



Friant-Kern Canal Pump-Back Project

Environmental Impact Report

Draft

October 2024



Mission Statement

The mission of the Friant Water Authority is to operate the Friant-Kern Canal and to represent members in federal or state policy, and in political and operational decisions that could affect the Friant Division's water supply. Friant's goal is to provide dependable, sustainable water from Millerton Lake to Friant Contractors.

Friant-Kern Canal Pump-Back Project Draft Environmental Impact Report

Lead Agency: Friant Water Authority

The project is located in the following counties in California: Fresno, Kern, Madera, Merced, and Tulare.

State Clearinghouse Number: 2024051211

ABSTRACT

The Friant-Kern Canal Pump-Back Project Draft Environmental Impact Report (EIR) evaluates facilitating the recirculation of recaptured Restoration Flows released from Millerton Lake for the San Joaquin River Restoration Program and other waters obtained by Friant Division Contractors to increase operational flexibility and the long-term reliability of water supplies conveyed through the Friant-Kern Canal (FKC). To achieve this, the Draft EIR evaluates the proposed project, which would construct three new permanent pump-back facilities on the FKC that include a 500-cubic-feet-per-second (cfs) facility at the Shafter-Wasco check structure, a 250 cfs facility at the Lake Woollomes check structure, and a 250 cfs facility at the Deer Creek check structure. In addition to the proposed project, this EIR evaluates: (1) a No Project Alternative, (2) a Low Flow Alternative under which the three new permanent pump-back facilities would be constructed on the FKC with a 200 cfs facility at the Shafter-Wasco check structure, a 75 cfs facility at the Lake Woollomes check structure, and a 75 cfs facility at the Deer Creek check structure and (3) a Seasonal Alternative under which two seasonal pump-back facilities would be installed and operated on the FKC, with up to a 200 cfs seasonal check structure replacing the existing temporary pump-back facility at the Shafter-Wasco check structure and up to a 75 cfs seasonal check structure replacing the existing temporary pump-back facility at the Lake Woollomes check structure.

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Contents

	Page
Executive Summary.....	ES-1
ES.1 Purpose of this Environmental Impact Report	ES-1
ES.2 Project Background.....	ES-1
ES.3 Project Objectives.....	ES-4
ES.4 Study Area.....	ES-4
ES.5 Proposed Project	ES-4
ES.6 Alternatives to the Proposed Project.....	ES-5
ES.7 Impact Summary.....	ES-6
ES.8 Areas of Controversy and Issues to be Resolved	ES-21
ES.9 Environmentally Superior Alternative.....	ES-22
Chapter 1 Introduction	1-1
1.1 Project Background.....	1-1
1.2 Project Objectives.....	1-3
1.3 Purpose of this Environmental Impact Report	1-3
1.4 Responsibilities of Lead, Responsible and Trustee Agencies.....	1-4
1.5 Public Involvement	1-4
Chapter 2 Project Description	2-1
2.1 Project Overview	2-1
2.2 Agency Coordination	2-12
Chapter 3 Environmental Setting	3-1
3.1 Aesthetic Resources.....	3-1
3.2 Air Quality	3-2
3.3 Biological Resources – Aquatic	3-5
3.4 Biological Resources – Terrestrial.....	3-5
3.5 Cultural Resources.....	3-8
3.6 Geology, Seismicity, and Soils	3-9
3.7 Greenhouse Gases.....	3-11
3.8 Hazards and Hazardous Materials.....	3-11
3.9 Hydrology and Water Resources – Surface Water.....	3-12
3.10 Hydrology and Water Resources – Groundwater	3-20
3.11 Noise and Vibration.....	3-28
3.12 Population and Housing.....	3-28
3.13 Recreation	3-29
3.14 Traffic and Transportation.....	3-29
3.15 Tribal Cultural Resources.....	3-30
3.16 Utilities, Service Systems, and Energy	3-32
3.17 Regulatory Setting.....	3-33

Chapter 4	Environmental Impacts	4-1
4.1	Resources Considered and Eliminated from Analysis	4-1
4.2	Aesthetics	4-2
4.3	Air Quality	4-3
4.4	Biological Resources – Aquatic	4-6
4.5	Biological Resources – Terrestrial	4-9
4.6	Cultural Resources	4-16
4.7	Geology, Seismicity, and Soils	4-17
4.8	Greenhouse Gases	4-19
4.9	Hazards and Hazardous Materials	4-22
4.10	Hydrology and Water Resources – Surface Water	4-24
4.11	Hydrology and Water Resources – Groundwater	4-29
4.12	Noise and Vibration	4-36
4.13	Population and Housing	4-38
4.14	Recreation	4-40
4.15	Traffic and Transportation	4-41
4.16	Tribal Cultural Resources	4-43
4.17	Utilities, Service Systems, and Energy	4-44
4.18	Mitigation Measures	4-47
Chapter 5	Alternatives	5-1
5.1	Introduction	5-1
5.2	Alternative Formulation	5-1
5.3	Project Alternatives	5-1
5.4	Evaluation of Project Alternatives	5-5
5.5	Environmentally Superior Alternative	5-45
Chapter 6	Cumulative Effects	6-1
6.1	Cumulative Effects Analysis	6-1
Chapter 7	Disclosures, Coordination, and Supplemental Material	7-1
7.1	Irreversible and Irretrievable Commitment of Resources	7-1
7.2	Significant and Unavoidable Impacts	7-1
7.3	Growth-Inducing Impacts	7-2
7.4	Areas of Controversy and Issues to be Resolved	7-3
7.5	Distribution List	7-4
Chapter 8	List of Preparers	8-1
Chapter 9	References	9-1

Tables

Table ES-1. Impact Summary.....	ES-7
Table ES-2. Comments Received During the Public Scoping Period.....	ES-21
Table 2-1. Estimated Energy Consumption for Each Pump-Back Facility Under the Proposed Project	2-12
Table 3-1. State and Federal Attainment Status	3-3
Table 3-2. Air Quality and Noise-Sensitive Receptors Within the Study Area	3-3
Table 3-3. Criteria Pollutants and Their Effects on Health	3-4
Table 3-4. Soil Characteristics within Proposed Construction Areas	3-10
Table 3-5. Friant Division Long-term Contractors	3-15
Table 3-6. Friant Contractors Taking Deliveries from the Four Reaches in the Study Area ...	3-17
Table 3-7. Key Water Quality Parameters.....	3-19
Table 3-8. Current Groundwater Quality Conditions by District	3-27
Table 3-9. Population and Housing Estimates, 2018-2022	3-29
Table 3-10. Existing Roadway Operations	3-30
Table 3-11. Federal, State, and Local Laws, Regulations, and Plans	3-33
Table 4-1. Resources Considered and Dismissed from Detailed Evaluation	4-1
Table 4-2. Unmitigated and Mitigated Construction Emissions Under the Proposed Project	4-5
Table 4-3. Unmitigated Construction GHG Emissions under the Proposed Project	4-21
Table 4-4. Operational GHG Emissions under the Proposed Project.....	4-21
Table 4-5. Surface Water Quality Significance Criteria	4-27
Table 4-6. Groundwater Quality Significance Criteria for Select Constituents Quantitatively Evaluated Using Modeling Tools	4-31
Table 4-7. Simulated Changes in Concentration of Total Dissolved Solids in Groundwater for Proposed Project under Existing and Future Conditions	4-33
Table 4-8. Simulated Changes in Concentration of Nitrate in Groundwater for Proposed Project Under Existing and Future Conditions	4-34
Table 4-9. Total Groundwater Pumping in Acre-Feet Over Simulation Period Under Existing Conditions, No Project Alternative, and Proposed Project	4-36
Table 4-10. Required Number of Construction Workers Under the Proposed Project.....	4-39
Table 5-1. Estimated Energy Consumption for each Pump-Back Facility Under the Low Flow Alternative	5-3
Table 5-2. Estimated Energy Consumption for Each Pump-Back Facility Under the Seasonal Alternative	5-5
Table 5-3. Unmitigated and Mitigated Construction Emissions Under the Seasonal Alternative.....	5-7
Table 5-4. Unmitigated Operations-Related Emissions under the Seasonal Alternative with Diesel Generators	5-9
Table 5-5. Unmitigated Construction GHG Emissions under the Seasonal Alternative	5-19
Table 5-6. Operational GHG Emissions Under the Seasonal Alternative with Grid Power...	5-19
Table 5-7. Operational GHG Emissions Under the Seasonal Alternative with Diesel Generators	5-20
Table 5-8. Simulated Changes in Total Concentration and Annual Rate of Change of Total Dissolved Solids in Groundwater under the No Project Alternative.....	5-26

Table 5-9. Simulated Changes in Concentration of Nitrate in Groundwater for the No Project Alternative.....	5-28
Table 5-10. Total Groundwater Pumping in Acre-Feet Over Simulation Period Under Existing Conditions and the No Project Alternative	5-30
Table 5-11. Simulated Changes in Concentration of Total Dissolved Solids in Groundwater for the Low Flow Alternative under Existing and Future Conditions	5-31
Table 5-12. Simulated Changes in Concentration of Nitrate in Groundwater for the Low Flow Alternative Under Existing and Future Conditions	5-33
Table 5-13. Total Groundwater Pumping Over the Simulation Period Under Existing Conditions, the No Project Alternative, and the Low Flow Alternative.....	5-35
Table 7-1. Comments Received During the Public Scoping Period	7-3
Table 7-2. Distribution List.....	7-4
Table 8-1. CEQA Lead Agency.....	8-1
Table 8-2. Consultants	8-1

Figures

Figure ES-1. Proposed Project Location	ES-3
Figure 2-1. Proposed Project Location.....	2-2
Figure 2-2. Conceptual Layout of Proposed Pump-Back Facility at the Shafter-Wasco Check Structure.....	2-3
Figure 2-3. Conceptual Layout of Proposed Pump-Back Facility at the Lake Woollomes Check Structure.....	2-4
Figure 2-4. Conceptual Layout of Proposed Pump-Back Facility at the Deer Creek Check Structure.....	2-6
Figure 2-5. Example Cofferdam Design	2-7
Figure 2-6. Shafter-Wasco Potential Haul Routes	2-9
Figure 2-7. Lake Woollomes Potential Haul Routes	2-10
Figure 2-8. Deer Creek Potential Haul Routes.....	2-11
Figure 3-1. Surface Water Hydrology Features in the Study Area	3-14
Figure 3-2. Groundwater Subbasins within the Study Area.....	3-21
Figure 5-1. Example Pump Housing	5-3
Figure 5-2. Example Metal Frames Housing a Single Pump	5-4

Appendices

Appendix A	Existing Conditions and Foreseeable Future Conditions
Appendix B	Alternative Development Report
Appendix C	Cumulative Projects
Appendix D	Regulatory Settings
Appendix E	Air Quality and Greenhouse Gas Emissions Calculations
Appendix F	Hydrology and Water Resources Modeling
Appendix G1	Noise Supporting Information
Appendix G2	Noise and Vibration Calculations
Appendix H	Biological Survey Report
Appendix I	FEMA Flood Insurance Rate Maps (FIRM)
Appendix J	Traffic and Transportation
Appendix K	Public Scoping Report

Acronyms

AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
AEWSD	Arvin-Edison Water Storage District
APE	area of potential effect
AQMD	Air Quality Management District
BLM	United States Department of the Interior, Bureau of Land Management
BMP	best management practice
BPS	best performance standard
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CalRecycle	California Department of Resources Recycling and Recovery
CalSim II	California Simulation Model II
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBOC	California Burrowing Owl Consortium
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CH ₄	methane
CHRIS	California Historical Resources Information System
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
CR	county road
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CVC	Cross Valley Canal
CVP	Central Valley Project

CWA	Clean Water Act
dBA	A-weighted decibel
DEID	Delano-Earlimart Irrigation District
DBCP	1,2-dibromo-3-chloropropane
DMC	Delta-Mendota Canal
DOC	California Department of Conservation
DPM	diesel particulate matter
dS/m	decisiemens per meter
DWR	California Department of Water Resources
EC	electrical conductivity
EIR	environmental impact report
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FKC	Friant-Kern Canal
FWA	Friant Water Authority
GHG	greenhouse gas
GSA	Groundwater Sustainability Agency
GSP	groundwater sustainability plan
GWh	gigawatt-hour
HCP	habitat conservation plan
ID	irrigation district
in./sec	inches per second
ISA	Inherent Scenic Attractiveness
ITA	Indian Trust Asset
KGA	Kern Groundwater Authority
KTWD	Kern-Tulare Water District
LOS	level of service
LTRID	Lower Tule River Irrigation District
LTS	less than significant
M&I	municipal and industrial
MCL	maximum contaminant level
mg/L	milligrams per liter
MTCO _{2e}	metric tons carbon dioxide equivalent
MWh	megawatt hour
N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NCP	noise control plan
NCCP	natural community conservation plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NI	no impact
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NRHP	National Register of Historic Places
O ₃	ozone
OHP	California Office of Historic Preservation
OSHA	Occupational Safety and Health Administration
OPR	Office of Planning and Research
PFYC	Potential Fossil Yield Classification
PG&E	Pacific Gas and Electric Company
PM	particulate matter
ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code
Reclamation	United States Department of the Interior, Bureau of Reclamation
RWQCB	Regional Water Quality Control Board
S	significant
SAR	sodium adsorption ratio
SB	Senate Bill
SBCWD	San Benito County Water District
SCVWD	Santa Clara Valley Water District
SHPO	State Historic Preservation Officer
SJKF	San Joaquin kit fox
SJRRP	San Joaquin River Restoration Program
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Air Pollution Control District
SMAQMD	Sacramento Metropolitan Air Quality Management District

SMS	Scenery Management System
SO ₂	sulfur dioxide
SR	state route
SRA	State Recreation Area
SSC	Species of Special Concern
SSJMUD	South San Joaquin Municipal Utilities District
SU	significant and unavoidable
SWID	Shafter-Wasco Irrigation District
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TBID	Terra Bella Irrigation District
TCP	1,2,3, trichloropropane
TDS	total dissolved solids
TPDWD	Tea Pot Dome Water District
tpy	tons per year
USFS	United States Department of the Interior, U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMT	vehicle miles traveled
VOC	volatile organic compound
µmhos/cm	micromhos per centimeter
<	less than
%	percent

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Executive Summary

ES.1 Purpose of this Environmental Impact Report

Friant Water Authority (FWA) is preparing an Environmental Impact Report (EIR) to evaluate the Friant-Kern Canal (FKC) Pump-Back Project (proposed project), which would facilitate the recirculation of recaptured Restoration Flows² released from Millerton Lake for the San Joaquin River Restoration Program (SJRRP), and from other waters obtained by Friant Division Contractors (Friant Contractors), to increase operational flexibility and the long-term reliability of the water supplies conveyed through the FKC. The EIR evaluates the environmental impacts of the proposed project and alternatives under the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations Title 14, Section 15000 et seq.). FWA is the Lead Agency, pursuant to CEQA.

A Notice of Preparation (NOP) was circulated for public review from May 29, 2024, to June 27, 2024. Three written comments on the proposed content and scope of the EIR were received and reviewed and incorporated into the Draft EIR as appropriate. FWA held a virtual public scoping meeting on June 12, 2024, to inform interested parties about the proposed project and to solicit agency and public input on the scope and content of the EIR. Two members of the public attended the virtual meeting and one comment was received.

ES.2 Project Background

The proposed project is a component of the SJRRP and proposes to construct permanent pump-back facilities along the southern portion of the FKC. These facilities would allow water to move from the California Aqueduct, through the Cross Valley Canal (CVC), for delivery to Friant Contractors along the southern portion of the FKC. Surface water supplies from the CVC are delivered through the FKC-CVC Intertie (Intertie) at the terminus of the FKC (Figure ES-1.). This water is then pumped up the canal and over check structures to contractor turnouts, an operational scenario referred to as “reverse-flow pump back.” The proposed pump-back facilities would convey water supplies accessible via the Intertie, including but not limited to recaptured restoration flows, water purchased from the Bureau of Reclamation (Reclamation) pursuant to CVC contracts, water in the California Aqueduct, water from banking projects, and other CVC supplies. All water

² The San Joaquin River Restoration Program was established in late 2006 to implement the Stipulation of Settlement in *NRDC, et al., v Kirk Rodgers, et al* and establishes the Restoration Goal and Water Management Goal. The Restoration Goal calls for releases of water from Friant Dam to the confluence of the Merced River (referred to as Restoration Flows) to restore and maintain fish populations in “good condition” in the main stem San Joaquin River. To achieve the Water Management Goal, the Settlement calls for recirculation, recapture, reuse, exchange, or transfer of Restoration Flows (referred to as recaptured Restoration Flows) to reduce or avoid impacts to water deliveries to all the Friant Contractors caused by the Restoration Flows.

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

conveyed and delivered to Friant Contractors is subject to appropriate approval and permitting by federal, state, and local agencies.

The SJRRP was established in late 2006 to implement a Stipulation of Settlement in *Natural Resource Defense Council et al., v. Kirk Rodgers, et al.* (Settlement). In 1988, a coalition of environmental groups, led by the Natural Resources Defense Council (NRDC), filed a lawsuit challenging the renewal of long-term water service contracts between the United States and Central Valley Project (CVP) Friant Contractors. In September 2006, the “Settling Parties,” including NRDC, FWA, and the U.S. Departments of the Interior and Commerce, agreed on the terms and conditions of the Settlement, which establishes two primary goals: Restoration Goal and Water Management Goal).

To achieve the Restoration Goal, the Settlement calls for releases of water from Friant Dam to the confluence of the Merced River (referred to as Interim and Restoration Flows), a combination of channel and structural modifications along the San Joaquin River below Friant Dam, and the reintroduction of Chinook salmon. To achieve the Water Management Goal, Paragraph 16 of the Settlement and Section 10201 of Part III of the San Joaquin River Restoration Settlement Act (Settlement Act) provide for certain activities to be developed and implemented to reduce or avoid adverse water supply impacts on Friant Contractors.

Section 10201(a)(2) of the Settlement Act directs Reclamation to explore the feasibility of reverse-flow pump-back facilities on the FKC, with reverse-flow capacity of approximately 500 cubic feet per second (cfs) at the Poso and Shafter-Wasco check structures and approximately 300 cfs at the Woollomes check structure. Water supply and economic analyses were performed in 2011 for the facilities being considered. The analyses showed that much of the pump-back capacity described in Section 10201(a)(2) of the Settlement Act would go unused because of limited conveyance capacity and the availability of recaptured Restoration Flows, demands, and downstream pump-back capacities.

In 2015, FWA proposed an alternative that would revise the proposed pumping capacities to 200 cfs at the Shafter check structure and 75 cfs at the Lake Woollomes and Deer Creek check structures for the additional benefit of accessing water banks or other water supplies available via the CVC (e.g., the Kern River, local groundwater banking projects, the California Aqueduct) during times of drought. This alternative was evaluated to an appraisal level as part of the SJRRP Water Management Goal Investment Strategy using all new facilities, Project ID 504 – Reverse Flow Pump-Back Facilities on the FKC (SJRRP 2015). However, since 2015, FWA (in coordination with Reclamation) has considered the potential benefits of increasing pumping capacities beyond the levels identified in the 2015 Investment Strategy Report.

Expanding the capacity of the pump-back facilities would allow for their use in supporting the pump-back of recaptured and recirculated Restoration Flows and the delivery of water from Cross Valley Contractors’ supplies, groundwater banking projects, the California Aqueduct, and other CVC supplies.

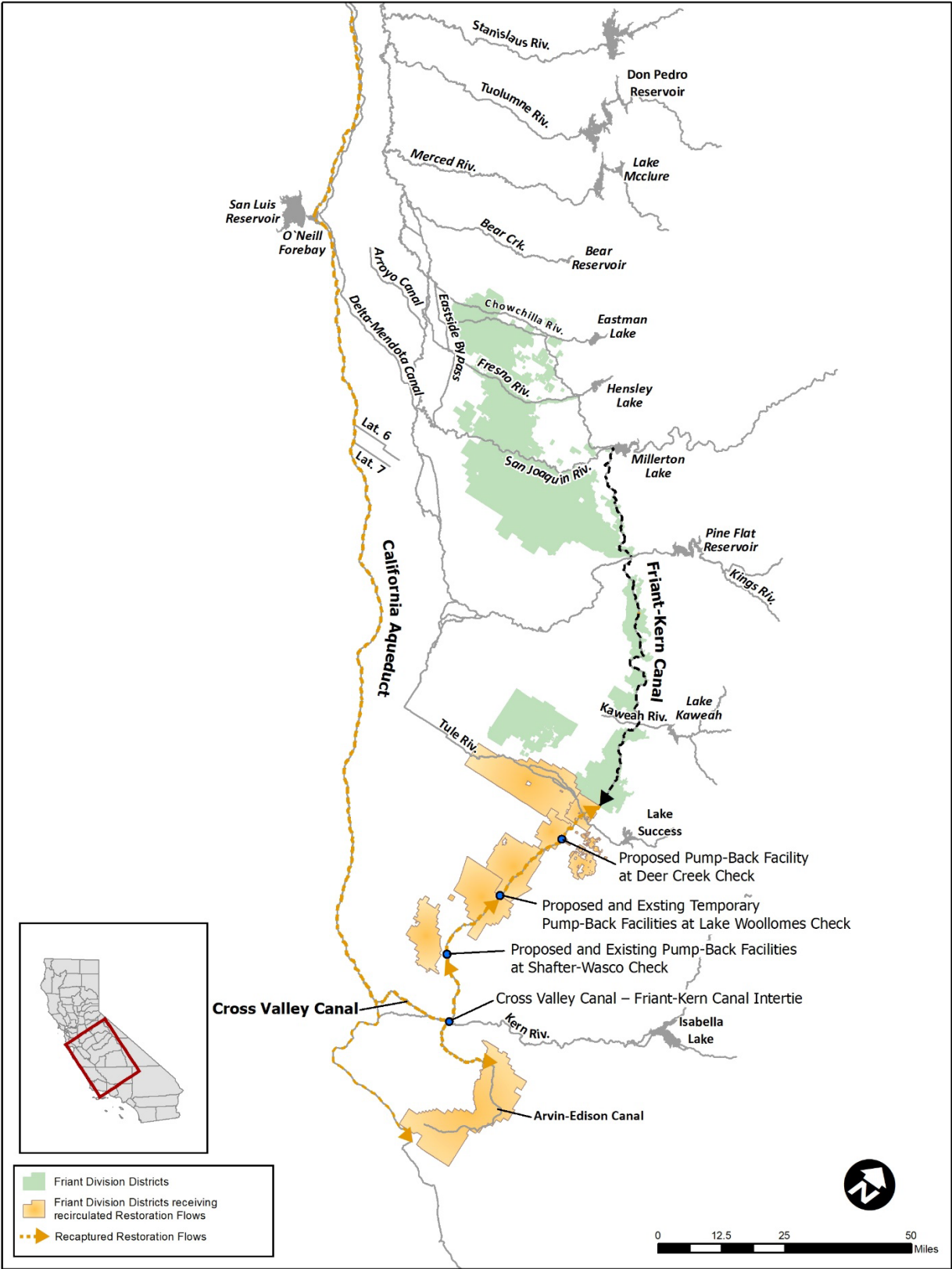


Figure ES-1. Proposed Project Location

ES.3 Project Objectives

ES.3.1 Project Objectives

As required by CEQA, a lead agency must identify the objective(s) sought by the proposed project. FWA has developed the following objectives:

- Increasing long-term reliability of surface water supply in the FKC for use by Friant Contractors.
- Increasing operational flexibility of the FKC for Friant Contractors.
- Support efforts to meet the stipulated Water Management Goal, specifically Paragraph 16, Section 10201(a)(2) of the Settlement Act.

ES.4 Study Area

The study area for this EIR (Figure ES-1.) includes the FKC and related water infrastructure near the Shafter-Wasco, Lake Woollomes, and Deer Creek check structures (between Mileposts 101.3 to 101.6, 120.2 to 120.3, and 135.8 to 135.9), where construction impacts under the proposed project would occur. The study area also extends (Extended Study Area) to include the facilities of Friant Contractors and related conveyance infrastructure that would not be directly impacted by project construction or operations, which includes the CVC, Kern River, and California Aqueduct, but is nevertheless relevant to project operations. The Extended Study Area is shown in Figure ES-1.

ES.5 Proposed Project

The proposed project would construct and operate three new pump-back facilities at the Shafter-Wasco, Lake Woollomes, and Deer Creek check structures to support the recirculation of recaptured Restoration Flows and other waters, allowing for increased long-term reliability of surface water supply and increased operational flexibility of the FKC for Friant Contractors. This would be accomplished by increasing the opportunity to bring non-Millerton water (i.e., water not sourced from Millerton Lake) into the FKC via the CVC, which could then be directly delivered to Friant Contractors and/or used in operational exchanges on the FKC. Under the proposed project, the following would be achieved: (1) a 500 cfs permanent six-bay pump-back facility would be built at Shafter-Wasco check structure, (2) a 250 cfs permanent four-bay pump-back facility would be constructed at the Lake Woollomes check structure, and (3) a 250 cfs permanent four-bay pump-back facility would be built at the Deer Creek check structure. Figure ES-1. shows the locations of these proposed pump-back facilities. The proposed pump-back facilities would convey water supplies accessible via the Intertie (including but not limited to recaptured Restoration Flows³), water purchased from Reclamation pursuant to CVC contracts,⁴ water in the California

³ Environmental compliance for the recirculation of recaptured Restoration Flows is analyzed outside of this EIR in a separate environmental compliance document, available at

https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=2940

⁴ Environmental compliance for the transfer of water purchased from Reclamation pursuant to CVC contracts is analyzed outside of this EIR in a separate environmental compliance document, available at

<https://ceganet.opr.ca.gov/Project/2020100075> and

https://www.usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=12130

Aqueduct, water from banking projects,⁵ and other CVC supplies. All water conveyed and delivered to Friant Contractors is subject to the appropriate approval and permitting by federal, state, and local agencies.

ES.6 Alternatives to the Proposed Project

As required by CEQA Guidelines (Section 15126.6), this EIR presents a discussion of a reasonable range of alternatives that would “feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives.” The alternatives to the proposed project are summarized in this section and discussed further in Chapter 5.

ES.6.1 No Project Alternative

Under the No Project Alternative, no new facilities would be constructed. Under this alternative, pump-back operations would use only existing facilities within the FKC. Existing pump-back facilities along the FKC include the Intertie, a 500 cfs permanent pump station that pumps water from the CVC into the lower end of the FKC; a 30 cfs permanent pump-back facility at the Shafter-Wasco check structure; a 50 cfs temporary pump-back facility at the Shafter-Wasco check structure; and a 50 cfs temporary pump-back facility at Lake Woollomes check structure. Figure ES-1. shows the location of the existing pump-back facilities. The temporary facilities would remain in place until the end of their service life.

ES.6.2 Low Flow Alternative

The Low Flow Alternative would involve constructing and operating three new pump-back facilities to support the recirculation of recaptured Restoration Flows and other waters. Under the Low Flow Alternative, the following would be achieved: (1) a 200 cfs permanent four-bay facility would replace the existing temporary 50 cfs pump-back facility at the Shafter-Wasco check structure, (2) a 75 cfs permanent three-bay facility would replace the existing 50 cfs temporary pump-back facility at the Lake Woollomes check structure, and (3) a 75 cfs three-bay permanent facility would be built at the Deer Creek check structure. As with the proposed project, the pump-back facilities under the Low Flow Alternative would convey recaptured Restoration Flows, water purchased from Reclamation pursuant to CVC contracts, water in the California Aqueduct, water from banking projects, and other CVC supplies accessible via the Intertie to contractor turnouts. Under the Low Flow Alternative, pump-back operations would be constrained by the reduced capacity of the pump-back facilities in comparison to the proposed project. The pump-back facilities would be operated to maximize the recirculation of recaptured Restoration Flows and the other sources of water (i.e., water purchased from Reclamation pursuant to CVC contracts, water in the California Aqueduct, water from banking projects, and other CVC supplies) would be conveyed, up to the pump-back facilities’ capacity.

⁵ Environmental compliance for the transfer of water from banking projects is analyzed outside of this EIR in a separate environmental compliance, available at <https://ceqanet.opr.ca.gov/2023080251> and <https://ceqanet.opr.ca.gov/2009071022/4>

ES.6.3 Seasonal Alternative

The Seasonal Alternative would involve constructing, installing, and operating two seasonal pump-back facilities to support the recirculation of recaptured Restoration Flows and other waters. Under the Seasonal Alternative, the following would be achieved: (1) up to a 200 cfs four-bay seasonal check structure would replace the existing temporary 50 cfs pump-back facility at the Shafter-Wasco check structure, and (2) up to a 75 cfs two-bay seasonal check structure would replace the existing temporary 50 cfs pump-back facility at the Lake Woollomes check structure. Under the Seasonal Alternative, no pump-back structure would be constructed or operated at the Deer Creek check structure.

As with the proposed project and the Low Flow Alternative, the seasonal pump-back facilities would convey water supplies accessible via the Intertie to contractor turnouts. Under the Seasonal Alternative, the pump-back facilities would be operated during the pump-back operation window to maximize the recirculation of recaptured Restoration Flows and the other sources of water (water purchased from Reclamation pursuant to CVC contracts, water in the California Aqueduct, water from banking projects, and other CVC supplies) would be conveyed, up to the pump-back facilities' capacity. The seasonal facilities would be operated when recaptured Restoration Flows are available and taken offline outside of the irrigation season (November to February), providing the flexibility to demobilize the seasonal pump-back facilities at Shafter-Wasco and Lake Woollomes outside of the operational window and allow for regular gravity flow operations within the FKC to support flood safety operations.

ES.7 Impact Summary

Table ES-1 summarizes the environmental impacts and mitigation measures identified for the proposed project and alternatives. The table consolidates and discloses the significance determinations made pursuant to CEQA throughout this EIR. FWA determined there would be no impacts related to agricultural resources and forestry resources, land use and planning, mineral resources, wildfire, or public services (see Section 4.1 of the Draft EIR); therefore, these resources are not analyzed further in this EIR and are excluded from the table below.

Table ES-1. Impact Summary

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Aesthetics				
Have a substantial adverse effect on a scenic vista.	Proposed Project	Construction – LTS Operation – NI	–	Section 4.2.3
	No Project	NI	–	Section 5.4.1.1
	Low Flow	Construction – LTS Operation – NI	–	Section 5.4.1.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.1.3
Substantially damage scenic resources, including, trees, rock outcroppings, and historic buildings within a state scenic highway.	Proposed Project	Construction – NI Operation – NI	–	Section 4.2.3
	No Project	NI	–	Section 5.4.1.1
	Low Flow	Construction – NI Operation – NI	–	Section 5.4.1.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.1.3
Substantially degrade the existing visual character or quality of public views of the site and its surroundings in nonurbanized areas and would conflict with applicable zoning and other regulations governing scenic quality in urbanized areas.	Proposed Project	Construction – LTS Operation – NI	–	Section 4.2.3
	No Project	NI	–	Section 5.4.1.1
	Low Flow	Construction – LTS Operation – NI	–	Section 5.4.1.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.1.3
Create a new source of substantial light or glare, which would adversely affect daytime or nighttime views in the area.	Proposed Project	Construction – LTS Operation – NI	–	Section 4.2.3
	No Project	NI	–	Section 5.4.1.1
	Low Flow	Construction – LTS Operation – NI	–	Section 5.4.1.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.1.3

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Air Quality²				
Conflict with or obstruct implementation of the applicable air quality plan.	Proposed Project	Construction – S, LTS Operation – NI	AQ-1	Section 4.3.3
	No Project	NI	–	Section 5.4.2.1
	Low Flow	Construction – S, LTS Operation – NI	AQ-1	Section 5.4.2.2
	Seasonal	Construction – LTS Operation – LTS	–	Section 5.4.2.3
Expose sensitive receptors to substantial pollutant concentrations.	Proposed Project	Construction – LTS Operation – NI	–	Section 4.3.3
	No Project	NI	–	Section 5.4.2.1
	Low Flow	Construction – LTS Operation – NI	–	Section 5.4.2.2
	Seasonal	Construction – LTS Operation – LTS	–	Section 5.4.2.3
Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	Proposed Project	Construction – LTS Operation – NI	–	Section 4.3.3
	No Project	NI	–	Section 5.4.2.1
	Low Flow	Construction – LTS Operation – NI	–	Section 5.4.2.2
	Seasonal	Construction – LTS Operation – LTS	–	Section 5.4.2.3
Biological Resources – Aquatic				
Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS.	Proposed Project	Construction – S, LTS Operation – LTS	HAZ-1, WR-1	Section 4.4.3
	No Project	NI	–	Section 5.4.3.1
	Low Flow	Construction – S, LTS Operation – LTS	HAZ-1, WR-1	Section 5.4.3.2
	Seasonal	Construction – LTS Operation – LTS	–	Section 5.4.3.3

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory corridors or impede the use of native wildlife nursery sites.	Proposed Project	Construction – LTS Operation – LTS	–	Section 4.4.3
	No Project	NI	–	Section 5.4.3.1
	Low Flow	Construction – LTS Operation – LTS	–	Section 5.4.3.2
	Seasonal	Construction – LTS Operation – LTS	–	Section 5.4.3.3
Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	Proposed Project	Construction – NI Operation – NI	–	Section 4.4.3
	No Project	NI	–	Section 5.4.3.1
	Low Flow	Construction – NI Operation – NI	–	Section 5.4.3.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.3.3
Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.	Proposed Project	Construction – LTS Operation – NI	–	Section 4.4.3
	No Project	NI	–	Section 5.4.3.1
	Low Flow	Construction – LTS Operation – NI	–	Section 5.4.3.2
	Seasonal	Construction – LTS Operation – NI	–	Section 5.4.3.3
Biological Resources – Terrestrial				
Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS.	Proposed Project	Construction – S, LTS Operation – S, LTS	TERR-1 through TERR-8, TERR-10	Section 4.5.3
	No Project	NI	–	Section 5.4.4.1
	Low Flow	Construction – S, LTS Operation – S, LTS	TERR-1 through TERR-8, TERR-10	Section 5.4.4.2
	Seasonal	Construction – S, LTS Operation – S, LTS	TERR-1 through TERR-8, TERR-10	Section 5.4.4.3

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS.	Proposed Project	Construction – S, LTS Operation – NI	TERR-9, HAZ-1	Section 4.5.3
	No Project	NI	–	Section 5.4.4.1
	Low Flow	Construction – S, LTS Operation – NI	TERR-9, HAZ-1	Section 5.4.4.2
	Seasonal	Construction – S, LTS Operation – NI	TERR-9, HAZ-1	Section 5.4.4.3
Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	Proposed Project	Construction – S, LTS Operation – NI	TERR-9, HAZ-1	Section 4.5.3
	No Project	NI	–	Section 5.4.4.1
	Low Flow	Construction – S, LTS Operation – NI	TERR-9, HAZ-1	Section 5.4.4.2
	Seasonal	Construction – S, LTS Operation – NI	TERR-9, HAZ-1	Section 5.4.4.3
Interfere substantially with the movement of any native resident or migratory fish or wildlife or with established native resident or migratory corridors or impede the use of native wildlife nursery sites.	Proposed Project	Construction – S, LTS Operation – NI	TERR-3	Section 4.5.3
	No Project	NI	–	Section 5.4.4.1
	Low Flow	Construction – S, LTS Operation – NI	TERR-3	Section 5.4.4.2
	Seasonal	Construction – S, LTS Operation – NI	TERR-3	Section 5.4.4.3
Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	Proposed Project	Construction – NI Operation – NI	–	Section 4.5.3
	No Project	NI	–	Section 5.4.4.1
	Low Flow	Construction – NI Operation – NI	–	Section 5.4.4.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.4.3

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Conflict with the provisions of an adopted habitat conservation plan; natural community conservation plan; or other approved local, regional, or state habitat conservation plan.	Proposed Project	Construction – NI Operation – NI	–	Section 4.5.3
	No Project	NI	–	Section 5.4.4.1
	Low Flow	Construction – NI Operation – NI	–	Section 5.4.4.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.4.3
Cultural Resources				
Cause a substantial adverse change in the significance of a historical resource pursuant to PRC Section 15064.5.	Proposed Project	Construction – LTS Operation – NI	–	Section 4.6.3
	No Project	NI	–	Section 5.4.5.1
	Low Flow	Construction – LTS Operation – NI	–	Section 5.4.5.2
	Seasonal	Construction – LTS Operation – NI	–	Section 5.4.5.3
Cause a substantial adverse change in the significance of an archaeological resource pursuant to PRC Section 15064.5.	Proposed Project	Construction – S, LTS Operation – NI	CUL-1	Section 4.6.3
	No Project	NI		Section 5.4.5.1
	Low Flow	Construction – S, LTS Operation – NI	CUL-1	Section 5.4.5.2
	Seasonal	Construction – S, LTS Operation – NI	CUL-1	Section 5.4.5.3
Disturb any human remains, including those interred outside of dedicated cemeteries.	Proposed Project	Construction – S, LTS Operation – NI	CUL-1	Section 4.6.3
	No Project	NI		Section 5.4.5.1
	Low Flow	Construction – S, LTS Operation – NI	CUL-1	Section 5.4.5.2
	Seasonal	Construction – S, LTS Operation – NI	CUL-1	Section 5.4.5.3

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Geology, Seismicity, and Soils				
Directly or indirectly cause potential substantial adverse effects including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground-shaking, seismic-related ground failure including liquefaction or landslides.	Proposed Project	LTS	–	Section 4.7.3
	No Project	NI	–	Section 5.4.6.1
	Low Flow	LTS	–	Section 5.4.6.2
	Seasonal	LTS	–	Section 5.4.6.3
Result in substantial soil erosion or the loss of topsoil.	Proposed Project	LTS	–	Section 4.7.3
	No Project	NI	–	Section 5.4.6.1
	Low Flow	LTS	–	Section 5.4.6.2
	Seasonal	LTS	–	Section 5.4.6.3
Be located in a geologic unit or on soil that is unstable or would become unstable as a result of the project, and potentially result in an on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.	Proposed Project	LTS	–	Section 4.7.3
	No Project	S	–	Section 5.4.6.1
	Low Flow	LTS	–	Section 5.4.6.2
	Seasonal	LTS	–	Section 5.4.6.3
Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.	Proposed Project	NI	–	Section 4.7.3
	No Project	NI	–	Section 5.4.6.1
	Low Flow	NI	–	Section 5.4.6.2
	Seasonal	NI	–	Section 5.4.6.3
Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.	Proposed Project	NI	–	Section 4.7.3
	No Project	NI	–	Section 5.4.6.1
	Low Flow	NI	–	Section 5.4.6.2
	Seasonal	NI	–	Section 5.4.6.3
Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	Proposed Project	S, LTS	PR-1	Section 4.7.3
	No Project	NI	–	Section 5.4.6.1
	Low Flow	S, LTS	PR-1	Section 5.4.6.2
	Seasonal	S, LTS	PR-1	Section 5.4.6.3

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Greenhouse Gases				
Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	Proposed Project	Construction – LTS Operation – LTS	–	Section 4.8.3
	No Project	NI	–	Section 5.4.7.1
	Low Flow	Construction – LTS Operation – LTS	–	Section 5.4.7.2
	Seasonal	Construction – LTS Operation – LTS	–	Section 5.4.7.3
Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	Proposed Project	LTS	–	Section 4.8.3
	No Project	NI	–	Section 5.4.7.1
	Low Flow	LTS	–	Section 5.4.7.2
	Seasonal	LTS	–	Section 5.4.7.3
Hazards and Hazardous Materials				
Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	Proposed Project	S, LTS	TR-1	Section 4.9.3
	No Project	NI	–	Section 5.4.8.1
	Low Flow	S, LTS	TR-1	Section 5.4.8.2
	Seasonal	S, LTS	TR-1	Section 5.4.8.3
Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	Proposed Project	S, LTS	HAZ-1, WR-1	Section 4.9.3
	No Project	NI	–	Section 5.4.8.1
	Low Flow	S, LTS	HAZ-1, WR-1	Section 5.4.8.2
	Seasonal	S, LTS	HAZ-1, WR-1	Section 5.4.8.3
Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	Proposed Project	NI	–	Section 4.9.3
	No Project	NI	–	Section 5.4.8.1
	Low Flow	NI	–	Section 5.4.8.2
	Seasonal	NI	–	Section 5.4.8.3
Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and as a result, would create a significant hazard to the public or the environment.	Proposed Project	NI	–	Section 4.9.3
	No Project	NI	–	Section 5.4.8.1
	Low Flow	NI	–	Section 5.4.8.2
	Seasonal	NI	–	Section 5.4.8.3

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area.	Proposed Project	NI	–	Section 4.9.3
	No Project	NI	–	Section 5.4.8.1
	Low Flow	NI	–	Section 5.4.8.2
	Seasonal	NI	–	Section 5.4.8.3
Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	Proposed Project	NI	–	Section 4.9.3
	No Project	NI	–	Section 5.4.8.1
	Low Flow	NI	–	Section 5.4.8.2
	Seasonal	NI	–	Section 5.4.8.3
Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires.	Proposed Project	NI	–	Section 4.9.3
	No Project	NI	–	Section 5.4.8.1
	Low Flow	NI	–	Section 5.4.8.2
	Seasonal	NI	–	Section 5.4.8.3
Hydrology and Water Resources – Surface Water				
Violate water quality standards or waste discharge requirements, including in-prism water quality thresholds, as established in the Water Quality Guidelines, or otherwise substantially degrade surface water quality such that it impedes the beneficial uses, as established in the Tulare Lake Basin Plan.	Proposed Project	Construction – S, LTS Operation – LTS	WR-1 and HAZ-1	Section 4.10.3
	No Project	Construction – NI Operation – LTS	–	Section 5.4.9.1
	Low Flow	Construction – S, LTS Operation – LTS	WR-1 and HAZ-1	Section 5.4.9.2
	Seasonal	Construction – S, LTS Operation – LTS	WR-1 and HAZ-1	Section 5.4.9.3

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on- or off-site, substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-site or off-site, create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff, or impede or redirect flood flows.	Proposed Project	Construction – S, LTS Operation – NI	HAZ-1	Section 4.10.3
	No Project	Construction – NI Operation – NI	–	Section 5.4.9.1
	Low Flow	Construction – S, LTS Operation – NI	HAZ-1	Section 5.4.9.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.9.3
In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.	Proposed Project	LTS	–	Section 4.10.3
	No Project	NI	–	Section 5.4.9.1
	Low Flow	LTS	–	Section 5.4.9.2
	Seasonal	LTS	–	Section 5.4.9.3
Conflict with or obstruct implementation of a water quality control plan.	Proposed Project	Construction – S, LTS Operation – LTS	–	Section 4.10.3
	No Project	Construction – NI Operation – LTS	–	Section 5.4.9.1
	Low Flow	Construction – S, LTS Operation – LTS	–	Section 5.4.9.2
	Seasonal	Construction – S, LTS Operation – LTS	–	Section 5.4.9.3

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Hydrology and Water Resources – Groundwater				
Violate water quality standards or waste discharge requirements or otherwise substantially degrade groundwater quality, such that it impairs reasonably anticipated beneficial uses of groundwater.	Proposed Project	Construction – S, LTS Operation – S, SU	WR-1, HAZ-1	Section 4.11.3
	No Project	Construction – NI Operation – S, SU	–	Section 5.4.10.1
	Low Flow	Construction – S, LTS Operation – S, SU	WR-1, HAZ-1	Section 5.4.10.2
	Seasonal	Construction – S, LTS Operation – S, SU	WR-1, HAZ-1	Section 5.4.10.3
Substantially decrease groundwater supplies such that the project may result in chronic lowering of groundwater levels.	Proposed Project	Construction – NI Operation – LTS	–	Section 4.11.3
	No Project	Construction – NI Operation – S, SU	–	Section 5.4.10.1
	Low Flow	Construction – NI Operation – LTS	–	Section 5.4.10.2
	Seasonal	Construction – NI Operation – LTS	–	Section 5.4.10.3
Noise and Vibration				
Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	Proposed Project	Construction – S, SU Operation – LTS	NOI-1	Section 4.12.3
	No Project	NI	–	Section 5.4.11.1
	Low Flow	Construction – S, SU Operation – LTS	NOI-1	Section 5.4.11.2
	Seasonal	Construction – LTS Operation – LTS	–	Section 5.4.11.3
Generation of excessive ground borne vibration or ground borne noise levels.	Proposed Project	LTS	–	Section 4.12.3
	No Project	NI	–	Section 5.4.11.1
	Low Flow	LTS	–	Section 5.4.11.2
	Seasonal	LTS	–	Section 5.4.11.3

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.	Proposed Project	LTS	–	Section 4.12.3
	No Project	NI	–	Section 5.4.12.1
	Low Flow	LTS	–	Section 5.4.11.2
	Seasonal	LTS	–	Section 5.4.11.3
Population and Housing				
Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).	Proposed Project	Construction – LTS Operation – NI	–	Section 4.13.3
	No Project	NI	–	Section 5.4.12.1
	Low Flow	Construction – LTS Operation – NI	–	Section 5.4.12.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.12.3
Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.	Proposed Project	Construction – NI Operation – NI	–	Section 4.13.3
	No Project	NI	–	Section 5.4.12.1
	Low Flow	Construction – NI Operation – NI	–	Section 5.4.12.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.12.3
Recreation				
Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	Proposed Project	Construction – LTS Operation – NI	–	Section 4.14.3
	No Project	NI	–	Section 5.4.13.1
	Low Flow	Construction – LTS Operation – NI	–	Section 5.4.13.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.13.3

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.	Proposed Project	Construction – LTS Operation – NI	–	Section 4.14.3
	No Project	NI	–	Section 5.4.13.1
	Low Flow	Construction – LTS Operation – NI	–	Section 5.4.13.2
	Seasonal	Construction – NI Operation – NI	–	Section 5.4.13.3
Traffic and Transportation				
Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.	Proposed Project	Construction – LTS Operation – LTS	–	Section 4.15.3
	No Project	NI	–	Section 5.4.14.1
	Low Flow	Construction – LTS Operation – LTS	–	Section 5.4.14.2
	Seasonal	Construction – LTS Operation – LTS	–	Section 5.4.14.3
Conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b).	Proposed Project	Construction – LTS Operation – LTS	–	Section 4.15.3
	No Project	NI	–	Section 5.4.14.1
	Low Flow	Construction – LTS Operation – LTS	–	Section 5.4.14.2
	Seasonal	Construction – LTS Operation – LTS	–	Section 5.4.14.3
Substantially increase hazards due to a geometric design feature or incompatible uses.	Proposed Project	Construction – S, LTS Operation – LTS	TR-1	Section 4.15.3
	No Project	NI	–	Section 5.4.14.1
	Low Flow	Construction – S, LTS Operation – LTS	TR-1	Section 5.4.14.2
	Seasonal	Construction – LTS Operation – LTS	–	Section 5.4.14.3

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Result in inadequate emergency access.	Proposed Project	Construction – S, LTS Operation – LTS	TR-1	Section 4.15.3
	No Project	NI	–	Section 5.4.14.1
	Low Flow	Construction – S, LTS Operation – LTS	TR-1	Section 5.4.14.2
	Seasonal	Construction – LTS Operation – LTS	–	Section 5.4.14.3
Tribal Cultural Resources				
The project would cause a substantial adverse change in the significance of a tribal cultural resources, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe.	Proposed Project	Construction – NI Operation – NI		Section 4.16.3
	No Project	NI		Section 5.1
	Low Flow	Construction – NI Operation – NI		Section 5.1
	Seasonal	Construction – NI Operation – NI		Section 5.1
Utilities, Service Systems, and Energy				
Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.	Proposed Project	LTS	–	Section 4.17.3
	No Project	NI	–	Section 5.4.15.1
	Low Flow	LTS	–	Section 5.4.15.2
	Seasonal		–	Section 5.4.15.3
Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years.	Proposed Project	Construction – LTS Operation – NI		Section 4.17.3
	No Project	NI		Section 5.4.15.1
	Low Flow	Construction – LTS Operation – NI		Section 5.4.15.2
	Seasonal	Construction – LTS Operation – NI		Section 5.4.15.3

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

Potential Impact	Alternative	Significance Determination (Without Mitigation, With Mitigation) ¹	Mitigation	Supporting Section
Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	Proposed Project	LTS	–	Section 4.17.3
	No Project	NI	–	Section 5.4.15.1
	Low Flow	LTS	–	Section 5.4.15.2
	Seasonal	LTS	–	Section 5.4.15.3
Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	Proposed Project	LTS	–	Section 4.17.3
	No Project	NI	–	Section 5.4.15.1
	Low Flow	LTS	–	Section 5.4.15.2
	Seasonal	LTS	–	Section 5.4.15.3
Comply with federal, state, and local management and reduction statutes and regulations related to solid waste.	Proposed Project	LTS	–	Section 4.17.3
	No Project	NI	–	Section 5.4.15.1
	Low Flow	LTS	–	Section 5.4.15.2
	Seasonal	LTS	–	Section 5.4.15.3
Result in potentially significant environmental impact because of wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation.	Proposed Project	LTS	–	Section 4.17.3
	No Project	NI	–	Section 5.4.15.1
	Low Flow	LTS	–	Section 5.4.15.2
	Seasonal	LTS	–	Section 5.4.15.3
Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	Proposed Project	NI	–	Section 4.17.3
	No Project	NI	–	Section 5.4.15.1
	Low Flow	NI	–	Section 5.4.15.2
	Seasonal	NI	–	Section 5.4.15.3

Notes:

¹ Column 3 presents significance determinations without and with the implementation of the proposed mitigation measure. For example, because a substantial increase in ambient noise levels under the proposed project is presented as "S, SU", the proposed project would cause significant impacts that would require implementation of NOI-1; however, even with the implementation of the mitigation measure, this impact would be significant and unavoidable.

² The air quality criterion regarding cumulatively considerable impacts (Section 6.1.2) is addressed in Chapter 6 and not summarized in this table.

Key: CDFW – California Department of Fish and Wildlife; CEQA – California Environmental Quality Act; CRHR – California Register of Historical Resources; GHG –greenhouse gas; LTS – Less than Significant; NI – No Impact; NMFS – National Marine Fisheries Service, NRHP – National Register of Historic Places; PRC – Public Resources Code; S – Significant; SRA – State Recreation Area; SWP – State Water Project; SU – Significant Unavoidable

ES.8 Areas of Controversy and Issues to be Resolved

Section 15123 of the CEQA Guidelines requires disclosure of areas of controversy raised by agencies and the public, and disclosure of issues to be resolved. Table ES-2 summarizes the comments received during the scoping period. The Public Scoping Report (Appendix K) provides further information on issues identified by agencies and the public during the public scoping process. Issues to be resolved include the final selection of the proposed action/project and the final selection of mitigation measures to reduce significant impacts.

Table ES-2. Comments Received During the Public Scoping Period

Area of Controversy/Issue	Summary of Issue	EIR Section or Appendix Addressing Area of Controversy/Issue
Project Description	Provide a project description that details the project footprint, construction methods and materials, and ground disturbance, including identifying adjacent roads and property ownership and any special conditions needed for project work.	Chapter 2, Project Description
Water Rights	Discuss the source of recirculated water, detailing all water rights and water entitlements pertaining to the project.	Chapter 2, Project Description
Water Supply	Evaluate how SWP facilities would be used during operations, considering potential impacts to the California Aqueduct and San Luis Canal.	Chapter 2, Project Description; Section 4.10, Hydrology and Water Resources – Surface Water
Water Quality	Evaluate potential adverse water quality impacts to state water contractor members relying on the California Aqueduct and San Luis Canal.	Chapter 2, Project Description; Section 4.10, Hydrology and Water Resources – Surface Water
Groundwater	Evaluate how the project will address and correct overdraft conditions for the groundwater basin and how the project will affect groundwater-dependent ecosystems and interconnected surface waters.	Section 4.5, Biological Resources – Terrestrial; Section 4.11, Hydrology and Water Resources – Groundwater
Tribal and Cultural Resources	Comply with CEQA, specifically Assembly Bill 52 and Senate Bill 18; Native American Tribal contact lists and Sacred Lands files and searches should be requested from the NAHC; analysis should be based on archaeological record searches at the appropriate regional California Historical Resources Information System Center and on required field survey results; include a mitigation and monitoring reporting program to avoid or minimize impacts.	Sections 3.5, 4.6, 5.4.5, and 6.1.5 – Cultural Resources; Sections 3.15, 4.16, Tribal Cultural Resources; Section 4.18, Mitigation Measures

Area of Controversy/Issue	Summary of Issue	EIR Section or Appendix Addressing Area of Controversy/Issue
Biological Resources	Fully evaluate all potential direct, indirect, and cumulative impacts on wetlands, vegetation, and all petitioned and listed species and critical habitat; conduct habitat assessment/field survey by a qualified biologist; conduct pre-activity surveys or employ buffers and other mitigation techniques for bird nests and biological resources; conduct formal stream mapping and wetland delineation; engage with USFWS as early in the process as possible.	Sections 3.3, 4.4, 5.4.3, and 6.1.3, Biological Resources – Aquatic; Sections 3.4, 4.5, 5.4.4, and 6.1.4, Biological Resources – Terrestrial; Appendix H, Biological Survey Report

Key: CEQA – California Environmental Quality Act; NAHC – Native American Heritage Commission;
USFWS – U.S. Fish and Wildlife Service

ES.9 Environmentally Superior Alternative

CEQA Guidelines require an EIR to identify an environmentally superior alternative. Identification of the environmentally superior alternative will be based on the information presented in this Draft EIR.

A comparative summary of the environmental impacts under each alternative with the environmental impacts associated with the proposed project is provided in Table ES-1. A detailed description of the potential impacts associated with each alternative is provided in Chapter 5 of this Draft EIR. Based on the analysis presented in Chapter 5, the No Project Alternative is considered to be the environmentally superior alternative. The No Project Alternative would avoid all construction-related impacts of the proposed project, while the Low Flow and Seasonal Alternatives have lower operational impacts in comparison to the proposed project.

In accordance with the CEQA Guidelines requirement to identify an environmental superior alternative other than the No Project Alternative, FWA has identified the Seasonal Alternative as the environmentally superior alternative based on the comparative analysis presented in this Draft EIR. As outlined in CEQA Guidelines Section 15126.6(c), the analysis addresses the ability of the Seasonal Alternative to “avoid or substantially lessen one or more of the significant effects of the project.” Under the Seasonal Alternative, the significant and unavoidable noise impact and the significant construction traffic impact associated with the proposed project would be avoided because of the shorter construction period and the limited use of equipment in comparison to the proposed project, and because there would be no nighttime construction activities. Additionally, since no dewatering or canal drawdown is required under the Seasonal Alternative, this would further reduce the less than significant effects on native aquatic species movement and the use of nursery sites for the Kern brook lamprey expected to occur under the proposed project. Potential air quality emissions from operations under the Seasonal Alternative are expected to remain less than significant but could be higher than under the proposed project because of the potential need to use diesel pumps.

While the Seasonal Alternative is considered the environmentally superior alternative, it would not fully meet the project objectives as this alternative would not provide long-term reliability of the surface water supply in the FKC because of the seasonal nature of the pumps installed under the Seasonal Alternative. FWA will consider feedback during the public review phase of the Draft EIR on the environmental benefits and impacts and mitigation measures of each alternative when developing the Final EIR and Notice of Determination.

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Chapter 1 Introduction

Friant Water Authority (FWA) is preparing an Environmental Impact Report (EIR) for the Friant-Kern Canal (FKC) Pump-Back Project (proposed project or Project), to ensure compliance with the California Environmental Quality Act (CEQA). FWA is the Lead Agency under CEQA.

1.1 Project Background

The FKC Pump-Back Project is part of the San Joaquin River Restoration Program (SJRRP) and proposes to construct permanent pump-back facilities along the southern portion of the FKC. These facilities would allow water to move from the California Aqueduct, through the Cross Valley Canal (CVC), for delivery to Friant Division Contractors (Friant Contractors) along the southern portion of the FKC. Surface water supplies from the CVC are delivered through the FKC-CVC Intertie (Intertie) at the terminus of the FKC (Figure 3-1). This water is then pumped up the canal and over check structures to contractor turnouts, an operational scenario referred to as “reverse-flow pump back.” The proposed pump-back facilities would convey water supplies accessible via the Intertie, including but not limited to recaptured Restoration Flows,⁶ water purchased from the Bureau of Reclamation (Reclamation) pursuant to CVC contracts, water in the California Aqueduct, water from banking projects, and other CVC supplies. All water conveyed and delivered to Friant Contractors is subject to appropriate approval and permitting by federal, state, and local agencies.

The SJRRP was established in late 2006 to implement a Stipulation of Settlement in *Natural Resources Defense Council, et al. v. Kirk Rodgers et al.* (Settlement). In 1988, a coalition of environmental groups, led by the Natural Resources Defense Council (NRDC), filed a lawsuit challenging the renewal of long-term water service contracts between the United States and Central Valley Project (CVP) Friant Contractors. In September 2006, the “Settling Parties,” including NRDC, FWA, and the U.S. Departments of the Interior and Commerce, agreed on the terms and conditions of the Settlement, which established two primary goals:

- **Restoration Goal** – To restore and maintain fish populations in “good condition” in the main stem San Joaquin River below Friant Dam to the confluence of the Merced River, including natural reproducing and self-sustaining populations of salmon and other fish
- **Water Management Goal** – To reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim and Restoration Flows provided for in the Settlement

⁶ The San Joaquin River Restoration Program was established in late 2006 to implement the Stipulation of Settlement in *NRDC, et al., v Kirk Rodgers, et al* and establish the Restoration Goal and Water Management Goal. The Restoration Goal calls for releases of water from Friant Dam to the confluence of the Merced River (referred to as Restoration Flows) to restore and maintain fish populations in “good condition” in the main stem San Joaquin River. To achieve the Water Management Goal, the Settlement calls for recirculation, recapture, reuse, exchange, or transfer of Restoration Flows (referred to as recaptured Restoration Flows) to reduce or avoid impacts to water deliveries to all the Friant Contractors caused by the Restoration Flows.

To achieve the Restoration Goal, the Settlement calls for releases of water from Friant Dam to the confluence of the Merced River (referred to as Interim and Restoration Flows), a combination of channel and structural modifications along the San Joaquin River below Friant Dam, and reintroduction of Chinook salmon. To achieve the Water Management Goal, Paragraph 16 of the Settlement and Part III of the San Joaquin River Restoration Settlement Act (Settlement Act) provide for certain activities to be developed and implemented to reduce or avoid adverse water supply impacts on all Friant Contractors. Specifically, Section 10201 of the Settlement Act states:

- a. The Secretary of the Interior (hereafter referred to as the “Secretary”) is authorized and directed to conduct feasibility studies in coordination with appropriate federal, state, regional, and local authorities on the following improvements and facilities in the Friant Division, CVP, California:
 1. Restoration of the capacity of the FKC and Madera Canal to such capacity as previously designed and constructed by Reclamation.
 2. Reverse-flow pump-back facilities on the FKC, with reverse-flow capacity of approximately 500 cubic feet per second at the Poso and Shafter Check Structures⁷ and approximately 300 cubic feet per second at the Woollomes Check Structure.
- b. Upon completion of and consistent with the applicable feasibility studies, the Secretary is authorized to construct the improvements and facilities identified in subsection (a) in accordance with all applicable federal and state laws.
- c. The costs of implementing this section shall be in accordance with Section 10203, and shall be a nonreimbursable federal expenditure.

Section 10201(a)(2) of the Settlement Act directs Reclamation to explore the feasibility of reverse-flow pump-back facilities on the FKC, with reverse-flow capacity of approximately 500 cfs at the Poso and Shafter-Wasco check structures and approximately 300 cfs at the Woollomes check structure. Water supply and economic analyses were performed for this option in 2011 and show that much of the pump-back capacity described in this section of the Settlement Act would be unused because of limited conveyance capacity and the availability of recaptured Restoration Flows, demands, and downstream pump-back capacities.

In 2015, FWA proposed an alternative that would revise the proposed pumping capacities to 200 cfs at the Shafter check structure and 75 cfs at the Lake Woollomes and Deer Creek check structures for the additional benefit of accessing water banks or other water supplies available via the CVC (e.g., Kern River, local Kern banking projects, California Aqueduct) during times of drought. This alternative was evaluated to an appraisal level as part of the SJRRP Water Management Goal Investment Strategy using all new facilities, Project ID 504 – Reverse Flow Pump-Back Facilities on the FKC (SJRRP 2015). However, since 2015, FWA (in coordination with Reclamation) has considered the potential benefits of increasing pumping capacities beyond the levels identified in the 2015 Investment Strategy Report.

⁷ Poso Creek has experienced land subsidence that required pump-back operations to be moved to Shafter-Wasco. Poso Creek has not been used for pump-back operations since 2012.

Expanding the capacity of the pump-back facility would allow for its use in supporting the pump-back of recaptured and recirculated Restoration Flows and the delivery of water from Cross Valley Contractors' supplies, banking projects, the California Aqueduct, and other CVC supplies.

1.2 Project Objectives

This section is a critical part of the environmental review process because it helps to set the overall direction of an EIR, identify the range of reasonable alternatives, and focus the scope of analysis.

As required by CEQA, a lead agency must identify the objective(s) sought by the proposed action. FWA has developed the following objectives:

- Increasing long-term reliability of surface water supply in the FKC for use by Friant Contractors.
- Increasing operational flexibility of the FKC for Friant Contractors.
- Support efforts to meet the stipulated Water Management Goal, specifically Paragraph 16, Section 10201(a)(2) of the San Joaquin River Restoration Settlement Act (Settlement Act).

1.3 Purpose of this Environmental Impact Report

FWA is preparing an EIR to evaluate the FKC Pump-Back Project, which would facilitate the recirculation of recaptured Restoration Flows released from Millerton Lake for the SJRRP and other waters obtained by Friant Division Contractors (Friant Contractors) to increase operational flexibility and long-term reliability of the water supplies conveyed through the FKC. The EIR evaluates the environmental impacts of these alternatives under the California Environmental Quality Act (CEQA Public Resources Code [PRC] Section 21000 et seq.) and the CEQA Guidelines (California Code of Regulations Title 14, Section 15000 et seq.). FWA has undertaken this Draft EIR to:

- Identify potentially significant environmental impacts and indicate the manner in which any such significant environmental impacts can be avoided or substantially lessened.
- Identify any significant and unavoidable adverse impacts that cannot be mitigated.
- Identify reasonable and feasible alternatives to the proposed project that would attain most of the project objectives and or eliminate or lessen any significant adverse environmental impacts.
- Inform the public, local community, and responsible trustee, state, and federal agencies of the nature of the proposed project, its potentially significant environmental effects, feasible mitigation measures to mitigate those effects, and reasonable and feasible alternatives.
- To enable FWA to consider the environmental consequences of the proposed project and make findings regarding each significant effect that is identified.
- To facilitate any responsible agencies in issuing permits and approvals for the proposed project.

1.4 Responsibilities of Lead, Responsible and Trustee Agencies

FWA is the CEQA lead agency in preparing this EIR. As the lead agency, FWA will be responsible for completing the Draft and Final EIR documents, completing the Notice of Determination after approving the proposed project or an alternative for implementation, then constructing and operating the approved project and ensuring all mitigation measures are fully implemented. FWA must certify the EIR before approving the proposed project or any of the alternatives. Upon certification, FWA and any responsible agencies will use the EIR to decide whether to approve and implement the proposed project or an alternative. Other agencies (e.g., trustee agencies) may also use this EIR in their review and approval processes.

1.5 Public Involvement

1.5.1 Public Scoping

The purpose of public scoping is to obtain feedback from agencies, the public, and other interested parties on significant issues associated with a project. This information helps guide an agency's environmental review of a project. FWA considered scoping comments received both as part of the alternative formulation process and to support the evaluation of potential environmental effects.

Additionally, the Notice of Preparation (NOP) informing agencies and the public about the EIR was circulated for a 30-day public comment period from May 29 to June 27, 2024. Three written comments on the proposed content and scope of the EIR were received in response to the NOP. The written comments were reviewed and incorporated, as appropriate, into the Draft EIR. All comments received during the scoping period are included in the Public Scoping Report in Appendix K. Table 3-1 in Appendix K itemizes the written comments. The scoping comments are presented in Attachment 5 of Appendix K.

A public scoping meeting was held by FWA on June 12, 2024, to inform interested parties about the proposed project and to solicit agency and public input on the scope and content of the EIR. The public scoping meeting was conducted online using a web-based tool that allowed FWA to present the project and allowed the public to participate through the online chat function. Two members of the public attended the meeting and one comment was received during the online public scoping meeting.

Chapter 2 Project Description

2.1 Project Overview

The proposed project would include constructing and operating three new pump-back facilities to support the recirculation of recaptured Restoration Flows and other waters, allowing for increased long-term reliability in the surface water supply and operational flexibility of the FKC for Friant Contractors. This would be accomplished by increasing the opportunity to bring non-Millerton water (i.e., water not sourced from Millerton Lake) into the FKC via the CVC, which could then be directly delivered to Friant Contractors and/or used in operational exchanges on the canal. Under the proposed project, a 500 cfs permanent six-bay pump-back facility would be built at the Shafter-Wasco check structure, a 250 cfs permanent four-bay pump-back facility would be constructed at the Lake Woollomes check structure, and a 250 cfs permanent four-bay pump-back facility would be built at the Deer Creek check structure. The three proposed pump-back facilities would convey water supplies accessible via the FKC-CVC Intertie, including but not limited to recaptured Restoration Flows,⁸ water purchased from Reclamation pursuant to CVC contracts,⁹ water in the California Aqueduct, water from banking projects,¹⁰ and other CVC supplies. All water conveyed and delivered to Friant Contractors is subject to appropriate approval and permitting by federal, state, and local agencies. Figure 2-1 shows the locations of these proposed pump-back facilities.

⁸ Environmental compliance for the recirculation of recaptured Restoration Flows is analyzed outside of this EIR in a separate environmental compliance document, available:

https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=2940

⁹ Environmental compliance for the transfer of water purchased from Reclamation pursuant to CVC contracts is analyzed outside of this EIR in a separate environmental compliance document, available:

<https://ceqanet.opr.ca.gov/Project/2020100075>

¹⁰ Environmental compliance for the transfer of water from banking projects is analyzed outside of this EIR in a separate environmental compliance, available: <https://ceqanet.opr.ca.gov/2023080251> and

<https://ceqanet.opr.ca.gov/2009071022/4>

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

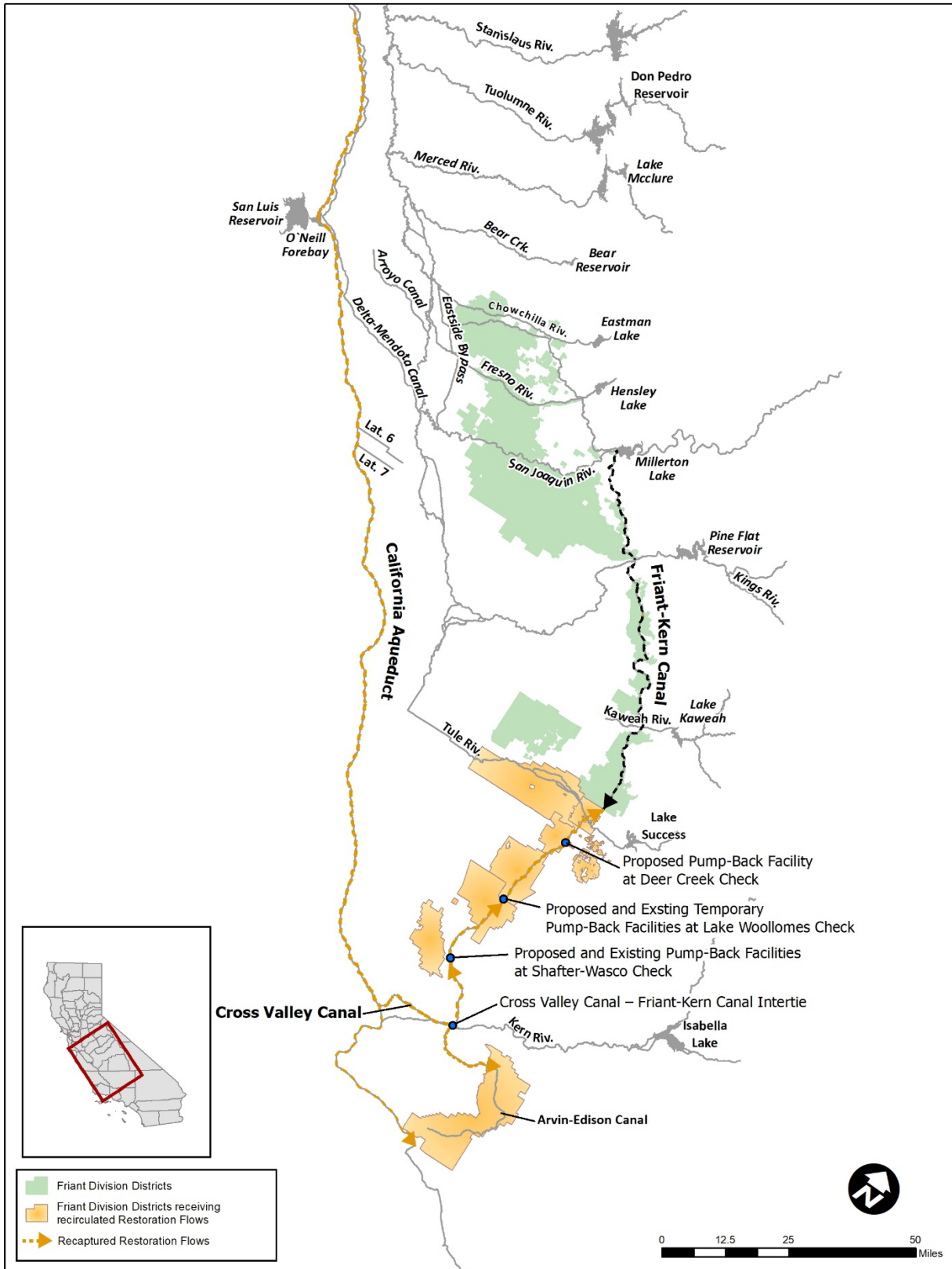


Figure 2-1. Proposed Project Location

2.1.1 Project Facilities

2.1.1.1 Pump-Back at Shafter-Wasco

The proposed project would replace the existing temporary 50 cfs pump-back facility at the Shafter-Wasco check structure with a permanent 500 cfs pump-back facility. The Shafter-Wasco check structure is the second check structure along the FKC, upstream (downstream during reverse flow pump-back operations) of the Kern check structure at milepost 137.2.

The proposed facility would consist of a six-bay in-channel pump structure located downstream of the existing Shafter-Wasco check structure, and an outlet structure located upstream of the check structure. Each pump would have 80 feet of 42-inch-diameter discharge piping that would manifold into a single 360-foot-long, 84-inch-diameter pipeline that would convey water from the pump structure to the outlet structure. The footprint of the Shafter-Wasco pump-back facility would be approximately 1.7 acres. Additionally, two temporary staging areas, covering up to 4.4 acres, would be used during construction. Figure 2-2 provides a conceptual layout of the proposed pump-back facility at Shafter-Wasco. The existing temporary facility at Shafter-Wasco does not include any constructed permanent structures, so no demolition or excavation would be anticipated. All construction activities at the Shafter-Wasco site, including the temporary staging areas, would be located within federal property and/or rights-of-way.

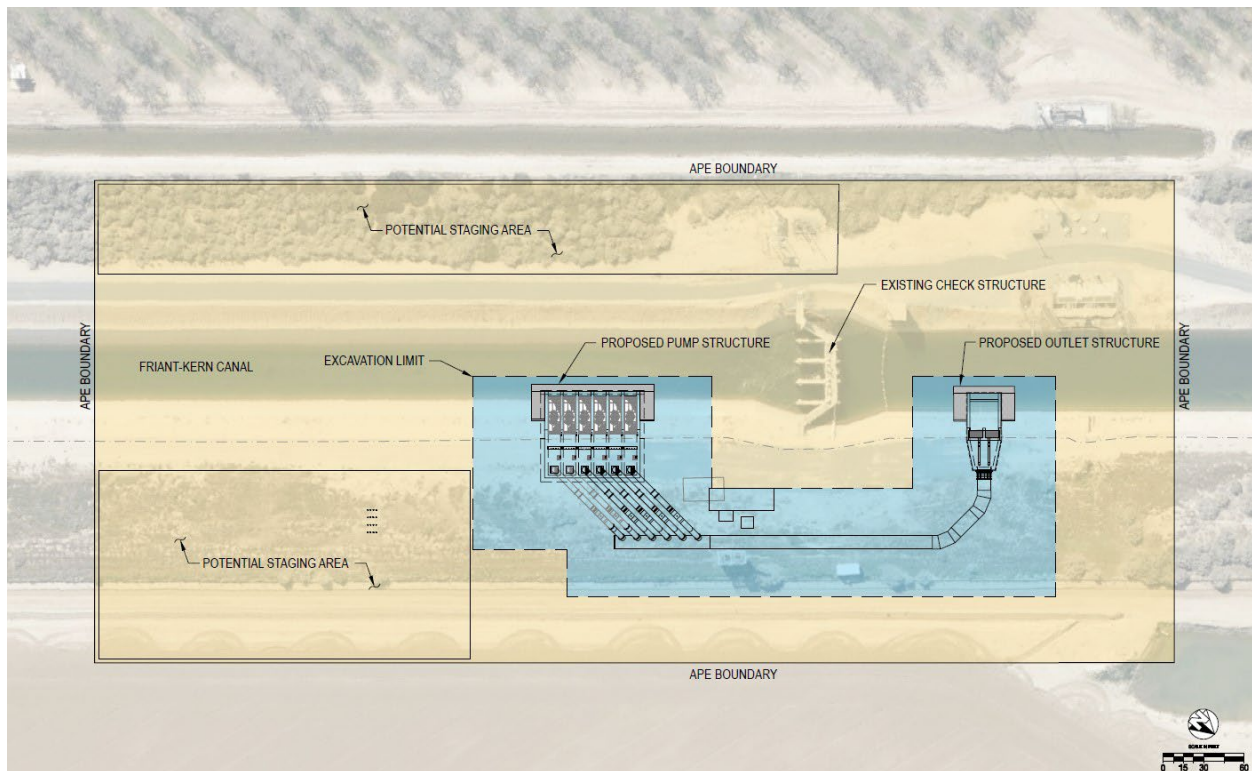


Figure 2-2. Conceptual Layout of Proposed Pump-Back Facility at the Shafter-Wasco Check Structure

2.1.1.2 Pump-Back at Lake Woollomes

The proposed project would replace the existing temporary 50 cfs pump-back facility at the Lake Woollomes check structure with a permanent 250 cfs pump-back facility. Lake Woollomes is an equalizing reservoir for the FKC and is located at milepost 121.52. Lake Woollomes was constructed for irrigation purposes, and water can be diverted into the lake when additional water is available in the canal. The surplus water can then be emptied back into the canal when water is needed downstream (Reclamation 1958).

The proposed facility would consist of a four-bay in-channel pump structure located downstream (upstream during reverse flow pump-back operations) of the existing Lake Woollomes check structure on the western embankment of the FKC. The pump would have 350 feet of 48--inch diameter discharge piping to an outlet structure in the embankment on the upstream side of the Lake Woollomes check structure. The footprint of the Lake Woollomes pump-back facility would be approximately 1.7 acres. Two temporary staging areas, covering up to 3.3 acres, would be used during construction.

Figure 2-3 provides a conceptual layout of the proposed pump-back facility at Lake Woollomes. The existing temporary facility at Lake Woollomes does not include any constructed permanent structures, as such, no demolition and/or excavation would be anticipated. All construction activities at the Lake Woollomes site, including the temporary staging areas, would be located within federal property and/or right-of-way.

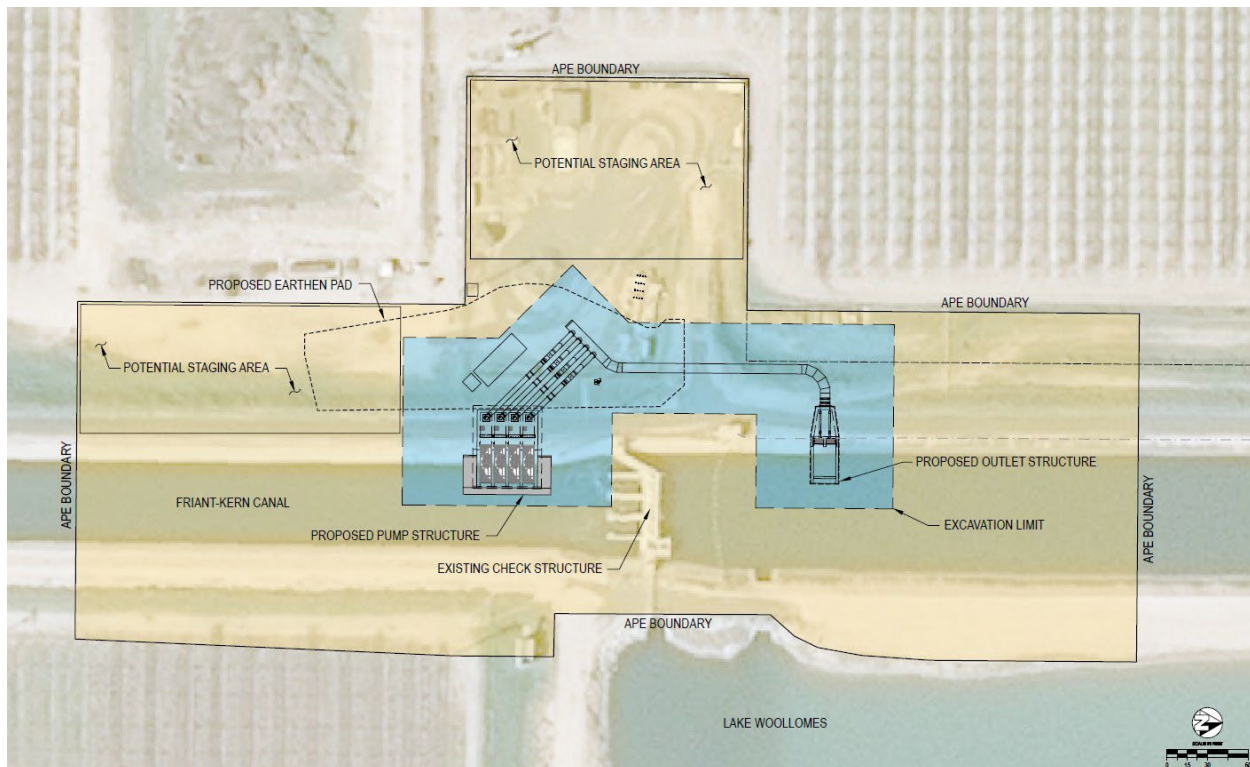


Figure 2-3. Conceptual Layout of Proposed Pump-Back Facility at the Lake Woollomes Check Structure

2.1.1.3 Pump-Back at Deer Creek

A 250 cfs proposed pump-back facility at the Deer Creek check structure would be built, replacing the existing Deer Creek check structure located along the FKC at milepost 102.69, where Deer Creek intersects with the FKC (Figure 2-1).

The four-bay in-channel pump structure proposed under the proposed project would be incorporated into the features constructed under the FKC Middle Reach Capacity Correction Project (i.e., the new FKC, earthen berms, pool, and siphon).¹¹ The proposed pump structure would divert water from the new FKC segment into a pool on the original FKC that would use the existing Deer Creek siphon on the original FKC to convey water to the upstream side (downstream during reverse flow pump-back operations) of the existing Deer Creek siphon. This pool would be formed by a new earthen berm in the original FKC, downstream of the siphon, and a new earthen berm/proposed pump station on the upstream side of the siphon in the original FKC. The gravity turnout with automated canal gate proposed under the proposed project would be constructed on the new FKC segment with a 72-inch-diameter pipe that discharges into the original FKC. The proposed four-bay pump station would be constructed inside the original FKC, upstream from the existing siphon, and convey water from the pool in the original FKC into the new FKC segment. The proposed pump would have up to 120 feet of 48-inch-diameter discharge piping connected to the proposed outlet structure in the new FKC. Construction activities (including excavation and staging) under this alternative would be limited to the areas to the west of the new FKC and on either side of Deer Creek, and would not result in disturbance to the creek. The footprint of the Deer Creek pump-back facility would be approximately 0.67 acres to the north of Deer Creek and 0.60 acres to the south. A temporary staging area using up to 3.7 acres to the north of Deer Creek and up to 3.6 acres to the south would be used during construction.

Figure 2-4 provides a conceptual layout of the proposed pump-back facility at Deer Creek under the proposed project, with the new components (earthen berms, FKC, pool, and siphon) to be constructed under the FKC Middle Reach Capacity Correction Project. All construction activities at the Deer Creek site, including the temporary staging areas, would be located within federal property and/or rights-of-way.

¹¹ In October 2020, FWA (CEQA lead agency) and Reclamation (National Environmental Policy Act [NEPA] lead agency) approved/certified the environmental impact statement/EIR for the FKC Middle Reach Capacity Correction Project. The project includes building a parallel canal to the original FKC where it passes the Deer Creek check structure. A new check structure and siphon will be constructed for the parallel canal at the Deer Creek crossing. This Draft EIR refers to the parallel canal, siphon, Deer Creek check structure, and earthen berms being built under the FKC Middle Reach Capacity Correction Project as the new FKC, the new siphon, the new check structure, and the new earthen berms, respectively.

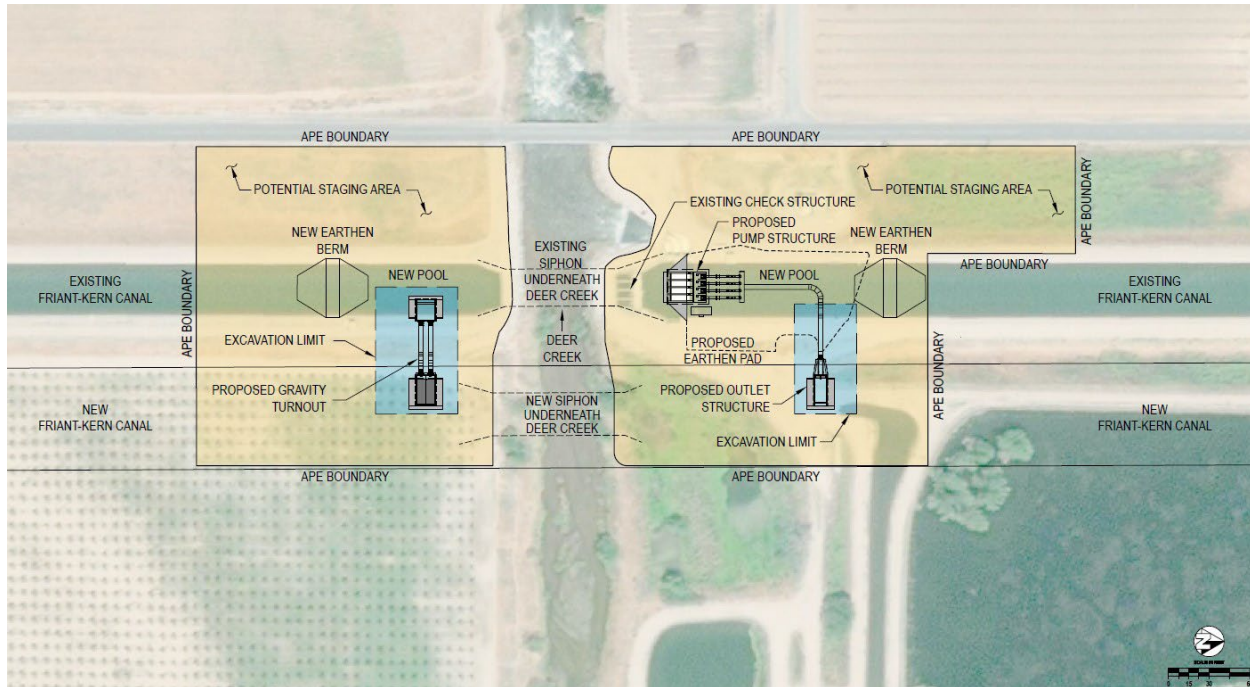


Figure 2-4. Conceptual Layout of Proposed Pump-Back Facility at the Deer Creek Check Structure

2.1.2 Construction of Project Facilities

Construction of the three pump-back facilities would occur simultaneously and is expected to last 6 to 8 months, starting in 2025. Most of the in-canal construction activities, such as for the pump intakes and outlets, would occur during the winter months when water levels in the FKC are low, such as from reduced irrigation demand, or during a planned canal drawdown period. If in-canal construction activities occur and extend beyond the winter drawdown period, six temporary cofferdams (one upstream and one downstream at each site) along the banks of the canal would be constructed to isolate/dewater the construction zones. Figure 2-5 shows an example cofferdam similar to the cofferdams that would potentially be placed on the FKC under the proposed project if construction were to occur outside of the winter drawdown period. The temporary cofferdams would reduce canal capacity by up to 25 percent (%). The maximum expected personnel per site is 40 workers (120 workers at all three sites combined). Work would be performed 5 to 6 days per week, Monday through Friday and some Saturdays. If the FKC needs to be refilled or if critical path items need to be completed, nighttime construction may occur.

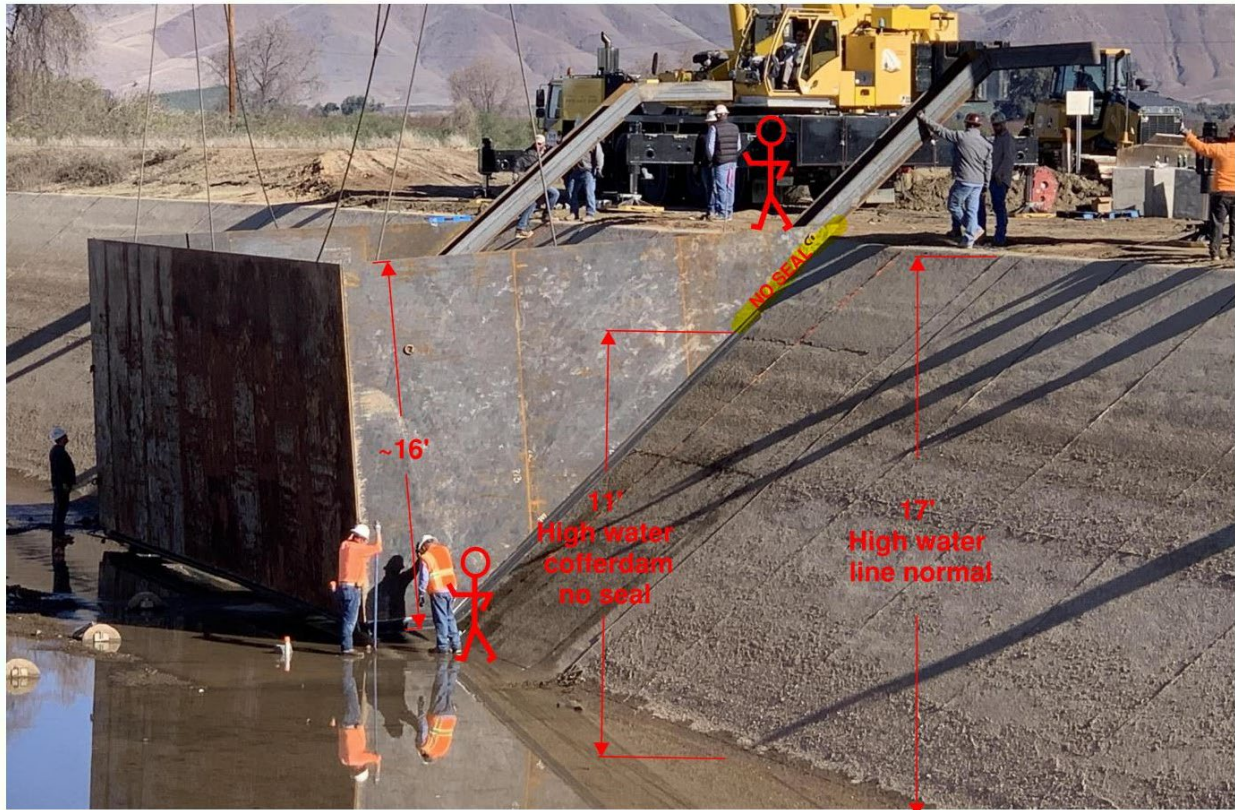


Figure 2-5. Example Cofferdam Design

Equipment staging areas are shown in Figure 2-2, Figure 2-3, and Figure 2-4. Equipment staging and stockpile areas would be returned to pre-construction conditions after the proposed project is completed. Equipment used to construct the proposed project would include (per site):

- Excavators
- Generator
- Paddle wheel scraper
- Backhoe
- Crane
- Bulldozers
- Blade scrapers
- Miscellaneous gas-powered hand tools
- Compactors
- Water trucks

Shafter-Wasco Site – Figure 2-2 shows the proposed excavation and staging area at the Shafter-Wasco site. Items in the staging areas would include trailers, equipment, and stockpiled materials. Approximately 5,300 cubic yards of material excavated from the site would be hauled to the Lake Woollomes and Deer Creek sites to be used for the proposed earthen pads. These proposed earthen pads would widen the existing embankment at the Lake Woollomes and Deer Creek sites to accommodate the new pump stations and discharge pipes. Fill material would be needed around the proposed pump stations and the discharge pipes would be buried to allow for passage of maintenance vehicles. Additionally, suitable surplus material from the structure and pipeline excavation at Shafter-Wasco may be hauled to Lake Woollomes to be used for the proposed

earthen pad. No earthen pads are proposed at the Shafter-Wasco site. Equipment and materials would be hauled using State Route (SR) 99. Up to 350 construction debris and waste material transports to the Shafter-Wasco landfill (the local landfill on Scofield Avenue) could be expected, along with the regular commuting of construction personnel. Approximately 130 linear feet of 30-inch steel pipe may be salvaged or disposed of by the construction contractor. Potential haul routes from Shafter-Wasco to the other sites and the potential route to the Shafter-Wasco landfill are presented in Figure 2-6.

Lake Woollomes Site – Figure 2-3 shows the proposed excavation and staging area at the Lake Woollomes site. Items in the staging areas would include trailers, equipment, and stockpiled materials. Approximately 2,600 cubic yards of material from the Shafter-Wasco site would be imported to the Lake Woollomes site to construct an earthen pad to hold the proposed pump station, requiring approximately 163 haul trips. The Lake Woollomes site is approximately 60 miles round trip from the Shafter-Wasco site. Equipment and materials would be hauled using SR 99. Up to 175 waste material transports to the Lost Hills landfill, also known as the Holloway landfill (the local landfill on Holloway Road), could be expected, along with the regular commuting of construction personnel. Approximately 360 linear feet of chain-link fence, concrete stairs and a pad, two utility poles, and a septic tank (if still on-site) are expected to be hauled away and disposed of by the contractor. The potential haul route from Lake Woollomes to the Lost Hills landfill is presented in Figure 2-7.

Deer Creek Site – Figure 2-4 shows the proposed excavation and staging area at the Deer Creek site. Items in the staging areas would include trailers, equipment, and stockpiled materials. Approximately 2,700 cubic yards of material from the Shafter-Wasco site would be transferred to the Deer Creek site to construct an earthen pad within the existing FKC right-of-way to hold the proposed pump station, requiring approximately 169 haul trips. The Deer Creek site is approximately 90 miles round trip from the Shafter-Wasco site. Equipment and materials would be hauled using SR 99. Up to 175 waste material transports to the Woodville landfill (the local landfill on Road 152) could be expected, along with the regular commuting of construction personnel. The potential haul route from Deer Creek to the Woodville landfill is presented in Figure 2-8.

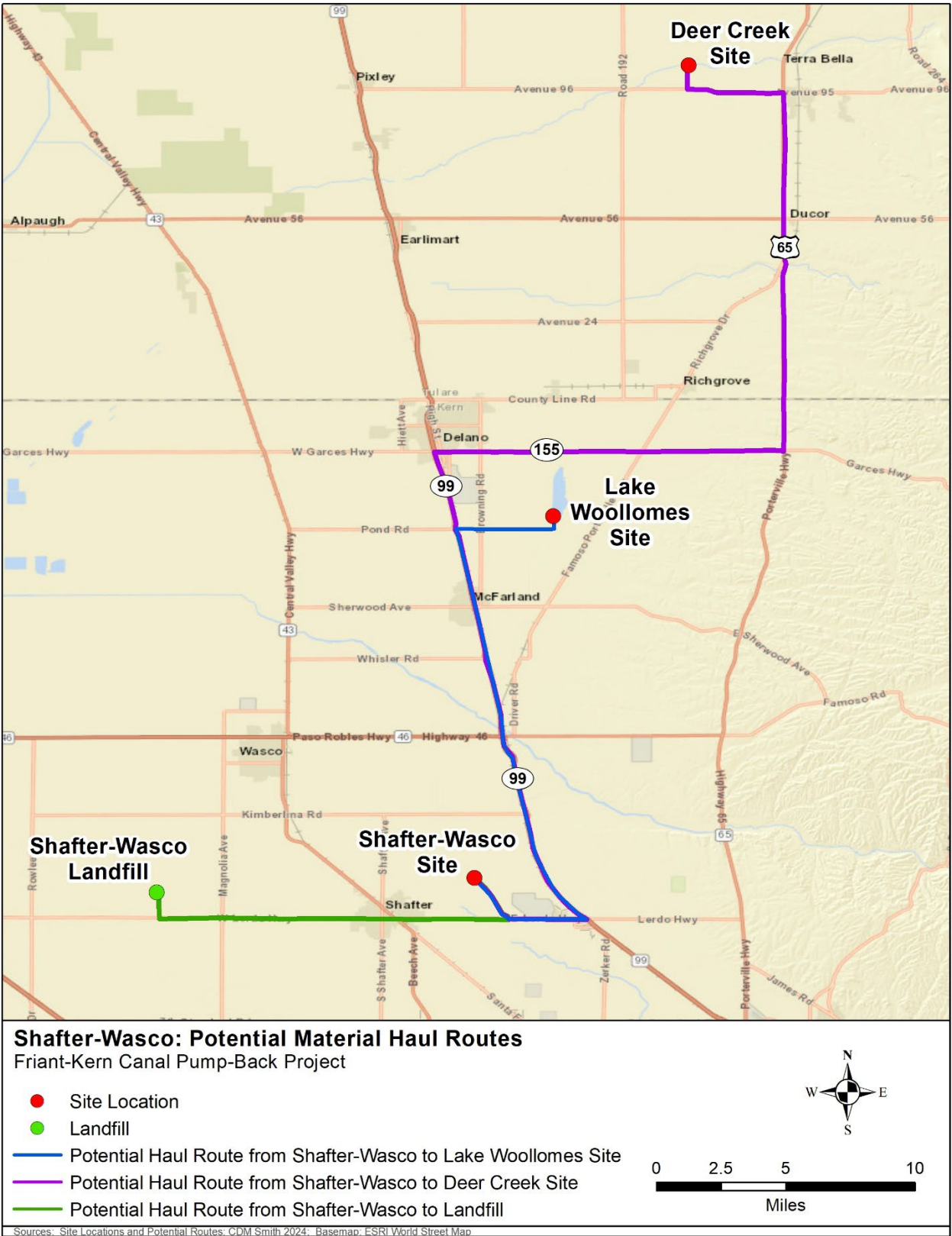


Figure 2-6. Shafter-Wasco Potential Haul Routes



Figure 2-7. Lake Woollomes Potential Haul Routes



Figure 2-8. Deer Creek Potential Haul Routes

2.1.3 Operation of Project Facilities

Pump-back facilities under the proposed project would be operated to support the pump-back of recaptured and recirculated Restoration Flows and the delivery of water from Cross Valley Contractors' supplies, banking projects, the California Aqueduct, and other CVC supplies. Restoration Flows vary with the season and water year. The proposed pump-back facilities will convey water supplies accessible via the Intertie to contractor turnouts. All water conveyed and delivered to Friant Contractors is subject to appropriate approval and permitting by federal, state, and local agencies. Under the proposed project, the pump-back facilities at Shafter-Wasco, Lake Woollomes, and Deer Creek would be operated year-round.

The three new pump-back facilities would all be electric-driven. Table 2-1 provides an estimated kilowatt-hour range for the pump-back facility at each site.

Table 2-1. Estimated Energy Consumption for Each Pump-Back Facility Under the Proposed Project

Pump-Back Facility	Estimated Energy Consumption (kWh) ¹
Shafter-Wasco	9,790,000
Lake Woollomes	3,899,000
Deer Creek	1,623,000

Note:

¹ To maintain a conservative approach, the energy consumption analysis presented in this EIR is based on 24/7 operation for 3 months at maximum pump station flow (minimum first value) and on the estimated kWh required to pump the maximum average acre-feet based on historical water order data used to size the pump stations. Values are rounded to the nearest 1,000 kWh.

Key: kWh – kilowatt-hour

2.2 Agency Coordination

The development of this Draft EIR and implementation of the proposed project have required and will continue to require coordination with a variety of federal, state, and local agencies. This section discusses these agencies and their roles in the process.

2.2.1 Central Valley Regional Water Quality Control Board

The proposed project and the alternatives could require several permits from the Central Valley Regional Water Quality Control Board (RWQCB), including coverage under a National Pollutant Discharge Elimination System (NPDES) permit for general construction. Reclamation and FWA would consult with the Central Valley RWQCB to determine permitting requirements. The construction contractor would obtain all required permits prior to construction. The Central Valley RWQCB will receive a copy of this Draft EIR for review and comment.

2.2.2 State Water Resources Control Board

FWA would coordinate with the State Water Resources Control Board (SWRCB) to ensure the project is covered under existing water right permits. The SWRCB will receive a copy of this Draft EIR for review and comment.

2.2.3 California Department of Fish and Wildlife

The proposed project has the potential to affect species covered under the California Endangered Species Act. FWA would consult with the California Department of Fish and Wildlife (CDFW) to ensure compliance with the California Endangered Species Act. CDFW will receive a copy of this Draft EIR for review and comment.

2.2.4 Local Governments

The proposed project has the potential to impact facilities within Kern and Tulare Counties. Kern and Tulare Counties will receive a copy of this Draft EIR for review and comment. FWA will coordinate with Kern and Tulare Counties.

2.2.5 Pacific Gas and Electric Company

FWA will coordinate with the Pacific Gas and Electric Company (PG&E) for permanent power connections at the Lake Woollomes and Deer Creek sites under the proposed project. FWA will obtain any required permits from the Kern and Tulare Counties' building and planning departments and submit an application with PG&E to upgrade the counties' service.

2.2.6 Southern California Edison

FWA will coordinate with Southern California Edison for permanent power connections at the Shafter-Wasco site under the proposed project. FWA will obtain any required permits from the Kern and Tulare Counties' building and planning departments and submit an application with Southern California Edison to upgrade the counties' service.

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Chapter 3 Environmental Setting

This chapter summarizes the environmental setting for the proposed project. Section 3.17 and Appendix D present the federal, state, and local laws, regulations, policies, and plans that are relevant and applicable to the affected environment, study area, and analysis of impacts. The study area for this EIR includes the FKC and related water infrastructure near the three proposed pump-back facilities from mileposts 101.3 to 101.6, 120.2 to 120.3, and 135.8 to 135.9, where construction impacts under the proposed project would occur (Figure 2-2, Figure 2-3, and Figure 2-4). The study area (Extended Study Area) also includes the facilities of Friant Contractors and related conveyance infrastructure that would not be directly impacted by project construction or operations, including the CVC, Kern River, and California Aqueduct, but is nevertheless relevant to project operations. The facilities included in the Extended Study Area are shown in Figure 2-1. Project construction- and operations-related impacts to these conveyance facilities are not anticipated, as discussed in Chapter 4. No impacts to water quality conditions in the CVC or California Aqueduct are anticipated from operation of the proposed project, as detailed in Section 4.10.3. The baseline conditions presented in this chapter are a current and accurate representation of existing conditions at the time the NOP was published, consistent with CEQA Guidelines Section 15125.

3.1 Aesthetic Resources

The aesthetic value of an area is derived from both natural and artificial features. The value is determined by the contrasts, forms, and textures exhibited by geology, hydrology, vegetation, wildlife, and human-made features. Individuals respond differently to changes in the physical environment, depending on prior experiences and expectations, proximity, and the duration of views. Consequently, aesthetic effects analyses tend to be highly subjective in nature. The study area for the evaluation of visual resources comprises the areas where important visual resources could be affected from implementing the proposed project, which includes the Shafter-Wasco, Lake Woollomes, and Deer Creek sites.

This analysis relies on the United States Department of Agriculture (USDA) Forest Service (USFS) Scenery Management System (SMS) to classify the visual resources in the study area. Because visual sensitivity and judgments of visual quality and viewer response are dependent on a number of conditions, they tend to be subjective in nature. The SMS uses scenic attractiveness and landscape visibility to develop a meaningful measurement of relative importance and sensitivity (i.e., what is seen and perceived) in the landscape. The SMS employs a system of Inherent Scenic Attractiveness (ISA) classes to assess and categorize the scenic value of different lands within a landscape. The three ISA classes are: Class A, Distinctive; Class B, Typical; and Class C, Indistinctive. Class A areas are recognized for their exceptional scenic value, Class B areas are valued but less distinctive, and Class C areas have minimal scenic value. Using the USFS SMS, the Lake Woollomes and Deer Creek sites have elements that are Classes A and B, while the Shafter-Wasco site has elements that are Class C (USFS 1995). Understanding why areas are classified is important because it helps in making informed decisions about land management and conservation priorities. Although areas classified as Class A (Distinctive) are recognized for their exceptional scenic value, they may require more

stringent protective measures. Class B (Typical) areas might not need the same level of protection. This classification aids in balancing the need for development with the preservation of visual and aesthetic resources.

3.2 Air Quality

Air quality in California is regulated nationwide by the U.S. Environmental Protection Agency (EPA), statewide by the California Air Resources Board (CARB), and locally by Air Pollution Control Districts or Air Quality Management Districts (AQMDs). The San Joaquin Valley Air Pollution Control District (SJVAPCD) regulates air quality within the study area.

For evaluating air quality, the study area is the area where air quality could be affected from implementing the proposed project, specifically, the immediate areas of the proposed pump-back facilities to which the public has general access (i.e., ambient air areas), and the broader region of the San Joaquin Valley Air Basin (SJVAB). In the SJVAB, ozone (O_3), inhalable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$) are pollutants of concern because ambient concentrations of these pollutants exceed the California Ambient Air Quality Standards (CAAQS). Additionally, ambient O_3 and $PM_{2.5}$ concentrations exceed the National Ambient Air Quality Standards (NAAQS), while carbon monoxide (CO) and PM_{10} concentrations recently attained the NAAQS and are designated maintenance. Table 3-1 summarizes the attainment status for the counties affected by the proposed project.

Most of the study area supports agricultural land uses. Crop cycles, including land preparation and harvest, contribute to pollutant emissions, primarily particulate matter. Additionally, where water resources from the FKC are not sufficient to maintain agricultural uses, groundwater pumping is used to supplement water from FKC. Groundwater pumping with diesel and natural-gas-fueled engines emits air pollutants through exhaust. The primary pollutants emitted by diesel pumps are nitrogen oxides (NO_x), volatile organic compounds (VOCs), CO, $PM_{2.5}$, and PM_{10} . NO_x and VOCs are precursors to O_3 formation.

Table 3-1. State and Federal Attainment Status

County	O ₃ CAAQS	PM _{2.5} CAAQS	PM ₁₀ CAAQS	O ₃ NAAQS	PM _{2.5} NAAQS	PM ₁₀ NAAQS	CO NAAQS
Kern ¹	N	N	N	N ²	N ³	M	M ⁴
Tulare	N	N	N	N ²	N ³	M	U

Sources: 17 California Code of Regulations Sections 60200 through 60210; 40 Code of Federal Regulations (CFR) 81; CARB 2023; EPA 2024a.

Notes:

¹ Only the western portion of Kern County is within the SJVAB. The eastern portion of Kern County is within the Eastern Kern Air Basin. The attainment status shown for Kern County refers to status applicable to the western portion of Kern County, the portion containing the FKC and proposed pump-back facilities.

² 8-hour O₃ classification = extreme.

³ PM_{2.5} classification = serious (2012 NAAQS); serious (2006 NAAQS).

⁴ Only the urbanized portion of Bakersfield is designated as a maintenance area in Kern County. All other areas are designated attainment or unclassified.

Key: CO – carbon monoxide; M – maintenance (area formerly exceeded the ambient air quality standards (i.e., was designated nonattainment), but has since attained the standards); N – nonattainment (background air quality exceeds the ambient air quality standards); O₃ – ozone; PM_{2.5} – fine particulate matter; PM₁₀ – inhalable particulate matter; U – unclassified/attainment (area does not have enough monitors to determine the background concentrations; treated the same as attainment)

Sensitive receptors are locations where segments of the population susceptible to poor air quality, including children, elderly, and people with preexisting health problems, may live or be present. Examples of sensitive receptors include residences, schools and school yards, park and playgrounds, daycare centers, nursing homes, and medical facilities. Table 3-2 summarizes the closest sensitive receptors to the center of each construction site. Figures G1-1 through G1-3 in Appendix G1 show the sensitive receptor locations in relation to each project site.

Table 3-2. Air Quality and Noise-Sensitive Receptors Within the Study Area

Sensitive Receptors	Distance from Center of Construction (feet)
Shafter-Wasco	
Residence on Fresno Avenue	8,110
Lake Woollomes	
Residence on Pond Road	2,800
Deer Creek	
Residence on Road 208	1,220

Table 3-3 summarizes the health effects associated with criteria air pollutants. EPA sets NAAQS and the local air districts set CEQA significance thresholds to reduce these health risks to acceptable levels. Appendix G1 contains more information about sensitive receptors within the study area.

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

Pollutant	Characteristics	Health Effects	Major Sources
O ₃	Highly reactive photochemical pollutant created by the action of sunshine on O ₃ precursors	• Cough and chest tightness pain upon taking a deep breath • Worsening of wheezing and other asthma symptoms • Reduced lung function • Increased hospitalizations for respiratory causes	Pollutants emitted from vehicles, factories, and other industrial sources; fossil fuels combustion; consumer products; and evaporation of paints
NO ₂	Reactive, oxidizing gas formed during combustion	• Respiratory symptoms • Episodes of respiratory illness • Impaired lung function	High-temperature combustion processes, such as those occurring in trucks, cars, and power plants
SO ₂	Colorless gas with pungent odor	• Wheezing, shortness of breath, and chest tightness • Pulmonary symptoms and disease • Decreased pulmonary function • Increased risk of mortality	Sulfur-containing fuel burned by locomotives, ships, and off-road diesel equipment, or industrial sources like petroleum refining and metal processing
CO	Highly toxic odorless, colorless gas; formed by the incomplete combustion of fuels	• Impairment of oxygen transport in the bloodstream • Aggravation of cardiovascular disease • Fatigue, headache, and dizziness	Carbon-containing fuels like gasoline or wood
PM _{2.5} and PM ₁₀	Small particles measuring 10 microns or less are termed PM ₁₀ (fine particles less than 2.5 microns are termed PM _{2.5}); solid and liquid particles of dust, soot, aerosols, smoke, ash, pollen, and other matter that is small enough to remain suspended in the air for a long period	• Increased risk of hospitalization for lung and heart-related respiratory illness • Increased risk of premature deaths • Reduced lung function • Increased respiratory symptoms and illness	Burning fuels like gasoline, oil, and diesel or wood (PM _{2.5}) and windblown dust (PM ₁₀)
Lead	Soft resilient metal	• Impaired blood formation and nerve conduction • Fatigue, anxiety, short-term memory loss, depression, weakness in extremities, and learning disabilities in children • Cancer	Various industrial activities

Key: CO – carbon monoxide; NO₂ – nitrogen dioxide; O₃ – ozone; PM_{2.5} – fine particulate matter; PM₁₀ – inhalable particulate matter; SO₂ – sulfur dioxide

3.3 Biological Resources – Aquatic

The area of analysis for fisheries resources includes the FKC (a concrete-lined irrigation canal), Lake Woollomes (an equalizing reservoir for the FKC), and Deer Creek (an intermittent stream).

There are no state or federally listed species within Lake Woollomes or Deer Creek (CDFW 2023). The Kern brook lamprey (*Lampetra hubbsi*), a state-listed species of concern, is known to inhabit the FKC where ammocoetes (larvae) occupy sand/mud substrates occurring within canal-associated siphons. The species has been documented within the FKC 2 miles north of the Lake Woollomes site (CDFW 2023). Therefore, the species is reasonably likely to inhabit the existing siphon that conveys water beneath Deer Creek.

3.4 Biological Resources – Terrestrial

The area of analysis for terrestrial resources includes the areas within the excavation limits of the proposed project (Figure 2-2, Figure 2-3, and Figure 2-4). These areas generally include the banks of the FKC, the existing maintenance roads (which are dirt or gravel-improved), and surrounding scrubland and grassland habitat. In March 2021, a reconnaissance-level biological resources survey of the three project sites was conducted to inspect and delineate wetland areas, observe and characterize vegetation communities, and assess habitat quality and the potential for common and special status wildlife and plant species to occur. In January 2023, an additional reconnaissance-level site visit was conducted to assess current habitat conditions at the three project sites. Appendix H details the methodology and findings of each survey.

3.4.1 Natural Communities

Dominant natural communities associated with the project sites include annual grassland and scrub/chaparral. Small areas featuring valley/foothill riparian vegetation were observed near the Deer Creek project area.

3.4.1.1 Common Natural Communities

The study area includes the San Joaquin River watershed and the Tulare Basin. Natural communities across the San Joaquin River watershed and Tulare Basin are highly altered from agricultural practices. Common natural communities in the study area include dry scrubland (present at all three project sites), annual grassland (present at the Deer Creek site), and disturbed areas (present at all three project sites). Dry scrubland is dominated by chamise (*Adenostoma fasciculatum*), Russian thistle (*Salsola* spp.), coyote brush (*Baccharis pilularis*), and California buckwheat (*Eriogonum fasciculatum*). Grassland habitats are likely dominated by non-native species, including wild oats (*Avena* spp.), brome (*Bromus* spp.), and wild barley (*Hordeum* spp.).

3.4.1.2 Sensitive Natural Communities

Sensitive natural communities that were identified in the project vicinity during the March 2021 site visit include valley/foothill riparian and wetlands. Trees typically associated with the valley/foothill riparian natural community, including willows (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), and western sycamore (*Platanus racemosa*), occur along Deer Creek just west of the Deer Creek project area, but not within the project area itself. During the site visit in January 2023, biologists found that the wetlands previously identified on the east side of the FKC in the

Deer Creek project area have since been graded and filled to support the construction of the FKC Middle Reach Capacity Correction Project and therefore no longer exist in the project area. The permanent alteration of these wetlands was permitted, carried out, and mitigated as part of the FKC Middle Reach Capacity Correction Project (Reclamation and FWA 2020). Appendix H provides details on the findings of the January 2023 site visit.

3.4.1.3 Wildlife

The valley/foothill riparian community, which does not occur within the project area but does occur along Deer Creek just west of the Deer Creek project area, supports a variety of common wildlife species. Bird species commonly found in this community include red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), common raven (*Corvus corax*), black phoebe (*Sayornis nigricans*), white-crowned sparrow (*Zonotrichia leucophrys*), and house sparrow (*Passer domesticus*). Reptiles, amphibians, and mammals that are common in the valley/riparian community include western fence lizard (*Sceloporus occidentalis*), western skink (*Eumeces skiltonianus*), western whiptail (*Cnemidophorus tigris*), southern alligator lizard (*Elgaria multicarinata*), racer (*Coluber constrictor*), gopher snake (*Pituophis catenifer*), king snake (*Lampropeltis* sp.), garter snake (*Thamnophis* sp.), northern Pacific rattlesnake (*Crotalus oreganus oreganus*), Pacific tree frog (*Pseudacris regilla*), western toad (*Anaxyrus boreas*), bullfrog (*Rana catesbeiana*), opossum (*Didelphis virginiana*), black-tailed jackrabbit (*Lepus californicus*), western gray squirrel (*Sciurus griseus*), California ground squirrel (*Otospermophilus beecheyi*), ringtail (*Bassariscus astutus*), river otter (*Lontra canadensis*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), and a number of bat species. Wetland natural communities support many species of waterfowl, such as mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), American widgeon (*Anas americana*), and Canada goose (*Branta canadensis*), and a variety of wading birds and shorebirds.

3.4.2 Special Status Species

Special status species are protected pursuant to federal or state endangered species laws or have been designated as species of special concern (SSC) by CDFW. Additionally, the California Native Plant Society (CNPS) has established California Rare Plant Ranks (CRPRs) that define and categorize rarity in California flora (CNPS 2023). CEQA Guidelines Section 15380(b) defines rare, endangered, or threatened species that are not included in any listing; species recognized under these terms are collectively referred to as “special status species.” Appendix H describes the database searches and surveys conducted to determine which special status species have the potential to occur in the area of analysis, and the findings of biological surveys conducted in March 2021 and January 2023. A list of special status species and their regulatory status, habitat requirements, and potential to occur in the study area is also provided. According to the research, 16 special status terrestrial wildlife species have the potential to occur based on the rationale provided. This section summarizes the potential for each wildlife species to occur near the Shafter-Wasco, Lake Woollomes, and Deer Creek sites.

3.4.2.1 Invertebrates

Crotch’s bumble bee (*Bombus crotchii*; state listed as candidate endangered) has a low potential to occur near the three project sites. There are six recorded occurrences of the species in the California Natural Diversity Database (CNDDB), which were located 2 miles from the Shafter-Wasco site and more than 6 miles from the Deer Creek site. No occurrences were recorded near the Lake Woollomes site (CDFW 2023). Suitable habitat (i.e., grasslands and shrubland) is present at the Shafter-Wasco and Deer Creek sites, although existing habitats are limited and of low quality.

3.4.2.2 Amphibians and Reptiles

Western spadefoot (*Spea hammondi*; designated as a CDFW SSC and proposed for federal listing as threatened) has been documented approximately 6 miles west of the Deer Creek site, where potentially suitable habitat (i.e., slow-moving creek, floodplain, or pool for breeding and nearby terrestrial areas of open vegetation and sandy soils for digging burrows) for the species is known to occur (CDFW 2023).

The Bakersfield legless lizard (*Anniella grinnelli*; designated as a CDFW SSC), California glossy snake (*Arizona elegans occidentalis*; designated as a CDFW SSC), coast horned lizard (*Phrynosoma blainvillii*; designated as a CDFW SSC), Northern California legless lizard (*Anniella pulchra*; designated as a CDFW SSC), and San Joaquin coachwhip (*Masticophis flagellum ruddocki*; designated as a CDFW SSC) are not known to occur near the Shafter-Wasco, Lake Woollomes, and Deer Creek sites (CDFW 2023); however, focused presence/absence surveys have not been conducted for these species at the three sites. Therefore, based on regional occurrence records and the presence of varying degrees of suitable habitat (marginal habitat for all five species exists at the Deer Creek site and similarly low-quality habitat for California glossy snake, coast horned lizard, and San Joaquin coachwhip exists at the Shafter-Wasco site), these species may be present at the Shafter-Wasco, Lake Woollomes, and Deer Creek sites.

3.4.2.3 Birds

Six special status species of birds may occur in the area of analysis: Swainson's hawk (*Buteo swainsoni*; state-listed as threatened), tricolored blackbird (*Agelaius tricolor*; state-listed as threatened and designated as a CDFW SSC), burrowing owl (*Athene cunicularia*; designated as a CDFW SSC); bald eagle (*Haliaeetus leucocephalus*, designated as a CDFW fully protected species); golden eagle (*Aquila chrysaetos*, designated as a CDFW fully protected species); and white-tailed kite (*Elanus leucurus*, designated as a CDFW fully protected species). Swainson's hawks and white-tailed kites have been observed flying over the project sites. The surrounding areas may provide foraging habitat for Swainson's hawk, tricolored blackbird, bald eagle, golden eagle, and white-tailed kite; however, no suitable nesting habitat occurs in or near the study area for any of these species. Potentially suitable habitat for the burrowing owl occurs within and near the study area.

3.4.2.4 Mammals

The San Joaquin kit fox (SJKF) (*Vulpes macrotis mutica*; federally listed as endangered, state listed as threatened) and the American badger (*Taxidea taxus*; designated as a CDFW SSC) have the potential to occur in the area of analysis. No dens were observed during the biological surveys performed in March 2021 or in January 2023; however, multiple CNDDB occurrences of SJKF have been recorded near the project sites, the most recent in 2007 (CDFW 2023). Marginal foraging habitat for badger and some foraging and denning habitat for SJKF may be present at each project site.

The Tipton kangaroo rat (*Dipodomys nitratoideus*; federally and state-listed as endangered) is known to occur regionally and may use the terraced floodplain and scattered woody shrubs of the project sites. Small burrows were observed during the March 2021 and January 2023 biological surveys, although no active burrows or sightings of the species were noted.

3.4.2.5 Plants

Seven special status plant species have been identified as having potential to be present within the study area. Suitable habitats for alkali mariposa-lily (*Calochortus striatus*; CRPR 1B¹¹), California satintail (*Imperata brevifolia*; CRPR 2B¹²), Mason's neststraw (*Stylocline masonii*; CRPR 1B), Recurved larkspur (*Delphinium recurvatum*; CRPR 1B), and subtle orache (*Atriplex subtilis*; CRPR 1B) are present within the study area; however a lack of recent CNDDB occurrences within 5 miles of the project sites and marginal existing suitable habitat suggest that these species have a low potential to occur (CDFW 2023). There have been historical CNDDB occurrences of Kern mallow (*Eremalche parryi* ssp. *kernensis*; CRPR 1B, federally listed as endangered) and San Joaquin woollythreads (*Monolopia congdonii*; CRPR 1B, federally listed as endangered) within 5 miles of the Deer Creek, Lake Woollomes, and Shafter-Wasco sites. The historical occurrences of San Joaquin woollythreads were recorded along Deer Creek. Rare plant surveys have not been conducted within the area of analysis; thus, the potential for these species to occur has been identified based on analysis of habitat suitability, range, and database occurrences. Rare plant surveys would be conducted prior to construction to further characterize botanical resources at the three sites.

3.5 Cultural Resources

Cultural resources include prehistoric and historic period archaeological sites, architectural or built environment resources (e.g., canals, roads, bridges, and buildings), and places important to Native American and ethnic groups that are generally 45 years of age or older. Federal laws, policies, and regulations applicable to cultural resources under this project include the National Environmental Policy Act (NEPA), Native American Graves Protection and Repatriation Act (NAGPRA), and regulations published by the Advisory Council on Historic Preservation (ACHP) and the National Park Service. Relevant state laws, policies, and regulations include CEQA and California Office of Historic Preservation (OHP) guidelines. Regional or local policies and regulations may be found in the affected counties' general plans. These laws, policies, and regulations are described more fully in Appendix D.

3.5.1 Cultural Resources Investigation and Results

The cultural resources area of analysis examined in this EIR is centered on the area of potential effect (APE) for the proposed project, or the area within which cultural resources may be directly or indirectly impacted by project construction and maintenance. The APE would include the proposed footprints and staging areas for the Shafter-Wasco, Lake Woollomes, and Deer Creek pump-back facilities (Section 2.1). The area of analysis for the proposed project consists of a 1-mile buffer surrounding the APE, but also considers the direct and indirect effects the project may have on the FKC, which extends from its headworks at Friant Dam to its outlet at the Kern River.

The cultural resources investigation conducted for the area of analysis included a records search through the Southern San Joaquin Valley Information Center of the California Historical Resources

¹¹ Plants with a CRPR of 1B are rare throughout their range, with most endemic to California. Plants ranked 1B must be evaluated during the preparation of environmental documents relating to CEQA, as they meet the definition of rare or endangered as defined in CEQA Guidelines Section 15380(b) (CNPS 2023).

¹² Plants ranked CRPR 2B are rare, threatened, or endangered in California but are more common elsewhere. Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA, as they meet the definition of rare or endangered as defined in CEQA Guidelines Section 15380(b) (CNPS 2023).

Information System (CHRIS), a literature review, and a pedestrian survey of the APE. Contact with Native American tribal representatives was also conducted (Section 3.15.2). The CHRIS records search revealed that 10 prior cultural resources studies have overlapped the APE while three additional studies have been conducted within a surrounding 1-mile radius. Eight of the 10 overlapping studies were research or planning oriented and involved no field studies, one was an architectural assessment focused on the FKC, and one was an archaeological survey. The CHRIS records search revealed one cultural resource within the APE and three within a surrounding 1-mile radius. The historic period FKC (P-15-013728/P-54-004614), which was completed in 1951 as part of the Friant Division of the CVP, is within the APE and would be directly impacted by the project. Reclamation determined that the FKC is individually eligible for listing in the National Register of Historic Places (NRHP) and CRHR under Criteria A/1 and C/3, for its role in accomplishing the goals of the CVP, for the transformation of land use it enabled in the counties it served, and for its size and scale, which demonstrated the magnitude of the engineering and construction feat accomplished by the CVP as well as Reclamation engineer Harry McBirney's important contributions to canal standardization (Norby and Wee 2019). The State Historic Preservation Officer (SHPO) concurred with Reclamation's determination in 2019 (Polanco 2019). The three resources previously recorded within 1 mile of the APE include two irrigation ditches, the Calloway Canal (P-15-007233) and channelized Deer Creek (P-54-005457), and one isolated prehistoric chert scraper (P-15-009030).

A pedestrian survey of all physically accessible portions of the APE was completed on March 22 and 23, 2021. The survey was conducted using 5- to 10-meter transects to systematically examine areas of proposed ground-disturbing activity. The APE at each project location was found to have been heavily impacted by prior canal construction and maintenance, and agricultural activity. Apart from the FKC, no cultural resources were observed within the APE.

A geoarchaeological sensitivity assessment was recently completed in support of the FKC Middle Reach Capacity Correction Project that included the area of analysis for the Lake Woollomes and Deer Creek facilities (Meyer 2020). An earlier geoarchaeological sensitivity assessment completed for California Department of Transportation (Caltrans) Districts 6 and 9 encompassed the study area for the Shafter-Wasco facility (Meyer et al. 2010). Each of these assessments relied on geological and soils maps, archaeological and historical data, and subsurface testing to identify the age and composition of depositional landforms and their potential to reveal buried cultural deposits. Deer Creek was found to have the highest buried cultural resource potential, Lake Woollomes had a low potential for buried cultural resources, and Shafter-Wasco had a very low potential for buried cultural resources. The methods and findings for the cultural resources investigation conducted for this project are detailed in a draft technical report submitted to Reclamation in April 2021.

3.6 Geology, Seismicity, and Soils

The study area for geology and soils consists of the three proposed project sites where excavation, filling, and other soil disturbances would occur. The study area also includes the regional seismic setting. Local soils in construction areas are summarized in Table 3-4, which shows the areas include a variety of soil texture types and shrink-swell characteristics. Natural Resource Conservation Service (NRCS) data indicate that soils in the construction areas are underlain by fine-textured, strongly structured soils, such as sandy loam (NRCS 2021). Loam includes a roughly even mixture of clay,

silt, and sand. As a result, loam and sandy soils drain well and are susceptible to erosion. Such soils have a wind erodibility index of 86 (tons per acre per year) when in a dry, unvegetated condition (USDA 1993). Highly wind-erodible soils, such as fine sands, have a wind erodibility index of 134 to 310. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in fine-grained clay sediments and results from the process of alternate wetting and drying. Expansive soils possess a shrink-swell characteristic, presenting a risk of structural damage over time if foundations are not properly engineered to account for soil volume change.

Table 3-4. Soil Characteristics within Proposed Construction Areas

Construction Area	Soil Texture	Erodibility Index	Soil Shrink-Swell Class
Shafter-Wasco	Sandy Loam	Moderate	Low
Lake Woollomes	Loam, Sandy Loam	Low to Moderate	Moderate
Deer Creek	Fine Sandy Loam, Sandy Loam	Moderate	Low to Moderate

Source: NRCS 2021.

According to the California Department of Conservation (DOC) Geologic Energy Management Division (CalGEM) Well Finder, there are two oil and gas production wells within 1 mile of the proposed Deer Creek construction area; both wells are plugged (DOC 2022a). When a well is no longer needed, either because the oil or gas reservoir becomes depleted, or because no oil or gas was found (called a dry hole), the well is permanently sealed and closed (i.e., plugged and abandoned). A well is plugged by placing cement in the wellbore or casing at specified intervals to prevent fluid from migrating between underground rock layers. This ensures the well is properly sealed to prevent any potential environmental hazards. There are no wells within 1 mile of the proposed Shafter-Wasco or Lake Woollomes construction areas.

According to the DOC Fault Activity Map of California (2015a), an unnamed quaternary fault lies approximately 4.5 miles east of the Deer Creek site, perpendicular to Deer Creek. An unnamed quaternary fault near Rag Gulch lies approximately 4.5 miles southeast from the Lake Woollomes site, and the historic Pond fault and quaternary Poso Creek Fault are approximately 7 miles away to the southwest. The Poso Creek Fault lies approximately 5.5 miles to the northeast from the Shafter-Wasco site and intersects with the historic New Hope Fault and Premier Fault approximately 8 miles to the northeast from the Shafter-Wasco site (DOC 2015a). Despite the presence of faults in the region, no existing or proposed facilities fall within an Alquist-Priolo Earthquake Fault Zone, liquefaction zone, and/or landslides zone, according to the DOC Earthquake Zones of Required Investigation Map (DOC 2022b).

Paleontological sensitivity is the potential for a geologic unit to produce scientifically significant fossils. This is determined using a qualitative measurement of fossil data, including rock type, history of the geologic unit in producing significant fossils, and fossil localities that are recorded from that geologic unit. Using the U.S. Department of the Interior, Bureau of Land Management (BLM) Potential Fossil Yield Classification (PFYC) system, geologic units are classified as Class 1 (very low) through Class 5 (very high) based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts. A higher-class number indicates a higher potential for occurrence. All three proposed facilities would be constructed within the geologic unit Qoa, which refers to Pleistocene/Holocene marine and nonmarine (continental) sedimentary rocks (DOC 2015b). Unit Qoa is classified as Class 3 (moderate) because it could include Pleistocene-age or otherwise sensitive units (BLM 2016).

3.7 Greenhouse Gases

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

Scientific research shows that global GHG emissions from human activities have grown since preindustrial times, with an increase of 78% between 1970 and 2010 (Intergovernmental Panel on Climate Change 2014). Atmospheric concentrations of carbon dioxide equivalent (CO₂e) reached an average of 420.99 parts per million (ppm) in 2022, an increase of 1.8 ppm throughout 2021 (National Oceanic and Atmospheric Administration [NOAA] 2022). Past concentrations reached 417.1 ppm in 2020, up from 407.8 ppm in 2018 and 405.5 ppm in 2017, far exceeding the natural range over the last 800,000 years as measured in ice core samples (NOAA 2020; World Meteorological Organization 2019). Most anthropogenic CO₂ emissions are attributed to burning fossil fuels for electricity, heat, and transportation, and to land use changes such as deforestation (EPA 2022).

If left unchecked, CO₂ concentrations will continue to increase, leading to climate change that threatens public health, the economy, and the environment. Efforts are underway globally to both mitigate GHG emissions to reduce further climate change and to adapt to the unavoidable changes in climate that will result from past and future GHG emissions. However, recent studies show that global GHG emissions have generally continued to rise since 1990, only decreasing in 2020 largely because of the impacts of the coronavirus (COVID-19) pandemic on travel and economic activity (EPA 2024b).

Agricultural emissions represented approximately 8.6% of California's GHG emissions in 2020, mainly from methane and nitrous oxide (CARB 2022). Agricultural emissions represent the sum of emissions from agricultural energy use (from pumping and farm equipment), agricultural residue burning, agricultural soil management (the practice of using fertilizers, soil amendments, and irrigation to optimize crop yield), enteric fermentation (fermentation that takes place in the digestive system of animals), histosols (soils that are composed mainly of organic matter) cultivation, manure management, and rice cultivation.

3.8 Hazards and Hazardous Materials

The study area for the evaluation of hazards and hazardous materials comprises the areas where sensitive receptors could be affected by implementing the proposed project. According to the California Department of Toxic Substances Control, sensitive receptors include schools, hospitals, day care centers, and elder care facilities (California Department of Toxic Substances Control 2019).

These locations house populations such as children and the elderly, who are more vulnerable to the adverse effects of environmental hazards compared to healthy adults.

3.8.1 Hazardous Material Sites

There are no underground storage tanks or hazardous materials sites within 1 mile of the Shafter-Wasco, Lake Woollomes, and Deer Creek sites. There is a certified voluntary cleanup site for pesticides 1.5 miles north of the Shafter-Wasco site (California Department of Toxic Substances Control 2022). Shafter-Minter Field is approximately 1.5 miles southeast of the Shafter-Wasco site. The Delano Municipal Airport is approximately 3 miles west of the Lake Woollomes site. The Porterville Municipal Airport is approximately 4 miles northeast of the Deer Creek site. All three airports are publicly owned and open to the public (AirNav.com 2022). There are no schools or hospitals within 0.25 miles of the proposed construction sites. The closest sensitive receptor to the proposed construction is the Sequoia Elementary School in Shafter, approximately 2.5 miles east of the proposed Shafter-Wasco construction work area.

3.8.2 Valley Fever

Valley fever is an infection caused by a fungus (*Coccidioides*) that grows in the soil. When inhaled, the fungus can affect the lungs, causing respiratory symptoms, fever, cough, chest pain, and tiredness. Valley fever is prevalent throughout the study area. Kern County has the highest reported rates of valley fever in the state (approximately 265 cases per 100,000 people) with Tulare County reporting lower case rates (approximately 66 cases per 100,000 people) (California Department of Public Health 2022).

3.8.3 Wildfire

The proposed construction areas are not located in a California State Responsibility Area for Wildfire Risk and are not in an area considered to be a Fire Hazard Severity Zone (California Department of Forestry and Fire, Office of State Fire Marshal 2022). The Tulare County Fire Department and Kern County Fire Department provide response services to the study area. Outside emergency responders may include CAL FIRE, as warranted.

3.8.4 Evacuation Routes

Kern and Tulare Counties do not specify evacuation routes in rural areas; therefore, none are identified near proposed construction areas. The Shafter-Wasco and Lake Woollomes sites are close to major roads listed in the Kern County General Plan Circulation Element (Kern County 2009) and include Highway 99, SR 46, and SR 43. The Deer Creek site is close to SR 65 and SR 190, which are major roads listed in the Tulare County General Plan (Tulare County 2012). In the study area, all roads leading from Shafter-Wasco, Lake Woollomes, and Deer Creek sites to Highway 99, SR 46, SR 43, SR 65, and SR 190 would be potential evacuation routes.

3.9 Hydrology and Water Resources – Surface Water

The study area is in the Tulare Lake Hydrologic Region, specifically in the Tulare–Buena Vista Lakes watershed (Hydrologic Unit Code 18030012). This essentially closed basin is situated in the topographic horseshoe formed by the Diablo and Temblor Ranges to the west, by the San Emigdio and Tehachapi Mountains to the south, and by the Sierra Nevada to the east and southeast (Central Valley Water Board 2018a). Surface water from the Tulare Lake Hydrologic Region drains north into

the San Joaquin River only during years of extreme rainfall. Friant Dam is on the San Joaquin River, 25 miles northeast of Fresno where the San Joaquin River exits the Sierra Nevada foothills and enters the valley. The drainage basin is 1,676 square miles with an average annual runoff of 1.77 million acre-feet.

Friant Dam provides flood management on the San Joaquin River, provides downstream releases to meet senior water rights requirements above Mendota Pool, and provides conservation storage and diversion into Madera Canal and the FKC. Water is delivered to one-million acres of cultivated land in Fresno, Kern, Madera, and Tulare Counties in the San Joaquin Valley via the FKC, south into Tulare Lake Basin, and via the Madera Canal, north to the Madera Irrigation District and Chowchilla Water District. Figure 3-1 shows the surface water features described further in this section.

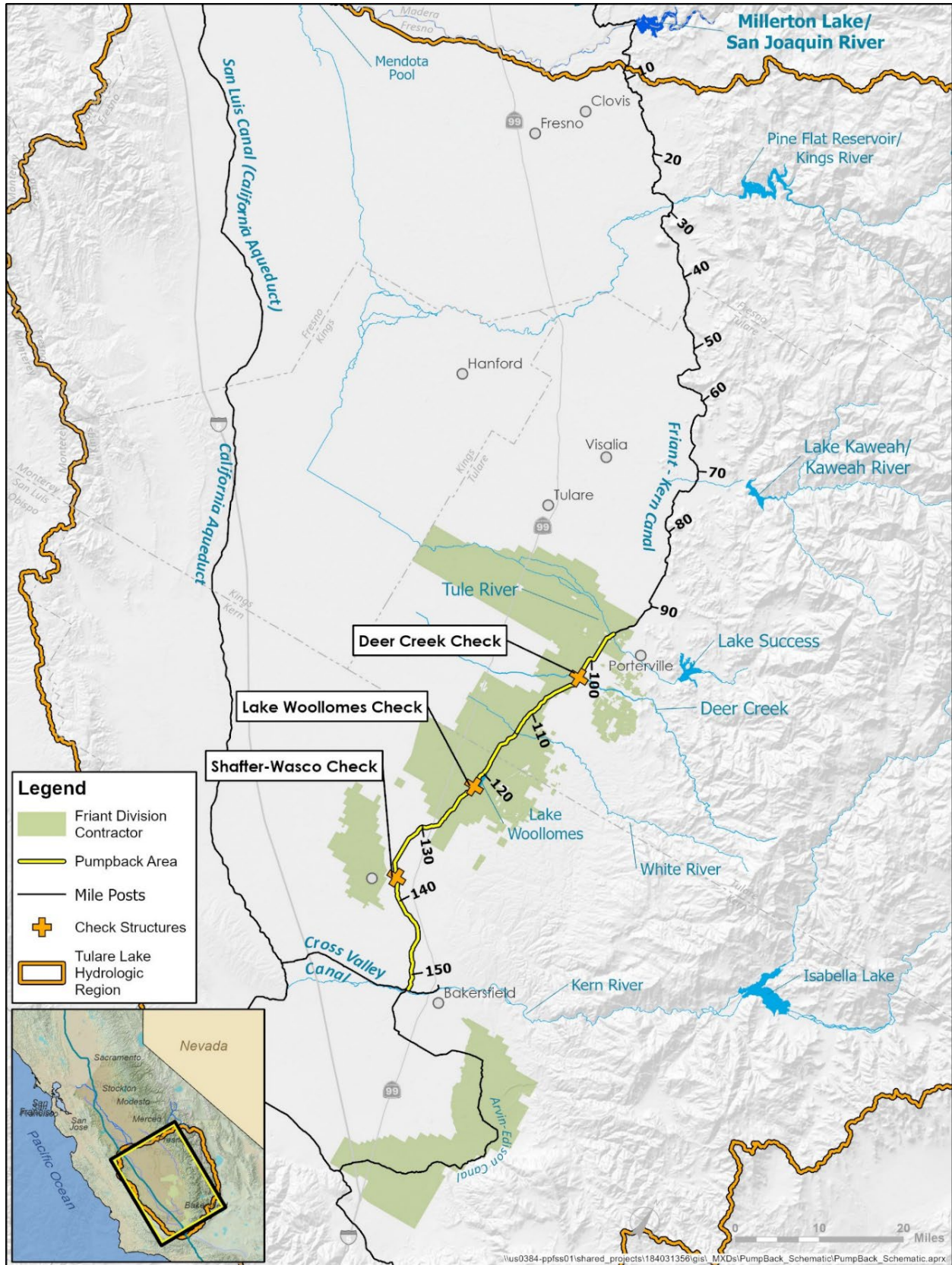


Figure 3-1. Surface Water Hydrology Features in the Study Area

The Friant Division was designed and is operated to support conjunctive water management in an area that has been historically subject to groundwater overdraft. CVP Water is delivered from Millerton Lake to the headworks of the FKC and then conveyed via gravity to individual contractor turnouts. Table 3-5 lists the Friant Division long-term contractors and their maximum Class I and Class II quantities. Reclamation employs a two-class system of water allocation to support conjunctive water management and take advantage of water during wetter years:

- Class 1 supplies, which are based on a firm water supply, are generally assigned to municipal and industrial (M&I) and agricultural water users that have limited access to quality groundwater. During operations, the first 800,000 acre-feet of annual water supply are allocated as Class 1 water.
- Class 2 water is a supplemental supply and is delivered directly for agricultural use or for groundwater recharge, generally in areas that have historically used groundwater and experience groundwater overdraft. Total Class 2 contracts equal approximately 1.4 million acre-feet.
- In addition to Class 1 and Class 2 water deliveries, water can be provided in accordance with Section 215 of the Reclamation Reform Act of 1982, which authorizes delivery of unstorable water that would otherwise be released in accordance with flood management criteria or unmanaged flood flows.

Table 3-5. Friant Division Long-term Contractors

Contractor Name	Maximum Contract Quantity (acre-feet)	
	Class 1	Class 2
Madera Canal Agricultural		
Chowchilla Water District	55,000	160,000
Madera Irrigation District	85,000	186,000
San Joaquin River Agricultural		
Gravelly Ford Water District	n/a	14,000
Friant-Kern Canal Agricultural		
Arvin-Edison Water Storage District ¹	40,000	311,675
Delano-Earlimart Irrigation District ¹	108,800	74,500
Exeter Irrigation District	11,100	19,000
Fresno Irrigation District	n/a	75,000
Hills Valley Irrigation District	1,250	n/a
Garfield Water District	3,500	n/a
International Water District	1,200	n/a
Ivanhoe Irrigation District	6,500	500
Kaweah Delta Water Conservation District	1,200	7,400
Kern-Tulare Water District ¹	n/a	5,000
Lewis Creek Water District	1,200	n/a
Lindmore Irrigation District	33,000	22,000
Lindsay-Strathmore Irrigation District	27,500	n/a
Lower Tule River Irrigation District ¹	61,200	238,000
Orange Cove Irrigation District	39,200	n/a

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

Contractor Name	Maximum Contract Quantity (acre-feet)	
	Class 1	Class 2
Porterville Irrigation District ¹	15,000	30,000
Saucelito Irrigation District ¹	21,500	32,800
Shafter-Wasco Irrigation District ¹	50,000	39,600
Southern San Joaquin Municipal Utility District ¹	97,000	45,000
Stone Corral Irrigation District	10,000	n/a
Tea Pot Dome Water District ¹	7,200	n/a
Terra Bella Irrigation District ¹	29,000	n/a
Tri-Valley Water District	400	n/a
Tulare Irrigation District	30,000	141,000
Friant Water Division Municipal and Industrial		
City of Fresno	60,000	n/a
City of Orange Cove	1,400	n/a
City of Lindsay	2,500	n/a
Fresno County Waterworks District Number 18	150	n/a
Madera County	200	n/a

Source: Reclamation 2016.

Note:

¹ Districts taking water from reaches of the FKC that allow for reverse-flow pump-back operations.

In addition to the Class 1, Class 2, and conjunctive management aspects of Friant Division operations, transfers between districts takes place annually. These transfers provide opportunities to improve water management within the Friant Division service area. In wet years, water surplus to one district's need can be transferred to other districts with the ability to recharge or bank groundwater. Conversely, in dry years, water can be transferred or returned to districts with little or no groundwater supply, thereby providing ongoing groundwater banking opportunities within the Friant Division.

In addition, pump-in programs are used to introduce non-Millerton water to the FKC to augment water supplies in various hydrologic conditions and to move water available in local streams during wet hydrologic cycles. Surface water supplies from the CVC are delivered through the Intertie at the terminus of the FKC (Figure 3-1). This water is then pumped up the canal and over check structures to contractor turnouts (i.e., -reverse flow pump back). Specifically, for reverse-flow pump-back operations, Kern -Tulare Water District (KTWD) has an electrical pump with a capacity of 30 cfs permanently installed at the FKC's Shafter-Wasco check structure, which is the first check structure upstream of the Intertie. Additionally, FWA, on behalf of KTWD and other Friant Contractors, installed temporary reverse-flow pump-back facilities with 50 cfs pumping capacities at the Shafter-Wasco and Lake Woollomes check structures. The reverse-flow structures are used to convey water supplies accessible via the intertie, including water purchased from Reclamation pursuant to CVC contracts, recaptured SJRRP Restoration Flows, water in the California Aqueduct, water from banking projects, and other CVC supplies.

The four reaches in the study area are defined by the location of check structures, and/or associated MPs, that allow for reverse-flow pump-back operations, as shown in Figure 3-1. Friant Contractors (or districts) taking deliveries within each project reach are shown in Table 3-6.

The study area receives imported water from the upper San Joaquin River watershed via the FKC. The major drainages that cross the study area flow from east to west and include, from north to south, the Tule River, Deer Creek, White River, Kern River, and Poso Creek. Another major water feature within the study area is the Arvin-Edison Canal, which flows south of the FKC and Kern River (Figure 3-1). Project construction and operations would not occur within Tule River, White River, Kern River, Poso Creek or Arvin-Edison Canal; therefore, these features are not discussed further in this section.

Table 3-6. Friant Contractors Taking Deliveries from the Four Reaches in the Study Area

Reach	Milepost Range	Reach Name	Districts Taking Deliveries
A	152–137	Intertie to Shafter-Wasco Check Structure	Arvin-Edison Water Storage District
B	137–122	Shafter-Wasco Check Structure to Lake Woollomes Check Structure	Shafter-Wasco Irrigation District Southern San Joaquin Municipal Utility District (78%)
C	122–113	Lake Woollomes Check Structure to Deer Creek Check Structure	Southern San Joaquin Municipal Utility District (22%) Kern-Tulare Water District Delano-Earlimart Irrigation District Saucelito Irrigation District (50%) Terra Bella Irrigation District (67%)
D	113–96	Deer Creek Check Structure to Tule River Check Structure	Saucelito Irrigation District (50%) Terra Bella Irrigation District (33%) Teapot Dome Irrigation District Pixley Irrigation District Lower Tule River Irrigation District (75%) Porterville Irrigation District (67%)

Note: Mileposts are rounded to nearest mile.

3.9.1 Friant-Kern Canal

The FKC is a 152-mile gravity canal that conveys water from Friant Dam at Millerton Lake south to the Kern River.¹³ The FKC is owned by Reclamation and operated and maintained by FWA. The FKC has a maximum design capacity of 5,300 cfs, gradually decreasing to 2,500 cfs to accommodate conveyance for downstream water demand. However, the maximum design capacity has not been actualized owing to inaccurate design roughness assumptions, and capacity has been further reduced because of increased canal surface roughness with age, vegetation in canal sections, changes in water delivery patterns, localized seepage through embankments, and regional land subsidence. In conjunction with the adjacent land, the canal has subsided, with significant localized depression between Deer Creek at about milepost 103 and White River at about milepost 107, where the FKC experienced subsidence greater than 10 feet since being constructed.

Check structures along the FKC are essential to its operation. These structures house radial gates that maintain the water level in the upstream canal segments to provide enough head to maintain

¹³ The FKC terminates at the Kern River but the river is not part of the study area; therefore, it is not included in the analysis.

submergence of turnouts. The Deer Creek check structure at milepost 102.7 has a design capacity of 4,000 cfs. In 2010, the calculated maximum capacity at this structure was 2,921 cfs (Reclamation 2020). The Lake Woollomes structure at the southern end of Lake Woollomes at milepost 121.5 has a design capacity of 3,500 cfs. In addition to maintaining water levels upstream, a turnout is just upstream of the check structure that allows flows into Lake Woollomes, which is used as an off-canal equalizing reservoir. In 2010, the calculated maximum capacity at this check structure was 2,299 cfs; however, with recent subsidence, the 2017 estimated capacity was about 1,575 cfs (Reclamation 2020). The Shafter-Wasco check structure at milepost 137.2 has a design capacity of 2,500 cfs. In 2010, the calculated maximum capacity at this structure was 1,893 cfs (Reclamation 2020). In June 2024, under the FKC Middle Reach Capacity Correction Project, a new FKC segment between mileposts 98.4 and 108.4 entered into service. This new canal segment is intended to restore the conveyance capacity within this reach to the original design and construction capacity. The new canal segment includes a check structure at Deer Creek. The capacity at the Deer Creek check structure with the new canal segment in operation is 2,400 cfs.

Generally, water in the FKC is supplied from Millerton Lake, which has a storage volume of 524 thousand acre-feet, a surface area of 4,905 acres, and an elevation of 580.6 feet above mean sea level at the top of active storage. Water quality within Millerton Lake is generally high quality, with low turbidity, high dissolved oxygen, and low concentrations of total dissolved solids (TDS), nitrate, chloride, boron, and other constituents. However, Millerton Lake is listed as impaired in the 2018 Clean Water Act (CWA), Section 303(d) for mercury, and is included in the Statewide Mercury Control Program for Reservoirs (SWRCB 2017). In addition, surface water supplies from the CVC are delivered to the FKC through the Intertie at the terminus of the FKC. This water is then pumped upstream into the FKC and over check structures to contractor turnouts along the FKC.

FWA manages in-prism (i.e., in-canal) water quality in the FKC using the *Guidelines for Accepting Water into the Friant-Kern Canal*, referred to as the Water Quality Guidelines. The Water Quality Guidelines were developed and adopted to protect domestic and agricultural beneficial uses within the Friant Division (FWA 2023). The Water Quality Guidelines define the water quality thresholds and required measures associated with introducing or receiving non-Millerton water and are applicable to all non-Millerton water introduced or diverted into the FKC. The Water Quality Guidelines require that water supplies are managed such that defined in-prism water quality thresholds are not exceeded. Specific management actions include real-time water quality monitoring, water quality monitoring when actions are taken that could change water quality conditions, and reductions or cessations of non-Millerton pump-ins (or other actions) when exceedances of thresholds occur or are imminent.

3.9.2 Cross Valley Canal and California Aqueduct

The CVC is a privately owned canal operated by the Kern County Water Agency. The CVC allows water to be conveyed between the California Aqueduct and the FKC for delivery to seven CVP contractors operating within the east side of the southern San Joaquin Valley. The CVC has a capacity of 1,422 cfs. At their intersection, the CVC and FKC are connected via the Intertie to allow up to 500 cfs to be moved from the CVC to the FKC.

The California Aqueduct has a capacity ranging from 8,350 to 13,100 cfs. Owned and operated by the California Department of Water Resources (DWR), the California Aqueduct carries water 443 miles from the Banks Pumping Plant in the Sacramento-San Joaquin River Delta to areas in

Southern California. The concrete-lined canal includes several pumping plants and branches to enable delivery to various agricultural and urban contractors. The central portion of the California Aqueduct, the San Luis Canal, is a joint-use facility for the CVP and State Water Project (SWP). The San Luis Canal begins on the southeast edge of the O'Neill Forebay, parallel to the Delta-Mendota Canal, and extends about 101.5 miles southeasterly to near Kettleman City.

Water quality in the California Aqueduct and CVC is subject to fluctuations in water quality in the Sacramento-San Joaquin River Delta, which in turn are influenced by climate, water quality in the San Joaquin and Sacramento Rivers, and local agricultural diversions and drainage water. Salinity is of particular importance for water quality concerns. Excessive salinity in water supplies delivered for agricultural use adversely affects crop yields, increases salinity levels in agricultural soils, requires more water for salt leaching in soils, and may contribute to increases in salinity levels in groundwater. Water quality in the CVC is of higher quality in comparison to the water in the California Aqueduct, likely because of dilution of California Aqueduct flows with Kern River flows entering the CVC (Reclamation 2014). Table 3-7 shows key water quality parameters for the FKC, CVC, and California Aqueduct.

Table 3-7. Key Water Quality Parameters

Constituent (units)	FKC ^{1,2}		California Aqueduct (before diversion to CVC) ³		CVC ⁴	
	Range	Average	Range	Average	Range	Average
Bicarbonate (mg/L)	11.0–48.0	22.7	--	--	42.0–120.0	80.1
Boron (mg/L)	0.0–1.0	0.0	0.1–0.6	0.2	0.0–0.2	0.1
Calcium (mg/L)	1.6–16.0	4.0	7.0–70.0	20.2	11.0–42.0	21.9
Chloride (mg/L)	0.5–8.7	1.9	10.0–157.0	73.1	14.0–150.0	43.2
Electrical Conductivity (µmhos/cm)	20.1–175.0	43.3	115.0–883.0	475.4	198.0–713.0	334.5
Magnesium (mg/L)	0.3–7.3	0.8	3.0–25.0	12.8	0.5–19.0	5.5
Nitrate (mg/L)	0.0–4.4	0.4	0.2–7.2	2.5	0.1–17.0	4.2
pH (standard units)	6.6–9.5	7.3	5.5–9.0	7.7	7.5–9.3	8.2
Sodium (mg/L)	1.4–18.0	3.5	8.0–112.0	52.7	0.4–100.0	36.4
TDS (mg/L)	11.0–94.0	24.4	67.0–593.0	268.1	110.0–730.0	183.3

Notes:

¹ Sample collected at the terminus of the FKC; data from 2011–2020 provided by AEWS; periods of indicated mixing with the CVC are excluded; based on 45 counts of data.

² Water quality data for the FKC also represents water quality data for the Tule, River which represents a local supply for both the Lower Tule River and Porterville Irrigation Districts.

³ Water quality data from Check 21 of the California Aqueduct before diversion to the CVC, 1968–2020.

⁴ Water quality data from AEWS CVC Pumping Plant 6 or 6B forebay; data from 2011–2020; periods of indicated mixing with the FKC or Kern River are excluded.

Key: AEWS – Arvin-Edison Water Storage District; CVC – Cross Valley Canal; FKC – Friant-Kern Canal; mg/L – milligrams per liter; TDS – total dissolved solids; µmhos/cm – micromhos per centimeter

3.9.3 Deer Creek

Deer Creek is a natural drainage that originates in the Sierra Nevada and flows in a westerly direction north of Terra Bella Irrigation District (TBID) and into Pixley Irrigation District (Pixley ID).

Discharges from Deer Creek historically dissipate into the ground in the San Joaquin Valley and only reached the historical Tulare Lake lakebed during high-flow events (ECORP Consulting

Incorporated 2007). Heavy rain and snow in the San Joaquin Valley resulted in flows reaching the Tulare Lake lakebed in early 2023. Streamflow has been measured at two U.S. Geological Survey (USGS) gaging stations: Deer Creek near Fountain Springs (USGS 11200800) and Deer Creek Diversion near Terra Bella (USGS 11201200). Both sites are outside the study area; Stations 11200800 and 11201200 are about 20 miles and 7 miles upstream from the FKC, respectively. Water supplies from the FKC are diverted into Deer Creek at Trenton Weir for delivery for irrigation to water users downstream via unlined canals.

Deer Creek is a losing stream such that infiltration of surface water within the stream channel recharges the groundwater system beneath it. Channel loss generally occurs between the Fountain Springs gaging station and Trenton Weir and between Trenton Weir and Homeland Canal, about 25 miles west of the FKC. Like other streams in the region, streamflow in Deer Creek is highly variable. Measured annual average flows for the Deer Creek near Fountain Springs site range from under 3 cfs to about 140 cfs, and peak flows exceed 1,500 cfs (ranging up to about 2,000 cfs) (USGS 2021). For Deer Creek Diversion at TBID, measured annual average flows range from about 0 to less than 5 cfs, with peak flow reaching up to 16 cfs (USGS 2021). Deer Creek flows over the FKC at milepost 102.7, where the FKC is directed through a 172-foot-long siphon.

Deer Creek supports beneficial uses for agricultural, industrial service, and industrial process supplies; contact and noncontact water recreation; warm freshwater and wildlife habitats; rare, threatened, or endangered species; and groundwater recharge (Central Valley Water Board 2018a). Deer Creek is listed as impaired on the 2018 303(d) list for pH, toxicity, and chlorpyrifos, which are from an unknown source (Central Valley Water Board 2018b). All pollutants negatively affect the warm freshwater habitat beneficial use.

3.9.4 Flood Zones

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) were reviewed for the proposed construction areas. FIRMs are included in Appendix I. The Lake Woollomes and Deer Creek pump-back facilities would be constructed within Zone A, which are areas subject to inundation by the 1% annual chance flood (no base flood elevations determined) (FEMA 2022). The Shafter-Wasco pump-back facility site is designated on FEMA's current FIRM as within Zone X, an area determined to be outside the 0.2% annual chance floodplain.

3.10 Hydrology and Water Resources – Groundwater

The proposed project is in a portion of the San Joaquin Valley Groundwater Basin that lies within the Tulare Lake Hydrologic Region. DWR's most recent groundwater update reports that the Tulare Lake Hydrologic Region uses more than twice the volume of groundwater than any other region in the state, averaging about 8.1 million acre-feet annually (DWR 2021). The region is divided into 23 groundwater basins, 7 of which have been designated as critically over drafted. The study area specifically overlies the Tule Groundwater Subbasin (5-022.13), Kern County Groundwater Subbasin (5-022.14), and White Wolf (Subbasin 5-022.18) (Figure 3-2). Tule and Kern Groundwater Subbasins are both considered critically over drafted. The Kaweah Groundwater Subbasin lies just outside of the study area, north of the City of Porterville.

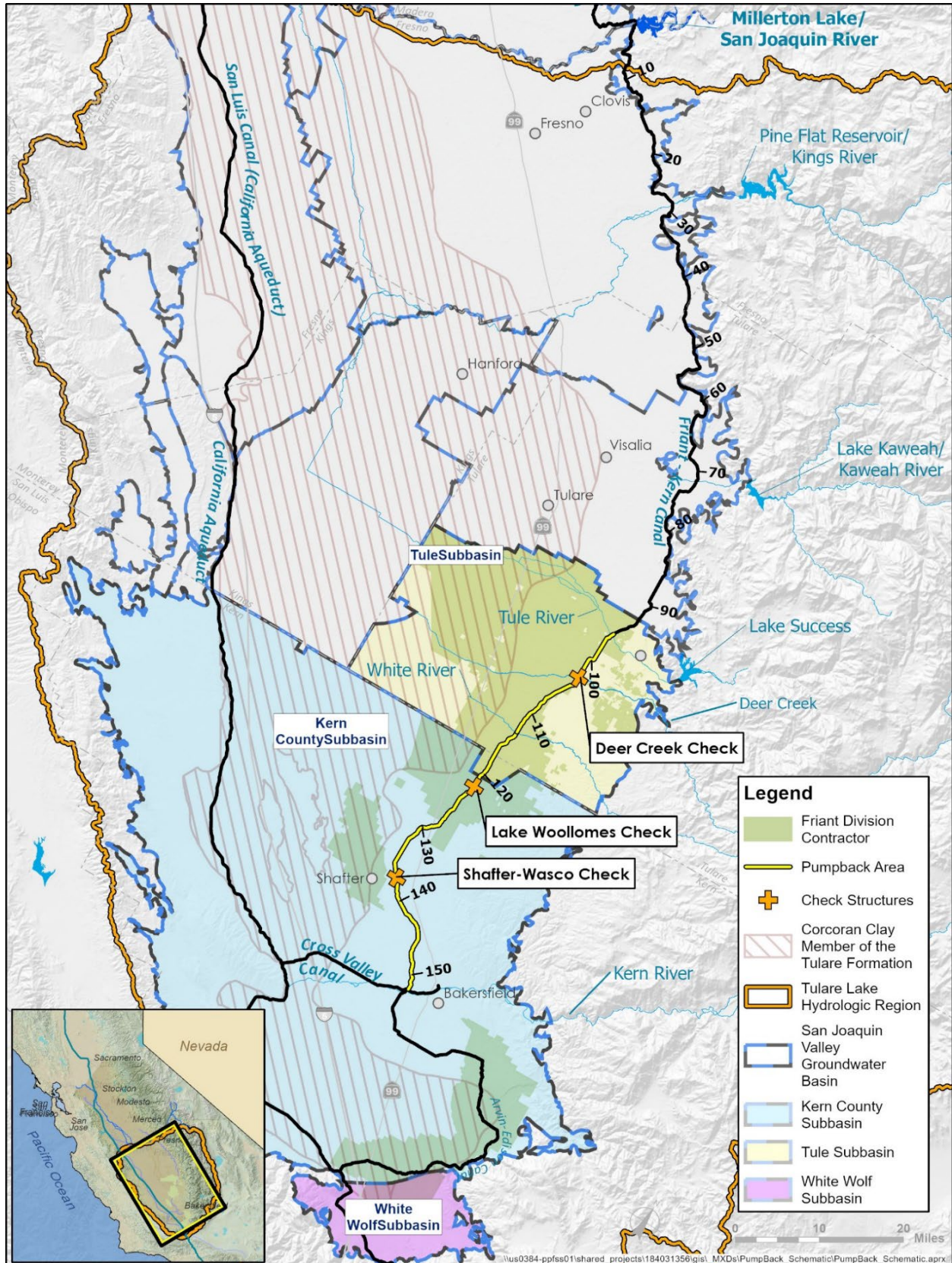


Figure 3-2. Groundwater Subbasins within the Study Area

3.10.1 Tule Groundwater Subbasin

The Tule Groundwater Subbasin is approximately 744 square miles and contains the Lower Tule River Irrigation District (LTRID), Porterville Irrigation District (Porterville ID), Saucelito Irrigation District (Saucelito ID), Delano-Earlimart Irrigation District (DEID), Tea Pot Dome Water District (TPDWD), TBID, Pixley ID, and the northern half of KTWD. The northern boundary is defined by the LTRID and Porterville ID boundaries. The eastern boundary is defined by the surface contact between the Sierra Nevada Mountain Range and surficial alluvial sediments that make up the groundwater basin. The southern and western boundaries generally follow the Tulare County line boundary, except for a portion of the Tulare Lake Basin Water Storage District that extends east across the county boundary and is excluded from the subbasin (Eastern Tule Groundwater Sustainability Agencies [GSA] et al. 2022). Groundwater flow is generally westward from the Sierra Nevada Mountains towards the western–central portion of the subbasin (DWR 2016; Eastern Tule GSA et al. 2022).

Groundwater elevation contours within the Tule Groundwater Subbasin diverge from the path of the Tule and White rivers in the northern and southern portions of the subbasin (DWR 2004). Groundwater inflow includes water from precipitation, recharge from stream and river channels, managed recharge in basins, canal losses, deep percolation of water applied for irrigation (or applied water), release of water from compression of aquitards, and subsurface inflows. Groundwater outflows occur from groundwater pumping, evapotranspiration, and subsurface outflow (Eastern Tule GSA et al. 2022). Changes in groundwater storage within the Tule Subbasin have been estimated through analysis of the water budget. Comparison of the groundwater inflow elements of the water budget with the outflow elements shows a cumulative change in groundwater storage throughout the 31-year period between 1986 and 1987 and 2016 and 2017 of approximately -4,948,000 acre-feet. The average annual change in storage resulting from the groundwater budget is approximately -160,000 acre-feet per year (Eastern Tule GSA et al. 2022).

3.10.2 Kern County Groundwater Subbasin

The Kern County Groundwater Subbasin is in the southern portion of the Tulare Lake Hydrologic Region and is approximately 2,800 square miles (Kern Groundwater Authority [KGA] 2022). The Kern County Subbasin contains the South San Joaquin Municipal Utilities District (SSJMUD), Shafter-Wasco Irrigation District (SWID), and a portion of the Arvin-Edison Water Storage District (AEWSD). The northern boundary of the subbasin is the Kern County line and the Tulare Lake and Tule Groundwater Subbasins. Rocks that comprise the Greenhorn Mountains, Breckenridge Mountain, Bear Mountain, and the Tehachapi Mountains define the eastern boundary. The White Wolf Fault and San Emigdio Mountains define the southern boundary. The Coast Range (Temblor Range) defines the western boundary (DWR 2018; KGA 2022).

The prominent natural surface water body over the Kern County Groundwater Subbasin is the Kern River, which flows westward from the Sierra Nevada. Groundwater within the subbasin generally flows northwest. Groundwater elevations within the subbasin vary greatly; however, groundwater levels have decreased over time with groundwater wells extending to depths of more than 1,000 feet (KGA 2022). The potential causes of groundwater depletion are increased groundwater pumping, reduced imported supplies, and reduced groundwater inflows from adjacent areas.

3.10.3 White Wolf Groundwater Subbasin

The White Wolf Groundwater Subbasin encompasses approximately 168 square miles of the southern area of the Tulare Lake Hydrologic Region and contains a portion of AEWS (White Wolf GSA 2021). It is bound to the north by the Kern County Groundwater Subbasin and the White Wolf Fault system. To the east and south, the basin is bounded by the Tehachapi and San Emigdio Mountains and the west side is bounded by the Sierra Nevada Mountain Range. The principal aquifer is composed of deposits within layers of Shallow Alluvium, the Kern River formation, and the Chanac formation. The White Wolf Fault system is a southward-dipping reverse fault that restricts groundwater from flowing northward out of the basin, while the Springs Fault creates a partial hydraulic barrier to flow in the southeastern corner of the basin (White Wolf GSA 2021).

Groundwater flows from the southeast to the northwest, with depths to groundwater ranging from 70 to 980 feet below ground surface, with the highest infiltration/recharge potential occurring in the central part of the basin (White Wolf GSA 2021). The greatest density of wells is in the central and northern parts of the basin, which corresponds to the service area of AEWS and other agricultural development. Groundwater recharge primarily occurs because of percolation of applied irrigation water, streamflow from surrounding watersheds, water conveyance and distribution system leakage, precipitation, and M&I effluent (White Wolf GSA 2021). Outflow occurs because of groundwater pumping (primarily for agricultural use and a small portion for M&I uses), groundwater flow across the White Wolf Fault, and discharges to or evaporation from springs and shallow groundwater located south of the Springs Fault (White Wolf GSA 2021).

From the 1950s to the 1970s, groundwater levels declined; however, by 2007, most of the decline had been recovered. Between 2010 and 2019, water levels began to decline again. Consequentially, total groundwater storage in the aquifer has gone from a net accumulation of 3,200 acre-feet per year between 1995 and 2014 to a deficit in more recent years, with a net decrease of 20,300 acre-feet per year between 2015 and 2019 (White Wolf GSA 2021).

3.10.4 Groundwater Management and Use

The Tule Subbasin (Subbasin 5-022.13) and Kern County Subbasin (Subbasin 5-022.14) are designated under Sustainable Groundwater Management Act as high-priority and identified as critically over drafted. The White Wolf Subbasin (Subbasin 5-022.18) is not critically over drafted and is designated as medium priority. The White Wolf Subbasin's Groundwater Sustainability Plan (GSP) was determined adequate by DWR in 2023 (DWR 2023). As a result of the critically over drafted designations, the managing agencies or GSAs in the Tule and Kern County subbasins were required to adopt GSPs by January 31, 2020, with 20 years to implement their GSPs and achieve their sustainability goal in the basins by 2040. The Kern County Subbasin originally fell under the jurisdiction of the KGA GSA (KGA 2022). However, the KGA has largely split and, as of 2024, members have formed their other GSAs and GSPs. GSAs include the Arvin GSA, SWID GSA, SSJMUD GSA, and the KTWD GSA – Kern County (DWR 2024). The Tule Subbasin falls under the jurisdiction of seven GSAs, four of which include the remainder of the Friant districts (herein often referred to as “districts”) within the pump-back study area: (i) DEID GSA; (ii) the Eastern Tule GSA, which includes the northern half of KTWD, TBID, TPDWD, Porterville ID, and SID; (iii) LTRID GSA; and (iv) Pixley ID GSA. As of March 2024, the Tule Subbasin and Kern Subbasin GSPs are still considered inadequate (DWR 2024).

DWR estimated that groundwater in the San Joaquin Valley has fallen more than 100 feet below historic levels, partially resulting from the groundwater withdrawal rate that is faster than the rate of natural basin recharge (Mettler 2016). During the past 50 years, each successive drought period has resulted in an increase in groundwater pumping that has caused the water table to drop significantly. In Tulare County, which overlies the Tule Groundwater Subbasin and other subbasins, total overdraft has been estimated at 820,000 acre-feet per year, while historical overdraft has been estimated at 308,000 acre-feet per year for the period from 1921 to 1993 (Tulare County Association of Governments 2018). In the Kern County Groundwater Subbasin, net historic water level changes decreased 25 to 50 feet from 1970 to 2000 in the McFarland/Shafter area (DWR 2006).

Groundwater from the Tule Groundwater Subbasin supports beneficial uses such as municipal and domestic water supply, agricultural supply, industrial service supply, industrial process supply, and wildlife habitat (Central Valley Water Board 2018a). Because of the closed nature of the Tulare Lake Hydrologic Region, there is little subsurface outflow. Groundwater from the Kern County Groundwater Subbasin supports the same beneficial uses as the Tule Subbasin, with the addition of water contact recreation and noncontact water recreation (Central Valley Water Board 2018a). The White Wolf Subbasin groundwaters support beneficial uses for municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply (Central Valley Water Board 2018a). AEWS is the only district that has a portion of their service area overlying this basin. Of that portion, about half of the district receives surface water supply for irrigation and half uses only groundwater supplies.

The use of groundwater to irrigate crops throughout the San Joaquin Valley increased rapidly from the 1920s until the mid-1960s; subsequently, there was land subsidence throughout the Tulare Lake Hydrologic Region (Ireland et al. 1984). Based on research published in 1984, land subsidence of 12 to 16 feet, because of deep compaction of fine-grained units, occurred in the Tule Groundwater Subbasin (DWR 2004; Ireland et al. 1984). More recently, during the 2012-to-2016 drought period, data show regional land subsidence from May 2015 to September 2016 lowered the land surface elevation by as much as 25 inches (National Aeronautics and Space Administration 2016 as cited in Reclamation and FWA 2020). The highest rates of land subsidence in the Tule Groundwater Subbasin were reported to occur in the northwestern portion near the FKC near Terra Bella. Between 1926 and 1970, more than 8 feet of subsidence occurred in the north-central portion of the Kern County Groundwater Subbasin owing to groundwater extraction, and approximately 9 feet in the south-central area (DWR 2006; Ireland et al. 1984). More recent data show up to 0.5 feet of subsidence from 2007 to 2011 across most of the subbasin north of the Kern River (Luhdorff & Scalmanini Consulting Engineers 2014).

3.10.5 Groundwater Quality

Groundwater quality conditions vary across the study area according to depth. Salinity, measured as TDS, along with boron, chloride, and sodium, are the primary constituents of consideration for agricultural beneficial uses, and nitrate and organic compounds are primary constituents of consideration for municipal beneficial uses. Salinity, if accumulated at critical concentrations and not managed properly at the rootzone depth, can impact crops and agricultural production (Ayers and Westcot 1985). Because of the closed nature of these subbasins, any incremental addition of constituent mass to the groundwater aquifer may contribute to long-term salt and nitrate loading in the subbasins.

The CV-SALTS Nitrate Control Program, defined in Appendix D, recently prioritized the Bulletin 118 groundwater subbasins based on the degree of concern over the ambient levels of nitrate within the subbasin; subbasins listed as “Priority 1” and “Priority 2” have been identified as having the most serious ambient water quality concerns for nitrate. The Tule Subbasin (5-022.13) was listed as Priority 1 and the Kern County Subbasin (5-022.14) was listed as Priority 2. Permittees in Priority 1 basins were required to begin addressing compliance and managing for nitrate a year from May 2020 (Central Valley Salinity Coalition 2022); Tule Subbasin submitted a Final Management Zone Proposal for monitoring nitrate compliance in 2022 (Central Valley Salinity Coalition 2022; Tule Basin Management Zone 2022), and a Management Zone Implementation Plan in September 2023 (Tule Basin Management Zone 2023).

Groundwater quality varies greatly across the Tule Subbasin and according to depth within the aquifer partially owing to the presence of the Corcoran Clay unit. On a regional level, nonpoint source constituents of consideration for groundwater quality include nitrate, pesticides, 1,2-dibromo-3-chloropropane (DBCP), and 1,2,3, trichloropropane (TCP) in the upper aquifer and arsenic, manganese, and hydrogen sulfide for the lower aquifer (Thomas Harder & Company 2022). Nitrate concentrations ranging from non-detect to more than 300 mg/L have been measured, with the highest concentrations present in the northwest portion of the subbasin (Thomas Harder & Company 2022). Salinity and historical EC measurements generally suggest groundwater is suitable for agricultural use because EC measurements are typically less than 600 $\mu\text{mhos/cm}$ (384 mg/L TDS); however, at depths of 1,500 to 3,000 feet, the groundwater becomes brackish, at 3,000 $\mu\text{mhos/cm}$ (1,920 mg/L TDS) (Thomas Harder & Company 2022).¹⁴ Elevated electrical conductivity above the subbasin average is detected in shallow groundwater in the northwestern and southwestern portions of the subbasin. The municipal and agricultural beneficial use designation for the perched upper aquifer in the southwestern portion of the subbasin was removed by the SWRCB because of these water quality issues (SWRCB 2017).

Subbasin-wide groundwater quality conditions for the Kern County Subbasin were reviewed and documented within the KGA GSP (2022) to characterize constituents of consideration in relation to both drinking water and agricultural standards. The KGA GSP found that the most common water quality issues in the basin were related to high concentrations of nitrate, arsenic, boron, hexavalent chromium, DBCP, 1,2,3-TCP, TDS, sodium, and chloride. Of 26 representative wells sampled, nitrate concentrations ranged from 1.1 to 21.0 mg/L, with a median value of 9.9 mg/L (KGA 2022). Elevated concentrations of boron in the southern part of the subbasin near the Tehachapi Mountains are from naturally occurring sources. Because the predominant land use in the subbasin is agricultural, the agricultural Water Quality Goals (Ayers and Westcott 1985) were chosen in the GSP to evaluate salinity (TDS, sodium, and chloride) levels in the basin. These constituents were found to be elevated above agricultural standards, especially in wells near naturally occurring marine deposits, water disposal ponds, perched water, and agricultural drainage ponds (KGA 2022).

¹⁴ Total dissolved solids (TDS) in mg/L converted from the values given for EC in $\mu\text{S/cm}$; 1 $\mu\text{S/cm}$ = 1 $\mu\text{mhos/cm}$ = 1/1,000 dS/m. 1000 $\mu\text{mhos/cm}$ = 1 dS/m = 640 mg/L TDS (Porter and Marek 2022).

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

Agricultural use is the dominant beneficial use within the White Wolf Subbasin, and groundwater quality is generally suitable for this use (White Wolf GSA 2021). Constituents of consideration that exceed primary or secondary maximum contaminant levels (MCLs) or a water quality objective in more than 15% of wells sampled between 2015 and 2019 include arsenic, boron, iron, nitrate, selenium, sodium, sulfate, and TDS (White Wolf GSA 2021).

Limited data are available to understand the spatial representation of groundwater quality trends in the Tule, Kern County, and White Wolf Groundwater subbasins. Table 3-8 shows the current groundwater quality conditions for each water district within the study area as of November 2021. Conditions for both the upper aquifer and lower aquifer units are provided to show groundwater quality variance with depth. Districts in the southern portion of the study area, AEWSD, SWID, and SSJMUD, show higher levels in groundwater quality constituent concentrations while groundwater quality constituent concentrations are relatively lower for more northern districts. Constituent concentrations in some areas exceed MCLs for designated agricultural and municipal beneficial uses.

Table 3-8. Current Groundwater Quality Conditions by District

Constituent Concentration (mg/L)	District										
	AEWSD	DEID	KTWD	LTRID	Pixley ID	TPDWD	Porterville ID	Saucelito ID	TBID	SSJMUD	SWID
Upper Aquifer											
Total dissolved solids	454	277	632	284	193	400	638	363	335	875	807
Nitrate (as Nitrogen)	8	9	5	16	10	20	15	10	27	9	9
Chloride	28	7	0.2	42	35	7	28	23	0.9	11	6
Boron	0.16	0.00	0.00	0.12	0.02	0.00	0.01	0.00	0.00	0.01	0.37
Lower Aquifer											
Total dissolved solids	767	268	447	289	197	271	227	236	247	554	465
Nitrate (as Nitrogen)	7	9	7	11	8	24	5	6	8	10	10
Chloride	33	29	38	24	32	18	12	20	23	29	28
Boron	0.71	0.06	0.11	0.12	0.05	0.04	0.10	0.04	0.08	0.04	0.04

Note: Groundwater quality data used to assign initial concentrations for the upper and lower aquifer zones were based on data downloaded from the California Water Board's Groundwater Ambient Monitoring and Assessment Groundwater Information System (SWRCB and USGS 2021) on November 5, 2021, and supplemented by district-provided groundwater quality data as needed. AEWSD provided boron concentrations for the upper aquifer on August 12, 2022.

Key: AEWSD – Arvin-Edison Water Storage District; DEID – Delano-Earlimart Irrigation District; ID – Irrigation District; KTWD – Kern-Tulare Water District; LTRID – Lower Tule River Irrigation District; mg/L – milligrams per liter; SSJMUD – Southern San Joaquin Municipal Utility District; SWRCB – State Water Resources Control Board; SWID – Shafter-Wasco Irrigation District; TBID – Terra Bella Irrigation District; TPDWD – Tea Pot Dome Water District; USGS – U.S. Geological Survey

3.11 Noise and Vibration

The study area for the evaluation of noise and vibration comprises areas where project construction and operation would occur, including the Shafter-Wasco and Lake Woollomes sites (Kern County) and the Deer Creek site (Tulare County).

The predominant land use near the Deer Creek, Lake Woollomes, and Shafter-Wasco sites is related to agricultural activities. Activities associated with land preparation, harvesting, and transporting of crops would contribute to the existing noise and vibration environment near the three sites. Typical heavy off-road equipment used for agricultural activities include tractors, harvesters, bailers, tillers, and seeders. Overflights from crop spraying also would occur over agricultural land uses.

Vehicular traffic is also a contributor to background noise and vibration in the study area. Railroad and aeronautical noise sources also exist around the Shafter-Wasco, Lake Woollomes, and Deer Creek sites and are included in the background ambient noise and vibration condition. These rail and aeronautical noise and vibration sources are, however, at distances greater than 0.5 miles from the construction areas, which limits their contribution to the background noise and vibration levels experienced by identified sensitive receptors.

Table 3-2 summarizes the closest sensitive receptors to the center of each construction site. At these sensitive receptors, the estimated noise level is a daytime average level of 40 A-weighted decibels (dBA) and a nighttime average level of 30 dBA, based on the EPA *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974).

3.12 Population and Housing

The study area for population and housing includes Kern and Tulare Counties and the major surrounding cities of the project sites. Table 3-9 presents population and housing statistics for the two counties, as well as the cities of Bakersfield, Delano, and Porterville. Kern County had an estimated population of 906,883 people in 2022 (U.S. Census Bureau 2022a) with a projected population of 1,019,221 by 2030 (California Department of Finance 2021). Tulare County had an estimated population of 473,446 people in 2022 (U.S. Census Bureau 2022a) with a projected population of 516,810 by 2030 (California Department of Finance 2021).

Construction of the proposed pump-back facilities would occur in Kern and Tulare Counties, requiring construction workers to reside within the counties and nearby cities. It is expected that most of the workers would be provided from within the region and commute locally, but some workers would be required from outside the region and require temporary housing during construction. Vacant housing units reported in Table 3-9 would be available for rent.

Table 3-9. Population and Housing Estimates, 2018-2022

Population and Housing	Kern County	Tulare County	City of Bakersfield	City of Delano	City of Porterville
2022 Population	906,883	473,446	404,321	50,498	62,491
Total Housing Units	301,687	151,190	131,310	12,047	19,937
Total Occupied	277,499	140,670	124,744	11,500	18,925
Total Vacant	24,188	10,520	6,566	547	1,012
Vacant: For Rent	4,329	1,519	1,566	139	244
Vacant: For Sale	1,964	682	575	38	50

Sources: U.S. Census Bureau 2022a, 2022b, 2022c.

3.13 Recreation

The Deer Creek and Shafter-Wasco pump-back facilities are not near any recreational areas.¹⁵ However, construction of the Lake Woollomes pump-back facility would occur close to Lake Woollomes Park, which offers recreational opportunities. Lake Woollomes is owned by Reclamation and leased by the Kern County Parks Division. The lake is an equalizing reservoir for the FKC. The park is open year-round, 7 days a week, and offers picnic areas, a boat dock and launching ramp, playground equipment, and fishing opportunities (Kern County 2021).

3.14 Traffic and Transportation

The study area for traffic and transportation comprises the SRs and county roads (CRs) where traffic volumes could be affected during implementation of the proposed project. Figure J-1 in Appendix J shows the roadway network surrounding the project sites and landfills within the study area. Table 3-10 provides the existing (2022) operating conditions of relevant roadway locations in the project area.

¹⁵ The FKC is not used for recreational purposes.

Table 3-10. Existing Roadway Operations

Highway	Location	Lanes	Road Type	2022 Annual Average Daily Traffic	Level of Service
Tulare County					
Avenue 96/Avenue 95/ Terra Bella Avenue	At SR 65	2	Rural Highway (Class I-Level)	4,773	C
CR 208	At Deer Creek Site	2	Rural Highway (Class I-Level)	847	B
Avenue 192	At County Road 192	2	Rural Highway (Class I-Level)	2,815	B
CR 152/Bliss Lane	At Avenue 188	2	Rural Highway (Class I-Level)	2,096	B
Kern County					
SR 65	North of SR 155	2	Rural Highway (Class I-Rolling)	8,000	D
SR 155	West of SR 65	2	Rural Highway (Class I-Rolling)	480	B
	East of SR 99	2	Rural Highway (Class II-Rolling)	18,550	E
SR 99	South of SR 155	6	Rural Freeway	69,000	C
	North of SR 46	6	Rural Freeway	68,000	C
	North of Lerdo Highway	6	Rural Freeway	71,000	C
SR 46	West of SR 99	2	Rural Highway (Class I-Level)	6,800	C
	East of SR 43	2	Rural Highway (Class I-Level)	6,800	C
	East of Interstate 5	2	Rural Highway (Class I-Level)	6,600	C
	East of Brown Material Road	2	Rural Highway (Class I-Level)	9,800	D
Lerdo Highway	West of SR 43	2	Urban Street	6,059	D
	West of SR 99	4	Rural Multilane Highway	16,255	B
Pond Road	East of SR 99	2	Rural Highway (Class I-Level)	4,233	B
Scofield Avenue	North of Lerdo Highway	2	Rural Highway (Class I-Level)	414	B
Holloway Road	North of SR 46	2	Rural Highway (Class I-Level)	741	B

Sources: Study Team, Caltrans 2022, Kern County 2022, Tulare County 2016.

Note: The 2016 volumes for roadways in Tulare County and the 2021 volume for Scofield Ave in Kern County are projected to 2022 based on the assumed compound annual growth rate of 0.5%, road type based on Highway Capacity Manual (Transportation Research Board 2022 and 2016) definitions.

3.15 Tribal Cultural Resources

3.15.1 Ethnography

The project area falls within the traditional territory of the Yokuts (Kroeber 1925; Latta 1977, 1999; Olsen and Payen 1968; Wallace 1978). The Yokuts' Penutian language was spoken by some 40 groups using distinctive but closely related dialects. These groups inhabited three main geographic locales in Central California—the Southern Valley (Tulare Lake), the Northern Valley (San Joaquin Valley), and adjacent foothills (Sierra Nevada) (Kroeber 1925; Wallace 1978). The population of Yokuts (Northern Valley Yokuts, Southern Valley Yokuts, and Foothills Yokuts) numbered

approximately 41,000 at contact and primarily clustered at a narrow strip of land bordering the San Joaquin River and its tributaries, as well as lands east of the river along the Sierra Nevada foothills. Fewer Yokuts are thought to have inhabited the western edge of the San Joaquin Valley where villages were typically located along watercourses (Wallace 1978).

3.15.2 Tribal Cultural Resources Investigations and Results

A request for a search of the Sacred Lands file for the project APE was submitted to the Native American Heritage Commission (NAHC) in February 2021. A reply was received in March 2021, noting that a search of the Sacred Lands file had failed to reveal the presence of Native American resources within the APE. The NAHC provided a list of 27 tribal representatives from 18 different tribes with potential interest in and knowledge of the project vicinity, including:

- Big Pine Paiute Tribe of the Owens Valley
- Big Sandy Rancheria of Western Mono Indians
- Chumash Council of Bakersfield
- Coastal Band of the Chumash Nation
- Dunlap Band of Mono Indians
- Fernandeno Tataviam Band of Mission Indians
- Kern Valley Indian Community
- Kitanemuk and Yowlumne Tejon Indians
- Quechan Tribe of the Fort Yuma Reservation
- San Fernando Band of Mission Indians
- San Manuel Band of Mission Indians
- Santa Rosa Rancheria Tachi Yokut Tribe
- Santa Ynez Band of Chumash Indians
- Tejon Indian Tribe
- Tubatulabal of Kern Valley
- Tule River Indian Tribe
- Wukache Indian Tribe/Eshom Valley Band
- yak tityu yak tilhini – Northern Chumash Tribe

Consistent with NAHC-suggested “best practice” procedures, letters were sent via certified mail on April 19, 2021, to the 27 tribal representatives identified by the NAHC in March 2021 as being within the project area. The letters asked recipients if they had information or concerns about tribal cultural resources that may be affected by the proposed project.¹⁶ Each tribe listed was sent a project notification letter and map, and was asked to convey any knowledge regarding locations of concern to local Native American groups within the project area. The letter also included information such as project location, a brief description of the proposed project, and results of the pedestrian archaeological survey. A response was received on April 22, 2021, from the San Manuel Band of Mission Indians, who indicated the proposed project is located outside of their ancestral territory and as such, the tribe would not be requesting to receive consulting party status or participate in scoping, development, or review of documents created pursuant to legal and regulatory mandates. To date, no additional responses to these requests for information have been received.

¹⁶ PRC Section 21080.3.1(c) states “To expediate the requirements of this section, the NAHC shall assist the lead agency in identifying the California Native American tribes that are traditionally and cultural affiliated with the project area.”

In accordance with AB 52, when FWA initiated preparation of the NOP for the proposed project, FWA had not received a written request from any tribe indicating its wish to be notified of projects within its traditionally and culturally affiliated areas, which is required by PRC Section 21080.3.1(b). Therefore, tribal consultation pursuant to PRC Section 21080.3.1(b) was not required. No tribal cultural resources, as defined under PRC Section 21074, and no Traditional Cultural Properties, as described under National Register Bulletin 38, have been identified within the APE. Moreover, no human remains, including those interred outside of a dedicated cemetery, are known to exist in the project area.

3.16 Utilities, Service Systems, and Energy

The study area for public utilities includes existing public utilities and services in local jurisdictions associated with construction in Tulare and Kern Counties, with the cities of Porterville, Delano, and Shafter as the closest major cities. The solid waste material would be transported to the closest solid waste landfills, Woodville Landfill, which has remaining capacity of 7,717,239 cubic yards (California Department of Resources Recycling and Recovery [CalRecycle] 2022), Shafter-Wasco Landfill, which has a remaining capacity of 12,835,041 cubic yards as of 2021 and a projected closure date of 2054 (CalRecycle 2021a), and Lost Hills Environmental Waste Facility, which has a remaining capacity of 3,777,340 cubic yards and an anticipated closure date of 2030 (CalRecycle 2021b).

Electric services within Kern and Tulare Counties are provided by Eastside Power Authority, Pacific Gas and Electric (PG&E), and Southern California Edison (California Energy Commission [CEC] 2020). The Lake Woollomes and Deer Creek sites fall within the Southern California Edison coverage area and the Shafter-Wasco site falls within the PG&E coverage area. In 2021, the power plants within Kern County produced approximately 32,855,303 megawatt hours (MWh) of power and the power plants with Tulare County produced approximately 812,775 MWh of power (CEC 2021).

Kern County Fire Department provides fire protection services in Kern County and unincorporated areas of Kern County and several cities, including the cities of Delano and Shafter (Kern County Fire Department Nd.). Tulare County Fire Department has 27 community-based fire stations and provides fire protection services to unincorporated communities, hamlets, and rural areas in Kern County (Tulare County Fire Department 2022). In addition, the City of Porterville is covered by the City of Porterville Fire Department (City of Porterville 2021). Each county has its own sheriff's office providing law enforcement services. The cities of Porterville, Delano, and Shafter have individual police departments to serve their respective communities.

The Kern County Superintendent of Schools comprises 46 school districts housing more than 270 school sites (Kern County Superintendent of Schools 2021; Kern County Superintendent of Schools 2019). The Tulare County Office of Education serves 44 public school districts housing more than 230 school sites (Tulare County Office of Education 2022). The closest school to the Shafter-Wasco site is Sequoia Elementary School in Shafter, approximately 2.5 miles east of the site. The closest school to the Lake Woollomes site is Cesar E. Chavez High School in Delano, approximately 3.5 miles northeast of the site. The closest school to the Deer Creek site is Terra Bella Elementary School in Terra Bella, approximately 4 miles southeast of the site.

3.17 Regulatory Setting

Table 3-11 lists the federal, state, regional, and local laws, regulations, policies, and plans that are relevant and applicable to the affected environment, area of analysis, and analysis of impacts. The proposed project would not have any inconsistencies with applicable local and regional plans.

Table 3-11. Federal, State, and Local Laws, Regulations, and Plans

Laws, Regulations, and Plans	Applicable Resources	Full Description
Federal		
Bald and Golden Eagle Protection Act	Terrestrial	D.1.1
Clean Air Act	Air Quality	D.1.2
Clean Air Non-Road Diesel Rule	Air Quality	D.1.3
Clean Water Act	Water Quality, Fisheries, Terrestrial	D.1.4
Comprehensive Environmental Response, Compensation, and Liability Act	Hazards and Hazardous Materials	D.1.5
Emergency Planning and Community Right to Know Act	Hazards and Hazardous Materials	D.1.6
Energy Policy and Conservation Act	Utilities, Service Systems, Energy	D.1.7
Endangered Species Act	Water Supply, Fisheries, Terrestrial	D.1.8
Migratory Bird Treaty Act	Terrestrial	D.1.9
Noise Control Act of 1972 (42 United States Code 4910)	Noise	D.1.10
Occupational Safety and Health Act	Hazards and Hazardous Materials	D.1.11
Resource Conservation and Recovery Act	Hazards and Hazardous Materials	D.1.12
Safe Drinking Water Act	Water Quality	D.1.13
Title 49, Code of Federal Regulations, Sections 171–177	Hazards and Hazardous Materials	D.1.14
Toxic Substances Control Act	Hazardous and Hazardous Materials	D.1.15
State		
Alquist-Priolo Earthquake Fault Zoning Act	Geology, Seismicity, Soils	D.2.1
AB 52	Cultural	D.2.2
California Building Code	Geology, Seismicity, Soils, Noise and Vibration	D.2.3
California Clean Air Act	Air Quality	D.2.4
CDFW Species Designations	Fisheries	D.2.5
California Department of Transportation Guide for the Preparation of Traffic Impact Studies ¹	Traffic and Transportation	D.2.6
California Department of Transportation Vehicle Miles Traveled-Focused Transportation Impact Study Guide	Traffic and Transportation	D.2.6
California Endangered Species Act	Fisheries, Terrestrial	D.2.7
California Environmental Protection Agency Unified Program	Hazards and Hazardous Materials	D.2.8
CEQA Guidelines	GHG, Cultural	D.2.9
California Executive Order S-3-05	GHG	D.2.10
California Executive Order B-30-15 and SB 32	GHG	D.2.11
California Fish and Game Code Section 1600, Streambed Alterations	Terrestrial	D.2.12

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

Laws, Regulations, and Plans	Applicable Resources	Full Description
California Fish and Game Code Sections 1900–1913, Native Plant Protection Act	Terrestrial	D.2.13
California Fish and Game Code Sections 3500–3705, Migratory Bird Protection	Terrestrial	D.2.14
California Global Warming Solutions Act of 2006 (AB 32)	GHG	D.2.15
California Governor's Office of Planning and Research's Technical Advisory on Evaluating Transportation Impacts in CEQA	Traffic and Transportation	D.2.16
California Important Farmland Inventory System and Farmland Mapping and Monitoring Program	Agriculture and Land Use Planning	D.2.17
California Natural Resources Agency Tribal Consultation Policy	Cultural	D.2.18
California Noise Control Act of 1973	Noise and Vibration	D.2.19
California Occupational Safety and Health Administration Standards	Hazards and Hazardous Materials	D.2.20
California Office of Historic Preservation	Cultural	D.2.21
California Porter-Cologne Water Quality Control Act	Water Quality	D.2.22
California Water Code Section 13240, Regional Water Quality Control Plan	Water Quality	D.2.23
California Water Code, Water Rights	Water Supply	D.2.24
Hazardous Waste Control Act	Hazards and Hazardous Materials	D.2.25
Native American Historic Resource Protection Act	Cultural	D.2.26
Noise Element Guidelines	Noise and Vibration	D.2.27
Seismic Hazards Mapping Act	Geology, Seismicity, and Soils	D.2.28
Senate Bill 743	Traffic and Transportation	D.2.29
State Planning and Zoning Laws	Agriculture and Land Use Planning	D.2.30
Surface Mining and Reclamation Act of 1975	Geology, Seismicity, and Soils	D.2.31
Sustainable Groundwater Management Act	Groundwater	D.2.32
Williamson Act: California Land Conservation Act of 1965	Agriculture and Land Use Planning	D.2.33
Local/ Regional		
Central Valley Salinity Alternatives for Long-Term Sustainability	Water Quality	D.3.1
Certified Unified Program Agencies to Implement the United Hazardous Waste and Hazardous Materials Management Regulatory Program	Hazards and Hazardous Materials	D.3.2
Kern County Code Ordinance	Noise	D.3.3
Kern County General Plan	Air Quality, Terrestrial, Aquatic, Cultural, Agriculture and Land Use Planning, Noise and Vibration, Traffic and Transportation, Utilities, Service Systems, Power, Hazard and Hazardous Materials	D.3.4
Kern Council of Governments 2014 Regional Transportation Plan/Sustainable Communities Strategy	Traffic and Transportation	D.3.5
Kern County Planning and Natural Resources Department	Agriculture and Land Use Planning	D.3.6

Laws, Regulations, and Plans	Applicable Resources	Full Description
Tulare County Association of Government's Regional Transportation Plan	Traffic and Transportation	D.3.7
Tulare County General Plan	Air Quality, GHG, Terrestrial, Aquatic, Cultural, Water Quality, Agriculture and Land Use Planning, Noise and Vibration, Traffic and Transportation, Hazards and Hazardous Materials	D.3.8
Tulare County Climate Action Plan	GHG	D.3.9
Tulare County Resource Management Agency	Land Use Planning and Agriculture	D.3.10
SJVAPCD Air Quality Attainment Plans	Air Quality	D.3.11
SJVAPCD Programs	Air Quality	D.3.12

Note:

¹ The Caltrans Guide for the Preparation of Traffic Impact Studies has been superseded by the Caltrans Vehicle Miles Traveled-Focused Transportation Impact Study Guide, however this guidance is included for informational purposes.

Key: Assembly Bill – AB; CDFW – California Department of Fish and Wildlife; CEQA – California Environmental Quality Act; GHG – greenhouse gas; SJVAPCD – San Joaquin Valley Air Pollution Control District

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Chapter 4 Environmental Impacts

This chapter presents the analysis of impacts associated with the implementation of proposed project. Each resource subsection begins with an explanation of the assessment method(s) used to identify and address potential impacts and then presents the basis and criteria for determining whether the potential impacts are significant (under CEQA) and whether mitigation of the impact is warranted. For each resource area, significance criteria were developed consistent with Appendix G of the CEQA Guidelines; criteria based on factual or scientific information; criteria based on regulatory standards of local, state, and federal agencies; and/or criteria developed by FWA. These significance criteria were used to assess the significance level of the impacts under CEQA. Resource areas with potentially significant impacts and areas of known controversy are discussed in this chapter. The resources in Section 4.1 were determined to be absent from the study area or unaffected by the proposed project and are therefore not discussed further in this chapter.

4.1 Resources Considered and Eliminated from Analysis

The resources listed in Table 4-1 were considered and eliminated from detailed evaluation in this EIR because they either do not exist in the study area or would not be affected by the proposed project.

Table 4-1. Resources Considered and Dismissed from Detailed Evaluation

Resource Topic	Reason for No Affect/No Impact Determination
Agricultural Resources	According to the California Important Farmland Finder, the FKC passes through prime farmland, farmland of statewide importance, and other significant agricultural resources (California DOC 2024a). However, the proposed project would not result in conversion, loss, or rezoning of farmland into nonagricultural use because the project activities and operations would only contribute to existing infrastructure in federal rights-of-way. There would be no changes to water supply or availability that would affect farmland operations under the proposed project.
Forestry Resources	According to the California Department of Forestry and Fire Protection vegetation mapper, no forests exist within the study area (2024). Therefore, the proposed project would not affect forests or forestry.
Land Use and Planning	The proposed project would not affect established communities or conflict with any existing land use plan, policy, or regulation because project activities would be located within the federal rights-of way. No changes in zoning or land use would occur under the proposed project. As discussed in Section 7.3, the proposed project would not increase water supply, therefore there would be no changes to land use and planning from growth-inducing impacts.
Wildfire	The proposed construction areas are not located in a California State Responsibility Area for Wildfire Risk and are not in an area considered to be a Fire Hazard Severity Zone (California Department of Forestry and Fire, Office of the State Fire Marshal 2022). Therefore, the proposed project would not affect wildfire hazards.

Resource Topic	Reason for No Affect/No Impact Determination
Mineral Resources	According to the DOC mines and mineral resources mapper, the project area spans the Tulare County Production-Consumption Region and Bakersfield Production-Consumption Region mineral resource areas (California DOC 2024b). However, neither the proposed project nor any of the alternatives would affect the availability of the mineral resources found in the regions because mining operations would not be disturbed and access to mineral deposits would not be changed.
Public Services	The proposed project would not affect government facilities related to public services (e.g., fire, police, schools, parks) because none of these types of facilities exist within the study area, nor would the proposed project require new government facilities.

Key: DOC – California Department of Conservation; FKC – Friant-Kern Canal

4.2 Aesthetics

4.2.1 Assessment Methods

Assessment of aesthetic resources was accomplished through the consideration of how modifications under the proposed project and under each alternative could affect scenic vistas and the scenic character in the study area. The area around Lake Woollomes, the FKC, and Deer Creek offers open scenic vistas of agricultural land and open water. This evaluation assesses the degree of public importance placed on landscapes viewed from travel ways (linear concentrations of public-viewing, including highways, trails, and waterways) and use areas (spots with concentrated public-viewing use).

4.2.2 Significance Criteria

Consistent with Appendix G of the CEQA Guidelines, impacts on aesthetic resources would be considered significant if the project would:

- a) have a substantial adverse effect on a scenic vista;
- b) substantially damage scenic resources, including trees, rock outcroppings, and historic buildings, within a state scenic highway;
- c) substantially degrade the existing visual character or quality of public views of the site and its surroundings in nonurbanized areas and would conflict with applicable zoning and other regulations governing scenic quality in urbanized areas; or
- d) create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

4.2.3 Environmental Impacts

4.2.3.1 Construction of Proposed Project

Under the proposed project, short-term construction staging near the Shafter-Wasco, Lake Woollomes, and Deer Creek sites could affect scenic vistas. However, temporary construction effects on the existing aesthetic character are considered minor because of the short-term nature of the construction activities and the size of each construction site in comparison to the broad surrounding vistas. **Overall, impacts to scenic vistas from construction activities under proposed project would be less than significant.**

No state scenic highways are located within or near the proposed project area (Caltrans 2024). Furthermore, no trees or rock outcroppings would be disturbed during construction activities. While the FKC is considered a known historic property and historical resource, the proposed project would not alter the character-defining features of the canal. **As such, there would be no impacts associated with damage to scenic resources within a state scenic highway under the proposed project.**

The area surrounding the project area is largely agricultural. The temporary addition of construction equipment would not differ substantially from the regular use of similarly sized farm equipment across the region. As such, construction activities associated with the proposed project would not substantially degrade the existing visual character. **The impact would be less than significant.**

There is a potential for nighttime construction to occur at the Shafter-Wasco, Lake Woollomes, and Deer Creek sites. New light sources during nighttime construction would be limited to temporary security lighting established to illuminate construction or staging areas. The area surrounding the construction sites is largely agricultural and the nearest sensitive receptors are farmhouses with the closest approximately 1,220 feet away. During certain seasons, some crop harvesting practices in the area require 24-hour harvesting activities with more intense lighting on farm equipment. These lights are an occasional but normal part of the nighttime landscape in the area. **Impacts associated with new sources of substantial light or glare under the proposed project would be less than significant.**

4.2.3.2 Operation of Proposed Project

Under the proposed project, pump-back facilities would be operated to deliver water to CVP Friant Contractors. Viewsheds at the Shafter-Wasco, Lake Woollomes, and Deer Creek sites would be unchanged by the annual operation of the pump-back facilities. The new permanent infrastructure developed to support these pump-back activities would be similar in scale, texture, and color to the other existing conveyance infrastructure in the areas near the Shafter-Wasco, Lake Woollomes, and Deer Creek sites and would not change the visual character at and around the three sites. Light sources would also be consistent with the existing infrastructure at each site. **Therefore, there would be no impacts to aesthetic resources from annual operations under the proposed project.**

4.3 Air Quality

4.3.1 Assessment Methods

This section describes the assessment methods used to analyze potential air quality effects of the proposed project. Construction-related emissions were estimated using the following sources: OFFROAD web database (CARB 2024), EMFAC 2021 web database (CARB 2021), paved road dust emission factors (EPA 2011), and the California Emissions Estimator Model (CalEEMod) User's Guide (California Air Pollution Control Officers Association 2022). Appendix E provides detailed information on the emission calculations for off-road construction equipment exhaust; on-road haul/vendor truck and construction worker commuting exhaust; and fugitive dust emissions from material handling, grading, and bulldozing.

4.3.2 Significance Criteria

Consistent with Appendix G of the CEQA Guidelines, impacts on air quality would be considered significant if the proposed project would:

- a) conflict with or obstruct implementation of the applicable air quality plan;
- b) result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard;
- c) expose sensitive receptors to substantial pollutant concentrations; or
- d) result in other emissions, such as those leading to objectionable odors, adversely affecting a substantial number of people.

The quantitative criteria developed by the local air district and SJVAPCD were used to determine compliance with the first two significance criteria. The second criterion for cumulative impacts is addressed in Chapter 6 and is not discussed further in this chapter.

SJVAPCD published CEQA Guidelines to assist lead agencies with uniform procedures for addressing air quality impacts in environmental documentation. Impacts on air quality would be significant if implementing an alternative would cause the thresholds shown in the CEQA guidance document to be exceeded; if these thresholds are exceeded, conflicts with applicable air quality plans and contributions to air quality standard violations for applicable pollutants can be assumed.

4.3.3 Environmental Impacts

4.3.3.1 Construction of Proposed Project

Construction-related emissions in the SJVAPCD were estimated for off-road construction equipment, on-road haul trucks and delivery vehicles, and construction worker commuting. Table 4-2 summarizes the annual construction-related emissions associated with the proposed project (Appendix E contains detailed calculations). **As shown in Table 4-2, under the proposed project, construction NO_x emissions would exceed the SJVAPCD's significance threshold, resulting in a significant impact.** Therefore, mitigation for air quality would be required.

Table 4-2. Unmitigated and Mitigated Construction Emissions Under the Proposed Project

Source	VOCs (tpy)	NO _x (tpy)	CO (tpy)	SO ₂ (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)
Shafter-Wasco	0.53	4.13	4.83	0.01	0.55	0.34
Lake Woollomes	0.53	4.15	4.84	0.01	0.56	0.34
Deer Creek	0.53	4.16	4.84	0.01	0.56	0.35
Total Emissions ^{1,2}	1.60	12.44	14.51	0.03	1.66	1.03
SJVAPCD Significance Thresholds	10	10	100	27	15	15
Mitigated Emissions ³	0.87	7.74	15.55	0.02	1.30	0.70

Notes:

¹ Totals may not add exactly because of rounding.

² Values in **bold** indicate exceedance of the SJVAPCD significance threshold or the general conformity de minimis threshold.

³ Mitigated emissions of CO would be higher than unmitigated emissions owing to newer equipment trading-off higher CO emissions for reduced NO_x emissions in engine design and specifications but the slightly higher level of 15.55 tpy of mitigated emissions of CO is still well below SJVAPCD's 100 tpy significance threshold.

Key: CO – carbon monoxide; NO_x – nitrogen oxides; PM_{2.5} – fine particulate matter; PM₁₀ – inhalable particulate matter;

SJVAPCD – San Joaquin Valley Air Pollution Control District; SO₂ – sulfur dioxide; tpy – tons per year;

VOC – volatile organic compound

Mitigation Measure AQ-1 would require construction contractors involved in the project to ensure that vehicles used during construction meet at minimum specific emission standards established by EPA. Based on CARB's EMFAC and OFFROAD emission factor databases from which equipment emission factors were derived, relative to the average engine emissions of typical construction fleets located within the SJVAB, equipment meeting these more stringent California Environmental Protection Agency engine standards would emit substantially less NO_x per hour of operation or per mile of travel, and implementation of this measure would, as shown in Table 4-2, reduce project emissions of NO_x to below the 10 tpy SJVAPCD significance threshold. This measure affects all haul trucks, vendor trucks, and other vehicles or equipment operating on-site. **Implementation of Mitigation Measure AQ-1, described in Section 4.18, would reduce NO_x emissions under the proposed project to a less than significant level.**

Construction of the proposed project could include diesel-powered construction equipment that have the potential to emit toxic air contaminants (TACs) in exhaust emissions, such as diesel particulate matter (DPM),¹⁷ however, construction impacts would be temporary. Pollutant concentrations are expected to drop 80% at approximately 1,000 feet from a distribution center and 70% at 500 feet from a major freeway (CARB 2005).¹⁸ The closest sensitive receptor, the residence on Road 108, is approximately 1,220 feet away. Therefore, the exposure of DPM to sensitive receptors is expected to be minimal because of the distance from the construction activities. Because

¹⁷ DPM is listed in the Office of Environmental Health Hazard Assessment as a carcinogen and has a noncancer chronic reference exposure level. DPM does not contribute to acute health hazards.

¹⁸ CARB's 2005 Air Quality and Land Use Handbook includes land use siting recommendations based on analyses of health effects associated with pollution, particularly DPM, from various sources including distribution centers and major freeways. While the proposed project does not involve a distribution center or major freeway, the rate of reduction to local concentrations associated with vehicle tailpipe emissions from those sources over distances would also be applicable to tailpipe emissions from construction-related equipment and vehicles and the reduction in risks over distance would be comparable.

there would be **no long-term exposures to any TACs, the effect on sensitive receptors would be insubstantial and would have a less than significant impact on sensitive receptors.**

The use of diesel equipment during construction may generate near-field odors that are a nuisance. Diesel equipment emits a distinctive odor that may be considered offensive to some individuals. Because of the short construction period (5 to 6 months) and distance to sensitive receptors, odors from diesel exhaust would not affect a substantial number of people. **Therefore, the potential for the proposed project to create objectionable odors affecting a substantial number of people would be less than significant.**

4.3.3.2 Operation of Proposed Project

Under the proposed project, three pump-back facilities would be operated to deliver water to CVP Friant Contractors. The newly constructed pumps would be electric-driven and would replace existing temporary diesel pumps. The removal of this diesel equipment would remove a source of a distinctive odor that may be considered offensive to some individuals. As such, there would be no local criteria pollutant emissions or objectionable odors through operation of the pump-back facilities. **Therefore, there would be no air quality impacts from the operation of the proposed project.**

4.4 Biological Resources – Aquatic

4.4.1 Assessment Methods

Potential project-related impacts to aquatic resources fall into two categories: (1) potential short-term construction-related impacts and (2) potential long-term operations-related impacts. Short-term construction activities could cause the temporary degradation of fish habitats from disturbance and increased sedimentation, as well as the release and exposure to construction-related contaminants. These impacts have been evaluated qualitatively in this section. Operation of the proposed project could cause impacts to aquatic resources because of changes in hydrology associated with changes in facilities' operations.

4.4.2 Significance Criteria

Impacts on fisheries and aquatic ecosystems could be significant if project implementation would:

- a) have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or the National Marine Fisheries Service (NMFS);
- b) have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS;
- c) have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

- d) interfere substantially with the movement of any native resident or migratory fish or aquatic-dependent species or with established native resident or migratory corridors, or impede the use of native nursery sites;
- e) conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- f) conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or state habitat conservation plan.

The significance criteria listed above were developed consistent with Appendix G of the CEQA Guidelines. Because significance criteria b) and c) are related to terrestrial resources, these criteria are analyzed below in Section 4.5.3.

4.4.3 Environmental Impacts

4.4.3.1 Construction of Proposed Project

Under the proposed project, construction activities within the FKC could coincide with the time of year (i.e., winter) during which flow in the FKC is low because of reduced irrigation demand or during a planned canal drawdown period. If in-canal construction activities occur and extend beyond the winter drawdown period, six temporary cofferdams (one upstream and one downstream at each site) along the banks of the canal may be constructed to isolate/dewater the construction zones. These cofferdams could result in up to a 25% reduction in water levels within the canal. Therefore, any fluctuation in water levels or water quality that would occur during the construction of the proposed project would likely fall within the normal annual range of conditions. As noted in Section 3.3, the Kern brook lamprey, which is a state-listed species of concern, is known to inhabit the FKC-associated siphons. However, construction activities under the proposed project would not result in water level conditions outside the normal range of those to which lamprey occurring in or near the project area are typically exposed.

As detailed in Sections 4.9 and 4.10, there is potential for construction activities to introduce chemicals to the canal (e.g., diesel fuel, solvents, degreasers), which could reduce the canal's water quality. This could result in a significant impact on a special status species if changes in water quality were to reduce the capacity of the habitat to support the Kern brook lamprey. However, this potentially significant impact would be mitigated through the implementation of Mitigation Measure HAZ-1 (Development and Implementation of a Stormwater Pollution Prevention Plan [SWPPP]). This measure would require that a SWPPP, consistent with the Statewide National Pollutant Discharge Elimination System (NPDES) Construction General Permit, be developed and implemented by FWA prior to construction. Erosion control best management practices (BMPs) that would be implemented include source control measures such as scheduling construction activities with regard to the rainy season, wetting of dry and dusty surfaces to prevent fugitive dust emissions, preservation of existing vegetation, and effective soil cover in inactive areas. Furthermore, Mitigation Measure WR-1 would require FWA to obtain relevant state and federal water quality and stormwater permits and adhere to any permit terms and conditions to reduce impacts on water quality. The full descriptions of Mitigation Measures HAZ-1 and WR-1 are provided in Section 4.18. The implementation of the erosion and sediment control measures outlined in these Mitigation Measures would protect water quality in the canal and consequently avoid adverse effects on the Kern brook lamprey present in the canal. **Therefore, construction-related impacts on candidate,**

sensitive, or special status species, specifically the Kern brook lamprey, would be less than significant with the implementation of Mitigation Measures HAZ-1 and WR-1.

Construction activities under the proposed project would not substantially interfere with Kern brook lamprey's use of existing nursery sites since the species' presence is likely limited to the existing siphon at Deer Creek, which would not be modified under the proposed project. Additionally, any interference with the normal movement patterns of aquatic species, including the Kern brook lamprey, would be temporary because such impacts would be limited to the period of in-canal construction. **Therefore, project implementation would result in less than significant impacts on native aquatic species movement and use of nursery sites.**

The construction of the proposed project would comply with any relevant local policies and ordinances protecting biological resources, including those outlined in Section D.3 of Appendix D. **Therefore, no impact would occur since the proposed project would not conflict with local policies or ordinances.**

Based on a review of CDFW's Conservation Plan Boundaries map, the proposed project does not occur within the boundaries of an established HCP or NCCP (CDFW 2024). FWA is not aware of any other approved local, regional, or state HCP that would cover the proposed project. **Therefore, no construction-related impacts would occur as the proposed project would not conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan.**

4.4.3.2 Operation of Proposed Project

Pump-back operations under the proposed project would result in increased deliveries of up to 500 cfs in the FKC. These water levels are comparable to existing levels, and thus, would not impact Kern brook lamprey. **Therefore, impacts to candidate, sensitive, or special status species, specifically the Kern brook lamprey, from operations under the proposed project would be less than significant.**

Because the changes to water levels in the FKC that would result from the implementation of the proposed project are expected to be comparable to the existing range of conditions that occur within the FKC, the operation of the proposed project would not alter the normal movement patterns of aquatic species, or the ability of aquatic species to use existing nursery sites. **Therefore, the operation of the proposed project would result in less than significant impacts on native aquatic species movement and use of nursery sites.**

The proposed project would be operated in compliance with all relevant local policies and ordinances protecting biological resources, including those outlined in Section D.3 of Appendix D. **Therefore, no impact would occur since the proposed project would not conflict with local policies or ordinances.**

As mentioned above, the proposed project does not occur within the boundaries of an established HCP or NCCP (CDFW 2024). FWA is not aware of any other approved local, regional, or state HCP that would cover the proposed project. **Therefore, no operational impacts would occur as the proposed project would not conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan.**

4.5 Biological Resources – Terrestrial

4.5.1 Assessment Methods

Potential project-related impacts to biological resources would fall into two categories: (1) potential construction-related impacts and (2) potential long-term operations-related impacts. Construction activities, including staging, could cause temporary or permanent degradation of habitat and could directly impact wildlife or plant species through interactions with equipment or personnel.

Operational impacts could be triggered by operation of new and upgraded pump-back facilities. The impact analysis in this section is based on the proposed construction under the proposed project and the potential for each species to occur based on multiple survey reports, including the report from a biological resources survey conducted in March 2021, database output, and habitat assessments provided in Appendix H.

4.5.2 Significance Criteria

Impacts of an alternative on fisheries and aquatic ecosystems would be significant if project implementation would:

- a) have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS;
- b) have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS;
- c) have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- d) interfere substantially with the movement of any native resident or migratory fish or wildlife or with established native resident or migratory corridors, or impede the use of native nursery sites;
- e) conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- f) conflict with the provisions of an adopted Habitat Conservation Plan (HCP), NCCP, or other approved local, regional, or state habitat conservation plan.

The significance criteria listed above were developed consistent with Appendix G of the CEQA Guidelines.

4.5.3 Environmental Impacts

4.5.3.1 Construction of Proposed Project

Potential Impacts on Special Status Species

Potential short-term construction-related impacts on special status species could occur if special status species were to occur within areas subject to temporary disturbance (i.e., staging areas) at each of the three project sites, or in areas close enough to the work areas that they could be disturbed by

noise and other construction-related disruptions. As described in Section 2.1.1, the temporary staging areas comprise up to 4.4 acres at the Shafter-Wasco project site, 3.3 acres at the Lake Woollomes project site, and up to 7.3 acres at the Deer Creek project site. The potential for -short-term impacts on special status species is discussed by taxon group in the following subsections.

Invertebrates

As described in Section 3.4.2.1 and Appendix H, there is low potential for Crotch's bumble bee to occur within staging areas at all three project sites. Should nest sites occur in the project work areas during ground-disturbing activities, the nests could be disturbed or destroyed, potentially resulting in a significant impact. However, to reduce the potential for adverse impacts on this species, a qualified biologist will conduct protocol-level surveys, consistent with the CDFW *Survey Considerations for California Endangered Species Act Candidate Bumble Bee Species* (2023), within 1 year of the start of construction to identify potential nesting sites. As required by Mitigation Measure TERR-1 (Crotch's Bumble Bee), FWA will consult with CDFW to develop adequate take avoidance measures, including protection for underground overwintering queens, if nests are found during the protocol-level surveys. **Therefore, with the implementation of TERR-1, the potential for Crotch's bumble bee to be affected by the construction of the proposed project would be reduced to a less than significant level.**

Amphibians and Reptiles

Six special status amphibians and reptiles (western spadefoot, Bakersfield legless lizard, California glossy snake, coast horned lizard, Northern California legless lizard, and San Joaquin coachwhip) have the potential to occur in the staging areas within the here project sites, as described in Section 3.4.2.2 and Appendix H.¹⁹ Should individuals of these species occur within the project work areas during construction, individuals could be disturbed, injured, or killed, potentially resulting in a significant impact. To reduce the potential for adverse impacts on these species, the implementation of Mitigation Measure TERR-2 (Special Status Reptiles and Amphibians) would require a qualified biologist to conduct pre-construction surveys for special status reptiles and amphibians no more than 2 weeks prior to construction within 100 feet of disturbance areas, including all areas where ground disturbance and staging would occur. Mitigation Measure TERR-2 also requires the qualified biologist to be present on-site during all project activities with the potential to affect special status reptiles and amphibians to reduce the potential for construction activities to impact individuals that may occur within the project areas after the pre-construction surveys/during construction. Should a special status reptile or amphibian be detected within work sites during construction, the biologist would stop work in the immediate area of detection until the individual has left the work site or been relocated by a qualified biologist. Although the implementation of TERR-2 has the potential to impact special status reptiles and amphibians through the potential relocation process, it is expected that only a small number of individuals may need to be relocated and therefore this impact would not reach a significant level. The number of individuals that may be relocated is expected to be very small because, based on the quality and amount of habitat in the project area, the number of special status amphibians and reptiles occurring in the project area is expected to be low and the number of individuals that may require relocation is expected to be even lower since relocation would only occur after all other possible avoidance and minimization measures have been exhausted.

¹⁹ The northwestern pond turtle (*Actinemys marmorata*), which was proposed for listing under the federal Endangered Species Act in 2023, does not have the potential to occur in the project areas owing to the absence of suitable upland and aquatic habitat (Appendix H). Therefore, the project has no potential to affect the northwestern pond turtle.

Additionally, should handling or relocation be required, USFWS and/or CDFW will be contacted to advise on additional measures that may be incorporated to reduce potential impacts on individuals. **Therefore, with the implementation of TERR-2, the potential for special status amphibians and reptiles to be affected by the construction of the proposed project would be reduced to a less than significant level.**

Birds

As discussed in Section 3.4.2.3 and Appendix H, six special status bird species have the potential to use the staging areas within the project sites as foraging habitat. Of these six species, the project sites only support nesting/burrowing habitat for the burrowing owl; therefore, Swainson's hawk, tricolored blackbird, bald eagle, golden eagle, and white-tailed kite have the potential to occur in the project sites only transiently while foraging or dispersing. Although project activities would result in a temporary reduction in the available foraging habitat for these species, the existing habitat within the areas that would be affected is very low quality and is surrounded by large expanses of foraging habitat of the same or greater quality. Therefore, the short-term impacts on foraging habitat for all six species that would occur are expected to be less than significant.

As mentioned previously, the only special status bird species whose nesting/breeding activities could be affected by the construction of the proposed project is the burrowing owl, which nests underground. Should nesting burrowing owls occur within the project sites during construction activities, their breeding activities could be disrupted and/or individuals could be disturbed, injured, or killed, resulting in a potentially significant adverse effect. Mitigation Measure TERR-3 (Nesting Bird Surveys), which is provided fully in Section 4.18, would require that ground-disturbing and vegetation-clearing activities occur outside of the general nesting bird season (February 1 through September 15) to the greatest extent practicable. Should activities be required during the breeding season, a qualified biologist will be on-site during all ground and/or vegetation-disturbing activities. Regardless of when ground and/or vegetation disturbance is scheduled, the qualified biologist will conduct nesting bird surveys within the project area and the surrounding 500-foot radius of the project area no more than 10 days prior to the start of ground or vegetation disturbance, in accordance with TERR-3. In addition to these pre-construction surveys, protocol presence/absence surveys shall be conducted during the burrowing owl breeding period (February 1 through August 31), as detailed in TERR-4 (Burrowing Owl) in Section 4.18. Should burrowing owl nests be discovered during these surveys, no-disturbance buffers would be implemented around active nests. These no-disturbance buffers shall vary in size, ranging from approximately 160 feet to up to 1,640 feet, based on the time of year during which work would occur and the level of disturbance that the proposed project would cause. As described in TERR-4, an exclusion and passive relocation plan will be developed and submitted to CDFW if the implementation of the no-disturbance buffers is not practicable, and CDFW will be consulted to determine alternative measures to minimize the potential for disturbance to occupied burrows and nesting activities. Although the implementation of TERR-4 has the potential to impact the burrowing owl through the relocation process, it is expected (based on the quality and amount of habitat in the project areas) that only a small number of individuals may occur in the project area, and the number of individuals that may require relocation is expected to be even lower since relocation would only occur after all other possible avoidance and minimization measures have been exhausted. Furthermore, any collapsed burrows would be mitigated through the introduction of artificial burrows at a 1 to 1 ratio. **Therefore, with the implementation of TERR-3 and TERR-4, the potential for special status birds to be**

affected by the construction of the proposed project would be reduced to a less than significant level.

Mammals

As described in Section 3.4.2.4, three special status mammal species—SJKF, Tipton kangaroo rat, and American badger—have the potential to forage and/or den/burrow within the staging areas at all three project sites. Should individuals of these species occur within the project work areas during construction, individuals could be disturbed, injured, or killed, potentially resulting in a significant impact. To reduce the potential for adverse effects on the SJKF, a qualified biologist will conduct pre-construction surveys following the USFWS *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* (2011), as specified in Mitigation Measure TERR-5 (SJKF) presented in Section 4.18. As described in TERR-5, the destruction and disturbance of any kit fox dens discovered during pre-construction surveys would be avoided through the implementation of exclusion zones. If disturbance/destruction of occupied dens cannot be avoided, FWA will consult with CDFW and/or USFWS for guidance on how to avoid take of this species. Similarly, to reduce the potential for effects on Tipton kangaroo rat, a qualified biologist will conduct protocol-level surveys following the USFWS *Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats* (2013) to determine whether occupied burrows occur within the project area, as described in Mitigation Measure TERR-6 (Tipton Kangaroo Rat). TERR-6, presented fully in Section 4.18, would also require FWA to consult with USFWS to determine additional avoidance and minimization measures if kangaroo rats are found in the project area during the pre-construction surveys. Project construction would conform to the terms and conditions of any applicable incidental take permits issued for the project. Finally, the potential for impacts on the American badger will be similarly reduced by requiring a qualified biologist to conduct focused pre-construction surveys concurrent with those being conducted for other special status species. If no occupied badger dens are found during the pre-construction survey, then no further mitigation is required; if dens are found, additional measures would be implemented consistent with Mitigation Measure TERR-7 (American Badger), as described in Section 4.18. Although the implementation of Mitigation Measures TERR-5 through TERR-7 has the potential to impact special status mammals through the surveying process, it is expected (based on the quality and amount of habitat in the project areas) that only a small number of individuals may occur in the project area. **Therefore, with the implementation of TERR-5, TERR-6 and TERR-7, the potential for special status mammals to be affected by the construction of the proposed project would be reduced to a less than significant level.**

Plants

As described in Section 3.4.2.5 and Appendix H, there is low potential for seven special status plant species—alkali mariposa-lily, California satintail, Kern mallow, Mason’s neststraw, recurved larkspur, San Joaquin woollythreads, and subtle orache—to occur in other parts of the project area (i.e., staging areas). Should special status plants occur within portions of the project area that that would experience surface-level ground disturbance, the plants could be significantly adversely affected by the use of heavy equipment and by workers walking through the area. The potential for adverse effects on special status plant species would be avoided through the implementation of Mitigation Measure TERR-8. Mitigation Measure TERR-8, which is fully described in Section 4.18, would require the study area to be surveyed by a qualified botanist during the appropriate bloom season for special status plant species with the potential to occur in the project area. If special status species are found within the study area, CDFW and/or USFWS will be consulted and a minimum no-

disturbance buffer of 50 feet (or a larger buffer, if directed by CDFW and/or USFWS) will be established around the individual plant(s) or population(s) during activities that could result in disturbance. If the avoidance buffer is infeasible, a mitigation plan will be prepared in coordination with the appropriate natural resource agency (i.e., CDFW and/or USFWS) prior to the commencement of construction activities that will include the transplantation of affected plants. Although the implementation of TERR-8 has the potential to impact special status plants through the transplant/relocation process, transplanted plants would be monitored for at least 5 years to reduce the potential for impacts, and FWA would provide for off-site mitigation if the transplantation process is not successful. Additionally, because the likelihood of special status plant occurrence in the project area is already low, the number of plants that may require translocation is expected to be even lower since translocation would only occur after all other possible avoidance and minimization measures have been exhausted. **Therefore, with the implementation of TERR-8, the potential for special status plants to be adversely affected by the construction of the proposed project would be reduced to a less than significant level.**

Additionally, the potential for direct impacts to both special status plant and wildlife species occupying staging areas through interactions with construction equipment or personnel would be minimized with the implementation of Mitigation Measure TERR-9 (Construction Contractor Environmental Awareness Training and Site Protection Measures), as described in Section 4.18. This measure would require all construction personnel to attend an environmental education program delivered by a USFWS- and CDFW-approved biologist prior to starting work. The training will include an explanation of how to identify each special status species with potential to occur and how to avoid the accidental take of special status plants and wildlife. Additional topics to reduce the potential for effects on special status species would also be covered during the training, as described in Section 4.18. **Based on the preceding analysis, and with the implementation of Mitigation Measures TERR-1 through TERR-8 (Section 4.18), the potential for special status plants and wildlife to be adversely affected by the construction of the proposed project would be less than significant.**

Potential Impacts on Other Terrestrial Resources

The northernmost project site is centered on Deer Creek, an intermittent waterway that supports a narrow band of riparian vegetation along both banks. Deer Creek would be considered a federally protected waterway, as it falls within the definition of Waters of the United States (88 FR 61964). Additionally, a wetland delineation performed in March 2021 determined that two federally protected wetlands partially overlap the northeastern corner of the project area, as described in Appendix H. However, a subsequent site visit in January 2023 found that the previously identified wetland areas have been filled and graded in service of the FKC Middle Reach Capacity Correction Project (Appendix H) and therefore no wetlands currently occur at the site. Thus, no project work would occur within wetlands. Additionally, no work is proposed within the riparian areas associated with Deer Creek. There is potential for ground-disturbing activities and staging/storage of equipment occurring adjacent to the riparian areas along Deer Creek to result in the deposition of soils and other construction-related contaminants within nearby riparian areas, which has the potential to cause a significant adverse impact. However, as required in Mitigation Measure TERR-9, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction areas and exclusive of established environmentally sensitive areas. All workers will be informed of the importance of preventing spills and the appropriate measures to take should a spill occur. All staging, maintenance, and storage of heavy machinery will be

conducted in such a location and manner that no fuel, oil, or other petroleum products may run off or be washed by rainfall into waterbodies near the project areas. Furthermore, Mitigation Measure HAZ-1 requires the development and implementation of a SWPPP, which would reduce the potential for project activities to introduce sediments or other contaminants to riparian areas.

Therefore, the proposed project is expected to have less than significant impacts on wetlands, riparian habitat, and other sensitive natural communities with the implementation of Mitigation Measures TERR-9 and HAZ-1.

The proposed project footprints coincide with the locations of existing pump-back facilities and other FKC-related infrastructure, such as access roads. Additionally, each site is surrounded by actively managed agricultural lands. Given the highly modified nature of project sites and their surrounding landscapes, local wildlife movement is likely already impaired to some degree. The proposed project would not include the construction of any new fences or similar structures expected to inhibit wildlife movement. Thus, although the proposed facilities may incrementally increase the overall level of development at each site through the construction of new structures, any such increases are expected to be consistent with the types of infrastructure already present at the project sites and would not further reduce conditions for wildlife movement.

No suitable nesting trees occur within the project areas; however, there are grassland, scrub, and nearby riparian habitats in or near project footprints that could support nesting migratory birds. Should nesting birds occur during project activities, they could be harmed or disturbed during construction. These impacts could be significant. However, ground-disturbing and vegetation-disturbing work would be conducted outside of nesting bird season (February 1 through September 15) to the extent practicable. If the nesting season cannot be avoided, a qualified biologist will be on-site during any activities that have the potential to affect migratory birds. The qualified biologist will also conduct pre-construction nesting bird surveys and establish no-disturbance buffers around any active nests discovered, following the requirements in Mitigation Measure TERR-3 (described in Section 4.18). If the establishment of the required no-disturbance buffers is not practicable, FWA shall consult with CDFW and/or USFWS to identify alternative conservation measures to implement to reduce the potential for effects on migratory birds. **Therefore, impacts on migratory birds would be less than significant with the implementation of TERR-3.**

The construction of the proposed project would comply with any relevant local policies and ordinances protecting biological resources, including those outlined in Section D.3 of Appendix D. **Therefore, no impact would occur since the proposed project would not conflict with local policies or ordinances.**

As mentioned in Section 4.4.3, the proposed project does not occur within the boundaries of an established HCP or NCCP (CDFW 2024). FWA is not aware of any other approved local, regional, or state HCP that would cover the proposed project. **Therefore, no construction-related impacts would occur as the proposed project would not conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan.**

4.5.3.2 Operation of Proposed Project

Permanent ground disturbance would occur within 1.7 acres at Shafter-Wasco, 1.7 acres at Lake Woollomes, and 0.67 acres to the north and 0.60 acres to the south at Deer Creek, as depicted by the “excavation areas” shown in Figure 2-2, Figure 2-3, and Figure 2-4, respectively. As described in Section 3.4.1, the biological surveys completed in 2021 and 2023 found that the areas subject to

permanent ground disturbance are all heavily disturbed and are largely devoid of habitat features that could support common or special status wildlife or plant species. Therefore, the permanent alteration of these areas is not expected to result in direct or indirect (i.e., habitat loss) impacts on special status wildlife species. However, as analyzed in Section 4.5.3.1, there is low potential for special status wildlife and plant species to occur within the staging areas at all three project sites. Although staging areas would be subject to disturbance/alteration during construction, the implementation of Mitigation Measure TERR-10 would require any temporary fill and construction debris to be removed and for disturbed areas to be restored to pre-project conditions, including by reestablishing vegetation where necessary. Therefore, no long-term reduction in suitable habitat for special status species is anticipated. Operations and maintenance activities associated with new and upgraded pump-back facilities would not result in significant increases in visual, noise, or other forms of disturbance that could disrupt the normal activity of special status wildlife that may occur in the vicinity. **Therefore, with the implementation of Mitigation Measure TERR-10, the potential for the operation of the proposed project to result in adverse effects on special status species would be less than significant after mitigation.**

The proposed facilities would not require the permanent alteration of any riparian areas, wetlands, or other sensitive natural communities. Additionally, as detailed in Section 4.11.3, operation of the proposed project would result in an increase in available surface water supplies and potential decreases in groundwater pumping within most of the study area; therefore, any impacts on groundwater supply would be less than significant. Operational activities would not disrupt existing hydrology/groundwater sources that may support riparian areas, wetlands, or other sensitive natural communities. **Therefore, the operation of the proposed project would have no impact on riparian areas, wetlands, or other sensitive natural communities.**

As described in Section 4.5.3.1, the proposed project footprints coincide with the locations of existing pump-back facilities and other FKC-related infrastructure, such as access roads. No permanent fences or other similarly obstructive structures would be installed that could hinder wildlife movement. Operations and maintenance activities associated with new and upgraded pump-back facilities would not result in significant increases in visual, noise, or other forms of disturbance that could disrupt the normal movement activities of wildlife occurring in the area. **Therefore, the operation of the proposed project would have no impact on wildlife movement/migratory corridors.**

The operation of the proposed project would comply with any relevant local policies and ordinances protecting biological resources, including those outlined in Section D.3 of Appendix D. **Therefore, no impact would occur since the proposed project would not conflict with local policies or ordinances.**

As mentioned above, the proposed project does not occur within the boundaries of an established HCP or NCCP (CDFW 2024). FWA is not aware of any other approved local, regional, or state HCP that would cover the proposed project. **Therefore, no operational impacts would occur as the proposed project would not conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan.**

4.6 Cultural Resources

4.6.1 Assessment Methods

CEQA requires state and local public agencies to identify potential impacts to historical resources, including cultural resources listed or eligible for listing in the CRHR or in a local register of historic resources, and to determine if those impacts would be significant (PRC 20184.1 and CEQA Guidelines Section 15064.5). CEQA further requires state and local public agencies to identify alternatives and mitigation measures that would substantially reduce or eliminate significant impacts to historical resources. Similar provisions are established for unique archaeological resources under PRC Section 21083.2(b) and for tribal cultural resources under PRC Section 21084.3. While there may be substantial overlap in historical resources, archaeological resources, and tribal cultural resources, these resources are treated individually in the PRC and in the CEQA Guidelines.

Pursuant to PRC Section 21084.1 and CEQA Guidelines Section 15064.5, an impact to a historical or archaeological resource is considered significant if a project would cause a substantial adverse change in the significance of a historical or archaeological resource, respectively. The criteria for evaluating cultural resources for listing in the CRHR are based on NRHP criteria and are defined at PRC Section 5024.1. A resource is listed in the CRHR once an eligibility nomination has been reviewed by the SHPO and approved by the California State Historical Resources Commission.

4.6.2 Significance Criteria

For the purposes of this EIR, consistent with Appendix G of the CEQA Guidelines, impacts to cultural resources would be significant if they would:

- a) cause a substantial adverse change in the significant of a historical resource pursuant to PRC Section 15064.5;
- b) cause a substantial adverse change in the significant of an archaeological resource pursuant to PRC Section 15064.5; or
- c) disturb any human remains, including those interred outside of dedicated cemeteries.

4.6.3 Environmental Impacts

4.6.3.1 Construction of Proposed Project

Under the proposed project, the construction of the Shafter-Wasco, Lake Woollomes, and Deer Creek pump-back facilities would have a direct effect on the FKC (P-15-013728/P-54-004614), a known historic property and historical resource. The footprint for these new facilities would be limited, however, and would impact three approximately 0.25-mile-long segments (less than 0.4%) of the 158.1-mile-long FKC. Construction of proposed permanent facilities under the proposed project is not expected to alter the character-defining features of the FKC that qualify it for inclusion in the NRHP, specifically its historical role in the development of the CVP and its overall engineering,

design, and construction (Section 3.5.1).²⁰ **Construction of the proposed project would result in less than significant impacts to historic cultural resources within the project area.**

Although there are no known archaeological resources in the project area that would be affected by the proposed project (Meyer 2020), and it is not anticipated that excavation associated with the proposed project would uncover any buried archaeological resources, there is a possibility of the inadvertent discovery of an archaeological resource during construction. **As such, this impact could be significant.** With the implementation of Mitigation Measure CUL-1, which requires the implementation of a detailed inadvertent discovery plan, **the impact to archaeological resources would be reduced to less than significant.**

Through a search of the Sacred Lands file and outreach with Native American tribal representatives (detailed in Section 3.15.2), no areas of cultural sensitivity within or near the project area were identified. In addition, there are no known human remains that have been recovered in the project area. Regardless, there is a possibility of the inadvertent discovery of human remains during construction activities associated with the proposed project. **As such, this impact could be significant.** With implementation of Mitigation Measure CUL-1, which requires human remains, if encountered, to be treated consistent with the NAGPRA if discovered on federal lands and PRC Section 21084.4 and California Health and Safety Code Section 7050.5 if encountered on nonfederal lands, **impacts to human remains would be reduced to less than significant.**

4.6.3.2 Operation of Proposed Project

Under the proposed project, operation of the Lake Woollomes, Shafter-Wasco, and Deer Creek pump-back facilities would result in no direct or indirect effects to historic properties, historical or archaeological resources, or other cultural resources including human remains within the project area. **Operation of the proposed project would result in no impacts to known historic properties, historical or archaeological resources, or other cultural resources including human remains within the project area.**

4.7 Geology, Seismicity, and Soils

4.7.1 Assessment Methods

The environmental consequences of the proposed project were analyzed qualitatively, based on a review of soil, geologic, and paleontological data. This analysis of potential impacts focuses on the proposed project's potential to increase the risk of personal injury, loss of life, and damage to

²⁰ Under the proposed project, there would be direct impacts to a known historic property and historical resource when compared to existing conditions. Reclamation owns the FKC, which is operated by FWA. Consequently, Reclamation will be taking federal action on the proposed project, at which time Reclamation will pursue Section 106 consultation with the SHPO and interested parties regarding direct and indirect effects to the FKC, as well as the resolution of any adverse effects pursuant to 36 CFR Part 800.6 and the amended programmatic agreement, which was executed in October 2020. Reclamation and the SHPO developed an amendment to the *Programmatic Agreement Between the Bureau of Reclamation Mid-Pacific Region and the California State Historic Preservation Officer Regarding Modifications to the Friant-Kern Canal Fresno, Tulare, And Kern Counties, California*, which was executed in February 2017. The amended programmatic agreement addresses actions under the proposed project and the FKC Middle Reach Capacity Correction Project.

property, including project facilities, as a result of geologic conditions in the study area as well as the proposed project's potential to destroy paleontological resources.

4.7.2 Significance Criteria

For the purposes of this EIR, consistent with Appendix G of the CEQA Guidelines, impacts related to geology, seismicity, and soils would be considered significant if the project would:

- a) directly or indirectly cause potential substantial adverse effects, including risk of loss, injury, or death involving:
 - (i) rupture of a known earthquake fault;
 - (ii) strong seismic ground shaking;
 - (iii) seismic-related ground failure including liquefaction; or
 - (iv) landslides.
- b) result in substantial soil erosion or the loss of topsoil;
- c) be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially would result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- d) be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property;
- e) have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater; or
- f) directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

4.7.3 Environmental Impacts of the Proposed Project

Based on a review of DOC Earthquake Zones of Required Investigation Map, no existing or proposed facilities fall within an Alquist-Priolo Earthquake Fault Zone, liquefaction zone, and/or landslide zone (DOC 2022b). However, as discussed in Section 3.6, there are faults within 10 miles of the three check structures. **As such, there would be less than significant impacts associated with potential adverse effects (including risk of loss, injury, or death) involving an earthquake fault, strong seismic ground shaking, seismic-related ground failure including liquefaction or landslides.**

Under the proposed project, temporary construction-related soil erosion and loss of topsoil could occur in specific areas where major construction work would take place. Potential construction activities, including grading, earth moving, removal of vegetation, installation of new infrastructure, and other proposed construction-related actions, could temporarily elevate erosion rates on-site. Although construction activities for the proposed project involve earthmoving, the soils in the area have a relatively low risk of wind erosion when left in a dry, unvegetated condition, as discussed in Section 3.6. **Therefore, the possibility for substantial soil erosion or the loss of topsoil under the proposed project would be less than significant.**

As discussed previously, no existing or proposed facilities fall within an Alquist-Priolo Earthquake Fault Zone, liquefaction zone, and/or landslides zone that would contribute to impacts from unstable soils or geologic units. However, the presence of faults near the check structures could contribute to unstable soils and geologic units. Additionally, the proposed project study areas have experienced severe subsidence primarily due to groundwater over extraction, as discussed in Section 3.10.4. The proposed project would increase operational flexibility and reliability of surface water deliveries to the Friant Contractors and thereby decrease their reliance on groundwater. Decreased pumping because of increased operational flexibility and reliability of surface water deliveries could result in less land subsidence under the proposed project. Therefore, there would be no impact to subsidence during the operation of the proposed project. **Overall, there would be less than significant impacts related to unstable soils or geologic units from construction or operation.**

As detailed in Section 3.6, the soil types in the project vicinity have a low to moderate potential for swelling. A low to moderate potential for swelling would not result in substantial risk to life or property. **Therefore, there would be no impact from expansive soils.**

The proposed project does not involve the construction or use of septic tanks or wastewater disposal systems. **Therefore, there would be no impact.**

There is the potential to encounter previously undetected but potentially significant paleontological resources during construction of the proposed project. The area surrounding the proposed facilities has been ranked as moderately sensitive (Section 3.6). Therefore, there is a moderate probability of encountering previously undetected paleontological resources near known paleontological resources, in areas of poor surface visibility where detection may have been impeded, and in areas that have not been subject to prior investigation which could result in a significant impact on paleontological resources. Mitigation Measure PR-1 would ensure earthmoving construction activities would be monitored by a qualified paleontologist and implementation of measures to avoid, record, preserve, or recover unique paleontological resources, if encountered. **Impacts to paleontological resources under the proposed project would be less than significant with mitigation.**

4.8 Greenhouse Gases

4.8.1 Assessment Methods

As part of an effort to assist lead agencies in addressing GHG impacts for CEQA purposes, the SJVAPCD provides guidance for evaluating the significance of GHG emissions (SJVAPCD 2009; SJVAPCD 2015); however, the determination of significant impacts is ultimately within the purview of the lead agency. The SJVAPCD guidance on assessing significance relies on best performance standards (BPSs) and demonstration of GHG reductions compared to business-as-usual conditions. Currently, BPSs have not been established for construction projects.

Numerical bright-line thresholds identify the point at which additional analysis and mitigation of project-related GHG emission impacts would be necessary. Some air resource districts, but not SJVAPCD, have adopted bright-line thresholds that have been developed for commercial projects, residential projects, and stationary sources. Commercial and residential bright-line thresholds are typically based on a market capture rate or a gap analysis, which is tied back to AB 32 reduction

targets (1990 levels by 2020). These bright-line thresholds reflect local or regional land use conditions, particularly residential and commercial density and access to transit. The Sacramento Metropolitan Air Quality Management District (SMAQMD) has adopted a threshold of 1,100 metric tons carbon dioxide equivalent (MTCO₂e) for construction of stationary source projects, and a threshold of 10,000 MTCO₂e for operation of stationary source projects. A stationary source bright-line threshold of 10,000 MTCO₂e has also been adopted by multiple air districts and other agencies as part of the permitting process, and the South Coast Air Quality Management District uses the same threshold when it is the lead agency.

No bright-line threshold has been formally adopted by SJVAPCD for use in the SJVAB. As discussed in the SMAQMD Guide to Air Quality Assessment in Sacramento County, the recommended thresholds were developed to ensure at least 90% of new GHG emissions would be reviewed and assessed for mitigation, thereby contributing to GHG emissions reduction goals set by AB 32, Senate Bill (SB) 32, the Scoping Plan, and Executive Orders (Appendix D contains descriptions of these regulations). The SJVAPCD does not limit a lead agency's authority in establishing its own process for determining significant of project-related impacts on global climate change and has previously allowed the use of SMAQMD CEQA modeling tools to be used in CEQA and Indirect Source Review assessments (SJVAPCD 2024). As such, the SMAQMD bright-line thresholds may be considered a tool for evaluating the significance of GHG emissions.

Direct GHG emission impacts will include both construction and operational activities. Because impacts from construction activities occur over a relatively short-term period, they contribute a relatively small portion of the overall lifetime project GHG emissions and reduction measures for construction equipment are relatively limited.

4.8.2 Significance Criteria

Developed in accordance with the CEQA Guidelines, the criteria described below are used here to determine the significance of potential impacts related to GHGs. Consistent with Appendix G of the CEQA Guidelines, impacts would be significant if implementing the project would:

- a) generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- b) conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHG.

For the purposes of this analysis, the project-specific threshold is set at 1,100 MTCO₂e for construction and 10,000 MTCO₂e for operations. The thresholds are used to determine the project's potential to generate GHG emissions that may have a significant impact on the environment or conflict with an applicable GHG plan, policy, or regulation.

4.8.3 Environmental Impacts of the Proposed Project

4.8.3.1 Construction of the Proposed Project

Construction under the proposed project would result in short-term GHG emissions from construction equipment and vehicles. GHG emissions from construction equipment exhaust, haul trucks, and construction worker commuting were estimated using a spreadsheet consistent with CalEEMod calculation methods, as shown in Table 4-3 (Appendix E contains detailed calculations).

Table 4-3 shows GHG emissions under the proposed project would result in a yearly total of 1,023 MTCO₂e per year during construction, which would not result in an exceedance of the applicable CEQA threshold of significance. **Therefore, construction of the proposed project would have less than significant GHG emission impacts.**

Table 4-3. Unmitigated Construction GHG Emissions under the Proposed Project

Source	CO ₂ (MT/year)	CH ₄ (MT/year)	N ₂ O (MT/year)	CO ₂ e (MT/year)
Deer Creek	334	0.02	0.03	344
Lake Woollomes	318	0.02	0.03	326
Shafter-Wasco	343	0.02	0.04	353
Total GHG Emissions	994	0.07	0.10	1,023
CEQA Threshold				1,100
Significant?				No

Note: Totals may not add exactly because of rounding.

Key: CEQA – California Environmental Quality Act; CO₂ – carbon dioxide; CH₄ – methane; CO₂e – carbon dioxide equivalent; GHG – greenhouse gas; MT/year – metric tons per year; N₂O – nitrous oxide

4.8.3.2 Operation of the Proposed Project

The three newly constructed pump-back facilities under the proposed project would be electric-driven and would replace existing temporary diesel pumps. Operation of these facilities would result in long-term GHG emissions associated with electricity generation. Table 4-4 summarizes operational GHG emissions.

Table 4-4. Operational GHG Emissions under the Proposed Project

Source	Electricity (MWh/year)	Annual Emissions (MT/year)			Annual Emissions (MTCO ₂ e/year)			
		CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	CO ₂ e
Emission Factor (lb/MWh)	n/a	98.47	0.032	0.004	n/a	n/a	n/a	n/a
Deer Creek	1,245	56	0.018	0.002	56	1	1	57
Lake Woollomes	3,899	174	0.057	0.007	174	2	2	178
Shafter-Wasco	9,784	437	0.142	0.018	437	4	5	446
Total GHG Emissions	14,928	667	0.217	0.027	667	6	7	680
CEQA Threshold								10,000
Significant?								No

Note: Totals may not add exactly because of rounding.

Key: CO₂ – carbon dioxide; CH₄ – methane; N₂O – nitrous oxide; CO₂e – carbon dioxide equivalent;

lb/MWh – pounds per megawatt-hour; MT/year – metric tons per year;

MTCO₂e/year – metric tons carbon dioxide equivalent per year; MWh/year – megawatt hours per year; n/a – not applicable

As shown in Table 4-4, GHG emissions under the proposed project would result in a yearly total of 680 MTCO₂e per year during operations, which would not result in an exceedance of the applicable CEQA threshold of significance. Moreover, implementation of the proposed project would replace existing diesel-fueled pumps with electric-driven pumps. This replacement of equipment with direct emissions from fossil fuel combustion with equipment with lower, indirect emissions from the increasingly renewable regional electric grid would be expected to reduce GHG emissions and the

associated incremental contribution to climate impacts of those emissions over the lifetime of the project. It is anticipated that, consistent with the California's Renewable Portfolio Standard requirements established in SB 1078 and accelerated by SB 350 and SB 100, that 60% of grid power would be provided by renewable sources by 2030 and 100% would be provided by renewable sources by 2045. Additionally, implementation of the proposed project would improve resiliency of water availability in the region against the effects of climate change. **Therefore, operation of the proposed project would have less than significant GHG emission impacts.**

If a project violates the significance criterion used to evaluate GHG emissions, such as exceeding a numerical GHG emission threshold, and that criterion was developed in a manner to be consistent with the state's GHG emission reduction goals, such as the bright-line threshold used in this analysis, then it would be assumed that the project would impede the state's ability to meet its GHG emission reduction goals outlined in AB 32. As shown, GHG emissions associated with construction and operations would not exceed the selected CEQA GHG emission significance threshold. **As such, the proposed project would not conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions, resulting in a less than significant impact.**

4.9 Hazards and Hazardous Materials

4.9.1 Assessment Methods

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

4.9.2 Significance Criteria

Consistent with Appendix G of the CEQA Guidelines, hazards and hazardous materials impacts would be considered significant if the project would:

- a) create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- b) create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- c) emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- d) be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result would it create a significant hazard to the public or the environment;

- e) for a project located within an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area;
- f) impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- g) expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

4.9.3 Environmental Impacts of the Proposed Project

Construction and operation of the proposed project would involve the use, transport, storage, and disposal of hazardous materials. Mitigation Measure TR-1 would require the development of and adherence to a health and safety plan outlining all applicable Occupational Safety and Health Administration (OSHA) requirements. Implementation of Mitigation Measure TR-1 would ensure safe use and transport of hazardous material. **The proposed project could result in a significant impact related to the transport, use, or disposal of hazardous materials; however, with implementation of Mitigation Measure TR-1, impacts would be less than significant.**

Soil disturbance during construction activities, including excavation and the movement of equipment could result in the release of Valley fever fungal spores, which are known to be present year-round in the soils of the region. This could expose persons, especially those high-risk, to these pathogens. However, because of the small scale and localized nature of construction, the proposed project would result in less dust than the extensive, daily agricultural operations that occur throughout the region. In addition, construction operations would be required to comply with local regulations, including SJVAPCD Regulation VIII, regarding fugitive dust to minimize temporary emissions.

Construction would require the use of vehicles and other construction equipment, which would use some hazardous materials (motor oil, gasoline, diesel fuel, solvents, and degreasers). The use, storage, handling, or disposal of hazardous materials could result in accidental release of pollutants, exposing people and the environment to hazardous materials. **This impact could be significant.** Implementation of Mitigation Measure HAZ-1 requires preparation of a SWPPP under the Construction General Permit. This measure would require that a SWPPP consistent with the Statewide NPDES Construction General Permit be developed and implemented by FWA prior to construction. The SWPPP would include erosion control BMPs to be implemented, including safety measures when transporting, storing or using hazardous materials to prevent release of hazardous materials and procedures for accidental spills. Furthermore, Mitigation Measure WR-1 would require FWA to obtain relevant state and federal water quality and stormwater permits and adhere to any permit terms and conditions to reduce impacts on water quality. Additionally, Mitigation Measures HAZ-1 and WR-1 would also be implemented to decrease erosion rates and delivery of sediments along with any other resident pollutants to surface waters, as well as reduce the potential for erosion and runoff of stockpiled soils and discharge of contaminated groundwater. The full descriptions of Mitigation Measures HAZ-1 and WR-1 are provided in Section 4.18. **Therefore, impacts related to creating a significant hazard to the public or the environment through reasonably foreseeable upset and accidental release of hazardous materials into the environment, including exposure to Valley fever, would be less than significant after mitigation.**

There are no schools or hospitals located within 0.25 mile of the proposed construction sites. The closest sensitive receptor²¹ to proposed construction is the Sequoia Elementary School in Shafter, approximately 2.5 miles east of the proposed Shafter-Wasco construction work area. **As such, there would be no impact associated with emitting hazardous emissions or handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of a school.**

As noted in Section 3.8, none of the project sites would not be located within hazardous materials site. The closest hazardous materials site is a certified voluntary cleanup site for pesticides 1.5 miles north of the Shafter-Wasco construction area (California Department of Toxic Substances Control 2022). **The proposed project would not create a risk to the public or environment associated with being located on a hazardous materials site, and there would be no impact.**

Shafter-Minter Field is a public airfield located approximately 1.5 miles southeast of the Shafter-Wasco site; however, the airfield has moderate levels of activity, about 123 flights per day, and would not generate a significant safety hazard related to people residing or working in the project area (U.S. Department of Transportation and Federal Aviation Association 2022 & U.S. Department of Transportation and Federal Aviation Association 2024). **There would be no impact associated with safety hazards or excessive noise for those residing or working in the project area, within two miles of a public airport or public use airport.**

The proposed project would not interfere with an adopted emergency response plan or emergency evacuation plan as neither Kern County nor Tulare County specify evacuation routes for rural areas (Kern County 2009; Tulare County 2012). **There would be no impact associated with impairing the implementation of or physically interfering with an adopted emergency response plan or emergency evacuation plan.**

The proposed project area is located in a California State Responsibility Area for Wildfire Risk or in an area considered to be a Fire Hazard Severity Zone (California Department of Forestry and Fire, Office of the State Fire Marshal 2022). Therefore, no people or structures would be exposed to a significant risk of loss, injury or death, such as wildland fires, as a result of implementation of the proposed project. **There would be no impact associated with exposing people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.**

4.10 Hydrology and Water Resources – Surface Water

4.10.1 Assessment Methods

A multi-objective modeling process was applied to analyze the impacts of the proposed project (and alternatives as discussed later in this document) on surface water supply and water quality conditions in the FKC. A suite of models and other tools were applied to simulate surface water supply operations and water quality conditions in the FKC, and statistical and quantitative metrics were used to evaluate potential impacts from operation of the proposed project on surface water. These simulations served two main purposes: (1) to evaluate changing surface water conditions in the

²¹ According to the California Department of Toxic Substances Control (n.d.), sensitive receptors, in related to hazardous materials, include hospitals, schools, day care centers, elderly care facilities and other such locations.

FKC, and (2) to provide inputs to the groundwater modeling tools referenced later in this document. Appendix F describes each tool, the analysis assumptions, and the simulated results.

Two baseline conditions were simulated using the modeling tools—an existing baseline condition and a future baseline condition. CEQA requires that existing conditions serve as the baseline to determine the potential impacts of the proposed project, which differs from NEPA, where future conditions serve as the baseline. The existing and future conditions differ because there are actions that could occur in the study area in the future, that 1) currently do not exist and 2) do not rely on approval or implementation of the proposed project. Here, the differences between the two conditions are related to future changes in the operational and regulatory environment in the Friant Division and are all independent of implementation of the proposed project. The details of the differences are documented in Appendix F. The primary difference is that, under future conditions, less CVP water from Millerton Lake would be available relative to the existing condition largely because of the full implementation of the SJRRP. In addition, there are differences in pump-in program operations between the future and existing conditions (Appendix F). The simulations of the proposed project (and the Low Flow and Seasonal Alternatives) under existing conditions are used for impact assessments in this document. The simulations of the proposed project under future conditions (and the Low Flow and Seasonal Alternatives) are shown for informational purposes.

As documented in Appendix F, the assumptions applied for modeling tools are conservative with respect to mass loading of constituents of consideration into the FKC. Thus, during certain times and operational scenarios, simulated surface water quality conditions in the FKC are worse than would be allowed by the Water Quality Guidelines. This approach was applied because it created a conservative condition to evaluate effects of additional mass loading from surface water on groundwater quality conditions in the Friant Division (discussed further in Section 4.11) under the proposed project.

Flood impacts under the proposed project would stem from construction activities impeding flood flow or exposing people to flooding risks. Additionally, short-term or long-term increases in runoff could result in flooding impacts. Potential changes to increases to flood risk are assessed qualitatively.

For each impact identified, the discussion is divided into the following subsections:

- **Effects of Project Construction** – These are impacts associated with preconstruction (e.g., site preparation) and construction-related activities. Construction-related impacts are often temporary.
- **Effects of Operations** – These are impacts caused by the project itself, once completed, and include operations and maintenance activities. These impacts are generally considered permanent or ongoing.

4.10.2 Significance Criteria

The thresholds of significance, or significance criteria, described below were applied to determine the significance of potential impacts in relation to surface water resources and water quality. The significance criteria include those developed in accordance with Appendix G of the CEQA Guidelines; criteria based on factual or scientific information; criteria based on regulatory standards of local, state, and federal agencies; and criteria developed by FWA. Impacts on surface water would be considered significant if the project would:

- a) violate water quality standards or waste discharge requirements, including in-prism water quality thresholds as established in the Water Quality Guidelines, or otherwise substantially degrade surface water quality such that it impedes the beneficial uses, as established in the Tulare Lake Basin Plan. Water quality thresholds established in the Water Quality Guidelines include MCLs set forth by the State of California in Title 22 to protect domestic uses, as well as more restrictive thresholds that protect agricultural beneficial uses in the study area. Refer to Table 4-5 for a summary of these thresholds.
- b) substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
 - i. result in substantial erosion or siltation on-site or off-site;
 - ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-site or off-site;
 - iii. create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
 - iv. impede or redirect flood flows.
- c) in flood hazard, tsunami, or seiche zones, risk release of pollutants because of project inundation.
- d) conflict with or obstruct implementation of a water quality control plan.

Table 4-5. Surface Water Quality Significance Criteria

Constituent	Threshold	Period	Threshold Objective
All in Title 22	MCLs	All year	MCLs to protect domestic uses.
Salinity as EC	1,000 $\mu\text{S}/\text{cm}$	March 1–June 30	Protects agricultural uses and crops sensitive to salinity including but not limited to almonds on Nemaguard root stock, apples, cherries, pears, and others.
	500 $\mu\text{S}/\text{cm}$	July 1–August 31	
	1,000 $\mu\text{S}/\text{cm}$	September 1–February 28	
Chloride	102 mg/L	March 1–June 30	Protects agricultural uses and crops sensitive to chloride including but not limited to almonds on Nemaguard root stock, cherries, pistachios, and others.
	55 mg/L	July 1–August 31	
	102 or 123 mg/L	September 1–February 28	
Boron	0.4 mg/L	All year	Protects agricultural uses and crops sensitive to boron including but not limited to grapes, apricots, figs, grapefruits, and others.
Turbidity	40 NTU	All year	Included to be consistent with Section 3 of the Final Initial Study/Negative Declaration for: Warren Act Contract and License, and Operation and Maintenance Agreement to Introduce Floodwaters from Reclamation District 770 into the FKC, March 2017.
TSS	20 ppm	All year	Included to be consistent with Section 3 of the Final Initial Study/Negative Declaration for: Warren Act Contract and License, and Operation and Maintenance Agreement to Introduce Floodwaters from Reclamation District 770 into the FKC, March 2017.
SAR	3 meq/L	All year	SAR and sodium are managed together. If the measured SAR value exceeds 3 AND the measured sodium concentration exceeds a threshold of 69 mg/L, management will be necessary. SAR is derived from Ayers Table 1 and assumes surface irrigation. The sodium threshold is also derived from Ayers Table 1 and suggests that irrigation waters less than 3 milliequivalents per liter (69 mg/L) is suitable for crops that are sprinkler irrigated.
Sodium	69 mg/L	All year	

Note: Title 22 refers to Title 22 domestic water quality and monitoring regulations specified by the State of California Health and Safety Code (Sections 4010–4037), and California Administrative Code Sections 64401 et seq., as amended.

Key: EC – electrical conductivity; MCL – maximum contaminant level; meq/L – milliequivalents per liter;

mg/L – milligrams per liter; NTU – nephelometric turbidity unit; ppm – parts per million; SAR – sodium adsorption ratio;

TSS – total suspended solids; $\mu\text{S}/\text{cm}$ – microsiemens per centimeter (1 $\mu\text{S}/\text{cm}$ = 1 $\mu\text{mhos}/\text{cm}$ = 1/1,000 decisiemens per meter [dS/m])

4.10.3 Environmental Impacts

4.10.3.1 Construction of Proposed Project

Water Quality

During the construction period, erosion caused by construction of the proposed project that reaches surface waters may cause adverse effects on water quality. Without mitigation, construction activities including site grading, soil stockpiling, and in-river activities could cause soil erosion and

sedimentation that could degrade water quality in Deer Creek downstream of the study area. Construction activities could also discharge waste petroleum products or other construction-related substances that could enter waterways in runoff. In addition, chemicals associated with operating heavy machinery would be used, transported, and stored on-site during construction activities. Therefore, the proposed project would have the potential to result in significant impacts related to water quality standards and conflicting with a water quality control plan as defined by the Tulare Lake Basin Plan.

As specified in Mitigation Measures WR-1 and HAZ-1 in Section 4.18, compliance with state and federal CWA requirements and implementation of a SWPPP and associated BMPs would minimize impacts on water quality from construction. Implementation of the sediment control measures would reduce the potential effect on water quality. **Therefore, impacts on surface water from construction activities associated with the proposed project would be less than significant with mitigation.**

Drainage Patterns

Under the proposed project, construction activities could temporarily alter existing drainage patterns and may increase surface runoff where construction would take place. The creation and implementation of a SWPPP, a required component of project completion under Mitigation Measure HAZ-1 (described in Section 4.18), would ensure that stormwater during and after construction is captured and runoff velocity is reduced. Temporary stormwater and erosion control BMPs described in the SWPPP would control flow rates and reduce flooding during construction and once the project is completed. **Therefore, temporary changes to existing drainage patterns or increases to surface runoff from construction of the proposed project would be less than significant with mitigation.**

4.10.3.2 Operation of Proposed Project

Water Quality

The proposed project would result in an increase in non-Millerton water entering the FKC because capacity of the pump-back facilities at the Shafter-Wasco, Lake Woollomes, and Deer Creek check structures would be increased from existing capacities. Introduction of non-Millerton water to the FKC would be regulated and managed by the Water Quality Guidelines and, as a result, in-prism surface water quality would be protected for domestic and agricultural uses and would not exceed the significance criteria. No impacts to water quality conditions in the California Aqueduct or CVC are anticipated because of operation of the proposed project. **Therefore, operation of the proposed project would not violate water quality standards or waste discharge requirements, nor conflict or obstruct the implementation of a water quality control plan and impacts would be less than significant.**

Drainage Patterns

Under the proposed project, pump-back facilities would be operated to deliver water to Friant Contractors. Flood flows would not be redirected as part of project operations, nor would operations result in any changes to existing drainage systems. **Therefore, there would be no impact on drainage patterns from operation of the proposed project.**

Flood

Under the proposed project, the Lake Woollomes and Deer Creek pump-back facilities would be constructed within Zone A—areas subject to inundation by the 1% annual chance flood (no base flood elevations determined) (FEMA 2022). Although proposed new structures would be within a flood hazard area, they would not result in significant additions of new impervious surfaces. In addition, the new facilities would not be constructed within any existing river or stream channels and would be placed close to other existing water supply infrastructure; therefore, **the proposed project would result in less than significant impacts associated with flood hazards.**

4.11 Hydrology and Water Resources – Groundwater

4.11.1 Assessment Methods

A multi-objective modeling process was applied to analyze the impacts of the proposed project (and alternatives as discussed later in this document) on groundwater supply and groundwater quality conditions. The modeling tools related to groundwater supply and groundwater quality conditions include a suite of models and other tools that simulate changes in groundwater pumping and groundwater quality conditions under various scenarios considering surface water deliveries, surface water quality, and other factors. The tools produce statistical and quantitative metrics that were used to evaluate potential impacts from operation of the proposed project on groundwater. Appendix F describes and documents, in detail, each tool, analysis assumption, and simulated results of the various project alternatives.

The groundwater tools collectively considered surface water deliveries, surface water quality, and groundwater extraction scenarios to assess the change in quantity and quality of groundwater within the 11 districts in the study area (together shown as “Friant Division Contractor” in Figure 3-2), from operation of the proposed project throughout the 50-year simulation period. As described in Section 4.11.1 and documented in Appendix F, both the surface water and groundwater modules were designed to provide a conservative condition in terms of the mass loading of the applied water within the Friant Division. The groundwater modeling tools include a balance calculation model that considers district-wide water demand, surface water deliveries (and water quality), groundwater pumping (and quality of applied groundwater), and subsurface flow components (e.g., subsurface vertical flow, subsurface lateral flow, groundwater pumping, recharge) to simulate monthly groundwater quality concentrations in the upper aquifer within each district.

Consistent with the surface water assessment methods, two baseline conditions were simulated using modeling tools: an existing conditions baseline and a future conditions baseline which represents future changes in operational and regulatory environment in the Friant Division (Appendix F). The existing conditions baseline and simulations of the proposed project under existing conditions are used for impacts assessments. The future conditions baseline and simulations of the proposed project under future conditions are also shown for informational and comparison purposes.

Changes in concentrations for four key constituents that affect the suitability of groundwater for beneficial uses (FWA 2023) were evaluated using modeling tools: salinity measured as TDS, chloride, boron, and nitrate. While salinity, chloride, and boron are important constituents for irrigation, nitrate was included because it is a major constituent of consideration in groundwater within the region affecting municipal use and public health. To evaluate potential effects of the proposed

project on groundwater quality conditions, the groundwater quality analysis focused on changes in concentrations of these key constituents in applied water under water operations simulated for the proposed project and does not consider site-specific, on-farm application of fertilizers (e.g., nitrate) and/or soil amendments. Appendix F provides greater detail on the groundwater modeling tools, associated utilities required to apply the tools, analysis assumptions, and application to this project. Potential impacts of the proposed project on groundwater quality conditions for other constituents of consideration (e.g., arsenic, hexavalent chromium, DBCP, pesticides, selenium, 1,2,3-TCP) were qualitatively evaluated using currently available data and possible trends.

In addition to evaluation of potential impacts of the proposed project on groundwater quality conditions, potential impacts on groundwater supplies were evaluated. Simulated changes in groundwater pumping over the simulation period were used to evaluate the potential impacts of the proposed project and, specifically, whether the project would substantially decrease groundwater supplies.

For each impact identified, the discussion is divided into the following subsections:

- **Effects of Project Construction:** These are impacts associated with preconstruction (e.g., site preparation) and construction-related activities. Construction-related impacts are often temporary.
- **Effects of Project Operations:** These are impacts caused by the project itself, once completed, and include operations and maintenance activities. These impacts are generally considered permanent or ongoing. Results of analysis are provided for each of the Friant Contractors associated with water deliveries under the proposed project.

Section 4.11.3.2 shows tabular results for simulations which drive the level of significance determination (e.g., no impact, less than significant, significant) when compared to significance criteria described below. Results from all simulations are provided in Appendix F.

4.11.2 Significance Criteria

The significance criteria described below were developed to determine the level of significance of potential impacts in relation to groundwater hydrology and water quality. The significance criteria applied include those developed in accordance with applicable information in Appendix G of the CEQA Guidelines; criteria based on factual or scientific information; criteria based on regulatory standards of local, state, and federal agencies; and criteria developed by FWA. Impacts on groundwater supply and quality would be considered significant if the project would:

- a) violate water quality standards or waste discharge requirements or otherwise substantially degrade groundwater quality, such that it impairs reasonably anticipated beneficial uses of groundwater.
- b) substantially decrease groundwater supplies (available) such that the project may result in chronic lowering of groundwater levels.
- c) conflict with or obstruct implementation of a groundwater management plan.

The groundwater quality thresholds that were selected for constituents that may impact beneficial uses for groundwater within the region are shown in Table 4-6. Thresholds were selected using commonly accepted agronomy references for applied water quality and agriculture (Ayers and

Westcott 1985), and/or regional, state, and federal regulations that protect beneficial uses, as detailed in Table 4-6.

Note that specific criteria provided in Appendix G of the CEQA Guidelines related to impacts to implementation of a sustainable groundwater management plan was not applied because of the uncertainty related to acceptance and implementation of GSPs in the region.

Table 4-6. Groundwater Quality Significance Criteria for Select Constituents Quantitatively Evaluated Using Modeling Tools

Parameter	Water Quality Threshold
Boron	0.7 mg/L is set as the threshold for the California Agricultural Water Quality Goals which contains criteria protective of various agricultural uses of water, including irrigation of various types of crops and stock watering (Ayers and Westcott 1985).
Chloride	106 mg/L is set as the threshold for the California Agricultural Water Quality Goals which contains criteria protective of various agricultural uses of water, including irrigation of various types of crops and stock watering (Ayers and Westcott 1985).
Nitrate as Nitrogen	10 mg/L is set as the California Primary MCL and applies to all groundwater basins that are designated with the municipal and domestic supply beneficial use.
Salinity as Total Dissolved Solids	Annual rate of increase of 3.2-3.84 mg/L/year (TDS), depending on location. The annual allowable rates of increase in EC chosen were established by the Basin Plan (Central Valley Water Board 2018a) and were converted to TDS equivalents. ¹ The Basin Plan outlines the seven groundwater hydrographic units within the Tulare Lake Basin and identifies the maximum average annual increase in EC allowed for each unit, measured as a 5-year average. AEWSD falls within the Kern River hydrographic unit, while all other districts fall within the Tule River/Poso hydrographic unit, which are permitted annual EC increases of 3.2 mg/L and 6 $\mu\text{S}/\text{cm}$ 3.84 mg/L, respectively. Limitations are proposed based on the applicable water quality objective that protects the most sensitive beneficial use and based on the application of the Antidegradation Policy.

Note:

¹ TDS in mg/L was converted from the values provided for EC in $\mu\text{S}/\text{cm}$ (5–6 $\mu\text{S}/\text{cm}$); 1 $\mu\text{S}/\text{cm}$ = 1 $\mu\text{mhos}/\text{cm}$ = 1/1,000 dS/m; 1,000 $\mu\text{mhos}/\text{cm}$ = 1 dS/m = 640 mg/L TDS (Porter and Marek 2022).

Key: AEWSD – Arvin-Edison Water Storage District; EC – Electrical conductivity TDS – total dissolved solids

4.11.3 Environmental Impacts

4.11.3.1 Construction of Proposed Project

Water Quality

Construction activities associated with the proposed project could result in localized degradation of groundwater quality. If hazardous materials used during construction or by construction vehicles were discharged to the land surface, they could infiltrate to underlying aquifers and degrade local groundwater quality conditions. As specified in mitigation measures WR-1 and HAZ-1, compliance with state and federal CWA requirements and implementation of a SWPPP and associated BMPs would minimize impacts on water quality from construction. **Therefore, construction-related effects on groundwater quality would be less than significant with mitigation.**

Groundwater Supply

Construction activities associated with the proposed project would not require groundwater pumping and therefore would not affect groundwater supplies. **Therefore, there would be no impact on groundwater supplies.**

4.11.3.2 Operation of Proposed Project

Water Quality

Operations of the proposed project could change groundwater quality conditions within Friant districts. Potential changes to groundwater quality conditions vary by district and could be attributed mainly to (1) characterization of the existing groundwater quality conditions, (2) the water quality of the surface water delivered, which ultimately recharges the aquifer, and (3) the volume of groundwater pumped to meet demand. As described, the groundwater modeling tools were used to simulate these complicated dynamics, and results are presented in subsections below.

Total Dissolved Solids

As shown in Table 4-7, simulated TDS concentrations and annual rates of change in TDS concentrations in groundwater would vary across districts under the proposed project. For 10 of the 11 districts, the simulated average annual rate of change in TDS concentrations in groundwater under the proposed project is lower than the specified significance threshold. For TBID, the TDS concentrations in groundwater would increase at a rate that exceeds the specified significance threshold. Additionally, the simulated maximum 5-year average annual rate of change in TDS concentration in groundwater would be higher than the specified significance threshold for 8 of the 11 districts evaluated. Because one district has a simulated average annual rate of change that exceeds the specified significance threshold, and several districts have simulated maximum 5-year average annual rates of change that exceed the significance threshold, groundwater quality conditions for beneficial uses could be affected in some districts under the proposed project.

There are no feasible mitigation measures that could be implemented by FWA at a project scale to reduce potential adverse impacts related to TDS concentrations in groundwater. However, at a basin level, potential adverse impacts on TDS concentrations under the proposed project could be reduced through continued implementation of the CV-SALTS Salt Control Program, administered by the Central Valley Water Board and the State Water Resources Control Board (SWRCB) in cooperation with stakeholders and the Central Valley Salinity Coalition (CVSC) (Section D.3.1 in Appendix D contains a description of the CV-SALTS Program), and/or execution of Groundwater Sustainability Agency (GSA) management actions specified in relevant GSPs, when implemented.

Table 4-7. Simulated Changes in Concentration of Total Dissolved Solids in Groundwater for Proposed Project under Existing and Future Conditions

District	Starting Concentration (mg/L)	Simulated Ending Concentration (mg/L)		Simulated Average Annual Rate of Change (mg/L/year)		Simulated Maximum 5-Year Average Annual Rate of Change (mg/L/year) ¹		Significance Threshold (mg/L/year)
		Existing Cond.	Future Cond.	Existing Cond.	Future Cond.	Existing Cond.	Future Cond.	
AEWSD	454	498	493	0.9	0.8	2.4	2.4	3.20
SWID	807	581	604	-4.5	-4.1	25.6	24.1	3.84
SSJMUD	875	745	757	-2.6	-2.4	3.8	3.5	3.84
KTWD	632	698	747	1.3	2.3	27.7	29.7	3.84
DEID	277	265	284	-0.2	0.1	7.7	8.4	3.84
TBID	335	632	663	5.9	6.6	15.5	16.6	3.84
SID	363	201	216	-3.2	-2.9	26.1	27.1	3.84
Pixley ID	193	253	212	1.2	0.4	9.0	6.0	3.84
TPDWD	400	258	284	-2.8	-2.3	5.7	7.8	3.84
Porterville ID	638	253	257	-7.7	-7.6	57.8	78.7	3.84
LTRID	284	91	94	-3.9	-3.8	2.1	2.3	3.84

Note:

¹ Maximum 5-year average annual rate of change calculated on a monthly timestep as the cumulative change in concentration relative to 5 years prior, divided by 5 years to produce an annual average rate.

Values in **bold** indicate exceedance of the threshold.

Key: AEWSD – Arvin-Edison Water Storage District, SWID – Shafter-Wasco Irrigation District, SSJMUD – Southern San Joaquin Municipal Utility District, KTWD – Kern-Tulare Water District, DEID – Delano-Earlimart Irrigation District, TBID – Terra Bella Irrigation District, SID – Saucelito Irrigation District, ID – Irrigation District, TPDWD – Tea Pot Dome Water District, LTRID – Lower Tule River Irrigation District

Chloride

For most districts evaluated, simulated monthly concentrations of chloride in groundwater under the proposed project are not anticipated to exceed the specified significance threshold. There are no simulated monthly exceedances of the chloride water quality threshold for the proposed project under existing conditions. For the proposed project under future conditions, there were no simulated monthly exceedances of the specified significance threshold of 106 mg/L for agricultural beneficial uses for 10 out of the 11 districts. However, for KTWD, there were simulated chloride concentrations that exceed the specified significance threshold during the simulation period, although the simulated ending concentration was below this threshold (Appendix F contains numerical analysis results). The simulated concentration of chloride in groundwater under the proposed project did not exceed the specified significance threshold of 106 mg/L for agricultural beneficial uses.

Boron

Project operations under the proposed project are not anticipated to have adverse effects on boron concentrations in groundwater within the study area. Under the proposed project, simulated results for monthly concentration of boron in groundwater for all 11 water districts did not exceed the specified significance threshold for boron of 0.7 mg/L for agricultural beneficial uses (Appendix F contains numerical analysis results).

Nitrate

As shown in Table 4-8, starting concentrations of nitrate in groundwater are higher than the significance threshold of 10 mg/L in 5 of the 11 districts evaluated. Simulations for the proposed project showed nitrate concentrations steadily decreasing during the simulation period in most (9 of 11) districts, except for KTWD and Porterville ID. For KTWD, simulated nitrate concentrations in groundwater increased over the simulation period under the proposed project, but did not exceed the specified significance threshold. Simulated nitrate concentrations in groundwater for Porterville ID rapidly increased to slightly above the threshold, specifically during a hydrologically dry period (when additional groundwater pumping is needed to meet demands), before quickly returning to below the threshold. In addition, nitrate concentrations in TBID remain well above the significance threshold for the entire simulation period. Because several districts have starting concentrations well above the threshold and/or see slight exceedances under the proposed project, beneficial uses could be affected within some districts. However, nitrate concentrations in groundwater generally decrease under the proposed project for most districts during the simulation period.

In addition, groundwater quality analysis performed to assess impacts of the proposed project focused on changes in concentrations of nitrate in applied water and did not consider site-specific, on-farm application of fertilizers (e.g., nitrate) and/or soil amendments.

There are no feasible mitigation measures that could be implemented by FWA at a project scale to reduce potential adverse impacts from nitrate concentrations. However, at a basin level, potential adverse impacts under the proposed project (whether from project operations or on-farm practices) could be reduced through continued implementation of the CV-SALTS Nitrate Control Program, administered by the Central Valley Water Board and SWRCB in cooperation with stakeholders and the CVSC (Section D.3.1.1 in Appendix D contains a description), and/or execution of GSA management actions specified in relevant GSPs, when implemented.

Table 4-8. Simulated Changes in Concentration of Nitrate in Groundwater for Proposed Project Under Existing and Future Conditions

District	Starting Concentration (mg/L)	Simulated Ending Concentration (mg/L)		Simulated Maximum Concentration (mg/L)		Significance Threshold (mg/L)
		Existing Conditions	Future Conditions	Existing Conditions	Future Conditions	
AEWSD	7.7	5.5	5.6	7.7	7.7	10
SWID	9.2	4.9	5.4	9.2	9.2	10
SSJMUD	8.8	5.6	5.9	8.8	8.8	10
KTWD	5.1	7.1	7.3	7.5	7.7	10
DEID	9.2	2.0	2.0	9.2	9.2	10
TBID	27.3	12.7	12.9	27.3	27.3	10
SID	10.0	2.5	2.7	10.0	10.0	10
Pixley ID	9.8	5.3	4.6	9.8	9.8	10
TPDWD	20.4	5.8	6.0	20.4	20.4	10
Porterville ID	15.3	3.6	3.4	15.3	15.3	10
LTRID	15.9	2.1	2.1	15.9	15.9	10

Notes:

Values in **bold** indicate exceedance of the threshold.

Key: AEWSD – Arvin-Edison Water Storage District, SWID – Shafter-Wasco Irrigation District, SSJMUD – Southern San Joaquin Municipal Utility District, KTWD – Kern-Tulare Water District, DEID – Delano-Earlimart Irrigation District, TBID – Terra Bella Irrigation District, SID – Saucelito Irrigation District, ID – Irrigation District, TPDWD – Tea Pot Dome Water District, LTRID – Lower Tule River Irrigation District

Other Constituents of Consideration

Operations under the proposed project are not anticipated to adversely affect concentrations of constituents of consideration for drinking water beneficial uses (e.g., arsenic, hexavalent chromium, DBCP, pesticides, selenium, 1,2,3-TCP). Additional surface water deliveries to Friant Contractors are anticipated under the proposed project, which may contribute to groundwater recharge and/or a reduction of local groundwater pumping and, potentially, a resultant decrease in concentrations of constituents of consideration for drinking water beneficial uses in the upper aquifer, if present. The concentrations of constituents of consideration are likely to continue to remain at current measured concentrations, some of which exceed Title 22 limits, potentially affecting beneficial uses within these districts.

Project operations under the proposed project are expected to result in groundwater quality conditions that impair beneficial uses of groundwater. This impact is mostly attributed to elevated concentrations of TDS, nitrate, and other constituents of consideration present in groundwater within the study area. Although implementation of state and/or local control programs, including CV-SALTS, may reduce adverse effects on groundwater quality conditions, concentrations of groundwater quality constituents under the proposed project are expected to exceed the thresholds evaluated in this report. **Therefore, impacts to groundwater quality resulting from the proposed project would be significant and unavoidable.** This is because there are no feasible project-level mitigation measures that could be implemented to reduce concentrations of TDS, nitrate and other constituents of consideration in the region. However, as discussed, continued implementation of the CV-SALTS program could improve or stabilize groundwater quality conditions.

Groundwater Supply

Operations under the proposed project would result in an increase in available surface water supplies and potential decreases in groundwater pumping within most of the study area. Table 4-9 shows that simulated groundwater pumping under the proposed project decreases for the 11 districts evaluated because of additional surface water deliveries to the 11 districts to meet their water demands (Appendix F contains additional detail). **Impacts to groundwater supplies from the proposed project would be less than significant.**

Table 4-9. Total Groundwater Pumping in Acre-Feet Over Simulation Period Under Existing Conditions, No Project Alternative, and Proposed Project

District	Total Simulated Groundwater Pumping ¹ (acre-feet)				Relative Change Compared to Existing Conditions (acre-feet) ²	Relative Change Compared to No Project Alternative (acre-feet) ²
	Existing Conditions ³	No Project Alternative ³	Proposed Project		Proposed Project	
			Existing Conditions	Future Conditions	Existing Conditions	Future Conditions
AEWSD	6,608,800	6,856,400	6,307,400	6,620,200	-301,300	-236,100
SWID	2,274,900	2,402,600	1,811,100	2,032,600	-463,800	-370,000
SSJMUD	2,544,500	2,718,600	1,812,100	2,093,900	-732,400	-624,700
KTWD	1,032,100	1,338,100	814,900	864,400	-217,200	-473,700
DEID	999,200	1,216,000	583,300	748,500	-415,900	-467,500
TBID	486,500	506,900	369,200	405,800	-117,300	-101,000
SID	1,257,700	1,346,600	1,092,900	1,236,500	-164,800	-110,100
Pixley ID	5,627,900	5,202,300	5,627,900	4,556,800	0	-645,600
TPDWD	198,100	205,200	152,000	174,400	-46,000	-30,800
Porterville ID	976,000	1,042,200	854,000	968,800	-121,900	-73,500
LTRID	3,063,000	2,954,300	2,627,800	2,243,900	-435,200	-710,300

Notes:

¹ Total groundwater pumping for upper and lower aquifers. Values are rounded to nearest 100 acre-feet.

² Relative to simulated total groundwater pumping for upper and lower aquifers. Values are rounded to nearest 100 acre-feet.

³ Existing Conditions and No Project Alternative data are included in this table to show how the relative changes were calculated and how impact significance determinations were made.

Key: AEWSD – Arvin-Edison Water Storage District, SWID – Shafter-Wasco Irrigation District, SSJMUD – Southern San Joaquin Municipal Utility District, KTWD – Kern-Tulare Water District, DEID – Delano-Earlimart Irrigation District, TBID – Terra Bella Irrigation District, SID – Saucelito Irrigation District, ID – Irrigation District, TPDWD – Tea Pot Dome Water District, LTRID – Lower Tule River Irrigation District

4.12 Noise and Vibration

4.12.1 Assessment Methods

Activities with the potential for generating short-term, temporary increases in noise levels include construction activities and construction-related traffic. Long-term noise impacts could occur from operation of new facilities. Appendix G1 presents a framework for understanding noise and vibration levels, a detailed description of the existing environment, study area figures, and details on the methods and results of the noise modeling conducted.

4.12.2 Significance Criteria

Consistent with the criterion set in Appendix G of the CEQA Guidelines, impacts on noise would be considered significant if the project would result in:

- a) generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- b) generation of excessive ground-borne vibration or ground-borne noise levels (significance threshold of 0.3 inches per second [in./sec] of peak particle velocity [PPV]); or
- c) for a project located within the vicinity of a private airstrip or with an airport land-use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public-use airport, the project would expose people residing or working in the project area to excessive noise levels.

To characterize construction noise impacts, a substantial increase in noise will be considered a greater than 10 dBA increase in the 1-hour equivalent continuous sound level during the daytime hours (7 a.m. to 9 p.m.) or 5 dBA increase or more during the nighttime hours (9 p.m. to 7 a.m.) at the sensitive noise receptors nearest to on-site construction. These significance thresholds are based on the Kern County Code thresholds as well as published studies on noise and vibration effects. A 10 dBA increase in noise level is perceived as a doubling of noise (Federal Highway Administration [FHWA] 2011). A ninefold increase in equivalent traffic volume, roughly equating to a 10 dBA increase in noise level, will be considered a substantial increase for construction traffic-related impacts.

Consistent with the Tulare and Kern General Plans, operational noise levels will be considered substantial if operations plus existing noise levels equal or surpass 60 dBA for the Deer Creek pump-back facility and 65 dBA for the Shafter-Wasco and Lake Woollomes pump-back facilities.

Project construction and operation that produce vibration levels that exceed 0.3 in./sec would be significant (Caltrans 2020). This criterion was used to evaluate the second criteria above.

The significance thresholds described above apply to the noise receptors that could be affected by the project. Figures G1-1 through G1-3 in Appendix G1 depict the closest sensitive receptors to each project site.

4.12.3 Environmental Impacts

4.12.3.1 Construction of Proposed Project

The PPV for the proposed project construction activities would not exceed the significance threshold of 0.3 in./sec (Table G1-8 in Appendix G1; Appendix G2 contains detailed calculations). No long-term project operations would occur that could generate vibrations or ground-borne noise or otherwise expose persons to such impacts. **Therefore, ground-borne vibration impacts associated with construction of the proposed project would be less than significant.**

Shafter-Minter Field, a public airport approximately 1.5 miles southeast of Shafter-Wasco site, has an average of approximately 123 aircraft operations per day (AirNav.com 2021). Implementation of the proposed project would not change the frequency or intensity of the existing Shafter-Minter Field operations and there would be no new permanent residents near the airport that would be affected by the plane noise. The Lake Woollomes and Deer Creek sites are not located within an airport land use plan or within 2 miles of a public airport. **Noise impacts associated with**

constructing and operating the proposed project within an airport land use plan would be less than significant.

Construction traffic, including construction vehicles and workers, would increase under the proposed project; however, traffic volume would only increase by sevenfold (7.61), which is below the ninefold increase threshold (Table G1-10 in Appendix G1). **Therefore, noise impacts associated with construction traffic would be less than significant.**

Under the proposed project, construction activities would affect nearby sensitive receptors. Noise levels at the residence on Pond Road and the residence on Road 208 would exceed the daytime significance criterion of a 10 dBA increase. All three nearby sensitive receptors would exceed nighttime significance criteria of a 5 dBA increase (Table G1-7 in Appendix G1; Appendix G2 contains detailed calculations). Although the setting is agricultural, where the sensitive receptors are commonly exposed to farm operations and industrial equipment, **the temporary increase in ambient noise because of construction noise under the proposed project would be substantial and have a significant impact.** Implementation of Mitigation Measure NOI-1 described in Section 4.18, would reduce the severity of impacts. A noise barrier or enclosure that completely breaks the line of sight between the noise source and the receptor could achieve a minimum 5 dBA noise reduction, which would be sufficient to reduce daytime noise levels at the residence on Pond Road below the 10 dBA increase threshold and nighttime noise levels at the residence on Fresno Ave below the 5 dBA increase threshold. This would not be sufficient to reduce daytime noise levels at the residence on Road 208 nor nighttime noise levels at the residence on Pond Road and the residence on Road 208. Conventional methods to reduce noise sources would not provide a substantial reduction in noise levels. Additionally, even if the construction were completely enclosed and shielded, only a 10 dBA reduction in noise would be expected (FHWA 2006). **Noise impacts associated with construction of the proposed project would remain significant and unavoidable after implementation of Mitigation Measure NOI-1.**

4.12.3.2 Operation of Proposed Project

Noise associated with operation of the upgraded pump-back facilities at the Shafter-Wasco and Lake Woollomes sites would not exceed the 65 dBA Kern County threshold and the new pump-back facility at Deer Creek would not exceed the 60 dBA Tulare County threshold (Table G1-9 in Appendices G1; Appendix G2 contains detailed calculations). **Operating the proposed project would not generate a substantial permanent increase in noise levels; therefore, operational impacts would be less than significant.**

4.13 Population and Housing

4.13.1 Assessment Methods

This analysis considers whether the proposed project would result in a substantial increase in population, and whether there would be sufficient housing available to accommodate this population increase. Table 4-10 presents the number of construction workers who would be needed during peak construction for the proposed project. To provide a conservative estimate of impacts on population and housing, it is assumed that all workers would be nonlocal and require one housing unit per worker.

Table 4-10. Required Number of Construction Workers Under the Proposed Project

Sites	Maximum Construction Workers	Months of Construction
Shafter-Wasco	40	5–6
Lake Woollomes	40	5–6
Deer Creek	40	5–6
Total	120	6–18

4.13.2 Significance Criteria

Consistent with Appendix G of the CEQA Guidelines, impacts on population and housing would be considered significant if they would:

- a) induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure); or
- b) displace substantial numbers of people or existing people or housing, necessitating the construction of replacement housing elsewhere.

4.13.3 Environmental Impacts of Proposed Project

4.13.3.1 Construction of the Proposed Project

Under the proposed project, no more than 120 total workers would be required during construction, as shown in Table 4-10. This number of workers would temporarily increase populations in the surrounding communities during construction. This increase would be temporary and insubstantial, therefore the proposed project would not directly or indirectly induce substantial unplanned population growth. **Impacts would be less than significant.**

As shown in Table 3-9, there are an adequate number of housing units available for rent and for sale in the surrounding communities to provide accommodations for workers; no new housing would be required. Workers could also be accommodated by hotels and other short-term vacation or rental housing in the area. The proposed project would not displace people, necessitating the construction of replacement housing. **As such, there would be no impact.**

4.13.3.2 Operation of the Proposed Project

Operations for the proposed project would not require any increase in workers. While the proposed project would improve long-term reliability of surface water supply, it is not expected to induce development growth or remove a barrier for growth that could be used to approve specific development projects by local agencies. The proposed project would not result in new housing, utilities, services, or permanent employment that could induce population growth in the region. Moreover, the proposed project would not result in any impacts that would require the provision of new housing, utilities, services, or permanent employment. Therefore, the proposed project would not induce population growth. **There would be no operational impacts on population and housing from unplanned population growth inducement or displacement under the proposed project.**

4.14 Recreation

4.14.1 Assessment Methods

This analysis assesses impacts to recreation by evaluating access restrictions or facility upgrades at recreation sites at or near the Deer Creek, Lake Woollomes, and Shafter-Wasco pump-back sites. This analysis also evaluates potential impacts to recreation during operation of each of the project alternatives.

4.14.2 Significance Criteria

Impacts on recreation would be significant if they would:

- a) increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
- b) include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

The significance criteria listed above were developed consistent with Appendix G of the CEQA Guidelines.

4.14.3 Environmental Impacts

4.14.3.1 Construction of Proposed Project

Under the proposed project, construction of the Deer Creek and Shafter-Wasco pump-back facilities would not occur near any recreational areas. However, construction of the Lake Woollomes pump-back facility would occur close to Lake Woollomes Park, which offers recreational opportunities. Lake Woollomes Park would remain open throughout the Lake Woollomes pump-back facility construction period. The proposed project would neither create nor alter demand for recreational services. Changes to flow would only occur in the FKC, which is not used for recreational purposes. As such, there would be no net increase in recreational opportunities with project construction and implementation. **Construction-related impacts associated with recreational facilities would be less than significant.**

4.14.3.2 Operation of Proposed Project

Under the proposed project, pump-back facilities would be operated to deliver water to CVP Friant Contractors. Operation of the Lake Woollomes pump-back facility in coordination with overall FKC operations would generate some short-term lake level fluctuations; however, these changes would be within the range of the water level fluctuations currently experienced, as the lake presently operates as an equalizing reservoir. The recreational facilities in the project area would remain unchanged from annual operation of the pump-back facilities. **Therefore, there would be no impact to recreation from annual operations under the proposed project.**

4.15 Traffic and Transportation

4.15.1 Assessment Methods

Traffic and transportation impacts stem from the construction activities associated with the proposed project. The impacts analysis considers the roadways with the potential to be affected by the proposed project and is based on the regulatory setting associated with traffic and transportation.

As detailed in Appendix D, the passage of SB 743 required the Governor's Office of Planning and Research (OPR) to amend the CEQA Guidelines to provide an alternative to the Level of Service (LOS) methodology for evaluating transportation impacts. Under the new Guidelines, LOS is no longer considered a valid measure for determining significant impacts under CEQA. Instead, vehicle miles traveled (VMT) has been adopted as the most appropriate measure of transportation impacts under CEQA.

CEQA Guidelines Section 15064.3 addresses project-level VMT analysis under CEQA. Section 15064.3(b)(3) recognizes that lead agencies may not be able to estimate VMT for every type of project, and further states that, for many projects, a qualitative analysis of construction traffic may be appropriate. A qualitative analysis of project-level VMT is presented below, as neither the Governor's OPR's Technical Advisory on Evaluating Transportation Impacts in CEQA documents (OPR 2018), or Tulare and Kern Counties' transportation guidance have specified models or methods to estimate VMT or provide VMT thresholds of significance for construction traffic.

Although LOS (which assesses vehicle delay) is no longer recognized as a valid methodology for assessing a project's transportation impacts under CEQA, Caltrans guidelines and guidelines from Tulare and Kern Counties regarding traffic impacts still rely upon LOS. To determine impacts associated with conflicting with a program, plan, ordinance, or policy addressing the circulation system, an LOS analysis is also presented below. Anticipated short-term construction-related trip generation was identified and assigned to regional roadways at key intersections near the project area (SR 65, SR 155, SR 99, SR 46, CR 208, Avenue 96/Avenue 95/Terra Bella Avenue, Pond Road, Lerdo Highway, Scofield Avenue, and Holloway Road, as discussed in more detail in Appendix J) to determine traffic operations and LOS. Year 2025 was selected as the analysis year because the construction of the three pump-back facilities would occur simultaneously and is expected to last 6 to 8 months starting in 2025. Appendix J provides detailed information about traffic flow assessment methods, trip generation, and roadway operations under the proposed project. In this analysis, all study roadway segments are either SRs or CRs, so the LOS standard from Caltrans and the Tulare and Kern Counties provided in Appendix J was used to identify traffic effects. LOS thresholds from the Highway Capacity Manual 6th and 7th Editions shown in Appendix J were used to identify corresponding daily-level LOS.

Traffic safety impacts were analyzed by reviewing potentially hazardous areas or roads/intersections not designed to handle the proposed construction traffic. Construction and operations impacts were also analyzed to identify conditions that could result in impact to emergency access.

4.15.2 Significance Criteria

Impacts related to traffic and transportation would be considered significant if they result in one or more of the following conditions or situations:

- a) conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities;
- b) conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b);
- c) substantially increase hazards due to a geometric design feature or incompatible uses; or
- d) result in inadequate emergency access.

The significance criteria apply to all transportation systems that could be affected by the project. These criteria, the associated significance determinations, mitigation, and references to the location of supporting evaluations for these determinations are detailed in Table ES-1.

4.15.3 Environmental Impacts

4.15.3.1 Construction of Proposed Project

The proposed project would involve the construction and operation of three new pump-back facilities to support the recirculation of recaptured Restoration Flows and other waters. Under the proposed project, equipment, material, and/or waste material haul trips from the Shafter-Wasco, Lake Woollomes, and Deer Creek sites would travel on the study roadways. The project would involve construction that would generate temporary construction-related traffic for approximately 6-8 months, starting in 2025.

Daily trip generation and roadway operations during construction of the proposed project are presented in Appendix J. Construction traffic is temporary, and trips are expected to be distributed along SRs and CRs in the surrounding rural area. The added construction-related trips would not worsen the LOS to a level exceeding the significance criteria at any of the study roadway segments. Therefore, construction-related traffic under the proposed project would not conflict with the goals and objectives of any applicable programs, plans, ordinances, or policies in relevant jurisdictions that establish roadway performance standards and address the circulation system. **As such, the impact would be less than significant.**

Construction activities would generate local VMT within the project area. The proposed project is not expected to add any long-term trips to the project site after the construction is complete. Because the increase in VMT during construction is temporary and localized, the proposed project is not anticipated to substantively change the surrounding vehicle transportation system conditions. Because of the proposed project's remote location in a rural area, reducing construction worker trip lengths or using alternative modes of transportation such as transit or bicycling is not practical. Construction-related trips are temporary and would not generate permanent trips. Once construction is complete, the construction-related traffic would cease, and the traffic conditions would revert to existing conditions.

Since the construction traffic is localized and temporary, construction of the proposed project would not result in impacts that would negatively affect SB 743's state goals to promote: (1) reduction of greenhouse gas emissions; (2) development of multimodal transportation networks; and (3) a diversity of land uses. **Therefore, the proposed project's construction-generated VMT would not conflict or be inconsistent with CEQA Guidelines Section 15064.3(b), and the potential impact would be less than significant.**

Construction haul trips and worker vehicle trips could increase traffic hazards at key roadway segments and intersections close to near the project sites and landfills, including Avenue 96/Avenue 95/Terra Bella Avenue, CR 208, Ave 192, CR 152/Bliss Lane in Tulare County, and SR 65, SR 155, SR 99, SR 46, Lerdo Highway, Pond Road, Scofield Avenue, and Holloway Road in Kern County.

This impact would be significant. Developing a site-specific health and safety plan, installing caution signs, implementing dust control measures, and implementing construction traffic management actions such as temporary traffic control plans included in **Mitigation Measure TR-1, described in Section 4.18, would reduce the severity of the traffic hazards impact to less than significant.**

Construction traffic has the potential to limit or slow emergency access within the project area. Therefore, construction of the proposed project would increase the potential for traffic hazards at roadways segments and intersections and potentially conflict with emergency vehicles. **This impact would be significant. Implementation of Mitigation Measure TR-1, described in Section 4.18, would reduce the severity of the impact to emergency access to less than significant.**

4.15.3.2 Operation of the Proposed Project

Under the proposed project, pump-back facilities would be operated to deliver water to CVP Friant Contractors. Occasional maintenance trips would be necessary to ensure the pump-back facilities remain in working order. However, these trips would result in virtually no change to VMT in the surrounding transportation network and would not worsen the LOS to a level exceeding the criteria at any of the study roadway segments compared to existing conditions. **Therefore, the impacts on traffic and transportation from annual operations under the proposed project would be less than significant.**

4.16 Tribal Cultural Resources

4.16.1 Assessment Methods

Pursuant to PRC Section 21084.2, an impact to a tribal cultural resource is considered significant if a project would cause a substantial adverse change in the significance of a tribal cultural resource. To help determine whether a project may have such an effect, the PRC requires a lead agency to consult with any California Native American tribe that has previously submitted a written request to the lead agency to be notified of projects within its traditionally and culturally affiliated areas, and that has requested consultation in response to being notified by the lead agency of a proposed project. As noted in Section 3.15.2, no Native American tribes have submitted a written request to be notified by FWA.

4.16.2 Significance Criteria

For the purposes of this EIR, consistent with Appendix G of the CEQA Guidelines, impacts to tribal cultural resources, would be significant if:

- a) the project would cause a substantial adverse change in the significance of a tribal cultural resources, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

- i. listed or eligible for listing in the CRHR or in a local register of historical resources as defined in PRC Section 5020.1(k); or
- ii. a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

4.16.3 Environmental Impacts

4.16.3.1 Construction of Proposed Project

To ensure that tribes were afforded the opportunity to identify tribal cultural resources, in April 2021, FWA sent letters to California Native American tribes with a traditional or cultural affiliation with the geographic area of the proposed project, as identified by the NAHC. No Native American tribes identified any known tribal cultural resources that may be affected by the proposed project. Based on a cultural resources investigation conducted for the area, the results of the NAHC's Sacred Lands file review, and outreach to Native American tribes with potential interest in and knowledge of the project vicinity, there are no tribal cultural resources on the project site or in the immediate vicinity. Based on the previously described baseline conditions and communication with relevant agencies and Native American tribes, the proposed project would not cause a substantial adverse change in the significance of tribal cultural resource, as defined by the PRC Section 21074.

Construction of the proposed project would result in no impacts to tribal cultural resources within the project area.

4.16.3.2 Operation of Proposed Project

As noted above, no tribal cultural resources were identified in or near the project area; therefore, operation of the Lake Woollomes, Shafter-Wasco, and Deer Creek pump-back facilities would not directly or indirectly affect tribal cultural resources. **Operation of the proposed project would result no impacts to tribal cultural resources within the project area.**

4.17 Utilities, Service Systems, and Energy

4.17.1 Assessment Methods

Impacts to utilities, service systems, and energy resources could occur during construction of the proposed project owing to the use of construction equipment. The significance of these impacts is assessed qualitatively. Potential long-term impacts to energy use and power in the area of analysis could result from changes in water supply sources and the operation of water supply facilities. These changes are analyzed based on the energy impact guidance in Appendix F of the CEQA Guidelines.

4.17.2 Significance Criteria

Impacts related to public utilities and service systems would be considered significant if the project would:

- a) require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects;
- b) have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years;
- c) result in a determination by the wastewater treatment provider, which serves or may serve the project, that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- d) generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals; or
- e) comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Impacts to energy would be considered significant if the project would:

- a) result in potentially significant environmental impact because of wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
- b) conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

The significance criteria listed above were developed consistent with Appendix G of the CEQA Guidelines.

4.17.3 Environmental Impacts

4.17.3.1 Construction of Proposed Project

Construction of the proposed project would not create any new demand on utilities or service systems. Construction of the pump-back facilities would not result in the need for additional water treatment or expansion of wastewater treatment facilities. Potable water and wastewater handling capacity demands generated by construction activities and the presence of construction workers would be met by existing local facilities. No new or expanded water entitlements would be necessary for construction of the proposed project. Construction activities under the proposed project would require a construction workforce that would be drawn from the local area and, for some staff, nonlocal construction workers that would establish temporary residence in Kern and Tulare Counties. It is likely that these temporary workers could be absorbed by the counties without stress that would not result in the need for additional water treatment or expansion of wastewater treatment facilities. **Therefore, construction of the proposed project would have a less than significant impact related to the relocation or construction of new or expanded utility facilities, the availability of sufficient water supplies, and adequate capacity at wastewater facilities.**

Construction activities under the proposed project could generate solid waste such as construction-related debris from excavation. This solid waste would have a negligible impact on the permitted capacity at landfills within the area given the current available landfill capacity (Section 3.16). The proposed project would not generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure. Disposal of solid waste generated by the construction of the

pump-back facilities under the proposed project would comply with federal, state, and local statutes and regulations. **Therefore, the proposed project would have less than significant impacts related to generation of solid waste in excess and compliance with statutes and regulations related to solid waste management.**

Construction of the proposed project would require the use of electricity, diesel, and/or natural gas to operate construction equipment, including generators and construction lighting. Once construction is complete, the operation of construction equipment would cease and their demand for energy resources would end. **Therefore, construction of the proposed project would have less than significant impacts related to the consumption of energy resources.**

4.17.3.2 Operation of Proposed Project

The proposed project would involve the installation and operation of new electric pumps. The Shafter-Wasco and Lake Woollomes sites, which are in Kern County, would generate, on average, approximately 13,689 MWh or 13.7 gigawatt-hours (GWh) in new demand annually, or less than 0.04% of the total energy generated by Kern County. The Deer Creek site, located in Tulare County, would require an estimated 1,623 MWh or 1.6 GWh in new demand annually or less than 0.20% of the total energy generated by Tulare County. The energy demand for the operation of the new electric pumps would be met by existing capacity. Reducing water users' reliance on older less efficient groundwater pumps would not conflict with statewide plans or local general plans. Therefore, operating the proposed project would not be a wasteful use of energy nor would it conflict with a state or local plan for energy efficiency. **This impact would be less than significant.**

Operating the proposed project would provide opportunities to improve water management within the Friant Division service area. In wet years, water surplus to one district's need could be transferred to other districts with the ability to recharge or bank groundwater. Conversely, in dry years, water could be transferred or returned to districts with little or no groundwater supply, thereby providing ongoing groundwater banking opportunities within the Friant Division. The proposed project would increase operational flexibility and long-term reliability of the water supplies conveyed through the FKC. Therefore, the proposed project would have positive impacts on water supply availability into the foreseeable future with normal, dry, and multiple dry years in mind. **As such, operating the proposed project would have no impact related to sufficient water supplies.**

In addition, the long-term operation of the proposed project would result in reduced reliance on local groundwater supplies and consequently reduced reliance on older less efficient groundwater pumps. California also has an "Energy Efficiency Strategic Plan" that includes goals to improve agricultural irrigation energy efficiency and improve use of renewable energy (California Public Utilities Commission 2011). Reducing water users' reliance on older less efficient groundwater pumps would not conflict with these statewide plans or local general plans. Therefore, operation of the proposed project would not conflict with existing plans related to renewable energy and energy efficiency; **there would be no impact.**

4.18 Mitigation Measures

The following mitigation measures are being incorporated to avoid or substantially reduce the potentially significant impacts of the project:

Mitigation Measure AQ-1. Construction contractors will ensure all haul trucks, vendor trucks, and other vehicles operating on-site with on-road engines meet Model Year 2014 or better emission standards.

Mitigation Measure NOI-1. FWA will ensure a Noise Control Plan (NCP) will be developed by the construction contractor prior to the start of any construction activities to address increased noise levels as a result of the proposed project. The NCP will identify the procedures for predicting construction noise levels at sensitive receptors and will describe the reduction measures required to minimize construction noise. The noise measures in the NCP will include, but are not limited to, the following:

- Appropriate level of sound attenuation will be used or constructed to minimize noise levels by at least 5 dBA. Potential sound attenuation measures could include, but are not limited to stationary equipment and stockpiles, or otherwise placed between the source(s) of construction noise and noise-sensitive receptors to completely break the line of sight between noise sources and the sensitive receptors, as appropriate.
- Contractor will be responsible for outfitting construction equipment with the most effective locally available commercial exhaust mufflers or other suitable noise reduction/attenuation devices.
- The loudest construction activities will be conducted during daytime hours, between 7:00 a.m. and 9:00 p.m.
- Shutting down equipment that are queued or not in use for 5 minutes or more.
- Pre-construction meeting with contractors and project managers to confirm that noise mitigation procedures are in place.
- Contractor will designate a “disturbance coordinator” who would be responsible for responding to any local complaints regarding construction noise. The disturbance coordinator will determine the cause of the noise complaint and will require that reasonable measures warranted to correct the problem be implemented. The disturbance coordinator shall clearly post the coordinator’s telephone number at the construction site and include it in a notice sent to nearby residences regarding the construction schedule.
- Signs must be posted at the construction sites that include permitted construction days and hours, a day and evening contact number for the job site, and a contact number for the disturbance coordinator.
- An on-site complaint and enforcement manager must respond to and track complaints and questions related to noise.

Mitigation Measure TERR-1: Crotch’s Bumble Bee. Within one year of the start of construction, a qualified biologist shall conduct protocol-level surveys within the project area following the CDFW *Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species* (2023) to identify bumble bees and potential nesting sites during the vegetation blooming

period prior to activities at project sites. If any Crotch's bumble bees or nests are detected, FWA will consult with CDFW to develop adequate take avoidance measures, including protection for underground overwintering queens if applicable. If avoidance of take is not feasible, FWA will obtain an Incidental Take Permit pursuant to Fish and Game Code Section 2081, subdivision (b).

Mitigation Measure TERR-2: Special Status Reptiles and Amphibians. A qualified biologist must conduct pre-construction surveys within the project area for special status reptile and amphibian species with the potential to occur on-site—western spadefoot (*Spea hammondi*), Bakersfield legless lizard (*Anniella grinnelli*), California glossy snake (*Arizona elegans occidentalis*), coast horned lizard (*Phrynosoma blainvillii*), Northern California legless lizard (*Anniella pulchra*), and San Joaquin coachwhip (*Masticophis flagellum ruddocki*)—no more than 2 weeks prior to construction within 100 feet of disturbance areas, including all areas where ground disturbance would occur and staging areas. A qualified biologist must relocate any individuals encountered during preconstruction surveys to suitable habitat outside of areas of disturbance. However, there is potential for individuals to avoid detection during pre-construction surveys or to move into the work sites after surveys have been completed. Therefore, a qualified biologist will be on-site during all project activities with the potential to affect special status reptiles and amphibians. If a special status reptile or amphibian is detected within work sites during construction, activities and equipment travel must cease in the immediate area of detection until the individual has left the work site or has been relocated out of the area by a qualified biologist. Should the biologist determine that relocation is required, USFWS and/or CDFW will be contacted prior to species handling/relocation activities to identify any additional measures that may be incorporated to reduce potential impacts on individuals.

Mitigation Measure TERR-3: Nesting Bird Surveys. Ground-disturbing and vegetation-disturbing work shall occur outside of nesting bird season (February 1 through September 15) to the extent practicable. However, if these activities must occur during nesting bird season, a qualified biologist will be on-site during any ground and/or vegetation disturbance occurring during nesting bird season. Regardless of when ground and/or vegetation disturbance is scheduled, the qualified biologist will conduct nesting bird surveys within the project area and the surrounding 500-foot radius of the project area no more than 10 days prior to the start of ground or vegetation disturbance. If an active bird nest is found, the following no-disturbance buffers shall be implemented around the nest:

- 250-foot no-disturbance buffer around nests of common bird species
- 300-foot no-disturbance buffer around nests of special status bird species
- 500-foot no-disturbance buffer around nests of raptors

These no-disturbance buffers will be implemented until the breeding season has ended or until the qualified biologist has determined that the birds have fledged and are no longer reliant on the nest or on-site parental care for survival. If establishment of the no-disturbance buffers is not practicable, appropriate conservation measures (as determined by a qualified biologist) will be implemented. These measures may include, but are not limited to, consultation with CDFW and/or USFWS to establish a different no-disturbance buffer around the active nest site and/or delaying construction activities near the active nest site until the young have fledged. The qualified biologist will continuously monitor any active nest sites discovered in the project area to detect any behavioral changes resulting from the project implementation; if behavioral changes occur, the biologist shall

stop construction and additional conservation measures (such as those described in the preceding sentence) will be implemented.

Mitigation Measure TERR-4: Burrowing Owl. Protocol-level presence/absence surveys during the breeding period (February 1 through August 31) will be conducted within the project area within one year of the start of construction. These surveys will follow the California Burrowing Owl Consortium's (CBOC's) *Burrowing Owl Survey Protocol and Mitigation Guidelines* (1993) and the California Department of Fish and Game's (CDFG's) *Staff Report on Burrowing Owl Mitigation* (2012). If burrowing owls are detected during these surveys or the nesting bird surveys required by Mitigation Measure TERR-3, no-disturbance buffers shall be implemented following the recommendations in the previously-referenced documents (CBOC 1993; CDFG 2012). These no-disturbance buffers shall vary in size, ranging from approximately 160 feet to up to 1,640 feet, based on the time of year during which work occur and the level of disturbance that the proposed project would cause.

If burrowing owls are found within these recommended buffers and avoidance is not possible, a qualified biologist will submit an exclusion and passive relocation plan. This plan will generally follow the guidelines outlined in Appendix E of the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012). The exclusion and passive relocation plan will consist of installing one-way doors in potential burrows, daily monitoring, and collapsing burrows once it is determined that the burrows are unoccupied. Exclusion may only take place during the nonbreeding season (September 1 through January 31) and may be an ongoing effort during this period. This will allow the owls to exit burrows if they are present, but not return. The exclusion and passive relocation plan will also detail plans to replace collapsed burrows with artificial burrows at a minimum 1:1 ratio or describe why artificial burrows are not needed (e.g., numerous available natural burrows are available in nearby areas that will not be disturbed). Monitoring of collapsed burrows will be conducted as needed so that burrowing owls do not recolonize the area prior to construction disturbance.

If occupied burrows are detected during the breeding season and maintaining the required no-disturbance buffer is not practicable, CDFW will be consulted to determine alternative measures to minimize the potential for disturbance to occupied burrows and nesting activities. Measures may include but are not limited to continuous biological monitoring by a qualified biologist until it has been determined that the young have fledged and are no longer reliant on the nest or parental care for survival or construction is complete. No direct disturbance of burrows with eggs or young can be conducted without written authorization from CDFW and USFWS.

Mitigation Measure TERR-5: SJKF. A qualified biologist will conduct preconstruction surveys no less than 14 days and no more than 30 days prior to the beginning of ground disturbance/construction activities to identify potential dens within the project area as described below. If dens are located within the proposed work area and cannot be avoided during construction activities, a USFWS- and CDFW-approved biologist will determine if the dens are occupied. If occupied dens are present within the proposed work sites, their disturbance and destruction will be avoided through the implementation of exclusion zones. Exclusion zones will be implemented following the latest USFWS-approved procedures.

- Pre-construction surveys will be conducted within 500 feet of work areas to identify potential SJKF dens or other refugia. A qualified biologist will conduct the survey for potential SJKF dens no less than 14 days and no more than 30 days before construction begins. All identified potential dens will be monitored for evidence of SJKF use by placing an inert tracking medium at den entrances and monitoring for at least three consecutive nights. If no activity is detected at these den sites, they will be closed following guidance established in the USFWS standardized recommendations.
- If occupied SJKF fox dens are identified, exclusion zones will be implemented as follows:
 - o Known den – 100 feet
 - o Natal or pupping den – to be determined on a case-by-case basis in coordination with USFWS

Project implementation will follow the USFWS *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* (2011). If the disturbance/destruction of occupied dens cannot be avoided, FWA will consult with CDFW and/or USFWS for guidance on how to avoid a take or acquire an Incidental Take Permit pursuant to Fish and Game Code Section 2081, subdivision (b).

Mitigation Measure TERR-6: Tipton Kangaroo Rat. No less than 5 days and no more than 30 days before construction begins, a qualified biologist will conduct protocol-level surveys within the project area following the USFWS *Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats* (2013) to determine presence of the species. If individuals are identified within the project area, avoidance and minimization measures, as determined in coordination with USFWS, will be implemented. These measures will conform to the terms and conditions of any applicable incidental take permits issued for the project. Measures may include the installation of barrier fencing in conjunction with a trap and relocation program to be carried out by a USFWS-approved biologist.

Mitigation Measure TERR-7: American Badger. Any American badger detected within the project areas during the implementation of the proposed project will be allowed to move out of the work areas of its own volition. Concurrent with other required surveys, during winter and spring months before new Project activities, and concurrent with other pre-construction surveys (e.g., SJKF, nesting bird surveys), a qualified biologist will perform a survey to identify the presence of active or inactive American badger dens. If this species is not found, no further mitigation will be required. If dens are identified within the construction footprint during or after the survey, they will be inspected and closed using the following methodology:

- When occupied dens are encountered outside of work areas but within 100 feet of proposed activities, vacant dens will be inspected to ensure they are empty and temporarily covered using plywood sheets or similar materials.
- If badger occupancy is determined at a given site within the work area, work activities at that site should be halted. Depending on the den type, reasonable and prudent measures to avoid harming badgers will be implemented and will include seasonal limitations on project construction near the site (e.g., restricting the construction period to avoid spring–summer pupping season) or establishing a construction exclusion zone around the identified site or resurveying the den at a later time to determine the species’ presence or absence.

- Badgers will be passively relocated using burrow exclusion (e.g., installing one-way doors on burrows) or similar CDFW-approved exclusion methods. In unique situations, it may be necessary to actively relocate badgers (using live traps) to protect individuals from potentially harmful situations. Such relocation would be performed with advance CDFW coordination and concurrence.

Mitigation Measure TERR-8: Special Status Plant Species. Prior to construction, the project area will be surveyed by a qualified botanist during the appropriate bloom period(s) for special status plant species: alkali mariposa-lily (*Calochortus striatus*), California satintail (*Imperata brevifolia*), Kern mallow (*Eremalche parryi* ssp. *Kernensis*), Mason's neststraw (*Stylocline masonii*), recurved larkspur (*Delphinium recurvatum*), San Joaquin woollythreads (*Monolopia congdonii*), and subtle orache (*Atriplex subtilis*).

If special status plants are found within the project area, in consultation with CDFW and/or USFWS, a minimum 50-foot no-disturbance buffer (or as otherwise recommended by CDFW and/or USFWS) shall be established placed around individual plant(s) or population(s) during activities that could result in disturbance. A greater no-disturbance buffer may be warranted to ensure the hydrology of the site is not disrupted and that the plants and seed bank will not be impacted. The no-disturbance buffer will be clearly identified in the field by staking, flagging, or fencing around depressions, swales, or other features containing plants of these species. Project activity will avoid buffer areas to ensure that the buffer area is not being encroached upon and that effects are being avoided.

If the avoidance buffer is infeasible, a mitigation plan will be prepared in coordination with the appropriate natural resource agency (i.e., USFWS and/or CDFW) prior to commencement of construction activities that will include transplantation of affected plants. The mitigation plan will include the locations where plants will be transplanted in suitable habitat adjacent to the project site, annual monitoring activities for a minimum of 5 years, and suitable success criteria. Annual monitoring will be conducted during the identifiable blooming season for the species (between March and October, depending on the species observed). Annual monitoring reports will be submitted to the appropriate natural resource agency by December of each monitoring year.

Mitigation Measure TERR-9: Construction Contractor Environmental Awareness Training and Site Protection Measures. All construction personnel will attend an environmental education program delivered by a USFWS- and CDFW-approved biologist prior to starting work. The training will include an explanation as how to identify each of the special status species with potential to occur and avoid the accidental take of special status plants and wildlife. The field meeting will include species identification, life history, descriptions, and habitat requirements. The program will include an explanation of federal and state laws protecting endangered species and avoidance and minimization methods being implemented to protect these species. A qualified biologist will be present on-site at all times during construction.

The construction contractor will provide closed garbage containers for the disposal of all trash items (e.g., wrappers, cans, bottles, food scraps). Work sites will be cleaned of litter before closure each day and placed in wildlife-proof garbage receptacles. Construction personnel will not feed or otherwise attract any wildlife. No pets, excluding service animals, will be allowed on-site or in construction areas.

Project-related vehicles will observe a daytime speed limit of 15 miles per hour throughout the site in all project areas, except on state and federal highways. Nighttime work will be minimized to the extent possible. If work does occur after dark, the speed limit will be reduced to 10 miles per hour.

Clearing and grading, number of access routes, and number and size of staging areas will be confined to the minimum area necessary to facilitate construction activities. Construction activities will be avoided in areas containing sensitive natural communities, to the maximum extent practicable. During construction, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of environmentally sensitive areas. All workers will be informed of the importance of preventing spills and appropriate measures to take should a spill occur. All staging, maintenance, and storage of heavy machinery will be conducted in such a location and manner that no fuel, oil, or other petroleum products may run off or be washed by rainfall into water bodies within or adjacent to the project area.

Mitigation Measure TERR-10: Restoration of Work Areas. After completion of construction activities, any temporary fill and construction debris will be removed and disturbed areas will be restored to pre-project conditions (including reestablishment of vegetation where necessary) within the same season or, at most, the same calendar year. Where revegetation activities are required, native plant species will be used to the maximum extent practicable.

Mitigation Measure CUL-1: Implement a Detailed Inadvertent Discovery Plan. Prior to initiating construction, a detailed inadvertent discovery plan will be prepared for the project. The plan will be prepared by personnel meeting appropriate *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines* (36 CFR Part 61) and will outline cultural resource training procedures for construction personnel and the protocols to follow if cultural resources or human remains are discovered during project ground-disturbing activities. In the event of an inadvertent discovery, construction near the find will halt and work will be directed elsewhere while the significance of the find is evaluated. If the discovery is significant, additional measures identified in the plan (e.g., avoidance, capping beneath a layer of sterile soil, data recovery excavations, consultation with the culturally affiliated tribe for suspected tribal cultural sources) will be implemented consistent with CEQA Guidelines Section 15126.4(b) and PRC Section 21084.3. Human remains, if encountered, will be treated consistent with the NAGPRA if discovered on federal lands and PRC Section 21084.4 and California Health and Safety Code Section 7050.5 if encountered on nonfederal lands.

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

Mitigation Measure WR-1: Permitting. Prior to construction, the lead agencies will obtain all required state and federal permits, including but not limited to permits and certifications under CWA Section 404 and Section 401 and CA Fish and Game Code Section 1602, as appropriate, and comply with all permit terms.

Mitigation Measure HAZ-1: Development and Implementation of an SWPPP. A SWPPP consistent with the Statewide NPDES Construction General Permit (Order No. 2009-0009-DWQ, as amended) will be developed and implemented by FWA prior to construction. The SWPPP will detail the construction-phase erosion and sediment control BMPs and the housekeeping measures for control of contaminants other than sediment, as well as the treatment measures and BMPs to be implemented for control of pollutants once the Project has been constructed. Erosion control BMPs will include source control measures such as scheduling of construction activities with regard to the rainy season, wetting of dry and dusty surfaces to prevent fugitive dust emissions, preservation of existing vegetation, and effective soil cover (e.g., geotextiles, straw mulch, hydroseeding) for inactive areas and finished slopes to prevent sediments from being dislodged by wind, rain, or flowing water. Sediment control BMPs will include measures such as street sweeping transportation corridors, and installation of fiber rolls and sediment basins to capture and remove particles that have already been dislodged. The SWPPP will establish good housekeeping measures such as construction vehicle storage and maintenance, handling procedures for hazardous materials, and waste management BMPs. These BMPs include procedural and structural measures to prevent release of wastes and materials used at the site. BMPs associated with installation of removable cofferdams and temporary diversion of flows around the work area will be described. The SWPPP will also describe post-construction BMPs to be implemented for control of pollutants once the Project has been constructed.

Performance tracking will be based on successful compliance with the Statewide NPDES Construction General Permit.

Mitigation Measure TR-1: Develop a Temporary Traffic Control Plan. The following construction management actions will be documented in a temporary traffic control plan developed by the contractor as a requirement that will be included in its construction contract. The temporary traffic control plan will be submitted for review by Caltrans, as well as Kern and Tulare counties, and approval during the Encroachment Permit process.

Construction contractors must install signage at roadways and intersections identified as dangerous in accordance with the California Manual on Uniform Traffic Control Devices guidelines warning motorists of slow-moving construction traffic and lane closures. Signage must also be posted at these locations 1 month in advance to allow motorists time to plan for delays or alternate routes.

Construction contractors must implement dust abatement and perform proper construction traffic management actions, including signage warning motorists of construction activity and traffic controls like flaggers or temporary traffic lights where construction equipment will be entering roadways, to reduce conflicts during periods of high traffic volume in and around each construction site and to avoid conflicts with emergency responders entering and existing the area during an emergency.

In addition to the temporary traffic control plan, prior to the initiation of any construction actions, construction contractors must develop and adhere to a health and safety plan outlining all applicable

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

OSHA requirements, important traffic safety plans including identification of emergency access routes in and through construction areas that would need to be kept clear at all times during construction. The health and safety plan must include coordination with emergency service personnel to ensure adequate mitigation for all impacts.

Chapter 5 Alternatives

5.1 Introduction

The CEQA Guidelines (Section 15126.6) require an EIR to present a discussion of a reasonable range of alternatives that would “feasibility attain most the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives.” This chapter includes a discussion of the alternatives to the Proposed Project, whether such alternatives would avoid or lessen any of the identified significant or less than significant environmental impacts associated with the Proposed Project, and the identification of the environmentally superior alternative.

As discussed in Chapter 4, the following resources would not be affected by proposed project: agricultural resources, forestry resources, land use and planning, wildfire, mineral resources, public services and tribal cultural resources, these resources are not further evaluated in this chapter.

5.2 Alternative Formulation

CEQA requires an EIR to identify a reasonable range of alternatives and provides guidance on the identification and screening of such alternatives. CEQA includes provisions that alternatives reasonably meet most of the project objectives while avoiding or substantially lessening any of the proposed project’s significant effects and be potentially feasible. FWA followed a structured, documented process to identify and screen alternatives for inclusion in this EIR. Formulated alternatives evaluated in this EIR are the combination of measures identified to facilitate the recirculation of recaptured Restoration Flows released from Millerton Lake for the SJRRP and other waters obtained by Friant Contractors to achieve the project objectives for the action. A total of 12 options were identified, and 7 were removed from consideration based on screening criteria. Following the screening of initial options, comprehensive alternatives were formulated to reflect a range of potential environmental effects. Appendix B describes this process and the alternatives considered in more detail.

5.3 Project Alternatives

5.3.1 No Project Alternative

CEQA Guidelines (Section 15126.6) require the evaluation of a No Project Alternative, which presents the reasonably foreseeable future conditions in the absence of the proposed project. The purpose of the No Project Alternative is to allow decision-makers to compare the impacts of approving the project to the impacts of not approving the project. Under CEQA, existing conditions (conditions at the time of the NOP), as well as what would be reasonably expected to occur in the foreseeable future, serve as the baseline to determine the potential impacts of the alternatives. The No Project Alternative may differ from existing conditions if there are actions that

could occur in the study area in the future, that (1) currently do not exist and (2) do not rely on approval or implementation of the proposed project. Differences between existing conditions and an anticipated future without project conditions (No Project Alternative) are detailed for each identified resource area and detailed in Appendix A.

Under the No Project Alternative, no new facilities would be constructed. Under this alternative, pump-back operations would use only existing facilities located in the FKC. Existing pump-back facilities along FKC include: (1) a 500-cubic-feet-per-second (cfs) pump station that pumps water from the CVC into the lower end of the FKC, (2) a 30 cfs permanent pump-back facility at the Shafter check structure, and (3) one 50 cfs temporary pump-back facility installed historically at the Shafter-Wasco check structure and one 50 cfs temporary pump-back facility at Lake Woollomes check to support pump-back operations (Figure 2-3 denotes the locations of the proposed pump-back facilities). These temporary facilities are currently in place and are covered under a CEQA Categorical Exemption completed in 2012 to support the delivery of CVC supply and banked CVP supply through the FKC. These temporary facilities would remain in place until their continued use could no longer be supported through regular maintenance.

5.3.2 Low Flow Alternative

Like the proposed project, the Low Flow Alternative would include the construction and operation of three new pump-back facilities at the Shafter-Wasco, Lake Woollomes, and Deer Creek check structures. The primary difference between the Low Flow Alternative and the proposed project is the pump-back capacity at each check structure. Under the Low Flow Alternative, the following would be achieved: (1) a 200 cfs permanent facility would replace the existing temporary 50 cfs pump-back facility at the Shafter-Wasco check structure, (2) a 75 cfs permanent facility would replace the existing temporary 50 cfs pump-back facility at the Lake Woollomes check structure, and (3) a 75 cfs permanent facility would be built at the Deer Creek check structure.

5.3.2.1 Construction of Project Facilities

Construction of the three pump-back facilities under the Low Flow Alternative would follow the same construction methods as discussed for the proposed project.

5.3.2.2 Operation of Project Facilities

As with the proposed project, the pump-back facilities under the Low Flow Alternative would convey recaptured Restoration Flows, water purchased from Reclamation pursuant to CVC contracts, water in the California Aqueduct, water from banking projects, and other CVC supplies accessible via the Intertie to contractor turnouts. Under the Low Flow Alternative, pump-back operations would be constrained by the reduced capacity of the pump-back facilities in comparison to proposed project. The pump-back facilities would be operated year-round to maximize the recirculation of recaptured Restoration Flows and the other sources of water (water purchased from Reclamation pursuant to CVC contracts, water in the California Aqueduct, water from banking projects, and other CVC supplies) would be conveyed, up to the pump-back facilities' capacity. The three new pump-back facilities would all be electric-driven. Table 5-1 provides an estimated kilowatt-hour range for the pump-back facility at each site.

Table 5-1. Estimated Energy Consumption for each Pump-Back Facility Under the Low Flow Alternative

Pump-Back Facility	Estimated Energy Consumption (kWh) ¹
Shafter-Wasco	1,615,000
Lake Woollomes	521,000
Deer Creek	379,000

Note:

¹ To maintain a conservative approach, the energy consumption analysis presented in this EIR is based on 24/7 operation for 3 months at maximum pump station flow. Values are rounded to the nearest 1,000 kWh.

5.3.3 Seasonal Alternative

The Seasonal Alternative would involve construction, installation, and operation of two seasonal pump-back facilities to support the recirculation of recaptured Restoration Flows and other waters. Under the Seasonal Alternative, the following would be achieved: (1) up to a 200 cfs four-bay seasonal check structure would replace the existing temporary pump-back facility at the Shafter-Wasco check structure, and (2) up to a 75 cfs two-bay seasonal check structure would replace the existing temporary pump-back facility at the Lake Woollomes check structure.

Operating seasonal pump-back facilities would involve utilizing retrofitted pumps that were originally purchased by Reclamation from the Red Bluff Diversion Dam when the pumping plant was decommissioned in 2014. The seasonal pump-back facilities would be placed in the same location as the existing, temporary check structures at Shafter-Wasco and Lake Woollomes. Figure 5-1 and Figure 5-2 depict an example of metal pump frames that would be used to house the seasonal retrofitted pumps at the Shafter-Wasco and Lake Woollomes check structures.



Figure 5-1. Example Pump Housing



Note: Though only a single pump is depicted, the metal frames can accommodate a second pump by removing the plywood.

Figure 5-2. Example Metal Frames Housing a Single Pump

5.3.3.1 Construction of Project Facilities

Installation and removal of the two seasonal pump-back facilities would be expected to take one day using a crew of one to two workers per site. Metal frames would be constructed to house the pumps; during seasonal operations, the pump frames would be installed by crane into the existing check structure bays. The retrofitted pumps would be transported to and from the site via a deck truck.

There is permanent electric power at both the Shafter-Wasco and Lake Woollomes check structures; however, available power is only sufficient to operate one 50 cfs pump at each site. Additional permanent power would be installed, or diesel generators would be used, to power pumps for the duration of the seasonal operation.

If it is determined that additional permanent power must be installed at both sites, coordination with the respective utility company for each check would be required. It is anticipated that no power interruption to existing customers would occur during installation.

5.3.3.2 Operation of Project Facilities

As with the proposed project and Low Flow Alternative, the seasonal pump-back facilities would convey water supplies accessible via the Intertie to contractor turnouts. Under the Seasonal Alternative, the pump-back facilities would be operated during the pump-back operation window to maximize the recirculation of recaptured Restoration Flows and the other sources of water (water

purchased from Reclamation pursuant to CVC contracts, water in the California Aqueduct, water from banking projects, and other CVC supplies) would be conveyed, up to the pump-back facilities' capacity. The seasonal facilities would be operated when recaptured Restoration Flows are available and taken offline outside of the irrigation season (November to February), providing the flexibility to demobilize the seasonal pump-back facilities at Shafter-Wasco and Lake Woollomes outside of the operational window, allowing for regular gravity flow operations within the FKC to support flood safety operations.

If additional permanent power is installed, the seasonal pump-back facilities would all be electric-driven. Table 5-2 provides the estimated energy consumption for the pump-back facility at each site.

If diesel power generators are used to power the seasonal pumps, the analysis assumes four 400-horsepower (hp) generators would be used at Shafter-Wasco and two 400 hp generators at Lake Woollomes. Up to two daily maintenance trips would be required to each site for regular generator maintenance

Table 5-2. Estimated Energy Consumption for Each Pump-Back Facility Under the Seasonal Alternative

Pump-Back Facility	Estimated Energy Consumption (kWh) ¹
Shafter-Wasco	1,360,000
Lake Woollomes	655,000

Notes:

¹ Values are based on the following operational assumptions (values rounded to the nearest 1,000 kWh):

- The pumps at Shafter-Wasco would be operated up to 18 hours per day for 4 months (July–October) and up to 6 hours per day for 8 months (November–June).
- The pumps at Lake Woollomes would be operated on average up to 8–12 hours per day for 8 months (September–April).

5.4 Evaluation of Project Alternatives

5.4.1 Aesthetics

5.4.1.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.2.3, the proposed project would result in less than significant impacts because of the short-term nature of construction and no impact to scenic and aesthetic resources during the annual operation of the pump-back facilities. Under the No Project Alternative, no new facilities would be constructed. Only existing infrastructure would be used, and no new, temporary or long-term light sources would be added. Conveyance of water in the FKC would be consistent with existing conditions and there would be no effect on the existing landscape character visible from adjacent land, vantage points, and roadways in the study area. Therefore, there would be no potential for impacts to aesthetic resources under the No Project Alternative. **The No Project Alternative would avoid the less than significant impacts to aesthetic resources associated with the proposed project.**

5.4.1.2 Environmental Impacts of Low Flow Alternative

As discussed in Section 4.2.3, the proposed project would result in less than significant impacts because of the short-term nature of construction. Under the Low Flow Alternative, construction

methods would be consistent with those described under the Proposed Action. As such, construction staging and nighttime construction at the Lake Woollomes, Shafter-Wasco, and Deer Creek sites under the Low Flow Alternative could affect scenic vistas. inconsistent with Section 4.2.3, there would be no impacts associated with damage to scenic resources within a state scenic highway. As with the proposed project, temporary construction effects on the existing aesthetic character under the Low Flow Alternative are considered minor because of the short-term nature of the construction activities and the size of each construction site in comparison to the broad surrounding vistas. In the long term, consistent with the proposed project, visual modifications from the addition of the new pump-back facilities under the Low Flow Alternative would not change the visual character of the FKC or the surrounding viewsheds. **Overall, construction-related impacts to aesthetic resources under the Low Flow Alternative would be less than significant and consistent with those under the proposed project.**

5.4.1.3 Environmental Impacts of Seasonal Alternative

As discussed in Section 4.2.3, the proposed project would result in less than significant impacts. Construction at the Shafter-Wasco and Lake Woollomes sites proposed under the Seasonal Alternative would have minimal construction effects on the existing visual character as construction would only require the single-day use of a crane and deck truck to install the seasonal pump-back facilities, with no equipment staging occurring on-site. As with the proposed project, the temporary addition of construction equipment would not differ substantially from the regular use of similarly sized farm equipment across the region. In addition, nighttime construction is not proposed under the Seasonal Alternative. Therefore, construction of the Seasonal Alternative would have no impacts to aesthetic resources. **The Seasonal Alternative would reduce the less than significant construction-related impact to aesthetic resources associated with the proposed project.**

5.4.2 Air Quality

5.4.2.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.3.3, the proposed project would result in less than significant impacts from construction and no impacts to air quality from operation. Under the No Project Alternative, no construction actions or operational changes would be implemented. Therefore, the No Project Alternative would result in no impacts to air quality. **The No Project Alternative would avoid the need to mitigate to less than significant with mitigation the impacts to air quality associated with the proposed project.**

5.4.2.2 Environmental Impacts of Low Flow Alternative

Construction of Low Flow Alternative

As discussed in Section 4.3.3, the proposed project would result in less than significant impacts after implementation of Mitigation Measure AQ-1. The Low Flow Alternative would rely on the same types and amount of construction equipment and would have the same construction schedule as the proposed project, the Low Flow Alternative would generate NO_x emissions that exceed the SJVAPCD's significance threshold. **Implementation of Mitigation Measure AQ-1, described in Section 4.18, would reduce NO_x emissions under the Low Flow Alternative to a less than significant level consistent with the proposed project (Table 4-2).**

As with the proposed project, construction activities under the Low Flow Alternative would not result in long-term exposure to any TACs because of the distance to the nearest sensitive receptors. In addition, because of the short construction period (5 to 6 months) and distance to sensitive receptors, odors from diesel construction equipment exhaust would not affect a substantial number of people. **Under the Low Flow Alternative, impacts to air quality from other construction-related emissions, such as TACs and objectionable odors, would be less than significant consistent with the proposed project.**

Operation of Low Flow Alternative

As discussed in Section 4.3.3, the proposed project would result in no impacts to air quality from operation. Similar to the proposed project, the Low Flow Alternative pump-back facilities would be operated to deliver water to CVP Friant Contractors. The three, newly constructed pumps would be electric-driven and would replace existing temporary diesel pumps. There would be no local criteria pollutant emissions through operation of the pump-back facilities. **Therefore, there would be no operational impacts to air quality from the operation of the Low Flow Alternative, consistent with the proposed project.**

5.4.2.3 Environmental Impacts of Seasonal Alternative

Construction of Seasonal Alternative

As discussed in Section 4.3.3, the proposed project would result in less than significant impacts after implementation of Mitigation Measure AQ-1. Construction-related emissions in the SJVAPCD were estimated for off-road construction equipment, on-road haul trucks and delivery vehicles, and construction worker commuting. Table 5-3 summarizes the annual construction-related emissions associated with the Seasonal Alternative (Appendix E contains detailed calculations). Under the Seasonal Alternative, no criteria pollutants would exceed the SJVAPCD's significance thresholds for construction emissions and no mitigation would be required. **The Seasonal Alternative would result in less than significant impacts and avoid the less than significant with mitigation impacts under the proposed project.**

Table 5-3. Unmitigated and Mitigated Construction Emissions Under the Seasonal Alternative

Source	VOCs (tpy)	NO _x (tpy)	CO (tpy)	SO ₂ (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)
Lake Woollomes	<0.01	0.01	0.02	<0.01	<0.01	<0.01
Shafter-Wasco	<0.01	0.01	0.02	<0.01	<0.01	<0.01
Total Emissions ¹	<0.01	0.02	0.04	<0.01	<0.01	<0.01
SJVAPCD Significance Thresholds	10	10	100	27	15	15
Mitigated Emissions ²	<0.01	0.01	0.16	<0.01	<0.01	<0.01

Notes:

¹ Totals may not add exactly because of rounding.

² Mitigated emissions of CO would be higher than unmitigated emissions owing to newer equipment trading-off higher CO emissions for reduced NO_x emissions in engine design and specifications.

Key: < – less than

Construction of the Seasonal Alternative could include diesel-powered construction equipment that has the potential to emit TACs in exhaust emissions, such as DPM; however, construction impacts would be temporary. Pollutant concentrations are expected to drop 80% at approximately 1,000 feet from a distribution center and 70% at 500 feet from a major freeway (CARB 2005). The closest sensitive receptor, the residence on Road 108, is approximately 1,220 feet away. Therefore, the exposure of DPM to sensitive receptors is expected to be minimal because of the distance from the construction activities. Moreover, the very short duration of the construction period (2 days), would further limit the exposure of sensitive receptors to TAC exposure. **Because there would be no long-term exposures to any TACs, the effect on sensitive receptors would be insubstantial and the impact on sensitive receptors would remain less than significant consistent with the proposed project.**

The use of diesel equipment during construction may generate near-field odors that are a nuisance. Diesel equipment emits a distinctive odor that may be considered offensive to some individuals. Because of the very short duration of the construction period (up to 2 days) and distance to sensitive receptors, odors from diesel exhaust would not affect a substantial number of people. **Therefore, the potential for the Seasonal Alternative to create objectionable odors affecting a substantial number of people would remain less than significant consistent with the proposed project.**

Operation of Seasonal Alternative

As discussed in Section 4.3.3, the proposed project would result in no impacts to air quality from operation. Under the Seasonal Alternative, seasonal pump back facilities would be operated to manage water flows. These pumps would either be electrically driven or powered by portable generators and would replace existing temporary diesel pumps. The replacement of this diesel equipment with seasonal equipment would remove (if electrically driven) or reduce (if generator-powered) a source of a distinctive odor that may be considered offensive to some individuals.

If electrical-driven, there would be no local criteria pollutant emissions through operation of the pump-back facilities. Seasonal operations-related emissions in the SJVAPCD were estimated assuming the use of six 400 hp portable diesel generators, on-road generator and pump delivery vehicles and a pump placement and removal crane at the start and end of the seasonal operation period, and daily maintenance worker commuting. Table 5-4 summarizes the annual operations-related emissions under the Seasonal Alternative (Appendix E contains detailed calculations). As shown, under the Seasonal Alternative, no criteria pollutants would exceed the SJVAPCD's significant thresholds. **If diesel generators are used under the Seasonal Alternative, potential impacts would be less than significant, but would be higher than the no operational impacts associated with the proposed project.**

Table 5-4. Unmitigated Operations-Related Emissions under the Seasonal Alternative with Diesel Generators

Source	VOCs (tpy)	NO _x (tpy)	CO (tpy)	SO ₂ (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)
Operations-Related Equipment	0.42	1.08	3.03	0.01	0.06	0.05
Construction Worker Commuting	<0.01	<0.01	0.02	<0.01	0.01	<0.01
Total Emissions ¹	0.42	1.08	3.05	0.01	0.07	0.06
SJVAPCD Significance Thresholds	10	10	100	27	15	15
General Conformity De Minimis Thresholds	10	10	100	70	100	70

Note:

¹ Totals may not add exactly because of rounding.

Operation of the Seasonal Alternative could include diesel-powered operational equipment that have the potential to emit TACs in exhaust emissions, such as DPM; however, operation of such equipment would be seasonal and would replace existing nonseasonal diesel-powered pumps. Therefore, the exposure of DPM to sensitive receptors during operation of the Seasonal Alternative is expected to be less than existing conditions. Moreover, pollutant concentrations are expected to drop 80% at approximately 1,000 feet from a distribution center, and 70% at 500 feet from a major freeway (CARB 2005). The closest sensitive receptor, the residence on Road 108, is approximately 1,220 feet away. Under the Seasonal Alternative, there would be no increase to long-term exposures to any TACs and the effect on sensitive receptors would be less than significant. **If diesel generators are used under the Seasonal Alternative, potential impacts for long-term exposure to any TACs would be less than significant, but would be higher than the no operational impacts associated with the proposed project.**

The replacement of the existing diesel equipment with seasonal equipment under the Seasonal Alternative would remove (if electric-driven) or reduce (if generator-powered) a source of a distinctive odor that may be considered offensive to some individuals. **Therefore, the potential for the Seasonal Alternative to create objectionable odors affecting a substantial number of people would be less than significant, but would be higher than the no operational impacts associated with the proposed project.**

5.4.3 Biological Resources – Aquatic

5.4.3.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.4.3, under the proposed project, construction impacts on Kern brook lamprey (a special status species) would be less than significant with the implementation of Mitigation Measures HAZ-1 and WR-1. The potential for other impacts on aquatic resources (i.e., impacts related to species movements and nursery sites) from the construction and operation of the proposed project would be less than significant. Under the No Project Alternative, no new facilities would be constructed. Only existing infrastructure would be used, and there would be no changes in operational practices. Thus, aquatic biological resources would not be subjected to any disturbance above existing levels. **The No Project Alternative would reduce the less than significant with mitigation impacts to aquatic resources associated with the proposed project to no impact.**

5.4.3.2 Environmental Impacts of Low Flow Alternative

Construction of Low Flow Alternative

As discussed in Section 4.4.3.1, under the proposed project, construction impacts on Kern brook lamprey (a special status species) would be less than significant with the implementation of Mitigation Measure HAZ-1 and WR-1. The proposed project's potential to interfere with any aquatic species' movements or use of existing nursery sites would be less than significant, as described in Section 4.4.3.1. The Low Flow Alternative would require the same types and amount of construction equipment and activities, and would have the same construction schedule as the proposed project. **Therefore, construction-related impacts on aquatic resources would remain less than significant with the implementation of Mitigation Measures HAZ-1 and WR-1, consistent with the proposed project.**

Operation of Low Flow Alternative

As discussed in Section 4.4.3.2, under the proposed project, operational impacts to aquatic resources would be less than significant. Operations under the Low Flow Alternative would have an even smaller impact on water levels in the FKC than the proposed project would, as water levels in the FKC would be increased by up to 200 cfs instead of up to 500 cfs (as expected under the proposed project). Therefore, this fluctuation in water levels is comparable to existing levels and would not impact Kern brook lamprey or the movements of other aquatic species. **Therefore, impacts to aquatic resources from operations under the Low Flow Alternative would remain less than significant, consistent with the proposed project.**

5.4.3.3 Environmental Impacts of Seasonal Alternative

Construction of Seasonal Alternative

As discussed in Section 4.4.3.1, under the proposed project, construction impacts on Kern brook lamprey (a special status species) would be less than significant with the implementation of Mitigation Measures HAZ-1 and WR-1. The proposed project's potential to interfere with any aquatic species' movements or use of existing nursery sites would be less than significant, as described in Section 4.4.3. Construction of the Seasonal Alternative would require the installation and removal of seasonal pump-back facilities at the Shafter-Wasco and Lake Woollomes check structures. Because no construction would occur at the Deer Creek site, the Seasonal Alternative is not expected to impact the Kern brook lamprey (a special status species). Furthermore, construction of the Seasonal Alternative would be short-term (approximately 1 day to install each seasonal pump-back structure) and a shorter duration in comparison to the proposed project. The installation actions under the Seasonal Alternative would not require dewatering or drawdown of canal waters. Although installation of the metal pump frames may cause minor changes in turbidity and flow within the canal during construction, these slight variations in turbidity and flow would be expected to fall within the normal range of conditions within the canal and would not affect movements of aquatic species. **Therefore, construction-related impacts on aquatic resources would be less than significant and would not require mitigation.**

Operation of Seasonal Alternative

As discussed in Section 4.4.3.2, under the proposed project, operational impacts to aquatic resources would be less than significant. Operations under the Seasonal Alternative would have an even smaller impact on water levels in the FKC than the proposed project would, as water levels in the

FKC would be increased by up to 200 cfs instead of up to 500 cfs (as expected under the proposed project). Therefore, this fluctuation in water levels is comparable to existing levels and would not impact Kern brook lamprey or the movements of other aquatic species. **Therefore, impacts to aquatic resources from operations under the Seasonal Alternative would remain less than significant, consistent with the proposed project.**

5.4.4 Biological Resources – Terrestrial

5.4.4.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.5.3.1, construction-related impacts of the Proposed Action on special status plant and wildlife species would be less than significant with the implementation of Mitigation Measures TERR-1 through TERR-9. The construction of the proposed project would have less than significant impacts on wetlands, riparian habitat, and sensitive natural communities with the implementation of Mitigation Measures TERR-9 and HAZ-1. Construction-related impacts of the proposed project on wildlife movement would be less than significant without mitigation, and impacts on migratory birds would be less than significant with the implementation of Mitigation Measure TERR-3. As described in Section 4.5.3.2, the implementation of Mitigation Measure TERR-10 would reduce the potential for adverse effects of the operation of the proposed project on special status species to less than significant. The operation of the proposed project would have no other impacts on terrestrial resources. Under the No Project Alternative, no new facilities would be constructed. Only existing infrastructure would be used, and there would be no changes in associated operational practices. Thus, terrestrial biological resources would not be subjected to any disturbance above existing levels. **Therefore, the No Project Alternative would reduce the less than significant with mitigation impacts on terrestrial resources associated with the proposed project to no impact.**

5.4.4.2 Environmental Impacts of Low Flow Alternative

Construction of Low Flow Alternative

As discussed in Section 4.5.3.1, construction-related impacts of the Proposed Action on special status plant and wildlife species would be less than significant with the implementation of Mitigation Measures TERR-1 through TERR-9. The construction of the proposed project would have less than significant impacts on wetlands, riparian habitat, and sensitive natural communities with the implementation of Mitigation Measures TERR-9 and HAZ-1. Construction-related impacts of the proposed project on wildlife movement would be less than significant without mitigation and impacts on migratory birds would be less than significant with the implementation of Mitigation Measure TERR-3. The Low Flow Alternative would require the same types and amount of construction equipment and activities and would have the same construction schedule as the proposed project. The extent of permanent and temporary ground disturbance that would be required under the Low Flow Alternative is expected to be consistent with the disturbance required under the proposed project. **Therefore, construction-related impacts on terrestrial resources would remain less than significant with the implementation of Mitigation Measures TERR-1 through TERR-9 and HAZ-1, consistent with the proposed project (detailed in Section 4.5.3.1).**

Operation of Low Flow Alternative

As discussed in Section 4.5.3.2, long-term operations-related impacts on special status species would be less than significant with the implementation of Mitigation Measure TERR-10. The operation of the proposed project would have no impacts on wetlands, riparian areas, sensitive natural communities, or species' movements/migration patterns. Similar to the proposed project, the Low Flow Alternative would not introduce new fences or other similarly obstructive structures that would reduce the movements/migrations of wildlife in the area. Under the Low Flow Alternative, operations and maintenance activities associated with new and upgraded pump-back facilities would not result in levels of disturbance that would disrupt the normal activity of wildlife that may occur in the vicinity, nor would operational activities affect existing hydrology sources that may support riparian areas, wetlands, or other sensitive natural communities. **Therefore, long-term operations-related impacts on terrestrial resources would remain less than significant with the implementation of Mitigation Measure TERR-10, consistent with the proposed project.**

5.4.4.3 Environmental Impacts of Seasonal Alternative

Construction of Seasonal Alternative

As discussed in Section 4.5.3.1, construction-related impacts of the Proposed Action on special status plant and wildlife species would be less than significant with the implementation of Mitigation Measures TERR-1 through TERR-9. The construction of the proposed project would have less than significant impacts on wetlands, riparian habitat, and sensitive natural communities with the implementation of Mitigation Measures TERR-9 and HAZ-1. Construction-related impacts of the proposed project on wildlife movement would be less than significant without mitigation and impacts on migratory birds would be less than significant with the implementation of Mitigation Measure TERR-3. Under the Seasonal Alternative, equipment associated with the construction of the metal frames and installation of the seasonal pumps would be transported, staged, and operated only on previously disturbed ground; therefore, no permanent habitat loss would occur. However, the installation of new permanent power or the placement of a diesel generator may require ground disturbance (e.g., installing a utility pole) on previously undisturbed ground in areas potentially suitable to support special status species. Therefore, if ground- or vegetation-disturbing work would be required to implement the Seasonal Alternative, Mitigation Measures TERR-1 through TERR-9 and HAZ-1 would be implemented to reduce the potential for effects on special status and common species and sensitive natural communities. **Therefore, construction-related impacts on terrestrial resources would remain less than significant with the implementation of Mitigation Measures TERR-1 through TERR-9 and HAZ-1, consistent with the proposed project (detailed in Section 4.5.3.1).**

Operation of Seasonal Alternative

As discussed in Section 4.5.3.2, long-term operations-related impacts on special status species would be less than significant with the implementation of Mitigation Measure TERR-10. The operation of the proposed project would have no impacts on wetlands, riparian areas, sensitive natural communities, or species' movements/migration patterns. Operations and maintenance activities associated with new the seasonal pump-back facilities would not result in significant increases in visual, noise, or other forms of disturbance that could disrupt the normal activity of common or special status wildlife that may occur in the vicinity. Additionally, operational activities would not disrupt existing hydrology sources that may support special status plants, wetlands, or sensitive natural communities. Should ground disturbance be required under this alternative, TERR-10 would

be implemented as applicable. **Therefore, long-term operations-related impacts on terrestrial resources would remain less than significant with the implementation of Mitigation Measure TERR-10, consistent with the proposed project.**

5.4.5 Cultural Resources

5.4.5.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.6.3, construction of the proposed project is not expected to alter the character-defining features of the FKC that qualify it for inclusion in the NRHP. Under the No Project Alternative, no new facilities would be constructed or maintained within the APE, and only existing temporary and permanent facilities would be used. There would be no direct or indirect impacts to known historic properties, historical resources, or other cultural resources under the No Project Alternative when compared to existing conditions. **The No Project Alternative would reduce the less than significant impacts on known historic properties, historical resources, or other cultural resources, including human remains associated with the proposed project to no impact.**

5.4.5.2 Environmental Impacts of Low Flow Alternative

Construction of Low Flow Alternative

As discussed in Section 4.6.3, construction of the proposed project would result in less than significant impacts to historic cultural resources. Under the Low Flow Alternative, construction methods and footprint for each facility would be the same as described under the proposed project. As such, the Low Flow Alternative also would have a direct effect on the FKC (P-15-013728/P-54-004614), a known historic property and historical resource. Under the Low Flow Alternative, there would be direct impacts to a known historic property and historical resource when compared to existing conditions. Construction of new permanent facilities under the proposed project is not expected to alter the character-defining features of the FKC that qualify it for inclusion in the NRHP²². **Consistent with the proposed project, construction of the Low Flow Alternative would result in less than significant impacts to historic properties, historical resources, or other cultural resources within the study area.**

As discussed in Section 4.6.3, the impact to archaeological resources because of the potential for inadvertent discovery during construction activities under the proposed project would be reduced to less than significant after implementation of Mitigation Measure CUL-1. Under the Low Flow Alternative, impacts to archaeological resources would be similar to those described under the proposed project. **Consistent with the proposed project, potentially significant impacts on**

²² If implemented, Reclamation will be taking federal action on the Low Flow Alternative, at which time Reclamation will pursue Section 106 consultation with the SHPO and interested parties regarding direct and indirect effects to the FKC, as well as the resolution of any adverse effects pursuant to 36 CFR Part 800.6 and the amended programmatic agreement, which was executed in October 2020. Reclamation and the SHPO developed an amendment to the *Programmatic Agreement Between the Bureau of Reclamation Mid-Pacific Region and the California State Historic Preservation Officer Regarding Modifications to the Friant-Kern Canal Fresno, Tulare, And Kern Counties, California*, which was executed in February 2017. The amended programmatic agreement addresses actions under the Low Flow Alternative and the FKC Middle Reach Capacity Correction Project.

archaeological resources would be reduced to less than significant after implementation of Mitigation Measure CUL-1.

As discussed in Section 4.6.3, the potential to disturb human remains during construction of the proposed project would be reduced to less than significant after implementation of Mitigation Measure CUL-1. Under the Low Flow Alternative, impacts associated with the disturbance of human remains would be similar to those described under the proposed project. **Consistent with the proposed project, potentially significant impacts on human remains would be reduced to less than significant after implementation of Mitigation Measure CUL-1.**

Operation of Low Flow Alternative

As under the proposed project, operation of the Lake Woollomes, Shafter-Wasco, and Deer Creek pump-back facilities under the Low Flow Alternative would result in no direct or indirect effects to historic properties, historical resources, or other cultural resources within the study area. **Operation of the Low Flow Alternative would result in no impacts to known historic properties, historical resources, or other cultural resources including human remains within the project area consistent with the proposed project.**

5.4.5.3 Environmental Impacts of Seasonal Alternative

Construction of Seasonal Alternative

As discussed in Section 4.6.3, construction of the proposed project is not expected to alter the character-defining features of the FKC that qualify it for inclusion in the NRHP, resulting in less than significant impacts. Under the Seasonal Alternative, the construction, installation and removal of seasonal pump-back facilities at Shafter-Wasco and Lake Woollomes would have a minimal effect on the FKC (P-15-013728/P-54-004614), a known historic property and historical resource, as ground disturbance would be limited, as construction activities would occur in a single day using a crew of 1 to 2 workers. The installation of new permanent power or the placement of a diesel generator may require ground disturbance (e.g., installing a utility pole), but these actions would not directly affect the FKC. In addition, the project area is heavily disturbed. Installation/removal of the temporary seasonal facilities and installation of a power source (electric or diesel) under the Seasonal Alternative is not expected to alter the character-defining features of the FKC that qualify it for inclusion in the NRHP, specifically its historical role in the development of the CVP and its overall engineering, design, and construction (Section 3.5.1). No additional historic properties, historical resources, or other cultural resources have been identified that would be subject to direct or indirect effects under the Seasonal Alternative when compared to existing conditions. **As such, construction of the Seasonal Alternative would result in less than significant impacts to known historic properties, historical resources, or other cultural resources within the project area consistent with the proposed project.**

As discussed in Section 4.6.3, the impact to archaeological resources because of the potential for inadvertent discovery during construction activities under the proposed project would be reduced to less than significant after implementation of Mitigation Measure CUL-1. Under the Seasonal Alternative, there is a possibility of the inadvertent discovery of an archaeological resource during construction activities at Shafter-Wasco and Lake Woollomes. **Consistent with the proposed project, potentially significant impacts on archaeological resources under the Seasonal**

Alternative would be reduced to less than significant after implementation of Mitigation Measure CUL-1.

As discussed in Section 4.6.3, the potential to disturb human remains during construction of the proposed project would be reduced to less than significant after implementation of Mitigation Measure CUL-1. There is a possibility of the inadvertent discovery of human remains during construction activities at Shafter-Wasco and Lake Woollomes associated with the Seasonal Alternative. **Consistent with the proposed project, potentially significant impacts on human remains under the Seasonal Alternative would be reduced to less than significant after implementation of Mitigation Measure CUL-1.**

Operation of Seasonal Alternative

As under the proposed project, operation of the Shafter-Wasco and Lake Woollomes temporary seasonal pump-back facilities under the Seasonal Alternative would result in no direct or indirect effects to historic properties, historical resources, or other cultural resources within the study area.

Operation of the Seasonal Alternative would result in no impacts to known historic properties, historical resources, or other cultural resources including human remains within the project area consistent with the proposed project.

5.4.6 Geology, Seismicity, and Soils

5.4.6.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.7.3, the proposed project has no existing or proposed facilities that fall within an Alquist-Priolo Earthquake Fault Zone, liquefaction zone, and/or landslides zone, however there are faults located near the project. As such, there would be less than significant impacts associated with potential adverse effects (including risk of loss, injury, or death) involving an earthquake fault, strong seismic ground shaking, seismic-related ground failure including liquefaction or landslides. The No Project Alternative would not involve the construction of project facilities.

Therefore, the No Project Alternative would reduce the less than significant impacts associated with potential adverse effects (including risk of loss, injury, or death) involving an earthquake fault, strong seismic ground shaking, seismic-related ground failure including liquefaction or landslides under the proposed project to no impact.

As discussed in Section 4.7.3, under the proposed project, soil erosion impacts would be less than significant. Under the No Project Alternative no construction would occur that would increase the potential for erosion. **Therefore, the No Project Alternative would reduce the less than significant impacts associated with soil erosion under the proposed project to no impact.**

As discussed in Section 4.7.3, no existing or proposed facilities fall within an Alquist-Priolo Earthquake Fault Zone, liquefaction zone, and/or landslide zone that would contribute to impacts from unstable soils or geologic units. However, the presence of faults near the check structures could contribute to unstable soils and geologic units. Decreased pumping because of increased operational flexibility and reliability of surface water deliveries could result in less land subsidence under the proposed project. Therefore, there would be no impact to subsidence during the operation of the proposed project. Overall, there would be less than significant impacts related to unstable geologic units or soils from construction or operation. Under the No Project Alternative, construction would not take place and facilities would not be located on unstable soils or geologic

units, and only existing facilities would be used. As such, the increase in operational flexibility and reliability of surface water deliveries would not occur and there would be no decrease in reliance on groundwater. Therefore, the project area would continue to experience subsidence because of groundwater over extraction and result in unstable soils. **Therefore, the No Project Alternative would increase the less than significant impacts associated with unstable soils or geologic units under the proposed project to significant under the No Project Alternative.**

As discussed in Section 4.7.3, impacts to paleontological resources would be less than significant with mitigation. Under the No Project Alternative, construction would not take place and no paleontological resources would be disturbed. **Therefore, under the No Action Alternative, impacts to paleontological resources would be reduced to no impact from less than significant with mitigation under the proposed project.**

5.4.6.2 Environmental Impacts of Low Flow Alternative

As discussed in Section 4.7.3, the proposed project has no existing or proposed facilities that fall within an Alquist-Priolo Earthquake Fault Zone, liquefaction zone, and/or landslide zone, however there are faults located near the project. Similar to the proposed project, the Low Flow Alternative would not expose people or structures to impacts related to fault rupture, ground shaking, ground failure, liquefaction, or landslides. **As such, there would be less than significant impacts associated with potential adverse effects (including risk of loss, injury, or death) involving an earthquake fault, strong seismic ground shaking, seismic-related ground failure including liquefaction or landslides consistent with the proposed project.**

As discussed in Section 4.7.3, the proposed project would have less than significant impacts associated with soil erosion. As with the proposed project, the Low Flow Alternative would require construction activities, including grading, earth moving, removal of vegetation, installation of new infrastructure, and other proposed construction-related actions, could temporarily elevate erosion rates on-site. Although construction activities for the Low Flow Alternative involve earthmoving, the soils in the area have a relatively low risk of wind erosion when left in a dry, unvegetated condition, as discussed in Section 3.6. **Therefore, substantial soil erosion or the loss of topsoil under the Low Flow Alternative would remain less than significant consistent with the proposed project.**

As discussed in Section 4.7.3, no existing or proposed facilities fall within an Alquist-Priolo Earthquake Fault Zone, liquefaction zone, and/or landslides zone that would contribute to impacts from unstable soils or geologic units. However, the presence of faults near the check structures could contribute to unstable soils and geologic units. Decreased pumping because of increased operational flexibility and reliability of surface water deliveries could result in less land subsidence under the proposed project. Therefore, there would be no impact to subsidence during the operation of the proposed project. The Low Flow Alternative would construct similar facilities in the same locations with different pumping capacities than the proposed project. **Therefore, the Low Flow Alternative would have less than significant impacts associated with unstable soils and geologic units, consistent with the proposed project.**

As discussed in Section 4.7.3, the proposed project would have less than significant impact on paleontological resources after implementation of Mitigation Measure PR-1. Similar to the proposed project, there is a moderate probability of encountering previously undetected paleontological resources during construction under the Low Flow Alternative. Mitigation Measure PR-1 would

ensure earthmoving construction activities would be monitored by a qualified paleontologist and implementation of measures to avoid, record, preserve, or recover unique paleontological resources if encountered. **Impacts to paleontological resources under the Low Flow Alternative would remain less than significant with mitigation consistent with the proposed project.**

5.4.6.3 Environmental Impacts of Seasonal Alternative

As discussed in Section 4.7.3, the proposed project has no existing or proposed facilities that fall within an Alquist-Priolo Earthquake Fault Zone, liquefaction zone, and/or landslide zone, however there are faults located near the project. Similar to the proposed project, the Seasonal Flow Alternative would not expose people or structures to impacts related to fault rupture, ground shaking, ground failure, liquefaction, or landslides. **As such, there would be less than significant impacts under the Seasonal Alternative associated with potential adverse effects (including risk of loss, injury, or death) involving an earthquake fault, strong seismic ground shaking, seismic-related ground failure including liquefaction or landslides, consistent with the proposed project.**

As discussed in Section 4.7.3, the proposed project would have less than significant impacts associated with soil erosion. The Seasonal Alternative would require minimal earthmoving during the installation of permanent power that could temporarily elevate erosion rates on-site. Although construction activities for the Seasonal Alternative may involve minimal, the soils in the area have a relatively low risk of wind erosion when left in a dry, unvegetated condition. **Therefore, potential increases to soil erosion under the Seasonal Alternative would remain less than significant as presented under the proposed project.**

As discussed in Section 4.7.3, no existing or proposed facilities fall within an Alquist-Priolo Earthquake Fault Zone, liquefaction zone, and/or landslides zone that would contribute to impacts from unstable soils or geologic units. However, the presence of faults near the check structures could contribute to unstable soils and geologic units. Decreased pumping because of increased operational flexibility and reliability of surface water deliveries could result in less land subsidence under the proposed project. Therefore, there would be no impact to subsidence during the operation of the proposed project. Under the Seasonal Alternative excavation would occur during the installation of permanent power at the Shafter-Wasco and Lake Woollomes sites. The facilities would be located in the same soils and geologic units as those under the proposed project and decreased groundwater pumping because of increased operational flexibility and reliability of surface water deliveries could result in less groundwater pumping and reduce land subsidence under the Seasonal Alternative similar to the proposed project. **Therefore, the Seasonal Alternative would have less than significant impacts associated with unstable soils and geologic units, consistent with the proposed project.**

As discussed in Section 4.7.3, the proposed project would have less than significant impact on paleontological resources after implementation of Mitigation Measure PR-1. Similar to the proposed project, there is a moderate probability of encountering previously undetected paleontological resources during construction under the Seasonal Alternative during the installation of permanent power at the Shafter-Wasco and Lake Woollomes sites. Mitigation Measure PR-1 would ensure earthmoving construction activities would be monitored by a qualified paleontologist and implementation of measures to avoid, record, preserve, or recover unique paleontological resources if encountered. **Impacts to paleontological resources under the Seasonal Alternative would remain less than significant with mitigation as presented under the proposed project.**

5.4.7 Greenhouse Gases

5.4.7.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.8.3, the proposed project would result in less than significant impacts because of GHG emissions during construction and operations. Under the No Project Alternative, no construction or maintenance actions would be implemented. In addition, no operational changes would occur. Therefore, there would be no impacts on GHG emissions under the No Project Alternative. **The No Project Alternative would reduce the less than significant impacts associated with GHG emissions under the proposed project to no impact.**

5.4.7.2 Environmental Impacts of Low Flow Alternative

Construction of Low Flow Alternative

As discussed in Section 4.8.3, the proposed project would result in less than significant impacts because of GHG emissions during construction. Under the Low Flow Alternative, construction activities and equipment would be similar to the proposed action. As such, GHG emissions under the Low Flow Alternative would result in GHG emissions that would not result in an exceedance of the CEQA significance criteria. **Therefore, construction of the Low Flow Alternative would have less than significant GHG emission impacts, consistent with the proposed project.**

Operation of Low Flow Alternative

As discussed in Section 4.8.3, the proposed project would result in less than significant impacts because of GHG emissions during operation of the newly constructed pump-back facilities. Implementation of the Low Flow Alternative would replace existing old diesel-fueled pumps and would therefore be expected to reduce GHG emissions and the associated incremental contribution to climate impacts of those emissions over the lifetime of the project. Additionally, implementation of the Low Flow Alternative would improve resiliency of water availability in the region against the effects of climate change. **Therefore, operation of the Low Flow Alternative would have less than significant GHG emission impacts, consistent with the proposed project.**

As the Low Flow Alternative would not exceed the significance criteria for construction and operations, the project would not impede the state's ability to meet its GHG emission reduction goals outlined in AB 32. **As such, the Low Flow Alternative would not conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions, resulting in a less than significant impact, consistent with the proposed project.**

5.4.7.3 Environmental Impacts of Seasonal Alternative

Construction of Seasonal Alternative

Construction under the Seasonal Alternative would result in short-term GHG emissions from construction equipment and vehicles. GHG emissions from construction equipment exhaust, haul trucks, and construction worker commuting were estimated using a spreadsheet consistent with CalEEMod calculation methods, as shown in Table 5-5 (Appendix E contains detailed calculations). As shown, GHG emissions under the Seasonal Alternative would result in a yearly total of 3 MTCO₂e per year during construction which would not result in an exceedance of the applicable CEQA significance criteria. Construction-related GHG emissions under the Seasonal Alternative would be less when compared to the proposed project. **Overall, construction-related impacts**

under the Seasonal Alternative would be less than significant, consistent with the proposed project.

Table 5-5. Unmitigated Construction GHG Emissions under the Seasonal Alternative

Source	CO ₂ , (MT/year)	CH ₄ , (MT/year)	N ₂ O, (MT/year)	CO ₂ e, (MT/year)
Lake Woollomes	2	<0.01	<0.01	2
Shafter-Wasco	2	<0.01	<0.01	2
Total GHG Emissions	3	<0.01	<0.01	3
CEQA Threshold				1,100
Significant?				No

Note: Totals may not add exactly because of rounding.

Operation of Seasonal Alternative

The pumps used under the Seasonal Alternative would either be electric-driven or powered by portable diesel generators and would replace existing temporary diesel pumps. Operation of these facilities would result in long-term GHG emissions associated with grid or generator electricity generation. Table 5-6 and Table 5-7 summarize operational GHG emissions associated with the Seasonal Alternative.

Table 5-6. Operational GHG Emissions Under the Seasonal Alternative with Grid Power

Source	Electricity (MWh/year)	Annual Emissions (MT/year)			Annual Emissions (MTCO ₂ e/year)			
		CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	CO ₂ e
Emission Factor (lb/MWh)	n/a	98.47	0.032	0.004	n/a	n/a	n/a	n/a
Lake Woollomes	655	29	0.010	0.001	29	<1	<1	30
Shafter-Wasco	1,360	61	0.020	0.002	61	1	1	62
Total GHG Emissions	2,015	90	0.029	0.004	90	1	1	92
CEQA Threshold								10,000
Significant?								No

Note: Totals may not add exactly because of rounding.

Table 5-7. Operational GHG Emissions Under the Seasonal Alternative with Diesel Generators

Source	CO ₂ , (MT/year)	CH ₄ , (MT/year)	N ₂ O, (MT/year)	CO ₂ e, (MT/year)
Lake Woollomes	1,317	0.13	0.12	1,352
Shafter-Wasco	7	0.00	0.00	7
Total GHG Emissions	1,324	0.13	0.12	1,360
CEQA Threshold				10,000
Significant?				No

Note: Totals may not add exactly because of rounding.

As shown, GHG emissions under the Seasonal Alternative would result in a yearly total of 1,360 MTCO₂e per year during operations, which would not result in an exceedance of the applicable CEQA significance criteria. Implementation of the Seasonal Alternative would replace existing old diesel-fueled pumps with newer, higher efficiency diesel generators or grid power and would therefore be expected to reduce GHG emissions and the associated incremental contribution to climate impacts of those emissions over the lifetime of the project. Additionally, implementation of the Seasonal Alternative would improve resiliency of water availability in the region against the effects of climate change. Operational GHG emissions under the Seasonal Alternative would be less when compared to the proposed project. **Overall, operational impacts under the Seasonal Alternative would be less than significant, consistent with the proposed project.**

If a project exceeds the significance criterion used to evaluate GHG emissions, it is assumed the project would impede the state's ability to meet its GHG emission reduction goals outlined in AB 32. As shown, GHG emissions associated with construction and operations would not exceed the CEQA significance criteria. **As such, the Seasonal Alternative would not conflict with an applicable plan, policy, or regulation adopted to reduce GHG emissions, resulting in a less than significant impact, consistent with the proposed project.**

5.4.8 Hazards and Hazardous Materials

5.4.8.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.9.3, the proposed project would require the use, transport, storage, and disposal of hazardous materials (motor oil, gasoline, diesel fuel, solvents, and degreasers) during construction and operation. In addition, soil disturbance during construction activities could result in the release of Valley fever fungal spores. With the implementation of Mitigation Measures HAZ-1, WR-1 and TR-1, impacts under the proposed project would be less than significant. Under the No Project Alternative, no new facilities would be constructed, and therefore the use, transport, storage, and disposal of hazardous materials would not be required. No construction nor impacts related to hazards and hazardous materials would occur. Therefore, there would be no impacts under the No Project Alternative. **The No Project Alternative would avoid the less than significant impacts after mitigation associated with hazards and hazardous materials under with the proposed project.**

5.4.8.2 Environmental Impacts of Low Flow Alternative

As discussed in Section 4.9.3, the proposed project would require the use, transport, storage, and disposal of hazardous materials during construction and operation. With the implementation of

Mitigation Measure TR-1, impacts associated with the transport, use or disposal of hazardous materials under the proposed project would be less than significant. Similar to the proposed project, the Low Flow Alternative would require the use, transport, storage, and disposal of hazardous materials during construction and operation. Implementation of Mitigation Measure TR-1 requires the development and adherence to a health and safety plan outlining all applicable OSHA requirements Mitigation Measure TR-1 would ensure safe use and transport of hazardous material. **Therefore, impacts related to the transport, use, or disposal of hazardous materials would be less than significant with implementation of Mitigation Measure TR-1 under the Low Flow Alternative, consistent with the proposed project.**

As discussed in Section 4.9.3, soil disturbance during construction activities under the proposed project could result in the release of Valley fever fungal spores. Similar to the proposed project, soil disturbance during construction activities could result in the release of Valley fever fungal spores, potentially exposing persons, especially those high-risk, to these pathogens. Because of the localized nature of construction, the Low Alternative would result in less dust than the extensive, daily agricultural operations that occur throughout the region. In addition, construction operations would be required to comply with local regulations, including SJVAPCD Regulation VIII, regarding fugitive dust to minimize temporary emissions.

As discussed in Section 4.9.3, the use, storage, handling, or disposal of hazardous materials under the proposed project could result in accidental release of pollutants, exposing people and the environment to hazardous materials. With the implementation of Mitigation Measures HAZ-1 and WR-1, impacts under the proposed project would be less than significant. Consistent with the proposed project, the use, storage, handling, or disposal of hazardous materials under the Low Flow Alternative could result in the accidental release of pollutants, exposing people and the environment to hazardous materials. Implementation of Mitigation Measures HAZ-1 and WR-1 would reduce these impacts. **Therefore, impacts related to creating a significant hazard to the public or the environment through reasonably foreseeable upset and accidental release of hazardous materials into the environment, including exposure of Valley fever, under the Low Flow Alternative would be less than significant after mitigation, consistent with the proposed project.**

5.4.8.3 Environmental Impacts of Seasonal Alternative

Similar to the proposed project, the Seasonal Alternative would require the use, transport, storage, and disposal of hazardous materials during construction and operation. Implementation of Mitigation Measure TR-1 requires the development and adherence to a health and safety plan outlining all applicable OSHA requirements Mitigation Measure TR-1 would ensure safe use and transport of hazardous material. **Therefore, impacts related to the transport, use, or disposal of hazardous materials would be less than significant with implementation of Mitigation Measure TR-1 under the Seasonal Alternative, consistent with the proposed project.**

Consistent with the proposed project, soil disturbance during construction activities under the Seasonal Alternative could result in the release of Valley fever fungal spores, potentially exposing persons, especially those high-risk, to these pathogens. Because of the localized nature of construction, the Seasonal Alternative would result in less dust than the extensive, daily agricultural operations that occur throughout the region. In addition, the limited construction duration (1-2 days) under the Seasonal Alternative would further limit exposure. Furthermore, construction

operations would be required to comply with local regulations, including SJVAPCD Regulation VIII, regarding fugitive dust to minimize temporary emissions.

Consistent with the proposed project, the use, storage, handling, or disposal of hazardous materials under the Seasonal Alternative could result in the accidental release of pollutants, exposing people and the environment to hazardous materials. Implementation of Mitigation Measures HAZ-1 and WR-1 would reduce these impacts. **Therefore, impacts related to creating a significant hazard to the public or the environment through reasonably foreseeable upset and accidental release of hazardous materials into the environment, including exposure of Valley fever, under the Seasonal Alternative would be less than significant after mitigation, consistent with the proposed project.**

5.4.9 Hydrology and Water Resources – Surface Water

5.4.9.1 Environmental Impacts of No Project Alternative

Water Quality

As discussed in Section 4.10.3, the construction activities associated with the proposed project would result in less than significant impacts to surface water after implementation of Mitigation Measures WR-1 and HAZ-1 with associated BMPs. Under the No Project Alternative, no new facilities would be constructed, and reverse-flow pump-back operations would continue using existing infrastructure. There would be no construction-related activities that would affect water quality within water courses in the study area and there would be no impact. **Therefore, the No Project Alternative would avoid the post-mitigation less than significant impacts to surface water quality with mitigation due to construction associated with the proposed project.**

As discussed in Section 4.10.3, the operation of the proposed project would result in less than significant impacts to surface water quality. Under the No Project Alternative, introduction of non-Millerton water would be regulated and managed by the Water Quality Guidelines and, as a result, in-prism surface water quality would be protected for domestic and agricultural uses and would not exceed the significance criteria. **Therefore, the No Project Alternative would not violate water quality standards or waste discharge requirements and impacts due to operation would be less than significant, which is consistent with the proposed project.**

Drainage Patterns

As discussed in Section 4.10.3, the proposed project would not significantly change flood flows or impede and redirect flood flows and impacts would be less than significant after implementation of HAZ-1. Under the No Project Alternative, no new facilities would be constructed or operated. Flooding occurrence and flood risk in Tulare and Kern Counties would not change. There would be no placement of structures in FEMA-defined flood zones and no alteration of existing drainage patterns. There would be no addition of impervious surfaces and no increase in runoff water that would result in flooding on-site or off-site. **Therefore, there would be no alterations to drainage patterns or stream courses and there would be no impacts due to construction or operation, thereby avoiding the less than significant impacts associated with the proposed project.**

Flood

As discussed in Section 4.10.3, the proposed project, would construct and operate facilities within Zone A—areas subject to inundation by the 1% annual chance flood (no base flood elevations determined) (FEMA 2022). Under the No Project Alternative, no new facilities would be constructed or operated. **As such, the No Project Alternative would result in no impacts to flood hazards, reducing the less than significant impact associated with the proposed project.**

5.4.9.2 Environmental Impacts of Low Flow Alternative

Construction of Low Flow Alternative

Water Quality

As discussed in Section 4.10.3, the construction activities associated with the proposed project would result in less than significant impacts to surface water quality after implementation of Mitigation Measures WR-1 and HAZ-1 with associated BMPs. Construction of the Low Flow Alternative would result in similar impacts on water quality as described under the proposed project. The Low Flow Alternative would require the same mitigation measures as the proposed project. **Therefore, impacts on surface water quality from construction activities associated with the Low Flow Alternative would be less than significant with mitigation, consistent with the proposed project.**

Drainage Patterns

As discussed in Section 4.10.3, the construction activities associated with the proposed project would result in less than significant impacts on drainage patterns after implementation of Mitigation Measure HAZ-1. Construction of the Low Flow Alternative could temporarily alter existing drainage patterns and may increase surface runoff. Temporary stormwater and erosion control BMPs described in the SWPPP, required under Mitigation Measure HAZ-1, would control flow rates and reduce flooding during construction. **Temporary impacts from construction under the Low Flow Alternative would remain less than significant with mitigation as presented under the proposed project.**

Flood

As discussed in Section 4.10.3, the proposed project would construct and operate pump-back facilities within Zone A—areas subject to inundation by the 1% annual chance flood (no base flood elevations determined) (FEMA 2022), resulting in a less than significant impact to flood hazards. Similar to the proposed project, the proposed Lake Woollomes and Deer Creek pump-back facilities would be within a flood hazard area, but these facilities would not result in significant additions of new impervious surfaces. This alternative would not significantly change flood flows or impede and redirect flood flows; therefore, **the Low Flow Alternative would result in less than significant impacts associated with flood hazards, consistent with the proposed project.**

Operation of Low Flow Alternative

Water Quality

As discussed in Section 4.10.3, the operation of the proposed project would result in less than significant impacts to surface water quality. The Low Flow Alternative would result in an increase in

non-Millerton water entering the FKC. Like under the proposed project, introduction of non-Millerton water would be regulated and managed by the Water Quality Guidelines and, as a result, in-prism surface water quality would be protected for domestic and agricultural uses and would not exceed the significance criteria. **Therefore, operation of the Low Flow Alternative would not violate water quality standards or waste discharge requirements and impacts would be less than significant consistent with the proposed project.**

Drainage Patterns

As discussed in Section 4.10.3, the operation of the proposed project would result in no impact to drainage patterns. Under the Low Flow Alternative, pump-back facilities would be operated to deliver water to Friant Contractors. Flood flows would not be redirected as part of project operations, nor would operations result in any changes to existing drainage systems. **Therefore, there would be no impact on drainage patterns from operation of the Low Flow Alternative consistent with the proposed project.**

5.4.9.3 Environmental Impacts of Seasonal Alternative

Construction of Seasonal Alternative

Water Quality

As discussed in Section 4.10.3, the construction activities associated with the proposed project would result in less than significant impacts to surface water quality after implementation of Mitigation Measures WR-1 and HAZ-1 with associated BMPs. Construction of the Seasonal Alternative to install seasonal pumping facilities would result in similar impacts on water quality as described under the proposed project, although construction of the Seasonal Alternative would not have the potential to affect water quality at Deer Creek as no construction is proposed at this location. **Therefore, impacts on surface water quality from construction activities associated with the Seasonal Alternative would be less than significant with mitigation, consistent with the proposed project.**

Drainage Patterns

As discussed in Section 4.10.3, the proposed project would not significantly change flood flows or impede and redirect flood flows and impacts would be less than significant. Construction activities associated with the proposed project would result in less than significant impacts on drainage patterns after implementation of Mitigation Measure HAZ-1. Under the Seasonal Alternative, seasonal pumps would be installed at the Shafter-Wasco and Lake Woollomes check structures. There would not be any changes in impervious surfaces. In addition, no alterations to existing drainage patterns or increases in surface runoff are anticipated. The Seasonal Alternative would not change drainage patterns, flood flows or impede and redirect flood flows. **As such, the significant impacts under the proposed project would be reduced to no impact.**

Flood

As discussed in Section 4.10.3, the proposed project would construct and operate pump-back facilities within Zone A—areas subject to inundation by the 1% annual chance flood (no base flood elevations determined) (FEMA 2022), resulting in a less than significant impact to flood hazards. Similar to the proposed project, the proposed, temporary Lake Woollomes pump-back facility would be within a flood hazard area. The seasonal facilities under the Seasonal Alternative would be operated when recaptured Restoration Flows are available and taken offline outside of the irrigation

season (November to February), providing the flexibility to demobilize the temporary pump-back facilities at Shafter-Wasco and Lake Woollomes outside of the operational window, allowing for regular gravity flow operations within the FKC to support flood safety operations; therefore, **the Seasonal Alternative would result in less than significant impacts associated with flood hazards, consistent with the proposed project.**

Operation of Seasonal Alternative

Water Quality

As discussed in Section 4.10.3, the operation of the proposed project would result in less than significant impacts to surface water quality. The Seasonal Alternative would result in an increase in non-Millerton water entering the FKC. Like the proposed project, introduction of non-Millerton water would be regulated and managed by the Water Quality Guidelines and, as a result, in-prism surface water quality would be protected for domestic and agricultural uses and would not exceed the significance criteria. **Therefore, operation of the Seasonal Alternative would not violate water quality standards or waste discharge requirements and impacts would be less than significant, consistent with the proposed project.**

Drainage Patterns

As discussed in Section 4.10.3, the operation of the proposed project would result in no impact to drainage patterns. Under the Seasonal Alternative, flood flows would not be redirected as part of project operations, nor would operations result in any changes to existing drainage systems. **Therefore, there would be no impact on drainage patterns from operation of the Seasonal Alternative, consistent with the proposed project.**

5.4.10 Hydrology and Water Resources – Groundwater

5.4.10.1 Environmental Impacts of No Project Alternative

Construction of No Project Alternative

Water Quality

As discussed in Section 4.11.3, the construction activities associated with the proposed project would result in less than significant impacts to groundwater quality with the implementation of Mitigation Measures WR-1 HAZ-1 and associated BMPs. Under the No Project Alternative, no new facilities would be constructed; reverse-flow pump-back operations would be continued using existing infrastructure. **Therefore, there would be no construction-related impacts on groundwater quality from the No Project Alternative, avoiding the less than significant impacts post-mitigation associated with the proposed project.**

Groundwater Supply

As discussed in Section 4.11.3, the construction activities associated with the proposed project would have no impact on groundwater supplies. Under the No Project Alternative, no new facilities would be constructed; reverse-flow pump-back operations would be continued using existing infrastructure. **Therefore, there would be no impact on groundwater supplies from the No Project Alternative consistent with the proposed project.**

Operation of No Project Alternative

Water Quality

Total Dissolved Solids

As shown in Table 5-8, simulated TDS concentrations and annual rates of change in TDS concentrations in groundwater vary widely across districts under the No Project Alternative. For 2 of the 11 districts, the simulated ending TDS concentration in groundwater would be higher than the simulated starting concentration under the No Project Alternative. The simulated average annual rate of change in TDS concentration in groundwater throughout the 50-year simulation period under the No Project alternative is less than the specified significance threshold for all districts. However, the simulated maximum 5-year annual rate of change in TDS concentration in groundwater is higher than the specified significance threshold for 8 of the 11 districts under the No Project Alternative.

Table 5-8. Simulated Changes in Total Concentration and Annual Rate of Change of Total Dissolved Solids in Groundwater under the No Project Alternative

District	Starting Concentration (mg/L)	Simulated Ending Concentration (mg/L)		Simulated Average Annual Rate of Change (mg/L/year)		Simulated Maximum 5-Year Average Annual Rate of Change (mg/L/year ¹)		Significance Threshold (mg/L/year)
		Existing Cond.	No Project	Existing Cond.	No Project	Existing Cond.	No Project	
AEWSD	454	423	425	-0.62	-0.58	2.43	2.44	3.20
SWID	807	432	452	-7.49	-7.10	16.77	17.23	3.84
SSJMUD	875	560	575	-6.30	-6.00	0.57	0.86	3.84
KTWD	632	631	785	-0.02	3.06	15.96	13.62	3.84
DEID	277	141	156	-2.72	-2.42	4.20	4.80	3.84
TBID	335	491	506	3.12	3.42	10.83	12.10	3.84
SID	363	192	200	-3.42	-3.26	26.49	27.34	3.84
Pixley ID	193	247	236	1.07	0.86	8.29	7.84	3.84
TPDWD	400	299	306	-2.02	-1.88	9.54	10.48	3.84
Porterville ID	638	246	229	-7.85	-8.18	85.49	108.20	3.84
LTRID	284	96	95	-3.76	-3.78	2.42	2.38	3.84

Note:

¹ Maximum 5-year average annual rate of change calculated on a monthly timestep as the cumulative change in concentration relative to 5 years prior, divided by 5 years to produce an annual average rate.

Values in **bold** indicate exceedance of the threshold.

Key: AEWSD – Arvin-Edison Water Storage District, SWID – Shafter-Wasco Irrigation District, SSJMUD – Southern San Joaquin Municipal Utility District, KTWD – Kern-Tulare Water District, DEID – Delano-Earlimart Irrigation District, TBID – Terra Bella Irrigation District, SID – Saucelito Irrigation District, ID – Irrigation District, TPDWD – Tea Pot Dome Water District, LTRID – Lower Tule River Irrigation District

There are no feasible mitigation measures that could be implemented at a project scale to reduce potential adverse impacts related to TDS concentrations in groundwater. However, at a basin level, potential adverse impacts on TDS concentrations under the No Project Alternative could be reduced through continued implementation of the CV-SALTS Salt Control Program (Section

D.3.1.2 in Appendix D contains a description) and/or execution of management actions specified in relevant GSPs, when implemented. This program was not considered in the modeling for this effects analysis.

Chloride

Simulated results of monthly concentration of chloride in groundwater for all 11 water districts did not exceed the threshold for chloride. Although groundwater concentrations of chloride under the No Project Alternative would be higher than simulated starting concentrations some districts, chloride concentrations would remain below the specified significance threshold and, therefore, would not adversely affect or impact beneficial uses (Appendix G contains numerical analysis results).

Boron

Simulated results for monthly concentration of boron in groundwater for all 11 water districts evaluated did not exceed the specified significance threshold. Although groundwater concentrations of boron under the No Project Alternative would be higher than simulated starting concentrations some districts, boron concentrations would remain below the specified significance threshold and, therefore, would not adversely affect or impact beneficial uses (Appendix G contains numerical analysis results).

Nitrate

As shown in Table 5-9, starting nitrate concentrations in groundwater are higher than the significance threshold in 5 of the 11 districts. For groundwater conditions in 9 of the 11 districts evaluated, the simulated concentrations of nitrate in groundwater under the No Project Alternative show steady decreases during the simulation period. For KTWD, simulated nitrate concentrations increase over the simulation period under the No Project Alternative and slightly exceed the threshold of 10 mg/L during certain periods. Simulated nitrate concentrations in groundwater for Porterville ID increased to slightly above the threshold over the simulation period, specifically during a hydrologically dry period (when additional groundwater pumping is needed to meet irrigation demands) but were below the threshold during other periods. Additionally, simulated nitrate concentrations in groundwater for TBID remained well above the significance threshold for the entire simulation period. Because starting concentrations of nitrate in groundwater for several districts are well above the 10 mg/L threshold, and nitrate concentrations exceeded the 10 mg/L threshold over the simulation period for some districts, groundwater beneficial uses could be adversely affected within some districts under the No Project Alternative. However, nitrate concentrations in groundwater generally decrease under the No Action Alternative for most districts during the simulation period.

Table 5-9. Simulated Changes in Concentration of Nitrate in Groundwater for the No Project Alternative

District	Starting Concentration (mg/L)	Simulated Ending Concentration (mg/L)		Simulated Maximum Concentration (mg/L)		Significance Threshold (mg/L)
		Existing Conditions	No Project	Existing Conditions	No Project	
AEWSD	7.7	5.4	5.5	7.7	7.7	10
SWID	9.2	5.7	6.0	9.2	9.2	10
SSJMUD	8.8	6.0	6.3	8.8	8.8	10
KTWD	5.1	8.3	10.5	9.1	11.4	10
DEID	9.2	1.8	2.0	9.2	9.2	10
TBID	27.3	12.9	13.0	27.3	27.3	10
SID	10.0	2.6	2.7	10.0	10.0	10
Pixley ID	9.8	5.3	4.9	9.8	9.8	10
TPDWD	20.4	6.3	6.4	20.4	20.4	10
Porterville ID	15.3	3.3	3.0	15.3	15.3	10
LTRID	15.9	2.1	2.1	15.9	15.9	10

Note: Values in **bold** indicate exceedance of the threshold.

Key: AEWSD – Arvin-Edison Water Storage District, SWID – Shafter-Wasco Irrigation District, SSJMUD – Southern San Joaquin Municipal Utility District, KTWD – Kern-Tulare Water District, DEID – Delano-Earlimart Irrigation District, TBID – Terra Bella Irrigation District, SID – Saucelito Irrigation District, ID – Irrigation District, TPDWD – Tea Pot Dome Water District, LTRID – Lower Tule River Irrigation District

In addition, groundwater quality analysis performed to assess impacts of the No Project Alternative focused on changes in concentrations of nitrate in applied water and did not consider site-specific, on-farm application of fertilizers (e.g., nitrate) and/or soil amendments.

There are no feasible mitigation measures that could be implemented at a project scale to reduce potential adverse impacts from nitrate concentrations. However, at a basin level, potential adverse impacts under the No Project Alternative (whether from project operations or on-farm practices) could be reduced through continued implementation of the CV-SALTS Nitrate Control Program (Section D.3.1.1 in Appendix D contains a description) and/or management actions specified in relevant GSPs, when implemented.

Other Constituents of Consideration

For certain districts, groundwater quality conditions for other constituents of consideration for drinking water beneficial uses (e.g., arsenic, hexavalent chromium, DBCP, pesticides, selenium, 1,2,3-TCP) currently exceed Title 22 limits. Under the No Project Alternative, project operations are not likely to affect concentrations of constituents of consideration in groundwater. The concentrations of other constituents of consideration are likely to continue to remain at current measured concentrations, some of which exceed Title 22 limits, potentially affecting beneficial uses within these districts.

As stated in Section 4.11.3, the operation of the proposed project would have significant and unavoidable impacts on groundwater quality. Under the No Project Alternative, continued project operations would result in a degradation of groundwater quality such that beneficial uses may be impaired. However, these impacts, which are specific to elevated concentrations of TDS, nitrate, and constituents of consideration under existing conditions, are independent of implementation of the No Project Alternative. Although implementation of the state and/or local control programs, including CV-SALTS, may reduce adverse effects on groundwater quality conditions, concentrations of groundwater quality constituents are expected to exceed the thresholds evaluated in this analysis.

As no feasible project-level mitigation measures could be implemented to reduce concentrations of TDS, nitrate and other constituents of consideration in the region, impacts resulting from the No Project Alternative would be significant and unavoidable, consistent with the proposed project.

Groundwater Supply

As stated in Section 4.11.3, the proposed project would have less than significant impact and beneficial effect on availability of groundwater supplies. Under the No Project Alternative, the simulated total groundwater pumping under the No Project Alternative would be higher than pumping under existing conditions for 9 of the 11 districts evaluated (Table 5-10). This is expected to occur because of the reduction in surface water supplies available in the No Project Alternative owing to full implementation of the SJRRP and assumptions related to future hydrology simulated under the No Project Alternative (as detailed in Section 4.11.1). The two districts where groundwater pumping is expected to decrease, Pixley ID and LTRID, would receive additional surface water deliveries owing to planned programs under the future conditions assumed for the No Project Alternative; therefore, these districts would pump less groundwater to meet water demands. **Under the No Project Alternative, decreases in groundwater supplies as a result of increased groundwater pumping would be a significant and unavoidable impact, which differs from the less than significant impact on groundwater supplies associated with the proposed project.**

Table 5-10. Total Groundwater Pumping in Acre-Feet Over Simulation Period Under Existing Conditions and the No Project Alternative

District	Total Simulated Groundwater Pumping ¹ (acre-feet)		Relative Change Compared to Existing Conditions ² (acre-feet)
	Existing Conditions	No Project	No Project
AEWSD	6,608,800	6,856,400	247,600
SWID	2,274,900	2,402,600	127,700
SSJMUD	2,544,500	2,718,600	174,100
KTWD	1,032,100	1,338,100	306,000
DEID	999,200	1,216,000	216,800
TBID	486,500	506,900	20,400
SID	1,257,700	1,346,600	88,900
Pixley ID	5,627,900	5,202,300	-425,600
TPDWD	198,100	205,200	7,100
Porterville ID	976,000	1,042,200	66,200
LTRID	3,063,000	2,954,300	-108,700

Notes:

¹ Total groundwater pumping for upper and lower aquifers. Values are rounded to nearest 100 acre-feet.

² Relative to simulated total groundwater pumping for upper and lower aquifers. Values are rounded to nearest 100 acre-feet.
proposed project

Key: AEWSD – Arvin-Edison Water Storage District, SWID – Shafter-Wasco Irrigation District, SSJMUD – Southern San Joaquin Municipal Utility District, KTWD – Kern-Tulare Water District, DEID – Delano-Earlimart Irrigation District, TBID – Terra Bella Irrigation District, SID – Saucelito Irrigation District, ID – Irrigation District, TPDWD – Tea Pot Dome Water District, LTRID – Lower Tule River Irrigation District

5.4.10.2 Environmental Impacts of Low Flow Alternative

Construction of Low Flow Alternative

Water Quality

As discussed in Section 4.11.3, the construction activities associated with the proposed project would result in less than significant impacts to groundwater with the implementation of Mitigation Measures WR-1 and HAZ-1 and associated BMPs. Construction activities associated with the Low Flow Alternative could result in localized degradation of groundwater quality. If hazardous materials used during construction or by construction vehicles were discharged to the land surface, they could infiltrate to underlying aquifers and degrade local groundwater quality conditions. As specified in Mitigation Measures WR-1 and HAZ-1, compliance with state and federal CWA requirements and implementation of a SWPPP and associated BMPs would minimize impacts on water quality from construction. **Therefore, construction-related effects on groundwater quality from the Low Flow Alternative would be less than significant post-mitigation, consistent with the proposed project.**

Groundwater Supply

As discussed in Section 4.11.3, the construction activities associated with the proposed project would have no impact on groundwater supplies. Construction activities associated with the Low

Flow Alternative would not require groundwater pumping and therefore would not affect groundwater supplies. **Therefore, there would be no impact on groundwater supplies from construction of the Low Flow Alternative, consistent with the proposed project.**

Operation of Low Flow Alternative

Water Quality

Total Dissolved Solids

As shown in Table 5-11, simulated TDS concentrations and annual rates of change in TDS concentrations in groundwater vary across districts under the Low Flow Alternative. For 10 of the 11 districts, the simulated average annual rate of change in TDS concentrations in groundwater under the Low Flow Alternative is lower than the specified significance threshold. For TBID, the TDS concentrations in groundwater increased at a rate that exceeds the specified significance threshold. Additionally, the simulated maximum 5-year average annual rate of change in TDS concentration in groundwater would be higher than the specified significance threshold for 8 of the 11 districts evaluated. Because one district has a simulated average annual rate of change that exceeds the specified significance threshold, and several districts have simulated maximum 5-year average annual rates of change that exceed the significance threshold, groundwater quality conditions for beneficial uses could be affected in some districts under the Low Flow Alternative.

There are no feasible mitigation measures that could be implemented at a project scale to reduce potential adverse impacts related to TDS concentrations in groundwater. However, at a basin level, potential adverse impacts on TDS concentrations from operations under the Low Flow Alternative could be reduced through continued implementation of the CV-SALTS Salt Control Program (Section D.3.1.2 in Appendix D contains a description) and/or execution of management actions specified in relevant GSPs, when implemented.

Table 5-11. Simulated Changes in Concentration of Total Dissolved Solids in Groundwater for the Low Flow Alternative under Existing and Future Conditions

District	Starting Concentration (mg/L)	Simulated Ending Concentration (mg/L)		Simulated Average Annual Rate of Change (mg/L/year)		Simulated Maximum 5-Year Average Annual Rate of Change (mg/L/year) ¹		Significance Threshold (mg/L/year)
		Existing Cond.	Future Cond.	Existing Cond.	Future Cond.	Existing Cond.	Future Cond.	
AEWSD	454	485	485	0.61	0.62	2.44	2.43	3.20
SWID	807	515	551	-5.85	-5.12	23.46	22.83	3.84
SSJMUD	875	690	709	-3.70	-3.32	3.71	3.55	3.84
KTWD	632	642	681	0.20	0.97	19.48	21.06	3.84
DEID	277	206	224	-1.43	-1.07	6.89	7.44	3.84
TBID	335	564	598	4.58	5.26	14.97	16.62	3.84
SID	363	195	206	-3.36	-3.15	26.09	27.21	3.84
Pixley ID	193	253	213	1.19	0.40	9.02	6.28	3.84

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

District	Starting Concentration (mg/L)	Simulated Ending Concentration (mg/L)		Simulated Average Annual Rate of Change (mg/L/year)		Simulated Maximum 5-Year Average Annual Rate of Change (mg/L/year) ¹		Significance Threshold (mg/L/year)
		Existing Cond.	Future Cond.	Existing Cond.	Future Cond.	Existing Cond.	Future Cond.	
TPDWD	400	279	292	-2.42	-2.15	7.75	9.11	3.84
Porterville ID	638	252	241	-7.72	-7.94	70.28	90.78	3.84
LTRID	284	94	89	-3.80	-3.90	2.30	2.16	3.84

Notes:

¹ Maximum 5-year average annual rate of change calculated on a monthly timestep as the cumulative change in concentration relative to 5 years prior, divided by 5 years to produce an annual average rate.

Values in **bold** indicate exceedance of the threshold.

Key: AEWSD – Arvin-Edison Water Storage District, SWID – Shafter-Wasco Irrigation District, SSJMUD – Southern San Joaquin Municipal Utility District, KTWD – Kern-Tulare Water District, DEID – Delano-Earlimart Irrigation District, TBID – Terra Bella Irrigation District, SID – Saucelito Irrigation District, ID – Irrigation District, TPDWD – Tea Pot Dome Water District, LTRID – Lower Tule River Irrigation District

Chloride

The Low Flow Alternative is not anticipated to have adverse effects on chloride concentrations in groundwater within the study area. Under operations for the Low Flow Alternative, simulated results for monthly concentration of chloride in groundwater for each of 11 districts did not exceed the specified significance threshold for chloride of 106 mg/L for agricultural beneficial uses (Appendix F contains numerical analysis results).

Boron

Project operations under the Low Flow Alternative are not anticipated to have adverse effects on boron concentrations in groundwater within the study area. Under the Low Flow Alternative, simulated results for monthly concentration of boron in groundwater for all 11 water districts did not exceed the specified significance threshold for boron of 0.7 mg/L for agricultural beneficial uses (Appendix F contains numerical analysis results).

Nitrate

As shown in Table 5-12, starting concentrations of nitrate in groundwater are higher than the significance threshold of 10 mg/L for 5 of the 11 districts evaluated. Simulations for the Low Flow Alternative showed nitrate concentrations steadily decreasing during the simulation period in most (9 of 11) districts, except for KTWD and Porterville ID. For KTWD, simulated nitrate concentrations in groundwater increased over the simulation period under the Low Flow Alternative but did not exceed the specified significance threshold. Simulated nitrate concentrations in groundwater for Porterville ID rapidly increased to slightly above the threshold, specifically during a hydrologically dry period (when additional groundwater pumping is needed to meet water demands), before quickly returning to below the threshold. For TBID, simulated nitrate concentrations in groundwater remained well above the significance threshold for the entire simulation period. Because several districts have starting concentrations of nitrate well above the 10 mg/L threshold and/or see slight exceedances, groundwater beneficial uses could be adversely affected within some districts under the Low Flow Alternative. However, nitrate concentrations in groundwater generally decrease under the proposed project for most districts during the simulation period.

Table 5-12. Simulated Changes in Concentration of Nitrate in Groundwater for the Low Flow Alternative Under Existing and Future Conditions

District	Starting Concentration (mg/L)	Simulated Ending Concentration (mg/L)		Simulated Maximum Concentration (mg/L)		Significance Threshold (mg/L)
		Existing Conditions	Future Conditions	Existing Conditions	Future Conditions	
AEWSD	7.7	5.5	5.6	7.7	7.7	10
SWID	9.2	5.4	5.7	9.2	9.2	10
SSJMUD	8.8	5.9	6.1	8.8	8.8	10
KTWD	5.1	7.7	8.0	8.3	8.5	10
DEID	9.2	1.8	2.1	9.2	9.2	10
TBID	27.3	12.8	13.0	27.3	27.3	10
SID	10.0	2.6	2.7	10.0	10.0	10
Pixley ID	9.8	5.3	4.7	9.8	9.8	10
TPDWD	20.4	6.0	6.2	20.4	20.4	10
Porterville ID	15.3	3.4	3.2	15.3	15.3	10
LTRID	15.9	2.1	2.1	15.9	15.9	10

Note: Values in **bold** indicate exceedance of the threshold.

Key: AEWSD – Arvin-Edison Water Storage District, SWID – Shafter-Wasco Irrigation District, SSJMUD – Southern San Joaquin Municipal Utility District, KTWD – Kern-Tulare Water District, DEID – Delano-Earlimart Irrigation District, TBID – Terra Bella Irrigation District, SID – Saucelito Irrigation District, ID – Irrigation District, TPDWD – Tea Pot Dome Water District, LTRID – Lower Tule River Irrigation District

In addition, groundwater quality analysis performed to assess impacts of the Low Flow Alternative focused on changes in concentrations of nitrate, in applied water and did not consider site-specific, on-farm application of fertilizers (e.g., nitrate) and/or soil amendments.

There are no feasible mitigation measures that could be implemented at a project scale to reduce potential adverse impacts from nitrate concentrations. However, at a basin level, potential adverse impacts under the Low Flow Alternative (whether from project operations or on-farm practices)

could be reduced through continued implementation of the CV-SALTS Nitrate Control Program (Section D.3.1.1 in Appendix D contains a description) and/or management actions specified in relevant GSPs, when implemented.

Other Constituents of Consideration

Project operations under the Low Flow Alternative are not anticipated to adversely affect concentrations of constituents of consideration for drinking water beneficial uses (e.g., arsenic, hexavalent chromium, DBCP, pesticides, selenium, 1,2,3-TCP). Additional surface water deliveries to Friant Contractors are anticipated under the Low Flow Alternative, which may contribute to groundwater recharge and/or a reduction of local groundwater pumping and, potentially, a resultant decrease in concentrations of constituents of consideration for drinking water beneficial uses in the upper aquifer, if present. The concentrations of constituents of consideration are likely to continue to remain at current measured concentrations, some of which exceed Title 22 limits, potentially affecting beneficial uses within these districts.

Project operations under the Low Flow Alternative are expected to result in groundwater quality conditions that impair beneficial uses of groundwater. This impact is mostly attributed to elevated concentrations of TDS, nitrate, and constituents of consideration present in groundwater within the study area. Although implementation of state and/or local control programs, including CV-SALTS, may reduce adverse effects on groundwater quality conditions, concentrations of groundwater quality constituents under the Low Flow Alternative are expected to exceed the thresholds. **As there are no feasible project-level mitigation measures that could be implemented to reduce concentrations of TDS, nitrate and other constituents of consideration in the region, impacts on groundwater quality resulting from operations of the Low Flow Alternative would be significant and unavoidable consistent with the proposed project.**

Groundwater Supply

As stated in Section 4.11.3, the proposed project would have less than significant impact and beneficial effect on the availability of groundwater supplies. Project operations under the Low Flow Alternative would result in an increase in available surface water supplies and potential decreases in groundwater pumping within most of the study area. Table 5-13 shows that simulated groundwater pumping under the Low Flow Alternative decreases for the 11 districts evaluated, likely due to additional surface water deliveries to meet their water demands (Appendix F contains additional detail). **Impacts from operations of the Low Flow Alternative on groundwater supply would be less than significant, consistent with the proposed project.**

Table 5-13. Total Groundwater Pumping Over the Simulation Period Under Existing Conditions, the No Project Alternative, and the Low Flow Alternative

District	Total Simulated Groundwater Pumping ¹ (acre-feet)				Relative Change Compared to Existing Conditions (acre-feet) ²	Relative Change Compared to No Project (acre-feet) ²
	Existing Conditions	No Project	Low Flow Alternative		Low Flow Alternative	
			Existing Conditions	Future Conditions	Existing Conditions	Future Conditions
AEWSD	6,608,800	6,856,400	6,457,900	6,757,900	-150,900	-98,500
SWID	2,274,900	2,402,600	2,065,200	2,219,100	-209,700	-183,500
SSJMUD	2,544,500	2,718,600	2,196,800	2,425,600	-347,700	-293,000
KTWD	1,032,100	1,338,100	908,300	967,400	-123,800	-370,700
DEID	999,200	1,216,000	786,700	1,006,600	-212,500	-209,400
TBID	486,500	506,900	429,000	463,200	-57,500	-43,700
SID	1,257,700	1,346,600	1,183,800	1,293,900	-73,900	-52,700
Pixley ID	5,627,900	5,202,300	5,627,900	4,644,800	0	-557,600
TPDWD	198,100	205,200	175,900	190,600	-22,200	-14,600
Porterville ID	976,000	1,042,200	922,200	1,007,800	-53,800	-34,400
LTRID	3,063,000	2,954,300	2,874,700	2,461,800	-188,300	-492,500

Notes:

¹ Total groundwater pumping for upper and lower aquifers. Values are rounded to the nearest 100 acre-feet.

² Relative to simulated total groundwater pumping for upper and lower aquifers. Values are rounded to the nearest 100 acre-feet.

5.4.10.3 Environmental Impacts of Seasonal Alternative

Construction of Seasonal Alternative

Water Quality

As discussed in Section 4.11.3, the construction activities associated with the proposed project would result in less than significant impacts to groundwater with the implementation of Mitigation Measures WR-1 and HAZ-1 and associated BMPs. Construction activities associated with the Low Flow Alternative would result in similar impacts to the proposed project. **Therefore, construction-related effects on groundwater quality from the Seasonal Alternative would be less than significant with mitigation, consistent with the proposed project.**

Groundwater Supply

As discussed in Section 4.11.3, the construction activities associated with the proposed project would have no impact on groundwater supplies. Construction activities associated with the Seasonal Alternative would not require groundwater pumping and therefore would not affect groundwater supplies. **There would be no impact on groundwater supplies from construction of the Seasonal Alternative, consistent with the proposed project.**

Operation of Seasonal Alternative

Water Quality

As discussed in Section 4.11.3, operation of the proposed project would result in significant impacts to groundwater quality. Project operations under the Seasonal Alternative would be consistent with the Low Flow Alternative. As detailed in Appendix F, the Low Flow Alternative and Seasonal Alternative were modeled together. **Therefore, impacts on groundwater quality would be significant and unavoidable, consistent with the proposed project.**

Groundwater Supply

As stated in Section 4.11.3, the proposed project would have less than significant impacts and beneficial effect on the availability of groundwater supplies. Project operations under the Seasonal Alternative would be consistent with the Low Flow Alternative. As detailed in Appendix F, the Low Flow Alternative and Seasonal Alternative were modeled together. **Therefore, impacts from the Seasonal Alternative would be less than significant to groundwater supplies, consistent with the proposed project.**

5.4.11 Noise and Vibration

5.4.11.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.12.3, the construction of proposed project would result in significant and unavoidable impacts even after implementation of Mitigation Measure NOI-1. Under the No Project Alternative, ambient noise levels would be the same as existing conditions as neither construction activities nor increased operational activities would occur. **The No Project Alternative would result in no impacts on noise, thereby reducing the significant and unavoidable impacts associated with the proposed project.**

5.4.11.2 Environmental Impacts of Low Flow Alternative

Construction of Low Flow Alternative

As discussed in Section 4.12.3, the proposed project would result in less than significant ground-borne vibration impacts associated with construction. Similar to the proposed project, the PPV for construction activities under the Low Flow Alternative would not exceed the significance threshold of 0.3 in./sec (Table G1-8 in Appendix G1; Appendix G2 contains detailed calculations).

Therefore, ground-borne vibration impacts associated with construction of the Low Flow Alternative would be less than significant, consistent with the proposed project.

As discussed in Section 4.12.3, the proposed project would result in less than significant impacts associated with construction and operation within an airport land use plan. Similar to the proposed project, Shafter-Minter Field is approximately 1.5 miles southeast of Shafter-Wasco site and has an average of approximately 123 aircraft operations per day (AirNav.com 2021). Implementation of the Low Flow Alternative would not change the frequency or intensity of the existing Shafter Airport operations and there would be no new permanent residents near the airport that would be affected by the plane noise. The Lake Woollomes and Deer Creek sites are not located within an airport land use plan or within 2 miles of a public airport. **Therefore, noise impacts associated with constructing and operating the Low Flow Alternative within an airport land use plan would be less than significant, consistent with the proposed project.**

As discussed in Section 4.12.3, construction of the proposed project would result in less than significant traffic noise impacts and significant and unavoidable noise impacts even after implementation of Mitigation Measure NOI-1. Because the construction activities and equipment would be the same under the Low Flow Alternative as the Proposed Action, construction noise and traffic impacts would be similar. Construction traffic would increase under the Low Flow Alternative when compared to existing conditions, increasing by sevenfold (7.61), which is below the ninefold increase threshold (Table G1-10 in Appendix G1; Appendix G2 contains detailed calculations). **As such, noise impacts associated with construction traffic would be less than significant consistent with the proposed project.** Noise levels at the residence on Pond Road and the residence on Road 208 would exceed the daytime significance criterion of a 10 dBA increase. All three nearby sensitive receptors would exceed nighttime significance criteria of a 5 dBA increase (Table G1-7 in Appendix G1; Appendix G2 contains detailed calculations). **As such, impacts would be significant.** Implementation of Mitigation Measure NOI-1 described in Section 4.18, would reduce the severity of impacts at some receptors below significance thresholds, but they would not be sufficient to reduce impacts to all sensitive receptors. Daytime noise levels at the residence on Road 208 and nighttime noise levels at the residence on Pond Road and the residence on Road 208 would remain significant. **Noise impacts associated with construction of the Low Flow Alternative would remain significant and unavoidable after implementation of Mitigation Measure NOI-1 consistent with the proposed project.**

Operation of Low Flow Alternative

As discussed in Section 4.12.3, the proposed project would result in less than significant ground-borne vibration impacts associated with operation. No long-term project operations would occur that could generate vibrations or ground-borne noise or otherwise expose persons to such impacts. **Therefore, ground-borne vibration impacts associated with operations of the Low Flow Alternative would be less than significant, consistent with the proposed project.**

As discussed in Section 4.12.3, the proposed project would result in less than significant operational noise impacts. The number of pumps at each facility would remain the same under the Low Flow Alternative as under the proposed project. As such, noise associated with operation of the upgraded pump-back facilities at the Shafter-Wasco and Lake Woollomes sites would not exceed the 65 dBA Kern County threshold and the new pump-back facility at Deer Creek would not exceed the 60 dBA Tulare County threshold (Table G1-9 in Appendix G; Appendix G2 contains detailed calculations). **Operating the Low Flow Alternative would not generate a substantial permanent increase in noise levels; therefore, operational impacts would be less than significant, consistent with the proposed project.**

5.4.11.3 Environmental Impacts of Seasonal Alternative

Construction of Seasonal Alternative

As discussed in Section 4.12.3, the proposed project would result in less than significant ground-borne vibration impacts associated with construction. The PPV for construction activities under the Seasonal Alternative would not exceed the significance threshold of 0.3 in./sec (Table G1-11 in Appendix G1; Appendix G2 contains detailed calculations). **Therefore, ground-borne vibration impacts associated with construction of the Seasonal Alternative would be less than significant, consistent with the proposed project.**

As discussed in Section 4.12.3, the proposed project would result in less than significant associated with construction and operation within an airport land use plan. Similar to the proposed project, Shafter-Minter Field is approximately 1.5 miles southeast of Shafter-Wasco site and has an average of approximately 123 aircraft operations per day (AirNav.com 2021). Installation of seasonal pumps under the Seasonal Alternative would not change the frequency or intensity of the existing Shafter Airport operations and there would be no new permanent residents near the airport that would be affected by the plane noise. The Lake Woollomes site is not located within an airport land use plan or within 2 miles of a public airport. **Therefore, noise impacts associated with constructing and operating the Seasonal Alternative within an airport land use plan would be less than significant, consistent with the proposed project.**

As discussed in Section 4.12.3, construction of the proposed project would result in less than significant traffic noise impacts. Construction traffic would not increase under the Seasonal Alternative because only one construction truck is required for the 1-day installation at both sites and hauling of material is not necessary. There would be no noise impacts associated with construction traffic under the Seasonal Alternative. **The Seasonal Alternative has no impact and would avoid the less than significant traffic noise-related impacts associated with the proposed project.**

As discussed in Section 4.12.3, construction of the proposed project would result in significant and unavoidable noise impacts even after implementation of Mitigation Measure NOI-1. Installation of the seasonal pumps under the Seasonal Alternative would require the use of a crane, a deck truck, and various hand tools, which could increase the ambient noise levels surrounding the project area. Noise levels at the residence on Fresno Ave would not exceed the daytime significance criterion of a 10 dBA increase. The residence on Pond Road would exceed the daytime significance criterion (Table G1-10 in Appendix G1; Appendix G2 contains detailed calculations). Although noise levels would increase above the daytime criterion, this increase would only occur on a single day of installation. In addition, the existing noise setting surrounding the project area includes frequent use of heavy equipment for agricultural and irrigation purposes, as well as stationary noises, including generators and motors. As such, the short-term use of construction equipment under the Seasonal Alternative would be temporary and consistent with the existing noise setting. No nighttime construction is proposed under the Seasonal Alternative. **The Seasonal Alternative would have less than significant impacts and avoid the significant and unavoidable noise impacts associated with the proposed project.**

Operation of Seasonal Alternative

As discussed in Section 4.12.3, the proposed project would result in less than significant ground-borne vibration impacts associated with operation. No long-term project operations would occur that could generate vibrations or ground-borne noise or otherwise expose persons to such impacts. **Therefore, ground-borne vibration impacts associated with operations of the Seasonal Alternative would be less than significant impacts, consistent with the proposed project.**

As discussed in Section 4.12.3, the proposed project would result in less than significant operational noise impacts. Noise associated with operation of the seasonal pump-back facilities and diesel power generators at the Shafter-Wasco and Lake Woollomes sites would not exceed the 65 dBA Kern County threshold (Table G1-12 in Appendix G1; Appendix G2 contains detailed calculations). **Operating the Seasonal Alternative would not generate a substantial permanent increase in**

noise levels and therefore operational impacts would be less than significant, consistent with the proposed project.

5.4.12 Population and Housing

5.4.12.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.13.3, the proposed project would result in less than significant impacts on population and housing from growth inducement. Under the No Project Alternative, no new facilities would be constructed. The impact of not implementing the project and not conducting the associated construction or operational activities would not change current or future population or housing trends. Population and housing growth would continue at a rate similar to existing conditions. The No Project Alternative would have no impact on population growth or housing resulting from growth inducement or displacement. **Therefore, the No Project Alternative would reduce the less than significant impacts associated with the proposed project.**

5.4.12.2 Environmental Impacts of Low Flow Alternative

As discussed in Section 4.13.3, the proposed project would result in less than significant construction-related impacts on population and housing from growth inducement. Similar to the proposed project, the Low Flow Alternative would require no more than 120 total workers during construction. This small number of workers would be temporary and insubstantial. **Construction-related impacts on population and housing from growth inducement would be less than significant under the Low Flow Alternative, consistent with the proposed project.**

5.4.12.3 Environmental Impacts of Seasonal Alternative

As discussed in Section 4.13.3, the proposed project would result in less than significant construction-related impacts on population and housing from growth inducement. The Seasonal Alternative would only require 1-2 workers during construction because of the short construction window and minimal construction equipment needed. **The Seasonal Alternative would result in no construction-related impacts on population and housing from growth inducement reducing the less than significant under the proposed project.**

5.4.13 Recreation

5.4.13.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.14.3, the proposed project would result in less than significant recreational impacts associated with construction and operation. Under the No Project Alternative, no new facilities would be constructed. The No Project Alternative would result in no change in access to recreational facilities and opportunities, or changes to visitor use at other local and regional recreation sites. There would be no impact. **The No Project Alternative would avoid the less than significant impacts to recreation associated with the proposed project.**

5.4.13.2 Environmental Impacts of Low Flow Alternative

As discussed in Section 4.14.3, the proposed project would result in less than significant recreational impacts associated with Lake Woollomes water level fluctuations during construction. Similar to the proposed project, construction of the Lake Woollomes pump-back facility under the Low Flow Alternative would also occur close to Lake Woollomes Park, which offers recreational opportunities. Lake Woollomes Park would remain open throughout the Lake Woollomes pump-back facility

construction period. As with the proposed project, operation of the Lake Woollomes pump-back facility in coordination with overall FKC operations would generate some short-term lake level fluctuations; however, these changes would be within the range of the water level fluctuations currently experienced, as the lake presently operates as an equalizing reservoir. **Impacts to recreational facilities from construction under the Low Flow Alternative would be less than significant, consistent with the proposed project.**

5.4.13.3 Environmental Impacts of Seasonal Alternative

As discussed in Section 4.14.3, the proposed project would result in less than significant recreational impacts associated with Lake Woollomes water level fluctuations during construction. Installation of the metal pump frame and permanent power at the Lake Woollomes check would occur close to Lake Woollomes Park, which offers recreational opportunities. Lake Woollomes Park would remain open during the 1-day construction period. Construction at the Lake Woollomes check structure would not result in changes to lake levels. As such, there would be no impact to recreation from water level fluctuations. **The Seasonal Alternative would avoid the less than significant impacts to recreation, associated with the proposed project.**

5.4.14 Traffic and Transportation

5.4.14.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.15.3, the proposed project's construction-generated VMT would not conflict or be inconsistent with CEQA Guidelines Section 15064.3(b), nor would the proposed project conflict with the goals and objectives of any applicable programs, plans, ordinances, or policies. In addition, the construction haul trips, and worker vehicle trips associated with proposed project would result in less than significant impacts to traffic hazards and emergency access after implementation of Mitigation Measure TR-1. Under No Project Alternative, no new facilities would be constructed, with only existing infrastructure being used. There would be no construction or changes to existing operations in the study area. There would be no short- or long-term impacts to traffic operations under No Project Alternative. As such, there would be no impact on traffic and transportation. **The No Project Alternative would avoid the less than significant impacts associated with the proposed project.**

5.4.14.2 Environmental Impacts of Low Flow Alternative

Construction of Low Flow Alternative

As discussed in Section 4.15.3, the proposed project would result in less than significant impacts associated with traffic and transportation. Consistent with the proposed project, construction traffic under the Low Flow Alternative would be temporary, and trips are expected to be distributed along SRs and CRs in the surrounding rural area. The added construction-related trips would not worsen the LOS to a level exceeding the significance criteria at any of the study roadway segments. As such, construction-related traffic associated with the Low Flow Alternative would not conflict with the goals and objectives of any applicable programs, plans, ordinances, or policies in relevant jurisdictions that establish roadway performance standards and address the circulation system. **Therefore, the potential impact under the Low Flow Alternative would be less than significant, consistent with the proposed project.**

Consistent with the proposed project, the Low Flow Alternative would produce equipment, material, and/or waste material haul trips from the Shafter-Wasco, Lake Woollomes, and the Deer Creek sites on the study roadways. The number and distribution of construction-related trips would be the same as the proposed project. **Therefore, the Low Flow Alternative's construction-generated VMT would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b), and the potential impact would be less than significant, consistent with the proposed project.**

As discussed in Section 4.15.3, the construction haul trips and worker vehicle trips associated with proposed project would result in less than significant impacts after implementation of Mitigation Measure TR-1. Similar to the proposed project, construction haul trips and construction worker vehicle trips would increase traffic hazards at key roadway segments and intersections near the project sites and landfills and potentially conflict with emergency vehicles. **This impact would be significant.** Implementation of Mitigation Measure TR-1 would ensure that these impacts would reduce to less than significant. **Therefore, the short-term traffic hazards and emergency access impacts due to construction of the Low Flow Alternative would be less than significant after mitigation, consistent with the proposed project.**

Operation of Low Flow Alternative

As discussed in Section 4.15.3, there would be less than significant impacts from operation of the proposed project. As with the proposed project, pump-back facilities operated under the Low Flow Alternative would be used to deliver water to CVP Friant Contractors. Occasional maintenance trips would be necessary to ensure the pump-back facilities remain in working order. **Therefore, the impacts on traffic and transportation from annual operations under the Low Flow Alternative would be less than significant, consistent with the proposed project.**

5.4.14.1 Environmental Impacts of Seasonal Alternative

Construction of Seasonal Alternative

As discussed in Section 4.15.3, the proposed project would result in less than significant impacts associated with traffic and transportation. The Seasonal Alternative would involve installation and operation of seasonal pump-back facilities at the Shafter-Wasco and Lake Woollomes sites. Construction is expected to take one day using a crew of one to two workers per site. Additional permanent power may be installed, or diesel generators would be used to power pumps for the duration of the seasonal operation. As with the proposed project, construction-related traffic under the Seasonal Alternative would not conflict with the goals and objectives of any applicable programs, plans, ordinances, or policies in relevant jurisdictions that establish roadway performance standards and address the circulation system. **Therefore, the potential impact would be less than significant, consistent with the proposed project.**

Because of the short construction duration for installation of the seasonal pump-back facilities, daily trip generation is expected to be significantly lower when compared to the proposed project. **Therefore, the Seasonal Alternative's construction-generated VMT would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b), and the potential impact would be less than significant, consistent with the proposed project.**

As discussed in Section 4.15.3, the construction haul trips and worker vehicle trips associated with proposed project would result in less than significant impacts after implementation of Mitigation Measure TR-1. As mentioned previously, construction of the Seasonal Alternative is expected to take one day using a crew of one to two workers per site. No construction haul trips are anticipated. Because of the limited nature of worker trips, it is expected that there would be no increase in traffic hazards at key roadway segments and intersections close to the project sites that could potentially conflict with emergency vehicles. As such, the traffic hazards and emergency access impacts would be less than significant and require no mitigation. **The Seasonal Alternative would result in less than significant impacts and avoid the significant impacts under the proposed project.**

Operation of Seasonal Alternative

As discussed in Section 4.15.3, there would be less than significant impacts from operation of the proposed project. Under the Seasonal Alternative, operation would be the same as under the proposed project, with the exception being no proposed use of facilities at the Deer Creek check. Occasional maintenance trips would be necessary to ensure the pump-back facilities at the Shafter-Wasco and Lake Woollomes sites remain in working order. If additional permanent power is installed, the seasonal pump-back facilities would all be electric-driven. If diesel power generators are used to power the seasonal pumps, up to two daily maintenance trips would be required for regular generator maintenance. **Since the potential additional maintenance trips to maintain the generators would be minimal, impacts to traffic and transportation from annual operations under the Seasonal Alternative would be less than significant consistent with the proposed project.**

5.4.15 Utilities, Service Systems, and Energy

5.4.15.1 Environmental Impacts of No Project Alternative

As discussed in Section 4.17.3, the proposed project would have less than significant impacts on utilities, service systems, and energy. Under the No Project Alternative, no new facilities would be constructed. No construction activities would occur and as a result no adverse impacts related to the provision of new or physically altered governmental facilities are anticipated. The No Project Alternative would not require new water, wastewater, or stormwater facilities to be constructed. Furthermore, the No Project Alternative would not produce solid waste and would not result in increased energy use or the need for additional energy supply capacity. There would be no construction or operational impacts related to public utilities, services, energy, or power. **The No Project Alternative would avoid the less than significant impacts associated with construction and operation of the proposed project.**

5.4.15.2 Environmental Impacts of Low Flow Alternative

Construction of Low Flow Alternative

As discussed in Section 4.17.3, the proposed project would have less than significant impacts related to the relocation or construction of new or expanded utility facilities and availability of sufficient water supplies. Consistent with the proposed project, the Low Flow Alternative would not create any new demand on utilities or service systems. Construction of the pump-back facilities would not result in the need for additional water treatment or expansion of wastewater treatment facilities. Potable water and wastewater handling capacity demands generated by construction activities and the presence of construction workers would be met by existing local facilities. No new or expanded

water entitlements would be necessary for construction of the Low Flow Alternative. Construction activities under the Low Flow Alternative would require a construction workforce that would be drawn from the local area and, for some staff, nonlocal construction workers that would establish temporary residence in Kern and Tulare Counties. It is likely that these temporary workers could be absorbed by the counties without stress that would not result in the need for additional water treatment or expansion of wastewater treatment facilities. **Therefore, construction of the Low Flow Alternative would have a less than significant impact related to the relocation or construction of new or expanded utility facilities and availability of sufficient water supplies, consistent with the proposed project.**

As discussed in Section 4.17.3, the proposed project would have less than significant impacts related to generation of solid waste in excess and compliance with statutes and regulations related to solid waste management. Construction activities under the Low Flow Alternative could generate solid waste such as construction-related debris from excavation. This solid waste would have a negligible impact on the permitted capacity at landfills within the area given the current available landfill capacity (Section 3.16). The Low Flow Alternative would not generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure. Disposal of solid waste generated by the construction of the pump-back facilities under the Low Flow Alternative would comply with federal, state, and local statutes and regulations. **Therefore, the construction of the Low Flow Alternative would have less than significant impacts related to generation of solid waste in excess and compliance with statutes and regulations related to solid waste management, consistent with the proposed project.**

As discussed in Section 4.17.3, construction of the proposed project would have less than significant impacts related the consumption of energy resources. Construction of the Low Flow Alternative would require the use of electricity, diesel, and/or natural gas to operate construction equipment, including generators and construction lighting. Once construction is complete, the operation of construction equipment would cease and their demand for energy resources would end. **Therefore, construction of the Low Flow Alternative would have less than significant impacts related the consumption of energy resources, consistent with the proposed project.**

Operation of Low Flow Alternative

As discussed in Section 4.17.3, the proposed project would have less than significant operational impacts associated with the wasteful use of energy. Similar to the proposed project, the Low Flow Alternative would involve the installation and operation of new electric pumps. The Shafter-Wasco and Lake Woollomes sites, in Kern County, would generate on average approximately 13,689 MWh or 13.7 GWh in new demand annually or less than 0.04% of the total energy generated by Kern County. The Deer Creek site, located in Tulare County, would require an estimated 1,623 MWh or 1.6 GWh in new demand annually or less than 0.20% of the total energy generated by Tulare County. The energy demand for the installation and operation of the new electric pumps would be met by existing capacity. Reducing water users' reliance on older less efficient groundwater pumps would not conflict with statewide plans or local general plans. **The Low Flow Alternative would be energy efficient and would result in less than significant impacts, consistent with the proposed project.**

5.4.15.3 Environmental Impacts of Seasonal Alternative

Construction of Seasonal Alternative

Consistent with the proposed project, the Seasonal Alternative would not create any new demand on utilities or service systems. Construction of the temporary pump-back facilities at Shafter-Wasco and Deer Creek would not result in the need for additional water treatment or expansion of wastewater treatment facilities. Potable water and wastewater handling capacity demands generated by construction activities and the presence of construction workers would be met by existing local facilities. No new or expanded water entitlements would be necessary for construction of the Low Flow Alternative. Construction activities under the Seasonal Alternative would require 1-2 workers per site. The limited number of workers would not result in the need for additional water treatment or expansion of wastewater treatment facilities. **Therefore, construction of the Seasonal Alternative would have a less than significant impact related to the relocation or construction of new or expanded utility facilities and availability of sufficient water supplies, consistent with the proposed project.**

Construction of the Seasonal Alternative would generate minimal solid waste due to the lack of excavation needed for installation of the temporary pumps. If it is determined that permanent power must be installed, any construction waste would have a negligible impact on the permitted capacity at landfills within the area given the current available landfill capacity (Section 3.16). The Seasonal Alternative would not generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure. Disposal of solid waste generated by the construction and installation of the pump-back facilities at Shafter-Wasco and Deer Creek under the Seasonal Alternative would comply with federal, state, and local statutes and regulations. **Therefore, the construction of the Seasonal Alternative would have less than significant impacts related to generation of solid waste in excess and compliance with statutes and regulations related to solid waste management, consistent with the proposed project.**

Construction of the Seasonal Alternative would require the use of electricity, diesel, and/or natural gas to operate construction equipment. Once construction is complete, the operation of construction equipment would cease and their demand for energy resources would end. **Therefore, construction of the Seasonal Alternative would have less than significant impacts related the consumption of energy resources, consistent with the proposed project.**

Operation of Seasonal Alternative

As discussed in Section 4.17.3, the proposed project would have less than significant operational impacts associated within the wasteful use of energy. The Seasonal Alternative would involve the seasonal installation and operation of refurbished electric pumps. Power for the pumps would either be from diesel generators or an upgraded permanent power connection. Upgrading to permanent power at the sites would require coordination with PG&E for the Shafter-Wasco site and Southern California Edison for the Lake Woollomes site, respectively. FWA would obtain any required permits from the Kern and Tulare Counties' building and planning departments and submit an application with PG&E and Southern California Edison to upgrade their service. At this time, FWA has begun coordination with PG&E and Southern California Edison. The Shafter-Wasco and Lake Woollomes sites in Kern County would generate, on average, approximately 1,306 MWh or 1.3 GWh in new demand annually, or less than 0.004% of the total energy generated by Kern County. The energy demand for the installation and operation of the electric pumps would be met

by existing power capacity in the region. Reducing water users' reliance on older less efficient groundwater pumps would not conflict with statewide plans or local general plans. Though this alternative would have an increase in operational energy consumption, there would be no wasteful, inefficient or unnecessary consumption of energy resources under this alternative. **The Seasonal Alternative would be energy efficient and would result in less than significant impacts, consistent with the proposed project.**

5.5 Environmentally Superior Alternative

CEQA Guidelines require an EIR to identify an environmentally superior alternative. Identification of the environmentally superior alternative will be based on the information presented in this Draft EIR.

A summary of the environmental impacts of the proposed project is provided in Chapter 4. A detailed description of the project alternatives and a comparative analysis of the potential impacts associated with the proposed project and each alternative is provided in this chapter. Based on the analysis presented in this chapter, the No Project Alternative is considered to be the environmentally superior alternative. The No Project Alternative would avoid all construction-related impacts of the proposed project, Low Flow Alternative and Seasonal Alternative and have lower operational impacts in comparison to the proposed project, Low Flow Alternative and Seasonal Alternative.

In accordance with the CEQA Guidelines requirement to identify an environmental superior alternative other than the No Project Alternative, FWA has identified the Seasonal Alternative as the environmentally superior alternative based on the comparative analysis presented in this Draft EIR. As outlined in the CEQA Guidelines (Section 15126.6(c)), the following analysis addresses the ability of the Seasonal Alternative to “avoid or substantially lessen one or more of the significant effects of the project.” Under the Seasonal Alternative, the significant and unavoidable noise impacts and the significant construction traffic impacts associated with the proposed project would be avoided due to the shorter construction period, limited use of equipment in comparison to proposed project and no nighttime construction activity. Additionally, since there is no potential for dewatering or canal drawdown under the Seasonal Alternative, this would reduce the less than significant effects on native aquatic species movement and use of nursery sites for the Kern brook lamprey expected to occur under the proposed project. Potential air quality emissions from operations under the Seasonal Alternative are expected to remain less than significant but could be higher than under the proposed project due to the potential use of diesel generators to power the temporary pumps.

While the Seasonal Alternative is considered the environmentally superior alternative, it would not fully meet the project objectives as this alternative would not provide the same level of reduction or avoidance of adverse water supply impacts on Friant Contractors (as stipulated in the Water Management Goal), the same level of long-term reliability of surface water supplies in the FKC, or the same level of operational flexibility due to the temporary/seasonal nature of the pumps installed under the Seasonal Alternative. FWA will consider feedback during the public review phase of the Draft EIR on the environmental benefits and impacts and mitigation measures of each alternative when developing the Final EIR and considering whether to approve the proposed project or one of the project alternatives.

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Chapter 6 Cumulative Effects

Section 15130 of the CEQA Guidelines states that “an EIR shall discuss cumulative impacts of a project when the project’s incremental effect is cumulatively considerable, as defined in Guidelines Section 15065(a)(3).” Guidelines Section 15065 defines cumulatively considerable to mean “the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects” Where a project’s contribution to a significant cumulative impact is cumulatively considerable, Section 15130(b) explains the requirements for an adequate discussion of cumulative impacts in an EIR:

“The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact. The following elements are necessary to an adequate discussion of significant cumulative impacts:

(1) Either:

(A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or

(B) A summary of projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include: a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program. Any such document shall be referenced and made available to the public at a location specified by the lead agency.”

This chapter provides an analysis of the cumulative effects of the proposed project, Low Flow Alternative, and Seasonal Alternative considering other past, present, and reasonably foreseeable probable future projects (or actions), consistent with CEQA Guidelines (Section 15130).

Resource -specific cumulative effects analyses are presented. Only resources resulting in less than significant impacts or greater, under the proposed project or alternatives, are evaluated. Descriptions of the cumulative projects are provided in Appendix C.

6.1 Cumulative Effects Analysis

6.1.1 Aesthetics

Construction of the proposed project and Low Flow Alternative would result in less than significant impacts to aesthetic resources due to construction staging and lighting. Because of the short

construction duration (1-day) and limited construction equipment required under the Seasonal Alternative, there would be no impacts to aesthetic resources, and therefore not cumulatively considerable. Most of the construction activities associated with the cumulative projects described in Appendix C would not be located in areas at which activities related to the proposed project or Low Flow Alternative would be visible concurrently. While construction activities associated with the FKC Middle Reach Capacity Correction Project and the DEID Turnipseed Water Bank Expansion would occur along or near the FKC, construction of these projects would be completed prior to the start of construction for the proposed project or Low Flow Alternative in 2025. As such, the introduction of construction equipment, lighting, and traffic associated with the construction of the cumulative projects and the proposed project or the Low Flow Alternative would not be visible at the same time. **There would be no significant cumulative impacts on aesthetics.**

6.1.2 Air Quality

Air pollution is largely a cumulative impact, as a region's nonattainment of the CAAQS and NAAQS is the product of past and present development within the region. While no one project can determine the region's attainment status, it can add to any existing air quality issues and have a significant cumulative effect. SJVAPCD air quality guidance states that an individual project that is compliant with an approved air quality attainment or maintenance plan would have an incremental contribution to a cumulative effect that is not cumulatively considerable (SJVAPCD 2015). Prior to mitigation, total construction-related NO_x would exceed SJVAPCD's annual significance threshold for both the proposed project and the Low Flow Alternative. This potentially cumulative impact would be reduced through the implementation of Mitigation Measure AQ-1. It is expected that each of the cumulative projects presented in Appendix C would also be required to implement mitigation measures to reduce significant project emissions. Operation of the proposed project and alternatives would not result in increased emissions over the long term and would therefore not contribute to a long-term cumulatively considerable impact. **With implementation of Mitigation Measure AQ-1, neither the proposed project nor the Low Flow Alternative would individually result in an exceedance of SJVAPCD's thresholds and therefore would not result in cumulatively considerable impacts on air quality post mitigation.**

6.1.3 Biological Resources – Aquatic

As described in Section 4.4 and Section 5.4.3, construction actions performed under the proposed project and alternatives would be conducted in accordance with the mitigation measures listed in Section 4.4 and Section 5.4.3 and detailed in Section 4.18. With implementation of these mitigation measures, project-related impacts would be less than significant. Of the cumulative projects described in Appendix C, none would require construction that would occur in the same vicinity and/or timeframe as construction of either the proposed project, Low Flow Alternative, or Seasonal Alternative; therefore, no changes to water levels or water quality are expected to occur in the project sites from the construction of the cumulative projects. Therefore, the impact of these cumulative projects, in combination with the proposed project, would not result in any cumulative impacts. Other regional projects that may impact water quality, and therefore aquatic habitat resources, include the Central Valley Salinity Alternatives for Long-term Sustainability and the San Joaquin River Salinity Management Plan, both of which have the potential to improve the conditions of aquatic habitats within the project area. **In summary, there are no cumulative projects that would result in adverse effects that, in combination with the proposed project or the alternatives, would result in a cumulative construction-related impact to aquatic biological resources.**

Operation of the proposed project and alternatives may result in minor changes to the water levels within the FKC; however, as discussed in Section 4.4 and 5.4.3, these changes would be within the normal annual range of conditions in the canal and would not significantly impact aquatic resources within or near the project area. It is expected that the projects described in Appendix C would be required to comply with a suite of laws and regulations protecting and mitigating impacts on aquatic biological resources, similar to those listed in Appendix D. **Therefore, there would be no cumulative operational impacts on aquatic resources.**

6.1.4 Biological Resources – Terrestrial

Cumulative impacts on terrestrial resources would occur if the geographic extent of impacts from other projects were to overlap with areas impacted by the proposed project, Low Flow Alternative, or Seasonal Alternative. As described in Section 4.5 and Section 5.4.4, construction actions performed under the proposed project and alternatives would be conducted in accordance with the mitigation measures listed in Section 4.5 and Section 5.4.4 and detailed in Section 4.18. with implementation of these mitigation measures, project-related impacts would be less than significant. Of the cumulative projects described in Appendix C, none would require construction that would occur in the same vicinity and/or timeframe as construction of the proposed project and alternatives; therefore, no short-term impacts from construction of cumulative projects are expected to occur concurrently with implementation of the proposed project and alternatives. **Neither the proposed project nor the alternatives, in conjunction with the other cumulative projects, would result in any cumulative construction-related impacts.**

Operational impacts of the proposed project and alternatives on terrestrial biological resources would be less than significant. Additionally, there are no anticipated operational impacts associated with any of the projects described in Appendix C that would have the potential to impact terrestrial resources in the project area over the long-term. Furthermore, it is expected that each of the cumulative projects would be required to comply with a suite of laws and regulations protecting and mitigating impacts on biological resources, similar to those listed in Appendix D. **Therefore, there would be no cumulative operational impacts on terrestrial resources.**

6.1.5 Cultural Resources

Under the proposed project, Low Flow Alternative, and Seasonal Alternative, construction would have a direct effect on the FKC, however activities are not expected to alter the character-defining features of the FKC that qualify it for inclusion in the NRHP. In addition, construction associated with the proposed project, Low Flow Alternative, and Seasonal Alternative could result in impacts associated with inadvertent discovery of archaeological resources and historical human remains during excavation activities. This impact would be reduced to a level that is less than significant through the implementation of Mitigation Measure CUL-1. The FKC Middle Reach Capacity Correction Project and Delta Conveyance Project have been identified as cumulative actions that could result in significant impacts to cultural resources. Archival and records search information, geoarchaeological sensitivity studies, and pedestrian inventory surveys were used to assess potential impacts to cultural resources within the project area of analysis. The cumulative projects listed in Appendix C could have a cumulatively significant effect on cultural resources, though impacts would be reduced through the implementation of mitigation measures associated with each project. Impacts to cultural resources from construction and operations under the proposed project or alternatives also would be reduced through implementation of Mitigation Measure CUL-1. **For this**

reason, the cumulative impacts of the proposed project alternatives, when combined with concurrent projects, would be less than significant.

6.1.6 Geology, Seismicity, and Soils

Potential construction activities associated with the proposed project, Low Flow Alternative, and Seasonal Alternative could result in impacts associated with the inadvertent discovery of paleontological resources during excavation. This impact would be reduced to a level that is less than significant through the implementation of Mitigation Measure PR-1. In addition, earthmoving activities under the proposed project, Low Flow Alternative, Seasonal Alternative could result in erosion or loss of topsoil. Construction activities associated with the FKC Middle Reach Capacity Correction Project and DEID Turnipseed Water Bank Expansion would involve earthmoving and construction projects near or along the FKC, which could also result in impacts such as erosion or loss of topsoil. However, as detailed in Section 4.7.3, the soils in the area have a relatively low risk of wind erosion when left in a dry, unvegetated condition. **Therefore, the proposed project or alternatives' incremental contribution to any significant cumulative geologic, seismic and soil impacts would each not be cumulatively considerable.**

6.1.7 Greenhouse Gases

Impacts from GHG emissions are inherently cumulative, with global emissions of GHG contributing to global and regional climate impacts. Implementation of the cumulative projects presented in Appendix C would emit GHGs during construction and operation that would contribute to cumulative GHG emissions in the region. No single project can noticeably change the global climate temperature; therefore, when considered in relationship to all past, present, and future development, implementation of the proposed project or alternatives could result in a significant cumulative impact. The significance criterion used to assess the proposed project and alternatives' individual significance is sufficient to determine whether a project would conflict with an applicable plan, policy, or regulation adopted for reducing GHG emissions for which project-specific thresholds have been set. Therefore, if the proposed project and alternatives would produce GHG emission impacts that are individually significant, then the proposed project and alternatives' impacts would be cumulatively considerable. GHG emissions under the proposed project and alternatives would be below the identified criteria and would not produce significant GHG emission impacts. **Therefore, the incremental contribution of the proposed project or alternatives would not be cumulatively considerable to global and regional climate impacts.**

6.1.8 Hazards and Hazardous Materials

Construction and operation of the proposed project and alternatives would use equipment that would require the use of motor oil, gasoline, diesel fuel, solvents, and degreasers that if spilled could result in an impact. This impact would be reduced through the implementation of Mitigation Measure HAZ-1 and Mitigation Measure TR-1. Construction and operational activities under the cumulative projects would also use equipment that would require the use of motor oil, gasoline, diesel fuel, solvents, and degreasers. It is expected that each of the cumulative projects presented in Appendix C would also be required to implement mitigation measures to reduce impacts associated with hazards and hazardous materials. **Therefore, the incremental contribution to significant cumulative hazardous impacts under the proposed project or alternatives would not be cumulatively considerable.**

6.1.9 Hydrology and Water Resources – Surface Water

Construction activities associated with the proposed project, Low Flow Alternative, and Seasonal Alternative could result in localized degradation of surface water quality. This impact would be reduced to a level that is less than significant through the implementation of Mitigation Measures WR-1 and HAZ-1. Operations of the proposed project, Low Flow Alternative, and Seasonal Alternative would be subject to the Water Quality Guidelines and, as such, would not violate water quality standards or waste discharge requirements. As a result, impacts would be less than significant. Many of the cumulative projects described in Appendix C are likely to result in construction- and operations-related changes to the volume and water quality conditions of available surface water supplies in the region. It is expected that each of the cumulative projects presented in Appendix C would also be required to implement mitigation measures and/or BMPs to reduce significant construction-related project effects on surface water quality. Moreover, the cumulative projects would be subject to water quality standards and/or waste discharge requirements, including the Water Quality Guidelines and other local, state and federal regulations, which would ensure that their operational impacts would be less than significant. With implementation of mitigation measures and adherence to regulatory requirements, **cumulative impacts to surface water quality associated with construction and operations of the proposed project, Low Flow Alternative, or Seasonal Alternative, in combination with other cumulative projects, would be less than significant.**

Construction activities of the proposed project and alternatives could temporarily alter existing drainage patterns and may increase surface runoff where construction would take place. However, the creation and implementation of an SWPPP, required under Mitigation Measure HAZ-1, would ensure that stormwater during and after construction is captured and runoff velocity is reduced. As a result, impacts would be reduced to a level that is less than significant. The proposed project and alternatives would not alter drainage patterns or increase surface water runoff during operations. Construction activities and operations associated with the cumulative projects described in Appendix C could also alter existing drainage patterns and increase surface runoff. These activities would not occur in the same vicinity and/or timeframe as construction of either the proposed project, Low Flow Alternative, or Seasonal Alternative. **Therefore, there would be no cumulative impacts to drainage patterns or surface runoff from the proposed project or alternatives in combination with cumulative projects.**

6.1.10 Hydrology and Water Resources – Groundwater

Construction of the proposed project, Low Flow Alternative, and Seasonal Alternative would not have adverse effects on groundwater supplies. Therefore, **the proposed project and alternatives would not contribute to any cumulative impacts related to groundwater supplies.**

Construction activities associated with the proposed project, Low Flow Alternative, and Seasonal Alternative could result in significant, localized degradation of groundwater quality. This impact would be reduced to a level that is less than significant through the implementation of Mitigation Measure WR-1 HAZ-1. Many of the cumulative projects described in Appendix C are likely to result in construction-related impacts to groundwater quality similar to the proposed project, Low Flow Alternative, and Seasonal Alternative. It is expected that each of the cumulative projects presented in Appendix C would also be required to implement mitigation measures and/or BMPs to reduce significant project effects on groundwater quality. **With implementation of mitigation measures and adherence to regulatory requirements, cumulative impacts on groundwater quality**

conditions from construction of the proposed project, Low Flow Alternative, or Seasonal Alternative, in combination with the cumulative projects described in Appendix C, would be less than significant.

Operations of the proposed project, Low Flow Alternative, and Seasonal Alternative are expected to affect groundwater quality conditions. Implementation of state and/or local regulatory programs, such as CV-SALTS, a project described in Appendix C, are intended to improve groundwater quality conditions in the region. However, due to elevated concentrations of TDS, nitrate, and constituents of consideration present in groundwater within the study area, operations of the proposed project, Low Flow Alternative, and Seasonal Alternative are expected to exceed regulatory thresholds for groundwater quality. Impacts from the proposed project, Low Flow Alternative, and Seasonal Alternative would be significant and unavoidable. Many of the cumulative projects described in Appendix C are likely to alter groundwater conditions in the project area indirectly through changes in volume and water quality conditions of available surface water supplies and directly through changes in management of groundwater resources in the region. Implementation of the proposed project, Low Flow Alternative, or Seasonal Alternative, in conjunction with cumulative projects, would result in a significant cumulative impact to groundwater quality. **Because the proposed project, Low Flow Alternative, or Seasonal Alternative would have individually significant and unavoidable impacts, the contribution of the proposed project or the alternatives to the significant cumulative impacts to groundwater quality conditions would be cumulatively considerable.**

Operations of the proposed project, Low Flow Alternative, and Seasonal Alternative would result in an increase in available surface water supplies and potential decreases in groundwater pumping throughout the study area, resulting in beneficial effects to groundwater supplies. Operations of the cumulative water supply projects described in Appendix C would result in an increase in available surface water supplies and support conjunctive use activities within the study area, potentially decreasing groundwater pumping, resulting in beneficial effects. **Therefore, it is anticipated that operations of the proposed project or alternatives, in combination with other cumulative projects, would not result in cumulatively considerable impacts to groundwater supplies.**

6.1.11 Noise and Vibration

The use of construction equipment near sensitive receptors and the necessity of nighttime construction under the proposed project and the Low Flow Alternative would cause a significant increase in ambient noise levels in project vicinity. While the construction activities proposed under the cumulative projects presented in Appendix C require the use of construction equipment and vehicles, which may contribute to an increase in ambient noise levels, the cumulative projects would not occur in the same vicinity and/or timeframe as construction of the proposed project nor the alternatives. **The contribution of the proposed project and the Low Flow Alternative to temporary significant cumulative noise impacts during construction would be cumulatively considerable and remain cumulatively considerable.** Noise increases during construction of the Seasonal Alternative would be temporary and consistent with the existing noise setting, resulting in less than significant impacts. **Therefore, the Seasonal Alternative's incremental contribution to temporary noise impacts would not be cumulatively considerable.**

Operation of the proposed project and alternatives would each not have significant permanent noise-related impacts and would not contribute to any cumulative noise impacts.

Nitrate

As shown in Table 5-12, starting concentrations of nitrate in groundwater are higher than the significance threshold of 10 mg/L for 5 of the 11 districts evaluated. Simulations for the Low Flow Alternative showed nitrate concentrations steadily decreasing during the simulation period in most (9 of 11) districts, except for KTWD and Porterville ID. For KTWD, simulated nitrate concentrations in groundwater increased over the simulation period under the Low Flow Alternative but did not exceed the specified significance threshold. Simulated nitrate concentrations in groundwater for Porterville ID rapidly increased to slightly above the threshold, specifically during a hydrologically dry period (when additional groundwater pumping is needed to meet water demands), before quickly returning to below the threshold. For TBID, simulated nitrate concentrations in groundwater remained well above the significance threshold for the entire simulation period. Because several districts have starting concentrations of nitrate well above the 10 mg/L threshold and/or see slight exceedances, groundwater beneficial uses could be adversely affected within some districts under the Low Flow Alternative. However, nitrate concentrations in groundwater generally decrease under the proposed project for most districts during the simulation period.

Table 5-12. Simulated Changes in Concentration of Nitrate in Groundwater for the Low Flow Alternative Under Existing and Future Conditions

District	Starting Concentration (mg/L)	Simulated Ending Concentration (mg/L)		Simulated Maximum Concentration (mg/L)		Significance Threshold (mg/L)
		Existing Conditions	Future Conditions	Existing Conditions	Future Conditions	
AEWSD	7.7	5.5	5.6	7.7	7.7	10
SWID	9.2	5.4	5.7	9.2	9.2	10
SSJMUD	8.8	5.9	6.1	8.8	8.8	10
KTWD	5.1	7.7	8.0	8.3	8.5	10
DEID	9.2	1.8	2.1	9.2	9.2	10
TBID	27.3	12.8	13.0	27.3	27.3	10
SID	10.0	2.6	2.7	10.0	10.0	10
Pixley ID	9.8	5.3	4.7	9.8	9.8	10
TPDWD	20.4	6.0	6.2	20.4	20.4	10
Porterville ID	15.3	3.4	3.2	15.3	15.3	10
LTRID	15.9	2.1	2.1	15.9	15.9	10

Note: Values in **bold** indicate exceedance of the threshold.

Key: AEWSD – Arvin-Edison Water Storage District, SWID – Shafter-Wasco Irrigation District, SSJMUD – Southern San Joaquin Municipal Utility District, KTWD – Kern-Tulare Water District, DEID – Delano-Earlimart Irrigation District, TBID – Terra Bella Irrigation District, SID – Saucelito Irrigation District, ID – Irrigation District, TPDWD – Tea Pot Dome Water District, LTRID – Lower Tule River Irrigation District

In addition, groundwater quality analysis performed to assess impacts of the Low Flow Alternative focused on changes in concentrations of nitrate, in applied water and did not consider site-specific, on-farm application of fertilizers (e.g., nitrate) and/or soil amendments.

There are no feasible mitigation measures that could be implemented at a project scale to reduce potential adverse impacts from nitrate concentrations. However, at a basin level, potential adverse impacts under the Low Flow Alternative (whether from project operations or on-farm practices)

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

the proposed project and alternatives' construction activities and the presence of construction workers would be met by existing local facilities.

The new, permanent pump-back facilities constructed under the proposed project and the Low Flow Alternative would create a new demand for electricity, however, the existing energy capacity would be sufficient to supply the increase in demand generated by the new pumps. Under the Seasonal Alternative, the pumps would be powered either by diesel generators or the installation of permanent power. The new demand in electricity would be met by current energy production. The proposed project and alternatives would use standard construction equipment fueled by gasoline or diesel, the demand for which could be met by regional supplies. It is expected that the cumulative projects would also use standard construction equipment which could be met by regional supplies and any new energy demand would be met by current production. In addition, the cumulative groundwater recharge and banking projects, presented in Appendix C, could lower energy use associated with groundwater pumping. **Therefore, the construction and operation of the proposed project or alternatives in combination with concurrent projects would each not result in significant cumulative impacts on public utilities and power.**

Chapter 7 Disclosures, Coordination, and Supplemental Material

CEQA requires consideration of irreversible and irretrievable commitments of resources, significant and unavoidable impacts, growth-inducing impacts, relationship between short-term uses and long-term productivity, and areas of controversy and issues to be resolved. These considerations are described in this chapter. In addition, this chapter summarizes activities undertaken by FWA for public and agency involvement required for the FKC Pump-Back Project. Appendix D contains a complete list of regulatory requirements necessary for implementation of the FKC Pump-Back Project alternatives.

7.1 Irreversible and Irretrievable Commitment of Resources

Construction of the proposed project and alternatives evaluated in this Draft EIR would involve the consumption of nonrenewable natural resources. These nonrenewable natural resources would consist of petroleum for fuels necessary to operate equipment used during construction activities. This would include generation of waste from earthmoving activities and excavation. Under the proposed project and the Low Flow Alternative, materials excavated from the Shafter-Wasco site would be hauled using SR 99 for use at the Lake Woollomes and Deer Creek sites. Construction waste from the disposal of nonsoil materials removed during construction would be hauled to regional landfills. Petroleum fuels would be used to haul these materials to the disposal sites. In addition to the fuels used in transportation, the use of disposal sites would constitute an irreversible and irretrievable commitment of resources.

7.2 Significant and Unavoidable Impacts

Significant and unavoidable adverse effects refer to the environmental consequences of an action that cannot be avoided by redesigning the project, changing the nature of the project, or implementing mitigation measures. CEQA Guidelines require a discussion of significant environmental effects that cannot be avoided and those that can be mitigated but not reduced to an insignificant level (Sections 15126.2(a) and 15126.2(b)). This section discusses the significant and unavoidable impacts of the proposed project, Low Flow Alternative, and Seasonal Alternative presented in Chapters 4 and 5.

Under the proposed project and Low Flow Alternative, construction activities could cause a substantial temporary or permanent increase in ambient noise levels in the project vicinity in excess of standards. Even after implementation of Mitigation Measure NOI-1: NCP, the impacts would remain significant and unavoidable. The full evaluation of noise impacts is presented in Sections 4.12.3 and 5.4.11.

Project operations under the proposed project, Low Flow Alternative, and Seasonal Alternative are expected to result in groundwater quality conditions that impair beneficial uses of groundwater,

attributed mostly to elevated concentrations of TDS, nitrate, and constituents of consideration present in groundwater within the study area. Although implementation of state and/or local control programs, including CV-SALTS, may reduce adverse effects on groundwater quality conditions, concentrations of groundwater quality constituents under the Low Flow Alternative are expected to exceed the thresholds and remain significant and unavoidable. The full evaluation of groundwater impacts is presented in Sections 4.11.3 and 5.4.10.

7.3 Growth-Inducing Impacts

Direct growth-inducing impacts generally stem from the construction of new housing, businesses, or infrastructure. Indirect growth inducement could result if a project establishes substantial new permanent employment opportunities or if it would remove obstacles hindering population growth, such as the expansion or the provision of urban services and infrastructure in an undeveloped area. Under CEQA, growth inducement may not necessarily be considered detrimental, beneficial, or of insignificant consequence. Induced growth is considered a significant impact only if it directly (or indirectly) affects the ability of agencies to provide needed public services or if it can be demonstrated that the potential growth significantly affects the environment.

The proposed project, the Low Flow Alternative, and Seasonal Alternative would each not result in new housing construction, either directly or indirectly. The proposed project, Low Flow Alternative, and Seasonal Alternative would each provide increased reliability and operational flexibility of the FKC but would not provide additional water supply to Friant Contractors. The proposed project, Low Flow Alternative, and Seasonal Alternative do not provide additional sources of water that could be used to approve specific development projects by local agencies. In addition, the proposed project and Low Flow Alternative would not provide new sewer, electricity, or natural gas infrastructure or facilities. The Seasonal Alternative may require additional permanent electric power be installed at the Shafter-Wasco and Lake Woollomes sites; however, the additional power would only be sufficient to support the operation of the seasonal pumps. The proposed project, the Low Flow Alternative, and Seasonal Alternative would each not require or create any new public services such as schools, public services, or public roads that could support increased growth in the study area. Therefore, the proposed project, the Low Flow Alternative, and Seasonal Alternative would each not induce growth.

The proposed project and the Low Flow Alternative would require construction workers to perform the necessary construction work. Any employment required for the proposed project and Low Flow Alternative would be temporary and would be needed only during a construction period of up to 8 months. Construction workers would likely commute to the sites from the surrounding local communities or find temporary accommodations for the construction duration. The Seasonal Alternative would require a crew of one to two workers to install the seasonal pumps at the Shafter-Wasco and Lake Woollomes sites. The small work crew, under the Seasonal Alternative, would likely commute from the surrounding local communities, which would only be required during the 1-day work period. Thus, there would be no need for new housing construction. Implementation of the proposed project, the Low Flow Alternative, and Seasonal Alternative would each not generate any permanent employment opportunities that would attract a substantial number of people to the region.

7.4 Areas of Controversy and Issues to be Resolved

Section 15123 of the CEQA Guidelines requires disclosure of areas of controversy raised by agencies and the public and disclosure of issues to be resolved. Table 7-1 summarizes comments received during the scoping period. The Public Scoping Report (Appendix K) provides further information on issues identified by agencies and the public during the public scoping process. Issues to be resolved include the final selection of the proposed action/project and final selection of mitigation measures to reduce significant impacts.

Table 7-1. Comments Received During the Public Scoping Period

Area of Controversy/Issue	Summary of Issue	EIR Section or Appendix Addressing Area of Controversy/Issue
Project Description	Provide a project description that details the project footprint, construction methods and materials, and ground disturbance, including identifying adjacent roads and property ownership and any special conditions needed for project work.	Chapter 2, Project Description
Water Rights	Discuss the source of recirculated water, detailing all water rights and water entitlements pertaining to the project.	Chapter 2, Project Description
Water Supply	Evaluate how SWP facilities would be used during operations, considering potential impacts to the California Aqueduct and San Luis Canal.	Chapter 2, Project Description; Section 4.10, Hydrology and Water Resources – Surface Water
Water Quality	Evaluate potential adverse water quality impacts to state water contractor members relying on the California Aqueduct and San Luis Canal.	Chapter 2, Project Description; Section 4.10, Hydrology and Water Resources – Surface Water
Groundwater	Evaluate how the project will address and correct overdraft conditions for the groundwater basin and how the project will affect groundwater-dependent ecosystems and interconnected surface waters.	Section 4.5, Biological Resources – Terrestrial; Section 4.11, Hydrology and Water Resources – Groundwater
Tribal and Cultural Resources	Comply with CEQA, specifically Assembly Bill 52 and Senate Bill 18; Native American Tribal contact lists and Sacred Lands files and searches should be requested from the NAHC; analysis should be based on archaeological record searches at the appropriate regional California Historical Resources Information System Center and on required field survey results; include a mitigation and monitoring reporting program to avoid or minimize impacts.	Sections 3.6, 4.6, 5.4.5, and 6.1.5 – Cultural Resources; Sections 3.15 and 4.16, Tribal Cultural Resources; Section 4.18, Mitigation Measures

Area of Controversy/Issue	Summary of Issue	EIR Section or Appendix Addressing Area of Controversy/Issue
Biological Resources	Fully evaluate all potential direct, indirect, and cumulative impacts on wetlands, vegetation, and all petitioned and listed species and critical habitat; conduct habitat assessment/field survey by a qualified biologist; conduct pre-activity surveys or employ buffers and other mitigation techniques for bird nests and biological resources; conduct formal stream mapping and wetland delineation; engage with USFWS as early in the process as possible.	Sections 3.3, 4.4, 5.4.3, and 6.1.3, Biological Resources – Aquatic; Sections 3.4, 4.5, 5.4.4, and 6.1.4, Biological Resources – Terrestrial; Appendix H, Biological Survey Report

Key: CEQA – California Environmental Quality Act; NAHC – Native American Heritage Commission;
USFWS – U.S. Fish and Wildlife Service

7.5 Distribution List

Copies of the Draft EIR will be sent to the agencies and organizations listed in Table 7-2.

Table 7-2. Distribution List

Federal Agencies	
National Marine Fisheries Service	U.S. Department of the Interior, Office of the Solicitor
U.S. Army Corps of Engineers	U.S. Department of Justice
Bureau of Indian Affairs	U.S. Environmental Protection Agency
U.S. Department of the Interior, Bureau of Land Management	U.S. Fish and Wildlife Service
State Agencies	
California Bay-Delta Authority	California Office of Historic Preservation
California Department of Fish and Wildlife	California Regional Water Quality Control Board, Region 5
California Department of Transportation	California State Water Resources Control Board
California Department of Water Resources	Native American Heritage Commission
California Environmental Protection Agency	
Regional and Local Agencies	
Kern County	Merced County
San Joaquin Valley Air Pollution Control District	Tulare County
Madera County	Fresno County

Chapter 8 List of Preparers

This EIR was prepared by FWA. Staff who prepared various sections of the EIR or significant background materials, or participated significantly in preparing this EIR are listed in Table 8-1 and Table 8-2.

Table 8-1. CEQA Lead Agency

Preparer	Agency	Role In Preparation
Ian Buck-Macleod	FWA	Project objective identification, alternative formulation, EIR development and review
Katie Duncan	FWA	Project objective identification, alternative formulation, EIR development and review
John Slater	FWA	Project objective identification, alternative formulation, EIR review

Key: EIS/EIR – Environmental Impact Statement/ Environmental Impact Report, FWA – Friant Water Authority.

Table 8-2. Consultants

Preparer	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
CDM Smith			
Christopher Park, AICP, PMP	MS, City and Regional Planning 18 years' experience	Water resources planner	Project manager, technical review
Anusha Kashyap	MS, Environmental Engineering 15 years' experience	Environmental engineer	Project management, introduction, project description
Laura Campagna	BS, Environmental Studies 7 years' experience	Environmental planner	Document review and revision, noise, air quality, greenhouse gases
Greta Gledhill	BS, Environmental Policy Analysis and Planning 2 years' experience	Environmental planner	Document review and revision, project description, utilities and power, environmental justice
Jenna Quan	BS, Ecology, Evolution, and Biodiversity 2 years' experience	Environmental planner	Terrestrial and aquatic resources
Gwen Pelletier	MS, Environmental Studies 13 years' experience	Environmental scientist	Air quality and greenhouse gases
Samuel Bankston	BS, Aquatic Biology 8 years' experience	Biologist	Terrestrial and aquatic resources
Jennifer Jones	BA, Biology; MS, Environmental Science 20 years' experience	Wildlife biologist	Technical review of terrestrial and aquatic resources

Friant-Kern Canal Pump-Back Project
Draft Environmental Impact Report

Preparer	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
John Wondolleck	BS, Biology; MS, Zoology 47 years' experience	Environmental management	Technical review
Terry Crowell	BS, Biology 29 years' experience	Quality assurance and technical editing	Editorial review
Pacific Legacy			
Lisa Holm, PhD	PhD, Archaeology 28 years' experience	Archaeologist	Cultural resources
John Holson, RPA	MA, Anthropology, CRM 43 years' experience	Archaeologist	Project manager, principal investigator
Provost and Pritchard			
Alex Collins	BS, Bioresource & Agriculture Engineering 18 years' experience	Water Resource Engineer	Principal Engineer, Project Manager
Trevor Sa	MS, Water Engineering BS, Bioresource & Agriculture Engineering 9 years' experience	Water Resource Engineer	Lead Project Engineer
Miguel Jimenez	BS, Civil Engineering 7 years' experience	Water Resource Engineer	Project Engineer
Jim Hansen	BS, Architectural Engineering 45 years' experience	Structural Engineer	Structural Engineer
Mike Brosseau	BS, Civil Engineering 8 years' experience	Water Resource Engineer	Project Engineer
Jose Amezcua	MS, Agriculture, Spec. in Water Engineering B.S., Bioresource & Agriculture Engineering 2 years' experience	Water Resource Engineer	Project Engineer
Stantec			
Jamil Ibrahim, PH	MS, Hydrologic Science; BS, Environmental Studies 26 years' experience	Senior Principal Hydrologist	Hydrology and Water Resources
Sarah Hamilton, PE	MS, Civil Engineering; BEng, Bioproducts and Biosystems Engineering 7 years' experience	Water Resources Engineer	Hydrology and Water Resources
Kevin Werbylo, PE	MS, Civil Engineering; BS, Environmental Engineering 11 years' experience	Water Resources Engineer	Hydrology and Water Resources
Arielle Gervasi	MS, Hydrologic Sciences; BS, Biology; B.A., Environmental Studies 9 years' experience	Water Resources Planner	Hydrology and Water Resources
Heather Waldrop	BS, Environmental Studies 24 years' experience	Senior Water Resources Specialist	Hydrology and Water Resources

Preparer	Degree(s)/Years of Experience	Experience and Expertise	Role In Preparation
Luhdorff & Scalmanini Consulting Engineers			
Barbara Dalgish, PG	MS, Hydrologic Science; BA, Geology 21 years' experience	Supervising Hydrogeologist	Hydrology and Water Resources - Groundwater Modeling
Pavan Dhaliwal	MS, Hydrologic Science; BS, Cognitive Systems 13 years' experience	Senior Hydrogeologist	Hydrology and Water Resources - Groundwater Modeling
Will Halligan, PG	MS, Geoscience; BS, Geology 30 years' experience	Senior Principal Hydrogeologist	Hydrology and Water Resources - Groundwater Modeling

Key: AICP – Association of Certified Planners, BA – Bachelor of Arts, B Eng – Bachelor of Engineering, BS – Bachelor of Science, CA – Certified Arborist, CERP – Certified Ecological Restoration Practitioner, CWB – Certified Wildlife Biologist, MS – Master of Science, PhD – Doctor of Philosophy, PE – Professional Engineer, PG – Professional Geologist, PH – Professional Hydrologist, RCA – Registered Consulting Arborist

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Chapter 4 – Environmental Impacts

4.1 – Resources Considered and Eliminated from Analysis

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Chapter 7 – Disclosures, Consultation, and Coordination

No references.



Friant-Kern Canal Pump-Back Project
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October 2024