

Friant-Kern Canal Pump-Back Project Environmental Impact Report

Appendix A: Existing Conditions and Foreseeable Future Conditions

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Appendix A Existing Conditions and Foreseeable Future Conditions

This appendix includes additional information on the water resource projects in the study area that are included under existing conditions or as components of the No Project Alternative.

A.1 Existing Conditions

As described in Section 15125 of the CEQA Guidelines, “the environmental setting will normally constitute the baseline conditions by which a lead agency determines whether an impact is significant.” The environmental setting or existing conditions is defined as the “physical environmental conditions as they exist at the time the notice of preparation is published”. Table A-1 lists the water resources projects in the study area included under existing conditions. Section A.3 provides a summary of each project.

Table A-1. Projects Included in Existing Conditions

Fresno Irrigation District Gould Canal to Friant-Kern Canal Intertie Project
Delta Lands Program
Warren Act Contract for Kern Tulare Water District and Lindsay-Strathmore Irrigation District
Terra Bella Irrigation District Warren Act Agreement for Tule River Water
Kaweah River Warren Act Agreements
Shafter-Wasco Irrigation District 5-Year Warren Act Agreement for Kern River Water
Ivanhoe Irrigation District Warren Act Agreement of Kaweah River
Table Mountain Rancheria 25-Year Warren Act Contract
Kern-Tulare Water District/ North Kern Water Storage District Banking Program
Delano-Earlimart Irrigation District/ North Kern Water Storage District Banking Program
Friant Division Groundwater Pump-In Program
Poso Creek Integrated Regional Water Management Plan
Kimberlina Groundwater Recharge Basin and Banking Program
Cawelo Water District Long-Term Warren Act Contract
San Joaquin River Restoration Program
Kern-Tulare Water District/ Rosedale Rio Bravo Water Storage District Banking Project
Delano-Earlimart Irrigation District/Rosedale Rio Bravo Water Storage District Banking Project
Kern-Tulare Water District/West Kern Groundwater Banking Project
Central Valley Project Interim Renewal Contracts

A.2 No Project Alternative – Foreseeable Future Condition

The No Project Alternative evaluated in the FKC Pump-Back EIR includes projected conditions as they would exist in the study area at the end of the planning horizon (2040). Table A-2 lists the water resources projects in the study area included under the foreseeable future conditions. Section A.3 provides a summary of each project.

Table A-2. Future Projects Included in the No Project Alternative

Fresno Irrigation District Gould Canal to Friant-Kern Canal Intertie Project
Delta Lands Program
Warren Act Contract for Kern Tulare Water District and Lindsay-Strathmore Irrigation District
Tule River Water Warren Act Agreement
Ivanhoe Irrigation District Warren Act Agreement of Kaweah River
Kern-Tulare Water District/ North Kern Water Storage District Banking Program
Delano-Earlimart Irrigation District/ North Kern Water Storage District Banking Program
Friant-Kern Canal Groundwater Pump-In Program
Poso Creek Integrated Regional Water Management Plan
Kimberlina Groundwater Recharge Basin and Banking Program
Cawelo Water District Long-Term Warren Act Contract
San Joaquin River Restoration Program
Cross Valley Contractors Conversion of Water Supply Contracts and Renewal of Conveyance Contracts
Sustainable Groundwater Management Act

A.3 Projects Included under Existing Conditions and No Project Alternative – Foreseeable Future Condition

This section provides descriptions of the projects in the study area identified for inclusion in existing conditions and the No Project Alternative for this EIR.

A.3.1 Fresno Irrigation District Gould Canal to Friant Kern Canal Intertie Project

In August 2016, the Bureau of Reclamation (Reclamation) and the Fresno Irrigation District (ID) completed a Finding of No Significance (FONSI) to enter into a series of 25-year Warren Act Contracts and/or transfer or exchange agreements for the introduction, storage, and conveyance of up to 50,000 AF per year of Fresno ID's Kings River water and/or previously banked non-CVP groundwater into land through Friant Division facilities. Reclamation also proposed to issue a MP-620 permit to Fresno ID for construction, operation, and maintenance of a new discharge structure at approximately milepost of 27.7 of FKC. Prior to this, Fresno ID installed a temporary pumping facility within Reclamation's right-of-way that temporarily connected the Gould Canal to the FKC in order to provide a mechanism to introduce Fresno ID's non-Project Kings River water into the FKC over a five-year period (Reclamation 2016a). Reclamation analyzed the proposed action in EA-14-003 and a FONSI was issued on August 24, 2016.

A.3.2 Delta Lands Program

Reclamation entered into a one-year Warren Act contract and license with Delta Lands Reclamation District No. 770 (RD770) to utilize otherwise unused capacity in the FKC to convey non-CVP floodwater pumped from the Kings, St John's, and Tule Rivers (Reclamation 2013a). The maximum amount of non-CVP floodwater from the three rivers to be conveyed in the FKC is 250,000 AF. Reclamation analyzed the project and issued a FONSI (FONSI-12-100) in January 2013.

A.3.3 Warren Act Contract for Kern Tulare Water District and Lindsay-Strathmore Irrigation District

This project approved storage, conveyance, and/or diversion of up to 30,000 AF per year of Lindsay-Strathmore ID and Kern-Tulare Water District (WD) non-CVP water in Federal facilities. This contract is currently being implemented until February 2043 (Reclamation 2014). Reclamation analyzed this project and issued a FONSI (FONSI-12-069) in January 2014.

A.3.4 Kaweah River Warren Act Agreements 2019-2023

Reclamation issued Warren Act agreements to the participant districts under Article 18 of their Repayment Contracts through February 2023. Under these agreements, Lindsay-Strathmore Irrigation District would convey up to 7,600 AF of non-CVP Kaweah River water into the FKC. The participant districts would then divert the water at their respective turnouts either directly or by operational exchange (Reclamation 2020a). Table A-6 presents the participant districts' agreement volumes.

Table A-3. Participant Districts' Agreement Volumes

Contractor	Estimated Volume (acre-feet)
Garfield Water District*	300
Hills Valley Irrigation District*	1,600
Orange Cove Irrigation District*	1,700
Exeter Irrigation District	1,000
Terra Bella Irrigation District	3,000

Source: Reclamation 2020a.

A.3.5 Shafter-Wasco Irrigation District 5-Year Warren Act Agreement for Kern River Water

Reclamation issued a 5-year Warren Act agreement to Shafter-Wasco Irrigation District for the introduction and conveyance of up to 5,000 AF of purchased non-CVP water supplies from Buena Vista (Reclamation 2017). Reclamation analyzed this project and issued a FONSI (FONSI-17-024) in December 2017.

A.3.6 Terra Bella Irrigation District Warren Act Agreement for Tule River Water

Reclamation issued a 5-year Warren Act Agreement with Terra Bella ID for the introduction of up to 5,000 AF per year of non-CVP Tule River water into the FKC. Water would be introduced into the FKC from June to August of each year (Reclamation 2020b).

A.3.7 Table Mountain Rancheria 25-Year Warren Act Contract

Reclamation issued a 25-year Warren Act contract for the conveyance and storage of non-CVP groundwater within Friant Division facilities for delivery to Table Mountain Rancheria, or for delivery to Friant Division and Cross Valley Contractors within Fresno County. Up to 50 AF per month of pumped groundwater would be authorized for introduction, totaling up to 600 AF annually (subject to available capacity, 5 percent conveyance losses and water quality requirements) (Reclamation 2019).

A.3.8 Ivanhoe Irrigation District Warren Act Agreement of Kaweah River

Reclamation approved a 5-year Agreement with Ivanhoe ID to receive up to 6,500 AF annually of non-CVP Kaweah River Water from Wutchumna Water Company, Longs Ditch Company, Foothill Ditch Company, Hamilton Ditch Company, and Hawkeye Ditch Company conveyed in FKC (Reclamation 2018a). The non-CVP water would only be introduced into the FKC when there is excess capacity available, as determined by Reclamation. Reclamation analyzed the proposed action in EA-14-003 and a FONSI was issued on June 7, 2018.

A.3.9 Kern-Tulare Water District/North Kern Water Storage District Banking Program

Kern-Tulare WD has developed a long-term groundwater banking program with North Kern Water Storage District (WSD) to deliver water to North Kern WSD for later withdrawal and use by the District. The project yields an annual dry year supply of up to 5,000 AF and improves local groundwater supplies to North Kern. The agreement requires Kern-Tulare WD to bank water before it can be extracted and leave 10% of the water banked in North Kern WSD to account for losses. Supplies available to the Kern-Tulare WD for banking include the District's CVP contract supplies, Section 215 water, flood flows conveyed in FKC, purchases from Friant contractors, and Kern River water (Reclamation 2009a).

Water is either directly recharged in existing spreading works or indirectly recharged by making irrigation deliveries to lands that would otherwise be pumping groundwater. Previously banked water will be returned to Kern-Tulare WD with wells that discharge into FKC. The program facilities include a 200 cubic feet per second turnout from FKC and four wells which discharge directly into FKC (Reclamation 2009a).

A.3.10 Delano-Earlimart Irrigation District/ North Kern Water Storage District Banking Program

Delano-Earlimart ID's completed a groundwater banking agreement in 2006 with North Kern WSD that allowed Delano-Earlimart ID to bank nearly 30,000 AF of surplus 2006 CVP water in North Kern for later withdrawal and use by Delano-Earlimart ID. Withdrawals occurred in both 2007 and 2009 to supplement below-average water years. In 2009, Delano-Earlimart ID entered into negotiations with North Kern WSD to expand the current banking program by allowing additional water to be banked through 2026 (Delano-Earlimart ID 2009). North Kern WSD's groundwater banking program operations utilize over 110 wells throughout the district, discharging at multiple locations along the FKC (North Kern WSD 2018).

A.3.11 Friant Division Groundwater Pump-In Program

In July 2021, Reclamation completed a FONSI (CGB-FONSI-2021-003) to enter into Warren Act Agreements with the CVP contractors located in the Friant Division and physically adjacent to the FKC. The agreements allowed for the introduction of up to 50,000 AF of non-CVP water, with varying amounts from different contractors. The contractors requested Warren Act Agreements to convey pumped groundwater into the FKC for conveyance of such groundwater to their agricultural users. The program is covered until end of contract year 2022 (Reclamation 2021). The program was also implemented in 2014, 2015 through one-year EAs (Reclamation 2016b), and 2016-2022 through a multi-year EA.

A.3.12 Poso Creek Integrated Regional Water Management Plan

Reclamation approved a 25-year groundwater banking, transfer, and exchange program, allowing the Poso Creek Regional Water Management Group to take advantage of water management opportunities during wet periods and the availability of surface water surplus to their immediate in-district needs supplies. All CVP water that is banked, exchanged, or transferred would be kept within the Region and within the CVP authorized place-of-use. This management plan is being implemented until 2037 (Reclamation 2012).

A.3.13 San Joaquin River Restoration Program

The San Joaquin River Restoration Program (SJRRP) is a comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River and restore a self-sustaining Chinook salmon fishery in the river while reducing or avoiding adverse water supply impacts from restoration flows. The restoration program is the product of more than 18 years of litigation, which culminated in a Stipulation of Settlement on the lawsuit known as *Natural Resource Defense Council (NRDC), et al., v. Kirk Rodgers, et al* (Settlement). The settling parties reached agreement on the terms and conditions of the settlement, which was subsequently approved by Federal Court on October 23, 2006. The settling parties include the NRDC, FWA, and the U.S. Departments of the Interior and Commerce. The settlement's two primary goals are to:

- Restore and maintain fish populations in “good condition” in the main stem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish, and;
- Reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the settlement.

The settlement requires specific releases of water from Friant Dam to the confluence of the Merced River, which are designed primarily to meet the various life stage needs for spring- and fall-run Chinook salmon. The release schedule assumes continuation of the current average Friant Dam release of 116,741 AF, with additional flow requirements depending on the year type. Interim flows began in October 2009, and full restoration flows began in January 2014. There are many physical improvements within and near the San Joaquin River that have/will be undertaken to fully achieve the river restoration goal. The improvements will occur in two separate phases that will focus on a combination of water releases from Friant Dam, as well as structural and channel improvements.

The project was authorized and funded with the passage of San Joaquin River Restoration Settlement Act, part of the Omnibus Public Land Management Act of 2009 (Public Law 111-11) (SJRRP 2023a).

Due to operational constraints, including conveyance capacity, ramping rate constraints, scheduled maintenance, reservoir storage, contractual obligations, and downstream seepage concerns, the San Joaquin River Restoration Program is limited in its ability to release Restoration Flows (SJRRP 2023b). The existing conditions and No Action Alternative for this EIS/EIR assumes the inclusion of these operational constraints.

A.3.14 Kimberlina Groundwater Recharge Basin and Banking Program

The Kimberlina Groundwater Recharge Basin and Banking Program is a component of the larger San Joaquin River Restoration Program and its main purpose is to increase the District's ability to capture, recharge, and bank available wet-period surface water supplies in the groundwater aquifer, as well as contributing to the achievement of the settlement Water Management Goal by reducing, avoiding, or offsetting the quantity of expected supply impacts to Friant Division long-term contractors caused by the release of Restoration Flows (SJRRP 2018).

The project is a recently constructed 60 cubic feet per second (cfs) groundwater banking facility within Shafter-Wasco Irrigation District (ID) that can receive deliveries from the FKC and the Calloway Canal. The project takes deliveries from two existing turnouts on the FKC and uses five regional conveyance improvements that allow delivery of water from the California Aqueduct to the new banking facility located off the Calloway Canal at Kimberlina Road. Three wells were constructed adjacent to the spreading facility to recover the banked supplies (SJRRP 2018).

The project provides about 153,000 acre-feet of Recovered Water Account (RWA) reduction over the 30-year Project life cycle for Shafter-Wasco ID and Kern-Tulare Water District (WD), a participating Friant Contractor. Shafter-Wasco ID and Kern-Tulare WD reduced RWA by 1) increasing deliveries of recirculated Restoration Flows from San Luis Reservoir, and 2) increasing deliveries of RWA water from Millerton Lake (SJRRP 2018).

A.3.15 Cawelo Water District Long-Term Warren Act Contract

The Long-Term Warren Act Contract with Cawelo WD conveys up to 20,000 AF of previously banked non-CVP water through the FKC from Cawelo WD for delivery via exchange. In addition, under this project, Reclamation issued Cawelo WD a license to erect, maintain, and operate structures, consisting of a series of discharge systems for the purpose of pumping groundwater across Reclamation's right-of-way and into the FKC (Reclamation 2010).

A.3.16 Kern-Tulare Water District/Rosedale Rio Bravo Water Storage District Banking Project

Rosedale-Rio Bravo WSD entered into its first 2:1 banking program agreement with the Kern-Tulare WD in 2001 for a term of 30 years. Kern-Tulare WD holds a federal water supply contract through the CVP and has access to high-flow water supplies from FKC. This partnership allows Rosedale-Rio Bravo WSD to gain access, through the banking arrangement, to the CVP water supplies. Kern-Tulare WD has delivered over 165,000 AF to Rosedale-Rio Bravo WSD under this agreement, which has generated over 73,000 AF of water supply benefits (Rosedale-Rio Bravo WSD 2018).

A.3.17 Delano-Earlimart Irrigation District/Rosedale Rio Bravo Water Storage District Banking Project

Reclamation approved the banking of Delano-Earlimart ID's CVP and 215 Water (when available) supplies outside of their service area boundary in the Rosedale-Rio Bravo WSD. Delano-Earlimart ID is able to deliver up to 80,000 AF per year to Rosedale-Rio Bravo WSD for banking from March 2010 through February 2026 via transfers, exchanges, or the FKC. Reclamation analyzed this project and issued a FONSI in March 2010 (Reclamation 2009b).

A.3.18 Kern-Tulare Water District/West Kern Groundwater Banking Project

In May 2013, Reclamation completed an Environmental Assessment (EA-11-071) to approve a water banking project in which Kern-Tulare WD would bank up to 40,000 AF per year of CVP and non-CVP water in West Kern WD groundwater bank. The project allows Kern-Tulare WD to benefit from extracted water, including during years of insufficient surface water supplies, to meet its in-district demands (Reclamation 2013b).

A.3.19 Cross Valley Contractors Conversion of Water Supply Contracts and Renewal of Conveyance Contracts

Beginning in 1975, Cross Valley Contractors entered into three-party contracts with Reclamation and California Department of Water Resources (DWR) with Reclamation providing water service and DWR providing conveyance of CVP water through SWP facilities. Cross Valley Contractors have an annual CVP water contract supply of approximately 128,300 AF. However, Cross Valley Contractors are generally unable to directly receive their water and enter exchange and transfer contracts with other parties. Thus, Cross Valley Contractors' CVP water typically comes from Millerton Lake, the FKC, other non-CVP water projects on the east side of the San Joaquin Valley, or from groundwater banks.

The initial interim renewal contracts (referred to as the Central Valley Project Interim Renewal Contracts) were negotiated for the Cross Valley Contractors whose long-term renewal contracts were expiring in 1994. The initial interim renewals covered a 3-year period and outlined that subsequent renewals would only last two years. The two latest interim renewal contracts covered eight contracts from March 2018 through March 2020, and March 2020 through March 2022 (Reclamation 2018b; Reclamation 2020c). Notices of Determination were filed in late 2021 for *Cross Valley Contractors Conversion of Water Supply Contracts and Renewal of Conveyance Contracts*, the latest long-term renewal contract (Lower Tule Water District 2021). The project converts the existing CVP contracts to a repayment contract under the WIIN Act and approves and executes a contract with Reclamation and DWR that renews and updates the terms of the existing 2020-2022 contracts. This project will be implemented until 2035 and includes the execution of up to seven¹ renewal contracts with the Cross Valley Contractors listed in Table B-7 and transfer approvals associated with the Cross Valley Contractor's exchange arrangements with individually proposed exchange partners that coincide with the renewal contracts (Lower Tule River Irrigation District 2021).

¹ Previous interim renewal contracts included the execution of up to eight renewal contracts. In the long-term renewal contract, seven renewal contracts are included as the Rag Gulch Water District (13,300 acre-feet per year) and Kern-Tulare Water District (40,000 acre-feet per year) consolidated into one contractor on January 1, 2009, reducing the number of Cross Valley Contractors to seven (Lower Tule River Irrigation District 2021).

Table A-4. Contractors, Contract Amount, and Expiration Dates

Contractor	Contract Quantity (AFY)	Effective Date of Existing Renewal Contract	Expiration of Existing Renewal Contract
County of Fresno	3,000	12/01/2021	2/28/2035
County of Tulare	5,308	12/01/2021	2/28/2035
Hills Valley Irrigation District*	3,346	11/01/2021	2/28/2035
Kern-Tulare Water District ^{1*}	40,000	11/01/2021	2/28/2035
Kern-Tulare Water District (from Rag Gulch Water District)	13,300	11/01/2021	2/28/2035
Lower Tule River Irrigation District ^{2*}	31,102	11/01/2021	2/28/2035
Pixley Irrigation District ²	31,102	11/01/2021	2/28/2035
Tri-Valley Water District*	1,142	12/02/2021	2/28/2035

Source: Lower Tule River Irrigation 2021; Reclamation 2022.

Notes:

* These contractors also receive CVP water under a Friant Division contract that is not part of the Project.

¹ Cross Valley Contract deliveries to Kern-Tulare Water District are considered under existing conditions

² Cross Valley Contract deliveries to Pixley Irrigation District and Lower Tule River Irrigation District are considered under No Action/No Project- Future Conditions

A.3.20 Sustainable Groundwater Management Act

The State enacted the Sustainable Groundwater Management Act (SGMA) in 2014 through a series of bills establishing a framework for groundwater-dependent areas to be operated in a sustainable manner. SGMA requires that Groundwater Sustainability Agencies (GSA) be created and act as the governing body with respect to groundwater management. The GSA is charged with developing a Groundwater Sustainability Plan (GSP) to outline the regions plans to reach a condition where any overdraft is halted and groundwater is managed sustainably.

Table A-8 provides a summary of the SGMA basin prioritization for each subbasin within the study area. High- and medium-priority groundwater subbasins are required to have a GSP developed by January 31, 2022. GSPs for all the subbasins in the study area have been submitted to DWR and are pending review after receiving a determination of incomplete in January 2022.

Table A-5. Sustainable Groundwater Management Act Basin Prioritization

Subbasin	Groundwater Sustainability Agencies (GSA)	Priority
Tule	Alpaugh GSA Delano-Earlimart Irrigation District GSA Lower Tule River Irrigation District GSA Pixley Irrigation District GSA Eastern Tule GSA County of Tulare GSA - Tule Tri-County Water Authority GSA - Tule	High

Appendix A
Existing Conditions and Foreseeable Future Conditions

Subbasin	Groundwater Sustainability Agencies (GSA)	Priority
Kern County	Buena Vista Water Storage District GSA Kern River GSA Greenfield County Water District GSA West Kern Water District GSA Pioneer GSA Olcese Water District GSA Henry Miller Water District GSA Semitropic Water Storage District GSA Kern Groundwater Authority GSA Cawelo Water District GSA City of McFarland GSA Arvin GSA Tejon-Castac Water District GSA Wheeler Ridge-Maricopa GSA Westside District Water Authority GSA South of Kern River GSA Shafter-Wasco Irrigation District GSA North Kern Water Storage District GSA	High

Source: DWR 2020; DWR 2023.

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Appendix B: Alternatives Development Report

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Friant-Kern Canal Pump-Back Project

Alternatives Development Report Draft

Prepared by
Friant Water Authority



**Friant Water Authority
Fresno, California
October 2024**

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Abbreviations and Acronyms

AF	acre-feet
CEQA	California Environmental Quality Act
CFS	cubic feet per second
CVP	Central Valley Project
Delta	Sacramento-San Joaquin River Delta
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FKC	Friant-Kern Canal
FWA	Friant Water Authority
NEPA	National Environmental Policy Act
NRDC	Natural Resource Defense Council
Settlement	Stipulation of Settlement in <i>Natural Resource Defense Council, et al., v. Kirk Rodgers, et al.</i>
Settlement Act	San Joaquin River Restoration Settlement Act
SJRRP	San Joaquin River Restoration Program
WSD	water storage district

Chapter 1 Introduction

This report describes the alternatives development process and proposed alternatives for the Friant-Kern Canal (FKC) Pump-Back Project Environmental Impact Report (EIR).

1.1 Background

The FKC Pump-Back Project is under the San Joaquin River Restoration Program (SJRRP) and proposes the construction of 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 along the southern portion of FKC. Surface water supplies from the CVC are delivered through the FKC-CVC Intertie (Intertie) located at the terminus of the FKC. 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 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 the Central Valley Project (CVP) Friant Division Contractors (Friant Contractors). In September 2006, the “Settling Parties”, including NRDC, Friant Water Authority (FWA), and the United States Departments of the Interior and Commerce, agreed on terms and conditions of the Settlement, which establishes 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.

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 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, Central Valley Project, California:

1. Restoration of the capacity of the FKC and Madera Canal to such capacity as previously designed and constructed by the Bureau of 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 Structures 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 cubic feet per second (cfs) at the Poso and Shafter 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 due to limited conveyance capacity, availability of recaptured Restoration Flows, demands, and downstream pump-back capacities.

In 2014, 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 2014). However, since 2014, FWA in coordination with Reclamation has considered the potential benefits of increasing pumping capacities beyond the levels identified in the 2014 Draft Investment Strategy Report.

1.1.1 History

The San Joaquin River is California's second longest river and discharges to the Sacramento-San Joaquin River Delta (Delta) and, ultimately, to the Pacific Ocean through San Francisco Bay. Historically, the San Joaquin River supported a rich and diverse ecosystem influenced by seasonal runoff patterns. Over the past two centuries, the development of water resources transformed the San Joaquin River. In the late 1880s, settlers in the Central Valley drained large areas of valley floor lands and put these lands into agricultural production, and hydroelectric projects were developed in the upper portions of the San Joaquin River watershed. In 1944, Reclamation completed the construction of Friant Dam on the San Joaquin River (FWA 2024a). With the completion of the FKC in 1951 and the Madera Canal in 1945, Friant Dam diverted San Joaquin River water supplies to over 1 million acres of highly productive farmland along the eastern portion of the San Joaquin Valley (FWA 2024b). Operation of the dam ceased flow in some portions of the river and extirpated salmon runs in the San Joaquin River upstream from its confluence with the Merced River.

1.1.2 Purpose of the Report

This Alternatives Development Report documents the process to develop the EIR alternatives. The Friant Water Authority is using this structured planning process to delineate a reasonable range of alternatives for evaluation in the EIR in compliance with CEQA.

1.2 References

Friant Water Authority (FWA). 2024a. History of the Friant Division. Accessed on September 20, 2024. Available at: <https://friantwater.org/history>

———. 2024b. About the Friant-Kern Canal. Accessed on September 20, 2024. Available at: <https://friantwater.org/fkc>

San Joaquin River Restoration Program (SJRRP). 2014. Water Management Goal Investment Strategy Report. December 2014. Accessed on April 17, 2023. Available at: http://www.restoresjr.net/?wpfb_dl=394.

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Chapter 2 Alternatives Development Process

CEQA requires EIRs to identify a reasonable range of alternatives. To identify and screen alternatives, a structured and documented process was developed to include internal and public scoping (Figure 2-1).



Figure 2-1. Alternatives Development and Screening Process

2.1 Project Objectives

The identification of the project objectives 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. FWA developed the following project objectives.

2.1.1 Problems and Needs

Paragraph 16 of the Settlement and Part III of the Settlement Act provide for certain activities to be developed and implemented to reduce or avoid adverse water supply impacts on all 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. This project would help Reclamation meet the stipulated Water Management Goal, specifically Paragraph 16, Section 10201(a)(2) of the Settlement Act.

2.1.2 Project Objectives

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).

2.2 Measure Identification

FWA and its member agencies identified specific measures that support the conceptual alternatives to address the project objectives. The list of initial measures is presented in Table 2-1 (described in more detail in Chapter 3 below).

The initial measures represent the individual component and identification of these measures are the starting point for the development of comprehensive alternatives that will achieve the project's purpose and need/project objectives. These measures are recirculation-related and aid in direct conveyance, transfers, or exchanges of Recapture Restoration Flows for the purpose of reducing or avoiding impacts to the Friant Contractors.

Table 2-1. Initial Measures

Recirculation Facility at Deer Creek
Recirculation Facility at Lake Woollomes
Recirculation Facility at Shafter-Wasco
Recirculation Facility at White River
Recirculation Facility at Poso Creek
Mid-Valley Canal
Trans-Valley Canal- Multi-District Alignment
Trans-Valley Canal- Tulare Alignment
Trans-Valley Canal- Poso Alignment

2.3 Screening Initial Measures

These initial measures were screened to eliminate impracticable measures or measures that would be inconsistent with Reclamation's obligation to recirculate Restoration flows without causing adverse impacts to any non-Friant Division south-of-Delta water service contractors. The screening criteria considered:

- Ability to contribute to meeting the project's objectives: this criterion considered whether the initial measure has the ability, when combined with other measures to contribute to an alternative's ability to increase operational flexibility and long-term reliability of surface water supply in the FKC for use by Friant-Kern contractors, and support efforts to meet the stipulated Water Management Goal.
- Potential for adverse water supply impacts to Friant Contractors: this criterion considered whether the initial measure has the ability, when combined with other measures, to contribute to an alternative's ability to reduce or avoid impacts to water deliveries to all the Friant Contractors caused by the Restoration Flows.

- Potential technical and environmental complexity: this criterion considered potential implementation challenges due to technical and environmental issues. Technical issues could include the need for extensive land acquisitions or land use conversions. Environmental issues may include land subsidence. Measures with less potential for technical and environmental complexity ranked higher.
- Cost: this criterion considered qualitative estimates of construction and operations and maintenance costs for each measure. Measures with lower estimated costs ranked higher.

2.4 Formulate Initial Alternatives

The formulation of comprehensive alternatives for consideration in the EIR relies on the combination of the measures remaining following screening. The resulting action alternatives, described in Chapter 5, are the combination of measures identified to facilitate the recirculation of recaptured Restoration Flows released from Millerton Lake for the San Joaquin River Restoration Program and other waters obtained by Friant Contractors to achieve the purpose and meet the need for the action.

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Chapter 3 Measures

This chapter describes measures identified for the alternatives development process. As described in Section 2.2, these measures represent individual components, that when combined, will achieve the project's purpose and need/project objectives. Chapter 4 includes an evaluation of the measures relative to the project purpose and need/ project objectives for the Friant-Kern Canal Pump-Back Project.

3.1 Recirculation Facility at Deer Creek

The recirculation of Restoration Flows at Deer Creek would involve constructing a new, permanent pump-back facility at Deer Creek.

3.2 Recirculation Facility at Lake Woollomes

3.2.1 Permanent Facility

The recirculation of Restoration Flows at Lake Woollomes would involve replacing an existing, temporary 50 cfs pump-back facility with a permanent larger capacity pump-back facility at Lake Woollomes.

3.2.2 Temporary Facility

The recirculation of Restoration Flows at Lake Woollomes would involve replacing an existing temporary 50 cfs pump-back facility with a temporary, larger capacity pump-back facility. During seasonal operation, the pumps would be installed and once the season concludes, the pumps would be removed.

3.3 Recirculation Facility at Shafter-Wasco

3.3.1 Permanent Facility

The recirculation of Restoration Flows at Shafter-Wasco would involve replacing an existing, temporary 50 cfs pump-back facility with a permanent larger capacity pump-back facility at Shafter-Wasco.

3.3.2 Temporary Facility

The recirculation of Restoration Flows at Shafter-Wasco would involve replacing an existing temporary 50 cfs pump-back facility with a temporary, larger capacity pump-back facility. During seasonal operation, the pumps would be installed and once the season concludes, the pumps would be removed.

3.4 Recirculation Facility at White River

The recirculation of Restoration Flows at White River would involve construction of a new, permanent pump-back facility at White River.

3.5 Recirculation Facility at Poso Creek

3.5.1 Permanent Facility

The recirculation of Restoration Flows at Poso Creek would involve replacing an existing, temporary 50 cfs pump-back facility with a permanent larger capacity pump-back facility at Poso Creek.

3.5.2 Temporary Facility

The recirculation of Restoration Flows at Poso Creek would involve replacing an existing temporary 50 cfs pump-back facility with a temporary, larger capacity pump-back facility. During seasonal operation, the pumps would be installed and once the season concludes, the pumps would be removed.

3.6 Mid-Valley Canal

The Mid-Valley Canal was considered as a part of the San Joaquin Valley Conveyance Investigation in 1990 and again as a part of the 1997 CALFED Storage and Conveyance investigation effort. The CALFED configuration consisted of a 500-cfs North Branch canal extending 33 miles from the Mendota Pool to the Chowchilla River east of the bypass system and a 1,500-cfs Main Branch canal extending 107 miles south from the Mendota Pool to the Peoples Weir on the Kings River and continuing south to the White River. The North Branch would utilize four new pumping plants and the Main Branch would rely on seven new pumping plants (CALFED 1997).

3.7 Trans-Valley Canal - Multi-District Alignment

The Multi-District Alignment would support recirculation of Restoration Flows by conveying water from the California Aqueduct east to the FKC, utilizing the Semitropic Water Storage District's (WSD) existing California Aqueduct turnout and connection to the Semitropic Junction Pumping Plant, 11 miles of new concrete canal, 8.7 miles of pipeline, one re-lift pumping plant, two inline booster pumps, and a new inlet/outlet structure at the FKC. The Multi-District Alignment would create increased conveyance capacity and allow flow in either direction to facilitate the recirculation to the Friant Division or the storage of Friant Division supplies in the Semitropic WSD.

3.8 Trans-Valley Canal - Tulare Alignment

The Tulare Alignment would support recirculation of Restoration Flows by conveying water from the California Aqueduct east to the FKC. The Tulare Alignment would require a new turnout on the California Aqueduct connected to approximately 51 miles of new pipe and canal, and utilizing 15 re-

lift pumping plants. The Tulare Alignment would create increased conveyance capacity from the California Aqueduct to the FKC to facilitate the recirculation to the Friant Division.

3.9 Trans-Valley Canal - Poso Alignment

The Poso Alignment would only support the conveyance of water from the FKC west to the California Aqueduct.

3.10 References

CALFED. 1997. *Facility Descriptions and Updated Cost Estimates for the Mid-Valley Canal*. CALFED Storage and Conveyance Refinement Team. April 25, 1997. Accessed on August 31, 2015. Available at: http://www.calwater.ca.gov/Admin_Record/D-004830.pdf.

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Chapter 4 Measures Screening Evaluation

4.1 Screening Evaluation

The criteria developed to evaluate the measures include (1) the ability of the measure to address the project objectives (increase operational flexibility and long-term reliability of surface water supply in the FKC, and support efforts to meet the stipulated Water Management Goal); (2) the ability of the measure to reduce or avoid impacts to water deliveries to all the Friant Contractors caused by the Restoration Flows); (3) the measure’s potential technical and environmental complexities; and (4) the measure’s potential cost. Measures were scored for each of the screening criteria using the following metrics:

- **High (3)** ranking means the measure fully meets the criteria
- **Medium (2)** ranking means the measure partially meets the criteria
- **Low (1)** ranking means the measure does not meet the criteria

Measures were eliminated from further consideration if they would not contribute to project objectives/project purpose and need, have a high potential cost, or have a high potential for technical and environmental complexity. Only those measures that scored highest moved forward to be incorporated into the alternatives. The following sections present the evaluation of each measure relative to the aforementioned screening criteria.

4.2 Screening Results

4.2.1 Recirculation Facility at Deer Creek

This measure would construct a new, permanent pump-back facility at Deer Creek to recirculate Restoration Flows. This measure would allow for greater operational flexibility and reliability of surface water supplies in the FKC for Friant Contractors. This measure would also reduce or avoid impacts to water deliveries to all Friant Contractors, when combined with other measures. This measure would not require extensive design, construction, or operational costs, and would not be technically or environmentally complex.

As such, this measure will be carried forward for consideration in the EIR.

Table 4-1. Recirculation Facility at Deer Creek Screening Result

	Ability to Meet Project Objectives	Ability to Reduce/Avoid Impacts to Friant Contractors	Technical and Environmental Complexity	Cost
Recirculation Facility at Deer Creek	2	3	3	2

Key: 3 – High, 2 – Medium, 1 – Low

4.2.2 Recirculation Facility at Lake Woollomes

4.2.2.1 Permanent Facility

Replacing an existing, temporary 50 cfs pump-back facility at Lake Woollomes with a larger capacity, permanent facility would provide improvement in long-term reliability and operational flexibility of surface water supplies in the FKC. In combination with other measures, this measure would reduce or avoid impacts to water deliveries to all Friant Contractors. Extensive design and construction costs, as well as technical and environmental complexities are not anticipated for this measure.

This measure, in combination with other measures to fully meet the project criteria, will move forward for consideration in the EIR.

4.2.2.2 Temporary Facility

Replacing an existing, temporary 50 cfs pump-back facility at Lake Woollomes with a larger capacity temporary facility would provide an improvement to operational flexibility of surface water supplies in the FKC, however this measure would not fully meet the long-term reliability project objective due to the temporary/seasonal nature of the pumps. In combination with other measures, this measure would reduce or avoid impacts to water deliveries to all Friant Contractors, however not to the same extent as experienced with a permanent facility. Extensive design, as well as technical and environmental complexities are not anticipated for this measure. Costs associated with a temporary facility are anticipated to be less when compared to a permanent facility due to the minimal nature of installation and removal.

This measure, in combination with other measures to meet the project criteria, will move forward for consideration in the EIR.

Table 4-2. Recirculation Facility at Lake Woollomes Screening Result

	Ability to Meet Project Objectives	Ability to Reduce/Avoid Impacts to Friant Contractors	Technical and Environmental Complexity	Cost
Permanent Recirculation Facility at Lake Woollomes	3	3	3	2
Temporary Recirculation Facility at Lake Woollomes	2	2	3	3

Key: 3 – High, 2 – Medium, 1 – Low

4.2.3 Recirculation Facility at Shafter-Wasco

4.2.3.1 Permanent Facility

This measure would recirculate Restoration Flows at Shafter-Wasco by replacing an existing, temporary 50 cfs pump-back facility with a larger capacity, permanent facility. Through the increased capacity at Shafter-Wasco, this measure would support increased operational flexibility and long-term reliability of surface water supplies in the FKC. This measure, in combination with other measures, would reduce or avoid impacts to water deliveries to all Friant Contractors. Extensive

design and construction costs, as well as technical and environmental complexities are not anticipated for this measure.

This measure, in combination with other measures to fully meet the project criteria, will move forward for consideration in the EIR.

4.2.3.2 Temporary Facility

Replacing an existing, temporary 50 cfs pump-back facility at Shafter-Wasco with a larger capacity temporary facility would provide an improvement to operational flexibility of surface water supplies in the FKC, however this measure would not fully meet the long-term reliability project objective due to the temporary/seasonal nature of the pumps. In combination with other measures, this measure would reduce or avoid impacts to water deliveries to all Friant Contractors, however not to the same extent as experienced with a permanent facility. Extensive design, as well as technical and environmental complexities are not anticipated for this measure. Costs associated with a temporary facility are anticipated to be less when compared to a permanent facility due to the minimal nature of installation and removal.

This measure, in combination with other measures to meet the project criteria, will move forward for consideration in the EIR.

Table 4-3. Recirculation Facility at Shafter-Wasco Screening Result

	Ability to Meet Project Objectives	Ability to Reduce/Avoid Impacts to Friant Contractors	Technical and Environmental Complexity	Cost
Permanent Recirculation Facility at Shafter-Wasco	3	3	3	2
Temporary Recirculation Facility at Shafter-Wasco	2	2	3	3

Key: 3 – High, 2 – Medium, 1 – Low

4.2.4 Recirculation Facility at White River

Constructing a new, permanent recirculation facility at White River would aide in supporting increased operational flexibility and long-term reliability of surface water supplies in the FKC, and, when combined with other measures, would reduce or avoid impacts to water deliveries to all Friant Contractors. Although the measure would support the project objectives, constructing at White River involves higher cost and technical/environmental complexity. Land acquisition and orchard removal and relocation of the White River spillway make this measure technically complex. An increased length of pipe required to cross an adjacent road results in higher costs under this measure.

Given this measure has technical complexity and would be less cost-effective, this measure will not be carried forward for consideration in the EIR.

Table 4-4. Recirculation Facility at White River Screening Result

	Ability to Meet Project Objectives	Ability to Reduce/Avoid Impacts to Friant Contractors	Technical and Environmental Complexity	Cost
Recirculation Facility at White River	2	3	1	1

Key: 3 – High, 2 – Medium, 1 – Low

4.2.5 Recirculation Facility at Poso Creek

4.2.5.1 Permanent Facility

This measure would replace an existing, temporary 50 cfs pump-back facility with a permanent larger capacity pump-back facility at Poso Creek to recirculate Restoration Flows. This would support the project objectives by providing long-term reliability and operational flexibility of water supplies in the FKC. The measure, when combined with others, could also reduce or avoid impacts to water deliveries to all Friant Contractors. In addition, the measure would not require extensive design and construction costs.

Although the measure has the ability to meet project objectives, Poso Creek experiences 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. Due to technical and environmental complexity with the Poso Creek site, this measure will not be carried forward for consideration in the EIR.

4.2.5.2 Temporary Facility

Replacing an existing, temporary 50 cfs pump-back facility at Poso Creek with a larger capacity temporary facility would provide an improvement to operational flexibility of surface water supplies in the FKC, however this measure would not fully meet the long-term reliability project objective due to the temporary/seasonal nature of the pumps. In combination with other measures, this measure would reduce or avoid impacts to water deliveries to all Friant Contractors, however not to the same extent as experienced with a permanent facility. In addition, the measure would not require extensive design and construction costs.

In addition to not fully meeting project objectives, Poso Creek experiences 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. Due to technical and environmental complexity with the Poso Creek site, this measure will not be carried forward for consideration in the EIR.

Table 4-5. Recirculation Facility at Poso Creek Screening Result

	Ability to Meet Project Objectives	Ability to Reduce/Avoid Impacts to Friant Contractors	Technical and Environmental Complexity	Cost
Permanent Recirculation Facility at Poso Creek	3	3	1	2
Temporary Recirculation Facility at Poso Creek	2	2	1	2

Key: 3 – High, 2 – Medium, 1 – Low

4.2.6 Mid-Valley Canal

This measure would recirculate water through the Mid-Valley, which would support the reduction or avoidance of impacts to water deliveries to all Friant Contractors and aide in providing long-term reliability and operational flexibility of water supplies in the FKC. Although this measure has the ability to meet the project objectives, it would be technically complex and costly.

This measure would require extensive land acquisition along with extensive design and construction costs. In addition, this measure would require a long implementation timeline. Given this measure would be costly and technically complex, this measure will not be carried forward for consideration in the EIR.

Table 4-6. Mid-Valley Canal Screening Result

	Ability to Meet Project Objectives	Ability to Reduce/Avoid Impacts to Friant Contractors	Technical and Environmental Complexity	Cost
Mid-Valley Canal	3	3	1	1

Key: 3 – High, 2 – Medium, 1 – Low

4.2.7 Trans-Valley Canal- Multi-District Alignment

This measure would support recirculation of Restoration Flows by conveying water from the California Aqueduct east to the FKC. In addition, the measure would and allow flow in either direction to facilitate the recirculation to the Friant Division or the storage of Friant Division supplies in the Semitropic WSD. Although this measure has the ability to meet the project objectives and reduce or avoid impacts to water deliveries to all Friant Contractors, it would be technically complex and costly.

This measure would require extensive land acquisition along with extensive design and construction costs. In addition, this measure would require a long implementation timeline. Given this measure would be costly and technically complex, this measure will not be carried forward for consideration in the EIR.

Table 4-7. Trans-Valley Canal- Multi-District Alignment Screening Result

	Ability to Meet Project Objectives	Ability to Reduce/Avoid Impacts to Friant Contractors	Technical and Environmental Complexity	Cost
Trans-Valley Canal – Multi-District Alignment	3	3	1	1

Key: 3 – High, 2 – Medium, 1 – Low

4.2.8 Trans-Valley Canal- Tulare Alignment

This measure would support recirculation of Restoration Flows by conveying water from the California Aqueduct east to the FKC. In addition, the measure would create increased conveyance capacity from the California Aqueduct to the FKC to facilitate the recirculation to the Friant Division. Although this measure has the ability to meet the project objectives and reduce or avoid impacts to water deliveries to all Friant Contractors, it would be technically complex and costly.

This measure would require extensive land acquisition along with extensive design and construction costs. In addition, this measure would require a long implementation timeline. As such, this measure will not be carried forward for consideration in the EIR.

Table 4-8. Trans-Valley Canal- Tulare Alignment Screening Result

	Ability to Meet Project Objectives	Ability to Reduce/Avoid Impacts to Friant Contractors	Technical and Environmental Complexity	Cost
Trans-Valley Canal- Tulare Alignment	3	3	1	1

Key: 3 – High, 2 – Medium, 1 – Low

4.2.9 Trans-Valley Canal- Poso Alignment

Under this measure, water would be conveyed from the FKC west to the California Aqueduct. Although this measure has the ability to meet the project objectives and reduce or avoid impacts to water deliveries to all Friant Contractors, it would be technically complex and costly. This measure would require extensive land acquisition along with extensive design and construction costs. In addition, this measure would require a long implementation timeline. As such, this measure will not be carried forward for consideration in the EIR.

Table 4-9. Trans-Valley Canal- Poso Alignment Screening Result

	Ability to Meet Project Objectives	Ability to Reduce/Avoid Impacts to Friant Contractors	Technical and Environmental Complexity	Cost
Trans-Valley Canal- Poso Alignment	3	3	1	1

Key: 3 – High, 2 – Medium, 1 – Low

4.3 Screening Summary

Table 4-10 presents a summary of screening results against each of the screening criteria for all of the measures listed in Section 4.2.

Table 4-10. Measure Screening Matrix

	Ability to Meet Project Objectives	Ability to Reduce/Avoid Impacts to Friant Contractors	Technical and Environmental Complexity	Cost
Recirculation Facility at Deer Creek	2	3	3	2
Permanent Recirculation Facility at Lake Woollomes	3	3	3	2
Temporary Recirculation Facility at Lake Woollomes	2	2	3	3
Permanent Recirculation Facility at Shafter-Wasco	3	3	3	2
Temporary Recirculation Facility at Shafter-Wasco	2	2	3	3
Recirculation Facility at White River	2	3	1	1
Permanent Recirculation Facility at Poso Creek	3	3	1	2
Temporary Recirculation Facility at Poso Creek	2	2	1	2
Mid-Valley Canal	3	3	1	1
Trans-Valley Canal- Multi-District Alignment	3	3	1	1
Trans-Valley Canal- Tulare Alignment	3	3	1	1
Trans-Valley Canal- Poso Alignment	3	3	1	1

Key: 3 – High, 2 – Medium, 1 – Low

4.4 Measures Carried Forward to Alternatives Formulation

The following measures fully met or partially met project objectives (as indicated in Section 4.2) and will be combined into alternatives to be analyzed in the EIR:

- Recirculation Facility at Deer Creek
- Permanent Recirculation Facility at Lake Woollomes
- Temporary Recirculation Facility at Lake Woollomes
- Permanent Recirculation Facility at Shafter-Wasco

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- Temporary Recirculation Facility at Shafter-Wasco

Chapter 5 Alternatives

This chapter presents alternatives developed and based on the evaluation described in Chapter 4. Alternatives for the EIR include different combinations of potential measures and a No Project Alternative.

5.1 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 Notice of Preparation), 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 action. Differences between existing conditions and an anticipated future without project conditions (No Project Alternative) are detailed for each identified resource area (Appendix B, Existing Conditions and Foreseeable Future Conditions).

Under the No Action 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 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; and (3) one 50 cfs temporary pump-back facility installed historically at the Shafter-Wasco check, and one 50 cfs temporary pump-back facility at Lake Woollomes check to support pump-back operations (see Figure 5-1 for the location of proposed pump-back facilities). These temporary facilities that are currently in place would remain in place until their continued use could no longer be supported through regular maintenance.

5.2 Permanent Pump-Back Facilities- High Flow Rate (Proposed Project)

The Permanent Pump-Back Facilities- High Flow Rate Alternative (proposed project) would include constructing and operating three new pump-back facilities to support the recirculation of recaptured Restoration Flows and other waters. Under the proposed project, (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 5-1 shows the locations of these proposed pump-back facilities.

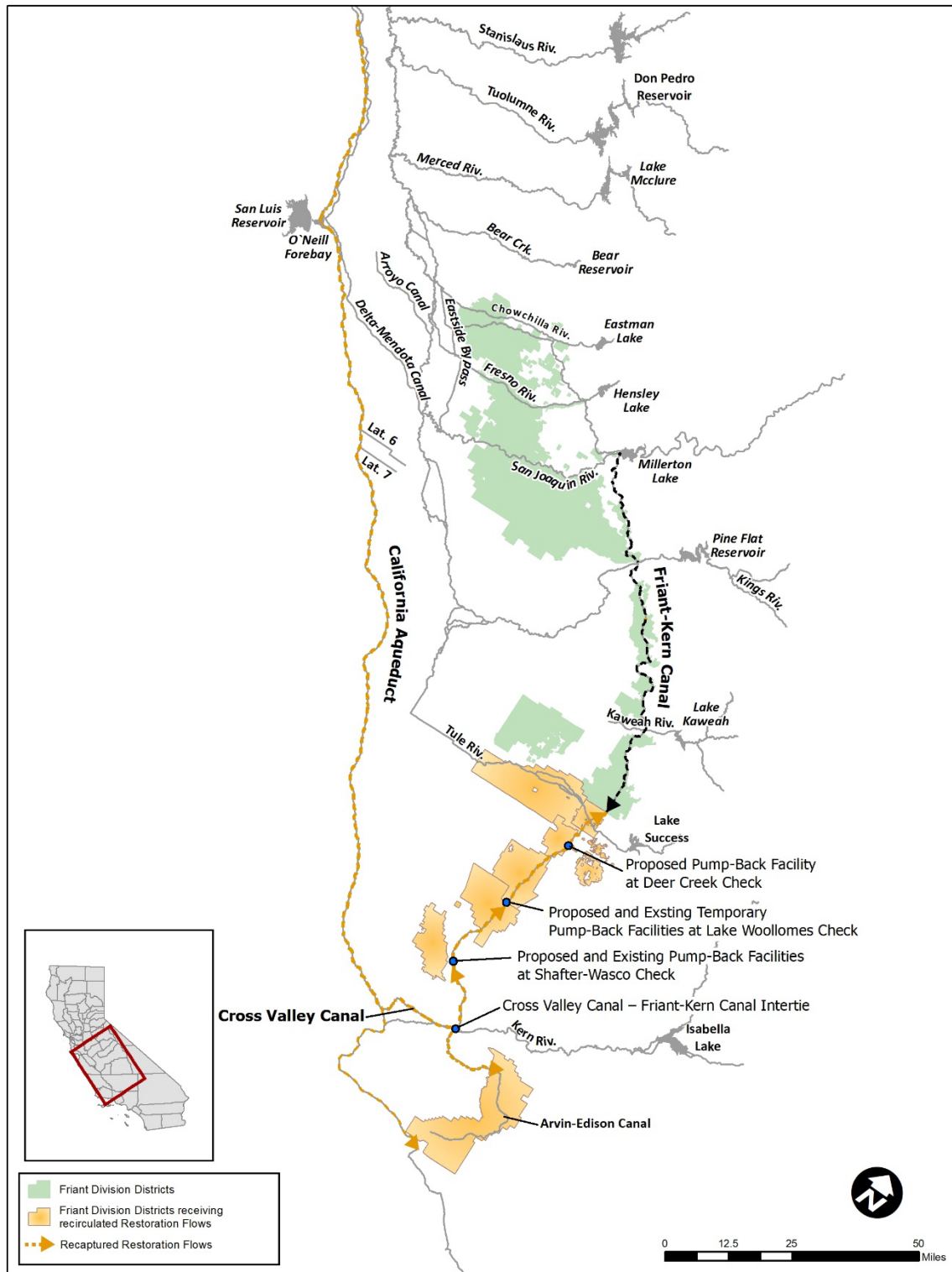


Figure 5-1. Proposed Project Location

5.2.1 Project Facilities

5.2.1.1 Pump-back at Shafter-Wasco Check

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 (MP) 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 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 5-2 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 and/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.

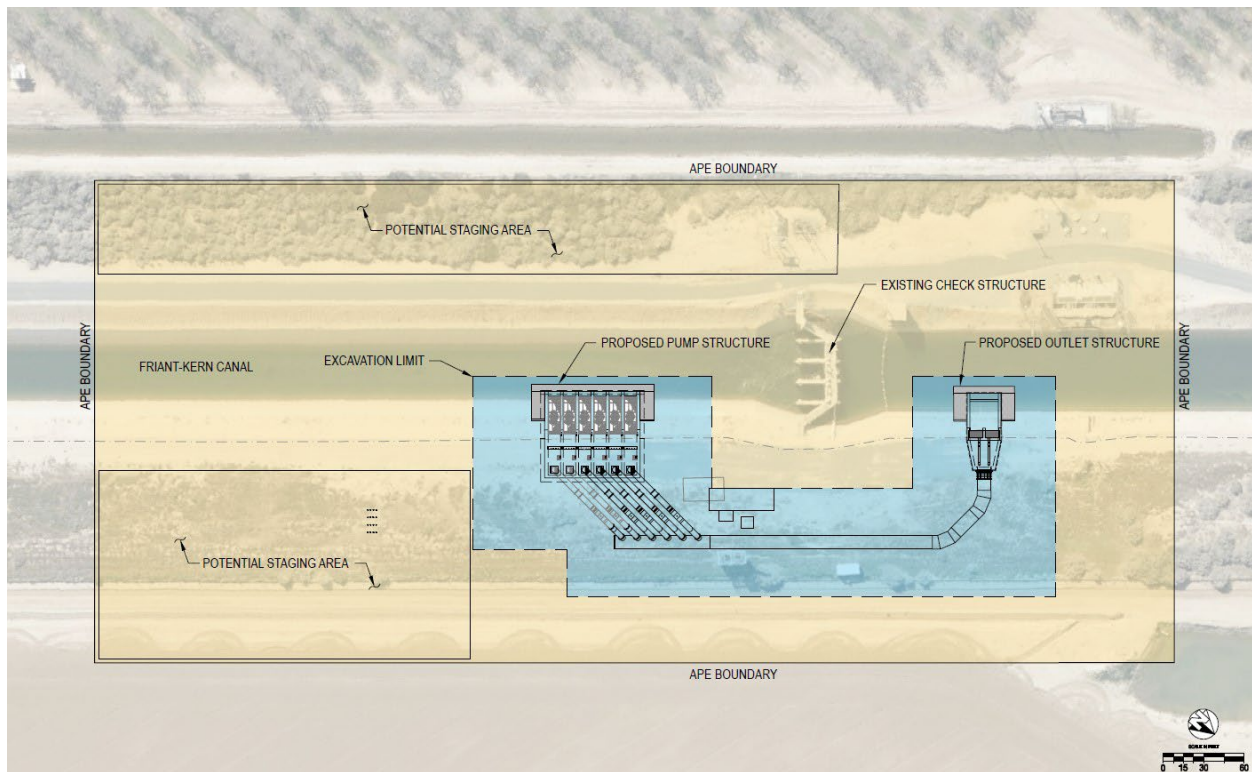


Figure 5-2. Conceptual Layout of Proposed Pump-Back Facility at the Shafter-Wasco Check Structure

5.2.1.2 Pump-back at Lake Woollomes

The proposed project would replace an existing temporary 50 cfs pump-back facility with a permanent 250 cfs pump-back facility at the Lake Woollomes. 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 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 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 5-3 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.

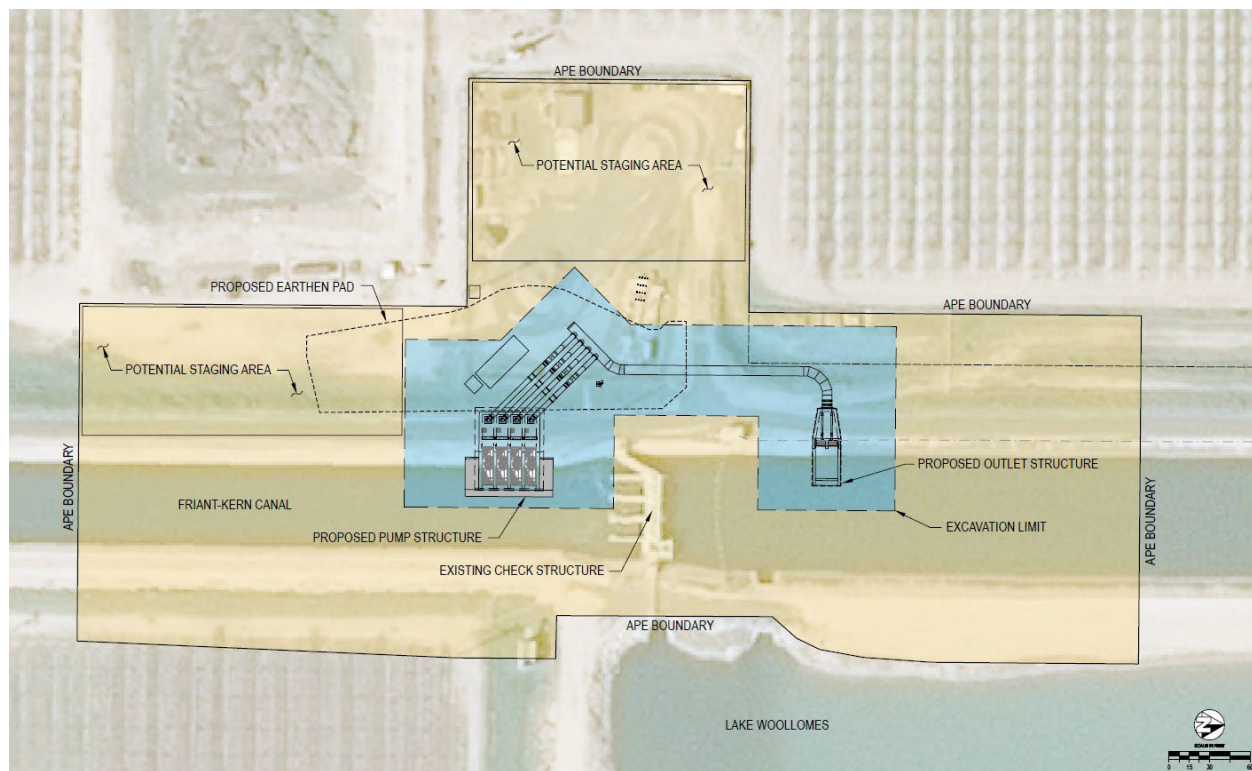


Figure 5-3. Conceptual Layout of Proposed Pump-Back Facility at the Lake Woollomes Check Structure

5.2.1.3 Pump-back at Deer Creek

The 250 cfs proposed pump-back facility at the Deer Creek check structure would be built (see Figure 5-1 for location of Deer Creek check structure). The Deer Creek check structure is located along the FKC at milepost 102.69 at the intersection of Deer Creek with the FKC.

The four-bay-in channel pump structure proposed under the proposed project would be incorporated into the features to be constructed under the FKC Middle Reach Capacity Correction Project, including the new FKC, earthen berms, pool, and siphon under Deer Creek.¹ The proposed pump structure would divert water from the new FKC segment into a pool on the original FKC that would utilize 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 an 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, and the proposed four-bay pump station would be constructed inside the original FKC upstream from the existing siphon would 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 (includes excavation and staging) under this alternative would be limited to the areas to the west on the new FKC and on either side of the Deer Creek and would not result in disturbance in 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 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 5-4 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.

¹ In September 2020, Friant Water Authority (CEQA lead agency) and Reclamation (NEPA lead agency) approved/certified the EIS/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 document refers to the parallel canal, siphon, the 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 (Reclamation and FWA 2020).

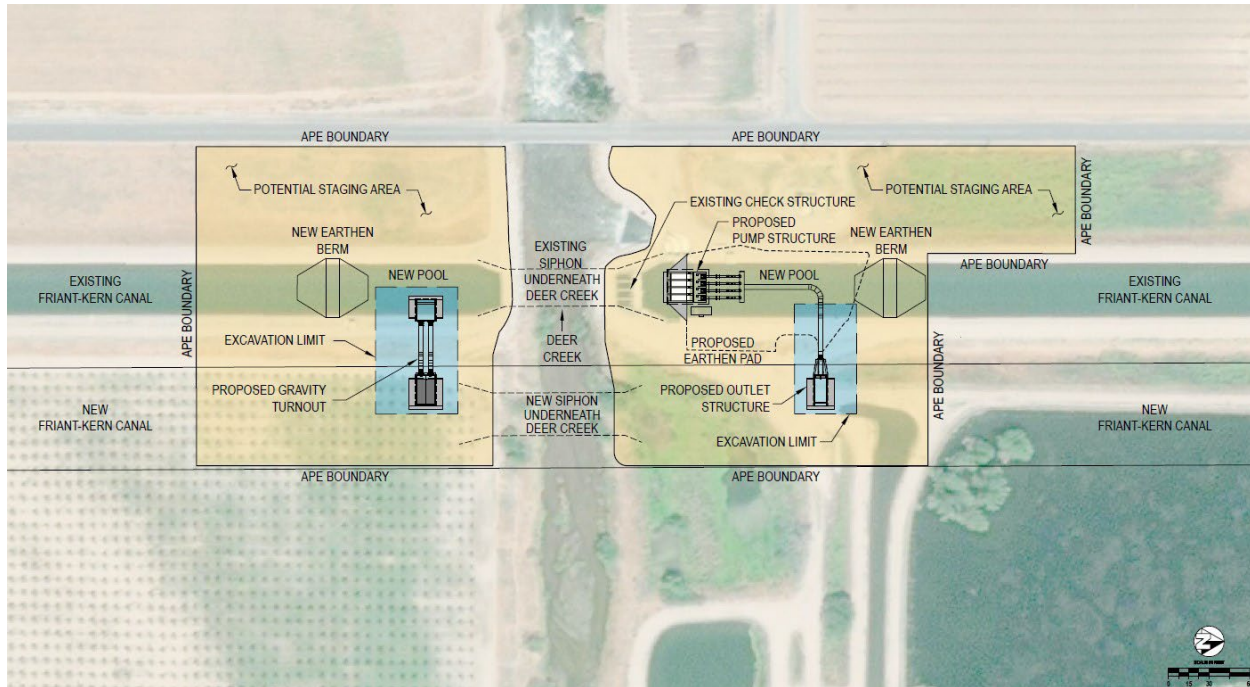


**Figure 5-4. Conceptual Layout of Proposed Pump-Back Facility
at Deer Creek Check Structure**

5.2.2 Construction of Project Facilities

Construction of the three pump-back facilities would occur simultaneously and is expected to last 6-8 months starting 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 coffer dams (one upstream and one downstream at each site) along the banks of the canal would be constructed to isolate/dewater the construction zones. These temporary coffer dams would reduce canal capacity by up to 25 percent. The maximum expected personnel per site are 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. In addition, if the FKC needs to be refilled or if critical path items need to be completed, nighttime construction may occur.

Equipment staging areas are shown in Figure 5-2, Figure 5-3, and Figure 5-4. Equipment staging and stockpile areas would be returned to pre-construction condition after the proposed project is completed. Equipment used to construct the proposed project would include:

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

Shafter-Wasco Site: Figure 5-2 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. Additional 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 99. Up to 350 construction debris and waste material transports to the Shafter-Wasco landfill (local landfill on Scofield Avenue) could be expected, along with the regular commuting of construction personnel.

Lake Woollomes Site: Figure 5-3 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.

Deer Creek Site: Figure 5-4 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. Equipment and materials would be hauled using State Route 99. Up to 175 waste material transports to the Woodville landfill (local landfill on Road 152) could be expected, along with the regular commuting of construction personnel.

5.2.3 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.

5.3 Permanent Pump-Back Facilities – Low Flow Rate

The Permanent Pump-Back Facilities- Low Flow Rate Alternative (Low Flow Alternative) would include the construction and operation of three new pump-back facilities at Shafter-Wasco check structure, Lake Woollomes check, and Deer Creek check similar to the proposed project. The primary difference between the High Flow and Low Flow Alternatives is the capacity of the check structures. Under Alternative 2, (1) a 200 cfs permanent six-bay pump-back facility would be built at Shafter-Wasco check structure; (2) a 75 cfs permanent four-bay pump-back facility would be constructed at the Lake Woollomes check structure; and (3) a 75 cfs permanent four-bay pump-back facility would be built at the Deer Creek check structure.

5.3.1 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 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.

5.4 Seasonal Pump-Back Facilities

The Seasonal Pump-Back Facilities Alternative (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, (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.

5.4.1 Project Facilities

Operating seasonal pump-back facilities would involve utilizing retrofitted pumps, 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 5-5 and Figure 5-6 depict an example of metal pump frames which will be used house the temporary retrofitted pumps at Shafter-Wasco and Lake Woollomes check structures.



Figure 5-5. Example Pump Housing



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

Figure 5-6. Example Metal Frames Housing a Single Pump

5.4.2 Construction of Project Facilities

Installation and removal of the two seasonal pump-back facilities is expected to take one day using a crew of one to two workers per site. Metal frames would be constructed to house the pumps and 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.

5.4.3 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 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.

5.5 References

Department of the Interior, Bureau of Reclamation (Reclamation). 1958. Technical Record of Design and Construction for the Friant-Kern Canal. Accessed on August 2, 2024. Available at:
<https://books.google.com/books?id=T6JAU3XRfdwC&pg=PA31&lpg=PA31&dq=equalizing+reservoir+for+Friant-Kern+Canal&source=bl&ots=lqHW2MgpXo&sig=ACfU3U1n5YKV9M5vnOP1B7aWaXBr9L5GKA&hl=en&sa=X&ved=2ahUKEwibvYn-49aHAxUGDQIHSEoBlk4ChDoAXoECB8QAw#v=onepage&q=lake%20woollomes&f=false>.

Department of the Interior, Bureau of Reclamation (Reclamation) and Friant Water Authority (FWA). 2020. Friant-Kern Canal Middle Reach Capacity Correction Project Environmental Impact Statement/Environmental Impact Report. September 2020. Accessed on September 20, 2024. Available at:
https://static1.squarespace.com/static/58c2ecccc15d5db46200ea426/t/5f63ff78c24f9b0ab475ab8d/1600388991871/FKC_EIS_EIR_Final.pdf.

Friant-Kern Canal Pump-Back Project Environmental Impact Report

Appendix C: Cumulative Projects

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Appendix C Cumulative Projects

This appendix provides an analysis of overall cumulative effects of the proposed project taken together with other past, present, and reasonably foreseeable probable future projects (or actions) as required by California Environmental Quality Act (CEQA) Guidelines (14 CFR, Section 15130). Information used in this cumulative impact analysis is based on the best information available at this time.

C.1 Cumulative Projects

Reasonably foreseeable probable future actions considered in this cumulative effects analysis are actions located within the study area that have been identified as potentially having an effect on resources that also may be affected by the proposed action. In addition, reasonably foreseeable probable future actions are projects where necessary environmental compliance evaluations have been completed and any associated decisions on the final project identified for implementation has been made. The following sections present brief descriptions for each of the projects and plans considered for the cumulative analysis.

C.1.1 Delta Conveyance Project

The Sacramento-San Joaquin River Delta (Delta) Conveyance Project is currently being analyzed by California Department of Water Resources (DWR) and several State Water Contractors.

The Delta Conveyance Project planning process began in 2006, when the Bureau of Reclamation (Reclamation) and DWR, along with several state and federal water contractors including, Kern County Water Agency, Metropolitan Water District of Southern California, San Luis and Delta-Mendota Water Authority (SLDMWA), Santa Clara Valley Water District, Westlands Water District, and the Zone 7 Water Agency (collectively referred to as Potential Authorized Entities) initially proposed the Bay-Delta Conservation Plan (BDCP). The BDCP envisioned updating the State Water Project (SWP) and Central Valley Project (CVP) by adding new points of diversion in the north Delta and by providing for large-scale species conservation through a 50-year habitat conservation plan (HCP)/natural communities conservation plan (NCCP). The HCP/NCCP was intended to comply with Section 10 of the federal Endangered Species Act and to achieve compliance with the California Endangered Species Act through the California Natural Community Conservation Planning Act. A Draft Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) was released in December 2013.

Following release of the Draft EIS/EIR, Reclamation and DWR issued a Supplemental Draft EIS/Partially Recirculated Draft EIR that included for consideration three additional alternatives that would update SWP and CVP without the large-scale conservation efforts in an HCP/NCCP. The Lead Agencies proposed that one of these non-HCP alternatives, known as California WaterFix Alternative 4A, be identified as the preferred alternative in replacement of the BDCP alternative (DWR and Reclamation 2015). The preferred WaterFix alternative (4A) consisted of three new diversion points in the north Delta, tunnel conveyance and ancillary facilities, operational elements, restoration measures, and an adaptive management program (DWR and Reclamation 2015). The Supplemental Draft EIS/Partially Recirculated Draft EIR also included updates to the BDCP

alternative and other revisions and updates to the 2013 Draft EIR/EIS analyses. In addition, the state proposed as a separate program, California EcoRestore, to provide restoration efforts for species conservation independent of the SWP and CVP facility upgrades. The Final EIS/EIR for the BDCP/California WaterFix that identified the California WaterFix for implementation was released in December 2016. Biological opinions for the California WaterFix were released in June 2017.

In May 2019, DWR rescinded all permits, permit applications, bond authorizations, and CEQA documentation for California WaterFix and announced that it was working with public water agencies on a new environmental review process for a single tunnel project called the Delta Conveyance Project. DWR issued a Notice of Preparation in January 2020 to initiate the preparation of an EIR for the project. In August 2020, The U.S. Army Corps of Engineers (USACE) issued a Notice of Intent for the development of an EIS for the project. DWR released the Draft EIR in July 2022 for public review and comment (DWR 2022).

USACE published their Notice of Intent to prepare an EIS in August of 2020. The USACE Sacramento District is serving as the lead agency and preparing a stand-alone EIS in coordination with the National Marine Fisheries Service, the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and Reclamation (USACE 2022). The draft EIS was released December 2022 and the public review and comment period ended in March 2023 (USACE 2023).

DWR expects the CEQA/NEPA process and other environmental permitting to be complete in mid-2024 (DWR 2020).

C.1.2 Central Valley Project Improvement Act

The Central Valley Project Improvement Act (CVPIA) mandates changes to the management of the protection, restoration, and enhancement of fish and wildlife. Major areas of change called for by the CVPIA include: 800,000 acre-feet of water dedicated to fish and wildlife annually; tiered water pricing applicable to new and renewed contracts; water transfers provision, including sale of water to users outside the CVP service area; special efforts to restore anadromous fish population by 2002; restoration fund financed by water and power users for habitat restoration and enhancement and water and land acquisitions; no new water contracts until fish and wildlife goals achieve; no contract renewals until completion of a Programmatic EIS; terms of contracts reduced from 40 to 25 years with renewal at the discretion of the Secretary of the Interior; installation of the temperature control device at Shasta Dam; implementation of fish passage measures at Red Bluff Diversion Dam; firm water supplies for Central Valley wildlife refuges; and development of a plan to increase CVP yield (Reclamation 2024).

C.1.3 San Joaquin River Restoration Program

This program was established to implement a Stipulation of Settlement in *NRDC, et al., v. Kirk Rodgers, et al.* (Settlement) as authorized by the Settlement Act. The Act authorizes and directs the Secretary of the Interior to implement the Settlement. The Settlement establishes two primary goals: 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 naturally reproducing and self-sustaining populations of salmon and other fish; and all of the Friant Division long-term contractors that may result from the Restoration Flows provided for in the Settlement (San Joaquin River Restoration Program [SJRRP] 2024a).

The cumulative conditions presented in this EIS/EIR assume no operational constraints (conveyance capacity, ramping rate constraints, scheduled maintenance, reservoir storage, contractual obligations, and downstream seepage concern) on the San Joaquin River Restoration Program's ability to release Restoration Flows (SJRRP 2024b)

C.1.3.1 Long-term Recapture and Recirculation of Restoration Flows

As a component of the larger San Joaquin River Restoration Program, the purpose of the Long-term Recapture and Recirculation of Restoration Flows Project is to recirculate, recapture, reuse, exchange, or transfer Restoration Flows to reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors. Restoration Flows released from Friant Dam are available for recapture currently at Mendota Pool, along the lower San Joaquin River, and in the Delta. Recaptured Restoration Flows are then recirculated from south-of-Delta facilities (by way of exchange, transfer, or direct delivery) to avoid or reduce adverse impacts to the Friant Division long-term contractors and meet the water management goal of the Settlement (SJRRP 2024c).

C.1.3.2 Reach 2B and Mendota Pool Bypass

To create a passable San Joaquin River for salmonids between Mendota Dam and the confluence with Merced River, a critical component for the SJRRP, Reclamation is proposing to create a river-like channel over a half-mile around Mendota Pool. The Reach 2B and Mendota Pool Bypass Project includes construction, operation, and maintenance of the Mendota Pool Bypass and improvements in the San Joaquin River channel in Reach 2B. In October 2016, Reclamation signed a ROD identifying Alternative B as the preferred alternative for the Reach 2B Project (Reclamation 2016b). Alternative B includes construction of setback levees capable of conveying flows up to 4,500 cfs, restoring floodplain habitat with an average width of approximately 4,200 feet. This alternative would also construct the Compact Bypass bifurcation structure capable of conveying up to 2,500 cfs from Reach 2B to the Mendota Pool (Reclamation 2016b). The replacement of Mowry Bridge in September 2021 marked the first complete component of this project. Construction is anticipated to end in 2025 (SJRRP 2024d).

C.1.3.3 Reach 4B and Eastside Bypass

The Reach 4B and Eastside Bypass Project is ongoing and consists of incorporating new floodplain and related riparian habitat to ensure conveyance of at least 4,000 cfs through Reach 4B of the San Joaquin River, modifications to ensure fish passage, and modifications in the Eastside and Mariposa bypass channels to support anadromous fish migration. Reach 4B is a 32.5-mile stretch starting at the Sand Slough Control Structure and ending at the confluence of the Eastside Bypass. The Eastside Bypass improvements include reinforcing 2 miles of levee to improve stability and reduce seepage. Future work is expected at the Eastside Bypass Control Structure to improve fish passage through the construction of a rock ramp (SJRRP 2024e).

C.1.3.4 Cordeniz Basin Ground Water Storage Project- Conjunctive Exchange Program

The Tulare Irrigation District (TID) created a Conjunctive Exchange Program that addresses the loss of water supplies to the SJRRP by augmenting its groundwater recharge facilities to expand the use of wet year water in the Friant Division. The exchange program is based on the completed construction of the 80-acre Cordeniz Recharge Basin and the creation of a Water Exchange Purchase Fund to allow TID to purchase and recharge wet year supplies for subsequent return to exchange partners in dry years using TID's Millerton Class 1 supplies. The Cordeniz Recharge Basin

includes the creation of two individual basin cells that will be served by Serpa Ditch (SJRRP 2018; SJRRP 2024f).

The total anticipated RWA reduction from the Project is 129,000 AF. This is based on 45,000 acre-feet (AF) of RWA reduction for TID (1,500 AF per year over the 30-year life of the Project) and 84,000 AF (2,800 AF over 30 years) from participating Friant Contractors that are required to reduce RWA balances equal to the amount of water returned through the exchange program (SJRRP 2018).

C.1.3.5 Porterville in Lieu Project Service Areas 1 & 2

This project proposed the construction of new water conveyance facilities in Porterville ID in two service areas that had no means of receiving surface water supplies. This would increase the amount of CVP water supplies the district would use in place of their current reliance on groundwater. A new turnout (reinforced concrete structure with control gate and flow measurement device) and 10,000-foot lateral off Wood Central Ditch was constructed to deliver water to Service Area 1. Service Area 2 receives water through the existing Poplar Ditch pipeline and a newly constructed 5,200-foot lateral off Poplar Ditch Pipeline Reclamation analyzed this project and released a Finding of No Significant Impact (FONSI) (16-05-SJRRP) in September 2016. Construction of this project is complete (SJRRP 2024f).

C.1.4 Friant-Kern Canal Middle Reach Capacity Correction Project

The FKC Middle Reach has lost over 50 percent of its original design capacity because of regional land subsidence and a design deficiency, which has resulted in water delivery impacts on Friant Contractors, a reduced ability of the FKC to convey flood waters during wet years, and more impacts. Reclamation and Friant Water Authority proposed to restore the capacity of a 33-mile-long section of the FKC located within Tulare and Kern Counties by widening and/or raising approximately 10 miles of the existing canal and realigning approximately 23 miles of the canal corridor to newly constructed canal segments. An EIS/EIR evaluating two action alternatives was published in September 2020, and a Record of Decision (ROD) was signed in November 2020. The realigned canal is planned to be constructed immediately east of the existing FKC (Reclamation 2020).

Phase One construction of this multi-phased project began in January 2022 and includes constructing 10 miles of new concrete-lined canal. Phase One is anticipated to take around three years and be completed and fully operational by January 2024 (Reclamation 2022a).

C.1.5 Delano-Earlimart Irrigation District Turnipseed Water Bank Expansion

The Turnipseed Water Banking Project began in 1993 with the purchase of an 80-acre site next to the White River. Phase I developed a recharge basin, with a recovery well installed in 2007. Starting in 2009, Phase II included the purchase of an additional 80-acre site south of the initial site and the development of four additional recovery wells. Phase III began in 2018 with the purchase of a 320-acre site near Phases I and II, bringing the total banking footprint acreage to 480 acres. Phases IV and V started in 2020 and increased the banking footprint again to 944 acres (Delano-Earlimart Irrigation District 2021).

Currently in Phase VI, the project will provide the Delano-Earlimart Irrigation District with additional recharge capacity for surface water storage and recovery to mitigate the effect of water shortages during dry or drought years. The project will increase the recharge capacity by 4,315-acre

feet per year through the construction of 148 acres of spreading grounds and 3 monitoring wells. The project received funding for FY 2023 in December 2022 (Reclamation 2022b). Construction is estimated to take 32 to 36 months (Delano-Earlimart Irrigation District 2021).

C.1.6 Akin Water Company Water Supply Project

The Akin Water Company Water Supply Project includes the construction of a new well for the City of Porterville, new distribution pipelines, the abandonment of two new existing wells, and the consolidation of the Akin Water Company into the City of Porterville Water System. The new well, located on city-owned property will be 16 inches in diameter, 710 feet deep, and capable of providing 2,000 gallons per minute (City of Porterville 2019). The first phase of the project is anticipated for completion in 2023 and includes the drilling of a 710-foot-deep pilot hole, water quality sampling, and the construction of a 690-foot-deep production well (Porterville Recorder 2022).

C.1.7 Central Valley Salinity Alternatives for Long-term Sustainability

The Central Valley Salinity Alternatives for Long-term Sustainability (CV-SALTS) is a collaborative stakeholder driven and managed program to develop sustainable salinity and nitrate management planning for the Central Valley. CV-SALTS developed a Salt and Nitrate Management Plan (SNMP) for the entirety of the Central Valley Regional Water Quality Control Board's jurisdictional area (also referred to as the "Central Valley" or "Region 5"). The Central Valley SNMP builds on a range of water quality management policies and mechanisms already in existence, proposes additional policies and tools needed to provide the Central Valley Water Board with flexibility in addressing legacy and ongoing loading of salt and nitrate in the diverse region, and presents a comprehensive regulatory and programmatic approach for the sustainable management of salt and nitrate (Central Valley Salinity Coalition 2024).

The Central Valley Regional Water Quality Control Board approved amendments to the water quality control plans in October of 2019 (Resolution No. 2019-0057), establishing a prioritized Nitrate Control Program for discharges to groundwater and a phased Salt Control Program for discharges to surface water and groundwater (Central Valley Salinity Coalition 2020). Phase 1 of the Salt Prioritization and Optimization Study will run for 10 to 15 years and define long-term salt management actions, including strategies and projects for reducing and removing salts. Phase 2 will include the design and permitting of the projects identified in Phase 1, with Phase 3 being the construction of those projects (Central Valley Salinity Coalition 2021).

C.1.8 San Joaquin River Salinity Management Plan

This plan describes actions taken by Reclamation to reduce or mitigate salinity and boron transferred from the Delta to the San Joaquin River Basin through operation of the CVP. The plan focuses on three major groups of actions taken by Reclamation: providing flows to the river system; reducing salt load to the river; and facilitating mitigation.

Salt load reduction actions include the Grassland Bypass Project, which is designed to improve water quality in the channels used to deliver water to wetland areas and the San Joaquin River (SLDMWA 2019), and the development of a Wetlands Best Management Practices Plan with the United States Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and Grasslands Conservation District to reduce the impacts of discharges from managed wetlands into the San Joaquin River (California Wetland Monitoring Workgroup 2023).

C.1.9 Tule River- Friant Kern Canal Water Bank

The project involves the construction of a pump station, six recovery wells, one turn-out from the Woods Central Canal, on-ranch canals, pipelines, groundwater recharge basins, and an overflow monitoring and alarm system 1 mile west of the City of Porterville. The pump station consists of four 25 cfs pumps. To improve groundwater recharge, 90 acres of existing temporary basins would be removed and replaced with 125 acres of permanent basin. The project will primarily bank water from the FKC and the Tule River. The Draft Initial Study/Mitigated Negative Declaration was released for public review in August 2019 (Porterville Irrigation District 2019a) and the Notice of Determination was filed in September 2019 (Porterville Irrigation District 2019b).

C.1.10 West Stanislaus ID Fish Screen Intake Project

In August 2017, an Initial Study/Environmental Assessment for the West Stanislaus ID Fish Screen Intake Project was completed. The project includes the installation and operation of a new 347-cfs capacity screened intake with a low-lift pump station located on the bank of the San Joaquin River adjacent to the mouth of the West Stanislaus ID intake canal. There would also be approximately 2,100 feet of underground pipeline from the proposed pump station to the intake canal, sediment removal and management, upgrades to existing roads, multiple wildlife crossings on the intake canal, construction of facilities to provide water deliveries to the Refuge in the fall, and a flood connectivity structure. The project would be conducted adjacent to the San Joaquin River in the unincorporated community of Grayson in northwestern Stanislaus County. Construction is anticipated to be completed within 22 months, following the contract award. Construction of the fish screen intake and pump station would take approximately 12 months, and, after completion of the screen and pump station, construction of the East and West Crossing structures would take 10 months (Reclamation 2017).

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Appendix D: Regulatory Settings

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Appendix D Regulatory Settings

Federal and State of California (state) laws, rules and regulations, Executive Orders (EOs), and compliance requirements for implementation of the alternatives are described in the following sections. Descriptions are organized by federal, state, and local requirements.

D.1 Federal Requirements

D.1.1 Bald and Golden Eagle Protection Act

Administered by the United States Fish and Wildlife Service (USFWS), the Bald and Golden Eagle Protection Act (BGEPA) provides for the protection of the bald eagle (*Haliaeetus leucocephalus*) and the golden eagle (*Aquila chrysaetos*) by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The BGEPA prohibits unregulated take and makes it illegal to kill, wound, pursue, shoot, shoot at, poison, capture, trap, collect, molest, or disturb bald or golden eagles. Surveys are required to determine whether nests will be disturbed and, if so, a buffer area with a specified radius around the nest must be established so that no disturbance or intrusion is allowed until the young have fledged and left the nest. Coordination with the USFWS is recommended for establishing an appropriate buffer.

D.1.2 Clean Air Act

The United States Environmental Protection Agency (EPA) is responsible for implementation of the federal Clean Air Act (CAA). The CAA was enacted in 1955 and was amended in 1963, 1965, 1967, 1970, 1977, 1990, and 1997. Under authority of CAA, EPA established National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), inhalable particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM₁₀), fine particulate matter with an aerodynamic diameter less than or equal to 2.5 microns (PM_{2.5}), and sulfur dioxide (SO₂).

CAA requires States to classify air basins (or portions thereof) as either “attainment” or “nonattainment” with respect to criteria air pollutants, based on whether the NAAQS have been achieved, and to prepare State Implementation Plans (SIPs) containing emission reduction strategies to maintain the NAAQS for those areas designated as attainment and to attain the NAAQS for those areas designated as nonattainment.

D.1.3 Clean Air Non-Road Diesel Rule

To reduce emissions from off-road diesel equipment, the EPA has established a series of emissions standards for new engines, in which manufacturers of off-road diesel engines are required to provide engines meeting these emissions standards based on the model year the engine was manufactured in accordance with the following compliance schedule (EPA 2004):

- Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower category
- Tier 2 standards were phased in from 2001 to 2006

- Tier 3 standards were phased in from 2006 to 2008
- Tier 4 standards, which require add-on emissions-control equipment to attain them, were phased in from 2008 to 2015

Construction equipment utilized to construct the proposed action would be in compliance with these emissions standards.

D.1.4 Clean Water Act

Growing public awareness and concern for controlling water pollution led to enactment of the Federal Water Pollution Control Act Amendments of 1972. As amended in 1977, this law became commonly known as the Clean Water Act (CWA).

The CWA implemented requirements to set water quality standards for all known contaminants in surface waters. Section 303(d) of the 1972 CWA requires States, territories and authorized tribes to develop a list of water quality-impaired segments of waterways. The Section 303(d) list includes water bodies that do not meet water quality standards for the specified beneficial uses of that waterway, even after point sources (e.g., wastewater treatment plant discharges) of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for water bodies on their Section 303(d) lists and implement a process, called Total Maximum Daily Loads (TMDLs), to meet water quality standards (EPA 2023a).

TMDLs are intended to address all significant stressors that cause, or threaten to cause, water body beneficial use impairments, including point sources, nonpoint sources (e.g., runoff from fields, streets, range, or forest land), and naturally occurring sources (e.g., runoff from undisturbed lands). The TMDL process is a tool for implementing water quality standards and is based on the relationship between point source pollution and its deleterious effects on ambient in-stream conditions. The TMDL establishes the maximum allowable loadings of a pollutant that can be assimilated¹ by a water body while still meeting applicable water quality standards. The TMDL provides the basis for the establishment of water quality-based controls. These controls should provide the pollution reduction necessary for a water body to meet water quality standards. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The TMDLs allocation calculation for each water body must include a margin of safety to ensure that the water body can be used for the beneficial uses the state has designated. Additionally, the calculation also must account for seasonal variation in water quality (EPA 2023a). For example, pollutant loads might be greater during winter months with higher flows, however, the rivers may have more assimilative capacity for such pollutants.

TMDLs may be based on readily available information and studies. In some cases, complex studies or models are needed to understand how stressors are causing water body impairment. In many cases, simple analytical efforts provide an adequate basis for stressor assessment and implementation planning. TMDLs are developed to provide an analytical basis for planning and implementing pollution controls, land management practices, and restoration projects needed to protect water quality. States are required to include approved TMDLs and associated implementation measures in

¹ As known as assimilative capacity: the ability of a body of water to cleanse itself; to receive waste waters or toxic substances without deleterious effects and without damage to aquatic life or humans who consume the water.

State water quality management plans. Within California, TMDLs implementation is regulated through regional Basin Plans.

Water quality of waters of the United States (U.S.) subjected to a discharge of dredged or fill material is regulated under Section 404 of the CWA. These actions must not violate federal or state water quality standards. Specifically, in the State of California, the applicable Regional Water Quality Control Board (RWQCB) administers Section 401 and either issues or denies water quality certifications depending upon whether the proposed discharge or fill material complies with applicable state and federal laws. The CWA also requires that a permit be obtained from EPA and the United States Army Corps of Engineers (USACE) when discharge of dredged or fill material into wetlands and waters of the U.S. occurs. Section 404 of the CWA requires EPA and USACE to issue individual and general permits for these activities.

In addition to complying with state and federal water quality standards, all point sources that discharge into waters of the U.S. must obtain a National Pollutant Discharge Elimination System (NPDES) permit under provisions of Section 402 of the CWA. In California, the State Water Resources Control Board (SWRCB) and RWQCBs are responsible for the implementation of the NPDES permitting process at the state and regional levels, respectively. The NPDES permit process also provides a regulatory mechanism for the control of non-point source pollution created by runoff from construction and industrial activities, and general and urban land use, including runoff from streets. To prevent polluted stormwater runoff from being washed into municipal separate storm sewer systems (MS4s), certain operators are required to obtain NPDES permits. The 1990 Phase I regulation requires medium and large cities or certain counties with populations of 100,000 or more to obtain NPDES permit coverage for their stormwater discharges. The 1999 Phase II regulation requires small MS4s in U.S. Census Bureau defined urbanized areas to obtain NPDES permit coverage for their stormwater discharges. Phase II also includes non-traditional MS4s such as public universities, departments of transportation, hospitals and prisons. There are approximately 855 Phase I MS4s and 6,695 Phase II MS4s (EPA 2024d).

Projects involving construction activities (e.g., clearing, grading, or excavation) involving land disturbance greater than one acre must file a Notice of Intent (NOI) with the applicable RWQCB to indicate their intent to comply with the State General Permit for Stormwater Discharges Associated with Construction Activity (General Permit). The State General Permit specifies Best Management Practices (BMPs), to achieve compliance as well as numeric action levels (NALs) in order to achieve federal standards to minimize sediment and pollutant loadings. The General Permit requires preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) as well as a Rain Event Action Plan (REAP) prior to construction. The SWPPP and REAP are intended to help identify the sources of sediment and other pollutants, and assess the effectiveness of BMPs in preventing or reducing pollutants in storm water discharges and authorized non-storm water discharges.

The General Permit only applies to individuals, public agencies, private businesses, and other legal entities that have submitted a complete NOI (Central Valley RWQCB 2016).

D.1.5 Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (43 USC Section 9601 et seq.) of 1980, also known as Superfund, created a tax on the chemical and petroleum industries to provide for response and cleanup of hazardous substances that may endanger public health or the environment. CERCLA established requirements for abandoned hazardous waste sites and provided for liability of persons responsible for releases of hazardous waste at these sites (EPA 2024a).

D.1.6 Emergency Planning and Community Right to Know Act

The Emergency Planning and Community Right-to-Know Act (1986) (40 CFR Parts 350 to 372) requires Federal, State, local governments, tribes, and industry to plan for emergencies and report on hazardous and toxic chemical use and releases to the public. Provisions within the act are meant to increase public knowledge and information access about chemicals being used and releases at facilities to help improve chemical safety and protect public health and the environment (EPA 2023b).

D.1.7 Energy Policy and Conservation Act

The Energy Policy and Conservation Act (EPCA) creates a comprehensive approach to federal energy policy. The primary goals of EPCA are to increase energy production and supply, reduce energy demand, provide energy efficiency, and give the executive branch additional powers to respond to disruptions in energy supply (GovTrack 2018). The act requires that all vehicles sold in the U.S. meet certain fuel economy goals. Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 miles per gallon. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not subject to fuel economy standards (The National Academies Press 2000).

D.1.8 Endangered Species Act

Under Endangered Species Act (ESA), the Secretary of the Interior and the Secretary of Commerce have joint authority to list a species as threatened or endangered (USC, Title 16, Section 1533[c]). ESA prohibits the “take” of endangered or threatened fish and wildlife species, the take of endangered or threatened plants in areas under federal jurisdiction or in violation of state law, or adverse modifications to their critical habitat. Under ESA, the definition of “take” is to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” USFWS and National Marine Fisheries Service (NMFS) also interpret the definition of “harm” to include significant habitat modification that could result in the take of a species.

If an activity would result in the take of a federally-listed species, one of the following is required: an incidental take permit under Section 10(a) of ESA or an incidental take statement issued pursuant to federal interagency consultation under Section 7 of ESA. Such authorization typically requires various measures to avoid and minimize species take, and to protect the species and avoid jeopardy to the species’ continued existence.

Pursuant to the requirements of Section 7 of ESA, a federal agency reviewing a proposed action which it may authorize, fund, or carry out must determine whether any federally-listed threatened or endangered species, or species proposed for federal listing, may be present in the study area and determine whether implementation of the proposed action is likely to affect the species. In addition, the federal agency is required to determine whether a proposed action is likely to jeopardize the

continued existence of a listed species or any species proposed to be listed under ESA or result in the destruction or adverse modification of critical habitat proposed or designated for such species (16 USC 1536[3], [4]).

NMFS administers ESA for marine and anadromous fish species, including California Central Valley steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS), Sacramento River winter-run and Central Valley spring-run Chinook salmon (*O. tshawytscha*) evolutionarily significant unit (ESU), and southern DPS of North American green sturgeon (*Acipenser medirostris*). USFWS administers ESA for non-anadromous and non-marine fish species such as delta smelt (*Hypomesus transpacificus*), and longfin smelt (*Spirinchus thaleichthys*), which has been recently proposed for listing and warrants consideration for protection under ESA. In 2012, USFWS acknowledged that the San Francisco Bay-Delta DPS of the longfin smelt warrants listing but was precluded from listing at that time because of other higher priorities and consequently will be treated as a candidate species. Projects for which a federally-listed species is present and likely to be affected by an existing or proposed action must receive authorization from USFWS and/or NMFS. Authorization may involve a letter of concurrence that the project will not result in the potential take of a listed species, or may result in the issuance of a Biological Opinion (BO) that describes measures that must be undertaken to minimize the likelihood of an incidental take of a listed species. NMFS and USFWS will issue a Reasonable and Prudent Alternative (RPA) in the BO when a project that is determined to jeopardize the continued existence of a listed species.

Where a federal agency is not authorizing, funding, or carrying out a project, take that is incidental to the lawful operation of a project may be permitted pursuant to Section 10(a) of ESA through approval of a habitat conservation plan (HCP).

ESA requires the federal government to designate “critical habitat” for any species it lists under the ESA. “Critical habitat” is defined as: 1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to the species conservation, and those features that may require special management considerations or protection; and 2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation.

D.1.8.1 Biological Opinions

As described above, BOs are prepared through formal consultation under Section 7 of the ESA by either NMFS or USFWS in response to a federal action affecting a listed species.

Reclamation completed NEPA on the CVP/SWP Coordinated Operations BOs and issued a Record of Decision (ROD) on January 11, 2016. Most recently, Reclamation reinitiated consultation on coordinated long-term operation of the CVP and SWP and completed an Environmental Impact Statement (EIS) in 2019 and issued a ROD on February 18, 2020 (Reclamation 2020) upon receiving new USFWS and NMFS Biological Opinions on October 21, 2019 (USFWS 2019, NMFS 2019). Reclamation is currently in active litigation and has negotiated an “interim operations plan” that allows for deviations from the 2020 ROD and 2019 Final EIS. On September 30, 2021, Reclamation and the California Department of Water Resources (DWR) again requested reinitiation of consultation with the USFWS and NMFS due to anticipated modifications to the proposed action that may cause effects to ESA-listed species or designated critical habitat that was not analyzed in the 2019 USFWS and NMFS Biological Opinions. On October 1, 2021, both agencies agreed to the reinitiation.

D.1.9 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) decrees that all migratory birds and their parts (including eggs, nests and feathers) are fully protected. The MBTA protects nearly all native North American bird species. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Under the MBTA, surveys are required to determine whether nests will be disturbed and, if so, a buffer area with a specified radius around the nest must be established so that no disturbance or intrusion is allowed until the young have fledged and left the nest. The size of the buffer area would vary depending on species and local conditions (e.g., presence of busy roads) and the professional judgment of the project biologist. Coordination with the USFWS is recommended for establishing an appropriate buffer.

D.1.10 Noise Control Act of 1972 (42 USC 4910)

In the past, the EPA coordinated all Federal noise control activities through its Office of Noise Abatement and Control. However, in 1981, Congress concluded that noise issues were best handled at the state or local government level. As a result, the EPA phased out the office's funding in 1982 as part of a shift in Federal noise control policy to transfer the primary responsibility of regulating noise to state and local governments. However, the Noise Control Act of 1972 and the Quiet Communities Act of 1978 were not rescinded by Congress and remain in effect today, although essentially unfunded. Additionally, Title IV – Noise Pollution of the Clean Air Act provides guidance to state and local entities in establishing appropriate noise control standards.

D.1.11 Occupational Safety and Health Act

The Occupational Safety and Health Act is enforced by the United States Department of Labor, Occupational Safety and Health Administration (OSHA). The Occupational Safety and Health Act authorizes the enforcement of standards to assure safe and healthful working conditions for employees; provides research, education, information, and training; and assists the states to encourage employers to assure safe and healthful working conditions (OSHA 2017).

D.1.12 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) of 1976, administered by the EPA, governs the disposal of solid and hazardous waste. Under RCRA, EPA was given authority of “cradle-to-grave” control of hazardous waste and this is the current approach for hazardous waste management. Three programs were established under RCRA including the solid waste program, hazardous waste program, and underground storage tank (UST) program. Under the law, controls for the generation, transport, treatment, storage, and disposal of hazardous waste are strictly mandated. Only active and future facilities are controlled under RCRA (EPA 2024c). There have been three amendments to RCRA, including the Hazardous and Solid Waste Amendments of 1984, the Federal Facility Compliance Act of 1992, and the Land Disposal Program Flexibility Act of 1996 (EPA 2024c).

D.1.13 Safe Drinking Water Act

The Federal Safe Drinking Water Act (SDWA) was enacted in 1974 to protect the quality of drinking water in the U.S. This law focuses on all waters actually or potentially designated for drinking use, whether from above ground or underground sources. The SDWA authorized the EPA to establish safe standards of purity for specified contaminants and required all owners or operators of public water systems to comply with primary (health-related) standards. State governments, which assume this power from the EPA, also encourage attainment of secondary standards (nuisance-

related). Contaminants of concern in a domestic water supply are those that either pose a health threat or in some way alter the aesthetic acceptability of the water. These types of contaminants are currently regulated by the EPA through primary and secondary maximum contaminant levels (MCLs). As directed by the SDWA amendments of 1986, the EPA has been expanding its list of primary MCLs. MCLs have been proposed or established for approximately 100 contaminants.

D.1.14 Title 49, Code of Federal Regulations, Section 171-177

Title 49 governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles. The administering agencies for Title 49 in California are the California Highway Patrol (CHP) and the federal Department of Transportation (DOT), Pipeline and Hazardous Materials Safety Administration. The project would conform to Title 49 by requiring that vehicles used to transport any construction-related hazardous materials use the required markings.

D.1.15 Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) of 1976 authorizes EPA to require reporting, record-keeping, testing, and restrictions for chemical substances. Food, drugs, cosmetics, and pesticides are excluded from the TSCA. Specific chemicals, such as polychlorinated biphenyls, asbestos, radon, and lead-based paint, are also addressed within the TSCA regarding the production, importation, use, and disposal of these substances. Within the TSCA various sections address authority to require pre-manufacture notification for new chemical substances, require testing of chemicals where risks of exposures are of concern, issue new rules where a new use is identified for a substance, maintain a TSCA inventory of chemicals as new ones are manufactured or imported, require certification reporting for import and export of chemicals, and require record-keeping for manufacturers and distributors (EPA 2024b).

D.2 State Requirements

D.2.1 Alquist-Priolo Earthquake Fault Zoning Act

The 1972 Alquist-Priolo Earthquake Fault Zoning Act (California Public Resources Code [PRC] Section 2621 *et seq.*) requires local agencies to regulate development within earthquake fault zones to reduce the hazards associated with surface fault ruptures. It also regulates construction in earthquake fault zones.

D.2.2 Assembly Bill 52

Signed in 2014 by Governor Brown, Assembly Bill (AB) 52 amends CEQA and creates a new category of environmental resource: “tribal cultural resources,” which considers tribal cultural values in addition to scientific and archaeological values when determining impacts and mitigation. Tribal cultural resources are defined as any site, feature, place, cultural landscape, sacred place, or object that has cultural value to a California Native American tribe. The bill further establishes a consultation process with all California Native American tribes listed by the Native American Heritage Commission, regardless of their federal recognition status.

D.2.3 California Building Code

Minimum standards for structural design and construction are outlined in the California Building Standards Code (CBSC) (Title 24, California Code of Regulations). The CBSC is based on the Uniform Building Code (UBC), which is widely used throughout the U.S. and has been modified for California conditions with numerous, more detailed and/or more stringent regulations.

D.2.3.1 Geology, Seismicity, and Soils

The CBSC requires that “classification of the soil at each building site...be determined when required by the building official” and that “the classification be based on observation and any necessary test of the materials disclosed by borings or excavations.” In addition, the CBSC states that “the soil classification and design-bearing capacity shall be shown on the (building) plans, unless the foundation conforms to specified requirements.” The CBSC provides standards for various aspects of construction, including but not limited to excavation, grading, and earthwork construction; fill placement and embankment construction; construction on expansive soils; foundation investigations; and liquefaction potential and soil strength loss. In accordance with California law, project design and construction would be required to comply with provisions of the CBSC.

D.2.3.2 Noise and Vibration

The Code provides acoustical regulations for both exterior-to-interior sound insulation, as well as sound and impact isolation between adjacent spaces of various occupied units. Title 24 regulations generally state that interior noise levels generated by exterior noise sources shall not exceed 45 A-weighted decibels (dBA) L_{dn} / Community Noise Equivalent Level (CNEL), with windows closed, in any habitable room for general residential uses.

D.2.4 California Clean Air Act

The California Clean Air Act (CCAA) substantially added to the authority and responsibilities of the State’s air pollution control districts. The CCAA establishes an air quality management process that generally parallels the federal process. The CCAA, however, focuses on attainment of the California Ambient Air Quality Standards (CAAQS) that, for certain pollutants and averaging periods, are typically more stringent than the comparable NAAQS. The CCAA requires that the CAAQS be met as expeditiously as practicable, but does not set precise attainment deadlines. Instead, the act established increasingly stringent requirements for areas that will require more time to achieve the standards.

The air quality attainment plan requirements established by the CCAA are based on the severity of air pollution problems caused by locally generated emissions. Upwind air pollution control districts are required to establish and implement emission control programs commensurate with the extent of pollutant transport to downwind districts.

The California Air Resources Board (CARB) is responsible for developing emission standards and regulations for on-road motor vehicles and some off-road equipment in the State. In addition, CARB develops guidelines for the local districts to use in establishing air quality permit and emission control requirements for stationary sources subject to the local air district regulations. In November 2022, CARB adopted amendments to regulations affecting offroad diesel equipment, including construction equipment, which require the use of renewable diesel fuel in all vehicle fleets, with limited exception, starting in January 2024.

D.2.5 California Department of Fish and Wildlife Species Designations

CDFW maintains an informal list of species called “species of special concern.” These are broadly defined as plant and wildlife species that are of concern to CDFW because of population declines and restricted distributions and/or because they are associated with habitats that are declining in California. These species are inventoried in the California Natural Diversity Database regardless of their legal status. Impacts on species of special concern may be considered significant.

D.2.6 California Department of Transportation

Traffic analysis in the State of California is guided by standards set at the State level by Caltrans, and by local jurisdictions. State highways fall under the jurisdiction of Caltrans. Other roadways fall under the local jurisdiction, either city or county, in which they are located. Each jurisdiction has adopted standards regarding the desired performance level of traffic conditions on the circulation system within its jurisdiction.

D.2.6.1 Guide for the Preparation of Traffic Impact Studies

The Guide for the Preparation of Traffic Impact Studies was prepared by Caltrans and released in 2002. Each jurisdiction has adopted standards regarding the desired performance level of traffic conditions on the circulation system within its jurisdiction. A performance measure called “Level of Service” (LOS) is used to characterize traffic operating conditions of a circulation element. Progressively worsening traffic operating conditions are given the letter grades “A” through “F”. Traffic operating conditions associated with each LOS designation, the LOS criteria for freeways using average densities, and the LOS criteria for roadways using daily traffic volumes are included in Appendix K.

While most motorists consider LOS A, B, and C as satisfactory travel conditions, LOS D is considered marginally acceptable. Congestion and delay are considered unacceptable to most motorists and are given the LOS E or F ratings.

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

D.2.6.2 Vehicle Miles Traveled-Focused Transportation Impact Study Guide

The Vehicle Miles Travel (VMT)- Focused Transportation Impact Study Guide (TISG) was prepared by Caltrans and released in May 2020. The TISG provides guidance regarding Caltrans review of a land use project’s transportation analysis using a VMT metric.

D.2.7 California Endangered Species Act

CDFW is responsible for administration of the California Endangered Species Act (CESA). For projects that affect a species that is both state and federal listed, compliance with the Federal Endangered Species Act will satisfy the CESA if CDFW determines that the federal incidental take authorization is “consistent” with the CESA. Projects that result in a “take” of a state-listed species may require an incidental take permit under the CESA. The state act also lends protection to species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly with regard to protection of isolated populations, nesting or den locations,

communal roosts, and other essential habitat. The area of analysis is known to support species listed under the CESA.

Fully Protected Species under California Fish and Game Code – Protection of fully protected species is described in four sections of the California Fish and Game Code that list 37 fully protected species (California Fish and Game Code Sections 3511, 4700, 5050, and 5515). These statutes prohibit take or possession at any time of fully protected species.

D.2.8 California Environmental Protection Agency Unified Program

The California Environmental Protection Agency (CalEPA) Unified Program was developed to protect Californians from hazardous waste and materials. CalEPA has certified 81 local government agencies as California Unified Program Agencies (CUPAs), which is responsible for implementing the hazardous waste and materials standards for five different state agencies including: CalEPA, California Department of Toxic Substances Control (DTSC), Governor's Office of Emergency Services (CalOES), California Department of Forestry and Fire Protection and the SWRCB (CalEPA 2024a). Under the Unified Program, the administration, permit, inspection and enforcement activities are consolidated for the following environmental and emergency management programs (CalEPA 2024b).

- Aboveground Petroleum Storage Act (APSA) Program
- Area Plans for Hazardous Materials Emergencies
- California Accidental Release Prevention (CalARP) Program
- Hazardous Materials Release Response Plans and Inventories (Business Plans)
- Hazardous Material Management Plan and Hazardous Material Inventory Statements (California Fire Code)
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs
- UST Program

A more in-depth discussion of some of these programs that have applicability are described below.

D.2.8.1 Hazardous Material Management Plan and Hazardous Material Inventory Statements

The Hazardous Material Business Plans program mandates the creation of a planning document by businesses and other entities who handle hazardous materials of certain quantities. The Business Plan shall include, among other things, an inventory of hazardous materials, a site location map, emergency plan and training program for their employees. These plans are to be submitted electronically to the California Environmental Reporting System. The local CUPA agency may be contacted for assistance with preparation of Business Plans. The CUPA will verify this information and provide it to "local emergency responders such as firefighters, health officials, planners, public safety officers, health care providers, regulatory agencies and other interested" parties. This information is prepared in response to federal community right-to-know laws (CalOES 2020a).

D.2.8.2 California Accidental Release Prevention Program

The CalARP program was developed to assist with prevention of harmful substances releases which could seriously harm the public and/or the environment. Businesses that handle certain quantities of regulated substances are required to prepare a Risk Management Plan that includes an engineering analysis of potential accident scenarios with mitigation measures. The mitigation measures, when implemented, would reduce the accident potential at a business. CalARP is implemented at the local government level (CUPA) who work directly with the regulated business (CalOES 2020b):

D.2.8.3 California Area Plan Program

The Area Plan Program requires CUPAs to prepare a plan utilizing information from CalARP and Hazardous Materials Business Plans (HMBP). The Area Plan includes emergency response procedures to minimize impacts from a hazardous material release or threatened release. Provisions for multi-agency coordination and notification during emergency responses are also to be addressed in the Area Plan (CalOES 2020c).

D.2.9 California Environmental Quality Act Guidelines

D.2.9.1 Greenhouse Gas Emissions

On March 18, 2010, the California Natural Resources Agency (CNRA) adopted amendments to the California Environmental Quality Act (CEQA) Guidelines to include provisions for evaluating the significance of GHG emissions. The amended guidelines give the Lead Agency leeway in determining whether GHG emissions should be evaluated quantitatively or qualitatively but requires that the following factors be considered when assessing the significance of impacts from GHG emissions (Section 15064.4):

- The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting
- Whether the project emissions exceed a threshold of significance that the lead agency determines apply to the project
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions

The amended guidelines also specify that Lead Agencies must analyze potentially significant impacts associated with placing projects in locations susceptible to hazardous conditions (e.g., floodplains, coastlines, and wildfire risk areas), including those that could be affected by climate change (Section 15126.2(a)).

Furthermore, the guidelines also suggest measures to mitigate GHG emissions, including implementing project features to reduce emissions, obtaining carbon offsets to reduce emissions, or sequestering GHG.

D.2.9.2 Cultural Resources

CEQA is the central law governing cultural resources at the state level. CEQA Guidelines Section 15064.5 states that a project may have a significant impact on the environment if it causes a substantial adverse change in the significance of a historical resource. Pursuant to Section 15064.5(a)(3), a historical resource is a resource that is included in, or eligible for inclusion in, the

California Register of Historical Resources (CRHR); a resource listed in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be significant. Resources automatically listed in the CRHR are those formally determined eligible for, or listed in, the NRHP; State Historical Landmarks numbered 770 or higher, and California Points of Historical Interest. If a lead agency determines that a cultural resource constitutes a historical resource, the provisions of PRC Section 21084.1 and CEQA Guidelines Section 15064.5 would apply. If a cultural resource does not meet the criteria for a historical resource, it may yet be regarded as a “unique” archaeological resource (PRC Section 21083.2). CEQA Guidelines Section 15064.5(c)(4) notes that if a resource is neither a unique archaeological resource nor a historical resource, the effects of a project on that resource shall not be considered a significant effect on the environment. Human remains, including those interred outside formal cemeteries, are protected under several state laws, including PRC Section 5097.98 and Health and Safety Code Section 7050.5.

D.2.10 California Executive Order S-3-05

On June 1, 2005, former California Governor Arnold Schwarzenegger signed EO S-03-05. This EO established the following GHG emission reduction targets for California:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80% below 1990 levels.

The order also requires the Secretary of the CalEPA to report to the Governor and the State Legislature biannually on progress made toward meeting the GHG emission targets, commencing in January 2006. The Secretary of the CalEPA is also required to report about impacts on water supply, public health, agriculture, the coastline, and forestry. Mitigation and adaptation plans to combat these impacts must also be developed.

California GHG emissions were estimated to be 446.06 million tonnes (metric tons) of CO₂ (carbon dioxide) equivalent (CO₂e) in 2010, compared to 467.19 million tonnes of CO₂e in 2000 (CARB 2019). The GHG emissions inventory indicates that emissions decreased by over 21 million tonnes of CO₂e over the decade, representing a 4% decrease in statewide emissions. Thus, the state was successful in meeting the first milestone of S-3-05.

D.2.11 California Executive Order B-30-15 and Senate Bill 32

California Governor Edmund G. Brown issued EO B-30-15 to reduce California GHG emissions to 40% below 1990 levels by 2030. The order aligns California’s GHG reduction targets with the United Nations Climate Change Conference in Paris. In 2016, Senate Bill (SB) 32 codified the EO B-30-15 target and directed state regulatory agencies to develop rules and regulations to meet the 2030 state target.

D.2.12 California Fish and Game Code Section 1600, Streambed Alterations

Section 1600 et seq. of the California Fish and Game Code, as administered by CDFW, mandates that “it is unlawful for any person to substantively divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds, without first notifying the department of such activity.”

Streambed alteration must be permitted by CDFW through a Streambed Alteration Agreement. CDFW defines streambeds as “a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life” and lakes as “natural lakes and man-made reservoirs.” CDFW jurisdiction includes ephemeral, intermittent, and perennial watercourses, and can extend to habitats adjacent to watercourses, including flood plains. Wetlands near watercourses would also be considered “habitats adjacent to watercourses.” A Lake and Streambed Alteration Agreement application may need to be submitted for construction actions disturbing the bed and bank of rivers or reservoirs.

D.2.13 California Fish and Game Code Sections 1900-1913, Native Plant Protection Act

Sections 1900-1913 of the California Fish and Game Code prohibits take of endangered or rare native plants, with some exceptions, including after proper notification to CDFW for vegetation removal from canals, roads, and other sites. The CDFW has the authority to enforce the provisions of this act and authorize measures to restore native plants that may otherwise be affected by project activities, if deemed applicable.

D.2.14 California Fish and Game Code Sections 3500 - 3705, Migratory Bird Protection

Sections 3500 through 3705 of the California Fish and Game Code regulate the taking of migratory birds and their nests. These codes prohibit the taking of nesting birds, their nests, eggs, or any portion thereof during the nesting season. Typically, the breeding/nesting season is from March 1 through August 30. Depending on each year’s seasonal factors, the breeding season can start earlier and/or end later. Several species of migratory birds are known to occur in the area of analysis.

D.2.15 California Global Warming Solutions Act of 2006 (Assembly Bill 32)

California AB 32, the Global Warming Solutions Act of 2006, codifies the state’s GHG emissions targets by requiring the state’s global warming emissions to be reduced to 1990 levels by 2020 and directs CARB to enforce the statewide cap that began to phase in during 2012. In 2007, CARB recommended and adopted a 1990 GHG emissions level and 2020 emissions limit of 427 million metric tons CO₂e (MMTCO₂e); however, this limit has subsequently been updated to 431 MMTCO₂e using the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report global warming potentials (CARB 2024). The limit is a statewide limit and does not require individual sectors or facilities to reduce emissions equally.

Key AB 32 milestones are as follows (CARB 2018):

- January 1, 2009 – Scoping Plan adopted indicating how emissions will be achieved from significant sources of GHGs via regulations, market mechanisms, and other actions.
- During 2009 – CARB staff drafted rule language to implement its plan and held a series of public workshops on each measure (including market mechanisms).
- January 1, 2010 – Early action measures took effect.
- During 2010 – CARB conducted series of rulemakings, after workshops and public hearings, to adopt GHG regulations, including rules governing market mechanisms.
- January 1, 2011 – Completion of major rulemakings for reducing GHGs, including market mechanisms.

- January 1, 2012 – GHG rules and market mechanisms adopted by CARB and are legally enforceable.
- November 14, 2012 – CARB held first quarterly auction of GHG emissions allowances as part of the cap-and-trade program.
- January 1, 2013 – Cap-and-trade program began with a GHG emissions cap that declines over time.
- September 17, 2013 – CARB issued first carbon offset credits as part of the cap-and-trade program.
- May 22, 2014 – CARB approved First Update to the Climate Change Scoping Plan.
- December 31, 2020 – Deadline for achieving 2020 GHG emissions cap.

CARB has been proactive in its implementation of AB 32 and has met each of the milestones identified above that have already passed and is on track to meet the last milestone.

D.2.16 California Governor's Office of Planning and Research's Technical Advisory on Evaluating Transportation Impacts in CEQA

The *Technical Advisory on Evaluating Transportation Impacts in CEQA* was released in December 2018 by the California Governor's Office of Planning and Research (OPR) in response to Senate Bill 743 (discussed in Section D.2.29). This document provides technical recommendations regarding assessment of Vehicle Miles Traveled (VMT), thresholds of significance, and mitigation measures (OPR 2018).

D.2.17 California Important Farmland Inventory System and Farmland Mapping and Monitoring Program

The California Department of Conservation (DOC), Office of Land Conservation, maintains a statewide inventory of farmlands. These lands are mapped by the Division of Land Resource Protection as part of the Farmland Mapping and Monitoring Program (FMMP). The FMMP was established by the State in 1982 to continue the Important Farmland mapping efforts begun in 1975 by the U.S. Soil Conservation Service (now called the NRCS). The intent of the NRCS was to produce agricultural resource maps based on soil quality and land use across the nation. The maps are updated every 2 years with the use of aerial photographs, a computer mapping system, public review, and field reconnaissance.

As part of the nationwide effort to map agricultural land uses, the NRCS developed a series of definitions known as Land Inventory and Monitoring (LIM) criteria. The LIM criteria classify land's suitability for agricultural production. Suitability includes both physical and chemical characteristics of soils, as well as the actual land use. Maps of Important Farmland are derived from NRCS soil survey maps using the LIM criteria and are available by county (DOC 2024b).

D.2.18 California Natural Resources Agency Tribal Consultation Policy

Under EO B-10-11 it is policy that every state agency and Department subject to executive control to implement effective government-to-government consultation with California Indian Tribes. The purpose of CNRA Tribal Consultation Policy is to ensure effective government-to-government consultation between the Natural Resources Agency, its Departments of the Natural Resources Agency and Indian tribes and tribal communities. It is only by engaging in open, inclusive and

regular communication efforts that the interests of California's Tribes and tribal communities will be recognized and understood in the larger context of complex decision-making. The goal of the policy is to engage in the timely and active process of respectfully seeking, discussing and considering the views of California Indian Tribes, Tribal communities and Tribal Consortia in an effort to resolve concerns of as many parties as possible.

D.2.19 California Noise Control Act of 1973

The California Noise Control Act states that excessive noise is a serious hazard to public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. The act established the now defunct Office of Noise Control, which has the responsibility to set standards for noise exposure. Although no longer in operation, the Office of Noise Control's guidelines still apply under the act and the applicable land use compatibility guidelines are provided below:

- An exterior noise level of 60 to 65 dBA community noise level equivalent (CNEL) is considered "normally acceptable" for residences.
- A noise level of 70 dBA CNEL is considered to be "conditionally acceptable" (i.e., the upper limit of "normally acceptable" noise levels for sensitive uses such as schools, libraries, hospitals, nursing homes, churches, parks, offices, and commercial/professional businesses).
- A noise level of greater than 75 dBA CNEL is considered "clearly unacceptable" for residences.

D.2.20 California Occupational Safety and Health Administration Standards

The California Occupational Safety and Health Administration (CalOSHA) enforces laws and regulations related to the safety and health of workers in the workplace. Laws and regulations enforced by CalOSHA include regulations related to construction and handling of carcinogens and asbestos (CalOSHA 2024).

D.2.21 California Office of Historic Preservation

The California Office of Historic Preservation (OHP) implements the policies of the NHPA on a statewide level and maintains the State Historic Resources Inventory database. The SHPO is responsible for the operation and management of the OHP and implements historic preservation programs within the state's jurisdiction while serving as a consulting party in the federal process described above.

D.2.22 California Porter-Cologne Water Quality Control Act

The California Porter-Cologne Water Quality Act (Porter-Cologne Act) was enacted in 1969 and established the SWRCB. The Porter-Cologne Act defines water quality objectives as the limits or levels of water constituents that are established for reasonable protection of beneficial uses, described in detail in Appendix XX. Unlike the CWA, the Porter-Cologne Act applies to both surface and groundwater. The Porter-Cologne Act requires that each of nine semi-autonomous RWQCB establish water quality objectives, while acknowledging that water quality may be changed to some degree without unreasonably affecting beneficial uses. Beneficial uses, together with the corresponding water quality objectives, are defined as standards, per Federal CWA regulations. Therefore, the regional plans provide the regulatory framework for meeting state and federal requirements for water quality control. Changes in water quality are only allowed if the change is

consistent with the most restrictive beneficial use designation identified by the state, does not unreasonably affect the present or anticipated beneficial uses, and does not result in water quality less than that prescribed in the Regional Water Quality Control Plans (Basin Plans) (SWRCB 2019).

Pursuant to the Porter-Cologne Water Quality Control Act, the SWRCB RWQCBs also regulates water quality through oversight of water monitoring and contamination cleanup and abatement. The RWQCBs are primarily responsible for protecting the quality of the waters of the State for present and future beneficial uses. The California SWRCB is responsible for several programs related to the cleanup and management of hazardous waste sites in California, including the Site Cleanup Program, UST Program, Department of Defense Program, and Land Disposal (SWRCB 2017). All of these programs are administered by the Central Valley RWQCB in San Joaquin, Stanislaus and Kern counties (SWRCB 2013). The Cleanup Program regulates unauthorized releases to soils and groundwater and, in some cases, surface waters or sediments. The purpose of the UST Program is to “protect public health and safety and the environment from releases of petroleum and other hazardous substances from tanks.” The Land Disposal program regulates the discharge of waste “to land for treatment, storage and disposal” (SWRCB 2017).

D.2.22.1 California Public Utilities Commission

The California Public Utilities Commission (CPUC) is a regulatory body overseeing privately owned electric, natural gas, telecommunications, water, railroad, rail transit and passenger transportation companies since 1912. The CPUC ensures the provision of safe, reliable utility service and infrastructure to consumers (CPUC 2021). The CPUC is responsible for ensuring that electric utilities meet the State’s Renewable Portfolio Standard; administering gas-related conservation programs; and ensuring water utilities meet all Federal and State water quality standards (CPUC 2020).

D.2.22.2 State Water Resources Control Board Decision 1641

SWRCB Decision-1641 presents the current water right requirements to implement the Delta flow-dependent objectives. In SWRCB Decision-1641, the SWRCB assigned responsibilities to Reclamation and DWR for meeting these requirements. These responsibilities require that the CVP and the SWP be operated to protect water quality, and that DWR and/or Reclamation will ensure that the flow dependent water quality objectives are met in the Delta (SWRCB 2000).

D.2.23 California Water Code Section 13240, Regional Water Quality Control Plans

The California Water Code (Section 13240) requires the preparation and adoption of Water Quality Control Plans (WQCPs) (Basin Plans), and the Federal CWA (Section 303) supports this requirement. According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, water quality objectives to protect those uses, and an implementation program needed for achieving the objectives. State law also requires that Basin Plans conform to the policies set forth in the Water Code, beginning with Section 13000, and any state policy for water quality control. The Basin Plans are regulatory references for meeting the state and federal requirements for water quality control (40 Code Federal Regulations 131.20). One significant difference between the state and Federal programs is that California’s basin plans also establish standards for groundwater in addition to surface water (Central Valley RWQCB 1998).

Basin Plans complement other WQCPs adopted by the SWRCB, such as the WQCP for Temperature Control and Ocean Waters. The SWRCB and the regional water boards maintain each Basin Plan in an updated and readily available edition that reflects the current water quality control programs.

The *Central Valley Region Basin Plan* covers the drainage areas of the entire Sacramento and San Joaquin River basins, involving an area bound by the crests of the Sierra Nevada on the east and the Coast Range and Klamath Mountains on the west. The area covered in this WQCP extends some 400 miles, from the California – Oregon border to the headwaters of the San Joaquin River.

D.2.24 California Water Code, Water Rights

The California Water Code establishes state policy, laws, statutes, and definitions for water rights. The Water Code established the SWRCB, delegating adjudicatory and regulatory functions of the state to the SWRCB in the field of water resources. Regulations pertaining to water law are found in Title 23, Sections 640 to 1024. After the enactment of the State Water Commission Act in 1914, the state required any person or agency seeking to use surface water, without an existing riparian right, to apply for and receive approval for such use from the SWRCB. Water rights permits granted by the SWRCB include detailed descriptions of the amounts, conditions, and construction timetables under which the proposed water project must comply. Prior to permit issuance, the SWRCB must take into account all prior rights and the availability of water in the basin. The SWRCB must also consider the flows needed to preserve instream uses such as recreation and fish and wildlife habitat. The SWRCB may impose additional conditions to ensure that these criteria are satisfied and it may use its continuing authority to enforce and revise the conditions of water right permits over time. The SWRCB is also empowered to revoke a permit or issue cease and desist orders if conditions of the permit are not being met.

D.2.25 Hazardous Waste Control Act

The Hazardous Waste Control Act was passed in 1972 by the State Legislature. The Hazardous Waste Control Law (Health and Safety Code sections 25100 et seq.) mandates regulatory standards for the generation, handling, processing, storage, transportation, and disposal of hazardous wastes through a “cradle to grave” system. The DTSC and local CUPAs are responsible for administration of the California Hazardous Waste Control Program (DTSC 2024).

D.2.26 Native American Historic Resource Protection Act

Section 5097.5 of the California PRC prohibits excavation or removal of any “vertebrate paleontological site or any other archaeological, paleontological, or historical feature, situated on public lands, except with express permission of the public agency having jurisdiction over such lands”.

D.2.27 Noise Element Guidelines (Health and Safety Code §46050.1)

The State of California provides guidance for the preparation of GPs and noise ordinances. In 1976, the State Department of Health Services (now the Department of Public Health) issued *Noise Element Guidelines* (Health and Safety Code §46050.1). In 1977, the State Office of Noise Control (ONC) published a model noise ordinance and mandated that each county develop a noise element as part of its GP (Section 65203[f] of the California Government Code). The purpose of this element is to identify and appraise noise problems in the community. The ONC’s model ordinance

recommends limits on temporary construction noise levels and operational noise levels in residential, commercial, and industrial areas.

The State's *General Plan Guidelines* recommend that local governments “analyze and quantify” noise levels and the extent of noise exposure through actual measurement and the use of noise modeling.” In addition to other requirements, the guidelines state that “technical data relating to mobile and point sources must be collected and synthesized into a set of noise control policies and programs that ‘minimizes the exposure of community residents to excessive noise’” (OPR 2017).

As part of the county-level planning process, analysis of existing conditions and community tolerance for noise are used to dictate the normally acceptable community noise exposure. Measured in dBA, a normally acceptable community noise exposure is used by the state to signify satisfactory land use in relation to noise exposure. Other terms used by the state to analyze community noise exposure are:

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

Table D-1 displays land use categories and community noise exposure levels.

Table D-1. Noise Compatible Land Use Planning

Land Use	Normally Acceptable L _{dn} or CNEL (dBA) ¹	Conditionally Acceptable L _{dn} or CNEL (dBA) ¹	Normally Unacceptable L _{dn} or CNEL (dBA) ¹	Clearly Unacceptable L _{dn} or CNEL (dBA) ¹
Residential – Low Density Single Family, Duplex, Mobile Homes	50-60	55-70	70-75	75+
Residential – Multi Family	50-65	60-70	70-75	75+
Transient Lodging – Motels, Hotels	50-65	60-70	70-80	80+
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-70	60-70	70-80	80+
Auditoriums, Concert Halls, Amphitheaters	N/A	50-70	N/A	65+
Sports Arena, Outdoor Spectator Sports	N/A	50-75	N/A	70+
Playgrounds, Neighborhood Parks	50-70	N/A	67-75	72+
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-75	N/A	70-80	80+
Office Buildings, Business Commercial and Professional	50-70	67-77	75+	N/A
Industrial, Manufacturing, Utilities, Agriculture	50-75	70-80	75+	N/A

Source: OPR 2017

¹ Ranges in the community noise exposure levels (and any subsequent overlaps in the different categories) reflect the differing noise goals of a community, the community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution (OPR 2017).

L_{dn} = day-night average level; CNEL = Community Noise Equivalent Level; dBA = A-weighted decibel scale; N/A = Not Applicable

D.2.28 Seismic Hazards Mapping Act

The 1990 Seismic Hazards Mapping Act² was enacted to minimize loss of life and property from strong ground shaking, liquefaction, landslides, or other ground failures as a result of earthquakes. The Act requires the California Geological Survey (CGS) to identify and map areas with the potential for liquefaction, landslides, or ground shaking. These maps are used by cities and counties in their land use permitting process and to adequately prepare the safety element of their general plans (DOC 2024a). Cities and counties are required to regulate development within mapped Seismic Hazard Zones. Permit review is the primary mechanism for local regulation of development; cities and counties are prohibited from issuing development permits for sites in Seismic Hazard Zones until appropriate site-specific geologic or geotechnical investigations have been carried out, and measures to reduce potential damage have been incorporated into the development plans.

D.2.29 Senate Bill 743

Codified in PRC Section 21099, SB 743 required the California Office of Planning and Research (OPR) to revise CEQA guidelines to establish new criteria for determining the significance of transportation impacts and define alternative metrics for traffic levels of service (LOS). The subsequent changes to CEQA requirements for transportation impact analyses included elimination

² PRC Section 2690-2699.6.

of auto delay, LOS, and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts for land use projects and plans in California. According to the legislative intent contained in SB 743, these changes to current practice were necessary to “more appropriately balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of greenhouse gas emissions.”

In 2018, Section 15064.3 was added to the CEQA Guidelines to reflect the provisions of SB 743. The section addresses both land use and transportation projects, and broadly describes the methodology, including the potential for qualitative analysis, used to assess VMT. The overall guidance for transportation projects is that they are presumed to have a less-than-significant project impact if they reduce VMT (CEQA Guidelines, §15064.3(b)(2)). Agencies are given “broad discretion” to select the methodology for analysis, or even apply a qualitative approach.

D.2.30 State Planning and Zoning Laws

California Government Code Section 65300 et seq. establishes the obligation of cities and counties to adopt and implement general plans. A general plan is a comprehensive, long-term strategy document that sets forth the expected location and general type of physical development expected in the city or county developing the document. The plan also may consider land outside its boundaries that, in the city’s or county’s judgment, may affect land use activities within its borders. The general plan addresses a broad range of topics, including, at a minimum, land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, the general plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city’s or county’s vision for the area. The general plan is a long-range document that typically addresses development over a 20-year period. Although the general plan serves as a blueprint for future development and identifies the overall vision for the planning area, it remains general enough to allow flexibility in the approach taken to achieve the plan’s goals.

The State Zoning Law (California Government Code Section 65800 et seq.) establishes that zoning ordinances, which are laws that define allowable land uses in a specific district, are required to be consistent with the general plan and any applicable specific plans. When amendments to the general plan are made, corresponding changes in the zoning ordinance may be required within a reasonable time to ensure that the land uses designated in the general plan also would be allowable by the zoning ordinance (Government Code Section 65860(c)).

D.2.31 Surface Mining and Reclamation Act of 1975

The Surface Mining and Reclamation Act (SMARA) of 1975 addresses surface mining and requires mitigation to reduce adverse impacts to public health, property, and the environment. Through the law, the State Geologist instated mineral land classifications to help identify and protect mineral resources in the State that may be subject to urban development pressures or other “irreversible land uses” which would inhibit mineral extraction (DOC and State Mining and Geology Board [SMGB] 2007). Following classification by the State Geologist, the SMGB designates lands containing mineral deposits as being of regional or statewide significance (DOC and SMGB 2007).

The SMARA applies to anyone (including a government agency) that disturbs more than one acre or removes more than 1,000 cubic yards of material through surface mining activities, even if activities occur on federally managed lands. Local city and county governments are required to develop ordinances for permitting that provide the regulatory framework for mining and reclamation

activities. The SMGB reviews local ordinances to ensure they comply with SMARA (DOC and SMGB 2007).

According to SMARA regulations, the State Geologist shall classify land into Mineral Resource Zones (MRZs) solely on the basis of geologic factors and without regard to existing land use.

D.2.32 Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA), passed in 2014 and amended in 2015, creates a framework for sustainable, local groundwater management. The act defines sustainable groundwater management as the “management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results,” such as land subsidence and water quality degradation (DWR 2024a).

The Sustainable Groundwater Management Act (SGMA) established a policy that requires local agencies to develop Groundwater Sustainability Agencies (GSAs) and Groundwater Sustainability Plans (GSPs) to sustainably manage groundwater resources in their underlying groundwater basins. Groundwater basins (also referred to as Bulletin 118 subbasins within the SGMA framework) are ranked by the DWR as high-, medium-, low-, or very low-priority, using the California Statewide Groundwater Elevation Monitoring system. High- and medium-priority basins are required to meet SGMA requirements to form GSAs and create GSPs, while low- and very low-priority basins are encouraged to participate. Developed GSPs have a 20-year implementation period and a planning horizon of 50 years. Additionally, SGMA directs DWR to identify groundwater basins and subbasins in conditions of critical overdraft, defined as: “when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts” (DWR 2024b).

The study area includes several groundwater basins designated under SGMA as high-priority due to the severity of groundwater overdraft. As a result of this designation, the managing agencies or Groundwater Sustainability Agencies (GSA) in the area were required to adopt Groundwater Sustainability Plans by January 31, 2020, with 20 years to implement their Groundwater Sustainability Plans and achieve their sustainability goal in the basins by 2040.

D.2.33 Williamson Act: California Land Conservation Act of 1965

The California Land Conservation Act of 1965, commonly known as the Williamson Act, was enacted when population growth and rising property taxes were recognized as a threat to the viability of valuable farmland in California. It enables local governments to enter into contracts with private landowners to promote the continued use of relevant land in agricultural or related open space use. In return, landowners receive property tax assessments that are based on farming and open space uses instead of full market value. Local governments receive an annual subvention (subsidy) of forgone property tax revenues from the State via the Open Space Subvention Act of 1971.

The Williamson Act empowers local governments to establish “agricultural preserves” consisting of lands devoted to agricultural and other compatible uses. After such preserves are established, the locality may offer to owners of included agricultural land the opportunity to enter into annually renewable contracts that restrict the land to agricultural use for at least 10 years (i.e., the contract continues to run for 10 years following the first date on which the contract is not renewed). In

return, the landowner is guaranteed a relatively stable tax rate, based on the value of the land for agricultural/open space use only, and is unaffected by its development potential.

Public agencies may acquire Williamson Act contracted land for a wide range of public improvements. Common reasons for publicly acquiring contracted land include wildlife habitat, water resource management, public open space, and schools. Before acquiring contracted lands, a public agency must make findings that there is no other non-contracted land reasonably feasible for the purpose and that the lower cost of contracted land is not a primary factor in its decision (DOC 2024c).

D.3 Local/Regional Requirements

D.3.1 Central Valley Salinity Alternatives for Long-term Sustainability

The Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) program was initiated in 2006 to address groundwater quality issues related to salinity in the region; interested parties in the Central Valley region were brought together to develop a regional salinity and nutrient management plan. CV-SALTS is 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) (CV-SALTS 2024a). In 2017, CV-SALTS completed the Central Valley Salt and Nitrate Management Plan (SNMP), providing a plan to address and manage salt and nitrate discharges within the region. Subsequently, the Central Valley Water Board adopted resolutions R5-2017-0031 and R5-2018-0034 related to amending the Water Quality Control Plans for the Sacramento and San Joaquin River Basin Plan and Tulare Lake Basin Plan (Basin Plans) (SWRCB 2018a, SWRCB 2018b, CV-SALTS 2024b). These resolutions address salinity and nitrate water quality concerns in the Central Valley, considering, where appropriate, strategies recommended by the SNMP, along with other input. Basin Plan amendments were approved by the Central Valley Water Board in 2020 (Resolution R5-2020-0057) and, in 2021, the SWRCB (Resolution 2021-0019) and Office of Administrative Law (OAL File Number: 2021-0929-05 S) approved revisions to the basin plans for the Sacramento River and San Joaquin River Basins and the Tulare Lake Basin to incorporate a Central Valley-Wide Salt and Nitrate Control Program.

D.3.1.1 Nitrate Control Program

Many smaller communities throughout the Central Valley rely on groundwater for drinking water. Nitrate levels currently present in groundwater poses a potential impact to human health resulting in some communities being unable to safely use groundwater as drinking water. The Nitrate Control Program has set three goals (CV-SALTS 2024c):

1. Provide safe drinking water supplies.
2. Reduce nitrate impacts to water supplies
3. Restore groundwater quality, where reasonable and feasible.

To achieve the above-listed goals, the Central Valley Water Board plans to implement regulations in the six Priority 1 groundwater basins, which began in 2020.

D.3.1.2 Salt Control Program

In the Central Valley, high salt concentrations may arise due to natural and human causes. Salts are concentrated in water and soils by human activities and evaporation. Human activities including importing water supplies, irrigation food processing, municipal water, and wastewater treatment all contribute to the salt problem by adding and concentrating salts. The Salt Control Program established the following goals to protect the beneficial uses of water in the Central Valley (CV-SALTS 2024d):

1. Protect high quality water for all beneficial uses by applying appropriate antidegradation requirements for the discharge of salt.
2. Prevent continued impacts to areas identified as salt sensitive.
3. Control the rate of water quality degradation through a “managed degradation” program.
4. Pursue long-term managed restoration where reasonable, feasible, and practicable.
5. Achieve long-term sustainability.

A phased approach has been developed to achieve the above-stated goals and create long-term solutions for managing salt in the Central Valley. The CV-SALTS Salt Control Program is currently in Phase 1, consisting of 10 to 15 years of planning and implementation of a Prioritization and Optimization Study to characterize the salt conditions in the Valley, identify salt management needs and mechanisms, evaluate the feasibility of potential solutions, prepare an implementation plan, and review and recommend revising salinity regulations, as necessary. Under Phase 2, the engineering design and environmental permitting required to implement the preferred physical projects identified in Phase 1 will be completed. Under Phase 3, construction of physical project will be completed (CV-SALTS 2024d).

D.3.2 Certified Unified Program Agencies to Implement the United Hazardous Waste and Hazardous Materials Management Regulatory Program

The CUPAs with local jurisdiction to implement the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program in the study area include: Tulare County Division of Environmental Health and Kern County Environmental Health Services Department. Each agency provides regulatory oversight of investigations and cleanups at sites within their jurisdiction and manage hazardous substances (including heavy metals, pesticides and herbicides) with respect to the following:

- Hazardous waste generators and hazardous waste onsite treatment
- Underground storage tanks
- Aboveground storage tanks
- California Uniform Fire Code
- HMBPs, which include a complete inventory of the hazardous materials being used and stored on a site.
- Hazardous Materials Release Response Plans and Inventory Law (California Health and Safety Code Section 25500 et seq.) [Business Emergency Plans (BEPs)]
- Risk management and accidental release prevention programs under the California Accidental Release Prevention (CalARP) program

D.3.3 Kern County Code of Ordinance

Kern County Code Ordinance, Section 8.36.020, establishes prohibited sounds within the unincorporated areas of the County (Kern County 2024). The following policy applies to the Project:

- To create noise from construction, between the hours of nine (9:00) p.m. and six (6:00) a.m. on weekdays and nine (9:00) p.m. and eight (8:00) a.m. on weekends, which is audible to a person with average hearing faculties or capacity at a distance of one hundred fifty (150) feet from the construction site, if the construction site is within one thousand (1,000) feet of an occupied residential dwelling.

D.3.4 Kern County General Plan

As required by state law, counties have developed their own general plans. At a minimum, these documents must address the topics of land use, transportation, housing, conservation, open space, noise, and safety. These documents serve as statements of county goals, policies, standards, and implementation programs for the physical development of a county.

The following goals and policies from the Kern County General Plan are relevant to Friant-Kern Canal Pump-Back Project resources. The Kern General Plan, adopted in 2009, has a 20-year planning horizon (Kern County 2009).

D.3.4.1 Air Quality

The General Provisions outlines the following goals and policies related to air quality (Kern County 2009):

- **Policy 19:** In considering discretionary projects for which an Environmental Impact Report (EIR) must be prepared pursuant to the CEQA, the appropriate decision-making body, as part of its deliberations, will ensure that:
 - a) All feasible mitigation to reduce significant adverse air quality impacts have been adopted; and
 - b) The benefits of the proposed project outweigh any unavoidable significant adverse effects on air quality found to exist after inclusion of all feasible mitigation. This finding shall be made in a statement of overriding considerations and shall be supported by factual evidence to the extent that such a statement is required pursuant to the CEQA.
- **Policy 20:** The County shall include fugitive dust control measures as a requirement for discretionary projects and as required by the adopted rules and regulations of the San Joaquin Valley Unified Air Pollution Control District and the Kern County Air Pollution Control District on ministerial permits.

D.3.4.2 Biological Resources

The Resources Section of the Kern County General Plan includes policies and implementation measures to protect biological resources throughout the county. The following policies are applicable to the Project:

- **Policy 27-** Threatened or endangered plant and wildlife species should be protected in accordance with state and federal laws.
- **Policy 28-** The County should work closely with state and federal agencies to assure that discretionary projects avoid or minimize impacts to fish, wildlife, and botanical resources.
- **Policy 29-** The County will seek cooperative efforts with local, State, and federal agencies to protect listed threatened and endangered plant and wildlife species through the use of conservation plans and other methods promoting management and conservation of habitat lands.
- **Policy 30-** The County will promote public awareness of endangered species laws to help educate property owners and the development community of local, state, and federal programs concerning endangered species conservation issues.
- **Implementation Measure Q-** Discretionary projects shall consider effects to biological resources as required by the California Environmental Quality Act.
- **Implementation Measure R-** Consult and consider the comments from responsible and trustee and wildlife agencies when reviewing a discretionary project subject to the California Environmental Quality Act.
- **Implementation Measure S-** Pursue the development and implementation of conservation programs with state and federal wildlife agencies for property owners desiring streamlined endangered species mitigation programs.

D.3.4.3 Cultural Resources

The Kern County General Plan under Section 1.10.3, Archaeological, Paleontological, Cultural, and Historical Preservation, sets forth the following policies and implementation measures regarding cultural resources:

- **Policy 25:** The County will promote the preservation of cultural and historic resources which provide ties with the past and constitute a heritage value to residents and visitors.
- **Implementation Measure L:** The County shall address archaeological and historical resources for discretionary projects in accordance with the California Environmental Quality Act.
- **Implementation Measure M:** In areas of known paleontological resources, the County should address the preservation of these resources where feasible.
- **Implementation Measure N:** The County shall develop a list of Native American organizations and individuals who desire to be notified of proposed discretionary projects. This notification will be accomplished through the established procedures for discretionary projects and CEQA documents.
- **Implementation Measure O:** On a project specific basis, the County Planning Department shall evaluate the necessity for the involvement of a qualified Native American monitor for grading or other construction activities on discretionary projects that are subject to a CEQA document.

The Kern County General Plan also includes goals, plans, and implementation measures related to tribal cultural resources. The following implementation measure is applicable:

- **Implementation Measure M:** The County shall develop a list of Native American organizations and individuals who desire to be notified of proposed discretionary projects. This notification will be accomplished through the established procedures for discretionary projects and CEQA documents.

D.3.4.4 Land Use Planning and Agriculture

Land Use, Open Space, and Conservation Element of the Kern County General Plan (Kern County 2009) details goals and policies that provide for a variety of land uses for future economic growth while also assuring the conservation of Kern County's agricultural, natural, and resource attributes.

D.3.4.5 Noise and Vibration

Chapter 3, Noise Element, sets forth the following goal regarding noise and vibration related to the Project:

- **Goal 1:** Ensure that residents of Kern County are protected from excessive noise and that moderate levels of noise are maintained.

D.3.4.6 Traffic and Transportation

Chapter 2, Circulation Element of the Kern County General Plan presents goals and guiding policies, and planning tools essential for achieving the local transportation goals and policies. The following goal pertains to the Project:

- **Goal 5:** Maintain a minimum LOS D

D.3.4.7 Utilities, Service Systems, and Power

The following policies in Section 1.10.6, Surface Water and Groundwater from the Kern County General Plan are relevant to the Project:

- **Policy 35.** Ensure that adequate water storage, treatment, and transmission facilities are constructed concurrently with planned growth.
- **Policy 37.** Ensure maintenance and repair of existing water systems.
- **Policy 39.** Encourage the development of the County's groundwater supply to sustain and ensure water quality and quantity for existing users, planned growth, and maintenance of the natural environment.
- **Policy 40.** Encourage utilization of community water systems rather than the reliance on individual wells.
- **Policy 43.** Drainage shall conform to the Kern County Development Standards and the Grading Ordinance.

D.3.4.8 Hazard and Hazardous Materials

Kern County General Plan, Safety Element was amended in 2012 and addresses the following topics related to hazardous materials and health and safety: wildland and urban fire, emergency planning, critical facilities and hazardous buildings, hazardous materials, and abandoned open shafts and wells. Goals, policies and implementation measures are identified for these topics and are described within the General Plan in order to protect residents and visitors to the County (Kern County 2009). Kern

County Planning and Natural Resources Department is currently in the process of updating the County General Plan with a 2040 planning horizon.

D.3.5 Kern Council of Governments 2014 Regional Transportation Plan/ Sustainable Communities Strategy

The 2022 Regional Transportation Plan (RTP) establishes a set of regional transportation goals, policies, and actions intended to guide development of the planned multimodal transportation systems in Kern County (Kern Council of Governments 2022). The following goal and policies are relevant:

- **Goal 5:** Livability – Promote livable communities and satisfaction of consumers with the transportation system.
 - **Policy 30.6:** Work with member agencies to preserve existing and future road and highway rights of-way from the encroachment of sensitive land uses
 - **Policy 30.9:** Relax roadway level of service (LOS) standards in high-priority transit corridors. In high-demand, high-capacity transit corridors.

D.3.6 Kern County Planning and Natural Resources Department

Providing consolidated land use planning, the Kern County Planning and Natural Resources Department administers the Kern County General Plan, to effectuate General Plan policies and goals; administration of the county's zoning and land division ordinances; and administration of the Agricultural Preserve Program.

D.3.7 Tulare County Association of Government's Regional Transportation Plan

The Tulare County Association of Governments (TCAG) is made up of nine member agencies, which include Tulare County and the eight cities in Tulare County. TCAG prepared the Regional Transportation Plan (RTP) in 2018 for its metropolitan planning area.

The RTP, with a planning horizon of 2042, is a long-range plan that provides a blueprint to help achieve a coordinated regional transportation system by creating a vision and identifying regional transportation planning policies and projects to address the county's transportation needs. The RTP includes programs and policies for congestion management, transit, bicycles and pedestrians, roadways, freight, and finances. Every 4 years the TCAG must prepare an RTP for its metropolitan planning area to ensure that the future transportation needs are adequately addressed. The RTP's primary use is as a regional long-range plan for federally funded transportation projects. It also serves as a comprehensive, coordinated transportation plan for all the governmental jurisdictions within the region.

D.3.8 Tulare County General Plan

The following goals and policies from the Tulare County General Plan are relevant to Friant-Kern Canal Pump-Back Project resources. The Tulare General Plan, adopted in 2012, has a 2030 planning horizon (Tulare County 2012).

D.3.8.1 Air Quality/ Greenhouse Gases

The following goal and policies are relevant to the protection of air quality in the study area:

- **Goal AQ-1:** To improve air quality through a regional approach and interagency cooperation.
 - **Policy AQ-1.3. Cumulative Air Quality Impacts.** The County shall require development to be located, designed, and constructed in a manner that would minimize cumulative air quality impacts. Applicants shall be required to propose alternatives as part of the State CEQA process that reduce air emissions and enhance, rather than harm, the environment.
 - **Policy AQ-1.5. California Environmental Quality Act (CEQA) Compliance.** The County shall ensure that air quality impacts identified during the CEQA review process are consistently and reasonably mitigated when feasible.
 - **Policy AQ-1.9. Support Off-Site Measures to Reduce Greenhouse Gas Emissions.** The County will support and encourage the use of off-site measures or the purchase of carbon offsets to reduce greenhouse gas emissions.
- **Goal AQ-4:** To implement the best available controls and monitoring necessary to regulate air emissions.
 - **Policy AQ-4.2. Dust Suppression Measures.** The County shall require developers to implement dust suppression measures during excavation, grading, and site preparation activities consistent with SJVAPCD Regulation VIII – Fugitive Dust Prohibitions. Techniques may include, but are not limited to, the following:
 1. Site watering or application of dust suppressants,
 2. Phasing or extension of grading operations,
 3. Covering of stockpiles,
 4. Suspension of grading activities during high wind periods (typically winds greater than 25 miles per hour), and
 5. Revegetation of graded areas
 - **Policy AQ-4.6. Asbestos Airborne Toxic Control and Dust Protection.** Asbestos is of concern to Tulare County because it occurs naturally in surface deposits of several types of ultramafic materials (materials that contain magnesium and iron and a very small amount of silica). Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining.

D.3.8.2 Biological Resources

The Environmental Resources Management (ERM), Section 8.1 sets forth the following goal and policies regarding biological resources relevant to the Project:

- **ERM-1.1 Protection of Rare and Endangered Species** The County shall ensure the protection of environmentally sensitive wildlife and plant life, including those species designated as rare, threatened, and/or endangered by the State and/or Federal government, through compatible land use development.

- **ERM-1.2 Development in Environmentally Sensitive Areas** The County shall limit or modify proposed development within areas that contain sensitive habitat for special status and direct development into less than significant areas. Development in natural habitats shall be controlled so as to minimize erosion and maximize beneficial vegetative growth.
- **ERM-1.4 Protect Riparian Areas** The County shall protect riparian areas through habitat preservation, designation as open space or recreational land uses, bank stabilization, and development controls.
- **ERM-1.6 Management of Wetlands** The County shall support the preservation and management of wetland and riparian plant communities for passive recreation, groundwater recharge, and wildlife habitats.
- **ERM-1.7 Planting of Native Vegetation** The County shall encourage the planting of native trees, shrubs, and grasslands in order to preserve the visual integrity of the landscape, provide habitat conditions suitable for native vegetation and wildlife, and ensure that a maximum number and variety of well-adapted plants are maintained.

D.3.8.3 Cultural Resources

The ERM, Section 8.6 of the general plan includes goals for the protection of cultural resources:

- **ERM-6** To manage and protect sites of cultural and archaeological importance for the benefit of present and future generations.
 - **ERM-6.1 Evaluation of Cultural and Archaeological Resources.** The County shall participate in and support efforts to identify its significant cultural and archaeological resources using appropriate state and federal standards.
 - **ERM-6.2 Protection of Resources with Potential State or Federal Designations.** The County shall protect cultural and archaeological sites with demonstrated potential for placement on the National Register of Historic Places and/or inclusion in the California State Office of Historic Preservation's California Points of Interest and California Inventory of Historic Resources. Such sites may be of Statewide or local significance and have anthropological, cultural, military, political, architectural, economic, scientific, religious, or other values as determined by a qualified archaeological professional.
 - **ERM-6.3 Alteration of Sites with Identified Cultural Resources.** When planning any development or alteration of a site with identified cultural or archaeological resources, consideration should be given to ways of protecting the resources. Development can be permitted in these areas only after a site-specific investigation has been conducted pursuant to CEQA to define the extent and value of resource, and mitigation measures proposed for any impacts the development may have on the resource.
 - **ERM-6.4 Mitigation.** If preservation of cultural resources is not feasible, every effort shall be made to mitigate impacts, including relocation of structures, adaptive reuse, preservation of facades, and thorough documentation and archival of records.
 - **ERM-6.5 Cultural Resources Education Programs.** The County should support local, state, and national education programs on cultural and archaeological resources.

- **ERM-6.6 Historic Structures and Sites.** The County shall support public and private efforts to preserve, rehabilitate, and continue the use of historic structures, sites, and parks. Where applicable, preservation efforts shall conform to the current Secretary of the Interior's Standards for the Treatment of Historic Properties and Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings.
- **ERM-6.7 Cooperation of Property Owners.** The County should encourage the cooperation of property owners to treat cultural resources as assets rather than liabilities, and encourage public support for the preservation of these resources.
- **ERM-6.8 Solicit Input from Local Native Americans.** The County shall continue to solicit input from the local Native American communities in cases where development may result in disturbance to sites containing evidence of Native American activity and/or to sites of cultural importance.
- **ERM-6.9 Confidentiality of Archaeological Sites.** The County shall, within its power, maintain confidentiality regarding the locations of archaeological sites in order to preserve and protect these resources from vandalism and the unauthorized removal of artifacts.
- **ERM-6.10 Grading Cultural Resources Sites.** The County shall ensure all grading activities conform to the County's Grading Ordinance and California Code of Regulations, Title 20, Section 2501 et seq.

D.3.8.4 Water Quality

Section 11.2, Water Quality, of the Tulare County General Plan provides policies on the management of water resources. The following policies are relevant to the Project (Tulare County 2012):

- **WR-2.3 Best Management Practices (BMPs)** The County shall continue to require the use of feasible BMPs and other mitigation measures designed to protect surface water and groundwater from the adverse effects of construction activities and urban runoff in coordination with the Water Quality Control Board.
- **WR-2.4 Construction Site Sediment Control** The County shall continue to enforce provisions to control erosions and sediment from construction sites.

D.3.8.5 Land Use and Planning

The Tulare County General Plan (Tulare County 2012) identifies goals, policies, and implementation measures aimed at land use and provides opportunities for the future expansion of agricultural uses and identifies protection measures to alleviate development pressures that would adversely affect or hinder existing or future agricultural operations, including objectives and policies to protect water resources and supply systems critical to agriculture.

D.3.8.6 Noise and Vibration

Section 10.8, Noise, of the Tulare County General Plan sets forth goals and policies to protect unincorporated Tulare County residents from harmful effects of noise and vibration, the following are applicable to the Project:

- **Goal HS-8:** To protect County residents and visitors from the harmful effects of excessive noise while promoting the County economic base.

- **HS-8.11 Peak Noise Generators** The County shall limit noise generating activities, such as construction, to hours of normal business operation. No peak noise generating activities shall be allowed to occur outside of normal business hours without County approval.
- **HS-8.18 Construction Noise** The County shall seek to limit the potential noise impacts of construction activities by limiting construction activities to the hours of 7 am to 7pm, Monday through Saturday when construction activities are located near sensitive receptors. No construction shall occur on Sundays or national holidays without a permit from the County to minimize noise impacts associated with development near sensitive receptors.
- **HS-8.19 Construction Noise Control** The County shall ensure that construction contractors implement best practices guidelines (i.e., berms, screens, etc.) as appropriate and feasible to reduce construction-related noise impacts on surrounding land uses.

Prior to nighttime construction taking place in Tulare County under this Project, County approval will be obtained.

D.3.8.7 Traffic and Transportation

Chapter 13, Transportation and Circulation provides policy context to achieve the county's vision for traffic and transportation. The following policy is relevant to the Project:

- **TC-1.16 County Level of Service (LOS) Standards** The County shall strive to develop and manage its roadway system (both segments and intersections) to meet a LOS of "D" or better in accordance with the LOS definitions established by the Highway Capacity Manual.

Section 13, Transportation & Circulation, of Tulare County's Goals and Policies Report in the General Plan (August 2012, as amended 2020) and SB 743 Guidelines (June 8, 2020) discuss SB 743 and performing VMT analysis under CEQA.

D.3.8.8 Hazards and Hazardous Materials

The Tulare County General Plan Health and Safety Element provides general safety policies (HS-1), as well as policies for hazardous materials (HS-4), urban and wildlife fire hazards (HS-6), and emergency response (HS-7).

D.3.9 Tulare County Climate Action Plan

Tulare County adopted the Tulare County Climate Action Plan (CAP) in August 2012 and updated the plan in 2018 to incorporate new baseline and future year inventories to reflect the latest information and updates to the county's strategy to address the SB 23 2030 target. The CAP is a guiding document for actions to reduce greenhouse gas emissions and adapt to the potential effects of climate change.

The CAP follows a four-step process recommended by the Institute for Local Government, including identification of a baseline year (2007) and emissions inventory; projected future year inventories (2020 and 2030); and provision of policies, regulations, and programs that would achieve reductions by the target years. The policies, regulations, and programs considered in the CAP include those by federal, state, and local governments. The following provides a summary of CAP actions (Tulare County 2010):

- Identifies sources of greenhouse gas emissions caused by activities within the unincorporated areas of Tulare County and estimates how these emissions may change over time.
- Establishes a reduction target of reducing Tulare County's greenhouse gas emissions to demonstrate consistent with AB 32 (2006) and SB 32 (2016) and CARB Scoping Plan targets.
- Provides energy use, transportation, land use, water conservation, and solid waste strategies to bring Tulare County's greenhouse gas emissions levels to the reduction target.
- Mitigates the impacts of Tulare County activities on climate change (by reducing greenhouse gas emissions consistent with the direction of the State of California via AB 32, SB 32, Governor's Executive Order S-03-05, and the 2009 amendments to the CEQA Guidelines to comply with SB 97 (2008). The CEQA Guidelines encourage the adoption of policies or programs as a means of addressing comprehensively the cumulative impacts of projects. (See CEQA Guidelines, Sections 15064(h)(3) and 15130(c).)
- Allows the greenhouse gas emissions inventory and CAP to be updated every five years and to respond to changes in science, effectiveness of emission reduction measures and federal, State, regional, or local policies to further strengthen the County's response to the challenges of climate change.
- Provides substantial evidence that the emission reductions estimated in the CAP are feasible.
- Serves as the threshold of significance within the County of Tulare for climate change impacts, by which all applicable developments within the County will be reviewed.
- Proposed development projects that are consistent with the emission reduction and adaptation measures included in the CAP and the programs that are developed as a result of the CAP, would be considered to have a less than significant cumulative impact on climate change and emissions consistent with CEQA Guidelines Section 15064(h)(3) as amended to comply with SB 97.

D.3.10 Tulare County Resource Management Agency

The Tulare County Resource Management Agency provides inspection service for unincorporated areas of the County. It provides oversight of the Tulare County General Plan and zoning codes and entitlements, as well as issuing permits, such as the encroachment permit, which are required for improvements in public right-of-way and building permits.

D.3.11 San Joaquin Valley Air Pollution Control District Air Quality Attainment Plans

The San Joaquin Valley Air Pollution Control District (SJVAPCD) has jurisdiction over the San Joaquin Valley Air Basin, which includes O₃, PM₁₀, and PM_{2.5} nonattainment areas.

The air districts have adopted a series of air quality attainment plans to meet the CAAQS and NAAQS. These plans require, among other emissions-reducing activities, control technology for existing sources; control programs for area sources and indirect sources; a permitting system designed to ensure no net increase in emissions from any new or modified permitted sources of emissions; transportation control measures; sufficient control strategies to achieve a 5% or more annual reduction in emissions (or 15% or more in a three-year period) for volatile organic compound, nitrogen oxides, CO, and PM₁₀; and demonstration of compliance with CARB's established reporting periods for compliance with air quality goals (SJVAPCD 2024).

D.3.12 San Joaquin Valley Air Pollution Control District Programs

The SJVAPCD is the local agency that is primarily responsible for regulating emissions from stationary sources. It also develops plans and implements control measures as required by state and federal requirements. To assist the Lead Agency with analyzing GHG emission and climate change impacts under CEQA, the SJVAPCD adopted two policies:

- “Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency” (SJVAPCD 2009a)
- “Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA” (SJVAPCD 2009b)

The SJVAPCD has not adopted a quantitative threshold for evaluating the significance of GHG emissions; however, the SJVAPCD’s guidance document for Valley land-use agencies (2009b) would be most relevant for assessing GHG-related impacts from the proposed restoration activities. In this guidance document, the SJVAPCD relies on the implementation of best performance standards (BPS), defined as the most effective achieved-in-practice means of reducing or limiting GHG emissions from a GHG emissions source, for evaluating a project’s significance. Projects implementing BPS would be determined to have less than significant individual and cumulative impacts on global climate change.

If a project does not implement BPS, then quantification of project-specific GHG emissions would be required. If project-related emissions would be reduced or mitigated by at least 29% compared to business-as-usual,³ then the project would be determined to have a less than significant individual and cumulative impact for GHG.

³ Business-as-usual “is referenced in the CARB’s AB 32 Scoping Plan as the Business-as-usual emissions occurring in 2020 if the average baseline emissions during the 2002-2004 period were grown to 2020 levels, without controls. Therefore, 2002-2004 emissions factors, on a unit of activity basis, multiplied by the activity expected to occur in 2020, is an appropriate representative of 2020 business as usual (BAU).” (SJVAPCD 2009b).

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Appendix E: Air Quality and Greenhouse Gas Calculations

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Table 1. Proposed Project and Low Flow Alternative Unmitigated Emissions Summary

Source	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Off-Road Construction Equipment	0.53	4.65	4.12	0.01	0.24	0.21	276	0.02	0.03	285
Construction Worker Commuting	0.00	0.18	0.01	0.00	0.06	0.01	56	0.00	0.00	56
On-Road Haul Trucks and Delivery Vehicles										
Export from Shafter-Wasco to Lake Woollomes	0.00	0.00	0.02	0.00	0.00	0.00	16	0.00	0.00	17
Export from Shafter-Wasco to Deer Creek	0.00	0.01	0.02	0.00	0.01	0.00	25	0.00	0.00	27
Fugitive Dust										
Grading	n/a	n/a	n/a	n/a	0.04	0.00	n/a	n/a	n/a	n/a
Bulldozing	n/a	n/a	n/a	n/a	0.21	0.12	n/a	n/a	n/a	n/a
Material Handling	n/a	n/a	n/a	n/a	0.00030	0.00005	n/a	n/a	n/a	n/a
Lake Woollomes Total	0.53	4.84	4.15	0.01	0.56	0.34	348	0.02	0.03	358
Shafter-Wasco Total	0.53	4.83	4.13	0.01	0.55	0.34	332	0.02	0.03	341
Deer Creek Total	0.53	4.84	4.16	0.01	0.56	0.35	357	0.02	0.04	367
Grand Total	1.60	14.51	12.44	0.03	1.66	1.03	1,037	0.07	0.10	1,066
SJVAPCD CEQA Significance Threshold	10	100	10	27	15		n/a	n/a	n/a	n/a
Exceed CEQA Significance Threshold?	No	No	Yes	No	No	No	n/a	n/a	n/a	n/a

Notes:

1. Shafter-Wasco export quantities applied to recipient site (i.e., emissions from the export of material to Lake Woollomes from Shafter-Wasco applied to Lake Woollomes total).
2. While the region is designated attainment for the SO2 standard, the region is designated nonattainment for PM2.5. Because SO2 is a precursor to PM2.5, it is subject to the same *de minimis* threshold as PM2.5
3. The Bakersfield urban area is the only area designated maintenance for CO in Kern and Tulare Counties. Although the projects are not located in this area, the *de minimis* threshold is still used to be conservative.
4. Totals may not add exactly because of rounding.

Table 2. Proposed Project and Low Flow Alternative Mitigated Emissions Summary

Source	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Off-Road Construction Equipment	0.29	4.99	2.55	0.01	0.12	0.10	262	0.02	0.03	270
Construction Worker Commuting	0.00	0.18	0.01	0.00	0.06	0.01	56	0.00	0.00	56
On-Road Haul Trucks and Delivery Vehicles										
Export from Shafter-Wasco to Lake Woollomes	0.00	0.00	0.02	0.00	0.00	0.00	16	0.00	0.00	17
Export from Shafter-Wasco to Deer Creek	0.00	0.01	0.02	0.00	0.01	0.00	25	0.00	0.00	27
Fugitive Dust										
Grading	n/a	n/a	n/a	n/a	0.04	0.00	n/a	n/a	n/a	n/a
Bulldozing	n/a	n/a	n/a	n/a	0.21	0.12	n/a	n/a	n/a	n/a
Material Handling	n/a	n/a	n/a	n/a	0.00030	0.00005	n/a	n/a	n/a	n/a
Lake Woollomes Total	0.29	5.18	2.58	0.01	0.43	0.23	334	0.02	0.03	344
Shafter-Wasco Total	0.29	5.18	2.57	0.01	0.43	0.23	318	0.02	0.03	326
Deer Creek Total	0.29	5.19	2.59	0.01	0.44	0.23	343	0.02	0.04	353
Grand Total	0.87	15.55	7.74	0.02	1.30	0.70	994	0.07	0.10	1,023
SJVAPCD CEQA Significance Threshold	10	100	10	27	15	15	n/a	n/a	n/a	n/a
Exceed CEQA Significance Threshold?	No	No	No	No	No	No	n/a	n/a	n/a	n/a

Notes:

1. Shafter-Wasco export quantities applied to receipt site (i.e., emissions from the export of material to Lake Woollomes from Shafter-Wasco applied to Lake Woollomes total).
minimis threshold as PM2.5
3. The Bakersfield urban area is the only area designated maintenance for CO in Kern and Tulare Counties. Although the projects are not located in this area, the *de minimis* threshold is still used to be conservative.
4. Totals may not add exactly because of rounding.

Table 3. Proposed Project and Low Flow Alternative Unmitigated Onsite Construction Equipment Emission Factors (lb/hp-hr)

Equipment	Fuel Type	Estimated HP	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Excavator	Diesel	53	6.26E-04	7.51E-03	6.83E-03	1.20E-05	1.45E-04	1.33E-04	3.71E-01	3.68E-05	3.43E-05
Backhoe	Diesel	39	2.16E-03	1.12E-02	9.34E-03	1.26E-05	5.66E-04	5.21E-04	3.91E-01	3.88E-05	3.61E-05
Bulldozer	Diesel	111	6.82E-04	6.87E-03	6.14E-03	1.08E-05	2.96E-04	2.72E-04	3.34E-01	3.31E-05	3.08E-05
Compactor	Diesel	32	1.53E-03	9.81E-03	8.49E-03	1.23E-05	4.08E-04	3.75E-04	3.83E-01	3.80E-05	3.54E-05
Generator	Diesel	222	1.15E-04	7.99E-04	3.05E-04	3.29E-06	1.50E-05	1.38E-05	1.04E-01	1.04E-05	9.64E-06
Water Truck	Diesel	181	2.83E-06	6.51E-05	2.71E-04	2.83E-06	7.78E-05	2.32E-05	3.06E-01	6.27E-06	4.86E-05
Crane	Diesel	84	1.21E-03	9.79E-03	1.07E-02	1.77E-05	7.24E-04	6.66E-04	5.49E-01	5.44E-05	5.07E-05
Paddle wheel scraper	Diesel	183	5.77E-04	3.41E-03	5.90E-03	1.12E-05	2.76E-04	2.54E-04	3.48E-01	3.45E-05	3.21E-05
Blade scraper	Diesel	83	1.78E-03	8.98E-03	1.45E-02	1.29E-05	1.12E-03	1.03E-03	3.99E-01	3.96E-05	3.68E-05
Misc. gas powered hand tools	Gasoline	10	1.26E-03	1.31E-01	3.07E-03	1.13E-05	6.42E-05	4.85E-05	9.31E-01	3.72E-04	1.92E-04

Source: Sa, Trevor, Provost & Pritchard, Electronic Mail Message to Anusha Kashyap, CDM Smith, Subject: RE: APE exhibits, Pump Back, March 10, 2021.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Average horsepower for gasoline hand tools estimated based on typical construction equipment

Table 4. Proposed Project and Low Flow Alternative Unmitigated Daily Onsite Construction Equipment Emissions by Pollutant

Equipment	Quantity	Estimated HP	ROG (lb/day)	CO (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Excavator	2	53	0.66	7.96	7.24	0.01	0.15	0.14
Backhoe	1	39	0.84	4.36	3.64	0.00	0.22	0.20
Bulldozer	1	111	0.76	7.62	6.81	0.01	0.33	0.30
Compactor	2	32	0.98	6.28	5.44	0.01	0.26	0.24
Generator	2	222	0.51	3.55	1.35	0.01	0.07	0.06
Water Truck	2	181	0.01	0.24	0.98	0.01	0.28	0.08
Crane	1	84	1.01	8.22	8.97	0.01	0.61	0.56
Paddle wheel scraper	1	183	1.06	6.25	10.80	0.02	0.51	0.47
Blade scraper	1	83	1.48	7.45	12.07	0.01	0.93	0.86
Misc. gas powered hand tools	1	10	0.13	13.09	0.31	0.00	0.01	0.00
Total (per site)			7.43	65.01	57.61	0.11	3.36	2.92
Total (all sites)			22.29	195.04	172.84	0.33	10.09	8.75

Sources:

Sa, Trevor, Provost & Pritchard, Electronic Mail Message to Anusha Kashyap, CDM Smith, Subject: RE: APE exhibits, Pump Back, March 10, 2021.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Key:

tpy = tons per year; MT/yr = metric tons per year

Table 5. Unmitigated Annual Onsite Construction Equipment Emissions by Pollutant

Equipment	Quantity	Estimated HP	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Excavator	2	53	0.05	0.57	0.52	0.00	0.01	0.01	25.54	0.00	0.00	26.23
Backhoe	1	39	0.06	0.31	0.26	0.00	0.02	0.01	9.90	0.00	0.00	10.17
Bulldozer	1	111	0.05	0.55	0.49	0.00	0.02	0.02	24.05	0.00	0.00	24.70
Compactor	2	32	0.07	0.45	0.39	0.00	0.02	0.02	15.91	0.00	0.00	16.34
Generator	2	222	0.04	0.25	0.10	0.00	0.00	0.00	30.07	0.00	0.00	30.89
Water Truck	2	181	0.00	0.02	0.07	0.00	0.02	0.01	71.92	0.00	0.01	74.99
Crane	1	84	0.07	0.59	0.64	0.00	0.04	0.04	29.93	0.00	0.00	30.74
Paddle wheel scraper	1	183	0.08	0.45	0.77	0.00	0.04	0.03	41.27	0.00	0.00	42.40
Blade scraper	1	83	0.11	0.53	0.86	0.00	0.07	0.06	21.49	0.00	0.00	22.07
Misc. gas powered hand tools	1	10	0.01	0.94	0.02	0.00	0.00	0.00	6.04	0.00	0.00	6.44
Total (per site)			0.53	4.65	4.12	0.01	0.24	0.21	276.11	0.02	0.03	284.97
Total (all sites)			1.59	13.95	12.36	0.02	0.72	0.63	828.34	0.07	0.09	854.92

Sources:

Sa, Trevor, Provost & Pritchard, Electronic Mail Message to Anusha Kashyap, CDM Smith, *Subject: RE: APE exhibits, Pump Back*, March 10, 2021.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Key:

tpy = tons per year; MT/yr = metric tons per year

Construction Schedule Assumptions

10 hours per day

6 work days per week

26 work days per month

5.5 months per site

3 sites

Source: Collins, Alex, Provost & Pritchard, Electronic Mail Message to Chris Park, CDM Smith, *Subject: RE: APE exhibits, Pump Back*, February 16, 2021.

Construction Schedule Range:

8-10 hours per day

5-6 days per week

5-6 months per site (work may or may not happen concurrently depending on how contract/funding is setup)

Global Warming Potential

CO2 1

CH4 28

N2O 265

Source: EPA. 2024. *GHG Emission Factors Hub*. Available: <https://www.epa.gov/climateleadership/ghg-emission-factors-hub/>, accessed February 29, 2024. Table 11

Table 6. Proposed Project and Low Flow Alternative Onroad Vehicle Emission Factors (grams per mile)

Source	ROG	CO	NOx	SOx	PM10 Exhaust	PM10 Tire Wear	PM10 Brake Wear	PM10 Paved Road Dust	PM2.5 Exhaust	PM2.5 Tire Wear	PM2.5 Brake Wear	PM2.5 Paved Road Dust	CO2	CH4	N2O
Construction Workers	0.0143	0.9945	0.0802	0.0033	0.0014	0.0080	0.0075	0.2921	0.0013	0.0020	0.0026	0.0730	329.4245	0.0035	0.0069
Haul Trucks	0.0155	0.3561	1.4828	0.0155	0.0175	0.0360	0.0804	0.2921	0.0167	0.0090	0.0281	0.0730	1,676.4732	0.0343	0.2661

Table 7. Proposed Project and Low Flow Alternative Offsite Construction Emissions - Construction Worker Commuting

Worker	Peak No. per Day	Vehicle Miles Traveled (mi/year)	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 Exhaust (tpy)	PM10 Tire Wear (tpy)	PM10 Brake Wear (tpy)	PM10 Paved Road Dust (tpy)	PM2.5 Exhaust (tpy)	PM2.5 Tire Wear (tpy)	PM2.5 Brake Wear (tpy)	PM2.5 Paved Road Dust (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Foreman	4	16,874.0	0.0003	0.0185	0.0015	0.0001	0.0000	0.0001	0.0001	0.0054	0.0000	0.0000	0.0000	0.0014	5.5587	0.0001	0.0001	5.5911
Carpenter	10	42,185.0	0.0007	0.0462	0.0037	0.0002	0.0001	0.0004	0.0003	0.0136	0.0001	0.0001	0.0001	0.0034	13.8968	0.0001	0.0003	13.9777
Cement Mason	4	16,874.0	0.0003	0.0185	0.0015	0.0001	0.0000	0.0001	0.0001	0.0054	0.0000	0.0000	0.0000	0.0014	5.5587	0.0001	0.0001	5.5911
Operator	8	33,748.0	0.0005	0.0370	0.0030	0.0001	0.0001	0.0003	0.0003	0.0109	0.0000	0.0001	0.0001	0.0027	11.1174	0.0001	0.0002	11.1822
Welder	4	16,874.0	0.0003	0.0185	0.0015	0.0001	0.0000	0.0001	0.0001	0.0054	0.0000	0.0000	0.0000	0.0014	5.5587	0.0001	0.0001	5.5911
Misc. Laborer	10	42,185.0	0.0007	0.0462	0.0037	0.0002	0.0001	0.0004	0.0003	0.0136	0.0001	0.0001	0.0001	0.0034	13.8968	0.0001	0.0003	13.9777
Total (per site)	40	168,740.0	0.0027	0.1850	0.0149	0.0006	0.0003	0.0015	0.0014	0.0543	0.0002	0.0004	0.0005	0.0136	55.5871	0.0006	0.0012	55.9108
Total (all sites)	120	506,220.0	0.0080	0.5549	0.0447	0.0018	0.0008	0.0045	0.0042	0.1630	0.0007	0.0011	0.0015	0.0407	166.7613	0.0018	0.0035	167.7325

Source: Collins, Alex, Provost & Pritchard, Electronic Mail Message to Chris Park, CDM Smith, *Subject: RE: APE exhibits, Pump Back* , February 16, 2021.

Table 8. Proposed Project and Low Flow Alternative Offsite Construction Emissions - Haul Trucks

Site	Vehicle Miles Traveled (mi/year)	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 Exhaust (tpy)	PM10 Tire Wear (tpy)	PM10 Brake Wear (tpy)	PM10 Paved Road Dust (tpy)	PM2.5 Exhaust (tpy)	PM2.5 Tire Wear (tpy)	PM2.5 Brake Wear (tpy)	PM2.5 Paved Road Dust (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Export from Shafter-Wasco to Lake Woollomes	9,800	0.0002	0.0038	0.0160	0.0002	0.0002	0.0004	0.0009	0.0032	0.0002	0.0001	0.0003	0.0008	16.4294	0.0003	0.0026	17.1299
Export from Shafter-Wasco to Deer Creek	15,200	0.0003	0.0060	0.0248	0.0003	0.0003	0.0006	0.0013	0.0049	0.0003	0.0002	0.0005	0.0012	25.4824	0.0005	0.0040	26.5688
Total (all sites)	25,000	0.0004	0.0098	0.0409	0.0004	0.0005	0.0010	0.0022	0.0080	0.0005	0.0002	0.0008	0.0020	41.9118	0.0009	0.0067	43.6987

Source: Collins, Alex, Provost & Pritchard, Electronic Mail Message to Chris Park, CDM Smith, *Subject: RE: APE exhibits, Pump Back* , February 16, 2021.

Assumptions

14.75 miles per trip (CalEEMod default assumption, San Joaquin Valley Air Basin, Rural Trip Length, Home-Work)
2 trips per day

Source: CAPCOA. 2022. *California Emissions Estimator Model User's Guide, Appendix G: Default Data Tables* . April. Available: <https://www.caleemod.com/user-guide>, accessed February 28, 2024, worksheet G-15.

Vehicle Types for Construction Workers

LDA
LDT1
LDT2
MDV

Vehicle Types for Haul Trucks

T7 Single Dump Class 8
(Diesel and natural gas)

Construction Schedule Assumptions

10 hours per day
6 work days per week
26 work days per month
5.5 months per site
3 sites

Source: Collins, Alex, Provost & Pritchard, Electronic Mail Message to Chris Park, CDM Smith, *Subject: RE: APE exhibits, Pump Back* , February 16, 2021.

Global Warming Potential

CO21
CH428
N2O265

Table 9. Proposed Project and Low Flow Alternative Mitigated Onsite Construction Equipment Emission Factors (lb/hp-hr)

Equipment	Fuel Type	Estimated HP	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Excavator	Diesel	53	7.47E-04	8.01E-03	6.49E-03	1.19E-05	1.41E-04	1.30E-04	3.71E-01	3.67E-05	3.42E-05
Backhoe	Diesel	39	9.82E-04	1.01E-02	8.22E-03	1.19E-05	3.63E-04	3.34E-04	3.71E-01	3.67E-05	3.42E-05
Bulldozer	Diesel	111	5.74E-04	6.62E-03	4.26E-03	1.07E-05	1.05E-04	9.62E-05	3.33E-01	3.30E-05	3.07E-05
Compactor	Diesel	32	8.72E-04	9.45E-03	8.06E-03	1.19E-05	3.39E-04	3.12E-04	3.71E-01	3.67E-05	3.42E-05
Generator	Diesel	222	1.12E-04	8.17E-04	2.46E-04	3.29E-06	7.73E-06	7.11E-06	1.04E-01	1.04E-05	9.64E-06
Water Truck	Diesel	181	2.83E-06	6.51E-05	2.71E-04	2.83E-06	7.78E-05	2.32E-05	3.06E-01	6.27E-06	4.86E-05
Crane	Diesel	84	2.66E-04	6.25E-03	5.15E-03	1.19E-05	1.75E-04	1.61E-04	3.71E-01	3.67E-05	3.42E-05
Paddle wheel scraper	Diesel	183	2.86E-04	2.29E-03	1.96E-03	1.07E-05	8.74E-05	8.04E-05	3.33E-01	3.30E-05	3.07E-05
Blade scraper	Diesel	83	2.52E-04	7.40E-03	6.30E-03	1.19E-05	4.74E-04	4.36E-04	3.71E-01	3.67E-05	3.42E-05
Misc. gas powered hand tools	Gasoline	10	1.94E-03	2.46E-01	4.98E-03	1.13E-05	6.38E-05	4.82E-05	9.26E-01	4.32E-04	2.23E-04

Source: Sa, Trevor, Provost & Pritchard, Electronic Mail Message to Anusha Kashyap, CDM Smith, Subject: RE: APE exhibits, Pump Back, March 10, 2021.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Average horsepower for gasoline hand tools estimated based on typical construction equipment

Table 10. Proposed Project and Low Flow Alternative Mitigated Daily Onsite Construction Equipment Emissions by Pollutant

Equipment	Quantity	Estimated HP	ROG (lb/day)	CO (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Excavator	2	53	0.79	8.49	6.88	0.01	0.15	0.14
Backhoe	1	39	0.38	3.93	3.20	0.00	0.14	0.13
Bulldozer	1	111	0.64	7.35	4.73	0.01	0.12	0.11
Compactor	2	32	0.56	6.05	5.16	0.01	0.22	0.20
Generator	2	222	0.50	3.63	1.09	0.01	0.03	0.03
Water Truck	2	181	0.01	0.24	0.98	0.01	0.28	0.08
Crane	1	84	0.22	5.25	4.32	0.01	0.15	0.14
Paddle wheel scraper	1	183	0.52	4.19	3.59	0.02	0.16	0.15
Blade scraper	1	83	0.21	6.14	5.23	0.01	0.39	0.36
Misc. gas powered hand tools	1	10	0.19	24.59	0.50	0.00	0.01	0.00
Total (per site)			4.03	69.86	35.69	0.10	1.65	1.34
Total (all sites)			12.08	209.58	107.06	0.31	4.94	4.02

Sources:

Sa, Trevor, Provost & Pritchard, Electronic Mail Message to Anusha Kashyap, CDM Smith, Subject: RE: APE exhibits, Pump Back, March 10, 2021.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Key:

tpy = tons per year; MT/yr = metric tons per year

Table 11. Proposed Project and Low Flow Alternative Mitigated Annual Onsite Construction Equipment Emissions by Pollutant

Equipment	Quantity	Estimated HP	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Excavator	2	53	0.06	0.61	0.49	0.00	0.01	0.01	25.48	0.00	0.00	26.17
Backhoe	1	39	0.03	0.28	0.23	0.00	0.01	0.01	9.37	0.00	0.00	9.63
Bulldozer	1	111	0.05	0.53	0.34	0.00	0.01	0.01	24.00	0.00	0.00	24.65
Compactor	2	32	0.04	0.43	0.37	0.00	0.02	0.01	15.38	0.00	0.00	15.80
Generator	2	222	0.04	0.26	0.08	0.00	0.00	0.00	30.07	0.00	0.00	30.89
Water Truck	2	181	0.00	0.02	0.07	0.00	0.02	0.01	71.92	0.00	0.01	74.99
Crane	1	84	0.02	0.38	0.31	0.00	0.01	0.01	20.19	0.00	0.00	20.74
Paddle wheel scraper	1	183	0.04	0.30	0.26	0.00	0.01	0.01	39.56	0.00	0.00	40.64
Blade scraper	1	83	0.01	0.44	0.37	0.00	0.03	0.03	19.95	0.00	0.00	20.49
Misc. gas powered hand tools	1	10	0.01	1.76	0.04	0.00	0.00	0.00	6.00	0.00	0.00	6.46
Total (per site)			0.29	4.99	2.55	0.01	0.12	0.10	261.93	0.02	0.03	270.46
Total (all sites)			0.86	14.98	7.65	0.02	0.35	0.29	785.78	0.07	0.09	811.39

Sources:

Sa, Trevor, Provost & Pritchard, Electronic Mail Message to Anusha Kashyap, CDM Smith, Subject: RE: APE exhibits, Pump Back, March 10, 2021.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Key:

tpy = tons per year; MT/yr = metric tons per year

Model Year 2014 (all equipment are this model year or newer)

Construction Schedule Assumptions

10 hours per day
6 work days per week
26 work days per month
5.5 months per site
3 sites

Source: Collins, Alex, Provost & Pritchard, Electronic Mail Message to Chris Park, CDM Smith, Subject: RE: APE exhibits, Pump Back, February 16, 2021.

Construction Schedule Range:

8-10 hours per day
5-6 days per week
5-6 months per site (work may or may not happen concurrently depending on how contract/funding is setup)

Global Warming Potential

CO2 1
CH4 28
N2O 265

Fugitive Dust Emissions - Grading

Operating Schedule

1 scrapers
7.1 miles per hour (AP-42, Table 11.9-3)
10 hours per day (per site)
71 miles per day
143 miles per year

Equations (AP-42, Chapter 11.9):

$$TSP = 0.040(S)^{2.5} \quad \text{and} \quad PM_{15} = 0.051(S)^{2.0}$$

where:

S = mean vehicle speed, miles per hour

Scaling Factors

PM₁₀ 0.60 (multiply the 15-micron equation by this fraction to determine emissions)
PM_{2.5} 0.031 (multiply the TSP equation by this fraction to determine emissions)

Table 12. Proposed Project and Low Flow Alternative Grading Emissions

Size	EF	Emissions	
	lb/VMT	lbs/day	tpy
PM ₁₀	1.54	42.7	0.04
PM _{2.5}	0.17	4.6	0.00

Dust Control

61% reduction from watering at least 3 times per day

Source: CalEEMod

Fugitive Dust Emissions - Bulldozing

Operating Schedule

1 bulldozers
10 hours per day (per site)
1,430 hours per year (per site)

Equations (AP-42, Chapter 11.9):

$$TSP = \frac{5.7(s)^{1.2}}{M^{1.3}} \quad \text{and} \quad PM_{15} = \frac{1.0(s)^{1.5}}{M^{1.4}}$$

where:

s = silt content 6.9 %
M = material moisture content 7.9 %

Source: CAPCOA. 2022. *California Emissions Estimator Model User's Guide, Appendix C: Calculation Details for CalEEMod*. April.
Available: <https://www.caleemod.com/user-guide>, accessed February 28, 2024, pages C-12 through C-13.

Scaling Factors

PM10 0.75 (multiply the 15-micron equation by this fraction to determine emissions)
PM2.5 0.105 (multiply the TSP equation by this fraction to determine emissions)

Table 13. Proposed Project and Low Flow Alternative Bulldozing Emissions

Size	EF	Emissions	
	lb/hr	lbs/day	tpy
PM10	0.75	2.9	0.21
PM2.5	0.41	1.6	0.12

Dust Control

61% reduction from watering at least 3 times per day

Source: CalEEMod

Fugitive Dust Emissions - Material Handling

Excavated Volume

5,300 cubic yards per year
37 cubic yards per day

Equation (AP-42, Chapter 13.2.4):

$$E = k(0.0032) \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

where:

E = emission factor, pound per ton
k = particle size multiplier
U = mean wind speed, miles per hour
M = material moisture content, %

Average Wind Speed 2.7 meters per second
6.04 miles per hour

Source: CAPCOA. 2022. *California Emissions Estimator Model User's Guide, Appendix C: Calculation Details for CalEEMod*. April.
Available: <https://www.caleemod.com/user-guide>, accessed February 28, 2024, pages C-14.

Material Moisture Content: 12 %

Source: CAPCOA. 2017. *California Emissions Estimator Model User's Guide, Appendix A: Calculation Details for CalEEMod*.
October. Available: <http://www.caleemod.com/>, accessed March 18, 2021, page A-11.

Table 14. Material Handling Emissions

Size	k	EF	Emissions	
		lb/ton	lbs/day	tpy
PM10	0.35	1.2E-04	0.00421	0.00030
PM2.5	0.053	1.8E-05	0.00064	0.00005

Operating Schedule

1 shift per day
6 days per week
143 days per year

Density

1.25 tons per cubic yard

Note: CalEEMod assumes haul trucks can handle 20 tons or 16 cy.

Number of Drops

2 drops per truck (one drop at borrow site and one drop at pump site)

Dust Control

61% reduction from watering at least 3 times per day

Source: CalEEMod

Table 15. Seasonal Alternative Unmitigated Emissions Summary

Source	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Off-Road Construction Equipment	0.00	0.05	0.01	0.00	0.00	0.00	1	0.00	0.00	1
Construction Worker Commuting	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0
On-Road Haul Trucks and Delivery Vehicles	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.06
Lake Woollomes Total	0.00	0.05	0.01	0.00	0.00	0.00	1	0.00	0.00	1
Shafter-Wasco Total	0.00	0.05	0.01	0.00	0.00	0.00	1	0.00	0.00	1
Grand Total	0.00	0.10	0.02	0.00	0.00	0.00	3	0.00	0.00	3
SJVAPCD CEQA Significance Threshold	10	100	10	27	15		n/a	n/a	n/a	n/a
Exceed CEQA Significance Threshold?	No	No	No	No	No	No	n/a	n/a	n/a	n/a

Notes:

1. Totals may not add exactly because of rounding.
2. While the region is designated attainment for the SO2 standard, the region is designated nonattainment for PM2.5. Because SO2 is a precursor to PM2.5, it is subject to the same *de minimis* threshold as PM2.5
3. The Bakersfield urban area is the only area designated maintenance for CO in Kern and Tulare Counties. Although the projects are not located in this area, the *de minimis* threshold is still used to be conservative.

Table 16. Seasonal Alternative Mitigated Emissions Summary

Source	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Off-Road Construction Equipment	0.00	0.08	0.01	0.00	0.00	0.00	1	0.00	0.00	1
Construction Worker Commuting	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0
On-Road Haul Trucks and Delivery Vehicles	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.06
Lake Woollomes Total	0.00	0.08	0.01	0.00	0.00	0.00	1	0.00	0.00	1
Shafter-Wasco Total	0.00	0.08	0.01	0.00	0.00	0.00	1	0.00	0.00	1
Grand Total	0.00	0.16	0.01	0.00	0.00	0.00	2	0.00	0.00	2
SJVAPCD CEQA Significance Threshold	10	100	10	27	15	15	n/a	n/a	n/a	n/a
Exceed CEQA Significance Threshold?	No	No	No	No	No	No	n/a	n/a	n/a	n/a

Notes:

1. Totals may not add exactly because of rounding.
 minimis threshold as PM2.5

3. The Bakersfield urban area is the only area designated maintenance for CO in Kern and Tulare Counties. Although the projects are not located in this area, the *de minimis* threshold is still used to be conservative.

4. Mitigated emissions of CO would be higher than unmitigated emissions due to newer equipment trading-off higher CO emissions for reduced NOx emissions in engine design and specifications.

Table 17. Seasonal Alternative Unmitigated Onsite Construction Equipment Emission Factors (lb/hp-hr)

Equipment	Fuel Type	Estimated HP	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Flatbed Truck	Diesel	181	2.83E-06	6.51E-05	2.71E-04	2.83E-06	7.78E-05	2.32E-05	3.06E-01	6.27E-06	4.86E-05
Crane	Diesel	84	1.21E-03	9.79E-03	1.07E-02	1.77E-05	7.24E-04	6.66E-04	5.49E-01	5.44E-05	5.07E-05
Misc. gas powered hand tools	Gasoline	10	1.26E-03	1.31E-01	3.07E-03	1.13E-05	6.42E-05	4.85E-05	9.31E-01	3.72E-04	1.92E-04

Source: CDM Smith. Project description.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Average horsepower for gasoline hand tools estimated based on typical construction equipment

Table 18. Seasonal Alternative Unmitigated Daily Onsite Construction Equipment Emissions by Pollutant

Equipment	Quantity	Estimated HP	ROG (lb/day)	CO (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Flatbed Truck	1	181	0.01	0.12	0.49	0.01	0.14	0.04
Crane	1	84	1.01	8.22	8.97	0.01	0.61	0.56
Misc. gas powered hand tools	3	10	0.377107	39.28	0.92	0.00	0.02	0.01
Total (per site)			1.40	47.62	10.38	0.02	0.77	0.62
Total (all sites)			2.79	95.23	20.76	0.05	1.54	1.23

Source: CDM Smith. Project description.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Key:

tpy = tons per year; MT/yr = metric tons per year

Table 19. Seasonal Alternative Unmitigated Annual Onsite Construction Equipment Emissions by Pollutant

Equipment	Quantity	Estimated HP	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Flatbed Truck	1	181	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.52
Crane	1	84	0.00	0.01	0.01	0.00	0.00	0.00	0.42	0.00	0.00	0.43
Misc. gas powered hand tools	3	10	0.00	0.04	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.27
Total (per site)			0.00	0.05	0.01	0.00	0.00	0.00	1.17	0.00	0.00	1.22
Total (all sites)			0.00	0.10	0.02	0.00	0.00	0.00	2.35	0.00	0.00	2.45

Source: CDM Smith. Project description.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Key:

tpy = tons per year; MT/yr = metric tons per year

Construction Schedule Assumptions

10 hours per day

2 work days per month

1 months per site

2 sites

Source: CDM Smith. Project description.

Global Warming Potential

CO2	1
CH4	28
N2O	265

Table 20. Seasonal Alternative Onroad Vehicle Emission Factors (grams per mile)

Source	ROG	CO	NOx	SOx	PM10 Exhaust	PM10 Tire Wear	PM10 Brake Wear	PM10 Paved Road Dust	PM2.5 Exhaust	PM2.5 Tire Wear	PM2.5 Brake Wear	PM2.5 Paved Road Dust	CO2	CH4	N2O
Construction Workers	0.0143	0.9945	0.0802	0.0033	0.0014	0.0080	0.0075	0.2921	0.0013	0.0020	0.0026	0.0730	329.4245	0.0035	0.0069
Haul Trucks	0.0155	0.3561	1.4828	0.0155	0.0175	0.0360	0.0804	0.2921	0.0167	0.0090	0.0281	0.0730	1,676.4732	0.0343	0.2661

Table 21. Seasonal Alternative Offsite Construction Emissions - Construction Worker Commuting

Worker	Peak No. per Day	Vehicle Miles Traveled (mi/year)	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 Exhaust (tpy)	PM10 Tire Wear (tpy)	PM10 Brake Wear (tpy)	PM10 Paved Road Dust (tpy)	PM2.5 Exhaust (tpy)	PM2.5 Tire Wear (tpy)	PM2.5 Brake Wear (tpy)	PM2.5 Paved Road Dust (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Misc. Laborer	2	118.0	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0389	0.0000	0.0000	0.0391
Total (per site)	2	118.0	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0389	0.0000	0.0000	0.0391
Total (all sites)	4	236.0	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0777	0.0000	0.0000	0.0782

Source: CDM Smith. Project description.

Table 22. Seasonal Alternative Offsite Construction Emissions - Haul Trucks

Site	Vehicle Miles Traveled (mi/year)	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 Exhaust (tpy)	PM10 Tire Wear (tpy)	PM10 Brake Wear (tpy)	PM10 Paved Road Dust (tpy)	PM2.5 Exhaust (tpy)	PM2.5 Tire Wear (tpy)	PM2.5 Brake Wear (tpy)	PM2.5 Paved Road Dust (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Vendor Delivery to Lake Woollomes	33	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0545	0.0000	0.0000	0.0568
Vendor Delivery to Shafter-Wasco	33	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0545	0.0000	0.0000	0.0568
Total (all sites)	65	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1090	0.0000	0.0000	0.1137

Source: CDM Smith. Project description.

Notes:

1. Totals may not add exactly because of rounding.

Assumptions

14.75 miles per worker trip (CalEEMod default assumption, San Joaquin Valley Air Basin, Rural Trip Length, Home-Work)

8.13 miles per vendor trip (CalEEMod default assumption, San Joaquin Valley Air Basin, Rural Trip Length, Home-Work)

2 trips per day

Source: CAPCOA. 2022. *California Emissions Estimator Model User's Guide, Appendix G: Default Data Tables* . April. Available: <https://www.caleemod.com/user-guide>, accessed February 28, 2024, worksheet G-15.

Vehicle Types for Construction Workers

LDA

LDT1

LDT2

MDV

Vehicle Types for Haul Trucks

T7 Single Dump Class 8

(Diesel and natural gas)

Construction Schedule Assumptions

10 hours per day

2 work days per month

1 months per site

2 sites

Source: CDM Smith. Project description.

Global Warming Potential

CO2	1
CH4	28
N2O	265

Table 23. Seasonal Alternative Mitigated Onsite Construction Equipment Emission Factors (lb/hp-hr)

Equipment	Fuel Type	Estimated HP	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Flatbed Truck	Diesel	181	2.83E-06	6.51E-05	2.71E-04	2.83E-06	7.78E-05	2.32E-05	3.06E-01	6.27E-06	4.86E-05
Crane	Diesel	84	2.66E-04	6.25E-03	5.15E-03	1.19E-05	1.75E-04	1.61E-04	3.71E-01	3.67E-05	3.42E-05
Misc. gas powered hand tools	Gasoline	10	1.94E-03	2.46E-01	4.98E-03	1.13E-05	6.38E-05	4.82E-05	9.26E-01	4.32E-04	2.23E-04

Source: CDM Smith. Project description.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Average horsepower for gasoline hand tools estimated based on typical construction equipment

Table 24. Seasonal Alternative Mitigated Daily Onsite Construction Equipment Emissions by Pollutant

Equipment	Quantity	Estimated HP	ROG (lb/day)	CO (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Flatbed Truck	1	181	0.01	0.12	0.49	0.01	0.14	0.04
Crane	1	84	0.22	5.25	4.32	0.01	0.15	0.14
Misc. gas powered hand tools	3	10	0.58	73.78	1.49	0.00	0.02	0.01
Total (per site)			0.81	79.15	6.31	0.02	0.31	0.19
Total (all sites)			1.62	158.29	12.62	0.04	0.61	0.38

Source: CDM Smith. Project description.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Key:

tpy = tons per year; MT/yr = metric tons per year

Table 25. Seasonal Alternative Mitigated Annual Onsite Construction Equipment Emissions by Pollutant

Equipment	Quantity	Estimated HP	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Flatbed Truck	1	181	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.52
Crane	1	84	0.00	0.01	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.29
Misc. gas powered hand tools	3	10	0.00	0.07	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.27
Total (per site)			0.00	0.08	0.01	0.00	0.00	0.00	1.04	0.00	0.00	1.09
Total (all sites)			0.00	0.16	0.01	0.00	0.00	0.00	2.07	0.00	0.00	2.17

Source: CDM Smith. Project description.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Key:

tpy = tons per year; MT/yr = metric tons per year

Model Year 2014 (all equipment are this model year or newer)

Construction Schedule Assumptions

- 10 hours per day
- 2 work days per month
- 1 months per site
- 2 sites

Source: CDM Smith. Project description.

Global Warming Potential

CO2	1
CH4	28
N2O	265

Paved Road Dust Emission Factor Calculation

Equation 1:

$$E = k(sL)^{0.91} \times (W)^{1.02}$$

where: E = particulate emission factor (having units matching the units of k),
 k = particle size multiplier for particle size range and units of interest (see below),
 sL = road surface silt loading (grams per square meter) (g/m²), and
 W = average weight (tons) of the vehicles traveling the road.

Equation 2:

$$E_{ext} = [k(sL)^{0.91} \times (W)^{1.02}] (1 - P/4N)$$

where: k, sL, and W are as defined in Equation 1 and
 E_{ext} = annual or other long-term average emission factor in the same units as k,
 P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging
 N = number of days in the averaging period (e.g., 365 for annual, 91 for seasonal, 30 for monthly).

Table 26. Particle Size Multipliers for Paved Road Equation

Size Range [a]	Ref.	Particle Size Multiplier, k [b]		
		g/VKT	g/VMT	lb/VMT
PM _{2.5}	[c]	0.15	0.25	0.00054
PM ₁₀		0.62	1.00	0.0022
PM ₁₅		0.77	1.23	0.0027
PM ₃₀	[d]	3.23	5.24	0.011

Source: USEPA. 2011. *Compilation of Air Pollutant Emission Factors (AP-42). Fifth Edition, Volume I. Chapter 13.2.1 Paved Roads.* January. Available: https://www.epa.gov/sites/production/files/2020-10/documents/13.2.1_paved_roads.pdf, accessed March 18, 2021.

Notes:

[a] Refers to airborne particulate matter (PM-x) with an aerodynamic diameter equal to or less than x micrometers.

traveled (lb/VMT). The multiplier k includes unit conversions to produce emission factors in the units shown for the indicated size range from the

[c] The k-factors for PM_{2.5} were based on the average PM_{2.5}:PM₁₀ ratio of test runs in Reference 30 in USEPA 2011.

[d] PM-30 is sometimes termed "suspendable particulate" (SP) and is often used as a surrogate for TSP.

Offsite Construction Vehicles

Number precipitation days >0.1 inches (P)

San Joaquin Valley Air Basin 16

Construction duration (N) 143 days

Road silt loading (sL) 0.1 g/m² (CalEEMod assumption)

Average vehicle weight (W) 2.4 tons

Source: CAPCOA. 2022. *California Emissions Estimator Model User's Guide, Appendix G: Default Data Tables.* April. Available: <https://www.caleemod.com/user-guide>, accessed February 28, 2024, worksheet G-2.

Paved Road Dust Emission Factors - Offsite Construction Vehicles

PM₁₀ 0.2921 g/VMT

PM_{2.5} 0.0730 g/VMT

Operational Emissions

Table 27. Proposed Project and Low Flow Alternative Purchased Electricity Emissions

Source	Electricity (MWh/year)	Annual Emissions (MT/year)			Annual Emissions (MTCO2e/year)			
		CO2	CH4	N2O	CO2	CH4	N2O	CO2e
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	14,928	667	0.217	0.027	667	6	7	680

CO2 Emission Factor Source: The Climate Registry. 2023. *2023 Default Emission Factors*, 2021 Emission Rates, Pacific Gas & Electric. Available online at <https://theclimateregistry.org/wp-content/uploads/2023/06/2023-Default-Emission-Factors-Final-1.pdf> [Accessed on March 11, 2024].

CH4 and N2O Emission Factor Source: The Climate Registry. 2023. U.S. Green-e(R) Residual Mix Emission Rates by eGRID Subregion, 2020 Emission Rates. Available online at <https://theclimateregistry.org/wp-content/uploads/2023/06/2023-Default-Emission-Factors-Final-1.pdf> [Accessed on March 11, 2024].

Table 28. Proposed Project and Low Flow Alternative GHG Emissions Comparison to CEQA Threshold

Source	Operations, MTCO2e/yr	Total, MTCO2e/yr
Deer Creek	57	57
Lake Woollomes	178	178
Shafter-Wasco	446	446
Total Emissions	680	680
CEQA Threshold		10,000
Significant?		No

Project Lifetime

50 years

Operation Range

Shafter-Wasco 3,951,000 - 9,784,000 kWh/year

Lake Woollomes 1,730,000-3,899,000 kWh/year

Deer Creek 863,000-1,245,000 kWh/year

Source: Sa, Trevor, Provost & Pritchard, Electronic Mail Message to Anusha Kashyap, CDM Smith, *Subject: FW: APE exhibits, Pump Back*, March 24, 2021.

GWP

CO2 1

CH4 28

N2O 265

Source: EPA. 2024. *GHG Emission Factors Hub*. Available: <https://www.epa.gov/climateleadership/ghg-emission-factors-hub/>, accessed February 29, 2024. Table 11

Operational Emissions

Table 29. Seasonal Alternative (Grid) Purchased Electricity Emissions

Source	Electricity (MWh/year)	Annual Emissions (MT/year)			Annual Emissions (MTCO2e/year)			
		CO2	CH4	N2O	CO2	CH4	N2O	CO2e
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	0	0	30
Shafter-Wasco	1,360	61	0.020	0.002	61	1	1	62
Total	2,015	90	0.029	0.004	90	1	1	92

CO2 Emission Factor Source: The Climate Registry. 2023. 2023 Default Emission Factors, 2021 Emission Rates, Pacific Gas & Electric. Available online at <https://theclimateregistry.org/wp-content/uploads/2023/06/2023-Default-Emission-Factors-Final-1.pdf> [Accessed on March 11, 2024].

CH4 and N2O Emission Factor Source: The Climate Registry. 2023. U.S. Green-e(R) Residual Mix Emission Rates by eGRID Subregion, 2020 Emission Rates. Available online at <https://theclimateregistry.org/wp-content/uploads/2023/06/2023-Default-Emission-Factors-Final-1.pdf> [Accessed on March 11, 2024].

Table 30. Seasonal Alternative (Grid) GHG Emissions Comparison to CEQA Threshold

Source	Operations, MTCO2e/yr	Total, MTCO2e/yr
Lake Woollomes	30	30
Shafter-Wasco	62	62
Total Emissions	92	92
CEQA Threshold		10,000
Significant?		No

Note: Construction emissions amortized over lifetime of the project.

Project Lifetime

50 years

Operation Range

Shafter-Wasco 1,360,000 kWh/year

Deer Creek 655,000 kWh/year

Source: Sa, Trevor, Provost & Pritchard, Electronic Mail Message to Anusha Kashyap, CDM Smith, *Subject: FW: APE exhibits, Pump Back*, March 24, 2021.

GWP

CO2 1

CH4 28

N2O 265

Source: EPA. 2024. *GHG Emission Factors Hub*. Available: <https://www.epa.gov/climateleadership/ghg-emission-factors-hub/>, accessed February 29, 2024. Table 11

Table 31. Seasonal Alternative (Generators) Operations-Related Emissions Summary

Source	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Operations-related Equipment	0.42	3.03	1.08	0.01	0.06	0.05	1,317	0.13	0.12	1,352
Maintenance Worker Commuting	0.00	0.02	0.00	0.00	0.01	0.00	7	0.00	0.00	7
Grand Total	0.42	3.05	1.08	0.01	0.07	0.06	1,324	0.13	0.12	1,360
SJVAPCD CEQA Significance Threshold	10	100	10	27	15		n/a	n/a	n/a	n/a
Exceed CEQA Significance Threshold?	No	No	No	No	No	No	n/a	n/a	n/a	n/a

Notes:

1. Totals may not add exactly because of rounding.

2. While the region is designated attainment for the SO2 standard, the region is designated nonattainment for PM2.5. Because SO2 is a precursor to PM2.5, it is subject to the same *de minimis* threshold as PM2.5

3. The Bakersfield urban area is the only area designated maintenance for CO in Kern and Tulare Counties. Although the projects are not located in this area, the *de minimis* threshold is still used to be conservative.

Table 32. Seasonal Alternative Operations-Related Equipment Emission Factors (lb/hp-hr)

Equipment	Fuel Type	Estimated HP	Hours/Year	ROG	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O
Generator	Diesel	400	n/a	1.04E-04	7.40E-04	2.63E-04	3.29E-06	1.41E-05	1.30E-05	3.55E-01	3.52E-05	3.28E-05

Source: CDM Smith. Project description.

Note:

Horsepower estimated based on the weighted average horsepower by equipment population for each equipment and fuel combination.

Average horsepower for gasoline hand tools estimated based on typical construction equipment

Table 33. Seasonal Alternative Operations-Related Equipment Emissions by Pollutant

Equipment	Quantity	Estimated HP	Hours per Year per Unit	ROG (lb/yr)	CO (lb/yr)	NOx (lb/yr)	SOx (lb/yr)	PM10 (lb/yr)	PM2.5 (lb/yr)	CO2 (lb/yr)	CH4 (lb/yr)	N2O (lb/yr)
Generators - Shafter-Wasco	4	400	3,650	605.50	4,322.74	1,537.61	19.20	82.50	75.90	2,073,201	205.69	191.44
Generators - Lake Woollomes	2	400	2,920	242.20	1,729.10	615.05	7.68	33.00	30.36	829,280	82.28	76.57
Total (all sites)				847.70	6,051.84	2,152.66	26.88	115.51	106.26	2,902,481	287.97	268.01

Source: CDM Smith. Project description.

Key:

tpy = tons per year; MT/yr = metric tons per year

Table 34. Operations-Related Equipment Emissions by Pollutant

Equipment	Quantity	Estimated HP	Hours per Year per Unit	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 (tpy)	PM2.5 (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Generators - Shafter-Wasco	4	400	3,650	0.30	2.16	0.77	0.01	0.04	0.04	940	0.09	0.09	966
Generators - Lake Woollomes	2	400	2,920	0.12	0.86	0.31	0.00	0.02	0.02	376	0.04	0.03	386
Total (all sites)				0.42	3.03	1.08	0.01	0.06	0.05	1317	0.13	0.12	1,352

Source: CDM Smith. Project description.

Key:
tpy = tons per year; MT/yr = metric tons per year

Global Warming Potential

CO2	1
CH4	28
N2O	265

Source: EPA. 2024. GHG Emission Factors Hub . Available: <https://www.epa.gov/climateleadership/ghg-emission-factors-hub/>, accessed February 29, 2024. Table 11

Table 35. Seasonal Alternative Operations-Related Onroad Vehicle Emission Factors (grams per mile)

Source	ROG	CO	NOx	SOx	PM10 Exhaust	PM10 Tire Wear	PM10 Brake Wear	PM10 Paved Road Dust	PM2.5 Exhaust	PM2.5 Tire Wear	PM2.5 Brake Wear	PM2.5 Paved Road Dust	CO2	CH4	N2O
Maintenance Workers	0.0143	0.9945	0.0802	0.0033	0.0014	0.0080	0.0075	0.2921	0.0013	0.0020	0.0026	0.0730	329.4245	0.0035	0.0069

Table 36. Seasonal Alternative Operations-Related Offsite Emissions - Maintenance Worker Commuting

Worker	Peak No. per Day	Vehicle Miles Traveled (mi/year)	ROG (tpy)	CO (tpy)	NOx (tpy)	SOx (tpy)	PM10 Exhaust (tpy)	PM10 Tire Wear (tpy)	PM10 Brake Wear (tpy)	PM10 Paved Road Dust (tpy)	PM2.5 Exhaust (tpy)	PM2.5 Tire Wear (tpy)	PM2.5 Brake Wear (tpy)	PM2.5 Paved Road Dust (tpy)	CO2 (MT/yr)	CH4 (MT/yr)	N2O (MT/yr)	CO2e (MT/yr)
Misc. Laborer	1	10,767.5	0.0002	0.0118	0.0010	0.0000	0.0000	0.0001	0.0001	0.0035	0.0000	0.0000	0.0000	0.0009	3.5471	0.0000	0.0001	3.5677
Total (per site)	1	10,767.5	0.0002	0.0118	0.0010	0.0000	0.0000	0.0001	0.0001	0.0035	0.0000	0.0000	0.0000	0.0009	3.5471	0.0000	0.0001	3.5677
Total (all sites)	2	21,535.0	0.0003	0.0236	0.0019	0.0001	0.0000	0.0002	0.0002	0.0069	0.0000	0.0000	0.0001	0.0017	7.0942	0.0001	0.0001	7.1355

Source: CDM Smith. Project description.

Assumptions

14.75 miles per worker trip (CalEEMod default assumption, San Joaquin Valley Air Basin, Rural Trip Length, Home-Work)
2 trips per day

Source: CAPCOA. 2022. *California Emissions Estimator Model User's Guide, Appendix G: Default Data Tables*. April. Available: <https://www.caleemod.com/user-guide>, accessed February 28, 2024, worksheet G-15.

Vehicle Types for Maintenance Workers

LDA
LDT1
LDT2
MDV

Global Warming Potential

CO2 1
CH4 28
N2O 265

Source: EPA. 2024. *GHG Emission Factors Hub*. Available: <https://www.epa.gov/climateleadership/ghg-emission-factors-hub/>, accessed February 29, 2024. Table 11