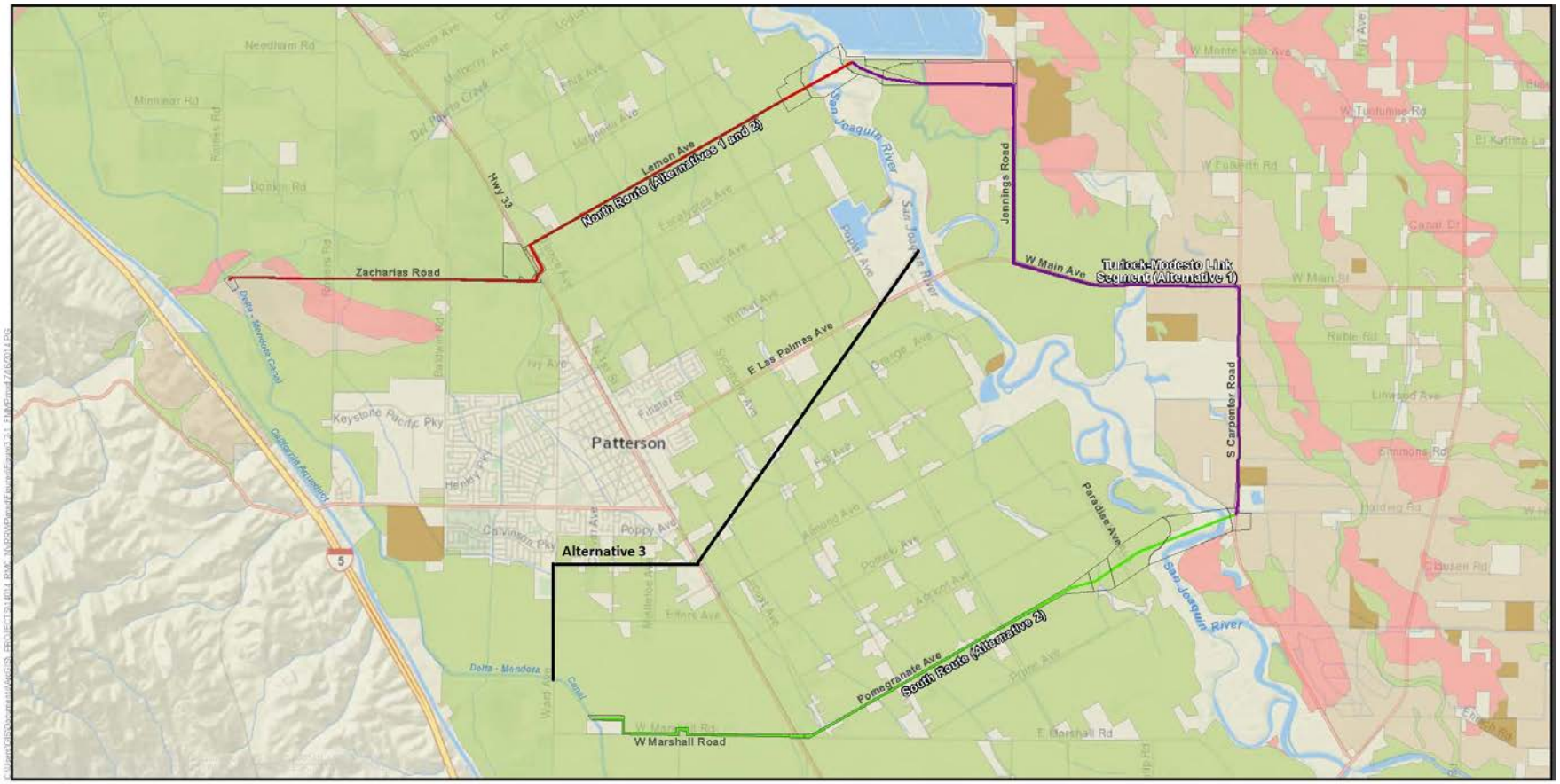

Figure 3.2-2: Williamson Act Lands

3.2.2 Regulatory Framework

This section describes laws and regulations at the federal, state, and local level that apply to agriculture and the Proposed Action.

Federal Policies and Regulations

Farmland Protection Policy Act The Farmland Protection Policy Act (FPPA) requires federal agencies to (a) evaluate the adverse effects of their programs on the preservation of farmland; (b) consider alternative actions that could lessen adverse effects, and (c) ensure that their programs are compatible with state and local programs and policies for the protection of farmland. Farmland is defined as prime or unique farmlands as determined by the appropriate state or local agency. Federal agencies are required to develop and review their policies and procedures to implement the FPPA every two years (USDA 2014).

State Policies and Regulations

Farmland Mapping and Monitoring Program The Farmland Mapping and Monitoring Program (FMMP), administered by CDOC, produces maps and statistical data for use in analyzing impacts on California's agricultural resources (CDOC 2013a). The FMMP rates agricultural land according to soil quality and irrigation status and publishes Important Farmland maps. FMMP maps are updated every two years using a computer mapping system, aerial imagery, public review, and field reconnaissance (CDOC 2013a). Important Farmland categories are as follows (CDOC 2013b):

> *Prime Farmland:* Farmland with the best combination of physical and chemical features able to sustain long-term agricultural production. These lands have the soil quality, growing season, and moisture supply needed to produce sustained high yields. Prime Farmland must have been used for irrigated agricultural production at some time during the 4 years before the FMMP's mapping date.
> *Farmland of Statewide Importance:* Farmland similar to Prime Farmland, but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Farmland of Statewide Importance must have been used for irrigated agricultural production at some time during the 4 years before the FMMP's mapping date.
> *Unique Farmland:* Farmland of lesser quality soils used for the production of the state's leading agricultural crops. These lands usually are irrigated but may include non-irrigated orchards or vineyards as found in some climatic zones. Unique Farmland must have been cropped at some time during the 4 years before the FMMP's mapping date.
> *Farmland of Local Importance***:** Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.

California Land Conservation Act of 1965 (Williamson Act) The California Land Conservation Act of 1965 (commonly referred to as the Williamson Act) allows local governments to enter into contracts with private landowners for the purpose of preventing conversion of agricultural land to non-agricultural uses (CDOC 2013c). In exchange for restricting their property to agricultural or related open space use, landowners receive property tax assessments that are substantially lower than the market rate (tax assessments are based upon farming and open space uses as opposed to full market value).

A Williamson Act Contract may be terminated either through nonrenewal (preferred method) or cancellation (CDOC 2013d). To terminate a Williamson Act Contract, a landowner may file a notice of nonrenewal. Beginning on the next contract anniversary date, the contract winds down over the remaining (usually nine-year) term with the landowner's property taxes gradually increasing until they reach the full unrestricted rate at the end of the nonrenewal period (CDOC 2013d).

According to the Williamson Act 2010 Status Report, approximately 15 million acres were enrolled under the Williamson Act statewide as of 2011 (CDOC 2013e). As of 2010, Stanislaus County had 690,110 acres under Williamson Act enrollment. Both Merced and San Joaquin Counties also have lands under Williamson Act Contract, but as no project facilities would be located in those counties, the Proposed Action has no potential to affect lands under Williamson Act Contract in Merced or San Joaquin County.

Local Policies and Regulations

Physical facilities for the project would be located in Stanislaus County. The Modesto Jennings Plant is within the Modesto City limits. Policies for Stanislaus County and the City of Modesto are presented below.

Stanislaus County General Plan The Stanislaus County General Plan (Stanislaus County, 2011) regulates land use and development in unincorporated areas of Stanislaus County and outlines goals and policies to guide zoning and land use decisions. The Stanislaus County General Plan contains the following goals, objectives and policies related to agricultural resources and the Proposed Action:

*GOAL ONE***:** Strengthen the agricultural sector of our economy.

Objective Number 1.2: Support the development of agriculture-related uses

Policy 1.7: Concentrations of commercial and industrial uses, even if related to surrounding agricultural activities, are detrimental to the primary use of the land for agriculture and shall not be allowed.

Objective Number 1.3: Minimizing Agricultural Conflicts

Policy 1.10: The County shall protect agricultural operations from conflicts with non-agricultural uses by requiring buffers between proposed non-agricultural uses and adjacent agricultural operations.

GOAL TWO: Conserve our agricultural lands for agricultural uses.

Objective Number 2.1: Continued Participation in the Williamson Act

Policy 2.1: The County shall continue to provide property tax relief to agricultural landowners by participating in the Williamson Act.

Policy 2.3 The County shall ensure all lands enrolled in the Williamson Act are devoted to agricultural and compatible uses supportive of the long-term conservation of agricultural land.

Objective Number 2.2: Discourage urbanization and the conversion of agricultural land in unincorporated areas of the County

Policy 2.5: To the greatest extent possible, development shall be directed away from the County's most productive agricultural areas.

Policy 2.6: Agricultural lands restricted to agricultural use shall not be assessed to pay for infrastructure needed to accommodate urban development.
Objective Number 2.4: Assessing and mitigating impacts of farmland conversion.
Policy 2.14: When the County determines that the proposed conversion of agricultural land to non-agricultural uses could have a significant effect on the environment, the County shall fully evaluate on a project-specific basis the direct and indirect effects, as well as the cumulative effects of the conversion.

*GOAL THREE***:** Protect the natural resources that sustain our agricultural industry.
Objective Number 3.2: Water Resources
Policy 3.4: The County shall encourage the conservation of water for both agricultural and urban uses.
Policy 3.5: The County will continue to protect the quality of water necessary for crop production and marketing.
Objective Number 3.3: Soil Resources
Policy 3.6: The County shall encourage the conservation of soil resources.

Stanislaus County Zoning Code The Stanislaus County zoning code dictates land use in unincorporated areas of Stanislaus County and describes allowable uses in designated zoning districts. According to the Stanislaus County zoning districts map, all the land within the study area is assigned to the General Agriculture District (A-2) (Stanislaus County 2010).

As described in the County's zoning code, the intent of the General Agriculture District is "to support and enhance agriculture as the predominant land use in the unincorporated areas of the county. These zoning regulations are also intended to protect open space lands and to ensure that all land uses are compatible with agriculture and open space, including natural resources management, outdoor recreation and enjoyment of scenic beauty (Section 21.20.010)."

In general, permitted uses in the A-2 districts include: all agricultural uses; single-family dwelling(s) on parcels of specified size; mobile homes; buildings and appurtenances generally supportive of farming; temporary agricultural service airports; lagoons or ponds for the storage of animal wastes; and other related uses (Section 21.20.020).

Uses that require a use permit in an A-2 district include (Section 21.20.030):

> C. Tier Three. The uses listed below are not directly related to agriculture but may be necessary to serve the A-2 district or may be difficult to locate in an urban area. Some of these uses can be people-intensive and, as a result, have the potential to adversely impact agriculture; these people-intensive uses are generally required to be located within LAFCO-approved spheres of influence of cities or community services districts and sanitary districts serving unincorporated communities. Tier three uses may be allowed when the planning commission finds that, in addition to the findings required under Section 21.96.050:
>
> > 1. The use as proposed will not be substantially detrimental to or in conflict with agricultural use of other property in the vicinity; and

> 2. The parcel on which such use is requested is not located in one of the county's "most productive agricultural areas," as that term is used in the agricultural element of the general plan; or the character of the use that is requested is such that the land may reasonably be returned to agricultural use in the future...
>
> j. Facilities for public utilities and communication towers,

In regard to uses on lands subject to the Williamson Act, the County's zoning code states: "Unless the planning commission and/or the board of supervisors makes a finding to the contrary, the following uses are hereby determined to be consistent with the principles of compatibility and may be approved on contracted land: (1) The erection, construction, alteration, or maintenance of gas, electric, water, communication facilities… (Section 21.20.2045)"

City of Modesto General Plan The existing Jennings Plant and several adjacent parcels to the south are within the jurisdiction of the City of Modesto. These include the parcels within and adjacent to the proposed pipeline alignment from the Jennings Plant and Turlock RWQCF (Alternative 1) along Jennings Road and W. Main Avenue. These parcels are all within the Planned Development Zone (P-D) district according to the City's zoning ordinance (see below) and as such would seem to be within the Planned Urbanizing Area, as defined in the City's General Plan (City of Modesto 2008). In regard to the Planned Urbanizing Area (PUA), the General Plan states that:

> Future development within the approximately 20,042-acre Planned Urbanizing Area (PUA) will occur on land which is predominantly flat, vacant and/or developed with agricultural uses, and minimally, if at all, served with urban services and infrastructure, including roads…The Planned Urbanizing Area is expected to absorb substantial urban development in a comprehensively planned manner (City of Modesto 2008: page II-2).

Agriculture policies for the PUA in the General Plan apply to new development (City of Modesto 2008: page VII-8). The pipelines proposed in the project would likely not be considered new development as they would be located below ground and would not change the existing land use. Nevertheless, the agriculture policies for the PUA in the City of Modesto General Plan are as follows:

> *Agricultural Policy (a):* The City will not annex agricultural land unless urban development consistent with the General Plan has been approved by the City.
> *Agricultural Policy (b):* The City shall support the continuation of agricultural uses on lands designated for urban uses until urban development is imminent.
> *Agricultural Policy (c):* The City shall encourage the County to retain agricultural uses on lands surrounding the General Plan area and on lands within the General Plan area pending their annexation to the City or development by mutual agreement with the County.
> *Agricultural Policy (d):* Where necessary to promote planned City growth, the City shall encourage development of those agricultural lands that are already compromised by adjacent urban development or contain property required for the extension of

infrastructure or other public facilities, before considering urban development on agricultural lands that are not subject to such urban pressures.
Agricultural Policy (e): For any subsequent project that is adjacent to an existing agricultural use, the project proponent may incorporate measures to reduce the potential for conflicts with the agricultural use. Potential measures to be implemented may include the following:

1) Include a buffer zone of sufficient width between proposed residences and the agricultural use.
2) Restrict the intensity of residential uses adjacent to agricultural lands.
3) Inform residents about the possible exposure to agricultural chemicals.

City of Modesto Zoning Ordinance As described above, several parcels along the San Joaquin River within and adjacent to the proposed pipeline alignment from the Jennings Plant to the Turlock RWQCF are within the jurisdiction of the City of Modesto. According to the City of Modesto's zoning map, all of these parcels are within the P-D district. As described in Section 21.40.020 of the City's zoning ordinance, the purpose and intent of the P-D district is as follows.

> The application of the conventional regulations can stifle creative planning and design efforts. The P-D district zoning is generally intended to apply to larger scale, integrated development as a means of providing opportunities for creative and cohesive design concepts. The district is intended to allow modification of requirements established by other districts and diversification in the relationship of different uses, buildings, structures, lot sizes and open spaces, while ensuring compliance with, and implementation of, the general plan. Additional objectives of the P-D district include the provision of development consistent with site characteristics, creation of optimum quantity and use of open space, encouragement of good design and promotion of compatible uses. (Ord. CS 556 §1, 1994).

Section 21.40.040 states that "All uses, when consistent with the general plan, shall be allowed in P-D districts subject to the approval of the development plan by the planning commission. (Ord. CS 556 §1, 1994).

3.2.3 Impact Analysis/Environmental Consequences

Methodology for Analysis

This section evaluates whether construction and operation of the facilities associated with the Proposed Action would result in significant impacts related to agriculture resources. It considers the extent to which the Proposed Action could result in conversion of farmland to non-agricultural uses, either temporarily or permanently. In general, temporary impacts would not be considered significant. It also considers the Proposed Action's consistency with existing zoning in the locations where facilities would be modified or constructed. Impacts to forestry are not evaluated because no forestry resources exist within the study area.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines,* an agricultural impact would be considered significant if the project would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to nonagricultural use.
- Conflict with existing zoning for agricultural use, or a Williamson Act Contract.
- Involve other changes in the existing environment that, because of their location or nature, could result in a conversion of Farmland to a non-agricultural use.

Impacts and Mitigation Measures

Impact AG-1 Convert Farmland to Non-Agricultural Use

No Action Alternative In the No Action Alternative, no pipelines would be installed and existing agricultural land would not be affected by construction. However, over the long-term a lack of reliable water supply could result in conversion of agriculture land to non-agricultural uses. This would be a significant impact for which no mitigation is available.

Combined Alignment Alternative (Alternative 1) Alternative 1 involves installation of pipelines and appurtenances (two reaches) and repurposing of the existing Jennings Plant outfall pump station. As described in **Table 2-1** and shown in **Figure 2-2**, the majority of the length of the two pipeline reaches proposed in Alternative 1 would be located along County roadways. Two segments of the reach from the Jennings Plant to the DMC would cross agricultural land; from roughly the San Joaquin River to Lemon Avenue and from SR 33 to the intersection of Zacharias Road and Baldwin Road. The agricultural land through which these segments of pipeline would be constructed is designated as Prime Farmland (see **Figure 3.2-1**).

As described in *Chapter 2, Alternatives and Proposed Action*, the pipeline would be installed using open-cut construction methods. The open-cut trench would range from 6 to 8 feet wide and approximately 8 to 10 feet deep, depending on the pipe size, existing utility locations, and pipe bedding requirements. To accommodate construction equipment and work area, the entire construction corridor (active work area including the trench) would be approximately 45 feet wide.

Installation of pipeline along roads would be conducted primarily within the public ROW (i.e., within the width of the road). The work area may extend onto adjacent agricultural land in locations where the public ROW is too narrow to accommodate pipeline construction.
In areas where the construction corridor would be located within agricultural lands, agriculture would be temporarily precluded for some portion of the 1.5-year construction period. Construction in agricultural fields may require the removal of crops, depending on the crop and time of year. Because of the temporary nature of this impact, it is considered less than significant.

Construction would also involve the removal of topsoil (to dig the trench). Heavy equipment (e.g., excavator, dump truck, flat-bed truck, front-end loader) would be used to dig trenches, transport pipe, and off-load excavated materials. Removal of topsoil and use of heavy equipment would also have the potential to adversely affect long-term soil characteristics and productivity of this land (i.e., through compaction/removal of topsoil). Potential exists that this could cause such areas to no longer be viable for agricultural production, which would be a significant impact. Implementation of **Mitigation Measure AG-1** would require that topsoil be stockpiled

and replaced, reducing this impact to a level that is less than significant and compliant with Policy 3.6 of Stanislaus County's General Plan (i.e., to conserve soil) (see Regulatory Framework above).

Otherwise, over the long term, agricultural land use in this area would be unaffected as a result of the proposed pipelines in Alternative 1. The pipe would be installed from 8 to 10 feet deep and soil would be backfilled over the trench such that farming would be able to resume following construction. The pipeline would need to be inspected and maintained after construction (for which permanent easements would be acquired as necessary), but inspection and maintenance activities would not be expected to significantly affect agricultural operations.

Separate Alignment Alternative (Alternative 2) The potential impacts associated with the pipeline reaches in Alternative 2 would be the same as for Alternative 1. In addition to the locations where the pipeline would traverse agricultural lands under Alternative 1, portions of the pipeline reach from Harding Drain Bypass Pipeline to the DMC would pass through agricultural fields designated as Prime Farmland. As described in **Table 2-2**, a segment of this reach would pass through agricultural fields designated as Prime Farmland roughly between the San Joaquin River and Pomegranate Avenue. Another segment of this reach would run parallel and north of West Marshall Road (up to 80 feet north of West Marshall Road) between SR 33 and the DMC. The land adjacent to West Marshall Road to the north is classified as Prime Farmland (see **Figure 3.2-1**). Potential impacts (i.e., conversion of farmland to non-agricultural use) from pipeline installation in these areas would be the same as those described for Alternative 1. In general, construction-related impacts in agricultural fields would be temporary and unlikely to result in permanent conversion of farmland to non-agricultural use. Potentially significant impacts to soil resources from construction would be reduced to a less than significant level with implementation of **Mitigation Measure AG-1**.

Alternative 2 would include the same repurposing of the existing Jennings Plant outfall pump station as described for Alternative 1, and the potential impacts would be the same as those described for Alternative 1.

Alternative 2 would also involve construction of a new pump station near the west end of the Harding Drain Bypass Pipeline. As described in *Chapter 2, Alternatives and Proposed Action,* the proposed pump station at the Harding Drain Bypass Pipeline would be above ground and enclosed. **Figure 2-5** shows the site plan for the new pump station. The above grade pump station building would be approximately 40 feet by 50 feet and would be surrounded by paving for access and a fence to ensure security. The pump station site on the west of S. Carpenter Road (and east of the San Joaquin River) is owned by the City of Turlock and is not classified as Important Farmland. Therefore no conversion of farmland to non-agricultural use would occur.

PID Conveyance Alternative (Alternative 3) The majority of the pipeline could be constructed in PID ROW adjacent to their main canal and would not be expected to affect farmland. There are parcels of Prime Farmland located along Bartch and Ward Avenues, and there is a possibility that pipeline construction could temporarily affect portions of those agricultural lands immediately adjacent to those roadways. Potentially significant impacts to soil resources from

construction would be reduced to a less than significant level with implementation of **Mitigation Measure AG-1**.

Alternative 3 would include construction of new facilities at the PID intake, which is not designated as Prime Farmland, Unique Farmland or Farmland of Statewide Importance (PID 2006). Therefore no conversion of farmland to non-agricultural use would occur in this area.

Significance Determination before Mitigation Potentially significant for Alternatives 1, 2 and 3; significant and unavoidable for the No Action Alternative.

Mitigation Measures **Mitigation Measure AG-1: Stockpile Soil** (Alternatives 1, 2 and 3). Topsoil removed during project construction shall be stockpiled for later reuse. Soil shall be stored in a clear area of the construction site where it would not have the potential to affect agricultural or biological resources. Stockpiled soil shall be covered with a tarp at all times to prevent generation of fugitive dust. Following pipeline insertion, soil shall be backfilled into the trench and restored to an appropriate level of compaction.

Significance after Mitigation Less than significant for Alternatives 1, 2 and 3; significant and unavoidable for the No Action Alternative.

Impact AG-2 Conflict with Existing Zoning for Agricultural Use

No Action Alternative The No Action Alternative would be a continuation of existing conditions. No pipelines or pump station would be installed on land zoned for agriculture and there would be no potential for conflict with existing zoning for agricultural use.

Also, under the No Action Alternative no recycled water would be provided to farmland in DPWD's service area. As described in **Impact AG-1**, DPWD's current and predicted future water supplies are not sufficient to meet demands. As such, the No Action Alternative could potentially result in greater fallowing of lands in DPWD's service area and ultimately, conversion of agricultural land to non-agricultural use. Because the extent of conversion and future uses of any such land are unknown and speculative, it is unknown whether such land uses would be in conflict with zoning for agricultural use.

Combined Alignment Alternative (Alternative 1) As described in **Impact AG-1**, the majority of the length of the two pipeline reaches proposed in Alternative 1 would follow the public ROW, but some construction may occur within lands zoned for agriculture.

Repurposing of the existing Jennings Plant outfall pump station would be generally contained within the footprint of the existing facility, but the construction work area may extend onto adjacent land. The land adjacent to the existing Jennings Plant is zoned for agriculture by Stanislaus County but is within the jurisdiction of the City of Modesto. As described in Section 3.2.2, Regulatory Framework, this land is zoned for P-D by the City of Modesto and designated as PUA in the City's general plan. The PUA is intended to absorb suburban development, but the general plan encourages preservation of agricultural uses in these areas until urban development is imminent. This alternative would not conflict with the agricultural policies of this land use designation or zoning district. The outfall pump station, once repurposed, would be contained

within the footprint of the existing facility and any pipelines through P-D zoning district land would be underground and would not affect agriculture.

Where the public ROW is not wide enough to accommodate the construction work area, installation of pipeline along roads may extend onto adjacent land zoned for agriculture. Other than the existing Jennings Plant and adjacent parcels to the south, the entire project area is within the jurisdiction of Stanislaus County. All the land within and adjacent to the proposed pipeline alignments under this alternative is zoned for agriculture by Stanislaus County. Given that construction impacts would be temporary and agriculture would be anticipated to resume following construction, construction would not conflict with the purpose of Stanislaus County's General Agriculture District zoning designation, which is to "support and enhance agriculture as the predominant land use in the unincorporated areas of the county…and to ensure that all land uses are compatible with agriculture (Section 21.20.010)." Following construction, the project area would be suitable for agriculture and agriculture would remain the predominant land use in the project area.

While the General Agriculture District regulations do not specifically reference water pipelines or utilities in their list of permitted uses, the proposed recycled water pipelines would be considered "appurtenances generally supportive of farming," which are defined as allowable in the Agriculture District under Section 21.20.010 of the Stanislaus County zoning code. The proposed pipelines would be used to convey irrigation water to be used on farmland in DPWD's service area.

In regard to Williamson Act Contract lands, Section 21.20.045 of the Stanislaus County code states that "the erection, construction, alteration, or maintenance of gas, electric, water, [and/or] communication facilities" may be approved on Williamson Act Contract lands unless the planning commission and/or the board of supervisors makes a finding to the contrary. Installation of pipelines through Williamson Act Contract lands for the Proposed Action would be allowable under this section of the County code.

The proposed pipelines would need to be inspected and maintained on a periodic basis, but such activities would not be expected to conflict with agricultural operations. Operation of the pipelines and project facilities after construction, including inspection and maintenance, do not require a use permit under Section 21.20.030 of the Stanislaus County code because it would not be substantially detrimental to or in conflict with agricultural use of other property in the vicinity and would not prevent agricultural use of the land.

Serving water to the lands zoned for agriculture in DPWD's service area would support the zoning designations in those locations, which is considered a beneficial impact.

Because Alternative 1 would be consistent with and support agricultural zoning, impacts are considered beneficial.

Separate Alignment Alternative (Alternative 2) The potential impacts associated with the pipeline reach from Jennings Plant to the DMC and the existing Jennings Plant outfall pump station would be the same for Alternative 2 as for Alternative 1.

As described in **Impact AG-1**, Alternative 2 would also involve construction of a new pump station at the western end of the Harding Drain Bypass Pipeline, which would be sited to the west of S. Carpenter Road (on APN 058-023-028). The land to the west of S. Carpenter Road is not currently in agricultural production or designated as Important Farmland, but it is still zoned for agricultural use by Stanislaus County.

On its face, the pump station would seem to conflict with the purpose of Stanislaus County's General Agriculture District, as it would not allow for agriculture within its footprint. However, the pump station would support conveyance of recycled water to DPWD's service area for irrigation of agricultural lands, and could therefore be considered to be serving "to support and enhance agriculture as the predominant land use in unincorporated areas of the county (Stanislaus County Zoning Code, Section 21.20.010)." This use would be consistent with Stanislaus County's zoning code. Similar to the pipelines, the pump station could also be considered an "appurtenance generally supportive of farming," as described in Stanislaus County's zoning code, and therefore permitted in the Agriculture District.

Overall, given that the pump station would be located on land not currently in agricultural production and that the pump station would only preclude a small area (roughly the size of the footprint of the above ground pump station building [approximately 40 feet by 50 feet] and surrounding pavement and fencing) from agricultural use in the future, the impact would be less than significant.

Like Alternative 1, Alternative 2 would serve water to lands zoned for agricultural use in DPWD's service area and thereby support the zoning designations in those locations.

PID Conveyance Alternative (Alternative 3) There are agricultural lands located along both sides of Bartch and Ward Avenues, but as noted above construction of pipelines is supportive of farming and is allowable under the zoning code. Impacts of the pipeline would be similar to Alternatives 1 and 2. The site for the expanded intake and pump station is within PID ROW and would not conflict with agricultural zoning.

Like Alternatives 1 and 2, Alternative 3 would serve water to lands zoned for agricultural use within DPWD's service area and thereby support the zoning designations in those locations. Because Alternative 3 would be consistent with and support agricultural zoning, and would not remove land zoned for agricultural use from production, impacts are considered beneficial.

Significance Determination Beneficial for Alternatives 1 and 3; less than significant for Alternative 2; no impact for the No Action Alternative.

Mitigation Measures No mitigation is necessary.

Impact AG-3 Conflict with Williamson Act Contract

No Action Alternative Under the No Action Alternative, no pipelines or pump station would be installed on Williamson Act Contract lands and no potential conflicts with Williamson Act Contracts would occur. In addition, no recycled water would be delivered to customers in DPWD's service area for irrigation of farmland. As DPWD is predicted to experience shortfalls in irrigation water supply of 41,000 AFY, the No Action Alternative could potentially affect Williamson Act Contracts within the District. There may be increased incentive for landowners with Williamson Act Contracts to convert their land to other uses (e.g., real estate developments) and exit contracts if sufficient irrigation water is unavailable. DPWD would be expected to seek alternative sources of irrigation water supply as it has in the past, but such supply may not be available. Termination of Williamson Act Contracts on parcels within DPWD due to lack of water supply is considered a significant and unavoidable impact.

Combined Alignment Alternative (Alternative 1) Several parcels within or adjacent to the proposed pipeline alignment under Alternative 1 are under Williamson Act Contracts. The land between SR 33 and the intersection of Zacharias Road and Baldwin Road and between the San Joaquin River and Lemon Avenue (through which pipeline would be installed) is under a Williamson Act Contract. The land directly adjacent to the existing Jennings Plant outfall pump station is not under a Williamson Act Contract.

As described in **Impact AG-1**, the majority of the pipeline alignment under Alternative 1 would follow existing roads. Installation of pipe along roads would be largely confined to the roadway and road shoulder, but work areas may extend onto adjacent agricultural land. This construction or staging activity may preclude agriculture and require the removal of crops on some portion of adjacent agricultural land under Williamson Act Contract, but these impacts would be temporary (lasting for the 1.5-year construction period) and would not affect the status of Williamson Act Contracts.

Installation of pipe through agricultural fields would entail clearing and use of a 45-foot-wide construction corridor, and operation of heavy machinery. Crops may have to be removed in this construction corridor and agriculture would be precluded for some portion of the construction period (1.5 years). These construction impacts would be temporary and would not affect the status of the Williamson Act Contract(s). Pipe would be installed 8 to 10 feet below-ground and topsoil would be conserved (see **Mitigation Measure AG-1**) and backfilled over installed pipe such that farming could resume following project construction. As a result, Alternative 1 would not conflict with any Williamson Act Contracts and there would be no impact.

Separate Alignment Alternative (Alternative 2) The Williamson Act Contract lands and potential impacts associated with the reach from Modesto's Water Quality Control Facility to the DMC would be the same for Alternative 2 as those described for Alternative 1.

As for the reach from the Harding Drain Bypass Pipeline to the DMC, **Figure 3.2-2** shows many parcels under Williamson Act Contracts within or adjacent to the proposed pipeline alignment. Parcels adjacent to Pomegranate Avenue between the San Joaquin River and Locust Avenue, and the private road between Locust Avenue and SR 33, are under Williamson Act Contracts. All of the land between SR 33 and the DMC is also under Williamson Act Contract (see **Figure 3.2-2**).

Potential conflicts with Williamson Act Contracts on these lands due to pipeline installation would be the same as described for Alternative 1. As mentioned above in the discussion for Alternative 1, the land adjacent to the existing Jennings Plant outfall pump station is not under a Williamson Act Contract so there would be no potential for conflict from repurposing of the existing Jennings Plant outfall pump station.

Alternative 2 would not conflict with any Williamson Act Contracts and there would be no impact.

PID Conveyance Alternative (Alternative 3) There are parcels of Williamson Act Contract lands located along Bartch and Ward Avenues, but as noted above, construction of pipelines is allowable on Williamson Act lands and would not conflict with the Williamson Act Contract(s). The site for the expanded intake and pump station is within PID ROW and would not conflict with a Williamson Act Contract. Alternative 3 would not conflict with any Williamson Act Contracts and there would be no impact.

Significance Determination No impact for Alternatives 1, 2, and 3; significant and unavoidable for the No Action Alternative.

Mitigation Measures No mitigation is necessary for Alternatives 1, 2 and 3. No mitigation is possible for the No Action Alternative.

Impact AG-4 Provide Drought-Resistant Source of Water to Agriculture

No Action Alternative Under this alternative, no recycled water would be provided to DPWD for irrigation of farmland in its service area. In 2014, 10,997 acres of agricultural land were fallowed due to lack of availability of surface water and insufficient quantities of groundwater. Without the Proposed Action, additional farmland may be fallowed, converting this farmland to non-agricultural uses. To the extent that farmland which would otherwise remain in agricultural production under the Proposed Action would be fallowed under this alternative, this impact is considered significant. DPWD would be expected to seek alternative sources of irrigation water supply as it has in the past, but such supply may not be available or reliable, and in these circumstances, additional fallowing of farmland would be unavoidable. Given this situation, impacts of the No Action Alternative are considered significant and unavoidable.

Combined and Separate Alignment Alternatives, PID Conveyance Alternative Under Alternatives 1, 2 and 3, the Proposed Action would establish a reliable, long-term water supply of up to 59,000 AFY of recycled water for DPWD. Alternatives 1 and 2 would also maximize the Partner Agencies' control over operations and delivery of water and establish a long-term ability to beneficially use recycled water. Agricultural water delivered to DPWD would be at a cost that supports regional economic sustainability.

The Proposed Action would address the shortage in water supply within DPWD's service area and would also offset potential related adverse effects from increased groundwater pumping (e.g., overdraft, subsidence, groundwater quality issues) that have occurred and would likely continue to occur with the absence of an alternative water supply.

The Proposed Action would provide a reliable source of water that would generally be available regardless of Delta pumping restrictions or drought conditions to help meet DPWD's water demands. The Proposed Action would provide recycled water produced at the Turlock RWQCF and Modesto Jennings Plant to farmland in DPWD's service area. Volumes of municipal wastewater generation are generally not greatly affected by climate, and as such the Proposed Action's water supply would be drought-resistant and would generally be available in all years.

Significance Determination Beneficial for Alternatives 1, 2 and 3; significant and unavoidable for the No Action Alternative.

Cumulative Impacts

The geographic scope of cumulative impacts on agricultural resources encompasses the study area. Several relevant present and future projects are under construction or in the planning phase that are in proximity to the Proposed Action facilities and the study area, including:

- Jennings Road Treatment Plant Phase 2 Improvements (City of Modesto); increase tertiary treatment capacity by 12.6 mgd.
- South County Corridor Study (Stanislaus County Council of Governments); study potential alignments and corridor options for an expressway from the City of Turlock on the west to I-5 on the east (Stanislaus County Public Works 2011).
- West Main Street Highway Improvement Project (Stanislaus County); widening of West Main Avenue to 3 lanes from the San Joaquin River to Crows Landing Road (Stanislaus County Public Works 2011).

Of these three projects, the South County Corridor Study and West Main Street Highway Improvement Project would have the potential to adversely affect agricultural resources. If the alignment of the new expressway from the City of Turlock to I-5 ultimately selected for construction through the South County Corridor Study were to pass through existing agricultural land, it could result in conversion of farmland to non-agricultural use. Widening of West Main Street could also result in conversion of farmland to non-agricultural use because the land adjacent to West Main Street between the San Joaquin River and the intersection of West Main Street and Crows Landing Road is predominantly Prime Farmland (CDOC 2012a).

A number of Reclamation projects are also underway or planned for the DMC, but none of these projects would be expected to adversely affect agricultural resources.

Ongoing conversion of farmland to non-agricultural uses is a regional problem in the study area and is considered a cumulatively significant impact. As described in the impact discussions above, the proposed project generally supports agriculture and would prevent farmland conversion. In addition, by providing a reliable source of water, the Proposed Action would reduce the potential for future conversions of farmland to non-agricultural use as a result of insufficient water supplies. The Proposed Action's contribution to this cumulative impact is therefore considered beneficial.

3.2.4 References

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3.3 Air Quality

This section evaluates the potential adverse impacts related to air quality that could result from implementation of the proposed NVRRWP Action alternatives compared to the No Action Alternative. The analysis is based on a review of current air quality conditions, inventory of the proposed project air emissions based on equipment expected to be used for the project, and information from state and local agencies.

3.3.1 Environmental Setting/Affected Environment

This section describes the environmental setting for air quality within the study area, which includes the project site and the San Joaquin Valley Air Basin (SJVAB) where the project is located.

Study Area

The study area consists of the locations where physical actions associated with the proposed project would take place. This is primarily the area near the terminus of the Turlock Harding Drain Bypass Pipeline, the City of Modesto's Jennings Plant, the PID intake facility, and the land immediately surrounding the proposed pipeline alignments that would connect to the DMC. The recycled water would be delivered to farms within the DPWD service area in Stanislaus, San Joaquin, and Merced Counties as well as certain SOD CVPIA designated refuges. The entire study area is within the SJVAB, which is under jurisdiction of the SJVAPCD.

San Joaquin Valley Air Basin

The California Air Resources Board (CARB) has divided California into regional air basins according to topographic air drainage features. The SJVAB, which is approximately 250 miles long and averages 35 miles wide, is the second largest air basin in the state. The SJVAB is defined by the Sierra Nevada Mountains in the east (8,000 to 14,000 feet in elevation), the Coast Range in the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains in the south (6,000 to 8,000 feet in elevation). The valley is essentially flat with a slight downward gradient to the north-northwest. The valley terminates where the Delta empties into San Francisco Bay. The San Joaquin Valley (SJV), thus, could be considered a "bowl" open only to the north. Although marine air generally flows into the basin from the Delta, the region's topographic features restrict air movement through and out of the basin. The Coast Range hinders wind access into the SJV from the west, the Tehachapi Mountains prevent southerly passage of airflow, and the high Sierra Nevada Mountains are a significant barrier to the east. These topographic features result in weak airflow, which becomes blocked vertically by high barometric pressure over the SJVAB. As a result, the SJVAB is highly susceptible to pollutant accumulation over time. Local climatological effects, including wind speed and direction, temperature, inversion layers, and precipitation and fog, can exacerbate air quality problems in the SJVAB.

Climate and Meteorology

The SJVAB is in a Mediterranean Climate Zone. Mediterranean Climates Zones occur in areas located on the west coast of continents at 30 to 40 degrees latitude and are influenced by a subtropical high-pressure cell most of the year. Mediterranean Climates are characterized by

sparse rainfall, which occurs mainly in winter. Summers are hot and dry. Summertime maximum temperatures often exceed 100 degrees Fahrenheit (ºF) in the SJV.

The subtropical high-pressure cell is strongest during spring, summer, and fall and produces subsiding air, which can result in temperature inversions in the valley. A temperature inversion can act like a lid, inhibiting vertical mixing of the air mass at the surface. Any emissions of pollutants can be trapped below the inversion. Most of the surrounding mountains are above the normal height of summer inversions (1,500-3,000 feet).

Winter-time high pressure events can often last many weeks with surface temperatures often lowering into the thirties (ºF). During these events, fog can be present and inversions are extremely strong. Wintertime inversions can inhibit vertical mixing of pollutants to a few hundred feet.

Wind Speed and Direction Wind speed and direction play an important role in dispersion and transport of air pollutants. Wind at the surface and aloft can disperse pollution by mixing vertically and by transporting it to other locations. Ozone (O_3) is classified as a "regional" pollutant in part because of the time required for O_3 formation. O_3 precursors can be transported well away from the source area before O_3 concentrations peak. Inhalable particulate matter (PM_{10} and $PM_{2.5}$) is also considered a regional pollutant in part because of its tendency to remain suspended in the air over long periods of time. Some other primary pollutants, carbon monoxide (CO) for example, are classified as "localized" pollutants in part because they tend to dissipate easily over long distances, but may form high concentrations close to the source when wind speed is low.

During the summer, wind speed and direction data indicate that wind usually originates at the north end of the SJV and flows in a south-southeasterly direction through the valley, through Tehachapi pass, into the Southeast Desert Air Basin. During the winter, wind speed and direction data indicate that wind occasionally originates from the south end of the SJV and flows in a north-northwesterly direction. Also during the winter months, the SJV experiences light, variable winds, less than 10 miles per hour (mph). Low wind speeds, combined with low inversion layers in the winter, create a climate conducive to high CO and PM_{10} concentrations.

Superimposed on this seasonal regime is the diurnal wind cycle. In the SJV, this cycle takes the form of a combination of sea breeze-land breeze and mountain-valley regimes. The sea breeze-land breeze regime has a sea breeze flowing into the SJV from the north during the day and a land breeze flowing out of the SJV at night. The mountain-valley regime has an upslope (mountain) flow during the day and a downslope (valley) flow at night. These phenomena add to the complexity of regional wind flow and pollutant transport within the SJVAB.

Temperature Temperature and solar radiation are particularly important in the chemistry of O_3 formation. O_3 is formed in a photochemical reaction requiring sunlight. Generally, the higher the temperature, the more O_3 formed, since reaction rates increase with temperature. However, extremely hot temperatures can "lift" or "break" the inversion layer. Typically, if the inversion layer does not lift to allow the build-up of contaminants to be dispersed into the Southeast Desert, O_3 levels peak in the late afternoon, sometimes as late as 3 to 7 P.M. If the inversion

layer breaks and the resultant afternoon winds occur, the O_3 will peak in the early afternoon and decrease in the late afternoon as the contaminants are transported to the Southeast Desert. Temperature is not as important to formation of high CO or PM_{10} levels except for the influence of temperature on the inversion layer.

The SJVAB has an "inland Mediterranean" climate, averaging over 260 sunny days per year. The valley floor is characterized by warm, dry summers and cooler winters. Summer high temperatures often exceed 100 ºF, averaging in the low 90s in the northern valley and high 90s in the south. In the entire SJV, high daily temperature readings in summer average 95 ºF. Over the last 30 years, the SJV averaged 106 days a year 90 ºF or hotter, and 40 days a year 100 ºF or hotter. The daily summer temperature variation can be as high as 30 ºF. In winter, as the cyclonic storm track moves southward, the storm systems moving in from the Pacific Ocean bring a maritime influence to the SJV. The high mountains to the east prevent the cold, continental air masses of the interior from influencing the valley. Thus, winters are mild and humid. Temperatures below freezing are unusual. Average high temperatures in the winter are in the 50s, but highs in the 30s and 40s can occur on days with persistent fog and low cloudiness. The average daily low temperature is 45 ºF.

Temperature Inversion The vertical dispersion of air pollutants in the SJV is limited by the presence of persistent temperature inversions. Because of expansional cooling of the atmosphere, air temperature usually decreases with altitude. A reversal of this atmospheric state, where the air temperature increases with height, is termed an inversion. Inversions can exist at the surface or at any height above the ground. The height of the base of the inversion is known as the "mixing height". This is the level to which pollutants can mix vertically. Semi-permanent systems of high barometric pressure fronts frequently establish themselves over the SJVAB, deflecting low-pressure systems that might otherwise bring cleansing rain and winds.

Air above and below the inversion base does not mix because of differences in air density. Warm air above the inversion is less dense than air below the base. The inversion base represents an abrupt density change where little exchange of air occurs. Inversion layers are an important factor for determining O_3 formation and CO and PM_{10} concentrations. O_3 and its precursors will mix and react to produce higher concentrations under an inversion, and inversions trap and hold directly emitted pollutants like CO. Two principal types of inversions occur in the SJV: a surface or radiation inversion, and a subsidence inversion.

Surface inversions are formed when the ground surface becomes cooler than the air above it during the night. The earth's surface goes through a radiative process on clear nights, where heat energy is transferred from the ground to a cooler night sky. As the earth's surface cools during the evening hours, the air directly above it also cools, while air higher up remains relatively warm. The inversion is destroyed when heat from the sun warms the ground, which in turn heats the lower layers of air and stimulates the ground-level air to float up through the inversion layer. Daytime temperature inversions during the summer are usually encountered 2,000 to 2,500 feet above the valley floor. Inversions are more persistent (stable) during the winter months. The daily cycle has overnight inversions occurring 500 to 1,000 feet above the valley floor. Studies in the southern part of the Valley indicate more frequent and persistent daytime radiation inversions than in the north due to the lack of marine air intrusion.

Subsidence inversions occur as air is pushed downward by some mechanism, such as the movement of air over mountain ranges, or by differential pressure changes in the atmosphere. As this air moves downward, its pressure increases, causing its temperature to increase. The warm layer of air created by this phenomenon will descend to some relatively static elevation above the ground, creating a low inversion layer. This type of inversion is quite persistent, since heat from the ground does not reach the inversion base to break it up. This is common in high-pressure areas along the coast.

Precipitation and Fog Precipitation and fog tend to reduce or limit some pollutant concentrations. O_3 needs sunlight for its formation, and clouds and fog block the required radiation. CO is slightly water-soluble, so precipitation and fog tends to reduce CO concentrations in the atmosphere. PM_{10} is also somewhat "washed" from the atmosphere with precipitation.

Precipitation in the SJV is strongly influenced by the position of the semi-permanent subtropical high-pressure belt located off the Pacific coast (Pacific High). In the winter, this high-pressure system moves southward, allowing Pacific storms to move through the SJV. These storms bring in moist, maritime air that produces considerable precipitation on the western, upslope side of the Coast Range. Significant precipitation also occurs on the western side of the Sierra Nevada Mountains. On the valley floor, however, there is some downslope flow from the Coast Range and the resultant evaporation of moisture from associated warming results in a minimum of precipitation. Nevertheless, the majority of the precipitation falling in the SJVAB is produced by storms during the winter. Precipitation during the summer months is in the form of convective rain showers and is rare. It is usually associated with an influx of moisture into the SJVAB through the San Francisco area during an anomalous flow pattern in the lower layers of the atmosphere. Although the hourly rates of precipitation from these storms may be high, their rarity keeps monthly totals low.

Precipitation on the SJVAB floor and in the Sierra Nevada decreases from north to south. Stockton in the north receives about 20 inches of precipitation per year, Fresno in the center, receives about 10 inches per year, and Bakersfield at the southern end of the valley receives less than 6 inches per year. This is primarily because the Pacific storm track often passes through the northern part of the state while the southern part of the state remains protected by the Pacific High. Precipitation in the SJVAB is confined primarily to the winter months with some also occurring in late summer and fall. Average annual rainfall for the entire SJV is 9.25 inches on the SJV floor.

Snowstorms, hailstorms, and icestorms occur infrequently in the SJVAB and severe occurrences of any of these are very rare. The winds and unstable air conditions experienced during the passage of storms result in periods of low pollutant concentrations and excellent visibility. Between winter storms, high pressure and light winds allow cold moist air to pool on the SJVAB floor. This creates strong low-level temperature inversions and very stable air conditions. This situation leads to the SJVAB's famous tule fogs. The formation of natural fog is caused by local cooling of the atmosphere until it is saturated (dew point temperature). This type of fog, known as radiation fog, is more likely to occur inland. Cooling may also be accomplished by heat

radiation losses or by horizontal movement of a mass of air over a colder surface. This second type of fog, known as advection fog, generally occurs along the coast.

Conditions favorable to fog formation are also conditions favorable to high concentrations of CO and PM_{10}. O_3 levels are low during these periods because of the lack of sunlight to drive the photochemical reaction. Maximum CO concentrations tend to occur on clear, cold nights when a strong surface inversion is present and large numbers of fireplaces are in use. A secondary peak in CO concentrations occurs during morning commute hours when a large number of motorists are on the road and the surface inversion has not yet broken.

The water droplets in fog, however, can act as a sink for CO and nitrogen oxides (NO_x), lowering pollutant concentrations. At the same time, fog may help in the formation of secondary particulates such as ammonium sulfate. These secondary particulates are believed to be a significant contributor of winter season violations of the PM_{10} and $PM_{2.5}$ standards.

Air Pollutants

Carbon Monoxide CO is an odorless, colorless gas that is highly toxic. CO is formed by the incomplete combustion of fuels and is emitted directly into the air. Ambient CO concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. CO concentrations are also influenced by wind speed and atmospheric mixing. Under inversion conditions, carbon monoxide concentrations may be distributed more uniformly over an area to some distance from vehicular sources. CO binds with hemoglobin, the oxygen-carrying protein in blood, and reduces the blood's capacity for carrying oxygen to the heart, brain, and other parts of the body. At high concentrations, CO can cause heart difficulties in people with chronic diseases, can impair mental abilities, and can cause death.

Ozone O_3 is a reactive gas consisting of three oxygen atoms. In the troposphere (the lowest region of the atmosphere), it is a product of the photochemical process involving the sun's energy. It is a secondary pollutant that is formed when NO_x and volatile organic compounds (VOC) react in the presence of sunlight. O_3 at the earth's surface causes numerous adverse health effects and is a criteria pollutant. It is a major component of smog. In the stratosphere, O_3 exists naturally and shields the Earth from harmful incoming ultraviolet radiation. High concentrations of ground level O_3 can adversely affect the human respiratory system and aggravate cardiovascular disease and many respiratory ailments. O_3 also damages natural ecosystems such as forests and foothill communities, agricultural crops, and some man-made materials such as rubber, paint, and plastics.

Oxides of Nitrogen NO_x are a family of gaseous nitrogen compounds and are precursors to the formation of O_3 and particulate matter (PM). The major component of NO_x, nitrogen dioxide (NO_2) is a reddish-brown gas that is toxic at high concentrations. NO_x results primarily from the combustion of fossil fuels under high temperature and pressure. On-road and off-road motor vehicles and fuel combustion are the major sources of this air pollutant.

Volatile Organic Compounds VOCs are hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and/or may themselves be toxic. VOC emissions are a major precursor to the formation of O_3.

Particulate Matter PM is a complex mixture of extremely small particles and liquid droplets. PM is made up of a number of components including acids, organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to the potential for causing health problems. PM particles that are smaller than 10 micrometers in diameter are of most concern because these particles pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. These inhalable coarse particles, called PM_{10}, are typically found near roadways and dusty industries. PM_{10} particles are deposited in the thoracic region of the lungs. Fine particles, called $PM_{2.5}$, are particles less than 2.5 micrometers in diameter and are found in smoke and haze. $PM_{2.5}$ particles penetrate deeply into the thoracic and alveolar regions of the lungs.

Sulfur Dioxide Sulfur dioxide (SO_2) is a colorless, irritating gas with a "rotten egg" smell formed primarily by the combustion of sulfur-containing fossil fuels. Suspended SO_2 particles contribute to the poor visibility that occurs in the SJVAB and are a component of PM_{10}.

Lead Lead is a metal that is a natural constituent of air, water, and the biosphere. Lead is neither created nor destroyed in the environment, so it essentially persists forever. The health effects of lead poisoning include loss of appetite, weakness, apathy, and miscarriage. Lead poisoning can also cause lesions of the neuromuscular system, circulatory system, brain and gastrointestinal tract.

Gasoline-powered automobile engines were a major source of airborne lead through the use of leaded fuels. The use of leaded fuel has been mostly phased out, with the result that ambient concentrations of lead have dropped dramatically. Lead concentrations were last systematically measured in the SJVAB in 1989, when the average concentrations were approximately five percent of the State lead standard. Though monitoring was discontinued in 1990, lead levels are probably well below applicable standards, and the SJVAB is designated as attainment for lead.

Hydrogen Sulfide Hydrogen sulfide (H_2S) is associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. H_2S is extremely hazardous in high concentrations and can cause death.

Sulfates Sulfates are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features.

CARB's sulfate standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function (moving

gas in and out of the lungs), aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to the fact that they are usually acidic, can harm ecosystems and damage materials and property. Data collected in the SJVAB demonstrate levels of sulfates significantly less than the health standards.

Vinyl Chloride Vinyl chloride is a colorless gas that does not occur naturally. It is formed when other substances such as trichloroethane, trichloroethylene, and tetrachloroethylene are broken down. Vinyl chloride is used to make polyvinyl chloride which is used to make a variety of plastic products, including pipes, wire and cable coatings, and packaging materials.

Toxic Air Contaminants Toxic Air Contaminants (TACs) are air pollutants that may lead to serious illness or increased mortality, even when present in relatively low concentrations. Hundreds of different types of TACs exist, with varying degrees of toxicity. Many TACs are confirmed or suspected carcinogens, or are known or suspected to cause birth defects or neurological damage. For some chemicals, such as carcinogens, no thresholds exist below which exposure can be considered risk-free. Examples of TAC sources in the proposed project include fossil fuel combustion.

Sources of TACs include stationary sources, area-wide sources, and mobile sources. The EPA maintains a list of 187 TACs, also known as hazardous air pollutants. These hazardous air pollutants are included on CARBs list of TACs (CARB 2013c). According to the California Almanac of Emissions and Air Quality (CARB 2013b), many researchers consider diesel PM (DPM) to be a primary contributor to health risk from TACs because particles in the exhaust carry many harmful organics and metals, rather than being a single substance as are other TACs. Unlike many TACs, outdoor DPM is not monitored by CARB because no routine measurement method exists. However, using the CARB emission inventory's PM_{10} database, ambient PM_{10} monitoring data, and results from several studies, CARB has made preliminary estimates of DPM concentrations throughout the state (OEHHA 2001).

Air Quality Attainment and Local Conditions

The CARB and the EPA have established Ambient Air Quality Standards in an effort to protect human health and welfare. Geographic areas are deemed to be in "attainment" if these standards are met or "nonattainment" if they are not met. Nonattainment status is classified by the severity of the nonattainment problem, with marginal, moderate, serious, severe, and extreme nonattainment classifications for O_3. Nonattainment classifications for PM range from marginal to serious. **Table 3.3-1** shows the attainment status for the SJVAB.

Table 3.3-1: San Joaquin Valley Attainment Status

Pollutant	Designation / Classification	
	Federal Standards	**State Standards**
O_3-1 hour	No Federal Standard[1]	Nonattainment/Severe
O_3-8 hour	Nonattainment/Extreme	Nonattainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment/Unclassified	Attainment/Unclassified
NO_2	Attainment/Unclassified	Attainment
SO_2	Attainment/Unclassified	Attainment
Lead	No Designation/Classification	Attainment
H_2S	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

Notes: 1. Effective June 15, 2005, the EPA revoked the federal 1-hour O_3 standard, including associated designations and classifications. EPA had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour O_3 nonattainment areas continue to apply to the SJVAB.
Source: SJVAPCD 2014a

Air Monitoring Data The SJVAPCD, CARB, and EPA operate an extensive air monitoring network to measure progress toward attainment of the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS). The closest air monitoring stations located near the project area are the Modesto 14th Street and Turlock South Minaret Street monitoring stations. **Table 3.3-2** shows the most recent three years of data that is available.

Table 3.3-2: Air Monitoring Data for 2011-2013

Site	Pollutant Standard	2013		2012		2011	
		# Exceed	Maximum Concentration	# Exceed	Maximum Concentration	# Exceed	Maximum Concentration
Modesto 14th Street	O_3, State 1-hour	0	0.088 ppm	2	0.104 ppm	0	0.091 ppm
Turlock South Minaret Street	O_3, State 1-hour	1	0.095 ppm	17	0.115 ppm	4	0.111 ppm
Modesto 14th Street	O_3, State 8-hour	13	0.082 ppm	12	0.091 ppm	7	0.078 ppm
Turlock South Minaret Street	O_3, State 8-hour	24	0.085 ppm	56	0.107 ppm	34	0.094 ppm
Modesto 14th Street	O_3, National 8 – hour	2	0.082 ppm	6	0.091 ppm	3	0.078 ppm
Turlock South Minaret Street	O_3, National 8-hour	14	0.084 ppm	35	0.106 ppm	17	0.093 ppm

Site	Pollutant Standard	2013		2012		2011	
		# Exceed	Maximum Concentration	# Exceed	Maximum Concentration	# Exceed	Maximum Concentration
Modesto 14th Street	$PM_{2.5}$, National 24-hour	37.6	83.2 µg/m^3	13	62.3 µg/m^3	25	71.7 µg/m^3
Turlock South Minaret Street	$PM_{2.5}$, National 24-hour	40.3	74.9 µg/m^3	25	58.4 µg/m^3	36.3	77.9 µg/m^3
Modesto 14th Street	$PM_{2.5}$, State Annual		14.3 µg/m^3		11.9 µg/m^3		14.6 µg/m^3
Turlock South Minaret Street	$PM_{2.5}$, State Annual		15.1 µg/m^3		14.8 µg/m^3		17.1 µg/m^3
Modesto 14th Street	$PM_{2.5}$, National Annual		14.3 µg/m^3		11.9 µg/m^3		14.6 µg/m^3
Turlock South Minaret Street	$PM_{2.5}$, National Annual		15.1 µg/m^3		14.8 µg/m^3		17.1 µg/m^3
Modesto 14th Street	PM_{10}, State 24-hour	57.7	77.5 µg/m^3	30.9	74.6 µg/m^3	ND	73.5 µg/m^3
Turlock South Minaret Street	PM_{10}, State 24-hour	73.7	82.9 µg/m^3	54.8	103.8 µg/m^3	ND	73.3 µg/m^3
Modesto 14th Street	PM_{10}, National 24-hour	0	73 µg/m^3	0	74.1 µg/m^3	0	6934 µg/m^3
Turlock South Minaret Street	PM_{10}, National 24-hour	0	79.2 µg/m^3	0	102.8 µg/m^3	0	69 µg/m^3
Modesto 14th Street	PM_{10}, State Annual		30.9 µg/m^3		25.6 µg/m^3		ND µg/m^3
Turlock South Minaret Street	PM_{10}, State Annual		35.9 µg/m^3		31 µg/m^3		ND µg/m^3
Modesto 14th Street	CO, State 1-hour	0	2.8 ppm	0	2.6 ppm	0	2.9 ppm
Turlock South Minaret Street	CO, State 1-hour	0	1.9 ppm	0	2.1 ppm	0	2 ppm
Modesto 14th Street	CO, State 8-hour	0	ND ppm	0	2.1 ppm	0	2.71 ppm
Turlock South Minaret Street	CO, State 8-hour	0	ND ppm	0	1.29 ppm	0	1.44 ppm
Modesto 14th Street	CO, National 8-hour	0	ND ppm	0	2.1 ppm	0	2.71 ppm
Turlock South	CO, National 8-hour	0	ND ppm	0	1.29 ppm	0	1.44 ppm

Site	Pollutant Standard	2013		2012		2011	
		# Exceed	Maximum Concentration	# Exceed	Maximum Concentration	# Exceed	Maximum Concentration
Minaret Street							
Turlock South Minaret Street	NO_2, State 1-hour	0	54 ppb	0	61 ppb	0	54 ppb
Turlock South Minaret Street	NO_2, National 1-hour	0	54 ppb	0	61 ppb	0	54 ppb

Source: CARB 2014 iADAM and CARB 2014 AQMIS2
Notes: ppm = parts per million; ppb = parts per billion; µg/m3 = micrograms per cubic meter

3.3.2 Regulatory Framework

This section describes laws and regulations at the federal, state, and local level that may apply to the project.

Federal Policies and Regulations

The EPA is responsible for establishing the NAAQS, enforcing the Federal Clean Air Act (CAA), and regulating transportation-related emission sources, such as aircraft, ships, and certain types of locomotives, under the exclusive authority of the federal government. The EPA also establishes vehicular emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet stricter emission standards established by CARB.

Clean Air Act The CAA governs air quality in the United States and is administered by the EPA. The EPA is responsible for setting and enforcing the NAAQS for atmospheric pollutants, which are presented in **Table 3.3-3**. It regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives. The EPA also has jurisdiction over emission sources outside state waters (outer continental shelf), and establishes various emissions standards for vehicles sold in states other than California. As part of its enforcement responsibilities, the EPA requires each state with nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the timeframe identified in the SIP.

Table 3.3-3: State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
O_3	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
O_3	8 Hour	0.070 ppm (137 µg/m^3)	Ultraviolet Photometry	0.075 ppm (147 µg/m^3)	Same as Primary Standard	Ultraviolet Photometry
PM_{10}	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
PM_{10}	Annual Arithmetic Mean	20 µg/m^3	Gravimetric or Beta Attenuation	—	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
$PM_{2.5}$[13]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
$PM_{2.5}$[13]	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12 µg/m^3	15 µg/m^3	Inertial Separation and Gravimetric Analysis
CO	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
CO	8 Hour	9.0 ppm (10 mg/m^3)	NDIR	9 ppm (10 mg/m^3)	—	NDIR
CO	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	NDIR	—	—	NDIR
NO_2[8]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemilum-inescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
NO_2[8]	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Gas Phase Chemilum-inescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
SO_2	1-hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
SO_2	3-hour	—	Ultraviolet Fluorescence	—	0.5 ppm (1300 µg/m^3)	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
SO_2	24-hour	0.04 ppm (105 µg/m^3)	Ultraviolet Fluorescence	0.14 ppm (for certain areas)[9]	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
SO_2	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (for certain areas)[9]	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Lead[10],[11]	30-day average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
Lead[10],[11]	Calendar quarter	—	Atomic Absorption	1.5 µg/m^3 (for certain areas)[11]	Same as Primary Standard	High Volume Sampler and Atomic Absorption
Lead[10],[11]	Rolling 3-month average	—	Atomic Absorption	0.15 µg/m^3	Same as Primary Standard	High Volume Sampler and Atomic Absorption
Visibility Reducing Particles[12]	8-hour	See footnote 12	Beta Attenuation and Transmittance through Filter Tape	No National Standards	No National Standards	No National Standards
Sulfates	24-hour	25 µg/m^3	Ion Chromato-graphy	No National Standards	No National Standards	No National Standards
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence	No National Standards	No National Standards	No National Standards
Vinyl Chloride[10]	24-hour	0.01 ppm (26 µg/m^3)	Gas Chromato-graphy	No National Standards	No National Standards	No National Standards

Notes: ppm = parts per million; ppb = parts per billion; µg/m3 = micrograms per cubic meter

1. California standards for O_3, CO (except 8-hour Lake Tahoe), SO_2 (1 and 24 hour), NO_2, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200, Title 17 of the California Code of Regulations.

2. National standards (other than O_3, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in 1 year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25 degrees Celsius (°C) (77 ºF) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of CARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by EPA.

8. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in ppb. California standards are in ppm. To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

9. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

10. CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

11. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

12. In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

13. In On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15.0 µg/m3 to 12.0 µg/m3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m3, as was the annual secondary standard of 15 µg/m3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

Source: CARB 2013a

Clean Air Act and Conformity Rule Pursuant to CAA Section 176(c) requirements, EPA promulgated Title 40 Code of Federal Regulations Part 51 (40 CFR Part 51), Subpart W and 40 CFR Part 93, Subpart B, "Determining Conformity of General Federal Actions to State or Federal Implementation Plans" (see 58 Federal Register 63214, [November 30, 1993], as amended; 75 Federal Register. 17253 [April 5, 2010]). These regulations, commonly referred to as the General Conformity Rule, apply to all federal actions, except for those federal actions which are excluded from review (e.g., stationary source emissions) or related to transportation plans, programs, and projects under Title 23 U.S. Code or the Federal Transit Act, which are subject to Transportation Conformity.

In states such as California that have an approved SIP revision adopting General Conformity regulations, 40 CFR Part 51, Subpart W, applies; in states that do not have an approved SIP revision adopting General Conformity regulations, 40 CFR Part 93, Subpart B, applies.

The General Conformity Rule is used to determine if federal actions meet the requirements of the CAA and the applicable SIP by ensuring that air emissions related to the action do not:

- Cause or contribute to new violations of NAAQS.
- Increase the frequency or severity of any existing violation of NAAQS.
- Delay timely attainment of NAAQS or interim emission reduction.

A conformity determination under the General Conformity Rule is required if the federal agency determines the following: the action will occur in a nonattainment or maintenance area; that one or more specific exemptions do not apply to the action; the action is not included in the federal

agency's "presumed to conform" list; the emissions from the proposed action are not within the approved emissions budget for an applicable facility; and the total direct and indirect emissions of a pollutant (or its precursors) are at or above the *de minimis* levels established in the General Conformity regulations (75 Federal Register 17255). The *de minimis* levels are shown in **Table 3.3-4**.

Conformity regulatory criteria are listed in 40 CFR Part 93.158. An action will be determined to conform to the applicable SIP if, for each pollutant that exceeds the *de minimis* emissions level in 40 CFR Part 93.153(b), or otherwise requires a conformity determination due to the total of direct and indirect emissions from the action, the action meets the requirements of 40 CFR Part 93.158(c). If on-site emissions reductions do not decrease emissions below the *de minimis* emissions level, then emissions must be off-set to zero for O_3 precursors through a combination of on-site and off-site mitigation.

In addition, federal activities may not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions toward attainment. The NVRRWP is subject to review under the EPA General Conformity Rule. Since the area is classified as extreme nonattainment for O_3, the applicable *de minimis* level is 10 tons per year of NO_x or VOC. For CO, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ the applicable level is 100 tons per year. The level for lead is 25 tons per year.

Table 3.3-4: General Conformity *De Minimis* Levels

Pollutant	Area Type	Tons/Year
O_3 (VOC or NO_x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	**10**
	Other areas outside an ozone transport region	100
O_3 (NO_x)	Marginal and moderate nonattainment inside an O_3transport region	100
	Maintenance	100
O_3 (VOC)	Marginal and moderate nonattainment inside an O_3 transport region	50
	Maintenance within an O_3 transport region	50
	Maintenance outside an O_3 transport region	100
CO, SO_2 and NO_2	**All nonattainment & maintenance**	**100**
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	**100**
$PM_{2.5}$ Direct emissions, SO_2, NO_x (unless determined not to be a significant precursor), VOC or ammonia (if determined to be significant precursors)	**All nonattainment & maintenance**	**100**
Lead	**All nonattainment & maintenance**	**25**

Source: EPA 2014.

Corporate Average Fuel Economy Standards The Corporate Average Fuel Economy (CAFE) standards were first enacted by Congress in 1975, requiring vehicle manufacturers to comply with the gas mileage or fuel economy standards. These standards are set and regulated by the National Highway Traffic Safety Administration (NHTSA), with testing and data support from the EPA.

The issued rules include fuel economy standards for both light- and heavy-duty vehicles. On September 15, 2011, EPA and NHTSA issued a final rule on greenhouse gas (GHG) emissions standards and fuel efficiency standards for medium- and heavy-duty engines and vehicles model years 2014 to 2018 (76 Federal Register 57106). On August 28, 2012, EPA and NHTSA issued a joint final rulemaking to establish 2017 through 2025 GHG emissions and CAFE standards for light-duty vehicles (77 Federal Register 62624). More fuel efficient vehicles result in lower air pollutant emissions.

Nonroad Emission Regulations EPA has adopted emissions standards for different types of nonroad engines, equipment, and vehicles. For nonroad diesel engines, EPA has adopted multiple tiers of emission standards.

EPA signed a final rule on May 11, 2004 introducing the Tier 4 emission standards, to be phased in between 2008 and 2015 (69 CFR 38957–39273, June 29, 2004). The Tier 4 standards require that emissions of PM and NO_x be further reduced by about 90 percent. Such emission reductions can be achieved through the use of control technologies, including advanced exhaust gas after-treatment. To enable sulfur-sensitive control technologies in Tier 4 engines, such as catalytic particulate filters and NO_x absorbers, EPA also mandated reductions in sulfur content in nonroad diesel fuels. In most cases, federal nonroad regulations also apply in California, which has only limited authority to set emission standards for new nonroad engines. The CAA preempts California's authority to control emissions from new farm and construction equipment under 175 horsepower (CAA Section 209[e][1][A]) and requires California to receive authorization from EPA for controls over other off-road sources (CAA Section 209[e][2][A]).

State Regulations and Policies

California Environmental Protection Agency The California Environmental Protection Agency (Cal-EPA) is a state agency that includes CARB, the SWRCB, nine Regional Water Quality Control Boards, the Integrated Waste Management Board, the Department of Toxic Substances Control, the Office of Environmental Health Hazard Assessment, and the Department of Pesticide Regulation. The mission of Cal-EPA is to restore, protect, and enhance the environment and to ensure public health, environmental quality, and economic vitality.

California Clean Air Act The California Clean Air Act (CCAA) requires nonattainment areas to achieve and maintain the health-based State Ambient Air Quality Standards by the earliest practicable date. The Act is administered by CARB at the state level and by local air quality management districts at the regional level, whereby the air districts are required to develop plans and control programs for attaining the state standards. **Table 3.3-3** above shows the CAAQS.

CARB is responsible for ensuring implementation of the CCAA, meeting state requirements of the federal CAA, and establishing the CAAQS. It is also responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. CARB also establishes passenger vehicle fuel specifications.

In-Use Off-Road Diesel Vehicle Regulation In 2007, CARB adopted a regulation to reduce DPM and NO_x emissions from in-use off-road heavy-duty diesel vehicles in California. The regulation imposes limits on vehicle idling and requires fleets to reduce emissions by retiring, replacing, repowering, or installing exhaust retrofits to older engines. In December 2010, major amendments were made to the regulation, including a delay of the first performance standards compliance date to no earlier than January 1, 2014.

Truck and Bus Regulation On December 12, 2008, CARB approved a new regulation to substantially reduce emissions of DPM, NO_x, and other pollutants from existing on-road diesel vehicles operating in California. The regulation requires affected trucks and buses to meet performance standards and requirements between 2011 and 2023. Affected vehicles included on-road, heavy-duty, diesel-fueled vehicles with a gross vehicle weight rating great than 14,000 pounds. The regulation was updated in 2011, with revisions that provide more compliance flexibility and reflect the impact of the economic recession on vehicle activity and emissions. Heavy-duty trucks used in proposed project activities would have to comply with this regulation.

Commercial Vehicle Idling Regulation On October 20, 2005, CARB approved the Airborne Toxic Control Measure (ACTM) to limit diesel-fuel commercial motor vehicle idling. This regulation was a follow-up to previous idling ATCMs, and it consists of new engine and in-use truck requirements, as well as idling emission performance standards. The regulation requires 2008 and newer model year heavy-duty diesel engines to be equipped with a nonprogrammable engine shutdown system that automatically shuts down the engine after 5 minutes of idling or optionally meets a stringent NO_x idling emission standard (i.e., 30 grams/hour). The regulation also is applicable to the operation of in-use trucks, requiring operators of both in-state and out-of-state registered, sleeper berth-equipped trucks to manually shut down their engine when idling more than 5 minutes at any location within California, beginning in 2008. Affected vehicles include diesel-fueled commercial vehicles with a gross vehicle weight rating greater than 10,000 pounds. Trucks used for vendor delivery of materials for proposed project activities would comply with the commercial vehicle idling regulatory requirements.

Heavy-Duty On-Board Diagnostic System Regulations In 2004, CARB adopted a regulation requiring on-board diagnostic systems (OBD) on all 2007 and later model year heavy-duty engines used in vehicles with a gross vehicle weight rating greater than 14,000 pounds in California. CARB subsequently adopted a comprehensive on-board diagnostic regulation for heavy-duty vehicles model years 2010 and beyond. The heavy-duty OBD regulation was updated in 2010 and 2013, with revisions to enforcement requirements, testing requirements, and implementation schedules. Heavy-duty trucks used for proposed project activities would comply with the heavy-duty on-board diagnostic regulatory requirements.

Heavy-Duty Vehicle Inspection Program This program requires for heavy-duty trucks and buses to be inspected for excessive smoke and tampering, and engine certification label compliance. Any heavy-duty vehicle (i.e., vehicles with a gross vehicle weight rating greater than 6,000 pounds) traveling in California, including vehicles registered in other states and foreign countries, may be tested. Tests are performed by CARB inspection teams at border crossings, California Highway Patrol weigh stations, fleet facilities, and randomly selected roadside locations. Owners of trucks and buses found in violation are subject to minimum penalties, starting at $300 per violation. Heavy-duty trucks used for proposed project activities would be subject to the inspection program.

California Standards for Diesel Fuel Regulations These regulations require diesel fuel with sulfur content of 15 parts per million (ppm) or lower (by weight) to be used for all diesel-fueled vehicles that are operated in California. The standard also applies to non-vehicular diesel fuel, other than diesel fuel used solely in locomotives or marine vessels. The regulations also contain standards for the aromatic hydrocarbon content and lubricity of diesel fuels.

State Portable Engine Airborne Toxic Control Measure The California Portable Engine ATCM is designed to reduce the PM emissions from portable diesel-fueled engines rated at 50 brake horsepower or larger. Because backpack sprayer engines are assumed to be electric or gas-powered and vehicle-mounted pump engines, such as dewatering pumps, are assumed to be smaller than 50 brake horsepower, they are exempt from the State Portable Engine ATCM. No other portable engines are expected to be used under the proposed project.

Portable Equipment Registration Program The statewide Portable Equipment Registration Program establishes a system to uniformly regulate portable engines and portable engine-driven equipment units. After being registered in this program, engines and equipment units may operate throughout the state without the need to obtain individual permits from air districts. Owners or operators of portable engines and certain types of equipment can voluntarily register their units under this program, to operate their equipment anywhere in the state. Operation of registered portable engines still may be subject to certain district requirements for reporting and notification. Engines with less than 50 brake horsepower are exempt from this program; therefore, some of the engines used for the proposed project would be exempt.

Senate Bill 709 Senate Bill 709 amends the Health and Safety Code to give the SJVAPCD more responsibility in terms of permitting, fee implementation, and agricultural assistance, as well as the authority to require the use of Best Available Control Technology (BACT) for existing emission sources, promote cleaner-burning alternative fuels, and encourage and facilitate ridesharing. Senate Bill 709 also amends the Vehicle Code to allow the SJVAPCD to adopt a surcharge on motor vehicle registration fees.

Regional Regulations and Policies

San Joaquin Valley Air Pollution Control District The SJVAPCD is responsible for (1) implementing air quality regulations, including developing plans and control measures for stationary sources of air pollution to meet the NAAQS and CAAQS, (2) implementing permit programs for the construction, modification, and operation of sources of air pollution, and (3)

enforcing air pollution statutes and regulations governing stationary sources. With CARB oversight, the SJVAPCD administers local regulations.

The SJVAPCD also coordinates transportation and air quality planning activities with the eight SJV transportation planning agencies. The SJVAPCD and the transportation planning agencies coordinate on mobile emissions inventory development, transportation control measure development and implementation, and transportation conformity issues.

The SJVAPCD has implemented several regulations and rules that are relevant to the proposed action described below.

SJVAPCD Rule 2201, New and Modified Stationary Source Review Rule 2201 applies to new or modified stationary sources and requires that sources not increase emissions above the specified thresholds. If the post-project stationary source potential to emit equals or exceeds the offset threshold levels, offsets will be required. New emergency generators at the pump stations would need to be permitted by the SJVAPCD and would have to comply with BACT requirements

SJVAPCD Rule 2280, Portable Equipment Registration Portable equipment used at project sites for less than 6 consecutive months must be registered with SJVAPCD. The district will issue the registrations 30 days after the receipt of the application.

SJVAPCD Rule 4201 and Rule 4202, Particulate Matter Concentration and Emission Rates Rule 4201 and Rule 4202 apply to operations that emit or may emit dust, fumes, or total suspended particulate matter. Particulate emissions from the project must be less than the specified emissions limit.

SJVAPCD Rule 8011, General Requirements–Fugitive Dust Emission Sources Fugitive dust regulations are applicable to outdoor fugitive dust sources. Operations, including construction operations, must control fugitive dust emissions in accordance with SJVAPCD Regulation VIII. According to Rule 8011, the SJVAPCD requires the implementation of control measures for fugitive dust emission sources. The project would also implement the mandatory control measures listed in Table 6-2 in the *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI) (SJVAPCD 2002) to reduce fugitive dust emissions. These measures are not considered mitigation measures under CEQA because they are required by law.

The SJVAPCD Rule 8011 requirements (some of which are not applicable to the project) are listed below:

- All disturbed areas, including storage piles, which are not being actively used for construction purposes, will be effectively stabilized for dust emissions using water or a chemical stabilizer/suppressant, or covered with a tarp or other suitable cover or vegetative ground cover.
- All on-site unpaved roads and offsite unpaved access roads will be effectively stabilized for dust emissions using water or a chemical stabilizer/suppressant.

- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities will be effectively controlled of fugitive dust emissions by utilizing an application of water or by presoaking.
- With the demolition of buildings up to six stories in height, all exterior surfaces of the building will be wetted during demolition.
- All materials transported off site will be covered or effectively wetted to limit visible dust emissions, and at least 6 inches of freeboard space from the top of the container will be maintained.
- All operations will limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.
- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, piles will be effectively stabilized to prevent fugitive dust emissions utilizing sufficient water or a chemical stabilizer/suppressant.
- Within urban areas, trackout will be immediately removed when it extends 50 or more feet from the site and at the end of each workday.
- Any site with 150 or more vehicle trips per day will prevent carryout and trackout.

SJVAPCD CEQA Guidelines The SJVAPCD prepared the GAMAQI to assist lead agencies and project applicants in evaluating the potential air quality impacts of projects in the SJVAB (SJVAPCD 2002). The GAMAQI provides SJVAPCD-recommended procedures for evaluating potential air quality impacts during the CEQA environmental review process. The GAMAQI provides guidance on evaluating short-term (construction) and long-term (operational) air emissions. The GAMAQI is currently being updated, but the most recent version (2002) was used in this evaluation and contains guidance on the following:

- Criteria and thresholds for determining whether a project may have a significant adverse air quality impact.
- Specific procedures and modeling protocols for quantifying and analyzing air quality impacts.
- Methods to mitigate air quality impacts.
- Information for use in air quality assessments and environmental documents that will be updated more frequently, such as air quality data, regulatory setting, climate, and topography.

SJVAPCD Plans Planning documents for pollutants for which the study area is classified as a federal nonattainment or maintenance area are developed by SJVAPCD and CARB and approved by EPA. The SJVAB is presently guided by the California SIP (CARB 2011b) and other planning documents. The following lists the relevant SIP documents for the SJVAB:

- 2007 O_3 Plan (SJVAPCD 2010a).
- 2004 Extreme O_3 Attainment Demonstration Plan (SJVAPCD 2010b).
- 2012 $PM_{2.5}$ Plan (SJVAPCD 2012a)
- 2004 Revision to the California State Implementation Plan for CO (CARB 2004).

- 2007 PM_{10} Maintenance Plan and Request for Redesignation (SJVAPCD 2009c).

2007 O_3 *Attainment Plan* The 2007 8-hour O_3 Air Quality Plan contained a comprehensive list of regulatory and incentive-based measures to reduce emissions of O_3 and PM precursors throughout the SJV. On December 18, 2007, the SJVAPCD Governing Board adopted the plan with an amendment to extend the rule adoption schedule for organic waste operations. On January 8, 2009, EPA found that the motor vehicle budgets for 2008, 2020, and 2030 from the 2007 8-hour O_3 Plan were not adequate for transportation conformity purposes (SJVAPCD 2010a).

On May 5, 2010, EPA reclassified the 8-hour O_3 nonattainment of the SJV from "serious" to "extreme." The reclassification requires the State of California to incorporate more stringent requirements, such as lower permitting thresholds and implementing reasonably available control technologies at more sources (EPA 2010).

2004 Extreme O_3 *Attainment Demonstration Plan* The SJVAPCD is required to submit a plan to meet the 1-hour O_3 standard for the SJV (EPA 2008). On March 8, 2010, EPA approved the SJV's 2004 Extreme O_3 Attainment Demonstration Plan for 1-hour O_3. Effective June 15, 2005, EPA revoked the federal 1-hour O_3 standard for certain areas, including the SJVAB (SJVAPCD 2010b); however, SJVAPCD is still required to submit a plan. Due to subsequent litigation, EPA withdrew its plan approval in November 2012 and the SJVAPCD and CARB withdrew this plan from consideration. SJVAPCD adopted the 2013 Plan for the Revoked 1-hour O_3 Standard in September 2013.

2012 PM2.5 Plan EPA designated the SJVAB as nonattainment under the 2006 $PM_{2.5}$ national standard on October 8, 2009. The SJVAPCD Governing Board adopted the 2012 $PM_{2.5}$ Plan following a public hearing in December 2012. On January 24, 2013, CARB adopted the plan and subsequently submitted the plan to EPA as a revision to California's SIP (CARB 2013b). This far-reaching plan provides measures designed to reduce emissions such that the valley will attain the 2006 $PM_{2.5}$ federal standards and the state standard as soon as possible. This plan satisfies the SIP requirements for compliance with the 2006 $PM_{2.5}$ standard. The NAAQS for annual $PM_{2.5}$ has recently been revised by EPA, and on January 12, 2015, EPA published a proposal to classify the SJV as a serious nonattainment area for $PM_{2.5}$.

2004 Revision to California State Implementation Plan for CO On July 22, 2004, CARB approved an update to the SIP that shows how 10 areas, including the SJVAB, will maintain the CO standard through 2018; revises emission estimates; and establishes new on-road motor vehicle emission budgets for transportation conformity purposes (CARB 2004). On November 30, 2005, EPA approved and promulgated the Implementation Plans and Designation of Areas for Air Quality Purposes (EPA 2005). This revision provided a 10-year update to the CO maintenance plan and established new CO motor-vehicle emissions budgets for the purposes of determining transportation conformity.

2007 PM_{10} *Maintenance Plan and Request for Redesignation* CARB approved SJVAPCD's 2007 PM_{10} Maintenance Plan and Request for Redesignation with modifications to the

transportation conformity budgets. On September 25, 2008, EPA redesignated the SJV as attainment for the PM_{10} NAAQS and approved the PM_{10} Maintenance Plan (SJVAPCD 2009).

Local Regulations and Policies

The General Plans for the Cities of Modesto and Turlock and Stanislaus County have applicable air quality policies. Policies for Merced and San Joaquin Counties are not discussed because air quality related activities and emissions would not occur in these counties.

City of Modesto The City of Modesto General Plan has the following applicable air quality policies:

> *Air Quality Policies (f):* The City of Modesto shall work with neighboring jurisdictions and affected agencies to address cross-jurisdictional and regional transportation and air quality issues.
> *Air Quality Policies (g):* The City of Modesto shall coordinate with other jurisdictions and other regional agencies in the San Joaquin valley to establish parallel air quality programs and implementation measures (trip reduction ordinances, indirect source programs, etc.).
> *Air Quality Policies (h):* The City of Modesto shall implement measures to reduce emissions associated with future development through the CEQA review process.
> *Air Quality Policies (i):* To be consistent with the SJVAPCD's Air Quality Guidelines for General Plans, the City of Modesto should consult with the SJVAPCD during CEQA review for discretionary projects with the potential for causing adverse air quality impacts.
> *Air Quality Policies (l):* The City of Modesto should encourage new air pollution sources such as, but not limited to, industrial, manufacturing, and processing facilities to be located an adequate distance (based on pollutant dispersion characteristics, site orientation, prevailing winds, etc.) from residential areas and other sensitive receptors.
> *Air Quality Policies (m):* The City of Modesto should implement measures to reduce the temporary, yet potentially significant, local air quality impacts from construction activities.
> *Air Quality Policies (n):* The City of Modesto shall require residential development projects and projects categorized as sensitive receptors (hospitals, schools, convalescent homes, etc.) to be located an adequate distance from existing and potential sources of toxic and/or odorous emissions such as freeways, major arterials, industrial sites, refuse transfer or disposal sites, and hazardous material locations.
> *Air Quality Policies (hh):* The City of Modesto should work with the SJVAPCD to reduce particulate emissions from construction, grading, excavation, and demolition to the maximum extent feasible in accordance with the requirements of SJVAPCD Regulation VIII. Regulation VIII was adopted to reduce the amount of particulate matter suspended in the atmosphere as a result of emissions generated from anthropogenic (man-made) fugitive dust sources.
> *Air Quality Policies (ii):* The City of Modesto shall require all access roads, driveways, and parking areas serving new commercial and industrial development to be constructed with materials that minimize particulate emissions in accordance with the requirements of SJVAPCD Regulation VIII and are appropriate to the scale and intensity of use.

Air Quality Policies (jj): The City of Modesto should reduce PM_{10} emissions from City of Modesto–maintained roads to the maximum extent feasible.

The following controls are required to be implemented at all construction sites:

Air Quality Policies (kk): All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, covered with a tarp or other suitable cover or vegetative ground cover.
Air Quality Policies (ll): All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
Air Quality Policies (mm): All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
Air Quality Policies (nn): With the demolition of buildings up to six stories in height, all exterior surfaces of the building shall be wetted during demolition.
Air Quality Policies (oo): When materials are transported off site, all material shall be covered, or effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.
Air Quality Policies (pp): All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday (the use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions.) (Use of blower devices is expressly forbidden.)
Air Quality Policies (qq): Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.
Air Quality Policies (rr): Within urban areas, trackout shall be immediately removed when it extends 50 or more feet from the site and at the end of each workday.
Air Quality Policies (ss): Any site with 150 or more vehicle trips per day shall prevent carryout and trackout.

The following measures should be implemented at construction sites when required to mitigate significant PM_{10} impacts (note, these measures are to be implemented in addition to Regulation VIII requirements):

Air Quality Policies (tt): Limit traffic speeds on unpaved roads to 15 mph; and
Air Quality Policies (uu): Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent (1%).

The following measures are strongly encouraged at construction sites that are large in area, located near sensitive receptors, or which for any other reason warrant additional emissions reductions:

Air Quality Policies (vv): Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site;
Air Quality Policies (ww): Install wind breaks at windward side(s) of construction areas;
Air Quality Policies (xx): Suspend excavation and grading activity when winds exceed 20 mph (regardless of windspeed, an owner/operator must comply with Regulation VIII's 20 percent (20%) opacity limitation); and
Air Quality Policies (yy): Limit the area subject to excavation, grading, and other construction activity at any one time.

City of Turlock The City of Turlock General Plan has the following applicable air quality policies:

8.1-a Prioritize Air Quality in Local Planning. Continue efforts to improve air quality in Turlock by integrating air quality analysis and mitigation in land use and transportation planning, environmental review, public facilities and operations, and special programs.
8.1-b Participate in Regional Efforts. Cooperate with the SJVAPCD and Stanislaus Council of Governments in developing and implementing air quality regulations and incentives.
8.1-c Coordination with Other Agencies. Work with neighboring jurisdictions and affected agencies to address cross-jurisdictional and regional transportation and air quality issues.
8.1-g Reduce Roadway Dust. Improve City roads to reduce dust to the greatest extent feasible by planting shoulders and medians. Dust from roadways contributes to PM_{10} pollution.
8.1-i Protect Residential Uses from Noxious Odors. Continue the present policy of not permitting any residential uses within a one-half mile radius of the Turlock Regional Water Quality Control Facility. Require that any new potential odor source locating within project screening trigger levels of sensitive receptors, as established by the SJVAPCD, undertake a detailed odor analysis.
8.1-l Use Air District Guidance in Environmental Review. Continue to use the SJVAPCD's Guide for Assessing and Mitigating Air Quality Impacts for determining and mitigating project air quality impacts and related thresholds of significance for use in environmental documents. Coordinate with the Air District, project applicants, and other interested parties, during pre-development consultation and negotiation over CEQA preparation.
8.1-m Minimize Roadway Dust. Require all access roads, driveways, and parking areas serving new development to be constructed with materials that minimize particulate emissions and are appropriate to the scale and intensity of use. To balance the goals of dust reduction and water infiltration, encourage the use of permeable paving or well-maintained gravel for parking spaces.
8.1-n Construction-Related Air Emissions Impacts. Continue to require mitigation measures as a condition of obtaining permits to minimize dust and air emissions impacts from construction. Require contractors to implement dust suppression measures during excavation, grading, and site preparation activities. Techniques may include, but are not limited to:

- Site watering or application of dust suppressants.
- Phasing or extension of grading operations.
- Covering of stockpiles.
- Suspension of grading activities during high wind periods (typically winds greater than 25 miles per hour).
- Revegetation of graded areas.

County of Stanislaus The County of Stanislaus General Plan has the following applicable air quality policies:

Policy Eighteen: The County will promote effective communication, cooperation and coordination among agencies involved in developing and operating local and regional air quality programs.

Implementation Measure 1: Refer discretionary projects under CEQA review to the SJVAPCD, neighboring jurisdictions and other affected agencies for review and comment.

Implementation Measure 2. Work with other agencies in the San Joaquin Valley to establish coordinated air quality programs and implementation measures.

Policy Nineteen: The County will strive to accurately determine and fairly mitigate the local and regional air quality impacts of proposed projects.

Implementation Measure 1. Require all development proposals, where appropriate, to include reasonable air quality mitigation measures.

Implementation Measure 2. Minimize case-by-case analysis of air quality impacts through the use of standard criteria for determining significant environmental effects, a uniform method of calculating project emissions.

3.3.3 Environmental Consequences

This section evaluates whether construction and operation of the proposed project and its actions would result in significant impacts related to air quality and odors.

Methodology for Analysis

As required by SJVAPCD, the California Emission Estimator Model (CalEEMod) version 2013.2.2 was used to quantify criteria pollutant emissions from the proposed project construction and operation activities. CalEEMod incorporates numerous default assumptions and CARB emission factors for on-road and off-road vehicles (EMFAC 2013 and In-Use Off-Road Equipment Inventory Model 2011). Below is a brief summary of the CalEEMod site-specific inputs used to estimate emissions from the proposed project. Further CalEEMod inputs and outputs are available in **Appendix B**.

The proposed Action alternatives are assumed to take approximately 1.5 years to construct from summer of 2016 through spring of 2018. The anticipated construction schedules for the Combined Alignment and Single Alignment alternatives were provided (see Appendix C) and are summarized in **Table 3.3-5**. In general, it was assumed that five construction crews would be working simultaneously. Details of construction schedule and equipment have not been developed for the PID Conveyance Alternative, which would require construction of 30,100 feet of pipeline, less than half the length of the pipeline required for the Combined Alignment Alternative. The PID Conveyance Alternative would not require construction of a river crossing, but would require construction of an expanded intake facility and new pumps at the existing PID intake. Emissions during construction are thus conservatively estimated to be about half of the emissions associated with construction of the Combined Alignment Alternative.

Table 3.3-5: Construction Schedule

Phase Name	Phase Type	Phase Start Date	Phase End Date	Days per Week	Number of Days
Combined Alignment	**(Alternative 1)**				
Construction Weir	Site Preparation	6/20/2016	07/15/2016	5	20
Construction Weir	Grading	07/18/2016	09/09/2016	5	40
Construction Weir	Building Construction	09/12/2016	11/18/2016	5	50
Construction Weir	Paving	11/21/2016	12/02/2016	5	10
Construction Pipe	Site Preparation	6/20/2016	07/14/2016	5	19
Construction Pipe	Trenching	07/15/2016	10/25/2016	5	73
Construction Pipe	Building Construction	10/26/2016	12/30/2016	5	48
Construction Pipe	Paving	01/02/2017	02/08/2017	5	28
Pump Station	Construction	06/20/2016	09/09/2016	5	60
Pump Station	Equipment Installation	09/12/2016	12/02/2016	5	60
River Crossing	Site Preparation	06/20/2016	06/02/2017	5	240
Water Truck	Grading	06/20/2016	03/31/2018	5	450
Separate Alignment	**(Alternative 2)**				
Construction Weir Modesto	Site Preparation	06/20/2016	07/15/2016	5	20
Construction Weir Modesto	Grading	07/18/2016	09/09/2016	5	40
Construction Weir Modesto	Building Construction	09/12/2016	11/18/2016	5	50
Construction Weir Modesto	Paving	11/21/2016	12/02/2016	5	10
Construction Weir Turlock	Site Preparation	12/05/2016	12/23/2016	5	20
Construction Weir Turlock	Grading	12/26/2016	02/17/2017	5	40
Construction Weir Turlock	Building Construction	02/20/2017	04/28/2017	5	50
Construction Weir Turlock	Paving	05/01/2017	05/12/2017	5	10
Construction Pipe	Site Preparation	06/20/2016	07/14/2016	5	19
Construction Pipe	Trenching	07/15/2016	11/11/2016	5	86
Construction Pipe	Building Construction	11/14/2016	01/31/2017	5	57
Construction Pipe	Paving	01/2/2017	02/8/2017	5	28
Pump Station Modesto	Site Preparation	06/20/2016	09/09/2016	5	60
Pump Station Modesto	Building Construction	09/12/2016	12/02/2016	5	60
Pump Station Turlock	Site Preparation	06/20/2016	10/21/2016	5	90
Pump Station Turlock	Building Construction	10/24/2016	1/13/2017	5	60
River Crossing Modesto	Trenching	06/20/2016	6/2/2017	5	240
River Crossing Turlock	Trenching	06/05/2017	05/04/2018	5	240
Water Truck	Grading	06/20/2016	03/31/2018	5	450

Source: **Appendix B, Appendix C**

The equipment anticipated to be used during each construction phase is shown in **Table 3.3-6 and 3.3-7**. The equipment was mapped to an appropriate CalEEMod equipment type and default horsepower and load factors were utilized unless it was mapped to a general equipment category which used a typical equipment size that may be used for the proposed project construction activities.

The number of worker and material hauling trips is shown in **Table 3.3-8**. Worker trips were assumed to be 20 miles one-way and, because construction materials are expected to be available

within a 30-mile radius of the construction area, material hauling trips were assumed to be 30 miles one way.

Once the baseline construction emissions associated with the alternatives were estimated, mitigation options were evaluated to see if on-site mitigation would be possible to reduce emissions below the significance thresholds. First, the change in estimated impact by requiring phased trips for all trucks hauling trench spoil and backfill, such that all trucks importing backfill material to the site would leave with excavated material that needs to be exported, was investigated. This substantially reduced the number of trench material hauling trips originally envisioned. Second, the change in estimated impact of using newer engines was investigated. Under this scenario, it was assumed that all off-road vehicle engines above 50 horsepower would meet EPA Tier 3 engine standards. The use of newer Tier 3 engines compared to the average fleet mix resulted in lower emissions for several criteria pollutants, particularly NO_x.

Table 3.3-6: Construction Equipment Total Hours of Use Combined Alignment

Off-Road Equipment Type	Horse-power	Load Factor	Total Equipment Hours Phase Combined Alignment											
			Weir Site Prep	Weir Excava-tion	Weir Construc-tion	Weir Paving	Pipe Site Prep	Pipe Trench-ing	Pipe Installa-tion	Pipe Backfill and Paving	Pump Station Construc-tion	Pump Station Equip-ment Install	River Cross-ing	Water Truck
Air Compressors	78	0.48			50									
Bore/Drill Rigs	60	0.5											360	
Bore/Drill Rigs	205	0.5		240										
Cement and Mortar Mixers	9	0.56				240								
Concrete/Industrial Saws	81	0.73		320										
Cranes	226	0.29			200						240	240	960	
Excavators	162	0.38		80				1168			480		1920	
Forklifts	89	0.2			600									
Graders	174	0.41	160					1168	768					
Off-Highway Trucks	400	0.38								896			720	1800
Other Construction Equipment	104	0.42									480		480	
Other Construction Equipment	215	0.42											480	
Pavers	125	0.42				70								
Pumps	84	0.74			100									
Rollers	80	0.38				70				448				
Rubber Tired Dozers	255	0.4		40			304	1168			480		480	
Rubber Tired Loaders	199	0.36									480	120	480	
Scrapers	361	0.48					304	2336	1536					
Signal Boards	6	0.82					1520	5840	3840	2240				
Tractors/Loaders/Backhoes	97	0.37	160	480	800	70		2336	1536	896				
Trenchers	80	0.5							768					

Table 3.3-7: Construction Equipment Total Hours of Use Separate Alignment

Off-Road Equipment Type	Horse power	Load Factor	Total Equipment Hours Separate Alignment																			
			Weir Site Prep	Weir Excavation	Weir Construction	Weir Paving	Weir Site Prep Turlock	Weir Excavation Turlock	Weir Construction Turlock	Weir Paving Turlock	Pipe Site Prep	Pipe Trenching	Pipe Installation	Pipe Backfill and Paving	Pump Station Construction	Pump Station Equipment Install	Pump Station Construction Turlock	Pump Station Equipment Install Turlock	River Crossing Modesto	River Crossing Turlock	Water Truck Modesto	Water Truck Turlock
Air Compressors	78	0.48			50				50													
Bore/Drill Rigs	60	0.5																	360	360		
Bore/Drill Rigs	205	0.5		240				240														
Cement and Mortar Mixers	9	0.56				240				240												
Concrete/ Industrial Saws	81	0.73		320				320														
Cranes	226	0.29			200				200						240	240	360	240	960	960		
Excavators	162	0.38		80				80				1376			480		1440		1920	1920		
Forklifts	89	0.2			600				600													
Graders	174	0.41	160				160					1376	912									
Off Highway Trucks	400	0.38												896			972		720	720	1800	1800
Other Equipment	104	0.42													480		720		480	480		
Other Equipment	215	0.42																	480	480		
Pavers	125	0.42				70				70												
Pumps	84	0.74			100				100													
Rollers	80	0.38				70				70				448								
Rubber Tired Dozers	255	0.4		40				40			304	1376			480		243		480	480		
Rubber Tired Loaders	199	0.36													480	120	720	120	480	480		

Off-Road Equipment Type	Horse power	Load Factor	Total Equipment Hours Separate Alignment																		
			Weir Site Prep	Weir Excavation	Weir Construction	Weir Paving	Weir Site Prep Turlock	Weir Excavation Turlock	Weir Construction Turlock	Weir Paving Turlock	Pipe Site Prep	Pipe Trenching	Pipe Installation	Pipe Backfill and Paving	Pump Station Construction	Pump Station Equipment Install	Pump Station Construction Turlock	Pump Station Equipment Install Turlock	River Crossing Modesto	River Crossing Turlock	Water Truck Modesto	Water Truck Turlock
Scrapers	361	0.48									304	2752	1824									
Signal Boards	6	0.82									1520	6880	4560	2240								
Tractors/ Loaders/ Backhoes	97	0.37	160	480	800	70	160	480	800	70		2752	1824	896								
Trenchers	80	0.5											912									

Table 3.3-8: Worker and Material Hauling Trips

Phase Name	Worker Trips Per Day	Total Material Hauling Trips
Combined Alignment (Alternative 1)		
Construction Weir	14	128 unphased 64 phased
Construction Pipe	32	15,118 unphased 8,400 phased
Pump Station Construction	18	60 unphased 42 phased
River Crossing	24	(accounted for in construction pipe)
Water Truck	24	0
Separate Alignment (Alternative 2)		
Construction Weir	14	128 unphased 64 phased
Construction Weir Turlock	14	128 unphased 64 phased
Construction Pipe	32	22,996 unphased 12,778 phased
Pump Station Modesto	18	60 unphased 42phased
Pump Station Turlock	18	86 unphased 50 phased
River Crossing Modesto	24	(accounted for in construction pipe)
River Crossing Turlock	24	(accounted for in construction pipe)
Water Truck Modesto	2	0
Water Truck Turlock	2	0

Source: **Appendix B, Appendix C**

Regarding operational emissions, only sporadic vehicle trips would be needed for maintenance and inspection. Since the amount of trips is not known, but likely substantially less than the small project threshold established by SJVAPCD, no operational emissions from vehicles were estimated. The pumps would be electricity-driven, and electricity was conservatively assumed to be supplied by Modesto Irrigation District. While the NVRRWP facilities may use electricity from the TID, using the Modesto Irrigation District is more conservative since it has slightly higher GHG emissions per unit of electricity, and final determination of the source of electricity has not been made. No criteria pollutants are associated with electricity use, but indirect GHG emissions were estimated using CalEEMod. The single alignment alternative may also require an emergency generator at the Turlock Harding Drain Bypass Pipeline. This was not evaluated in CalEEMod since this a permitted stationary source and would undergo permitting procedures that are assumed to result in emissions below the significance thresholds.

Regarding other operational impacts associated with the proposed project and occurring in the project area, impact significance was determined qualitatively by considering the project emission sources and duration, and/or by applying the SJVAPCD's Small Project Analysis Level (SJVAPCD 2012b) trip generation rates. The SJVAPCD has established thresholds of significance for criteria pollutant emissions, which are based on SJVAPCD New Source Review

offset requirements for stationary sources. Using project type and size, the SJVAPCD has estimated emissions and determined a size below which it is reasonable to conclude that a project would not exceed applicable thresholds of significance for criteria pollutants.

Thresholds of Significance

Consistent with Appendix G of the *CEQA Guidelines* an air quality impact would be considered significant if the project would:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Violate any air quality standard established by EPA or CARB, or contribute substantially to an existing or projected air quality violation, in comparison to the SJVAPCD thresholds below.
- Expose sensitive receptors to substantial air pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

GAMAQI Thresholds The SJVAPCD has developed quantifiable significance thresholds to address the potential impacts identified in the CEQA Guidelines. The 2002 SJVAPCD GAMAQI listed quantifiable thresholds for operational VOC and NO_x only, but it makes reference to SJVAPCD stationary source offset requirements. The Draft 2012 GAMAQI reiterates the use of stationary source requirements as a threshold and specifically lists the values. SJVAPCD states that a significant impact would occur if implementation of the proposed project would result in emissions that exceed the following SJVAPCD thresholds shown in **Table 3.3-9**.

Table 3.3-9: SJVAPCD CEQA Significance Thresholds

Pollutant	Construction Emissions (tons per year)	Operational Emissions (tons per year)	
		Permitted Equipment and Activities	Non-Permitted Equipment and Activities
CO	100	100	100
NO_x	10	10	10
VOC	10	10	10
SO_x	27	27	27
PM_{10}	15	15	15
$PM_{2.5}$	15	15	15

Source: SJVAPCD 2014b.

These thresholds are applied separately to construction and operations emissions, even if there is overlap in the emissions. Therefore, for this analysis a comparison of project emissions to the thresholds shown in **Table 3.3-9** is used to determine whether the proposed Action alternatives would violate ambient air quality standards.

According to SJVAPCD's guidance, operation and construction emissions are considered to be a less-than-significant impact if fugitive dust (PM_{10} and $PM_{2.5}$) emissions are below the significance level listed above. In addition, SJVAPCD Regulation VIII requires all projects that involve earthmoving or travel on unpaved roads to implement fugitive dust control measures;

implementation of the control measures would constitute sufficient measures to reduce PM_{10} and $PM_{2.5}$ impacts to a level considered less than significant.

Quantitative TAC thresholds of significance identified in the GAMAQI include:

- Probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in a million.
- Ground-level concentrations of non-carcinogenic TACs would result in a Hazard Index greater than 1 for the MEI.

However, since locations of the specific emissions would be continually moving in time during pipeline construction and the project would not result in lifetime exposure to hazardous air pollutants, a qualitative analysis was performed to determine the impact significance of potential TAC emissions. For the proposed project construction and operation, health risks from TACs were evaluated by identifying the project's potential to generate TAC emissions and by determining whether sensitive receptors could be affected by those emissions.

To determine whether the project is consistent with existing air quality plans, the analysis examines whether the project is consistent with relevant general or specific plans upon which the air plans are based.

Small Project Analysis Level SJVAPCD has established screening levels based on project types (land use) and sizes (e.g., square footage, housing units). Projects below these sizes are considered to have emissions below the numeric thresholds of significance for criteria pollutants. The proposed project is categorized as General Light Industrial Land Use. Projects that are at or below these criteria would result in less-than-significant impacts:

- Industrial land uses: result in vehicle trips of 1,506 trips/day.
- General light industrial land uses: construct 510,000 square feet.

Impacts and Mitigation Measures

Impact AIR-1 Construction emissions of criteria pollutants and precursors

No Action Alternative Under the No Action Alternative there would be no construction required. There would be no construction emissions and therefore no impact on air quality.

Combined Alignment Alternative (Alternative 1) Under standard equipment assumptions including unphased material hauling trips, the anticipated construction emissions associated with this alternative are shown in **Table 3.3-10**. Based on comparison to the significance thresholds, all pollutants except NO_x are below the construction emission thresholds. Thus, NO_x emissions would be considered significant for the Combined Alignment Alternative construction without mitigation.

Table 3.3-10: Combined Alignment Alternative Construction Emissions (tons per year)

Year	Scenario[1]	VOC[2]	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
2016	Unmitigated	1.45	16.34	11.09	0.021	1.61	1.03
	Phased Reduction		(1.32)				
	Tier 3 Reduction		(7.67)				
	Mitigated Potential		7.35				
2017	Unmitigated	0.17	1.72	1.02	.0025	0.20	0.087
	Phased Reduction		(0)				
	Tier 3 Reduction		(0.69)				
	Mitigated Potential		1.03				
2018	Unmitigated	0.013	0.14	0.072	.00023	0.098	0.015
	Phased Reduction		(0)				
	Tier 3 Reduction		(.036)				
	Mitigated Potential		0.10				
Significance	Threshold-CEQA	10	10	100	27	15	15

Notes:

1. The amount of reduction that occurs as a result of mitigation (material hauling phasing or Tier 3 equipment) is shown in parentheses for NO_x only. There may be reductions in other pollutants as well and a minor increase in CO but that would not increase emissions above significance thresholds. Calculations are shown in **Appendix B**.

2. Reactive Organic Gases (ROGs) are a subset of VOCs. Emissions level for VOCs includes all project emissions of ROG; for purposes of this analysis they are considered equal.

Note: Lead emissions are not quantified as they are negligible due to fuel regulations limiting lead content in fuel.

Source: **Appendix B**

To determine if mitigation is available to reduce NO_x emissions through on-site measures to below the NO_x construction significance threshold of 10 tons per year, the emissions reduction associated with both phased material hauling trips and use of Tier 3 engines for all equipment above 50 horsepower was estimated using CalEEMod. Based on the reductions that would occur from these activities, shown in **Table 3.3-10**, emissions could be reduced with on-site measures to below the 10 tons per year NO_x significance threshold. However, because detailed design is not complete it is possible that there could be changes in the specific construction equipment required, with resulting changes in estimated emissions. Since this project would be subject to General Conformity, if emissions cannot be reduced to below 10 tons per year on-site, emissions would need to be off-set to **zero tons per year** according to acceptable conformity requirements. Thus, **Mitigation Measure AIR-1** would need to be implemented, if necessary, to mitigate emissions on-site to below 10 tons per year or to offset emissions to zero tons per year by funding SJVAPCD's Emission Reduction Incentive Program (ERIP) which provides verified pound-for-pound offsets within the SJVAB. With implementation of **Mitigation Measure AIR-1**, project impacts would be less than significant.

Separate Alignment Alternative (Alternative 2) Under standard equipment assumptions including unphased material hauling trips, the anticipated construction emissions associated with this alternative are shown in **Table 3.3-11**. Based on comparison to significance thresholds, all pollutants except NO_x would be below the construction emission thresholds. Thus, NO_x emissions would also be considered significant for the Separate Alignment Alternative construction. Based on the reductions that would occur from phased hauling and use of Tier 3 engines, as shown in **Table 3.3-11**, emissions for Alternative 2 could be reduced with on-site measures to below the 10 tons per year NO_x significance thresholds. To ensure General Conformity, **Mitigation Measure AIR-1** would also be implemented for Alternative 2, if necessary. With implementation of **Mitigation Measure AIR-1**, the project impacts would be less than significant.

PID Conveyance Alternative (Alternative 3) Alternative 3 would require construction of 30,100 feet of pipeline, which is less than half the length of the pipeline required for Alternative 1. Alternative 3 would not require construction of a river crossing, but would require construction of an expanded intake facility and new pumps at the existing PID intake. Emissions during construction are thus conservatively estimated to be about half of the emissions associated with construction of the Alternative 1. Because details of construction schedule and equipment have not been developed, although emissions are likely to be less than Alternative 1, it is assumed that mitigation may still be required to ensure that emissions are not significant.

Significance Determination before Mitigation Potentially significant for Alternatives 1, 2 and 3; no impact for the No Action Alternative.

Table 3.3-11: Separate Alignment Alternative Construction Emissions (tons per year)

Year	Scenario[1]	VOC	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
2016	Unmitigated	1.82	20.74	13.95	0.029	1.90	1.23
	Phased Reduction		(2.02)				
	Tier 3 Reduction		(9.14)				
	Mitigated Potential		9.58				
2017	Unmitigated	0.59	6.25	3.98	.0078	0.57	0.40
	Phased Reduction		(0)				
	Tier 3 Reduction		(2.88)				
	Mitigated Potential		3.37				
2018	Unmitigated	0.042	0.43	0.27	.00078	0.034	0.020
	Phased Reduction		(0)				
	Tier 3 Reduction		(0.16)				
	Mitigated Potential		0.27				
Significance	Threshold-CEQA	10	10	100	27	15	15

Notes:

1. The amount of reduction that occurs as a result of mitigation (material hauling phasing or Tier 3 equipment) is shown in parentheses for NO_x only. There may be reductions in other pollutants as well and a minor increase in CO but that would not increase emissions above significance thresholds. Calculations are shown in **Appendix B**.

Source: **Appendix B**

Mitigation Measures **Mitigation Measure AIR-1: Reduce NO_x Emissions (Alternatives 1, 2 and 3)** NO_x emissions associated with construction activities shall be reduced to 10 tons per year through on-site equipment and hauling vehicle mitigation measures to the extent feasible. All vehicles and equipment used during construction shall be maintained and properly tuned in accordance with the manufacturer's specifications to perform at EPA certification levels and to perform at verified standards applicable to retrofit technologies. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure CCR Title 13 Section 2485). Emissions reduction methods may be chosen from any combination of the following measures:

- Minimize the use and trips of construction equipment and trucks by consolidating trips and loads to the extent feasible.
- Minimize unnecessary idling by shutting off equipment and trucks when not in use to the extent feasible.

- Conduct periodic unscheduled inspections to ensure equipment is maintained properly and in accordance with manufacturer's recommendations and excessive idling is not occurring.
- Prepare inventory of all equipment prior to construction consistent with SJVAPCD Indirect Source Review Rule.
- Develop a construction, traffic, and parking management plan that minimizes traffic interference and maintains traffic flow.

The contractor will be encouraged to implement the following measures to the extent feasible before implementation of off-site mitigation measures and identify why the measures are infeasible if not implemented in particular due to economic infeasibility:

- Use of alternative fueled vehicles.
- Use of newer tier engines such as EPA Tier 4 exhaust emissions standards for heavy-duty nonroad compression ignition engines.
- Use of newer on-highway vehicles that meet the EPA exhaust emissions standards for model year 2010 and newer heavy-duty on-highway compression ignition engines
- Use of phased material hauling trips.
- Use of after-market pollution control devices to reduce emissions.
- Lengthening the construction schedule to reduce the annual intensity of construction activities.

If all feasible on-site measures have been implemented and annual emissions are anticipated to still be above 10 tons per year for NO_x, then the project proponents shall enter into a Voluntary Emissions Reduction Agreement (VERA) with SJVAPCD. The VERA would provide pound-for-pound mitigation of air emissions increases down to a net zero emissions per year as required under general conformity through a process that develops, funds, and implements emission reduction projects. SJVAPCD would serve as administrator of the emissions reduction projects and verifier of the successful mitigation effort.

Under the VERA, the project proponent shall agree to mitigate project-specific emissions by providing funds for the SJVAPCD's ERIP. The funds would be disbursed by ERIP in the form of grants for projects that achieve emission reductions. Types of emission reduction projects that have been funded in the past include electrification of stationary internal combustion engines (such as agricultural irrigation pumps), replacing old heavy-duty trucks with new, cleaner, more efficient heavy-duty trucks, and replacement of old farm tractors. The initial agreement would generally be based on the projected maximum emissions increases as calculated by a SJVAPCD-approved air quality impact assessment, and contain the corresponding maximum fiscal obligation. However, because the goal is to mitigate actual emissions, the SJVAPCD has designed flexibility into the VERA such that the final mitigation would be based on actual emissions related to the project as determined by actual equipment used, hours of operation, and duration of work. After the project is mitigated, the SJVAPCD would certify to the lead agency that the mitigation is completed, providing the lead agency with an enforceable mitigation measure demonstrating that project-specific emissions have been mitigated to less than significant.

Significance after Mitigation Less than significant for all Action Alternatives.

Impact AIR-2 Local community risks and hazards during construction

No Action Alternative Under the No Action Alternative, there would be no construction and no construction emissions. There would be no impact on air quality.

Combined Alignment Alternative (Alternative 1) The closest sensitive receptors to construction under this alternative consist of several residences located adjacent to the roadways along the pipeline alignments. No sensitive receptors are located near the pump station location. The pollutants of concern that would affect sensitive receptors would be particulates, specifically PM_{10} and $PM_{2.5}$ contained in fugitive dust, and DPM from construction equipment. The control of particulates and fugitive dust is discussed above in **Impact AIR-1** and SJVAPCD Regulation VIII, which would be implemented during construction activities to minimize exposure to fugitive dust. The construction period for the proposed Action Alternatives, including this one, is approximately 1.5 years. As the construction phase of this alternative would be continually moving in location along the pipeline alignment, would not involve the use of substantial quantities of construction equipment, it would not emit substantial quantities of DPM to any particular location. DPM exposure of 1.5 years from construction equipment is not quantified, as cancer potency factors are based on life-time exposure and there is considerable uncertainty in trying to evaluate the cancer risk from projects that would only last a small fraction of a lifetime (OEHHA 2012). Due to the short duration of the project, this alternative would not pose long-term or significant health risks to nearby residents and workers in the vicinity of the construction activities. Thus, the impact on sensitive receptors from fugitive dust and other pollutants would be less than significant.

Separate Alignment Alternative (Alternative 2) Emissions would be as described for the Alternative 1, though the specific receptors would be somewhat different. Residences along the northern alignment would be the same, but there would be additional residents along the southern alignment segment that would be affected by this alternative. However, similar to the Alternative 1, construction activities for this alternative would also be continually moving in location along the pipeline alignments, would not involve the use of substantial quantities of construction equipment, and would not emit substantial quantities of DPM to any particular location. Thus, this alternative would also not pose long-term or significant health risks to nearby residents and workers in the vicinity of proposed construction activities and the impact on sensitive receptors from fugitive dust and other pollutants would be less than significant.

PID Conveyance Alternative (Alternative 3) Impacts would be similar to those described above for the other two Action Alternatives. Thus, this alternative would also not pose long-term or significant health risks to nearby residents and workers in the vicinity of construction activities and the impact on sensitive receptors from fugitive dust and other pollutants would be less than significant.

Significance Determination before Mitigation Less than significant for Alternatives 1, 2 and 3; no impact for the No Action Alternative.

Mitigation Measures No mitigation required.

Impact AIR-3 Odors generated during project construction
No Action Alternative Under the No Action Alternative, there would not be any construction and therefore no additional odors could occur.

Combined Alignment Alternative (Alternative 1) Construction activities under this alternative would not result in the generation of permanent or long-term objectionable odors. Odors associated with the intermittent operation of diesel-powered equipment might be detected by nearby sensitive receptors, but these odors would be of short duration and would not affect a substantial number of people. Soil excavated or brought up from trenchless construction may contain organic material that is decaying that may create an objectionable odor. The intensity of the odor perceived by a receptor depends on the distance of the receptor from the construction activity and the amount and quality of the exposed soil material. The location of the construction activities would be limited and in rural areas not located near large numbers of receptors. Exposed soil would be either quickly reused on-site or hauled and disposed of properly off-site. Therefore any odor that could be produced would be short-term and temporary. This impact would be less than significant.

Separate Alignment Alternative (Alternative 2) Impacts would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Impacts would be the same as Alternative 1.

Significance Determination before Mitigation Less than significant for Alternatives 1, 2 and 3; no impact for the No Action Alternative.

Mitigation Measures No mitigation required.

Impact AIR-4 Direct emissions of criteria pollutants during project operation
No Action Alternative Under the No Action Alternative, treated waste water would continue to be discharged to the San Joaquin River or disposed of on land. There would be no change in operational emissions from current practices and thus no impact on air quality.

Combined Alignment Alternative (Alternative 1) Under Alternative 1, there would only be occasional trips associated with pipeline maintenance and inspection. The SJVAPCD's small project analysis level guidance states that general industrial activities generating less than 1,506 trips per day are assumed to have a less-than-significant impact on air quality, and criteria pollutant emissions associated with these activities would not need to be quantified. The proposed project's activities would result in a fraction of this truck trip significance threshold and these limited maintenance trips would not be expected to conflict with or obstruct implementation of the local air districts' air quality plans or increase criteria pollutant emissions above the significant thresholds. The impact would be less than significant.

Separate Alignment Alternative (Alternative 2) Under Alternative 2, similar to Alternative 1, there would also be occasional trips associated with pipeline maintenance and inspection. In addition, the pump station at the Harding Drain Bypass Pipeline would require an emergency generator that would be permitted under SJVAPCD stationary source permits, which require

sources to achieve BACT and offset any emissions above the significance thresholds. The only operational emissions that would routinely occur would be for periodic testing at this facility. Given the small number of maintenance trips and the limited use of the emergency generator for testing along with permit requirements, this alternative is not expected to increase criteria pollutant emissions above significant thresholds. The impact would be less than significant.

PID Conveyance Alternative (Alternative 3) Under Alternative 3, similar to the other two Action alternatives, there would be occasional trips associated with pipeline maintenance and inspection. In addition, the pump at the PID Intake may require an emergency generator that would be also be permitted under SJVAPCD stationary source permits. Similar to the Alternative 2, the only operational emissions that would routinely occur would be periodic testing of the emergency generator. This is also not expected to increase criteria pollutant emissions above significant thresholds and the impact would be less than significant.

Significance Determination before Mitigation Less than significant for Alternatives 1, 2 and 3; no impact for the No Action Alternative.

Mitigation Measures No mitigation required.

Impact AIR-5 Local community risks and hazards during project operation
No Action Alternative Under the No Action Alternative, treated waste water would continue to be discharged to the San Joaquin River or disposed of on land. There would be no change from current operations and thus no new operational emissions would be generated.

Combined Alignment Alternative (Alternative 1) DPM from truck exhaust represents the primary health risk from operation of the pipeline. Truck exhaust would only be emitted during maintenance and pipeline inspection activities for this alternative, which are anticipated to be minimal. Given the small number of trips and the fact that CARB regulations limit diesel truck idling to 5 minutes or less, would not expose any nearby residents or other sensitive receptors to significant health risks during project operation and impacts are considered less than significant.

Separate Alignment Alternative (Alternative 2) Impacts would be similar to Alternative 1. The emergency generator would only operate under emergency situations and for periodic testing. The emergency generator would be a permitted source under SJVAPCD regulations which require BACT standards and minimization of health risks to sensitive receptors. Given the minimal amount of trucks and permit requirements for the emergency generator, the impacts to the health of sensitive receptors are considered less than significant.

PID Conveyance Alternative Impacts under this alternative would be similar to the impacts for the Alternative 2. Given the minimal amount of trucks and permit requirements for the emergency generator, the impacts to the health of sensitive receptors are considered less than significant.

Significance Determination before Mitigation Less than significant for Alternatives 1, 2 and 3; no impact for the No Action Alternative.

Mitigation Measures No mitigation required.

Impact AIR-6 Odor emissions during project operation
No Action Alternative Under the no action alternative, treated waste water would continue to be discharged to the San Joaquin River or disposed of on land. Effluent proposed for discharge would undergo tertiary treatment. Water that has undergone this level of treatment generally does not have any offensive odors associated with it, and impacts would be less than significant.

Combined Alignment Alternative (Alternative 1) Effluent proposed for discharge into the DMC under this alternative would undergo tertiary treatment prior to discharge. Water that has undergone this level of treatment generally does not have any offensive odors associated with it. Therefore, impacts related to odor under this alternative would be considered less than significant.

Separate Alignment Alternative (Alternative 2) Impacts related to odor would be the same as Alternative 1.

PID Conveyance Alternative (Alternative 3) Effluent proposed for discharge into the San Joaquin River under this alternative would undergo tertiary treatment prior to discharge. Water that has undergone this level of treatment generally does not have any offensive odors associated with it. Therefore, impacts related to odor under this alternative would be considered less than significant.

Significance Determination before Mitigation Less than significant for Alternatives 1, 2 and 3 and the No Action Alternative.

Mitigation Measures No mitigation required.

Impact AIR-7 Consistency with applicable air quality plans
No Action Alternative Under the No Action Alternative, treated wastewater would continue to be discharged to the San Joaquin River or disposed of on land. There would be no change in emissions from current practice and current practice is consistent with SJVAPCD Air Quality Attainment Plan.

Combined Alignment Alternative (Alternative 1) Alternative 1 would result in construction of pipelines and modification of an existing pump station. Specific air quality impacts related to criteria pollutants are discussed in **Impact AIR-1** and **AIR-4**. The project includes relevant mitigation requirements that are contained within the SJVAPCD Air Quality Attainment Plan and would comply with SJVAPCD regulations. Therefore, Alternative 1 would not conflict with or obstruct the SJVAPCD Air Quality Attainment Plans and the impact would be less than significant.

Separate Alignment Alternative (Alternative 2) Alternative 2 would result in construction of pipelines, modification of an existing pump station, and construction of a new pump station. Impacts would be similar to those of Alternative 1. Alternative 2 would not conflict with or

obstruct the SJVAPCD Air Quality Attainment Plans and the impact would be less than significant.

PID Conveyance Alternative (Alternative 3) This alternative would result in construction of pipelines and modification of an existing intake, including construction of a new pump. Impacts would be similar to those of Alternatives 1 and 2, with slightly lower emissions during construction. This alternative would not conflict with or obstruct the SJVAPCD Air Quality Attainment Plans and the impact would be less than significant.

Significance Determination before Mitigation Less than significant for Alternatives 1, 2 and 3; no impact for the No Action Alternative.

Mitigation Measures No mitigation required.

Impact AIR-8 Cumulative Impact on Air Quality The SJVAB is currently designated as a nonattainment area for federal and state O_3 and $PM_{2.5}$ standards, and state PM_{10} standards. The SJVAPCD has adopted a cumulative threshold of significance of 10 tons per year for O_3 precursors (VOC and NO_x) and 15 tons per year for PM_{10} and $PM_{2.5}$.

No Action Alternative Past, present, and probable future projects could have a significant cumulative impact on air quality in the project area. However, since there would be no new emissions associated with the No Action Alternative, this alternative would not contribute to cumulative air quality impacts.

Combined Alignment Alternative (Alternative 1) Operation of this alternative would result in emissions of PM and exhaust gases that would not exceed applicable criteria. However, it is possible that construction activities associated with this alternative would exceed the criteria for NO_x, which is considered a considerable contribution to a significant cumulative impact. Implementation of **Mitigation Measure AIR-1** would reduce construction air emissions to levels below SJVAPCD's construction significance thresholds. Therefore, with implementation of **Mitigation Measure AIR-1**, the incremental contribution of this alternative would not be cumulatively considerable.

Separate Alignment Alternative Impacts under this alternative would be similar to Alternative 1. Implementation of **Mitigation Measure AIR-1** would reduce construction air emissions to levels below SJVAPCD's construction significance thresholds. Therefore, with implementation of **Mitigation Measure AIR-1**, the incremental contribution of this alternative would not be cumulatively considerable.

PID Conveyance Alternative (Alternative 3) Impacts would be similar to those of Alternatives 1 and 2, with slightly lower emissions during construction. Implementation of **Mitigation Measure AIR-1** would reduce construction air emissions to levels below SJVAPCD's construction significance thresholds. Therefore, with implementation of **Mitigation Measure AIR-1**, the incremental contribution of this alternative would not be cumulatively considerable.

Significance Determination before Mitigation Potentially significant for Alternatives 1, 2 and 3; no impact for the No Action Alternative.

Mitigation Measures **Mitigation Measure AIR-1**.

Significance Determination after Mitigation Less than significant.

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